

Technical Report

Professional Services

Delaware Valley Regional Planning Commission New Jersey Traffic Signal Retiming Initiative

Quakerbridge Road, Mercer County Route 533

From Sloan Avenue/Flock Road to Province Line Road (CR 569)/Nassau Park
Boulevard, and

Sloan Avenue/Flock Road

From Quakerbridge Road (CR 533) to Fairlawn Avenue/AMC Driveway

In West Windsor, Lawrence & Hamilton Townships Mercer County, New Jersey

November 25, 2019

Prepared For:



Prepared By:



I. Summary

A. *Project Overview*

Under contract with Delaware Valley Regional Planning Commission (DVPRC), in cooperation with Mercer County and the New Jersey Department of Transportation, the Taylor Wiseman & Taylor (TWT) project team has completed traffic signal retiming work at twelve (12) signalized intersections along Quakerbridge Road (Mercer County Route 533), in Hamilton, Lawrence and West Windsor Townships, Mercer County. Additionally, the intersection of Sloan Avenue at Fairlawn Avenue and AMC Driveway was added to the project for a total of thirteen (13) project intersections. This work started in May 2018, following completion of Phase 1 of the contract which evaluated candidate corridors within Mercer County and established a consensus priority list. In accordance with the process jointly established by DVRPC, Mercer County and the TWT team, the updated timing plans were implemented by December 15, 2018, including adjustments to cycle lengths, splits, and offsets, as well as the introduction of additional time-of-day coordination patterns. The corridors were closely monitored through the holiday shopping season, both on weekends and weekdays.

This project involved extensive traffic data collection, including automatic traffic recorder counts, peak hour turning movement counts, controller assessments and 'before' travel time runs. The collected data was analyzed using traffic engineering software including Synchro™ and Tru-Traffic™. New timing plans were developed for the corridor, which were implemented by the consultant team in November/December 2018. Fine-tuning and field observations were conducted throughout implementation, resulting in minor timing changes to those initially implemented. The northern signals on the corridor (Province Line Road/Nassau Park Boulevard and Mercer Mall Drive) were controlled by West Windsor Township Police during the holiday shopping season on weekends and some weeknights, making true evaluation of the signal timing difficult and limited. Final travel time runs were completed in early 2019 and comparisons were made to the 'before' condition. This report summarizes the activities, observations and results of this project.



Photo 1: Looking southbound at Quakerbridge Road and Sloan Avenue.

B. *Results*

With implementation of the 1) updated timing plans, and 2) modifications to the corridor's time-of-day schedule, the TWT team has documented significant reductions in corridor travel times and delay. The TWT team reduced overall weekday morning, mid-day, evening and weekend mid-day peak travel times by 14%, 6%, 5%, and 18%, respectively. Cumulative Delay on the corridor was impacted more dramatically, as overall weekday morning, mid-day, evening and weekend delay was reduced by 41%, 17%, 10% and 39%. Summary results for the corridor are presented in **Table 1**. Detailed results, showing a further breakdown of this data is presented later in this report. The Tru-Traffic™ comparison (before retiming/after implementation) reports for the weekday morning, mid-day and evening, as well as Saturday peak hours are presented in **Appendix A**.

Cumulative Delay
on the Quaker-
bridge Road corri-
dor was reduced in
the weekday morn-
ing time period

41%

Table 1
Before Retiming/After Implementation Results for Quakerbridge Road
From Sloan Avenue/Flock Road to Province Line Road (CR 569)/Nassau Park Boulevard
Quakerbridge Road

West Windsor, Lawrence and Hamilton Townships, Mercer County

Time Period	Travel Time (% Difference)			Cumulative Delay (% Difference)		
	NB	SB	Combined	NB	SB	Combined
Weekday AM	-19%	-9%	-14%	-52%	-30%	-41%
Weekday Mid-Day	-5%	-7%	-6%	-15%	-20%	-17%
Weekday PM	-9%	-2%	-5%	-22%	-3%	-10%
Saturday Mid-Day	-30%	-7%	-18%	-56%	-17%	-39%

C. Project Description

Quakerbridge Road, Mercer County Route 533 is an urban minor arterial with a north to south orientation. The corridor project limits extend approximately 4.02 miles along County Route 533 (Quakerbridge Road) from Sloan Avenue on the southern limit to Province Line Road, CR 589/Nassau Park Boulevard on the northern limit. The project also included the intersection of Sloan Avenue at Fairlawn Avenue and AMC Theater Drive, which is approximately 1,000 feet west of the Quakerbridge Road/Sloan Avenue/Flock Road intersection. Sloan Avenue, within the project limits, is a Mercer County-maintained roadway with no defined designation.

The project area is within the jurisdictions of West Windsor, Lawrence and Hamilton Townships in Mercer County, New Jersey. The project area is accessible to/from US Route 1 to the north and Interstate 295 (Exit 65) via Sloan Avenue to/from the south. The project area is greatly influenced by retail centers (Including, but not limited to Shoppes at AMC, AMC Theater, Clover Square, COSTCO, Quakerbridge Mall, Mercer Mall and the Nassau Park Boulevard complex) but also has stand-alone retail, commercial and residential. Speed limits on the corridor vary from 40 to 50 miles per hour.

It should be noted that Mercer County's construction of an interconnected signal system occurred simultaneously with this project's retiming effort. Mercer County, Department of Transportation and Infrastructure was in the construction phase of a central computer-based Trafficware 2070N controller system at all intersections on Quakerbridge Road in this system. The following is a list of signalized intersections within the project limits:

Within West Windsor Township:

1. □ Quakerbridge Road (CR 533), Province Line Road (CR 569) and Nassau Park Boulevard [MP 8.41]
2. □ Quakerbridge Road (CR 533) and Mercer Mall Driveway
3. □ Quakerbridge Road (CR 533) and Quakerbridge Mall Driveway
4. □ Quakerbridge Road (CR 533) and Clarksville Road (CR 638)
5. □ Quakerbridge Road (CR 533) and Avalon Way
6. □ Quakerbridge Road (CR 533) and Village Road West

Within Lawrence Township:

7. □ Quakerbridge Road (CR 533) and Lawrence Square Boulevard South

Within Hamilton Township:

8. □ Quakerbridge Road (CR 533) and Hughes Drive
9. □ Quakerbridge Road (CR 533) and Youngs Road

- 10. □ Quakerbridge Road (CR 533) and Nami Lane
 - 11. □ Quakerbridge Road (CR 533), Quakerbridge Plaza Drive/Terrill Avenue
 - 12. □ Quakerbridge Road (CR 533) and Sloan Avenue/Flock Road [MP 4.39]
 - 13. □ Sloan Avenue, Fairlawn Avenue and AMC Theater Driveway
- The project corridor location is shown in **Exhibit 1**.

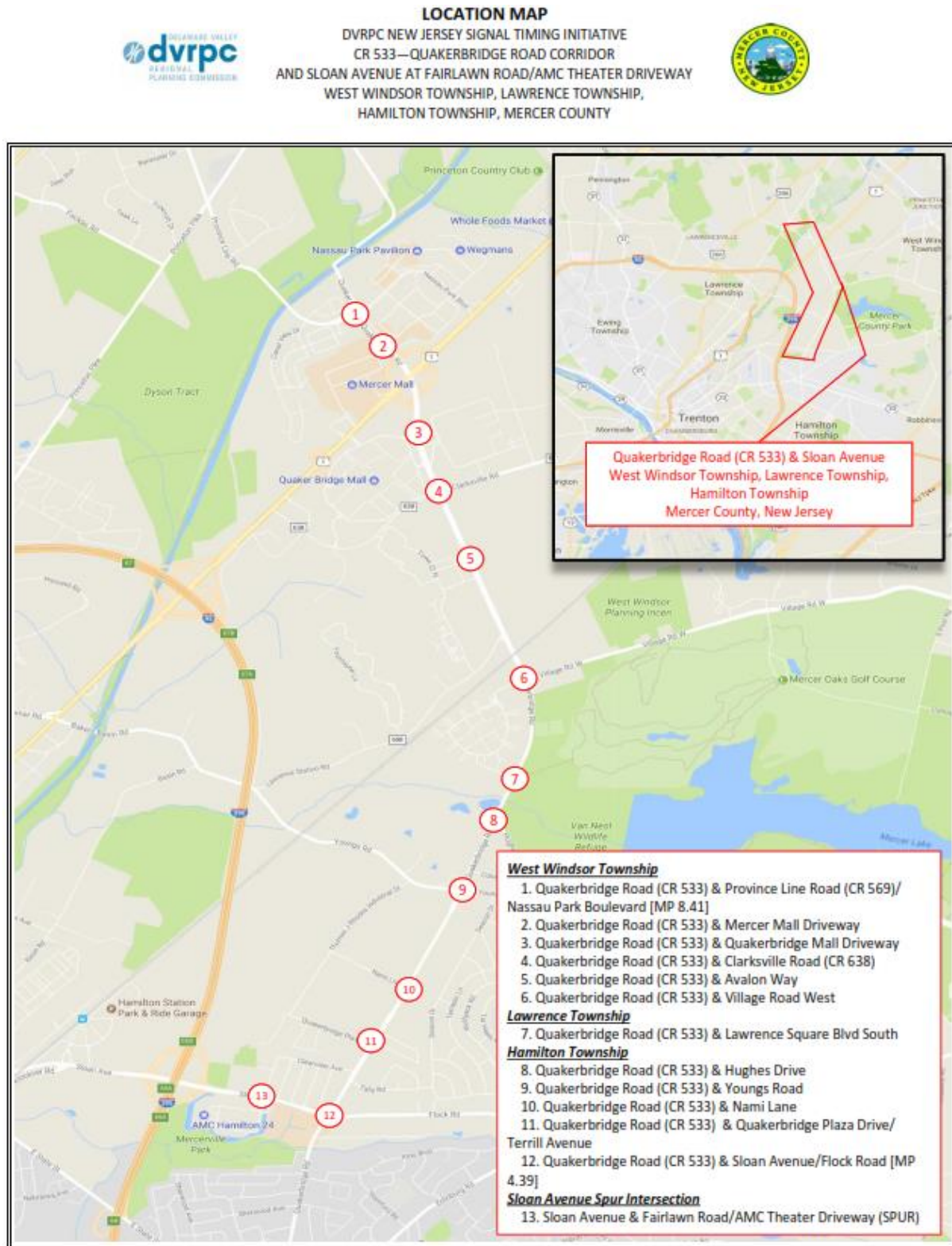


Photo 2: Looking northbound at southbound traffic approaching Clarksville Road (11/1/18) during PM peak hour. Note substantial queuing before retiming.



Photo 3: Looking at southbound left turn queue at Clarksville Road during evening peak hour (11/25/18).

Exhibit 1 – Project Location and Intersections



II. Traffic Data Collection

A. *Turning Movement Counts*

Peak hour intersection counts were conducted at the project intersections during the weekday morning (7:00 am to 9:00 am), weekday mid-day (11:00 am to 1:00 pm) and evening (4:00 pm to 6:00 pm) peak hour periods. Saturday counts were taken between 11:00 am and 1:00 pm. The manual turning movement counts were taken on Thursday, November 16, 2017 and Saturday, November 18, 2017 by the TWT team. The turning movement counts were conducted in advance of other data collection to fully utilize project funds from 2017 funding. The TMCs are available on the project website, <http://www.dvrpc.taylorwiseman.com/>.

B. *Automatic Traffic Recorder (ATR) Counts*

In May/June 2018, automatic traffic recorder counts were taken by the TWT team as summarized in **Table 2**:

Table 2
2018 Average Daily Traffic
Quakerbridge Road, Mercer County Route 533

Location	Average Daily Traffic
Quakerbridge Road, at US Route 1– NB Traffic	17,464 vehicles
Quakerbridge Road, at US Route 1—SB Traffic	15,520 vehicles
Total ADT	32,984 vehicles
Quakerbridge Road, between Avalon Way & Village Road West—NB Traffic	15,842 vehicles
Quakerbridge Road, between Avalon Way & Village Road West—SB Traffic	14,980 vehicles
Total ADT	30,822 vehicles
Quakerbridge Road, between Youngs Way and Nami Lane—NB Traffic	9,809 vehicles
Quakerbridge Road, between Youngs Way and Nami Lane—SB Traffic	10,698 vehicles
Total ADT	20,307 vehicles
Quakerbridge Road, South of Sloan Avenue/Flock Road—NB Traffic	9,438 vehicles
Quakerbridge Road, South of Sloan Avenue/Flock Road—SB Traffic	9,461 vehicles
Total ADT	18,899 vehicles

The twenty-four hour counts clearly show the fluctuation of traffic volumes the project corridor experiences on any given day. The northern segment of the corridor experiences almost twice as much traffic as the southern section of the corridor. The automatic traffic recorder counts are available on the project website: <http://dvrpc.taylorwiseman.com/>.

C. Travel Time Runs

Travel time runs were collected within the project area both before and after initial timing plan implementation. Using a GPS enabled laptop with the software Tru-Traffic™, trip logs were recorded along northbound and southbound Quakerbridge Road. Tru-Traffic™ was also utilized during implementation to fine-tune splits and offsets.

D. Traffic Signal Timing and Phasing Data

Traffic signal timing and phasing data were obtained from the Mercer County Engineering Office. Movement, sequence and timing information, as well as various NEMA settings and time of day/date were field verified in the existing project controllers. The controller units were set to US Navy observatory time utilizing smart phone applications and time variances were noted. Mercer County did not have existing directives for Quakerbridge Road at Quakerbridge Plaza Drive/Terrill Avenue or Sloan Avenue at Fairlawn Avenue and AMC Theater Driveway. The existing timing directives for the remaining eleven project intersections are presented in **Appendix B**.



Photo 4: Controller cabinet at Quakerbridge Road and Clarksville Road, November 2018

E. Field Review of Existing Operations

Field notes were collected at the intersection on various intersection, signal, and traffic characteristics to assist in model development and signal optimization. Information gathered included lane geometry, storage lengths, number and types of signal heads, cabinet and pedestrian push button locations, and signal phasing.



Photo 5: Controller cabinet at Quakerbridge Road and Clarksville Road (May, 2019).

Posted speed limits, left turn types (protected, protected/permitted, or permitted), turn restrictions, and the presence of roadway lighting and signal back plates were noted. Pedestrian push buttons were tested for proper operation during the field review.

Twelve out of thirteen project controllers at the start of the project were Econolite ASC/3-2100 in a NEMA TS-1 configuration. The

controller at Village Road/Lawrence Square Boulevard North was a PEEK3000 in a NEMA TS-1 configuration. All detection on the corridor was functioning at the end of implementation. The controller cabinets, in general, were in good to excellent condition. Immediately following fine tuning, Mercer County upgraded the twelve controllers on Quakerbridge Road, providing Trafficware (formerly known as Naztec) N2070 controllers and system communications. The N2070 timer units provide downward compatibility with NEMA controller assemblies in that “A, B, C and D” connectors are provided. The controller timer at Sloan Avenue at Fairlawn Avenue and AMC Theater Driveway remains as an Econolite ASC/3S.

III. Analysis and Implementation

A. *Modeling*

The TWT Team developed a set of base Synchro™ models for management of the new traffic data, initial analysis of the intersection with and without various timing changes and a screening level review of each intersection’s overall potential for capacity-level improvements using the Intersection Capacity Utilization (ICU) Methodology. Microscopic simulation using SimTraffic™ was used to assess the impact of unmet demand, turn pocket overflow, metering and spillback, and the effects of origin-destination pairs. TruTraffic™ was used to assist in offset determination in order to assess early release issues created when minor phases gap out and unused cycle time is typically sent back to the coordinated phases.

It is important to note that the delay minimization focus of the optimization routine in Synchro™ is helpful to a point in deriving improved cycle lengths and splits; however, this method does not necessarily favor corridor progression and bandwidth requirements. After development of the base models and supplemental evaluations in SimTraffic™, the UTDF file transfer feature with various spreadsheets was used to create base TruTraffic™ models for more in-depth optimization. Synchro summary reports are presented in **Appendix C** of this report.

B. *Implementation*

During the months of November and December 2018, the consultant team implemented the optimized timing plans into the thirteen controllers within the project limits. The consultant team verified that each controller maintained a common time standard.

The TWT team established four subsystems (designated as zones A, B, C & D) within the project area, as represented in **Table 3**. Traffic demand/congestion was very evident at both the northern and southern ends of the corridor. The northern end of the corridor is accessed by US Route 1, a major arterial within Mercer County. To the west of US Route 1, the intersections of Nassau Park Boulevard and Mercer Mall Drive both served major retail centers and provided major operational problems for the TWT team. The Nassau Park Boulevard intersection serves a private road providing access to a major retail center. The center maintains private signals within its complex, which could present a problem for the Quakerbridge Road system. There is a private signal on Nassau Park Boulevard within 500 feet of Quakerbridge Road. This intersection is not coordinated with Quakerbridge Road and during peak shopping times queuing often extends through the private signal. The intersection with Mercer Mall was a source of concern as the northbound left-turn into the Mercer Mall complex often backed up into the thru Quakerbridge Road lanes, causing significant congestion. This backup was caused by both demand and the internal circulation within the Mercer Mall. These two signals were identified by the implementation team as subsystem zone A. During the holiday shopping period these two signals were manually controlled by contracted West Windsor Police.

The second subsystem, designated as zone B, presented as the intersections of Quakerbridge Road with Quakerbridge Mall, Clarksville Road, Avalon Way and Village Road. These intersections handle the tremendous surge of commuter and project area traffic associated with US Route 1. Significant congestion occurs at these intersections, largely due to the surge of commuter traffic. The SB left-turn lane at Clarksville Road is a critical movement within this subsystem.

The third subsystem, designated as zone C, included the Quakerbridge Road intersections with Lawrence Boulevard South, Hughes Drive, Youngs Road, Nami Lane and Quakerbridge Plaza are not remarkable. They typically operated very well with minimal adjustment to the calculated Synchro/Tru-Traffic controller settings.

The fourth subsystem, designated as zone D, was the Sloan Avenue system. Sloan Avenue accommodates a great deal of traffic oriented to/from Interstate 295. During implementation the consultant team implemented a 150 second cycle length during peak periods to move traffic between the limited access highway and Quakerbridge Road.

Table 3
Coordination Subsystems
Quakerbridge Road/Sloan Avenue Corridors, Mercer County NJ
December, 2018

Intersection	Subsystem	Cycle Length			
		AM	Mid-Day	PM	Week-end
Quakerbridge Road & Nassau Park Blvd.	A	80	85	90	90
Mercer Mall Drive					
Quakerbridge Mall Drive	B	115	95	120	120
Clarksville Road					
Avalon Way					
Village Road/Lawrence Square Blvd North	C	85	95	90	80
Lawrence Square Blvd South					
Hughes Drive					
Youngs Road					
Nami Lane					
Quakerbridge Plaza	D	150	100	150	105
Quakerbridge Road & Sloan Avenue					
Sloan Avenue at Fairlawn Avenue & AMC Theater Drive					

It is the understanding of the TWT team that the improvements constructed by Mercer County Department of Transportation and Infrastructure on Quakerbridge Road will include system communications, which should provide a common time synchronization at the Quakerbridge Road signals.

C. Fine-Tuning of Signal Timings

The TWT team observed each new timing plan at every intersection during its respective peak hour to ensure each phase split was appropriate for the traffic conditions present. If a movement or intersection was over capacity, split adjustments were made to manage queue spillback and lane blockage.

In addition to fine-tuning splits, offset adjustments often have a larger effect on the performance of the corridor. Offsets were adjusted at the coordinated intersections by conducting travel time runs along the corridor. During implementation, the TWT team utilized Tru-Traffic™ in conjunction with a direct connect GPS unit to observe the operation of the progressive system. TWT team engineers can track the system time as well as their location within the time-space diagram for any time period. This effort often results in several minor adjustments to split and offset times during a time period.

As noted previously in the report, there are several critical intersections within the project area, namely:

- □ The intersection of Quakerbridge Road, Nassau Park Boulevard and Province Line Road provides a direct connection to the Nassau Park Center, in which numerous big-box retailers have located. This center's traffic generation alone can lock up the local intersection as well as Mercer Mall Drive to the south.
- □ The intersection of Mercer Mall has a critical movement which is capable of disrupting traffic flow up and down stream. The NB left turn of the center is restricted by internal circulation within the shopping center and is capable of spilling over into the NB Quakerbridge Road through lanes.
- □ The SB left-turn on Quakerbridge Road at Clarks-ville Road is a major concern as the demand for this movement often results in the queue spilling over into the SB through lanes. This situation should be monitored regularly by Mercer County.
- □ The Sloan Avenue signals at Quakerbridge Road and at the Fairlawn Avenue/AMC Driveway handle a tremendous amount of traffic which flows freely from Interstate 295. This situation should be monitored by Mercer County.



Photo 6: Looking west at Sloan Avenue traffic approaching Quakerbridge Road.

The revised signal timings are available from the project website, <http://www.dvrpc.taylorwiseman.com> and are presented in **Appendix D**. Updated signal timing directives were developed by the consultant team, with electronic and paper copies delivered to Mercer County and laminated copies placed in each controller.

IV. Results

A. *Before and After Data*

Travel time data along the corridor was collected before and after implementation of the initial timing plans during the weekday morning, mid-day, evening and the weekend mid-day peak hour periods.

With implementation of the new timing plans and maintenance of a uniform time clock between controllers, progression along Quakerbridge between Sloan Avenue and Province Line Road improved significantly, in both directions. For all four peak hour periods, the implemented retiming is producing positive results and significant savings in travel time, delay, the number of stops, and travel speed in both directions. Refer to **Appendix A** for the travel time summary reports for the time periods. **Table 4** summarizes both the directional and cumulative summary of performance metrics collected on Quakerbridge Road.

Table 4
Quakerbridge Road (CR 533) between Sloan Avenue and Province Line Road (CR 569)
West Windsor, Lawrence and Hamilton Townships, Mercer County
Peak Hour Travel Time and Delay Comparison

Direction		AM Peak		Mid-day Peak		PM Peak		Weekend Mid-day Peak	
		Travel Time (s)	Delay (s)	Travel Time (s)	Delay (s)	Travel Time (s)	Delay (s)	Travel Time (s)	Delay (s)
Southbound	Existing	470	147	512	189	710	387	530	206
	Implemented	427	103	475	152	699	375	494	171
	Difference	-44	-44	-37	-37	-12	-12	-36	-36
	% Difference	-9%	-30%	-7%	-20%	-2%	-3%	-7%	-17%
Northbound	Existing	519	195	490	166	548	225	709	386
	Implemented	418	94	465	141	499	176	494	171
	Difference	-101	-101	-25	-25	-49	-49	-215	-215
	% Difference	-19%	-52%	-5%	-15%	-9%	-22%	-30%	-56%
Both Directions	Existing	490	166	501	178	629	306	602	278
	Implemented	422	99	470	147	599	275	494	171
	Difference	-67	-67	-31	-31	-30	-30	-107	-107
	% Difference	-14%	-41%	-6%	-17%	-5%	-10%	-18%	-39%

Southbound: Province Line Road to Sloan Avenue

Northbound: Sloan Avenue to Province Line Road

B. Opportunities for Improvement

Quakerbridge Road and Sloan Avenue had basic timing in place at the start of this project. Maintenance of the signal system, as well as the on-street equipment was excellent. Working with Mercer County Traffic Engineering, the Regional Signal Timing Initiative has shown significant benefit to updated traffic signal timing in reduced delay, travel time and stops by motorists. The updated timing scheme allows the traffic signal controllers an opportunity to serve peak hour commuter as well as weekend traffic efficiently.

The Regional Signal Timing Initiative has shown that dramatic improvement in traffic operations is possible with the introduction of new timing plans as well as a common time standard on the Quakerbridge Road (CR 533) corridor. The consultant team recommends the following:

1. Maintenance of a common time standard at all thirteen project controllers is critical. At this time, it is our understanding that system communications will be established on Quakerbridge Road.

- When this happens, the controllers will sync with a common time standard at least once per day. The controller at Sloan Avenue, Fairlawn Avenue and AMC Theater Driveway is independent. Mercer County should consider installation of a GPS antenna at this location to ensure that all project controllers share the same time. Until the time-syncing computer system is established on Quakerbridge Road, Mercer County should review/inspect controller time clocks at least twice a year.
- 2. ☐ Operations within Subsystem A and B should be closely monitored. The use of West Windsor Township Police to hand control the two northern signals included in Subsystem A will impact signal operations on this segment of Quakerbridge Road. Likewise, the operation of Quakerbridge Mall and Clarksville Road should be monitored closely due to recurring congestion.
 - 3. ☐ Operations on Subsystem D (Sloan Avenue) should be closely monitored and revised if necessary.
 - 4. ☐ Timing plans on the corridor should be revisited within 3-5 years.
 - 5. ☐ Mercer County should consider use of a GPS unit in all future cabinets, ensuring that the controller time clocks are synchronized with atomic time daily. Even though Quakerbridge Road will have communications, it is not uncommon for a system to fail and the presence of GPS backup would maintain the backup time of day programs.

C. Additional Resources/Project Data

Additional information, including project data, analysis files, and other detailed reports will be available on the project website at: <http://www.dvrpc.taylorwiseman.com/>

Appendix A

pref test title

Thursday 6/6/2019 2:21:16 PM

Travel Time & Delay Report for Quakerbridge Road

Legend:

CTT:	Summarized Cumulative Travel Time since beginning of Run (seconds)
CTL:	Summarized Cumulative Travel Distance since beginning of Run (feet)
CDL:	Summarized Cumulative User-specified Design Distance since beginning of Run (feet)
CD:	Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT
CRT:	Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run
CPLSD:	Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)
CPLRT:	Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run
CMxSD:	Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)
CMinRT:	Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run
CStopD:	Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again
CBS1T:	Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)
CAS1T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T
CBS2T:	Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)
CAS2T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T
CAS:	Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT
CStops:	Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGST:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGCT:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)
CQDL:	Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CLN:	Summarized Cumulative Number of Links in Run
TV:	Summarized Through Volume (vph)

Cumulative Summary of runs Northbound from Sloan Avenue/Flock Road (#12)

4 Before-type runs, collected Wednesday 5/16/2018 to Wednesday 5/16/2018, over day(s) Wed, with starting times during 7:17:43 AM to 9:03:15 AM
 7 After-type runs, collected Thursday 6/6/2019 to Thursday 6/6/2019, over day(s) Thu, with starting times during 6:58:53 AM to 8:47:20 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Province Line Road (#1)																					
Average Before (n=4)	519	21176	20909	195	324	-52	570	216	303	134	138	380	217	302	28.1	4.8	177.2	400.5	488	10	0
Std Dev Before (n=4)	59	7	0	59	0	59	0	49	14	40	42	20	64	10	3.0	0.5	27.1	3.0	271	10	0
Average After (n=7)	418	21165	20909	94	324	-152	570	136	282	76	76	342	126	292	35.4	3.1	108.1	405.4	282	10	0
Std Dev After (n=7)	68	5	0	68	0	68	0	64	7	52	52	21	70	5	6.1	2.0	73.3	71.9	248	10	0
Difference	-101	-11	0	-101	0	-101	0	-80	-21	-59	-62	-38	-91	-10	7.3	-1.6	-69.1	4.9	-206	10	0
Std Dev Difference	90	9	0	90	0	90	0	81	16	66	67	29	95	12	6.8	2.1	78.1	72.0	367	10	0
% Difference	-19%	0%	0%	-52%	0%	-195%	0%	-37%	-7%	-44%	-45%	-10%	-42%	-3%	25.9%	-33.8%	-39.0%	1.2%	-42%	10	0

Cumulative Summary of runs Southbound from Province Line Road (#1)

6 Before-type runs, collected Wednesday 5/16/2018 to Wednesday 5/16/2018, over day(s) Wed, with starting times during 7:26:32 AM to 9:12:35 AM
 7 After-type runs, collected Thursday 6/6/2019 to Thursday 6/6/2019, over day(s) Thu, with starting times during 7:05:17 AM to 8:58:29 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV

to Sloan Avenue/Flock Road (#12)

Average Before (n=6)	470	21136	20909	147	324	-100	570	174	297	103	105	366	169	301	30.9	4.2	156.0	387.8	990	10	0
Std Dev Before (n=6)	45	13	0	45	0	45	0	33	14	26	28	19	44	6	2.8	1.3	56.0	96.3	1188	10	0
Average After (n=7)	427	21156	20909	103	324	-143	570	144	283	89	90	336	133	294	34.3	2.9	99.5	393.2	495	10	0
Std Dev After (n=7)	55	9	0	55	0	55	0	49	10	44	45	19	52	6	4.4	0.9	49.9	52.5	924	10	0
Difference	-44	20	0	-44	0	-44	0	-30	-14	-14	-14	-29	-36	-8	3.4	-1.3	-56.5	5.3	-495	10	0
Std Dev Difference	72	16	0	72	0	72	0	59	18	51	53	27	68	8	5.2	1.6	75.1	109.7	1505	10	0
% Difference	-9%	0%	0%	-30%	0%	-44%	0%	-17%	-5%	-14%	-14%	-8%	-21%	-3%	11.1%	-31.4%	-36.2%	1.4%	-50%	10	0

Cumulative Summary of all runs, either direction through artery

10 Before-type runs, collected Wednesday 5/16/2018 to Wednesday 5/16/2018, over day(s) Wed, with starting times during 7:24:32 AM to 9:19:25 AM

14 After-type runs, collected Thursday 6/6/2019 to Thursday 6/6/2019, over day(s) Thu, with starting times during 7:03:14 AM to 9:05:33 AM

	CTI	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Before (n=10)	490	21152	20909	166	324	-81	570	191	299	115	118	371	188	301	29.8	4.4	164.4	392.9	789	20	0
Std Dev Before (n=10)	54	23	0	54	0	54	0	43	14	34	36	19	55	8	3.1	1.1	45.9	72.1	936	20	0
Average After (n=14)	422	21160	20909	99	324	-148	570	140	282	82	83	339	130	293	34.8	3.0	103.8	399.3	389	20	0
Std Dev After (n=14)	60	9	0	60	0	60	0	55	8	47	47	20	59	5	5.1	1.5	60.4	60.8	659	20	0
Difference	-67	9	0	-67	0	-67	0	-51	-17	-33	-35	-32	-59	-9	5.1	-1.4	-60.7	6.4	-401	20	0
Std Dev Difference	81	25	0	81	0	81	0	70	16	58	60	28	81	9	6.0	1.9	75.9	94.3	1145	20	0
% Difference	-14%	0%	0%	-41%	0%	-84%	0%	-27%	-6%	-29%	-30%	-9%	-31%	-3%	17.1%	-31.8%	-36.9%	1.6%	-51%	20	0

pref test title

Thursday 6/6/2019 2:20:20 PM

Travel Time & Delay Report for Quakerbridge Road

Legend:

CTT: Summarized Cumulative Travel Time since beginning of Run (seconds)

CTL: Summarized Cumulative Travel Distance since beginning of Run (feet)

CDL: Summarized Cumulative User-specified Design Distance since beginning of Run (feet)

CD: Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT

CRT: Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run

CPLSD: Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)

CPLRT: Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run

CMxSD: Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)

CMinRT: Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run

CStopD: Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again

CBS1T: Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)

CAS1T: Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T

CBS2T: Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)

CAS2T: Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T

CAS: Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT

CStops: Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph

CGST: Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph

CGCT: Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)

CQDL: Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph

CLN: Summarized Cumulative Number of Links in Run

TV: Summarized Through Volume (vph)

Cumulative Summary of runs Northbound from Sloan Avenue/Flock Road (#12)

7 Before-type runs, collected Wednesday 5/16/2018 to Wednesday 5/16/2018, over day(s) Wed, with starting times during 10:59:22 AM to 12:51:52 PM
 7 After-type runs, collected Thursday 6/6/2019 to Thursday 6/6/2019, over day(s) Thu, with starting times during 10:54:41 AM to 12:52:46 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Province Line Road (#1)																					
Average Before (n=7)	490	21170	20909	166	324	-81	570	173	316	101	104	385	165	324	29.8	4.0	145.4	399.5	465	10	0
Std Dev Before (n=7)	52	11	0	52	0	52	0	55	11	46	46	8	60	14	3.4	1.5	52.9	43.0	353	10	0
Average After (n=7)	465	21174	20909	141	324	-105	570	163	302	93	97	368	173	292	31.2	3.6	132.0	382.4	214	10	0
Std Dev After (n=7)	39	6	0	39	0	39	0	35	14	25	29	24	45	10	2.5	1.3	60.3	18.2	99	10	0
Difference	-25	4	0	-25	0	-25	0	-10	-14	-8	-7	-17	7	-32	1.4	-0.4	-13.4	-17.1	-252	10	0
Std Dev Difference	65	13	0	65	0	65	0	65	18	53	54	25	75	17	4.3	2.0	80.2	46.7	366	10	0
% Difference	-5%	0%	0%	-15%	0%	-31%	0%	-6%	-5%	-8%	-7%	-4%	4%	-10%	4.8%	-10.7%	-9.2%	-4.3%	-54%	10	0

Cumulative Summary of runs Southbound from Province Line Road (#1)

7 Before-type runs, collected Wednesday 5/16/2018 to Wednesday 5/16/2018, over day(s) Wed, with starting times during 11:08:26 AM to 1:02:41 PM
 7 After-type runs, collected Thursday 6/6/2019 to Thursday 6/6/2019, over day(s) Thu, with starting times during 10:44:47 AM to 12:42:21 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Sloan Avenue/Flock Road (#12)																					

Average Before (n=7)	512	21148	20909	189	324	-58	570	200	313	117	123	390	214	299	28.5	5.0	144.6	392.3	991	10	0
Std Dev Before (n=7)	55	17	0	55	0	55	0	49	15	42	43	23	55	6	3.5	1.6	58.8	82.0	1271	10	0
Average After (n=7)	475	21159	20909	152	324	-95	570	180	296	105	108	368	182	293	31.0	4.9	217.9	380.5	1960	10	0
Std Dev After (n=7)	72	3	0	72	0	72	0	63	11	50	51	24	74	7	4.6	1.7	123.1	42.1	1166	10	0
Difference	-37	11	0	-37	0	-37	0	-20	-17	-11	-15	-22	-31	-6	2.5	-0.1	73.4	-11.8	968	10	0
Std Dev Difference	91	17	0	91	0	91	0	80	19	65	67	33	92	9	5.8	2.3	136.4	92.2	1725	10	0
% Difference	-7%	0%	0%	-20%	0%	-64%	0%	-10%	-5%	-10%	-12%	-6%	-15%	-2%	8.8%	-2.9%	50.7%	-3.0%	98%	10	0

Cumulative Summary of all runs, either direction through artery

14 Before-type runs, collected Wednesday 5/16/2018 to Wednesday 5/16/2018, over day(s) Wed, with starting times during 11:04:42 AM to 1:10:05 PM

14 After-type runs, collected Thursday 6/6/2019 to Thursday 6/6/2019, over day(s) Thu, with starting times during 10:51:41 AM to 12:58:10 PM

	CTI	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Before (n=14)	501	21159	20909	178	324	-69	570	187	315	109	114	387	190	311	29.1	4.5	145.0	395.9	728	20	0
Std Dev Before (n=14)	53	18	0	53	0	53	0	52	13	43	44	17	61	17	3.4	1.6	53.7	63.0	937	20	0
Average After (n=14)	470	21167	20909	147	324	-100	570	171	299	99	102	368	178	293	31.1	4.2	175.0	381.4	1087	20	0
Std Dev After (n=14)	56	9	0	56	0	56	0	50	12	38	40	23	59	8	3.6	1.6	103.3	31.2	1205	20	0
Difference	-31	8	0	-31	0	-31	0	-15	-16	-10	-11	-20	-12	-19	2.0	-0.3	30.0	-14.5	358	20	0
Std Dev Difference	77	20	0	77	0	77	0	72	18	58	60	28	84	19	4.9	2.3	116.4	70.3	1527	20	0
% Difference	-6%	0%	0%	-17%	0%	-45%	0%	-8%	-5%	-9%	-10%	-5%	-6%	-6%	6.8%	-6.3%	20.7%	-3.7%	49%	20	0

pref test title

Wednesday 6/12/2019 10:06:59 PM

Travel Time & Delay Report for Quakerbridge Road

Legend:

CTT: Summarized Cumulative Travel Time since beginning of Run (seconds)

CTL: Summarized Cumulative Travel Distance since beginning of Run (feet)

CDL: Summarized Cumulative User-specified Design Distance since beginning of Run (feet)

CD: Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT

CRT: Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run

CPLSD: Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)

CPLRT: Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run

CMxSD: Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)

CMinRT: Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run

CStopD: Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again

CBS1T: Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)

CAS1T: Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T

CBS2T: Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)

CAS2T: Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T

CAS: Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT

CStops: Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph

CGST: Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph

CGCT: Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)

CQDL: Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph

CLN: Summarized Cumulative Number of Links in Run

TV: Summarized Through Volume (vph)

Cumulative Summary of runs Northbound from Sloan Avenue/Flock Road (#12)

6 Before-type runs, collected Wednesday 5/16/2018 to Wednesday 5/16/2018, over day(s) Wed, with starting times during 3:48:40 PM to 5:57:38 PM
 10 After-type runs, collected Wednesday 6/5/2019 to Thursday 6/6/2019, over day(s) Wed, Thu, with starting times during 4:00:13 PM to 5:41:53 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Province Line Road (#1)																					
Average Before (n=6)	548	21167	20909	225	324	-22	570	218	330	138	141	407	233	315	26.6	4.3	146.4	408.0	602	10	0
Std Dev Before (n=6)	65	4	0	65	0	65	0	71	16	64	65	16	74	15	3.3	0.8	73.8	57.5	449	10	0
Average After (n=10)	499	21180	20909	176	324	-71	570	200	299	130	133	366	194	305	29.2	3.6	153.0	413.2	476	10	0
Std Dev After (n=10)	51	12	0	51	0	51	0	45	11	38	39	19	47	11	3.4	0.8	68.8	64.5	291	10	0
Difference	-49	13	0	-49	0	-49	0	-18	-31	-7	-8	-41	-39	-10	2.6	-0.7	6.7	5.2	-127	10	0
Std Dev Difference	83	13	0	83	0	83	0	84	19	74	76	25	88	18	4.7	1.2	100.9	86.4	535	10	0
% Difference	-9%	0%	0%	-22%	0%	-224%	0%	-8%	-9%	-5%	-6%	-10%	-17%	-3%	9.8%	-16.9%	4.5%	1.3%	-21%	10	0

Cumulative Summary of runs Southbound from Province Line Road (#1)

6 Before-type runs, collected Wednesday 5/16/2018 to Wednesday 5/16/2018, over day(s) Wed, with starting times during 3:36:29 PM to 5:43:48 PM
 10 After-type runs, collected Wednesday 6/5/2019 to Thursday 6/6/2019, over day(s) Wed, Thu, with starting times during 4:09:30 PM to 5:54:11 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Sloan Avenue/Flock Road (#12)																					

Average Before (n=6)	710	21144	20909	387	324	140	570	364	346	257	264	446	445	265	21.0	6.7	218.0	385.6	1893	10	0
Std Dev Before (n=6)	141	17	0	141	0	141	0	126	28	119	117	42	171	33	4.5	1.6	78.2	49.6	1397	10	0
Average After (n=10)	699	21162	20909	375	324	128	570	377	321	288	290	408	433	265	21.2	6.8	219.8	358.1	2068	10	0
Std Dev After (n=10)	123	9	0	123	0	123	0	112	19	114	112	32	145	27	3.5	1.6	64.9	47.6	1342	10	0
Difference	-12	18	0	-12	0	-12	0	13	-24	30	26	-38	-12	0	0.2	0.1	1.8	-27.6	175	10	0
Std Dev Difference	187	19	0	187	0	187	0	169	34	165	161	53	224	42	5.7	2.3	101.6	68.7	1937	10	0
% Difference	-2%	0%	0%	-3%	0%	-8%	0%	4%	-7%	12%	10%	-8%	-3%	0%	0.8%	2.0%	0.8%	-7.1%	9%	10	0

Cumulative Summary of all runs, either direction through artery

12 Before-type runs, collected Wednesday 5/16/2018 to Wednesday 5/16/2018, over day(s) Wed, with starting times during 3:45:00 PM to 6:05:59 PM

20 After-type runs, collected Wednesday 6/5/2019 to Thursday 6/6/2019, over day(s) Wed, Thu, with starting times during 4:05:33 PM to 6:08:25 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Before (n=12)	629	21156	20909	306	324	59	570	291	338	198	203	427	339	290	23.8	5.5	182.2	396.8	1248	20	0
Std Dev Before (n=12)	135	17	0	135	0	135	0	124	23	110	110	37	167	36	4.8	1.7	81.6	52.5	1197	20	0
Average After (n=20)	599	21171	20909	275	324	29	570	289	310	209	212	387	314	285	25.2	5.2	186.4	385.6	1272	20	0
Std Dev After (n=20)	137	13	0	137	0	137	0	123	19	116	115	34	162	29	5.3	2.1	73.6	62.0	1249	20	0
Difference	-30	15	0	-30	0	-30	0	-3	-28	11	9	-39	-25	-5	1.4	-0.3	4.2	-11.2	24	20	0
Std Dev Difference	192	21	0	192	0	192	0	175	30	160	159	50	233	46	7.1	2.7	109.8	81.2	1730	20	0
% Difference	-5%	0%	0%	-10%	0%	-51%	0%	-1%	-8%	6%	4%	-9%	-8%	-2%	5.8%	-5.5%	2.3%	-2.8%	2%	20	0

pref test title

Tuesday 6/25/2019 10:05:03 PM

Travel Time & Delay Report for Quakerbridge Road

Legend:

CTT:	Summarized Cumulative Travel Time since beginning of Run (seconds)
CTL:	Summarized Cumulative Travel Distance since beginning of Run (feet)
CDL:	Summarized Cumulative User-specified Design Distance since beginning of Run (feet)
CD:	Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT
CRT:	Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run
CPLSD:	Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)
CPLRT:	Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run
CMxSD:	Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)
CMinRT:	Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run
CStopD:	Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again
CBS1T:	Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)
CAS1T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T
CBS2T:	Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)
CAS2T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T
CAS:	Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT
CStops:	Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGST:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGCT:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)
CQDL:	Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CLN:	Summarized Cumulative Number of Links in Run
TV:	Summarized Through Volume (vph)

Cumulative Summary of runs Northbound from Sloan Avenue/Flock Road (#12)

4 Before-type runs, collected Saturday 5/12/2018 to Saturday 5/12/2018, over day(s) Sat, with starting times during 11:03:06 AM to 1:04:53 PM
 7 After-type runs, collected Saturday 6/15/2019 to Saturday 6/15/2019, over day(s) Sat, with starting times during 11:33:13 AM to 1:41:57 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Province Line Road (#1)																					
Average Before (n=4)	709	21190	20909	386	324	139	570	381	329	283	295	414	425	284	21.0	7.3	133.2	356.8	523	10	0
Std Dev Before (n=4)	141	2	0	141	0	141	0	127	17	121	118	31	162	22	4.1	2.5	72.0	34.9	258	10	0
Average After (n=7)	494	21177	20909	171	324	-76	570	202	292	131	135	359	197	297	29.3	4.3	134.9	408.9	480	10	0
Std Dev After (n=7)	30	12	0	30	0	30	0	31	10	34	32	12	37	9	1.9	1.1	59.0	70.7	278	10	0
Difference	-215	-13	0	-215	0	-215	0	-179	-36	-151	-160	-56	-228	13	8.3	-3.0	1.7	52.1	-43	10	0
Std Dev Difference	144	12	0	144	0	144	0	131	20	125	123	33	166	24	4.5	2.7	93.1	78.8	379	10	0
% Difference	-30%	0%	0%	-56%	0%	-155%	0%	-47%	-11%	-54%	-54%	-13%	-54%	4%	39.8%	-40.9%	1.2%	14.6%	-8%	10	0

Cumulative Summary of runs Southbound from Province Line Road (#1)

6 Before-type runs, collected Saturday 5/12/2018 to Saturday 5/12/2018, over day(s) Sat, with starting times during 11:13:49 AM to 1:18:46 PM
 7 After-type runs, collected Saturday 6/15/2019 to Saturday 6/15/2019, over day(s) Sat, with starting times during 11:43:35 AM to 1:52:37 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Sloan Avenue/Flock Road (#12)																					
Average	530	21158	20909	206	324	-40	570	213	317	133	139	391	234	296	27.4	5.2	161.1	389.6	2971	10	0

Before (n=6)																					
Std Dev Before (n=6)	51	11	0	51	0	51	0	54	11	48	46	18	57	9	2.7	1.3	63.7	31.4	1414	10	0
Average After (n=7)	494	21154	20909	171	324	-76	570	193	301	119	121	374	190	304	29.5	4.7	161.1	389.9	2199	10	0
Std Dev After (n=7)	63	6	0	63	0	63	0	58	11	53	55	18	68	8	3.5	1.7	48.2	44.1	1132	10	0
Difference	-36	-4	0	-36	0	-36	0	-20	-15	-14	-19	-17	-44	9	2.1	-0.5	0.1	0.3	-772	10	0
Std Dev Difference	81	13	0	81	0	81	0	79	16	72	72	26	89	12	4.4	2.2	79.9	54.1	1811	10	0
% Difference	-7%	0%	0%	-17%	0%	-88%	0%	-9%	-5%	-10%	-13%	-4%	-19%	3%	7.7%	-8.8%	0.0%	0.1%	-26%	10	0

Cumulative Summary of all runs, either direction through artery

10 Before-type runs, collected Saturday 5/12/2018 to Saturday 5/12/2018, over day(s) Sat, with starting times during 11:09:35 AM to 1:27:21 PM

14 After-type runs, collected Saturday 6/15/2019 to Saturday 6/15/2019, over day(s) Sat, with starting times during 11:39:45 AM to 1:59:25 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Before (n=10)	602	21171	20909	278	324	31	570	280	321	193	202	400	311	291	24.9	6.0	149.9	376.5	1992	20	0
Std Dev Before (n=10)	129	18	0	129	0	129	0	120	14	110	111	25	142	16	4.6	2.1	64.7	35.3	1653	20	0
Average After (n=14)	494	21165	20909	171	324	-76	570	197	297	125	128	366	194	301	29.4	4.5	148.0	399.4	1340	20	0
Std Dev After (n=14)	47	15	0	47	0	47	0	45	11	43	44	17	53	9	2.7	1.4	53.5	57.4	1193	20	0
Difference	-107	-6	0	-107	0	-107	0	-83	-25	-68	-74	-34	-117	9	4.6	-1.5	-1.9	22.9	-652	20	0
Std Dev Difference	138	24	0	138	0	138	0	128	18	118	119	30	152	18	5.3	2.5	84.0	67.4	2038	20	0
% Difference	-18%	0%	0%	-39%	0%	-342%	0%	-30%	-8%	-35%	-36%	-8%	-38%	3%	18.4%	-25.0%	-1.3%	6.1%	-33%	20	0

Appendix B

[illegible]

FLASH	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	A	B
WALK										
PED CLEAR										
MIN. GREEN	5	5	5	7	5	5		7		
EXTENSION	2.0	2.0	2.0	2.0	2.0	2.0		2.0		
MAX GREEN	18	18	34	12	18	18		12		
MAX II										
MAX STEP										
MAX LIMIT										
AMBER	4.0	3.0	3.0	4.0	3.0	4.0		4.0		
RED CLEAR	2.0	2.0	2.0	2.0	2.0	2.0		2.0		

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	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
MIN RECALL	OFF	OFF	OFF	ON	OFF	OFF		ON
PED RECALL	OFF	OFF	OFF	OFF	OFF	OFF		OFF
MAX RECALL	OFF	OFF	OFF	OFF	OFF	OFF		OFF
MEMORY	OFF	OFF	OFF	OFF	OFF	OFF		OFF

	1	2	3	4	5	6	7	8
DELAY								
INHIBIT DELAY	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø
ASSOCIATION	Ø1&6	Ø2&5	Ø 3	Ø4&8	Ø	Ø1&6	Ø	Ø4&8



Quaker Bridge & Mercer Mall

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FLASH	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	B
WALK									
PED CLEAR									
MIN. GREEN	7	40		7		40			
EXTENSION	2.0			2.0					
MAX GREEN	25	40		25		40			
MAX II									
MAX STEP									
MAX LIMIT									
AMBER	3.0	5.0		4.0		5.0			
RED CLEAR	1.0	2.0		3.0		2.0			

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R □ □ □ □ □ □ □

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
MIN RECALL	OFF	OFF		OFF		OFF		
PED RECALL	OFF	OFF		OFF		OFF		
MAX RECALL	OFF	ON		OFF		ON		
MEMORY	OFF	OFF		OFF		OFF		

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	1	2	3	4	5	6	7	8
DELAY				10.0				
INHIBIT DELAY	Ø	Ø	Ø	Ø 4	Ø	Ø	Ø	Ø
ASSOCIATION	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8

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Quaker Bridge & Mercer Mall

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EVENT	TIME	COMMAND
001	11:30	OVRD COORD PLAN 003
002	13:30	OVRD COORD PLAN 001
003	16:00	OVRD COORD PLAN 002
004	19:00	OVRD COORD PLAN 001
005	10:00	OVRD COORD PLAN 003
006	16:00	OVRD COORD PLAN 001

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DAY PLAN 1	EVENTS 1, 2, 3, & 4 SELECTED
DAY PLAN 2	EVENTS 5 & 6 SELECTED

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SUN	MON	TUE	WED	THU	FRI	SAT
02	01	01	01	01	01	02

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Quaker Bridge & Mercer Mall

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TO REFERENCE	00:00	DET. ACCUM. INTERVAL	CYCLE
OFFSET REFERENCE	T0	CYCLES OF DET. ACCUM.	000
EXT. COORD. TYPE	NONE	MINUTES OF DET. ACCUM.	000
CYCLES OF NO SYNC	000	COORD. DUAL ENTRY	

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PERM STRATEGY	T0	OMIT STRATEGY	MAX
TO LOCATION	START OF STEP 1	3% WINDOW	NO
STRETCH 3% BY	000	GBP OMTS	NO
EARLY RETURN	YES	ONCE AROUND	YES
CYCLE LENGTH	100	MIN. CYCLE LENGTH	078
MAX CYCLE LENGTH	140	OFFSET	000
EXT. SYNC	NO	ACTIVE S.F.C.	
DET. PLAN	001	PROT. ONLT ENABLE	
CALC. WALK		REST IN WALK	
NO SKIP			

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ST PRM	000	000	000	000	000	000	000	000	000	000
AC SPLIT	053	086	100	000	000	000	000	000	000	000
OPTION	MAX	NO	NO	NO	NO	NO	NO	NO	NO	NO
SPLIT	GBP	REL	REL	REL	REL	REL	REL	REL	REL	REL
RESERV	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
PED?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

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ST PRM	000	000	000	000	000	000	000	000	000	000
AC SPLIT	053	086	100	000	000	000	000	000	000	000
OPTION	MAX	NO	NO	NO	NO	NO	NO	NO	NO	NO
SPLIT	GBP	REL	REL	REL	REL	REL	REL	REL	REL	REL
RESERV	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
PED?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO



Quaker Bridge & Mercer Mall

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☐ RD ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 2 ☐

PERM STRATEGY	T0	OMIT STRATEGY	MIN
TO LOCATION	START OF STEP 1	3% WINDOW	NO
STRETCH 3% BY	000	GBP OMITTS	NO
EARLY RETURN	YES	ONCE AROUND	YES
CYCLE LENGTH	100	MIN. CYCLE LENGTH	080
MAX CYCLE LENGTH	140	OFFSET	000
EXT. SYNC	NO	ACTIVE S.F.C.	
DET. PLAN	001	PROT. ONLT ENABLE	
CALC. WALK		REST IN WALK	
NO SKIP			

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ST PRM	000	000	000	000	000	000	000	000	000	000
AC SPLIT	055	081	100	000	000	000	000	000	000	000
OPTION	MAX	NO	NO	NO	NO	NO	NO	NO	NO	NO
SPLIT	GBP	REL	REL	REL	REL	REL	REL	REL	REL	REL
RESERV	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
PED?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

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ST PRM	000	000	000	000	000	000	000	000	000	000
AC SPLIT	055	081	100	000	000	000	000	000	000	000
OPTION	MAX	NO	NO	NO	NO	NO	NO	NO	NO	NO
SPLIT	GBP	REL	REL	REL	REL	REL	REL	REL	REL	REL
RESERV	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
PED?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

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FLASH	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	
WALK				10					
PED CLEAR				10					
MIN. GREEN	5	40		7		40			
EXTENSION	2.0			2.0					
MAX GREEN	15	40		20		40			
MAX II									
MAX STEP									
MAX LIMIT									
AMBER	3.0	5.0		4.0		5.0			
RED CLEAR	2.0	2.0		2.0		2.0			

[illegible]

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
MIN RECALL	OFF	OFF		OFF		OFF		
PED RECALL	OFF	OFF		OFF		OFF		
MAX RECALL	OFF	ON		OFF		ON		
MEMORY	OFF	OFF		OFF		OFF		

[illegible]

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
DELAY								
INHIBIT DELAY								
ASSOCIATION	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8

9

EVENT	TIME	COMMAND
001	16:30	OVERIDE FREE PLAN 2
002	19:00	OVERIDE FREE PLAN 1
003		
004		
005		
006		

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Quaker Bridge & Avalon Way

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TO REFERENCE	00:00	DET. ACCUM. INTERVAL	CYCLE
OFFSET REFERENCE	T0	CYCLES OF DET. ACCUM.	001
EXT. COORD. TYPE	NONE	MINUTES OF DET. ACCUM.	001
CYCLES OF NO SYNC	000	COORD. DUAL ENTRY	

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PERM STRATEGY	T0	OMIT STRATEGY	MAX
TO LOCATION	START OF STEP 1	3% WINDOW	NO
STRETCH 3% BY	000	GBP OMTS	NO
EARLY RETURN	YES	ONCE AROUND	YES
CYCLE LENGTH	90	MIN. CYCLE LENGTH	75
MAX CYCLE LENGTH	120	OFFSET	000
EXT. SYNC	NO	ACTIVE S.F.C.	
DET. PLAN	001	PROT. ONLT ENABLE	
CALC. WALK		REST IN WALK	
NO SKIP			

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ST PRM	000	000	000	000	000	000	000	000	000	000
AC SPLIT	55	83	100	000	000	000	000	000	000	000
OPTION	MAX	NO	NO	NO	NO	NO	NO	NO	NO	NO
SPLIT	GBP	REL	REL	REL	REL	REL	REL	REL	REL	REL
RESERV	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
PED?	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO

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ST PRM	000	000	000	000	000	000	000	000	000	000
AC SPLIT	55	100	000	000	000	000	000	000	000	000
OPTION	MAX	NO	NO	NO	NO	NO	NO	NO	NO	NO
SPLIT	GBP	REL	REL	REL	REL	REL	REL	REL	REL	REL
RESERV	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
PED?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Quakerbridge & Village - *PEEK*

3.1.1. Sequence/Startup

Startup	1	2	3	4	5	6	7	8
Phases		X				X		

Interval	2
Flash	0
Red	0.0
Sequence	3

FUNC/PH	1	2	3	4	5	6	7	8
Ring 1	☐	☐	☐	☐	☐	☐	☐	☐
Ring 2	☐	☐	☐	☐	☐	☐	☐	☐

FUNC/PH	1	2	3	4	5	6	7	8
RINGS	☐	☐	☐	☐	☐	☐	☐	☐
CO PH 1	☐	☐	☐	☐	☐	☐	☐	☐
CO PH 2	☐	☐	☐	☐	☐	☐	☐	☐

3.1.3 ☐☐☐



FLASH	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
INITIAL	7	14	4	5	7	30	4	5
PASSAGE	2.0		2.0	2.0	2.0	2.0	2.0	2.0
YELLOW	3.0	5.0	3.0	4.0	3.0	5.0	3.0	4.0
RED	1.0	2.0		2.0	1.0	2.0		2.0
WALK		35		10				10
PED CLEAR		14		10				10
MAX 1	18	49	10	20	23	49	12	20
MAX 2								
MAX 3 LIM								
MAX 3 ADJ								



3.1.3 ☐☐☐ In effect 14:30 to 19:00 M - F

FLASH	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
INITIAL	7	14	4	5	7	30	4	5
PASSAGE	2.0		2.0	2.0	2.0	2.0	2.0	2.0
YELLOW	3.0	5.0	3.0	4.0	3.0	5.0	3.0	4.0
RED	1.0	2.0		2.0	1.0	2.0		2.0
WALK		35		10		25		10
PED CLEAR		14		10		14		10
MAX 1	18	49	10	13	23	40	22	13
MAX 2								
MAX 3 LIM								
MAX 3 ADJ								



3.1.2. R□□□□□□

KEYSTROKES	FUNCTION	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
3.1.2.2.	C.N.A.								
"	WRM		X						
"	PED RECYCLE		X						
3.1.2.1.	MIN RECALL						X		
"	MAX RECALL								
"	PED RECALL								
"	SOFT RECALL								
"	NON-LOCK	X		X	X	X		X	X
"	WALK REST		X						
"	MAX II								
"	RED REST								

3.1.9.1. D

3.1.9.2. D□□□ □□R□□□□□-□□

- 1) Phase 4 on calls Phase 8
- 2) Phase 8 on calls Phase 4
- 3) Phase 3 on calls Phase 4
- 4) Phase 7 on calls Phase 8

D□□□□□R□□

3.1.4.1. Dr

[illegible]

3.1.4.3. DörM d

[illegible]

3.1.4.4. D | | | | | | | |--|--|--|--|--|--| | | | | | | | |--|--|--|--|--|--|

[illegible]

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3.1.4.5. D□□□□□□□□□□

DET \ PH	1	2	3	4	5	6	7	8
1	□	□	□	□	□	□	□	□
2	□	□	□	□	□	□	□	□
3	□	□	□	□	□	□	□	□
4	□	□	□	□	□	□	□	□
5	□	□	□	□	□	□	□	□
6	□	□	□	□	□	□	□	□
7	□	□	□	□	□	□	□	□
8	□	□	□	□	□	□	□	□

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Quaker Bridge & Lawrence Square

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FLASH	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
WALK				9				
PED CLEAR				9				
MIN. GREEN		50		5	4	50		
EXTENSION				2.0	2.0			
MAX GREEN		50		18	8	50		
MAX II								
MAX STEP								
MAX LIMIT								
AMBER		5.0		3.0	3.0	5.0		
RED CLEAR		2.0		1.0		2.0		

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	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
MIN RECALL		ON		OFF	OFF	ON		
PED RECALL		OFF		OFF	OFF	OFF		
MAX RECALL		OFF		OFF	OFF	OFF		
MEMORY		OFF		OFF	OFF	OFF		

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	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
DELAY				10.0				

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Traffic Signal Timing Directive
Quakerbridge Road (CR 533) and Hughes Drive
Township of Hamilton, Mercer County

VARIABLE BACKGROUND CYCLE LENGTHS

VEHICLE ACTUATION		INDICATIONS										111	211	311
Phase		1,2,3	4	5,6,7	8,9	10,11	P1-P2	P3-P4	COORD Plan 1 (75 SEC)	COORD Plan 2 (100 SEC)	COORD Plan 3 (90 SEC)			
A. 1 & 6	Quakerbridge Rd SB/Left	←G/G	G	R	R	R/G→	DW	DW	5-14	5-39	5-24			
	Change	←Y/G	G	R	R	Y/G→	DW	DW	3	3	3			
B. 2 & 6	Quakerbridge Rd NB/SB R.O.W.	G	G	G	R	R	DW	W	25-7	51-7	36-7			
	Ped Clearance	G	G	G	R	R	DW	FDW	26	26	26			
	Change	Y	Y	Y	R	R	DW	DW	4	4	4			
C. 4	Clearance	R	R	R	R	R	DW	DW	2	2	2			
	Hughes Drive	R	R	R	G	G	DW	DW	5-15	5-15	5-15			
	Change	R	R	R	Y	Y/G→	DW	DW	3	3	3			
	Clearance	R	R	R	R	R/G→	DW	DW	1	1	1			
	Emergency Flash	Y	Y	Y	R	R	DARK	DARK	50-60 FPM					

NOTES:

- 1) Coordination Plan 1 shall be in effect from 7:00 to 9:00 AM, Monday through Friday. A 75 second background cycle shall be employed during this time.
- 2) Coordination Plan 2 shall be in effect from 4:00 to 6:00PM, Monday through Friday. A 100 second background cycle shall be employed during this time.
- 3) Coordination Plan 3 shall be in effect all other times. A 90 second background cycle shall be employed
- 4) Unused green time to Hughes Drive and SB Quakerbridge Rd. left turn movement shall be allocated to the Quakerbridge Rd through movement.
- 5) Signal shall rest in Phase B Walk.
- 6) Vehicle extension shall be set at 2.0 seconds
- 7) Phase C shall only follow phase B.
- 8) The right turn green arrow shall only be displayed upon actuation of the SB Quakerbridge Rd. left turn slot. Otherwise, the green arrow shall be omitted.

Traffic Signal Timing Directive
 Quakerbridge Road (CR 533) and Hughes Drive
 Township of Hamilton, Mercer County

VARIABLE BACKGROUND CYCLE LENGTHS

VEHICLE ACTUATION		INDICATIONS									
	Phase	1,2,3	4	5,6,7	8,9	10,11	P1-P2	P3-P4	COORD Plan 1 (75 SEC)	COORD Plan 2 (100 SEC)	COORD Plan 3 (90 SEC)
A.	Quakerbridge Rd SB/Left Change	←G/G ←Y/G	G G	R R	R R	R/G→ Y/G→	DW DW	DW DW	8 3	33 3	23 3
B.	Quakerbridge Rd NB/SB R.O.W. Ped Clearance Change Clearance	G G Y R	G G Y R	G G Y R	R R R R	R R R R	DW DW DW DW	W FDW DW DW	7 26 4 2	7 26 4 2	7 26 4 2
C.	Hughes Drive Ped Clearance Change Clearance	R R R R	R R R R	R R R R	G G Y R	G G Y/G→ R/G→	W FDW DW DW	DW DW DW DW	5 16 3 1	5 16 3 1	5 16 3 1
	Emergency Flash	Y	Y	Y	R	R	DARK	DARK	50-60 FPM		



Quakerbridge & Youngs

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M□□□r□□□D□□□ M□□2□□□□□□□2□□□□

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BATTERY BACKUP

□M□□□□

FLASH	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
WALK		7		7		7		7
PED CLEAR		13		21		13		21
MIN. GREEN	5	20		7	5	20		7
EXTENSION	2.0	2.0		2.0	2.0	2.0		2.0
MAX GREEN	7	30		21	7	30		21
MAX II	17	50		28	17	50		28
MAX STEP								
MAX LIMIT								
AMBER	3.0	5.0		4.0	3.0	5.0		4.0
RED CLEAR		2.0		2.0		2.0		2.0

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	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
MIN RECALL	OFF	ON		OFF	OFF	ON		OFF
PED RECALL	OFF	ON		OFF	OFF	ON		OFF
MAX RECALL	OFF	ON		OFF	OFF	ON		OFF
MEMORY	OFF	OFF		OFF	OFF	OFF		OFF

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□ 2□□□□ □r□□□□□□□□□□

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D□□□□□□ R□□□□d□□□d□□□□□□□□□□

	1	2	3	4	5	6	7	8
DELAY								
INHIBIT DELAY	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø
ASSOCIATION	Ø 1	Ø 6	Ø 2	Ø 5	Ø 4	Ø 4	Ø 8	Ø 8

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EVENT	TIME	COMMAND
001	00:00	OVERIDE FREE PLAN 3
002	07:00	OVERIDE FREE PLAN 1
003	09:00	OVERIDE FREE PLAN 3
004	16:00	OVERIDE FREE PLAN 2
005	18:00	OVERIDE FREE PLAN 3
006		

[illegible]

Diagram illustrating a 1D array structure. The array contains 20 slots. The 12th slot is labeled 'RM', the 14th slot is labeled 'M', and the 16th slot is labeled 'M' and highlighted with a green background.

9

DAY PLAN 1	EVENTS 1,2,3,4 & 5 SELECTED
DAY PLAN 2	EVENT 1 SELECTED

SUN	MON	TUE	WED	THU	FRI	SAT
02	01	01	01	01	01	02

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Traffic Signal Timing Directive

Intersection of Quakerbridge Road (County Route 533) and Nami Lane
Township of Hamilton
Date: March 2, 2015

90 Second Background Cycle WITHOUT PEDESTRIAN ACTUATION

Phase		Signal Indications				Time (seconds)
		1-8	9-14	P1-P4	P5-P8	
A.	Quakerbridge Rd (CR 533)	G	R	W	DW	56-40
	Pedestrian Clearance	G	R	FDW	DW	16
	Yellow	Y	R	DW	DW	4.0
	All Red	R	R	DW	DW	2.0
B.	Nami Lane/ Driveway	R	G	DW	DW	7-23
	Yellow	R	Y	DW	DW	3.0
	All Red	R	R	DW	DW	2.0
	Emergency Flash	FY	FR	Dark	Dark	50-60 FPM

90 Second Background Cycle WITH PEDESTRIAN ACTUATION

Phase		Signal Indications				Time (seconds)
		1-8	9-14	P1-P4	P5-P8	
A.	Quakerbridge Rd (CR 533)	G	R	W	DW	56-40
	Pedestrian Clearance	G	R	FDW	DW	16
	Yellow	Y	R	DW	DW	4.0
	All Red	R	R	DW	DW	2.0
B.	Nami Lane/ Driveway	R	G	DW	W	7
	Pedestrian Clearance	R	G	DW	FDW	16
	Yellow	R	Y	DW	DW	3.0
	All Red	R	R	DW	DW	2.0
	Emergency Flash	FY	FR	Dark	Dark	50-60 FPM

Notes:

1. ☐ Signal shall rest in Green and Walk for Phase A, Quakerbridge Road.
2. ☐ Vehicle Extension shall be set at 2.0 seconds.
3. ☐ Manual control shall be disconnected.

☐ ☐ **M** ☐ ☐ ☐ ☐

R□□□□□□D R d D



Quakerbridge & Sloan

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TYPE	EVP	EVP	EVP	EVP
INPUT LATCH	NON- LOCK	NON- LOCK	NON- LOCK	NON- LOCK
INPUT SENSE	NON- INVERT	NON- INVERT	NON- INVERT	NON- INVERT
ABORT RED REVERT	ABORT	ABORT	ABORT	ABORT
FLASH PRIORITY	FLASH	FLASH	FLASH	FLASH
MAN. CONTROL ENABLE	ALLOWED	ALLOWED	ALLOWED	ALLOWED
DELAY OUTPUT	DELAY	DELAY	DELAY	DELAY
OVRD. MIN. TIME	005	005	005	005
OVRD. WALK TIME	000	000	000	000
OVRD. F.D.W. TIME	000	000	000	000
DELAY TIME	000	000	000	000
HOLD TIME	000	000	000	000
CLEAR PHASES 1				
OVLP. RED				
CLEAR GREEN TIME 1	001	000	001	000
CLEAR PHASES 2				
OVLP. RED 2				
CLEAR GREEN TIME 2	000	000	000	000
PREEMPT PHASES	2 & 5	4	1 & 6	8
INT. 5 FLASH	NO	NO	NO	NO
INT. 5 OVLP. RD/FYL				
INT. 5 MIN TIME	010	010	010	010
INT. 5 MAX TIME	002	002	002	002
INT. 6 YELLOW	00.0	00.0	00.0	00.0
INT. 7 RED	00.0	00.0	00.0	00.0
RETURN PHASES	2 & 6	8	2 & 6	2 & 6
RETURN VEH. CALLS				
RETURN PED. CALLS				

□

Appendix C

d

M



Abstract

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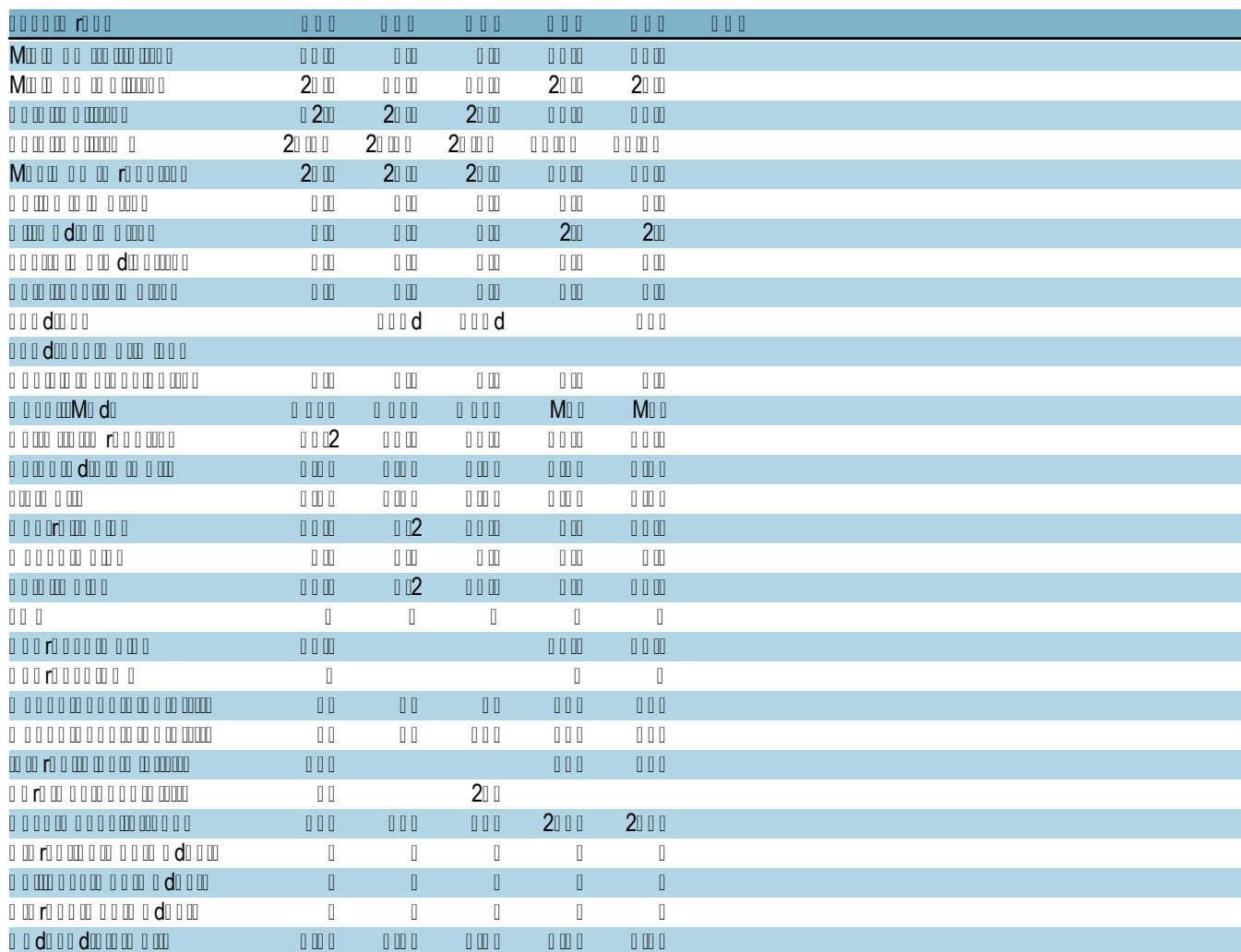
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↙ Ø6			
57 s			

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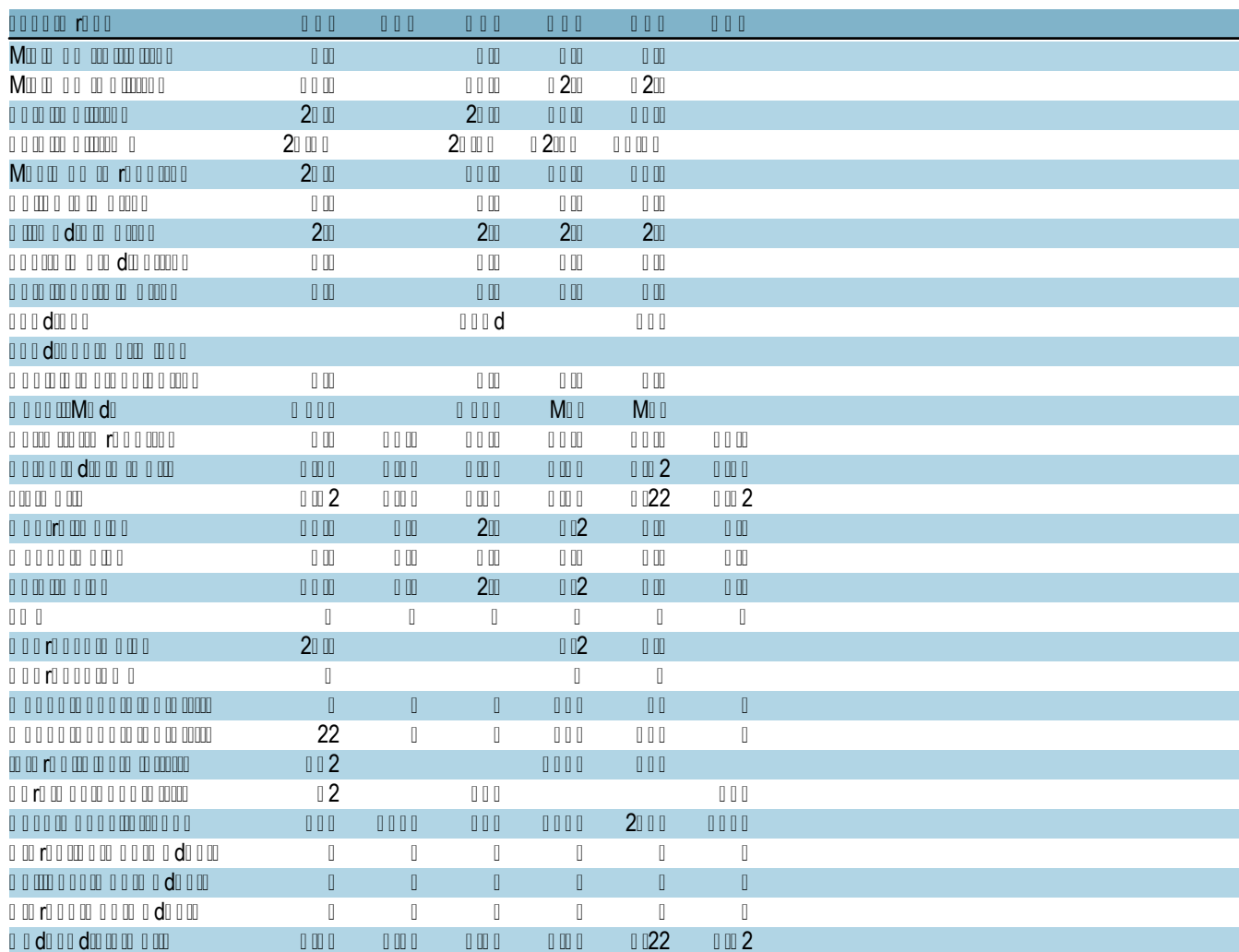
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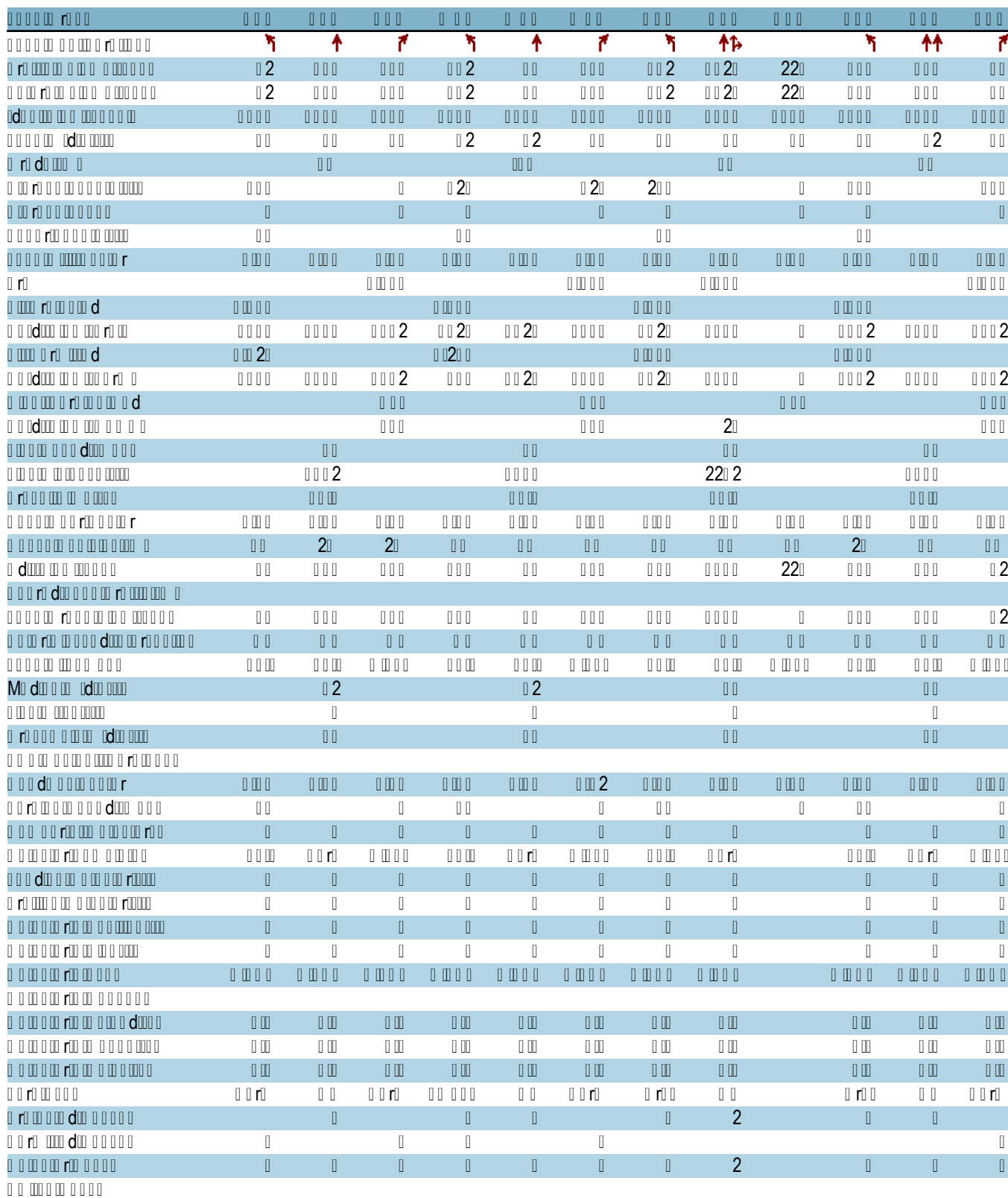
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 Ø2 67 s	 Ø8 26 s
 Ø5 20 s	 Ø6 47 s

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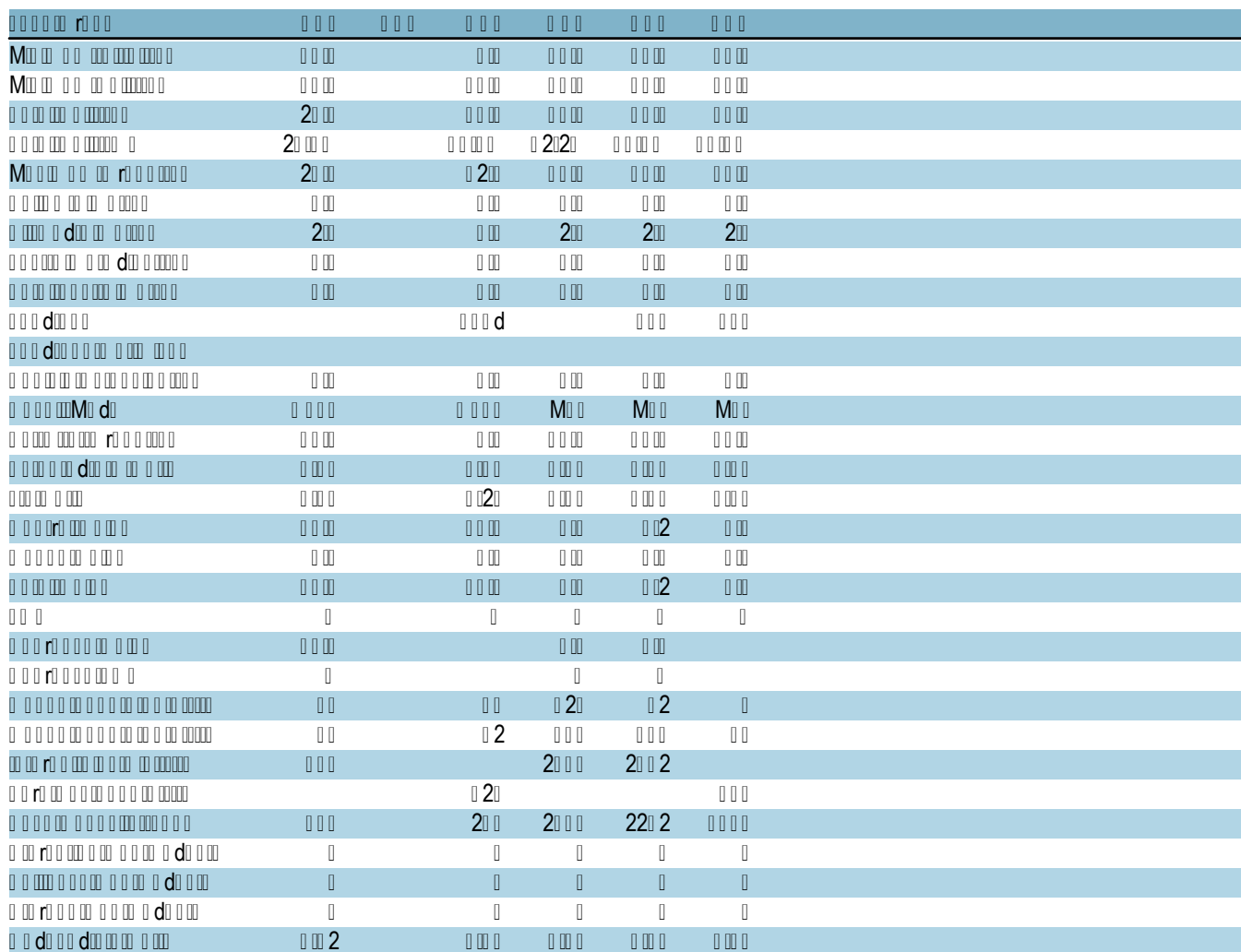
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 $\varnothing_5$ 27 s	 $\varnothing_6$ 41 s	 $\varnothing_4$ 49 s	

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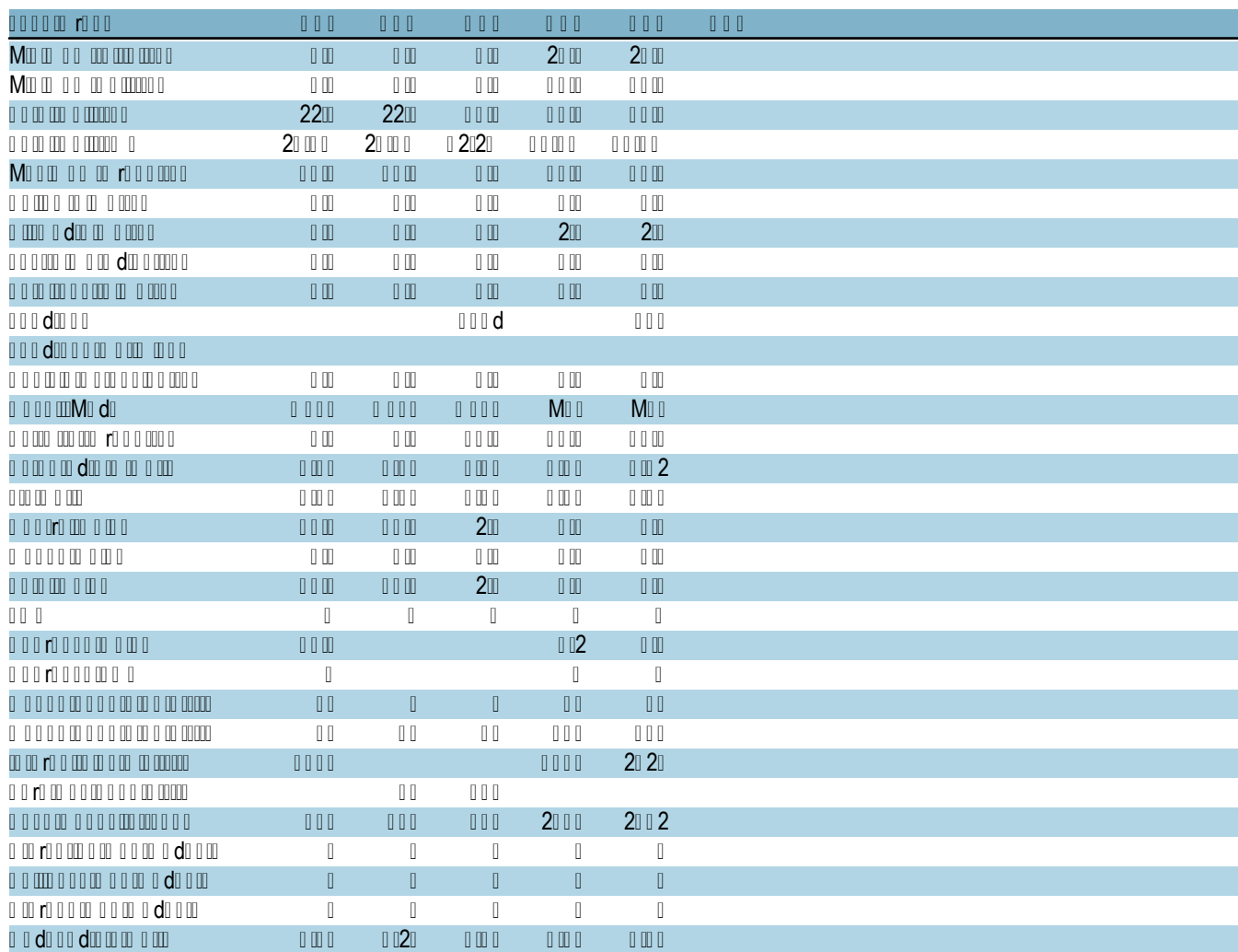
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 Ø1 27 s	 Ø2 56 s	 Ø8 26 s	 Ø16 26 s
 Ø5 22 s	 Ø6 61 s		

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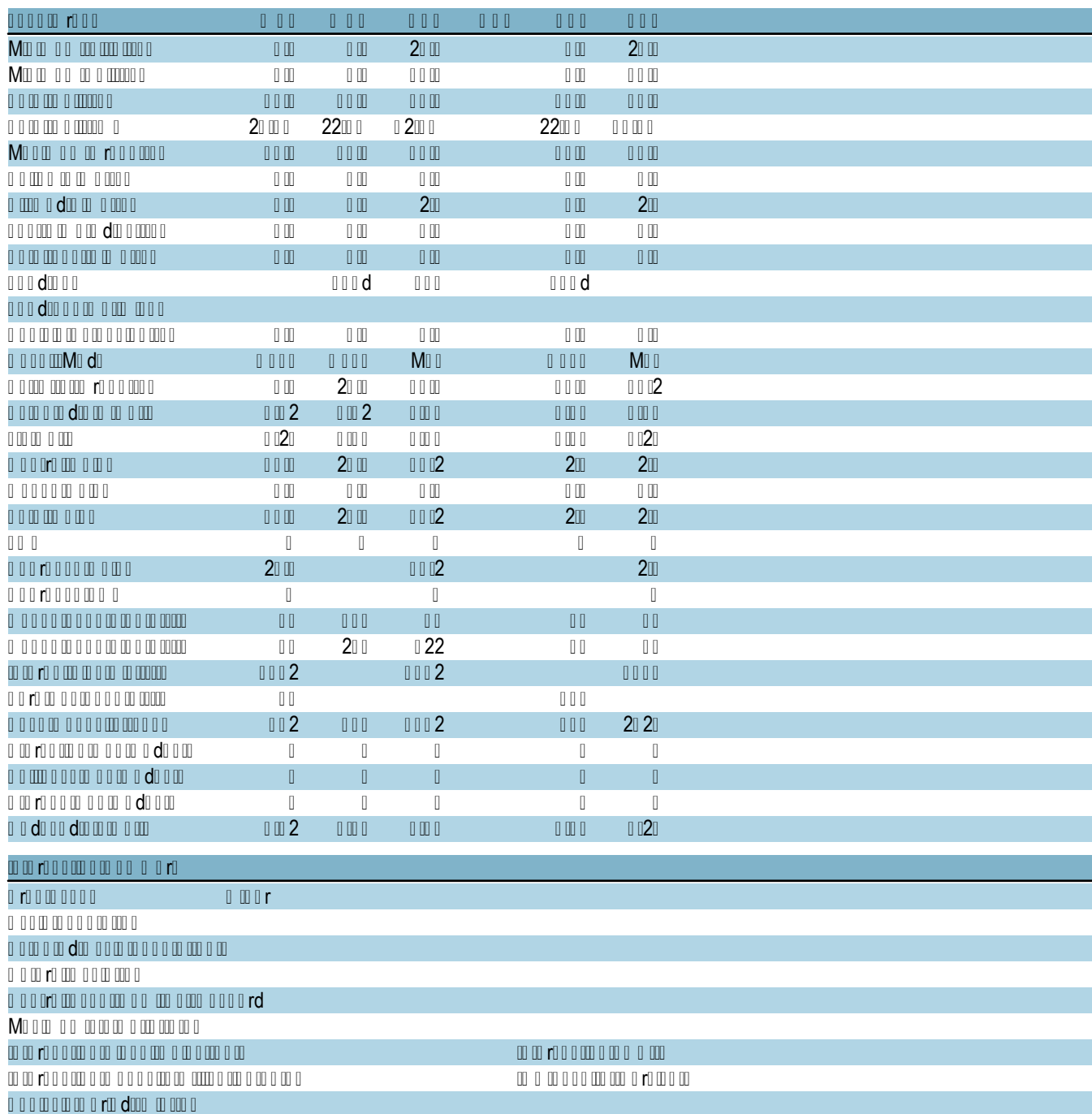
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 Ø2 68 s		 Ø4	
 Ø5 11 s	 Ø6 57 s	 Ø4 22 s	

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 Ø1 17 s	 Ø2 39 s	 Ø8 19 s
 Ø6 56 s		

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QUESTION

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Monday, 11/11/2019 11:11 AM

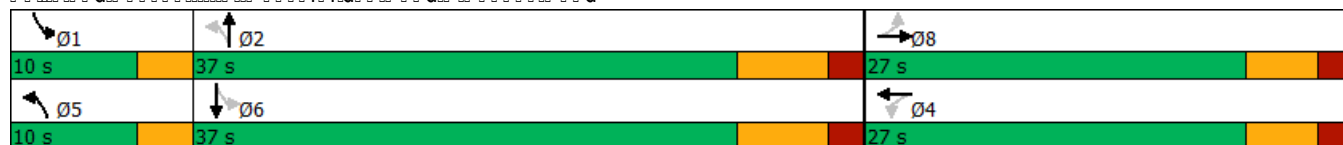
Abstract

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QUESTION

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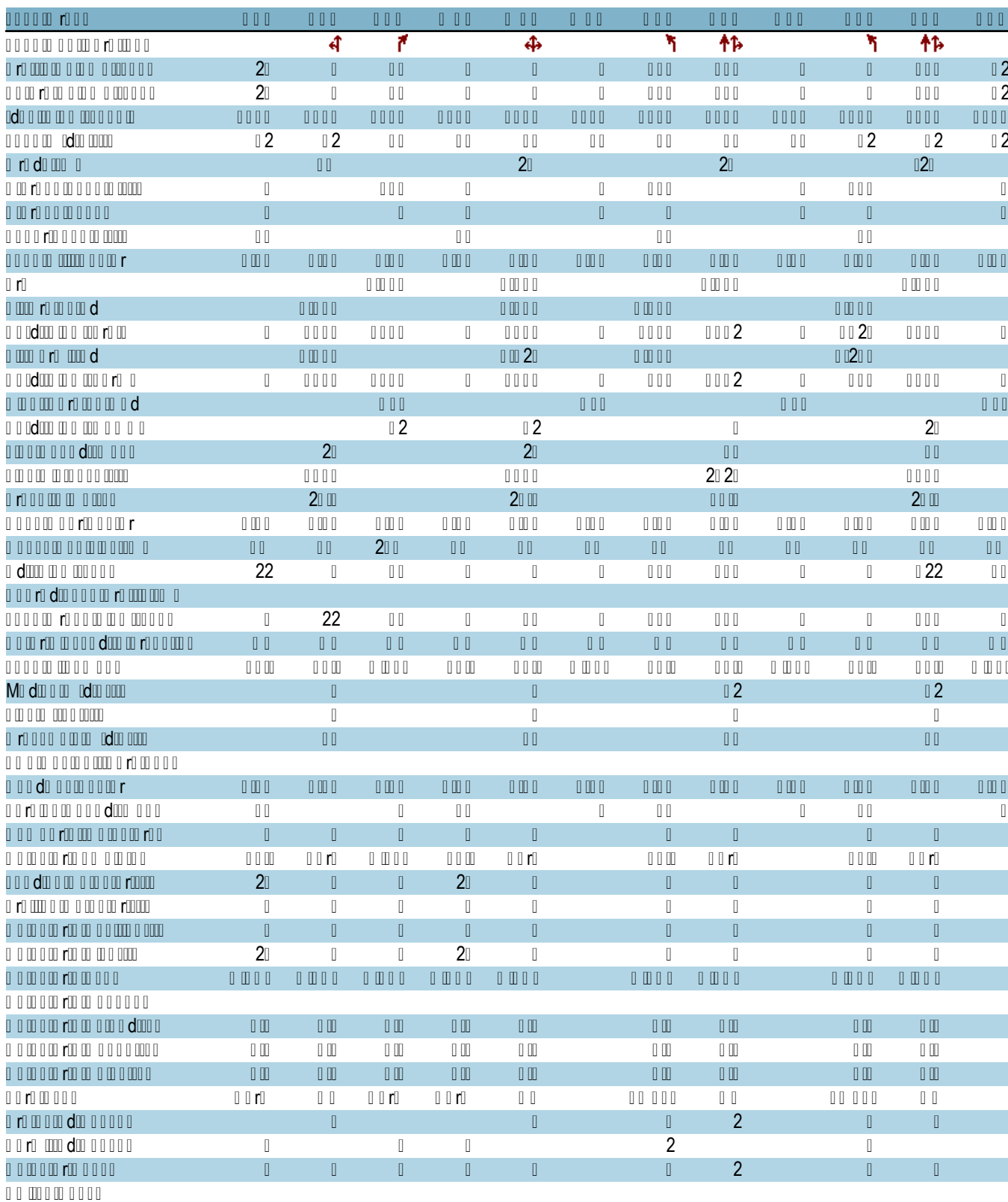
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 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000
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 Ø5 21 s	 Ø6 48 s	 Ø4 24 s

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Figure 1

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Abstract

QUESTION **ANSWER**

0 000000 0 00 00 0 **r**0 0 0 0000 00 00 00 0 00 00 00 0 **d**0 00 00 0 0000 0000 0 0 0 00 0 0 00 0 0000 0 0 0 **r**0

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$\frac{d}{dt} \left(\frac{1}{r^2} \right) = -\frac{2}{r^3} \frac{dr}{dt}$

 Ø5 18 s	 Ø6 39 s	 Ø4 46 s	
 Ø1 18 s	 Ø2 39 s		 Ø8 41 s

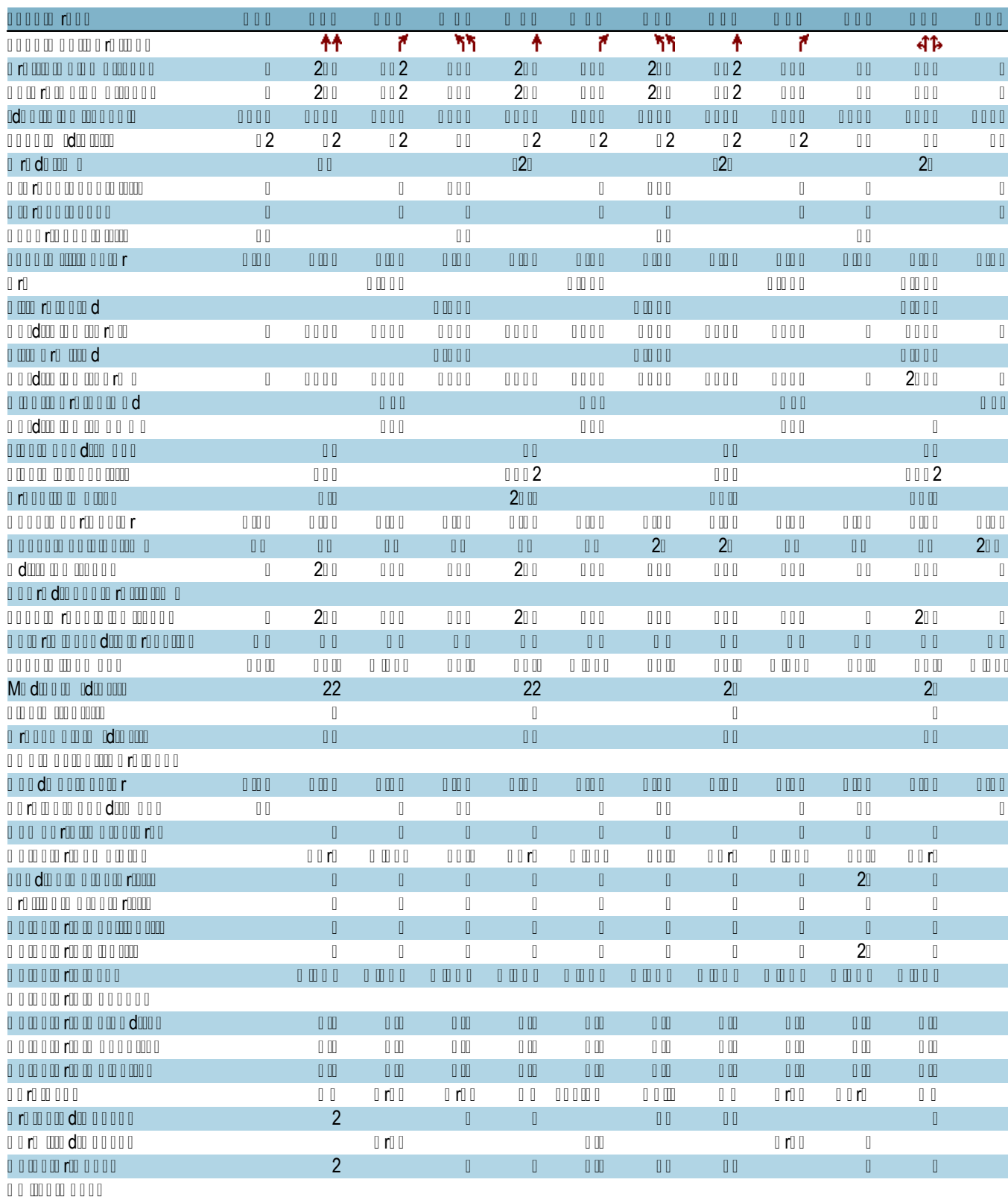
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Mr. Riddell

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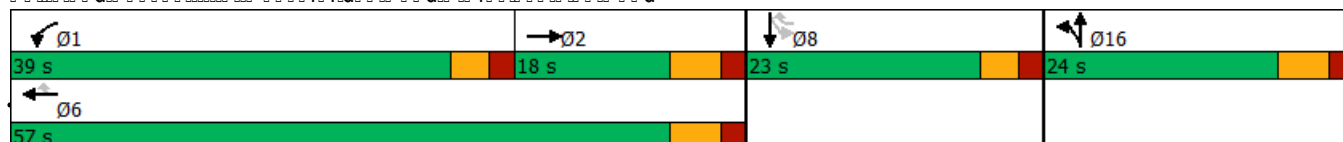
2022年12月22日
 2022年12月22日

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 104

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1. 在 `main` 函数中，定义一个整型变量 `r`，并赋值为 10。
 2. 调用 `change` 函数，将 `r` 的值传递给 `change` 函数。
 3. 在 `change` 函数中，定义一个整型变量 `d`，并赋值为 20。
 4. 在 `change` 函数中，将 `d` 的值乘以 2，得到 40。
 5. 在 `change` 函数中，将 `d` 的值乘以 2，得到 80。
 6. 在 `change` 函数中，将 `d` 的值乘以 2，得到 160。
 7. 在 `change` 函数中，将 `d` 的值乘以 2，得到 320。
 8. 在 `change` 函数中，将 `d` 的值乘以 2，得到 640。
 9. 在 `change` 函数中，将 `d` 的值乘以 2，得到 1280。
 10. 在 `change` 函数中，将 `d` 的值乘以 2，得到 2560。
 11. 在 `change` 函数中，将 `d` 的值乘以 2，得到 5120。
 12. 在 `change` 函数中，将 `d` 的值乘以 2，得到 10240。
 13. 在 `change` 函数中，将 `d` 的值乘以 2，得到 20480。
 14. 在 `change` 函数中，将 `d` 的值乘以 2，得到 40960。
 15. 在 `change` 函数中，将 `d` 的值乘以 2，得到 81920。
 16. 在 `change` 函数中，将 `d` 的值乘以 2，得到 163840。
 17. 在 `change` 函数中，将 `d` 的值乘以 2，得到 327680。
 18. 在 `change` 函数中，将 `d` 的值乘以 2，得到 655360。
 19. 在 `change` 函数中，将 `d` 的值乘以 2，得到 1310720。
 20. 在 `change` 函数中，将 `d` 的值乘以 2，得到 2621440。
 21. 在 `change` 函数中，将 `d` 的值乘以 2，得到 5242880。
 22. 在 `change` 函数中，将 `d` 的值乘以 2，得到 10485760。
 23. 在 `change` 函数中，将 `d` 的值乘以 2，得到 20971520。
 24. 在 `change` 函数中，将 `d` 的值乘以 2，得到 41943040。
 25. 在 `change` 函数中，将 `d` 的值乘以 2，得到 83886080。
 26. 在 `change` 函数中，将 `d` 的值乘以 2，得到 167772160。
 27. 在 `change` 函数中，将 `d` 的值乘以 2，得到 335544320。
 28. 在 `change` 函数中，将 `d` 的值乘以 2，得到 671088640。
 29. 在 `change` 函数中，将 `d` 的值乘以 2，得到 1342177280。
 30. 在 `change` 函数中，将 `d` 的值乘以 2，得到 2684354560。
 31. 在 `change` 函数中，将 `d` 的值乘以 2，得到 5368709120。
 32. 在 `change` 函数中，将 `d` 的值乘以 2，得到 10737418240。
 33. 在 `change` 函数中，将 `d` 的值乘以 2，得到 21474836480。
 34. 在 `change` 函数中，将 `d` 的值乘以 2，得到 42949672960。
 35. 在 `change` 函数中，将 `d` 的值乘以 2，得到 85899345920。
 36. 在 `change` 函数中，将 `d` 的值乘以 2，得到 171798691840。
 37. 在 `change` 函数中，将 `d` 的值乘以 2，得到 343597383680。
 38. 在 `change` 函数中，将 `d` 的值乘以 2，得到 687194767360。
 39. 在 `change` 函数中，将 `d` 的值乘以 2，得到 1374389534720。
 40. 在 `change` 函数中，将 `d` 的值乘以 2，得到 2748779069440。
 41. 在 `change` 函数中，将 `d` 的值乘以 2，得到 5497558138880。
 42. 在 `change` 函数中，将 `d` 的值乘以 2，得到 10995116277760。
 43. 在 `change` 函数中，将 `d` 的值乘以 2，得到 21990232555520。
 44. 在 `change` 函数中，将 `d` 的值乘以 2，得到 43980465111040。
 45. 在 `change` 函数中，将 `d` 的值乘以 2，得到 87960930222080。
 46. 在 `change` 函数中，将 `d` 的值乘以 2，得到 175921860444160。
 47. 在 `change` 函数中，将 `d` 的值乘以 2，得到 351843720888320。
 48. 在 `change` 函数中，将 `d` 的值乘以 2，得到 703687441776640。
 49. 在 `change` 函数中，将 `d` 的值乘以 2，得到 1407374883553280。
 50. 在 `change` 函数中，将 `d` 的值乘以 2，得到 2814749767106560。
 51. 在 `change` 函数中，将 `d` 的值乘以 2，得到 5629499534213120。
 52. 在 `change` 函数中，将 `d` 的值乘以 2，得到 11258999068426240。
 53. 在 `change` 函数中，将 `d` 的值乘以 2，得到 22517998136852480。
 54. 在 `change` 函数中，将 `d` 的值乘以 2，得到 45035996273704960。
 55. 在 `change` 函数中，将 `d` 的值乘以 2，得到 90071992547409920。
 56. 在 `change` 函数中，将 `d` 的值乘以 2，得到 180143985094819840。
 57. 在 `change` 函数中，将 `d` 的值乘以 2，得到 360287970189639680。
 58. 在 `change` 函数中，将 `d` 的值乘以 2，得到 720575940379279360。
 59. 在 `change` 函数中，将 `d` 的值乘以 2，得到 1441151880758558720。
 60. 在 `change` 函数中，将 `d` 的值乘以 2，得到 2882303761517117440。
 61. 在 `change` 函数中，将 `d` 的值乘以 2，得到 5764607523034234880。
 62. 在 `change` 函数中，将 `d` 的值乘以 2，得到 11529215046068469760。
 63. 在 `change` 函数中，将 `d` 的值乘以 2，得到 23058430092136939520。
 64. 在 `change` 函数中，将 `d` 的值乘以 2，得到 46116860184273879040。
 65. 在 `change` 函数中，将 `d` 的值乘以 2，得到 92233720368547758080。
 66. 在 `change` 函数中，将 `d` 的值乘以 2，得到 184467440737095516160。
 67. 在 `change` 函数中，将 `d` 的值乘以 2，得到 368934881474191032320。
 68. 在 `change` 函数中，将 `d` 的值乘以 2，得到 737869762948382064640。
 69. 在 `change` 函数中，将 `d` 的值乘以 2，得到 1475739525896764129280。
 70. 在 `change` 函数中，将 `d` 的值乘以 2，得到 2951479051793528258560。
 71. 在 `change` 函数中，将 `d` 的值乘以 2，得到 5902958103587056517120。
 72. 在 `change` 函数中，将 `d` 的值乘以 2，得到 11805916207174113034240。
 73. 在 `change` 函数中，将 `d` 的值乘以 2，得到 23611832414348226068480。
 74. 在 `change` 函数中，将 `d` 的值乘以 2，得到 47223664828696452136960。
 75. 在 `change` 函数中，将 `d` 的值乘以 2，得到 94447329657392904273920。
 76. 在 `change` 函数中，将 `d` 的值乘以 2，得到 188894659314785808547840。
 77. 在 `change` 函数中，将 `d` 的值乘以 2，得到 377789318629571617095680。
 78. 在 `change` 函数中，将 `d` 的值乘以 2，得到 755578637259143234191360。
 79. 在 `change` 函数中，将 `d` 的值乘以 2，得到 1511157274518286468382720。
 80. 在 `change` 函数中，将 `d` 的值乘以 2，得到 3022314549036572936765440。
 81. 在 `change` 函数中，将 `d` 的值乘以 2，得到 6044629098073145873530880。

↑ Ø2 76 s	↓ Ø6 47 s	↘ Ø4 32 s
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$$2\pi \int_0^1 r \, dr \int_0^{2\pi} d\theta \int_0^\pi \sin \theta \, d\theta \int_0^\infty r^2 \, dr = 4\pi \int_0^\infty r^2 \, dr$$

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 Ø2 67 s	 Ø8 26 s
 Ø5 20 s	 Ø6 47 s

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
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 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
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 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700
 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800
 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900
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 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 103

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$\frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx = \frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx$

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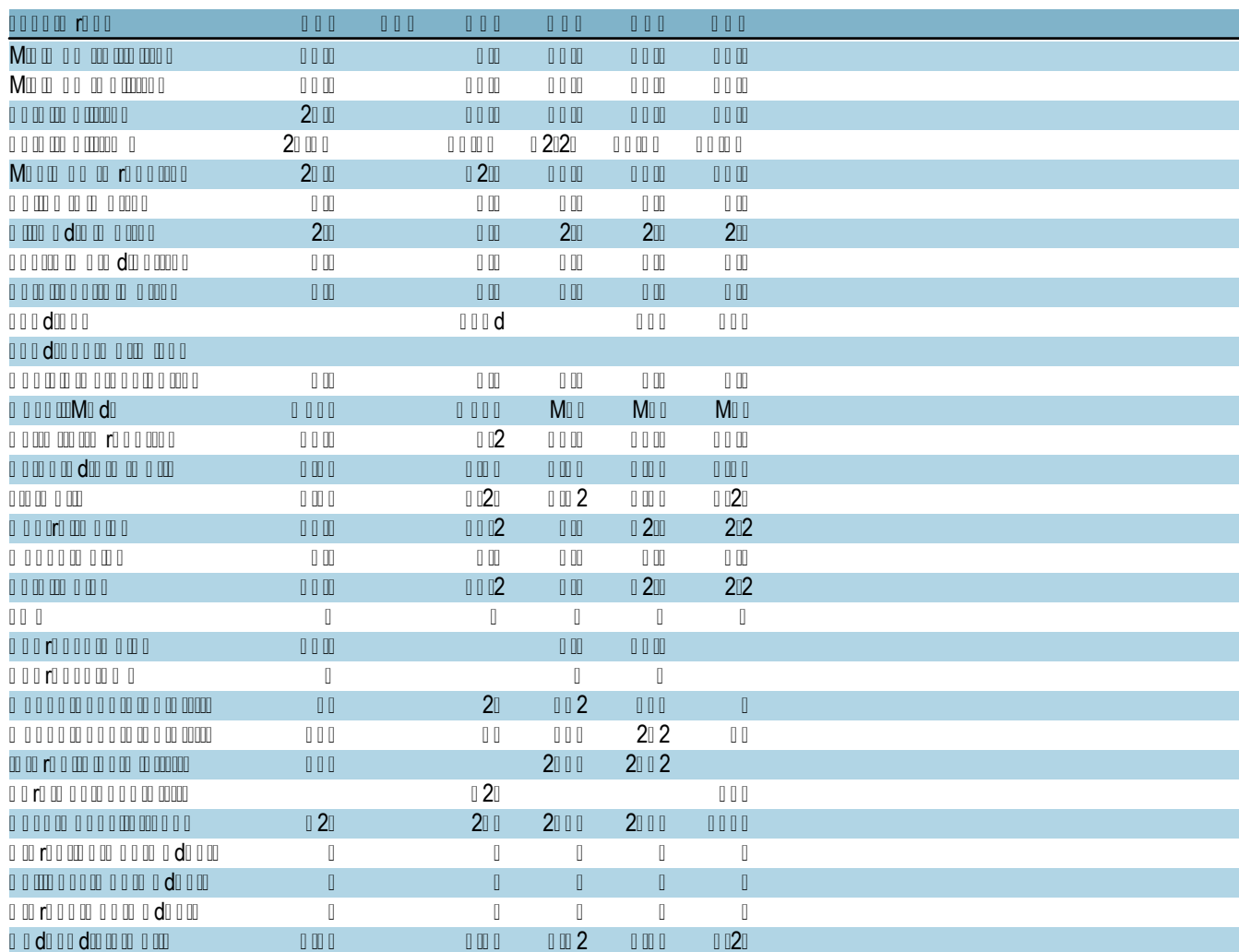
1. $r_1, r_2, \dots, r_n$ are the radii of the circles.
 2. $r_1, r_2, \dots, r_n$ are the radii of the circles.
 3. $r_1, r_2, \dots, r_n$ are the radii of the circles.
 4. $r_1, r_2, \dots, r_n$ are the radii of the circles.
 5. $r_1, r_2, \dots, r_n$ are the radii of the circles.
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 8. $r_1, r_2, \dots, r_n$ are the radii of the circles.
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 10. $r_1, r_2, \dots, r_n$ are the radii of the circles.

$\frac{1}{n} \sum_{i=1}^n r_i d_i = \frac{1}{n} \sum_{i=1}^n d_i$

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r_1 r_2 r_3 r_4 r_5 r_6 r_7 r_8 r_9 r_{10} r_{11} r_{12} r_{13} r_{14} r_{15} r_{16} r_{17} r_{18} r_{19} r_{20} r_{21} r_{22} r_{23} r_{24} r_{25} r_{26} r_{27} r_{28} r_{29} r_{30} r_{31} r_{32} r_{33} r_{34} r_{35} r_{36} r_{37} r_{38} r_{39} r_{40} r_{41} r_{42} r_{43} r_{44} r_{45} r_{46} r_{47} r_{48} r_{49} r_{50} r_{51} r_{52} r_{53} r_{54} r_{55} r_{56} r_{57} r_{58} r_{59} r_{60} r_{61} r_{62} r_{63} r_{64} r_{65} r_{66} r_{67} r_{68} r_{69} r_{70} r_{71} r_{72} r_{73} r_{74} r_{75} r_{76} r_{77} r_{78} r_{79} r_{80} r_{81} r_{82} r_{83} r_{84} r_{85} r_{86} r_{87} r_{88} r_{89} r_{90} r_{91} r_{92} r_{93} r_{94} r_{95} r_{96} r_{97} r_{98} r_{99} r_{100} r_{101} r_{102} r_{103} r_{104} r_{105} r_{106} r_{107} r_{108} r_{109} r_{110} r_{111} r_{112} r_{113} r_{114} r_{115} r_{116} r_{117} r_{118} r_{119} r_{120} r_{121} r_{122} r_{123} r_{124} r_{125} r_{126} r_{127} r_{128} r_{129} r_{130} r_{131} r_{132} r_{133} r_{134} r_{135} r_{136} r_{137} r_{138} r_{139} r_{140} r_{141} r_{142} r_{143} r_{144} r_{145} r_{146} r_{147} r_{148} r_{149} r_{150} r_{151} r_{152} r_{153} r_{154} r_{155} r_{156} r_{157} r_{158} r_{159} r_{160} r_{161} r_{162} r_{163} r_{164} r_{165} r_{166} r_{167} r_{168} r_{169} r_{170} r_{171} r_{172} r_{173} r_{174} r_{175} r_{176} r_{177} r_{178} r_{179} r_{180} r_{181} r_{182} r_{183} r_{184} r_{185} r_{186} r_{187} r_{188} r_{189} r_{190} r_{191} r_{192} r_{193} r_{194} r_{195} r_{196} r_{197} r_{198} r_{199} r_{200} r_{201} r_{202} r_{203} r_{204} r_{205} r_{206} r_{207} r_{208} r_{209} r_{210} r_{211} r_{212} r_{213} r_{214} r_{215} r_{216} r_{217} r_{218} r_{219} r_{220} r_{221} r_{222} r_{223} r_{224} r_{225} r_{226} r_{227} r_{228} r_{229} r_{230} r_{231} r_{232} r_{233} r_{234} r_{235} r_{236} r_{237} r_{238} r_{239} r_{240} r_{241} r_{242} r_{243} r_{244} r_{245} r_{246} r_{247} r_{248} r_{249} r_{250} r_{251} r_{252} r_{253} r_{254} r_{255} r_{256} r_{257} r_{258} r_{259} r_{260} r_{261} r_{262} r_{263} r_{264} r_{265} r_{266} r_{267} r_{268} r_{269} r_{270} r_{271} r_{272} r_{273} r_{274} r_{275} r_{276} r_{277} r_{278} r_{279} r_{280} r_{281} r_{282} r_{283} r_{284} r_{285} r_{286} r_{287} r_{288} r_{289} r_{290} r_{291} r_{292} r_{293} r_{294} r_{295} r_{296} r_{297} r_{298} r_{299} r_{300} r_{301} r_{302} r_{303} r_{304} r_{305} r_{306} r_{307} r_{308} r_{309} r_{310} r_{311} r_{312} r_{313} r_{314} r_{315} r_{316} r_{317} r_{318} r_{319} r_{320} r_{321} r_{322} r_{323} r_{324} r_{325} r_{326} r_{327} r_{328} r_{329} r_{330} r_{331} r_{332} r_{333} r_{334} r_{335} r_{336} r_{337} r_{338} r_{339} r_{340} r_{341} r_{342} r_{343} r_{344} r_{345} r_{346} r_{347} r_{348} r_{349} r_{350} r_{351} r_{352} r_{353} r_{354} r_{355} r_{356} r_{357} r_{358} r_{359} r_{360} r_{361} r_{362} r_{363} r_{364} r_{365} r_{366} r_{367} r_{368} r_{369} r_{370} r_{371} r_{372} r_{373} r_{374} r_{375} r_{376} r_{377} r_{378} r_{379} r_{380} r_{381}
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Figure 1: Gantt chart of the schedule. The chart shows three tasks: Task 1 (green bar, 65s), Task 2 (green bar, 15s), and Task 3 (green bar, 50s). Task 1 has a duration of 65s and is preceded by a vertical arrow labeled Ø2. Task 2 has a duration of 15s and is preceded by a vertical arrow labeled Ø5. Task 3 has a duration of 50s and is preceded by a vertical arrow labeled Ø6. Task 3 is followed by a vertical arrow labeled Ø4. The bars are composed of green, yellow, and red segments.

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 Ø1 27 s	 Ø2 56 s	 Ø8 26 s	 Ø16 26 s
 Ø5 27 s	 Ø6 61 s		

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0 0 0 0 0 0 0 0 0 0 0	22 0 0	22 0 0	0 0 0 0	0 0 0 0	0 0 0 0
0 0 0 0 0 0 0 0 0 0 0	2 0 0 0 0	2 0 0 0 0	0 2 0 2	0 0 0 0 0	0 0 0 0 0
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 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
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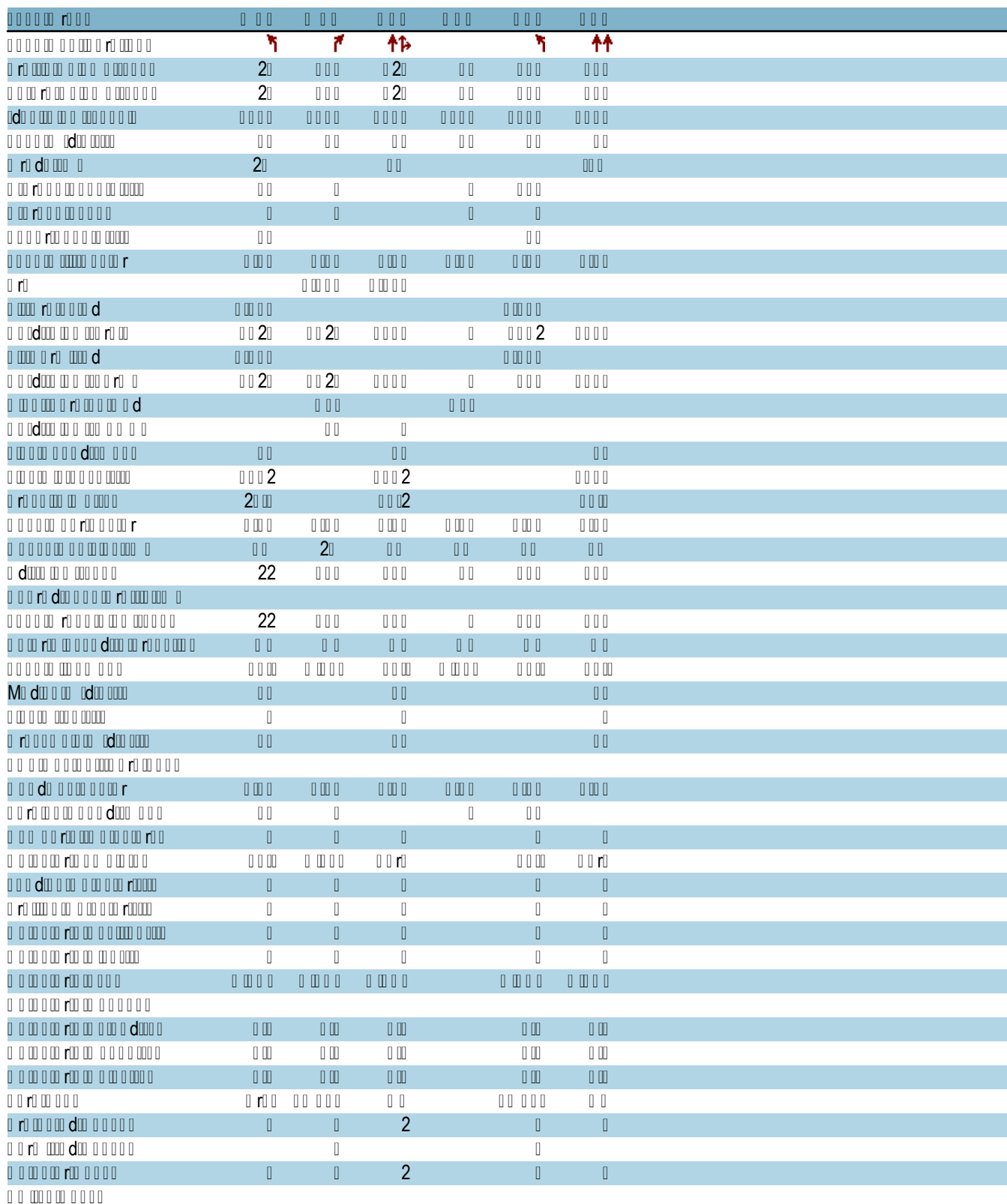


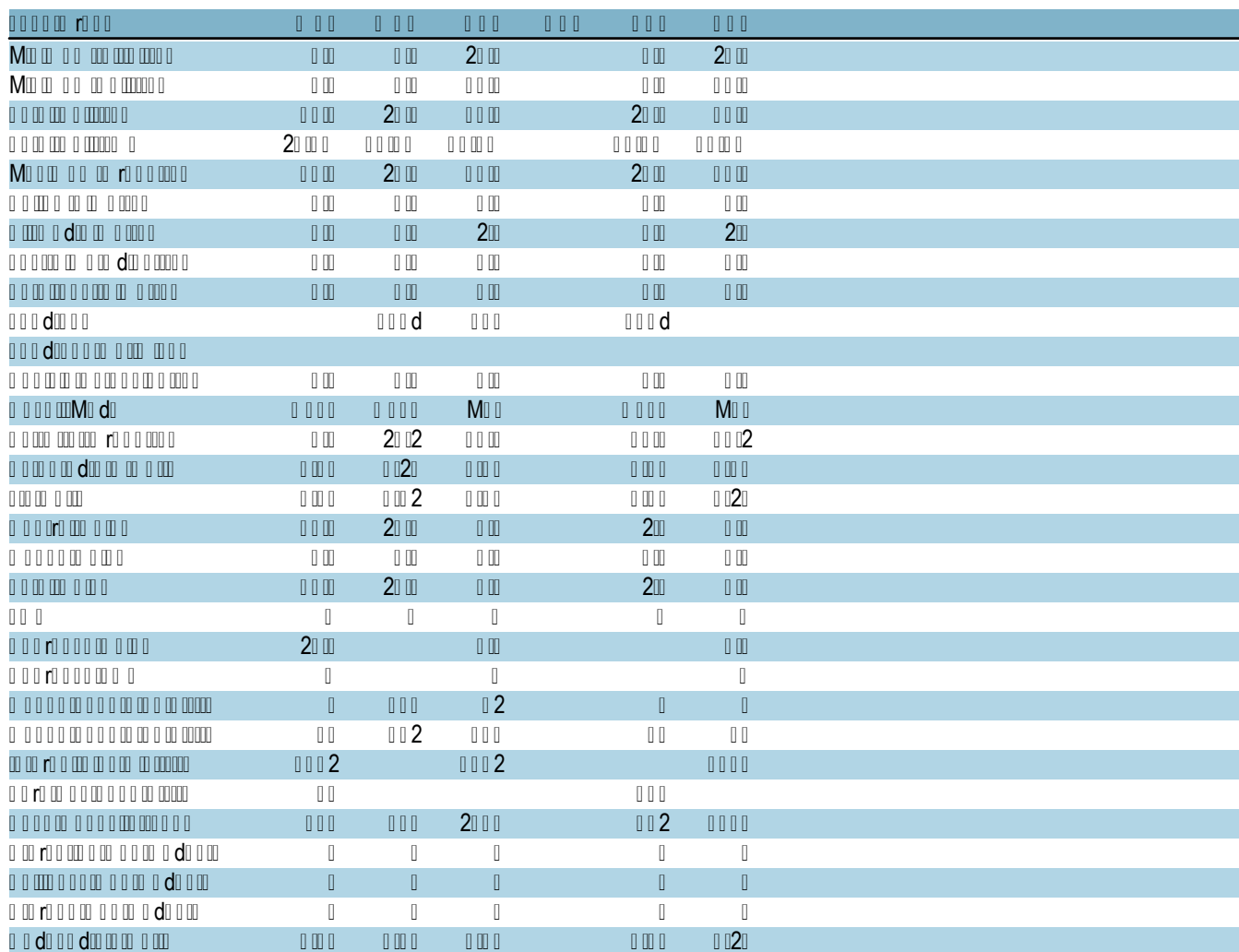
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第 2 章

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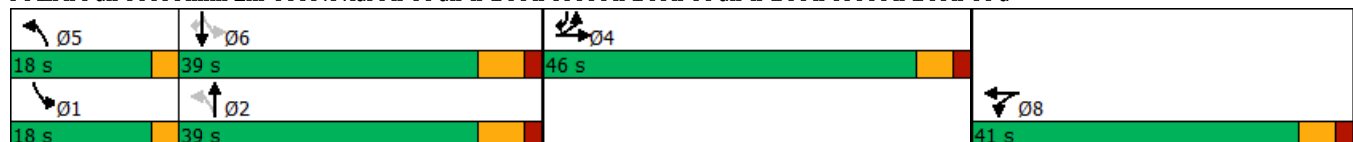
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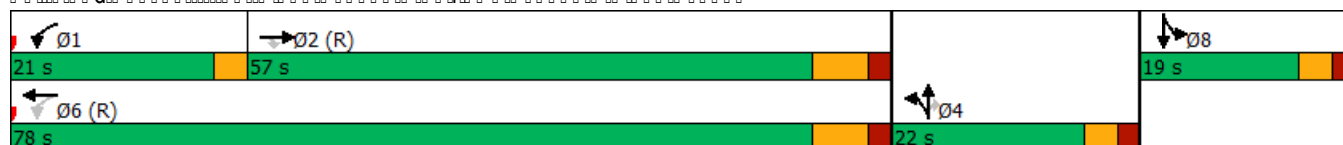
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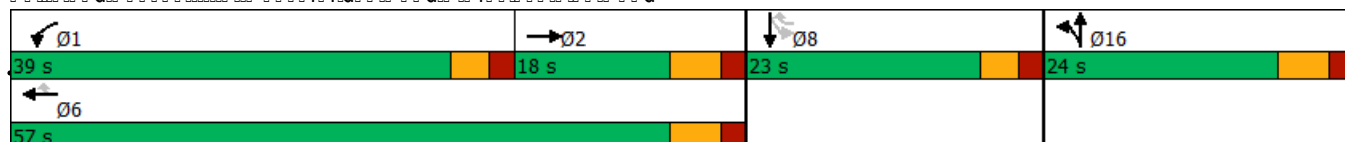
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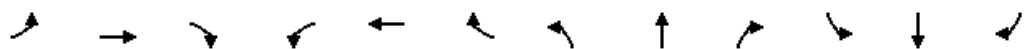
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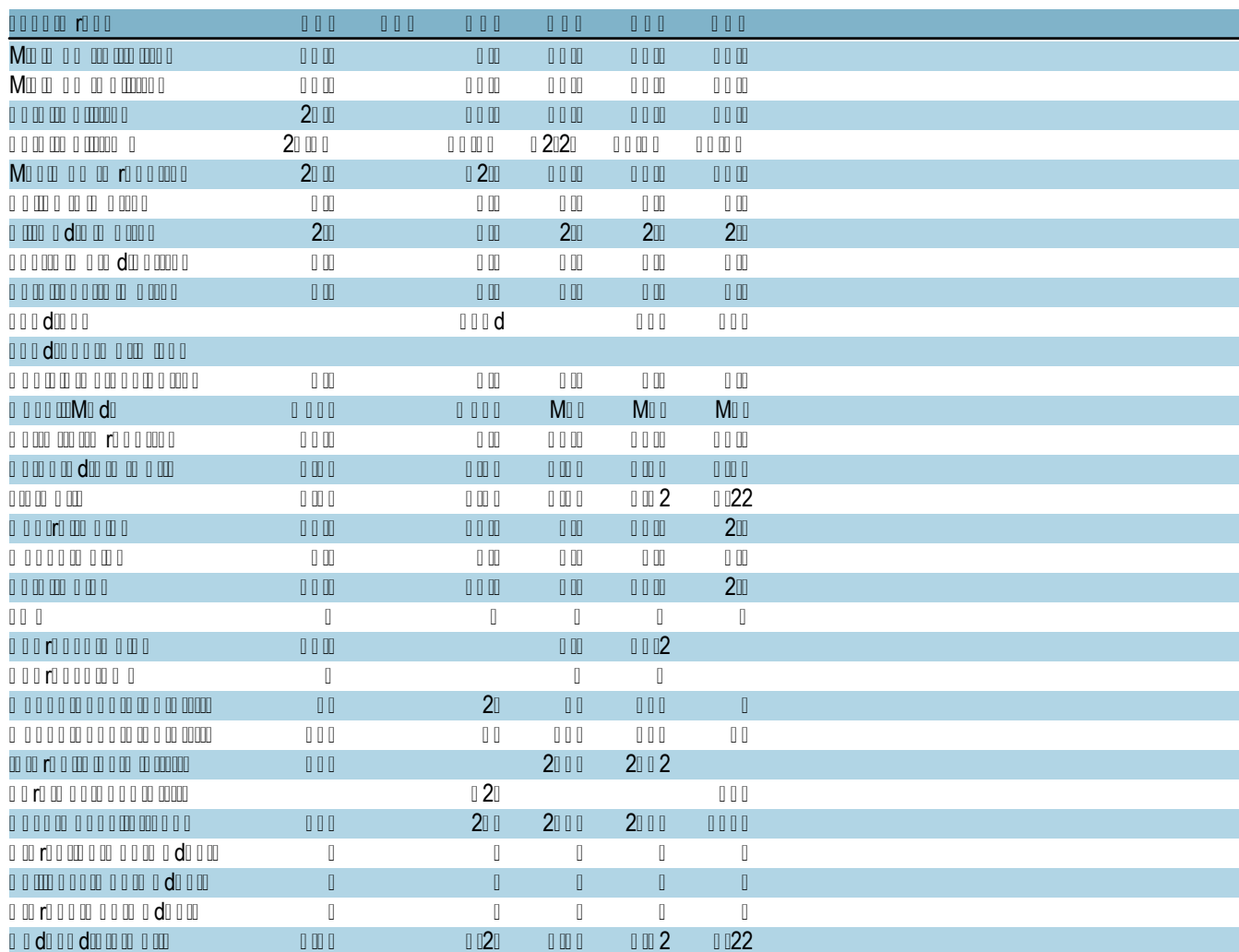
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Figure 1: Gantt chart of the schedule. The chart shows three tasks: Task 1 (green bar, 65s), Task 2 (green bar, 15s), and Task 3 (green bar, 50s). Task 1 starts at 0s and ends at 65s. Task 2 starts at 0s and ends at 15s. Task 3 starts at 15s and ends at 65s. The chart is divided into three sections: 0-15s, 15-50s, and 50-65s. The first section shows Task 1 and Task 2. The second section shows Task 1 and Task 3. The third section shows Task 1 and Task 3. The chart is labeled with '02', '05', '06', and '04' at the top.

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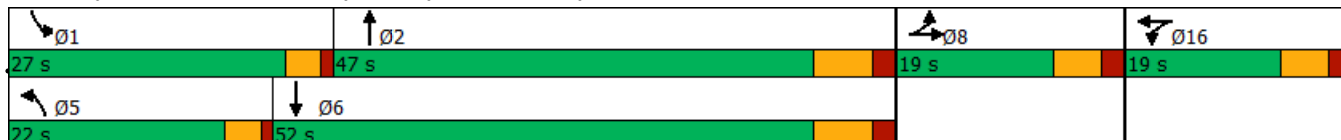
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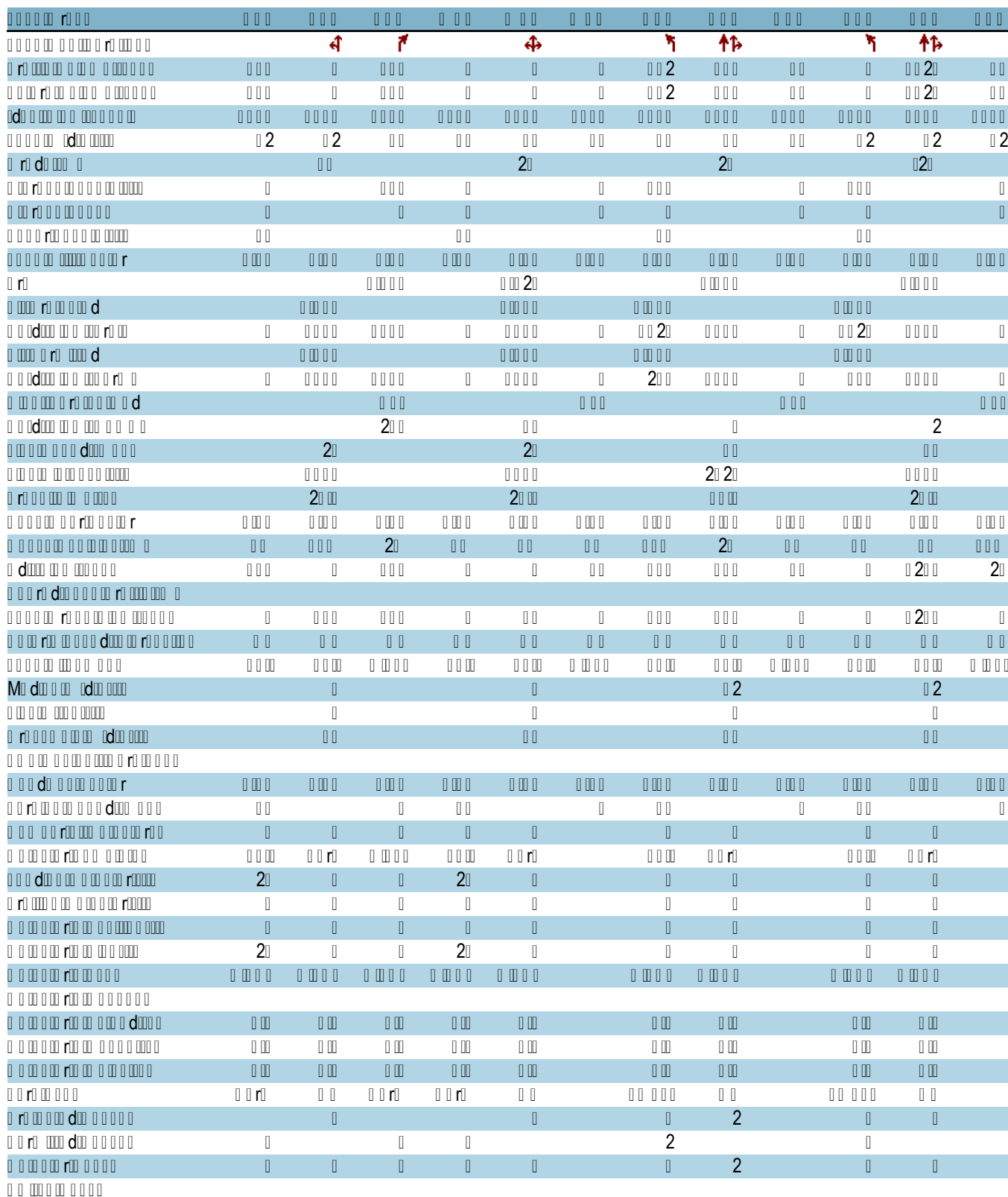
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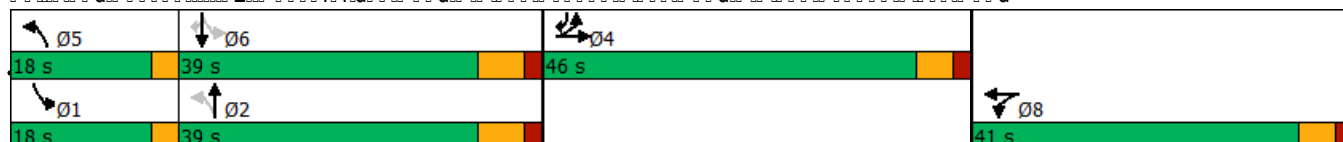
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Abstract

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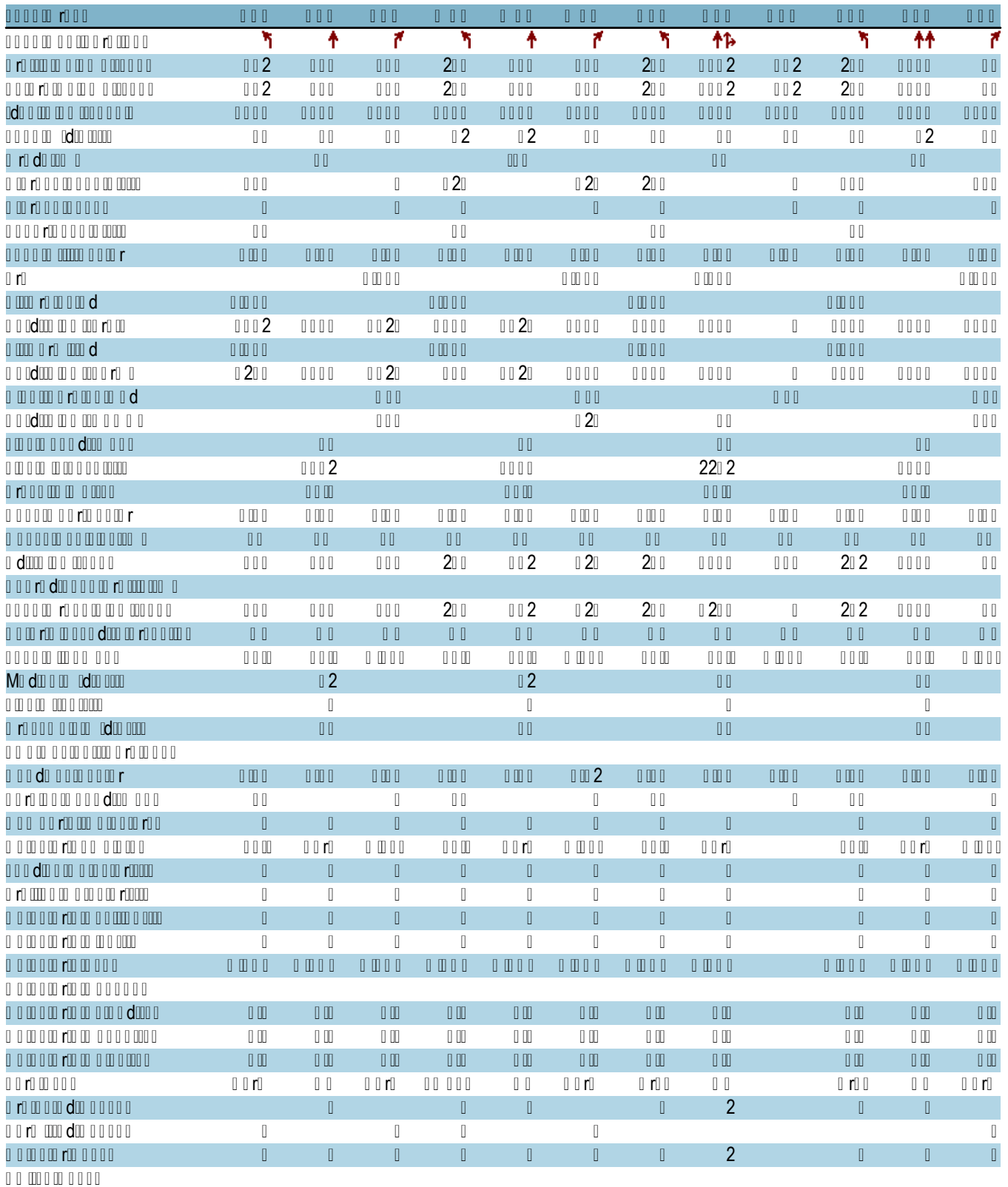
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22 s	41 s	15 s	34 s
 $\varnothing_5$	 $\varnothing_6$	 $\varnothing_4$	
27 s	41 s	40 s	

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Figure 10: Gantt chart for the 2-machine scheduling problem. The chart shows two machines, M1 and M2, with their respective job schedules. Machine M1 processes jobs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50. Machine M2 processes jobs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50. The chart is divided into two main sections: the left section for jobs 1-25 and the right section for jobs 26-50. Each section has a header row with job numbers and a corresponding color-coded bar. The Gantt chart shows the processing times for each job on each machine. For example, job 1 takes 65s on M1 and 15s on M2. Job 2 takes 50s on M1 and 25s on M2. Job 3 takes 15s on M1 and 50s on M2. Job 4 takes 25s on M1 and 15s on M2. Job 5 takes 50s on M1 and 25s on M2. Job 6 takes 15s on M1 and 50s on M2. Job 7 takes 25s on M1 and 15s on M2. Job 8 takes 50s on M1 and 25s on M2. Job 9 takes 15s on M1 and 50s on M2. Job 10 takes 25s on M1 and 15s on M2. Job 11 takes 50s on M1 and 25s on M2. Job 12 takes 15s on M1 and 50s on M2. Job 13 takes 25s on M1 and 15s on M2. Job 14 takes 50s on M1 and 25s on M2. Job 15 takes 15s on M1 and 50s on M2. Job 16 takes 25s on M1 and 15s on M2. Job 17 takes 50s on M1 and 25s on M2. Job 18 takes 15s on M1 and 50s on M2. Job 19 takes 25s on M1 and 15s on M2. Job 20 takes 50s on M1 and 25s on M2. Job 21 takes 15s on M1 and 50s on M2. Job 22 takes 25s on M1 and 15s on M2. Job 23 takes 50s on M1 and 25s on M2. Job 24 takes 15s on M1 and 50s on M2. Job 25 takes 25s on M1 and 15s on M2. Job 26 takes 50s on M1 and 25s on M2. Job 27 takes 15s on M1 and 50s on M2. Job 28 takes 25s on M1 and 15s on M2. Job 29 takes 50s on M1 and 25s on M2. Job 30 takes 15s on M1 and 50s on M2. Job 31 takes 25s on M1 and 15s on M2. Job 32 takes 50s on M1 and 25s on M2. Job 33 takes 15s on M1 and 50s on M2. Job 34 takes 25s on M1 and 15s on M2. Job 35 takes 50s on M1 and 25s on M2. Job 36 takes 15s on M1 and 50s on M2. Job 37 takes 25s on M1 and 15s on M2. Job 38 takes 50s on M1 and 25s on M2. Job 39 takes 15s on M1 and 50s on M2. Job 40 takes 25s on M1 and 15s on M2. Job 41 takes 50s on M1 and 25s on M2. Job 42 takes 15s on M1 and 50s on M2. Job 43 takes 25s on M1 and 15s on M2. Job 44 takes 50s on M1 and 25s on M2. Job 45 takes 15s on M1 and 50s on M2. Job 46 takes 25s on M1 and 15s on M2. Job 47 takes 50s on M1 and 25s on M2. Job 48 takes 15s on M1 and 50s on M2. Job 49 takes 25s on M1 and 15s on M2. Job 50 takes 50s on M1 and 25s on M2.

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 Ø1 27 s	 Ø2 56 s	 Ø8 26 s	 Ø16 26 s
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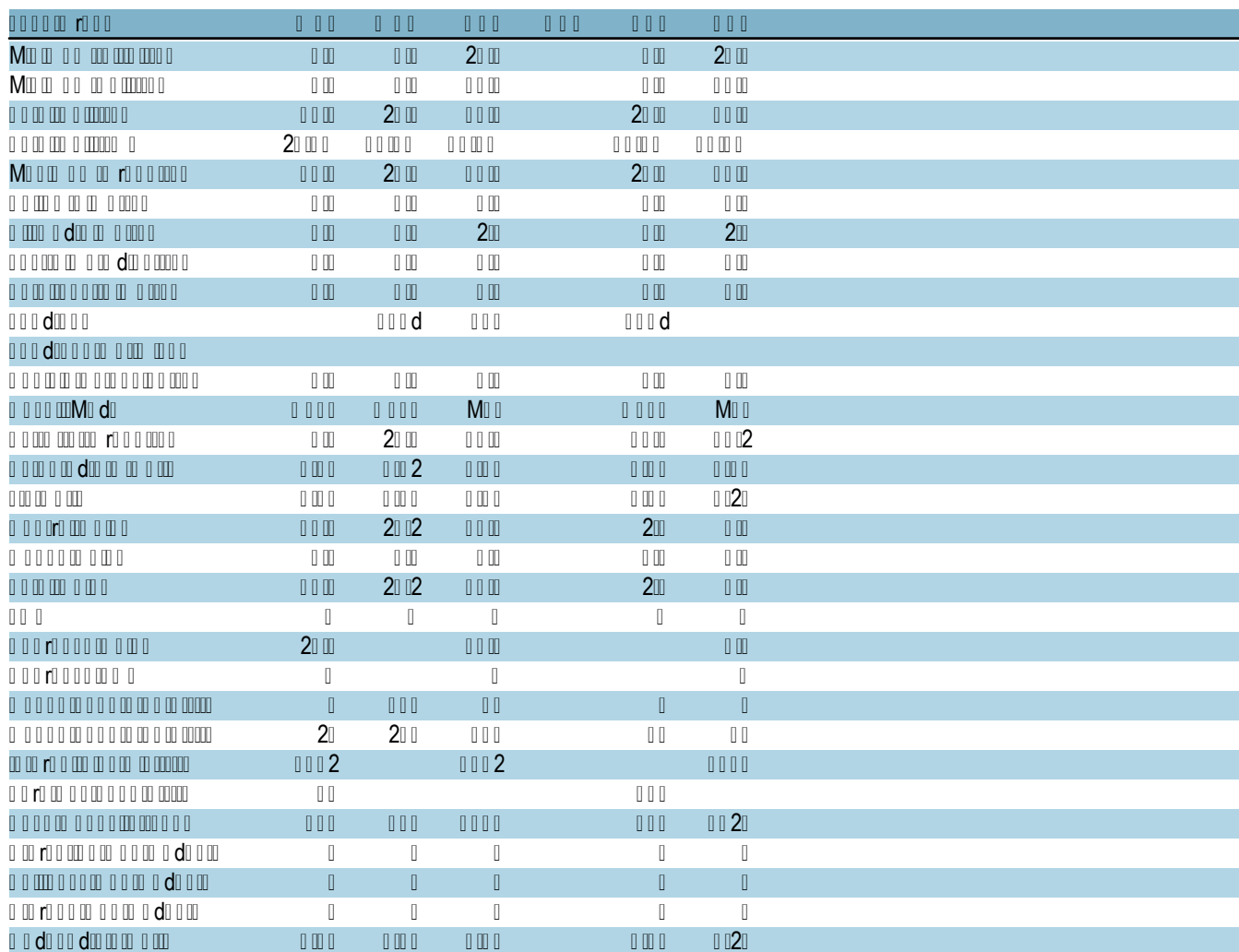
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Figure 6. The effect of the number of trials on the accuracy of the response. The mean proportion of correct responses as a function of the number of trials (10, 20, 30, 40) for each condition (10, 20, 30, 40). Error bars represent standard error.

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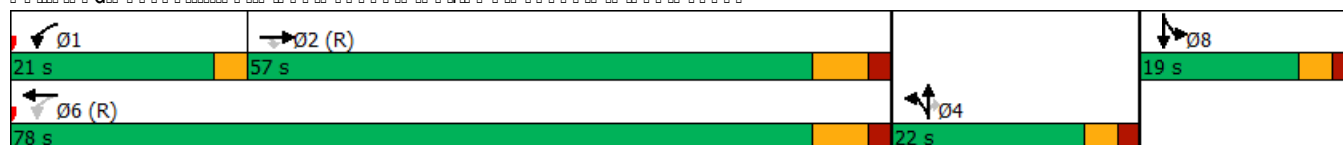


Figure 6. The effect of the number of nodes on the performance of the proposed algorithm. The figure shows two bar charts comparing the execution time (in seconds) of the proposed algorithm against the number of nodes (ranging from 10 to 100). The top chart shows the execution time for the proposed algorithm, which increases linearly with the number of nodes. The bottom chart shows the execution time for the proposed algorithm, which also increases linearly with the number of nodes.

Abstract

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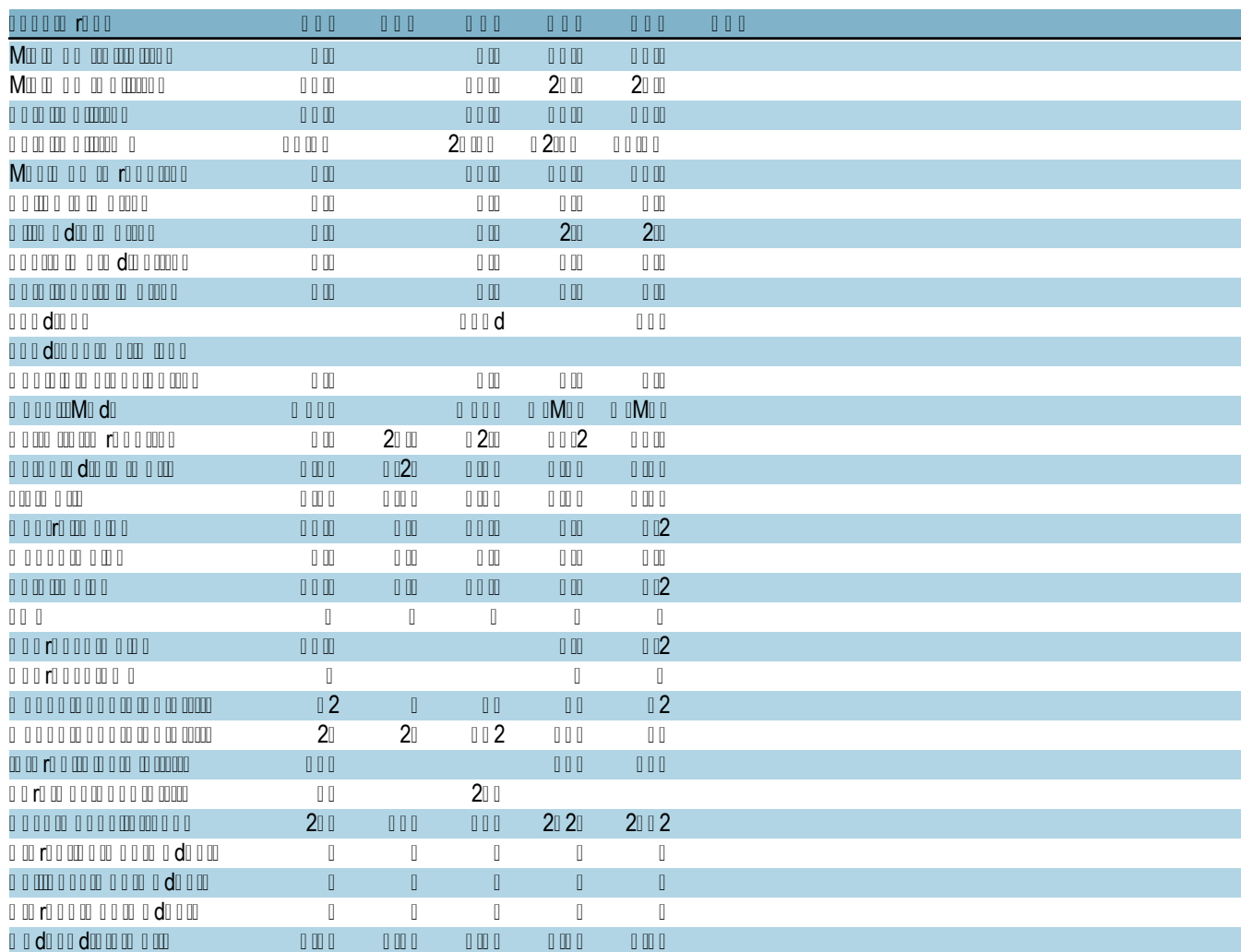
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13 s |  Ø6
36 s |  Ø2
17 s |
|  Ø8 (R)
27 s |  | | |

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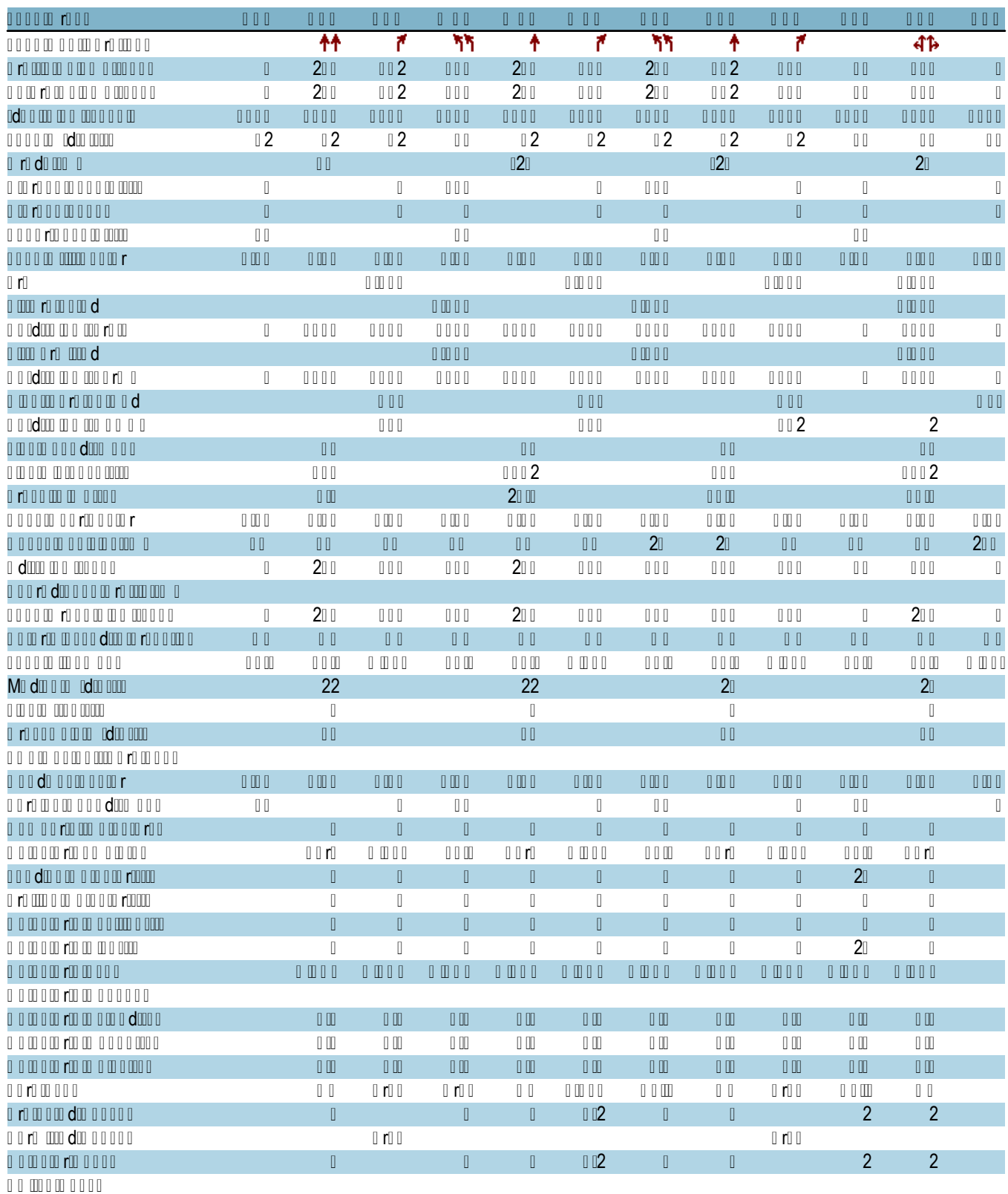
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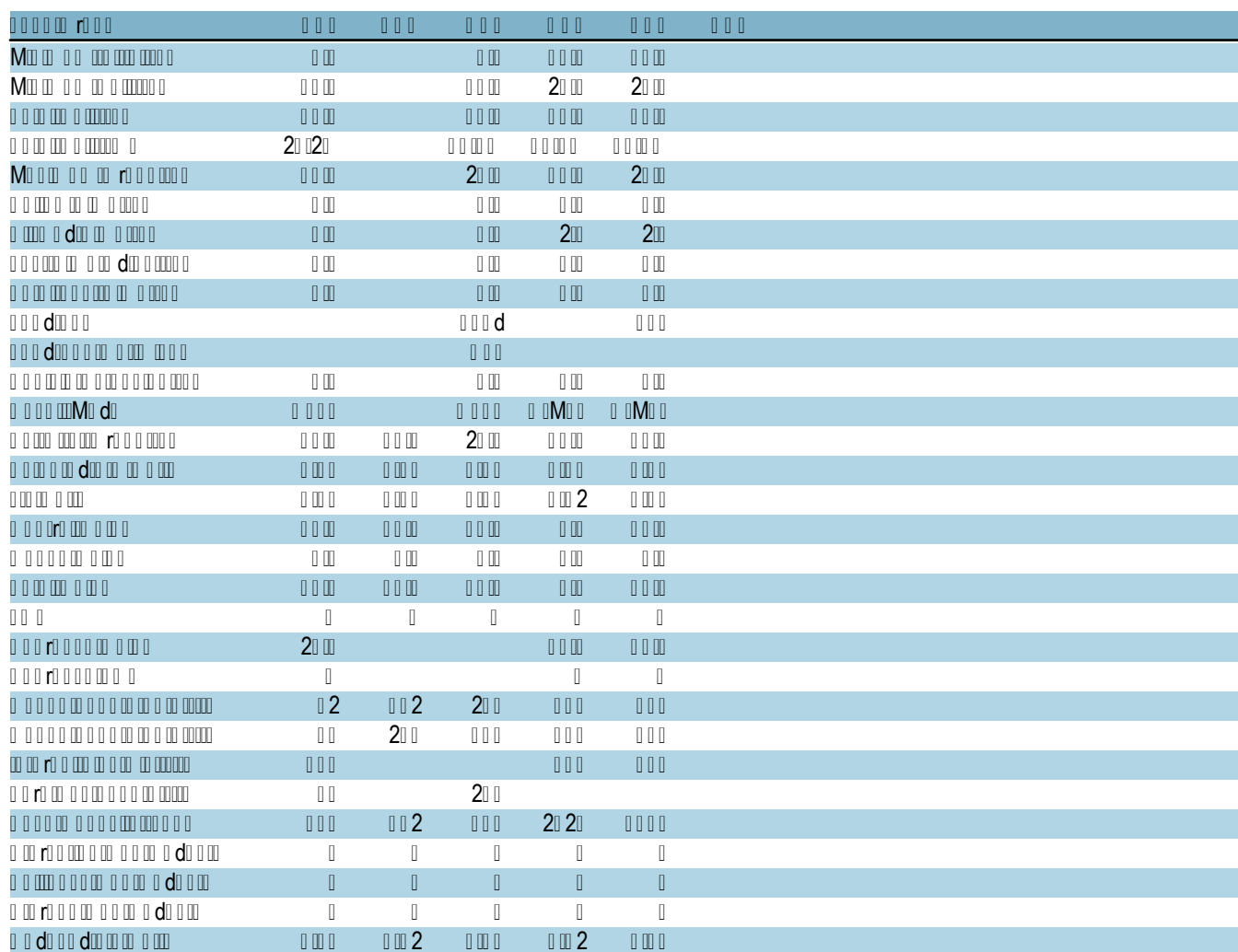
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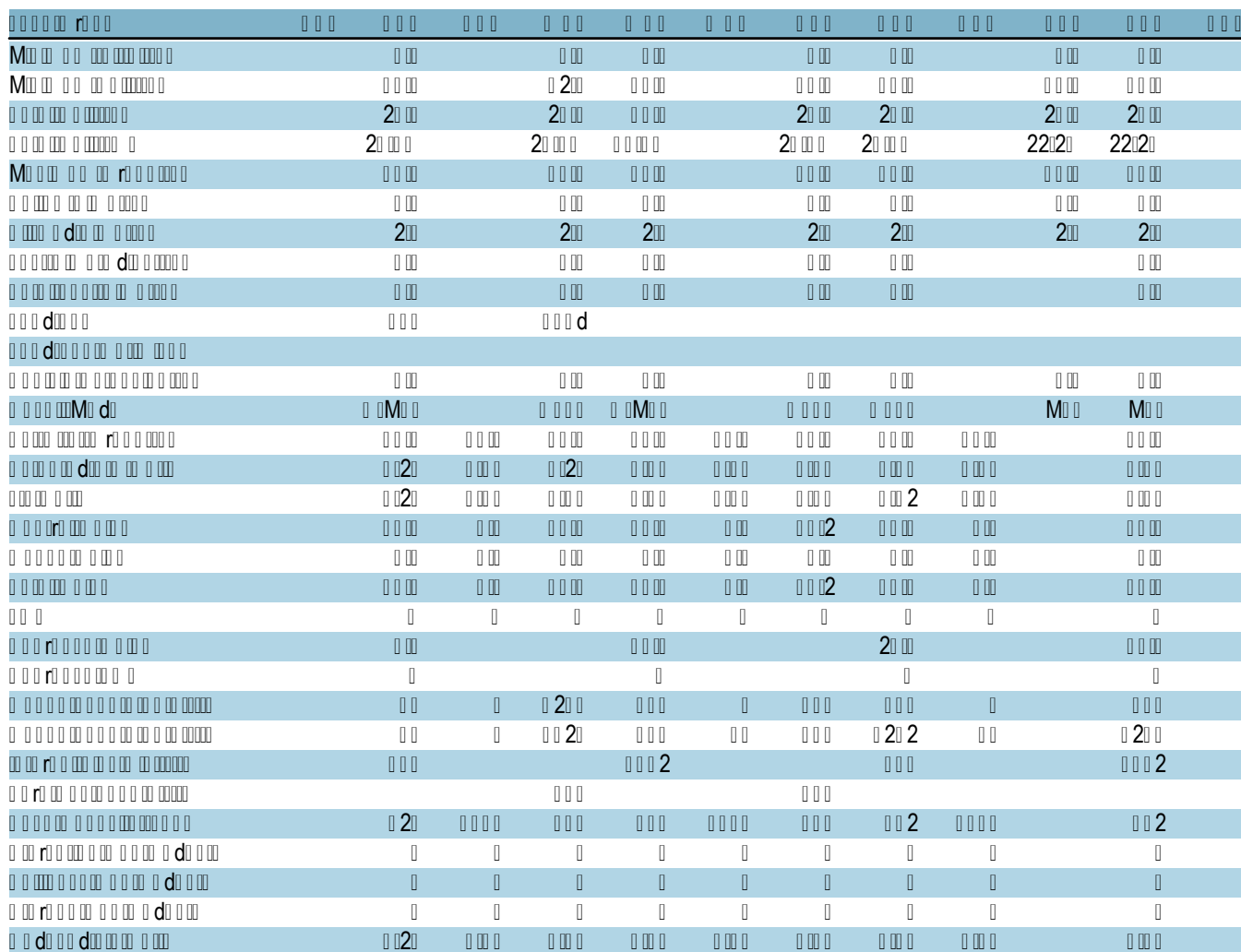
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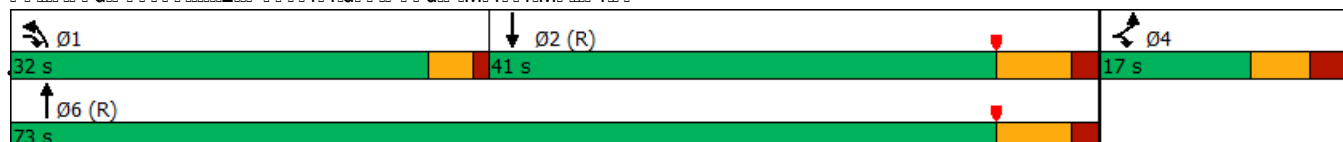
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 195. **Project**
 196. **Initiative**
 197. **Effort**
 198. **Work**
 199. **Job**
 200. **Task**
 201. **Assignment**
 202. **Exercise**
 203. **Activity**
 204. **Operation**
 205. **Process**
 206. **Procedure**
 207. **Method**
 208. **Technique**
 209. **Approach**
 210. **Strategy**
 211. **Policy**
 212. **Plan**
 213. **Program**
 214. **Project**
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 248. **Strategy**
 249. **Policy**
 250. **Plan**
 251. **Program**
 252. **Project**
 253. **Initiative**
 254. **Effort**
 255. **Work**
 256. **Job**
 257. **Task**
 258. **Assignment**
 259. **Exercise**
 260. **Activity**

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Introduction

QUESTION

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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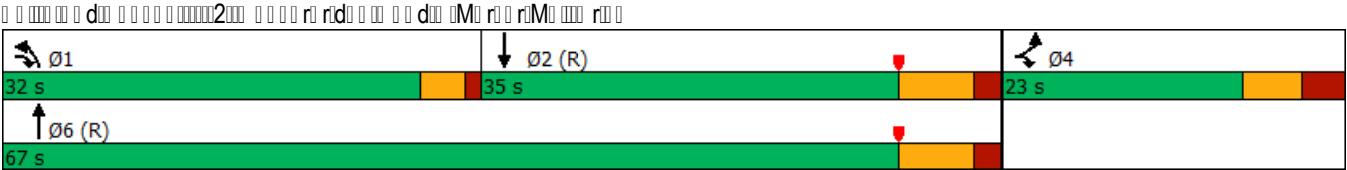
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 Ø8 (R)
 48 s |  Ø4 (R)
 16 s
 |  Ø6
 22 s |  Ø2
 20 s |
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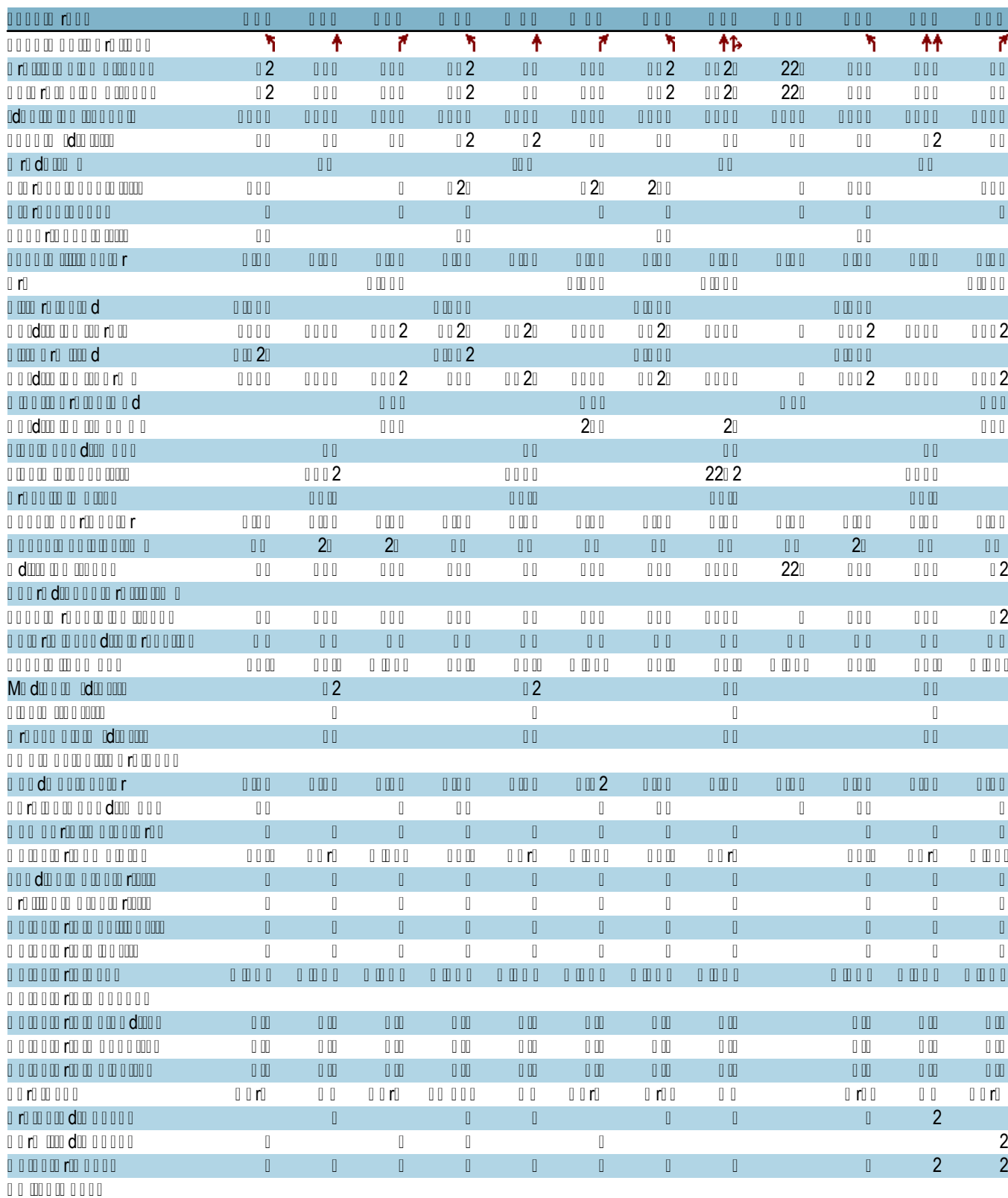
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Figure 1 is a Gantt chart illustrating the schedule for a 3-processor problem. The chart shows three horizontal bars representing the execution of jobs on three processors. The top bar is for job 1 (13s), the middle for job 2 (75s), and the bottom for job 6 (88s). Each bar is divided into segments of different colors (green, yellow, red) representing different phases of the job. Arrows indicate the start and end of each job's execution on its respective processor. The bottom bar also shows a segment for job 4 (27s) at the end.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 104

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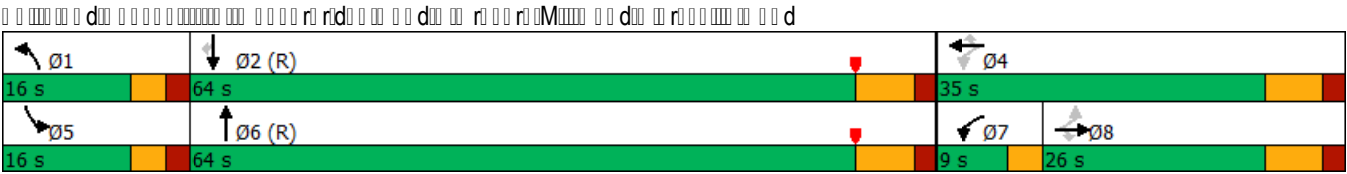
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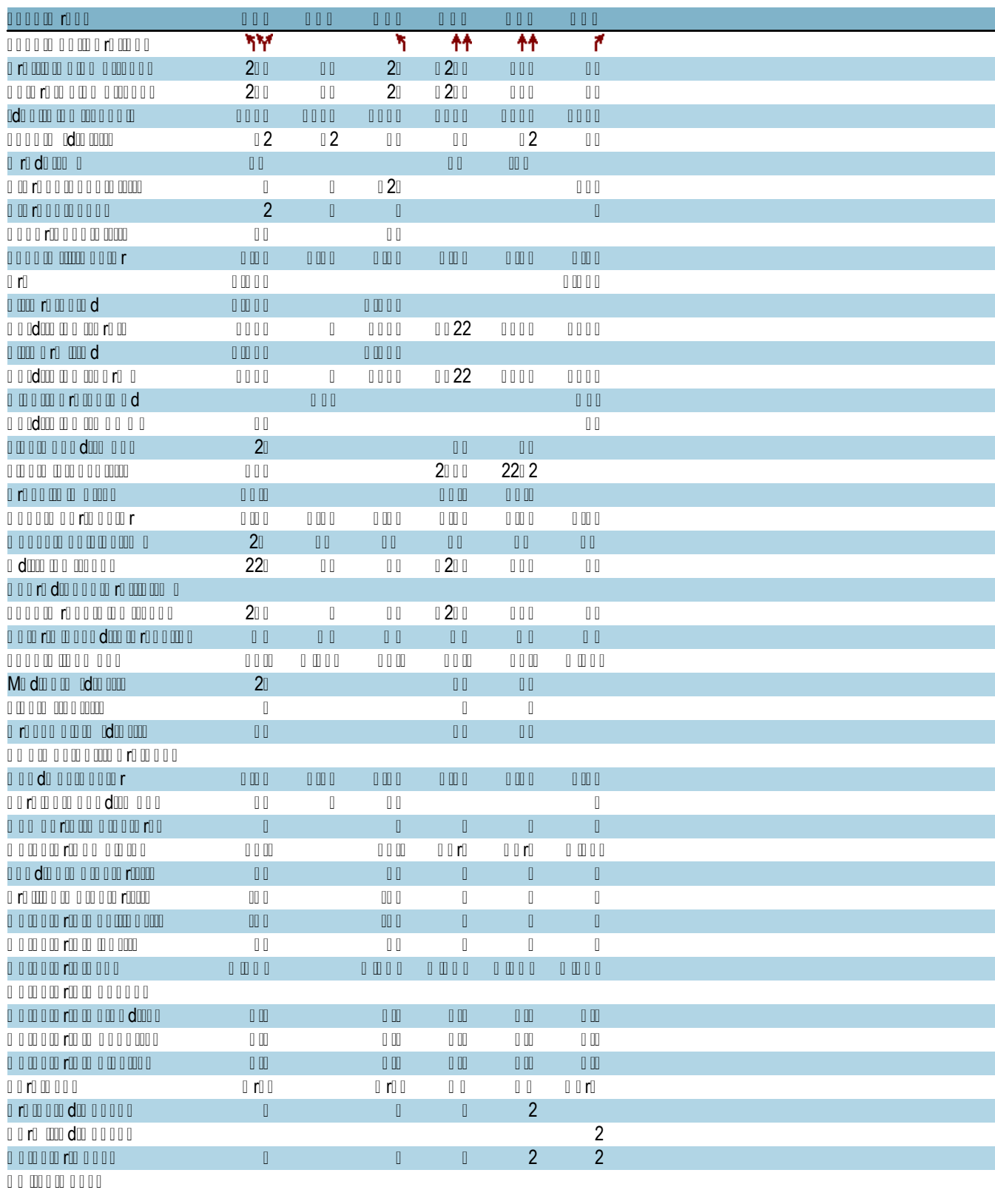
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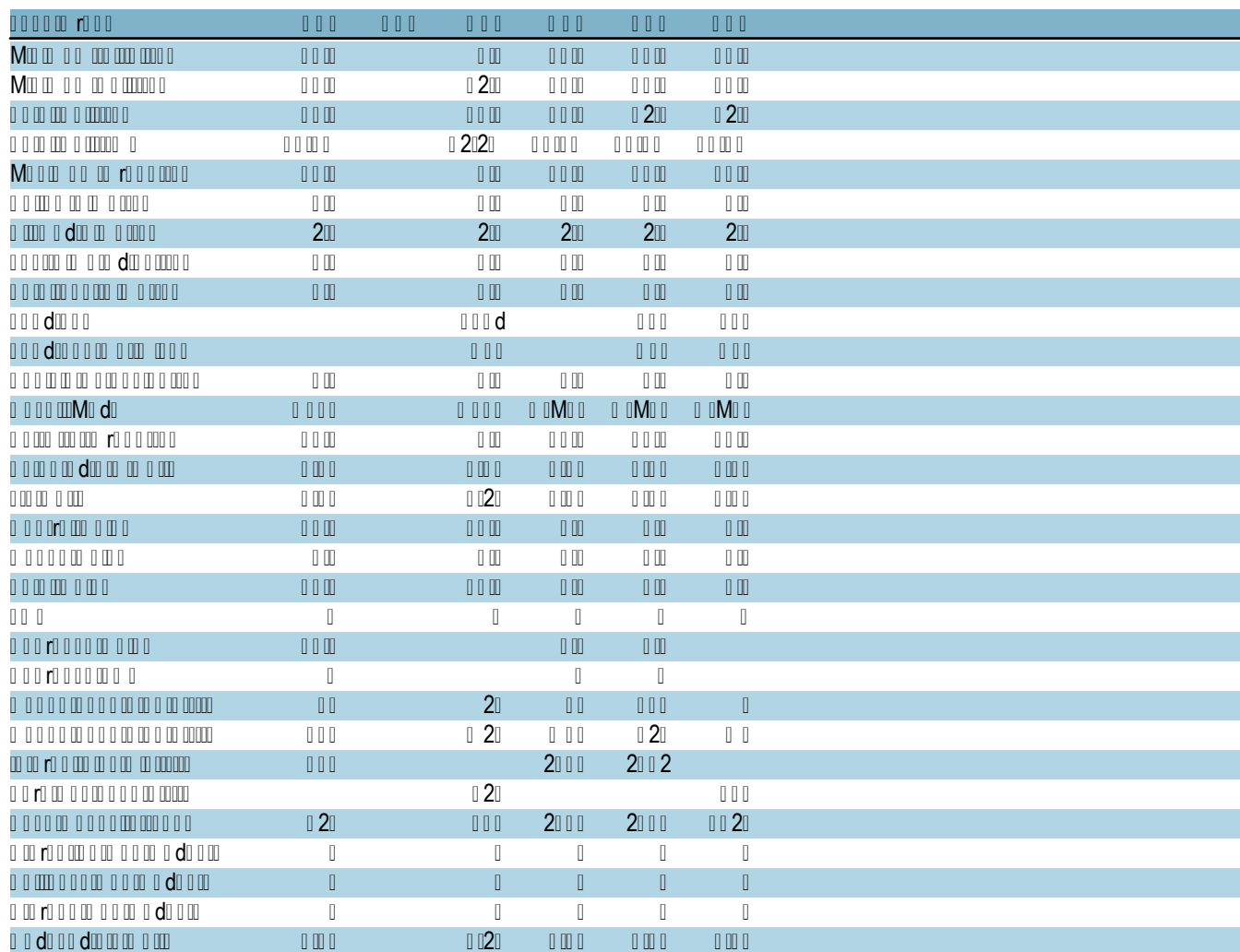
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|  Ø1
14 s |  Ø2 (R)
82 s |  Ø4
19 s |
|  Ø6 (R)
96 s | | |

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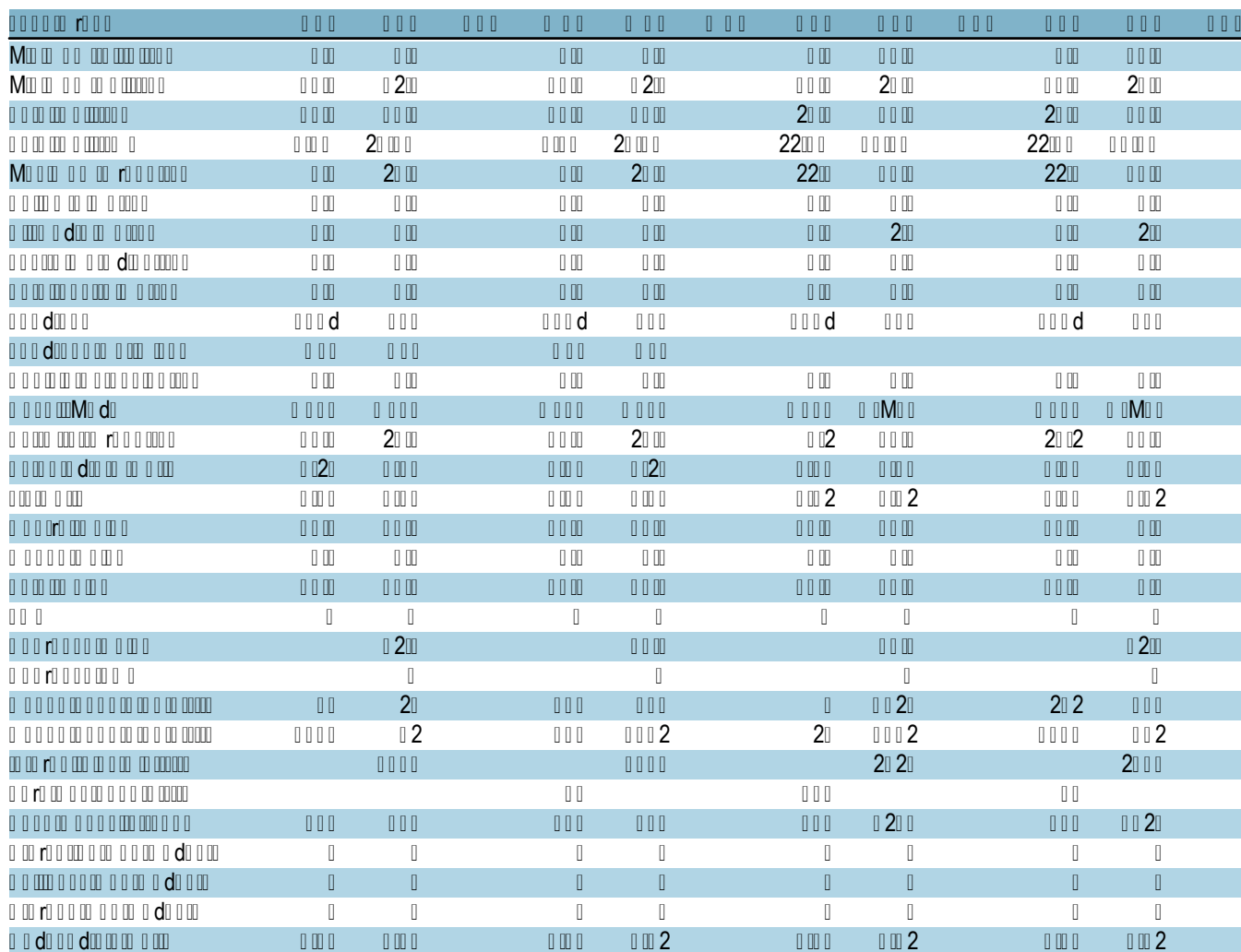
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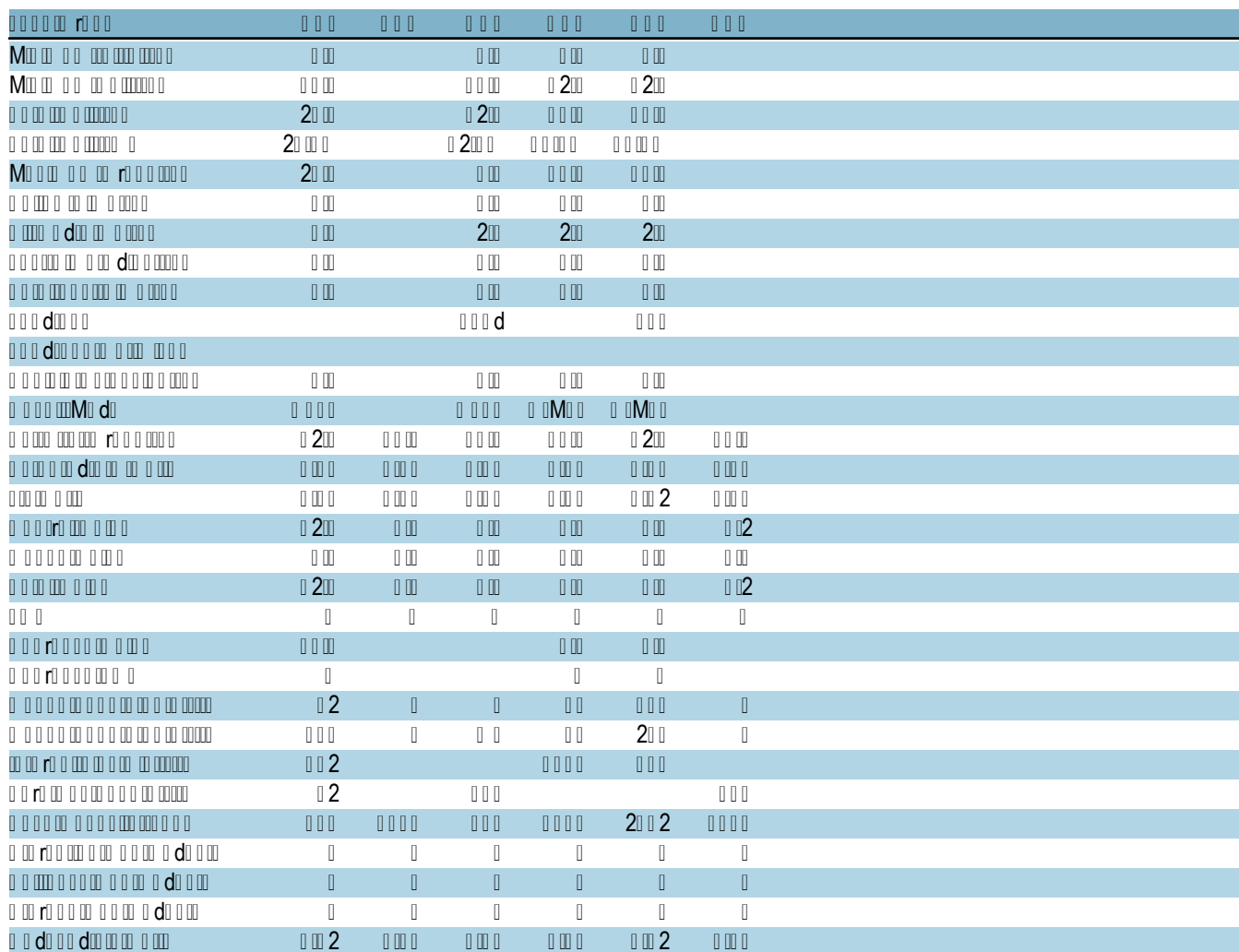
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| ↖ Ø1 | ↓ Ø2 (R) | ↗ Ø3 | ↖ Ø4 |
| 26 s | 45 s | 11 s | 33 s |
| ↖ Ø5 | ↑ Ø6 (R) | ↘ Ø7 | ↗ Ø8 |
| 26 s | 45 s | 11 s | 33 s |

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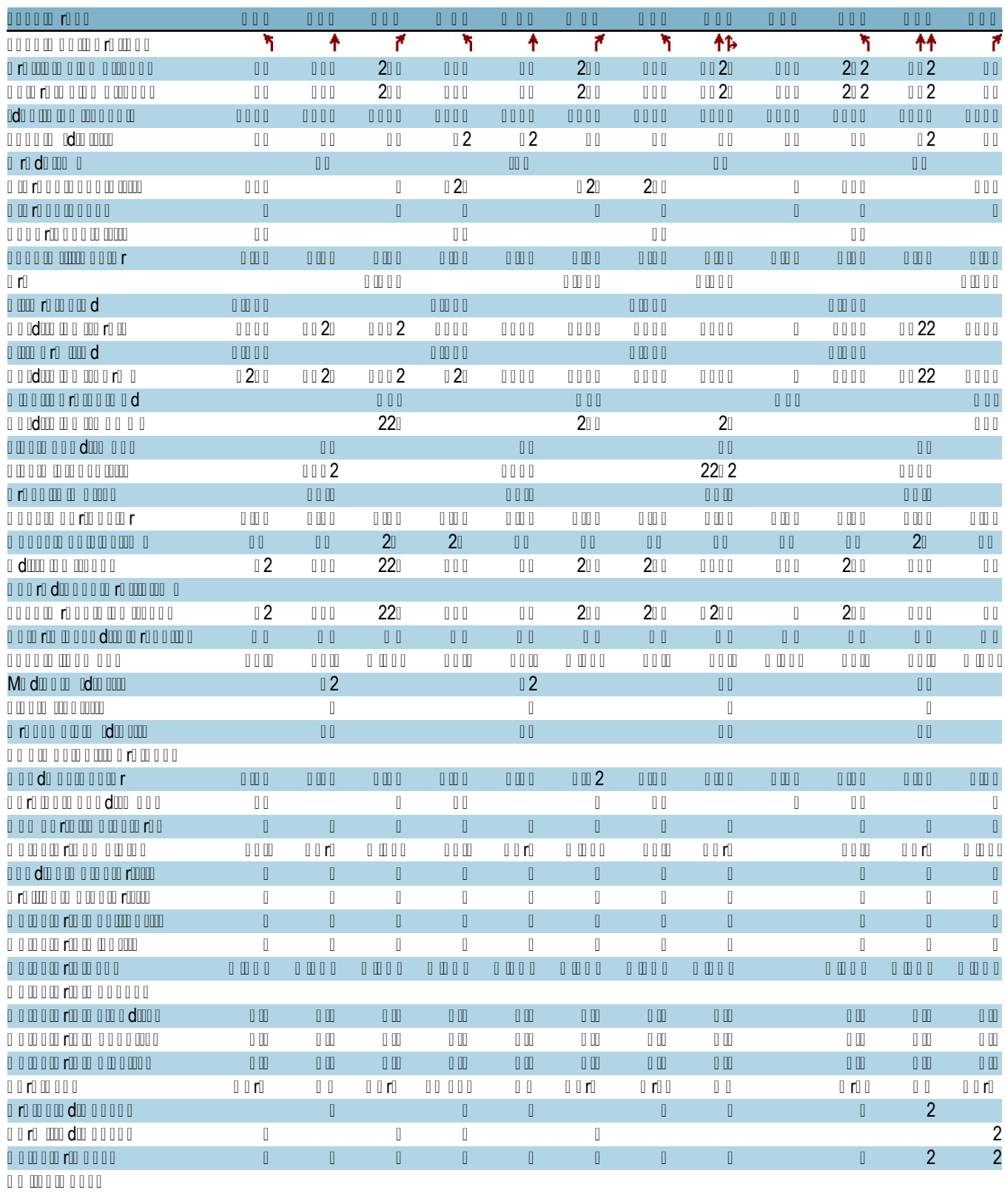
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| <div> <div>↙ Ø1</div> <div>12 s</div> </div> | <div> <div>↓ Ø2 (R)</div> <div>56 s</div> </div> | |
| <div> <div>↖ Ø6 (R)</div> <div>68 s</div> </div> | | <div> <div>↗ Ø4</div> <div>27 s</div> </div> |

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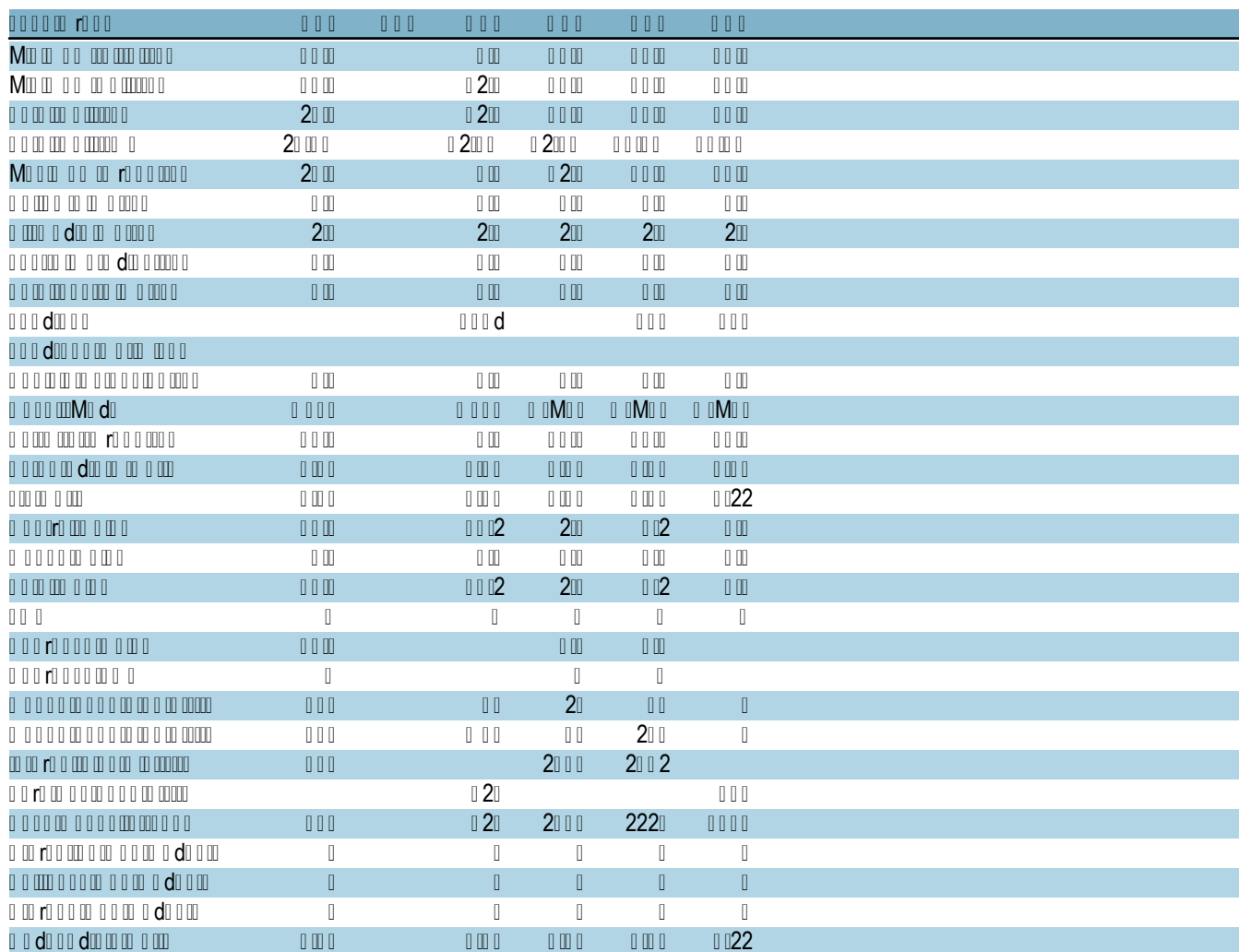
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|  Ø1
18 s |  Ø2 (R)
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|  Ø5
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51 s |  Ø7
10 s |  Ø8
16 s |

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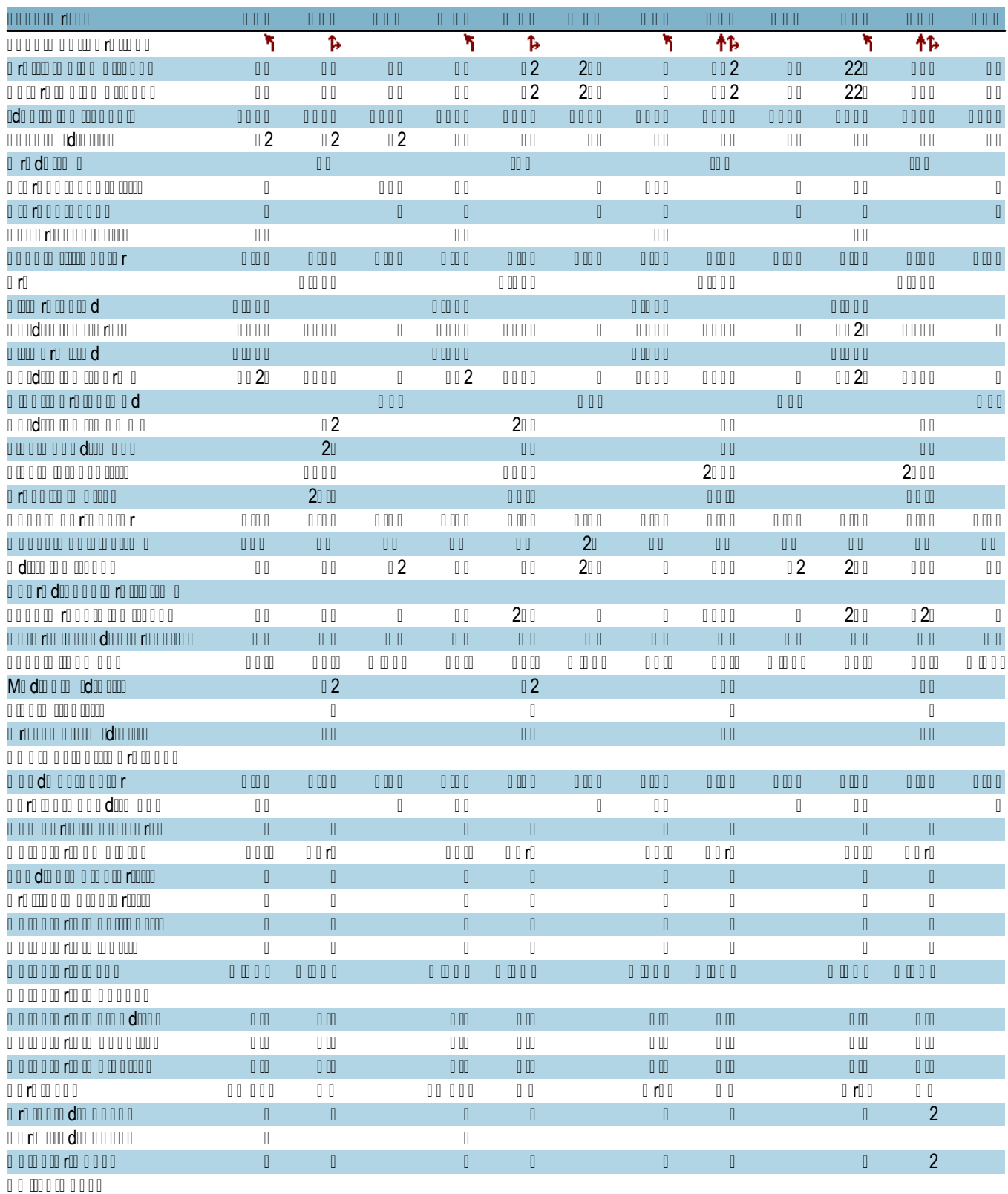
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| 12 s | 57 s | | |
| ↑ Ø6 (R) | | | ↘ Ø4 |
| 69 s | 26 s | | |

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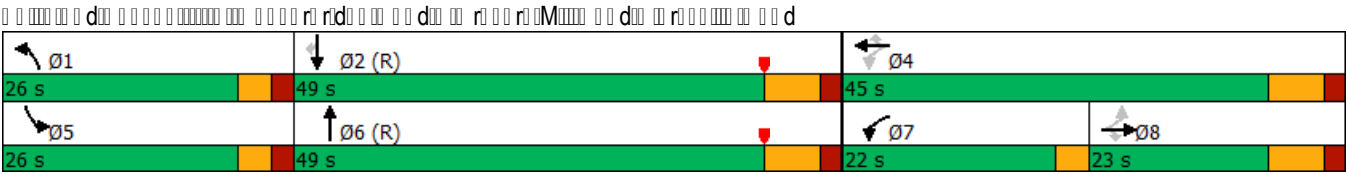
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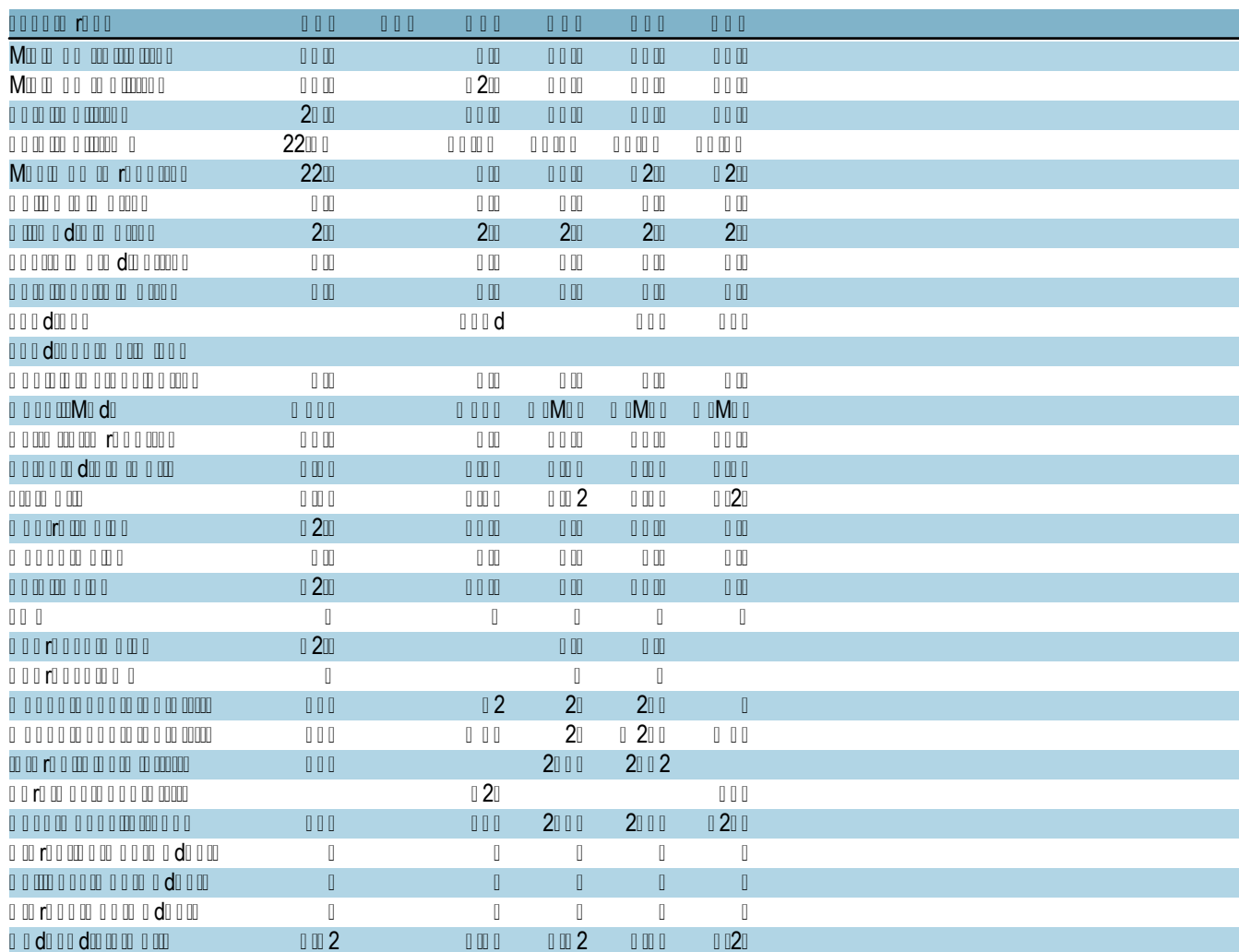
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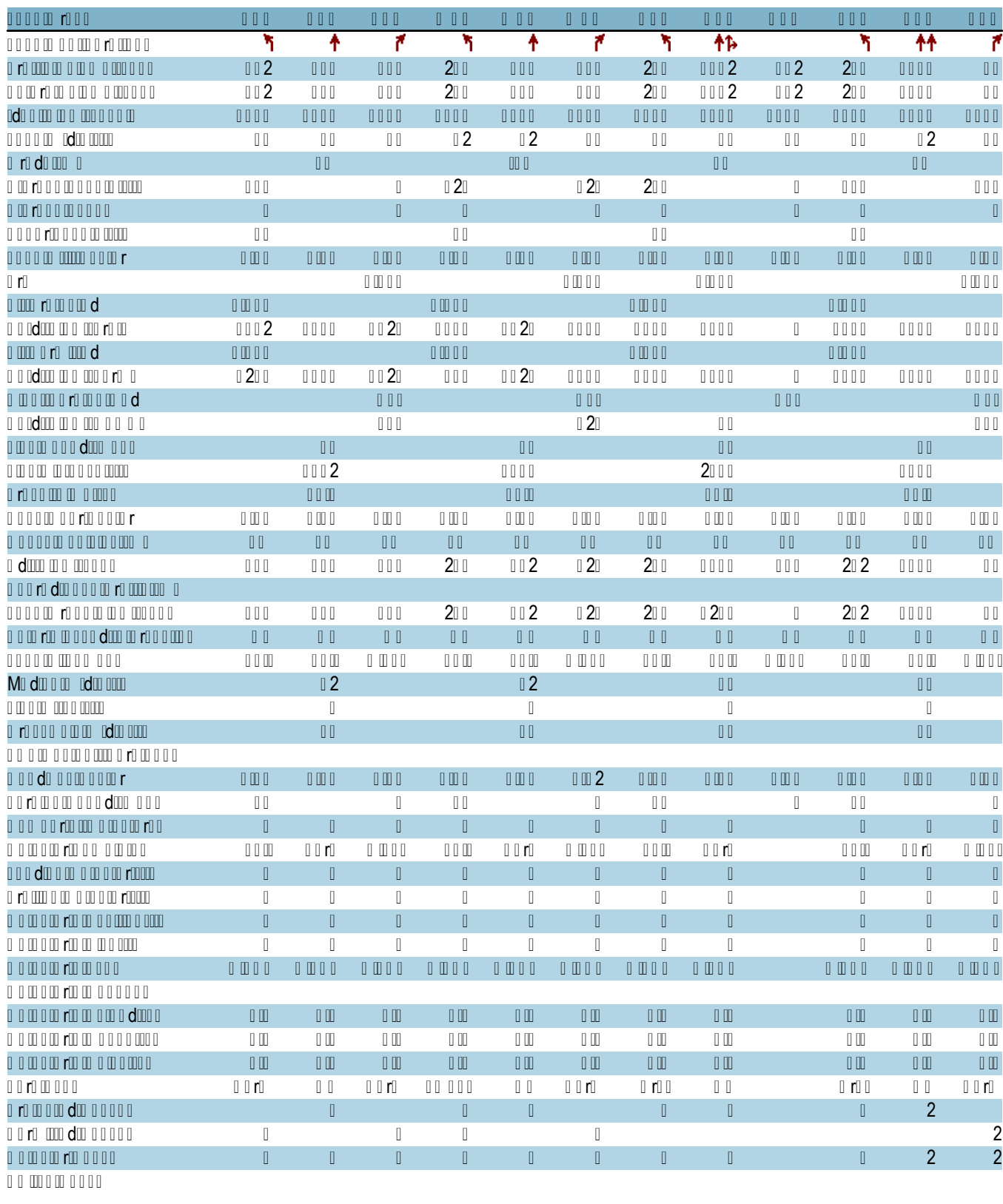
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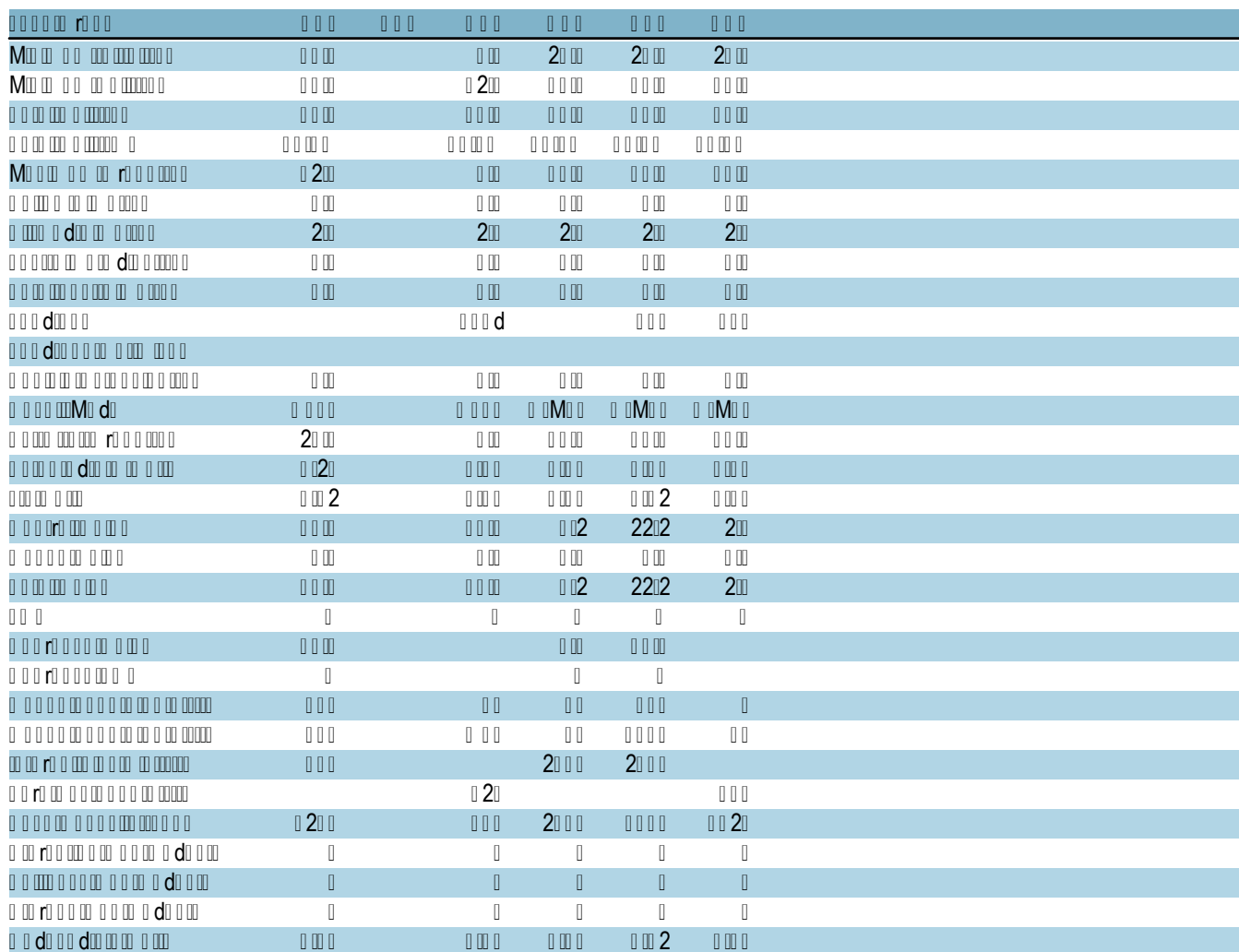
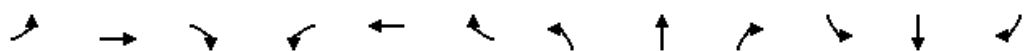
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Figure 1: Gantt chart showing the schedule of the four machines. The chart is divided into four rows, each representing a machine. The top row is labeled $\varnothing 1$ with a left arrow, $\varnothing 2 (R)$ with a down arrow, and $\varnothing 4$ with a right arrow. The second row shows a green bar from 13 s to 40 s, followed by a yellow bar and a red bar. The third row shows a green bar from 13 s to 40 s, followed by a yellow bar and a red bar. The bottom row shows a green bar from 13 s to 37 s, followed by a yellow bar and a red bar. Red vertical markers are placed at 40 s and 37 s. The x-axis is labeled with 13 s, 40 s, and 37 s.

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$\frac{1}{n} \sum_{i=1}^n \left(\frac{\partial \log p(\mathbf{x}_i)}{\partial \theta} \right)^T \frac{\partial \log p(\mathbf{x}_i)}{\partial \theta} = -\frac{1}{n} \sum_{i=1}^n \frac{\partial^2 \log p(\mathbf{x}_i)}{\partial \theta^2}$

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| | | |
|---|---|--|
|  Ø1
 13 s
 |  Ø2 (R)
 47 s
 |  Ø8
 25 s
 |
|  Ø5
 13 s
 |  Ø6 (R)
 47 s
 |  Ø4
 25 s
 |

1 2 3 4 5 6 7 8 9 10 11 12 r

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

| | |
|--|--|
|  Ø2 (R) |  Ø8 |
| 72 s | 13 s |
|  Ø6 (R) |  Ø4 |
| 72 s | 13 s |

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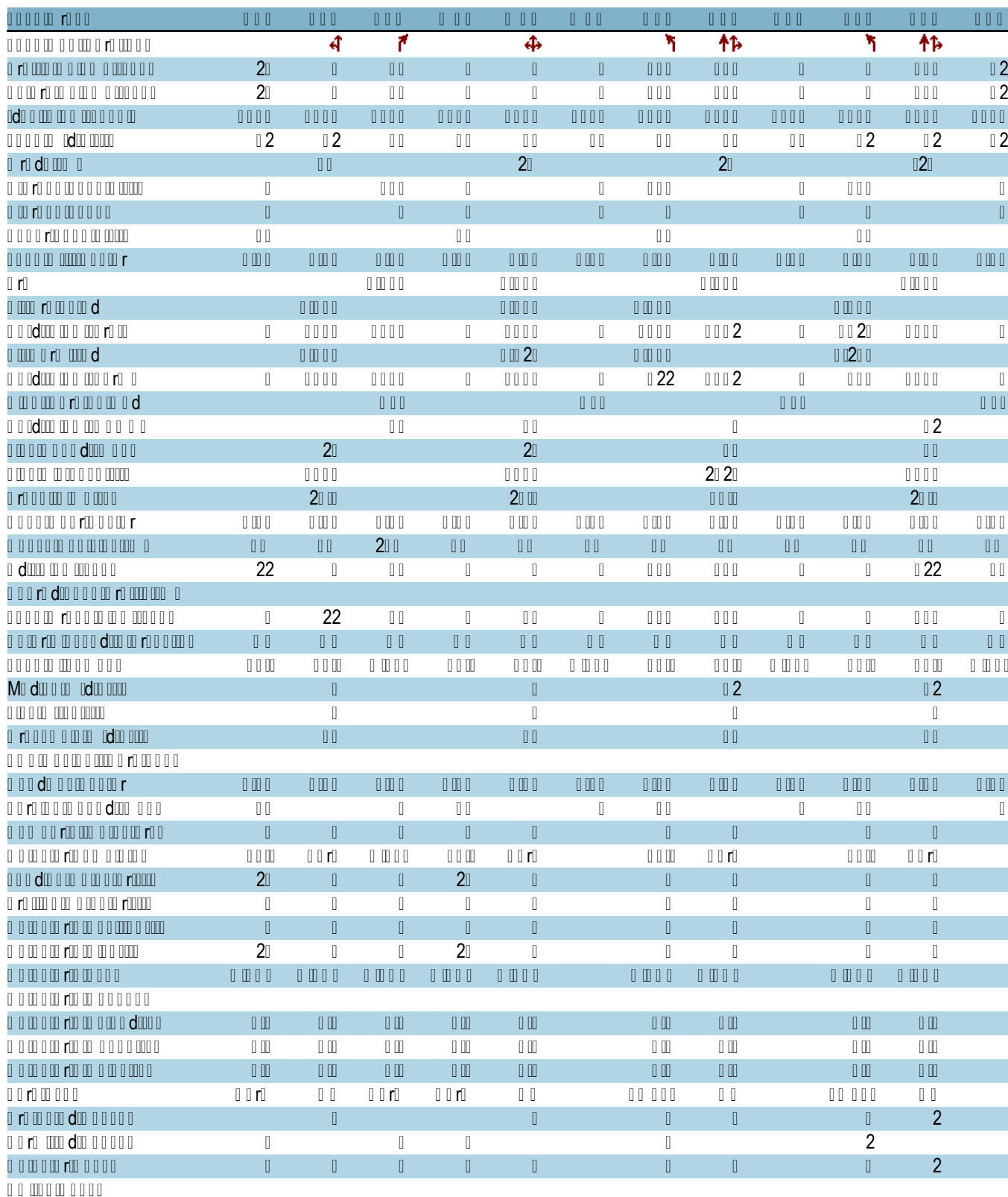


Figure 6

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| | | |
|--|--|--|
|  Ø1
10 s |  Ø2 (R)
61 s |  Ø8
14 s |
|  Ø5
10 s |  Ø6 (R)
61 s |  Ø4
14 s |

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$\frac{1}{n} \sum_{i=1}^n \left(\frac{1}{m_i} \sum_{j=1}^{m_i} x_{ij} \right) = \frac{1}{n} \sum_{i=1}^n \bar{x}_i$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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QUESTION

QUESTION **ANSWER**

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QUESTION

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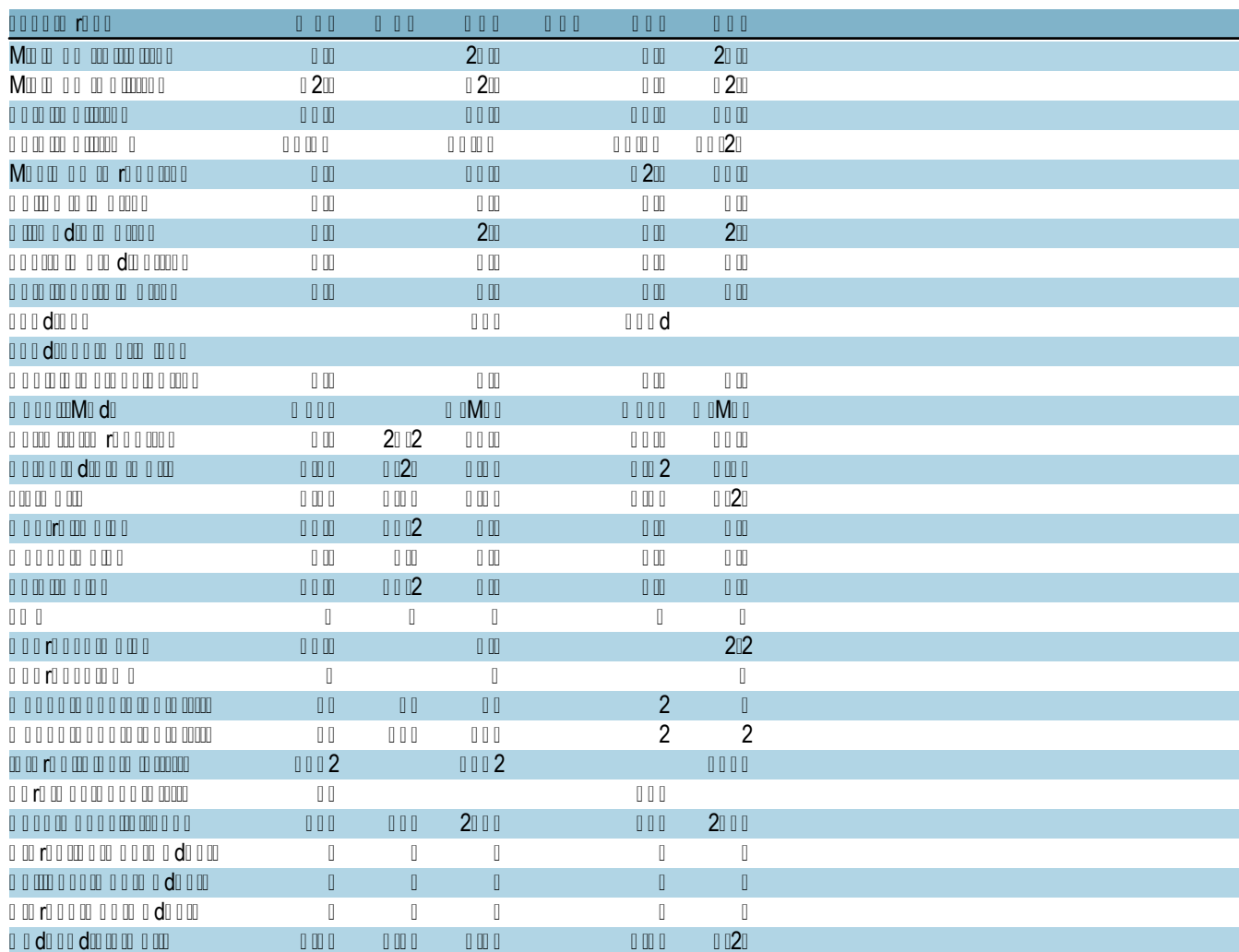


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1. $r_1, r_2, \dots, r_n$ are the roots of the polynomial $P(x)$.
 2. $r_1, r_2, \dots, r_n$ are the roots of the polynomial $P(x)$.
 3. $r_1, r_2, \dots, r_n$ are the roots of the polynomial $P(x)$.
 4. $r_1, r_2, \dots, r_n$ are the roots of the polynomial $P(x)$.
 5. $r_1, r_2, \dots, r_n$ are the roots of the polynomial $P(x)$.
 6. $r_1, r_2, \dots, r_n$ are the roots of the polynomial $P(x)$.
 7. $r_1, r_2, \dots, r_n$ are the roots of the polynomial $P(x)$.
 8. $r_1, r_2, \dots, r_n$ are the roots of the polynomial $P(x)$.
 9. $r_1, r_2, \dots, r_n$ are the roots of the polynomial $P(x)$.
 10. $r_1, r_2, \dots, r_n$ are the roots of the polynomial $P(x)$.

| | | | |
|--|--|--|--|
|  Ø1
15 s |  Ø2 (R)
65 s |  Ø6 (R)
80 s |  Ø4
15 s |
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$\frac{1}{n} \sum_{i=1}^n \left(\frac{\partial \log p(\mathbf{x}_i)}{\partial \theta} \right)^T \left(\frac{\partial \log p(\mathbf{x}_i)}{\partial \theta} \right) = -\frac{1}{n} \sum_{i=1}^n \frac{\partial^2 \log p(\mathbf{x}_i)}{\partial \theta^2}$

_____r_____d_____

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| | | |
|------|----------|------|
| ↖ Ø1 | ↓ Ø2 (R) | ↖ Ø8 |
| 12 s | 60 s | 23 s |
| ↖ Ø5 | ↑ Ø6 (R) | ↗ Ø4 |
| 12 s | 60 s | 23 s |

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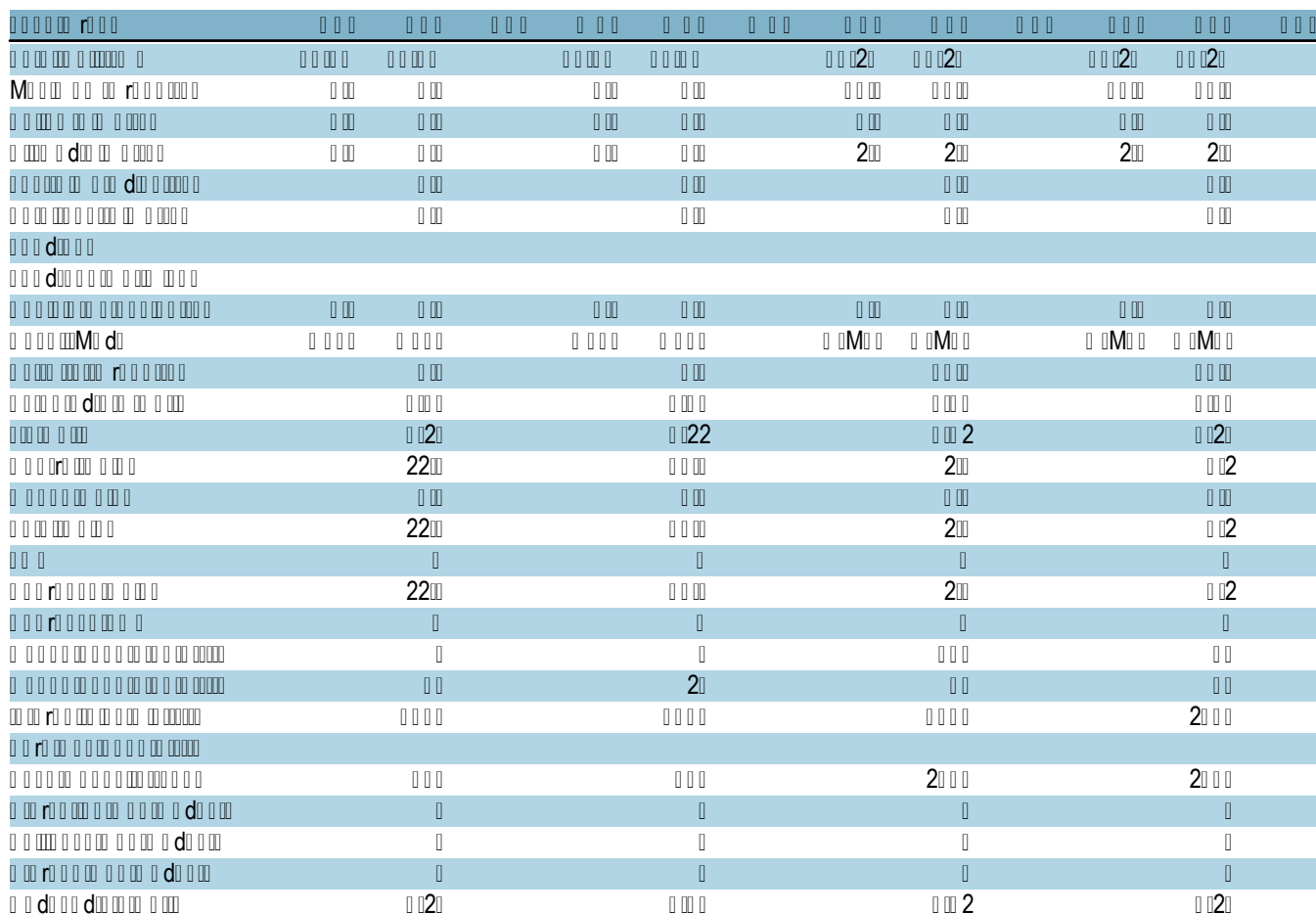
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| | |
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|  Ø2 (R) |  Ø6 (R) |
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r r d d

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| | | |
|------|----------|------|
| ↖ Ø1 | ↓ Ø2 (R) | ← Ø8 |
| 13 s | 64 s | 18 s |
| ↖ Ø5 | ↑ Ø6 (R) | → Ø4 |
| 13 s | 64 s | 18 s |

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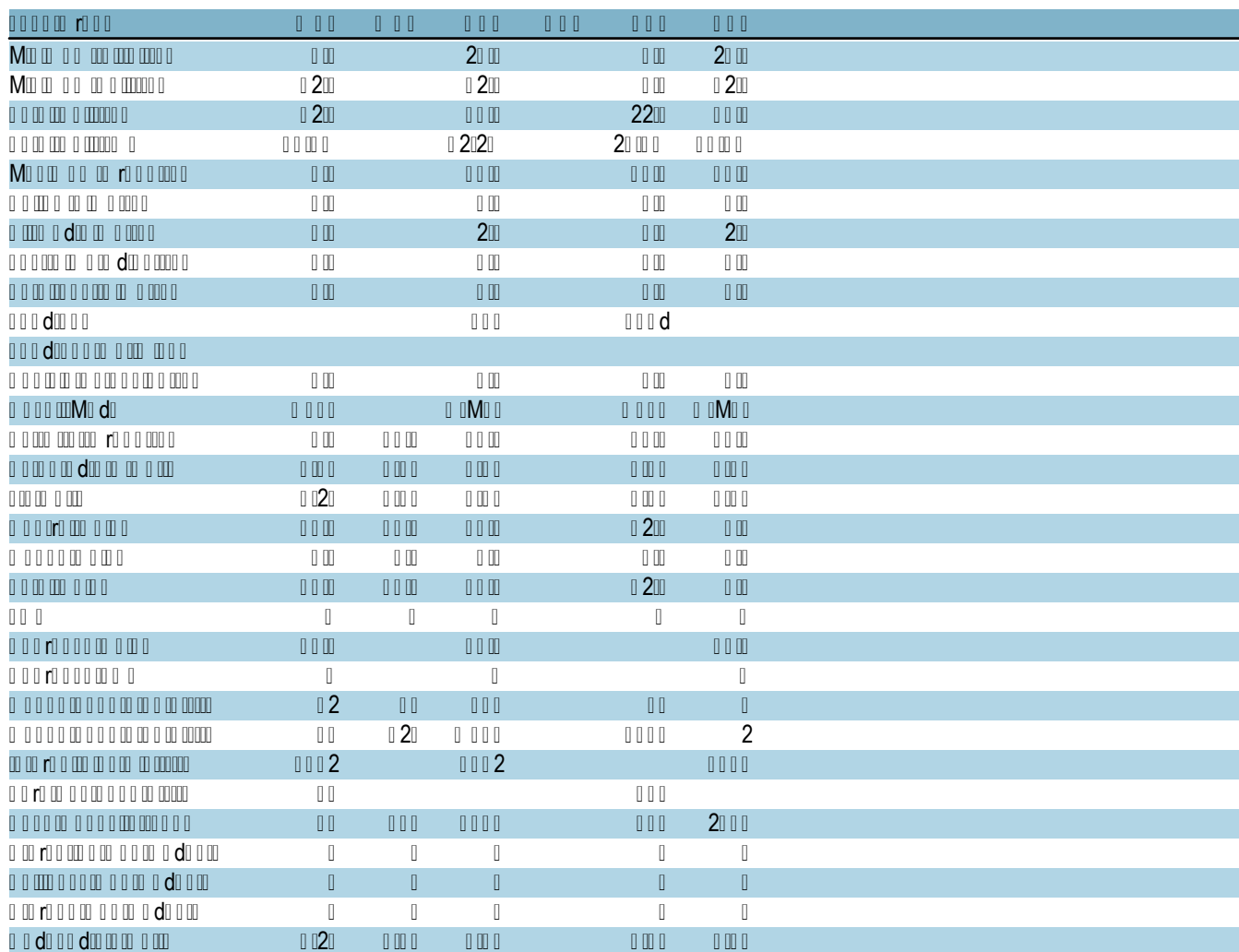
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| | | |
|--------|--------|------|
| Ø2 (R) | | |
| 77 s | | |
| Ø5 | Ø6 (R) | Ø4 |
| 11 s | 66 s | 13 s |

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| | | |
|--|--|--|
|  Ø1
22 s |  Ø2 (R)
56 s |  Ø4
12 s |
|  Ø6 (R)
78 s | | |

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M

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_____r_____d_____

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| | | |
|--|--|--|
|  Ø1 |  Ø2 (R) |  Ø8 |
| 11 s | 57 s | 22 s |
|  Ø5 |  Ø6 (R) |  Ø4 |
| 11 s | 57 s | 22 s |

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Figure 1

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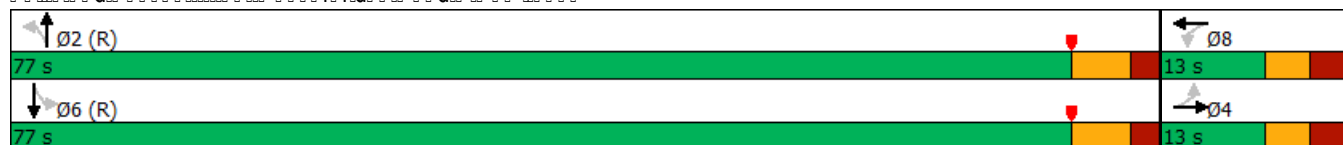
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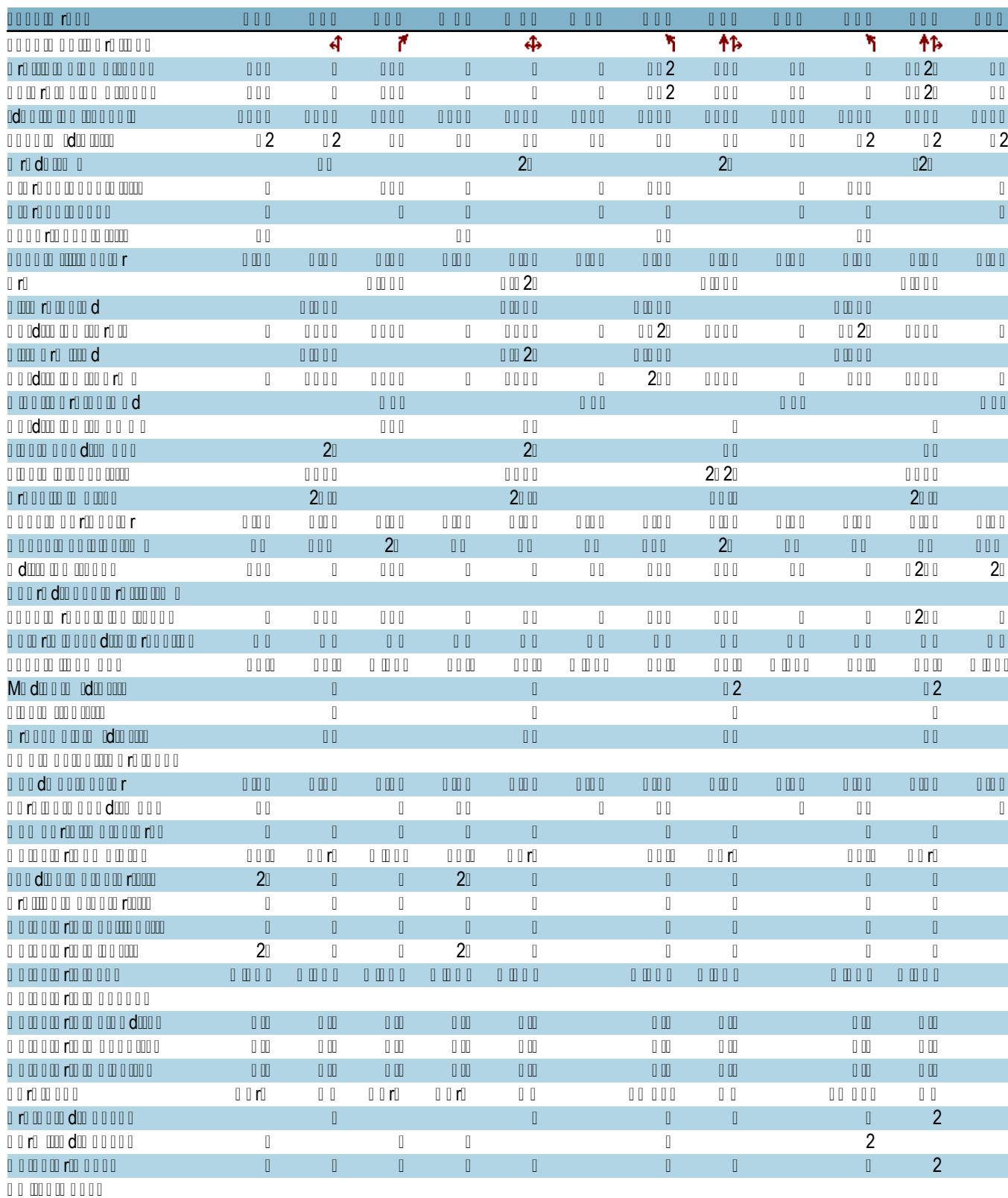
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| | | |
|--|--|--|
|  Ø1 |  Ø2 (R) |  Ø8 |
| 11 s | 61 s | 18 s |
|  Ø5 |  Ø6 (R) |  Ø4 |
| 11 s | 61 s | 18 s |

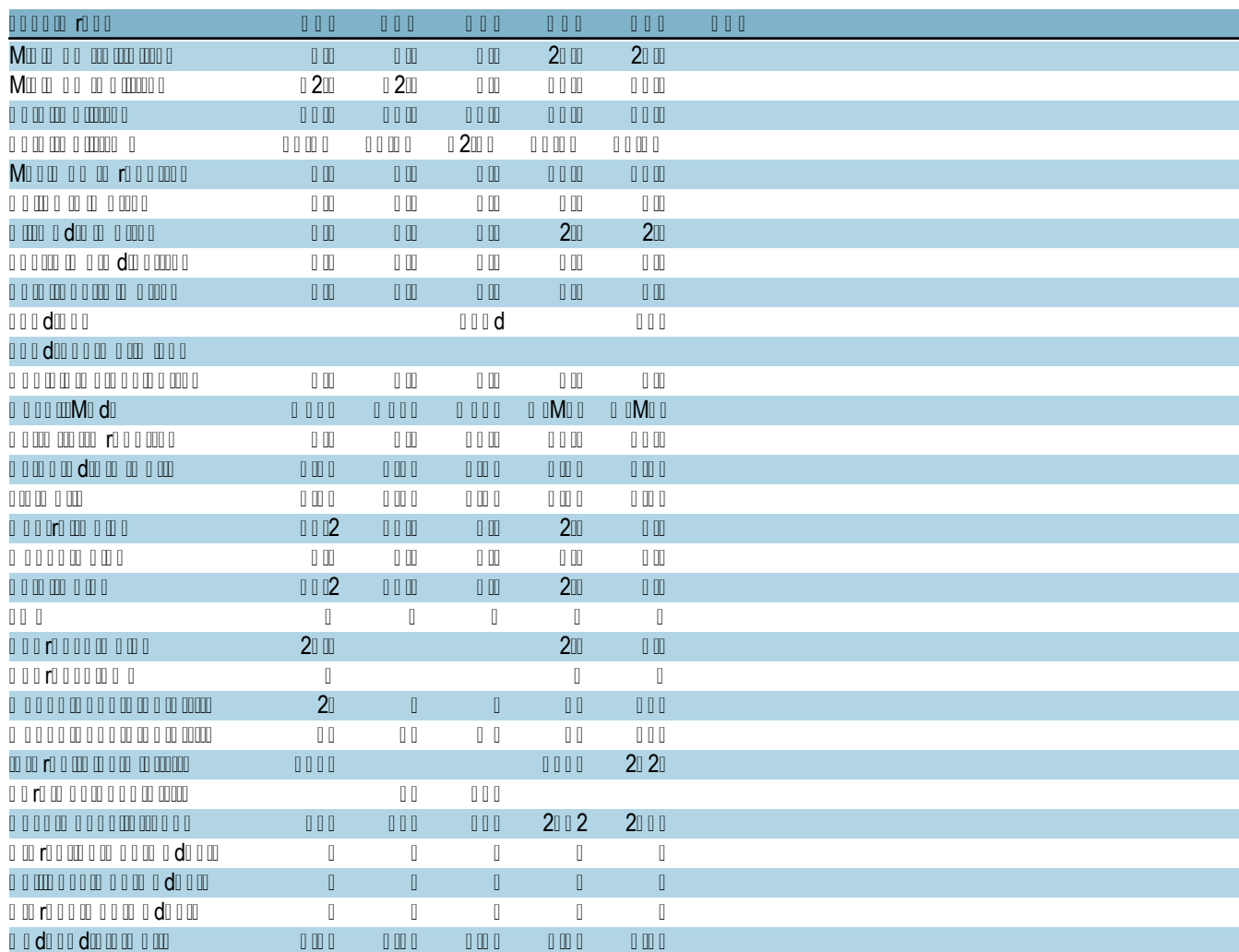
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Figure 10: Gantt chart for the 2nd iteration of the scheduling algorithm. The chart shows the execution of tasks Ø2 (R), Ø5, Ø6 (R), and Ø4. Task Ø2 (R) runs for 67s. Task Ø5 runs for 10s. Task Ø6 (R) runs for 57s. Task Ø4 runs for 13s. The chart is divided into two main sections by a vertical line. The left section contains Ø2 (R), Ø5, and Ø6 (R). The right section contains Ø4. The tasks are represented by colored bars: green for the main execution, yellow for a secondary phase, and red for a final phase. Arrows indicate task dependencies or priorities.

$\frac{1}{n} \sum_{i=1}^n \log p(\mathbf{x}_i)$

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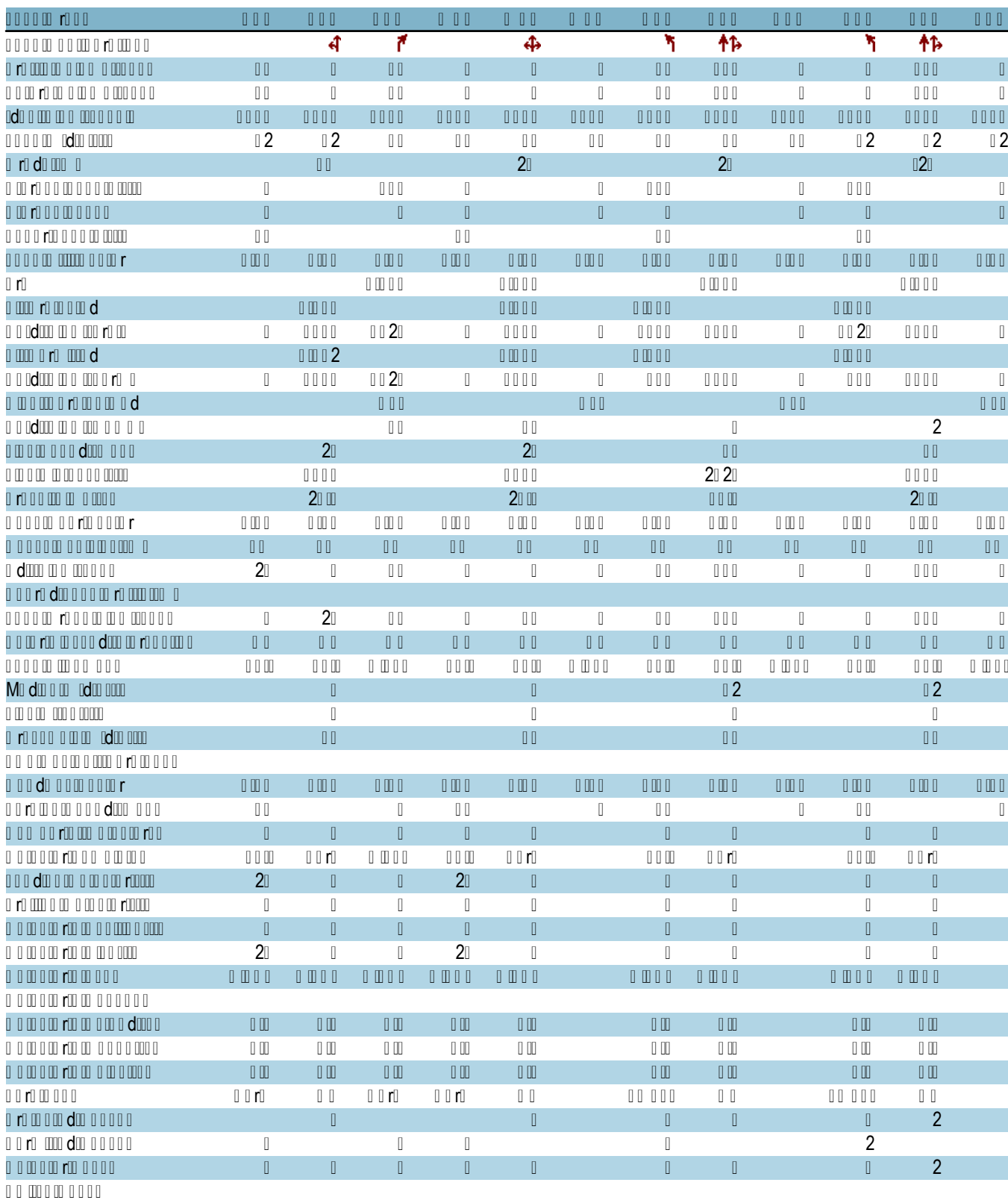
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
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 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800
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| | | |
|------|----------|------|
| ↖ Ø1 | ↓ Ø2 (R) | ↖ Ø8 |
| 12 s | 55 s | 13 s |
| ↖ Ø5 | ↑ Ø6 (R) | ↗ Ø4 |
| 12 s | 55 s | 13 s |

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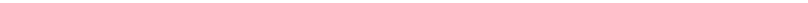
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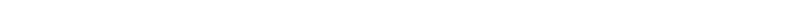
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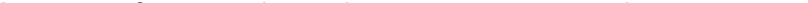
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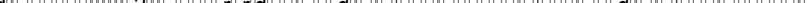
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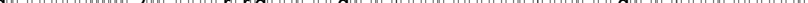


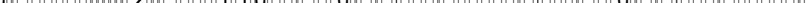


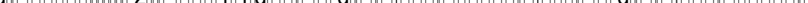


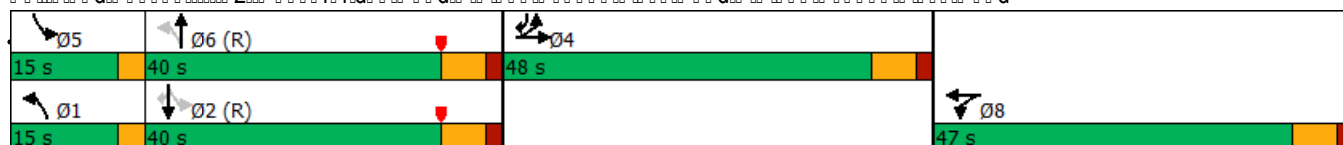












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|---|--|--|
|  Ø1
8 s | → Ø2 (R)
111 s |  Ø8
15 s |
|  Ø6 (R)
119 s |  Ø4
16 s | |

Abstract

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QUESTION

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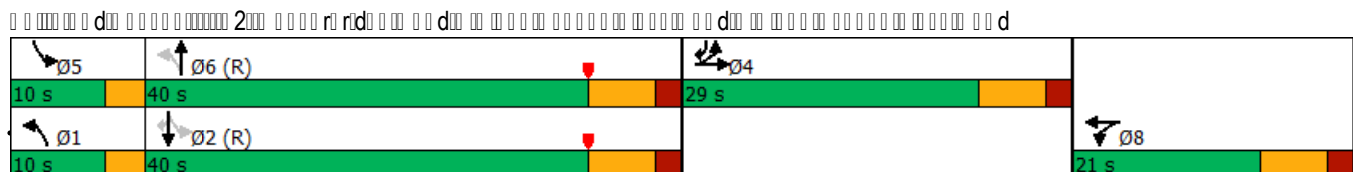
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[Terms of Service](#)

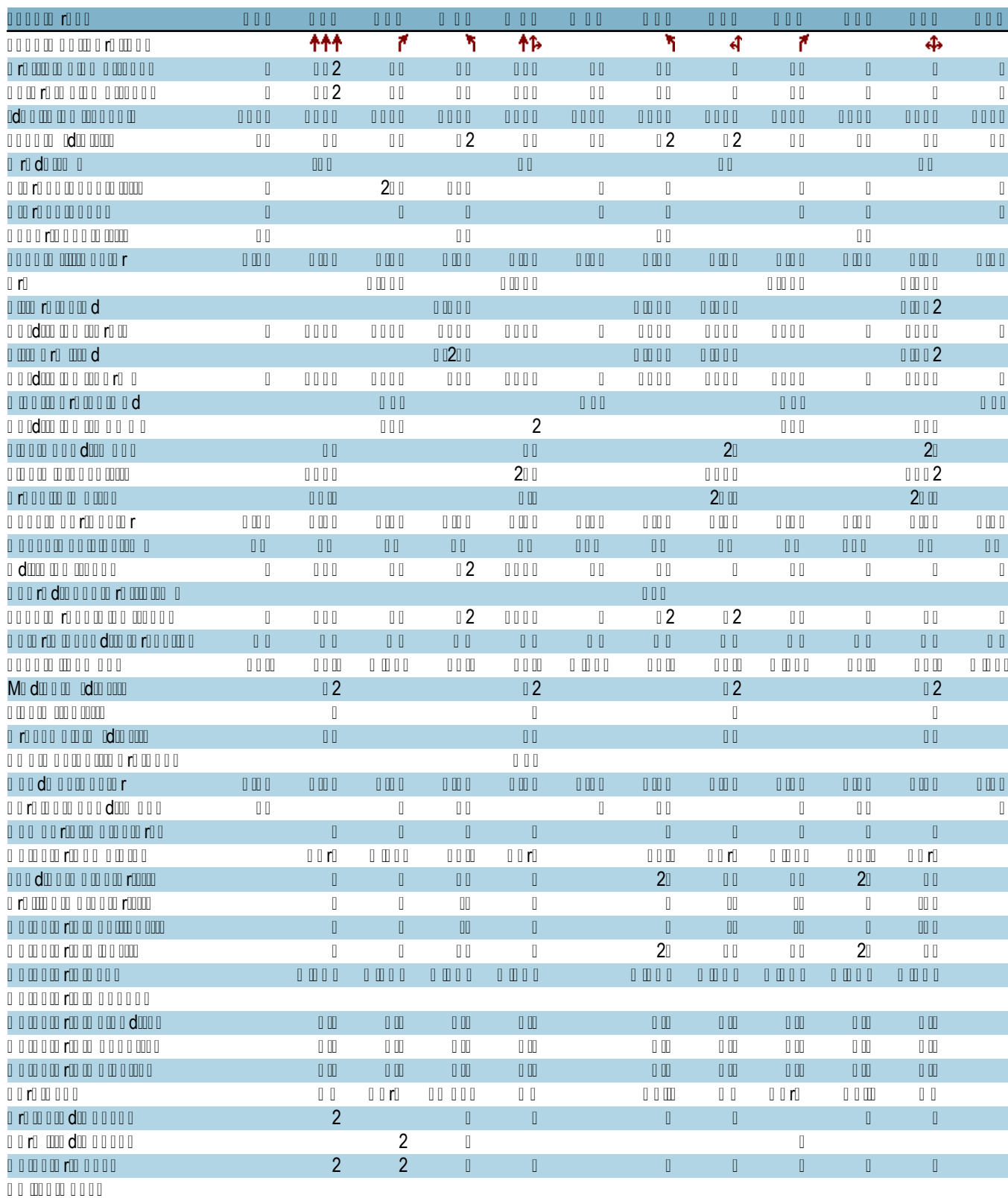
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|--|--|--|
|  Ø1
10 s |  Ø2 (R)
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|  Ø6 (R)
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15 s | |

Abstract

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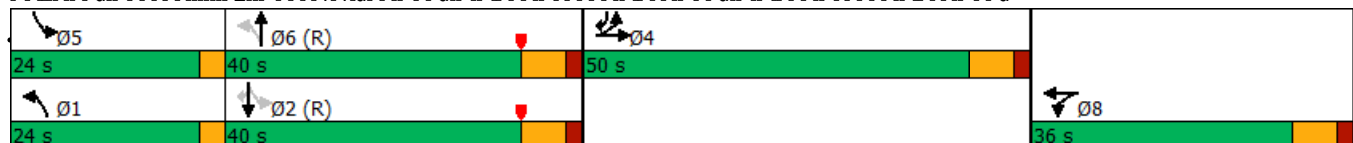
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Abstract

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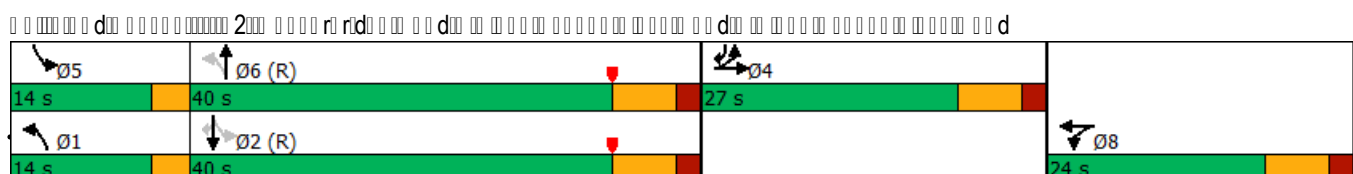
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| Ø1
15 s | Ø2 (R)
57 s | Ø4
20 s | Ø8
13 s |
| Ø6 (R)
72 s | | | |

Abstract

□ □ □ □ □ r □ □ □

Appendix D

**Quakerbridge Road (CR 533), Nassau Park Boulevard,
Province Line Road and Quaker Road**

West Windsor & Lawrence Township, Mercer County, New Jersey

File: WW13

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|-----|-----|-----|-----|----|-----|
| MINIMUM | 5 | 5 | 5 | 7 | 5 | 5 | | 7 |
| EXTENSION | 2 | 2 | 2 | 2 | 2 | 2 | | 2 |
| MAX I | 18 | 18 | 34 | 12 | 18 | 18 | | 12 |
| MAX II | | | | | | | | |
| PED WALK | | | | | | | | |
| PED CLEAR | | | | | | | | |
| AMBER | 5 | 4 | 3 | 4 | 4 | 5 | | 4 |
| RED | 2 | 2 | 2 | 2 | 2 | 2 | | 2 |
| MIN RECALL | OFF | OFF | OFF | ON | OFF | OFF | | ON |
| PED RECALL | OFF | OFF | OFF | OFF | OFF | OFF | | OFF |
| MAX RECALL | OFF | OFF | OFF | OFF | OFF | OFF | | OFF |
| MEMORY | OFF | OFF | OFF | OFF | OFF | OFF | | OFF |

Ø 1 Quakerbridge Road LEFT

Ø 2 Quaker Road

Ø 3 Nassau Park Blvd LEFT

Ø 4 Province Line Road

Ø 5 Dummy phase

Ø 6 Quakerbridge Road

Ø 8 Nassau Park Blvd

OVLP B Nassau Park Blvd RIGHT

1 Phase OVLP B omitted if Phase 2 is skipped in the absence
of vehicular demand

2 The signal shall rest in Phases 4+8

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|----|----|-----------|----|----|----|----|----|-------|--------|---------------------------|
| 1 | 36 | 17 | 14 (LEAD) | 13 | 17 | 36 | | 27 | 80 | 60 | Start of Yellow Phase 4+8 |
| 2 | 23 | 20 | 25 (LEAD) | 17 | 20 | 23 | | 42 | 85 | 1 | Start of Yellow Phase 4+8 |
| 3 | 24 | 20 | 23 (LEAD) | 23 | 20 | 24 | | 46 | 90 | 1 | Start of Yellow Phase 4+8 |
| 4 | 22 | 20 | 32 (LEAD) | 16 | 20 | 22 | | 45 | 90 | 4 | Start of Yellow Phase 4+8 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Quakerbridge Road (CR 533) and Mercer Mall Drive

West Windsor & Lawrence Township, Mercer County, New Jersey

File: WW12

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|----|-----|----|-----|----|----|
| MINIMUM | 7 | 16 | | 5 | | 16 | | |
| EXTENSION | 2 | 2 | | 2 | | 2 | | |
| MAX I | 25 | 40 | | 25 | | 40 | | |
| MAX II | | | | | | | | |
| PED WALK | | | | | | | | |
| PED CLEAR | | | | | | | | |
| AMBER | 3 | 5 | | 4 | | 5 | | |
| RED | 2 | 2 | | 3 | | 2 | | |
| MIN RECALL | OFF | OFF | | OFF | | OFF | | |
| PED RECALL | OFF | OFF | | OFF | | OFF | | |
| MAX RECALL | OFF | ON | | OFF | | ON | | |
| MEMORY | OFF | OFF | | OFF | | OFF | | |

Ø 1 Quakerbridge Road NB LEFT

Ø 2 Quakerbridge Road SB

Ø 4 Mercer Mall Drive

Ø 6 Quakerbridge Road NB

OVLP B Mercer Mall Drive RIGHT

1 Phase OVLP B omitted if Phase 1 is skipped in the absence of vehicular demand

2 The signal shall rest in Phases 2+6

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|-----------|----|----|----|----|----|----|----|-------|--------|---------------------------|
| 1 | 19 (LEAD) | 47 | | 14 | | 66 | | | 80 | 0 | Start of Yellow Phase 2+6 |
| 2 | 33 (LEAD) | 34 | | 18 | | 67 | | | 85 | 0 | Start of Yellow Phase 2+6 |
| 3 | 32 (LEAD) | 41 | | 17 | | 73 | | | 90 | 0 | Start of Yellow Phase 2+6 |
| 4 | 32 (LEAD) | 35 | | 23 | | 62 | | | 90 | 0 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Quakerbridge Road (CR 533) and Quakerbridge Mall

Lawrence Township, Mercer County, New Jersey

File: LA02

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|----|-----|----|-----|----|----|
| MINIMUM | 5 | 5 | | 5 | | 5 | | |
| EXTENSION | 2 | | | 2 | | | | |
| MAX I | 15 | 40 | | 20 | | 40 | | |
| MAX II | | | | | | | | |
| PED WALK | | | | 7 | | | | |
| PED CLEAR | | | | 30 | | | | |
| AMBER | 3 | 5 | | 4 | | 5 | | |
| RED | 2 | 2 | | 3 | | 2 | | |
| MIN RECALL | OFF | OFF | | OFF | | OFF | | |
| PED RECALL | OFF | OFF | | OFF | | OFF | | |
| MAX RECALL | OFF | ON | | OFF | | ON | | |
| MEMORY | OFF | OFF | | OFF | | OFF | | |

Ø 1 Quakerbridge Road NB LEFT

Ø 2 Quakerbridge Road SB

Ø 4 Quakerbridge Mall

Ø 6 Quakerbridge Road NB

1 Phases 1+6 may be skipped in the absence of vehicular demand

2 The signal shall rest in Phases 2+6

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|-----------|----|----|----|----|----|----|----|-------|--------|---------------------------|
| 1 | 13 (LEAD) | 75 | | 27 | | 88 | | | 115 | 2 | Start of Yellow Phase 2+6 |
| 2 | 12 (LEAD) | 56 | | 27 | | 68 | | | 95 | 13 | Start of Yellow Phase 2+6 |
| 3 | 12 (LEAD) | 80 | | 28 | | 92 | | | 120 | 22 | Start of Yellow Phase 2+6 |
| 4 | 10 (LEAD) | 83 | | 27 | | 93 | | | 120 | 18 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

**Quakerbridge Road (CR 533) and Clarksville Road (CR 638),
Grover's Mill Road (CR 638)**

West Windsor & Lawrence Township, Mercer County, New Jersey

File: WW02

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|----|-----|-----|-----|-----|-----|
| MINIMUM | 5 | 20 | | 5 | 5 | 20 | 5 | 5 |
| EXTENSION | 2 | | | 2 | 2 | | 2 | 2 |
| MAX I | 17 | 34 | | 27 | 17 | 34 | 12 | 27 |
| MAX II | | | | | | | | |
| PED WALK | | | | | | | | |
| PED CLEAR | | | | | | | | |
| AMBER | 3 | 5 | | 5 | 3 | 5 | 3 | 5 |
| RED | 2 | 2 | | 2 | 2 | | | 2 |
| MIN RECALL | OFF | OFF | | OFF | OFF | OFF | OFF | OFF |
| PED RECALL | OFF | OFF | | OFF | OFF | OFF | OFF | OFF |
| MAX RECALL | OFF | ON | | OFF | OFF | ON | OFF | OFF |
| MEMORY | OFF | OFF | | OFF | OFF | OFF | OFF | OFF |

- Ø 1 Quakerbridge Road NB LEFT
 Ø 2 Quakerbridge Road SB
 Ø 4 Clarksville Road WB
 Ø 5 Quakerbridge Road SB LEFT
 Ø 6 Quakerbridge Road NB
 Ø 7 Clarksville Road WB LEFT
 Ø 8 Grover's Mill Road EB (mall side)

- 1 Phases 1+5 may be skipped in the absence of vehicular demand
 2 Phases 1+5 opposing left turns are to operate separately and independently with the non-conflicting through movement
 3 Phases 4+7 and 4+8 may be skipped in the absence of vehicular demand
 4 The signal shall rest in Phases 2+6

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|-----------|----|----|----|-----------|----|-----------|----|-------|--------|---------------------------|
| 1 | 16 (LEAD) | 64 | | 35 | 16 (LEAD) | 64 | 9 (LEAD) | 26 | 115 | 0 | Start of Yellow Phase 2+6 |
| 2 | 18 (LEAD) | 51 | | 26 | 18 (LEAD) | 51 | 10 (LEAD) | 16 | 95 | 0 | Start of Yellow Phase 2+6 |
| 3 | 26 (LEAD) | 49 | | 45 | 26 (LEAD) | 49 | 22 (LEAD) | 23 | 120 | 0 | Start of Yellow Phase 2+6 |
| 4 | 28 (LEAD) | 54 | | 38 | 28 (LEAD) | 54 | 13 (LEAD) | 25 | 120 | 0 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Quakerbridge Road (CR 533) and Avalon Way

Lawrence Township, Mercer County, New Jersey

File: LA10

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|----|-----|----|-----|----|----|
| MINIMUM | 5 | 29 | | 5 | | 29 | | |
| EXTENSION | 2 | | | 2 | | | | |
| MAX I | 12 | 43 | | 20 | | 43 | | |
| MAX II | | | | | | | | |
| PED WALK | | 29 | | | | 29 | | |
| PED CLEAR | | | | | | | | |
| AMBER | 3 | 5 | | 3 | | 5 | | |
| RED | 2 | 2 | | 2 | | 2 | | |
| MIN RECALL | OFF | OFF | | OFF | | OFF | | |
| PED RECALL | OFF | OFF | | OFF | | OFF | | |
| MAX RECALL | OFF | ON | | OFF | | ON | | |
| MEMORY | OFF | OFF | | OFF | | OFF | | |

Ø 1 Quakerbridge Road NB LEFT

Ø 2 Quakerbridge Road SB

Ø 4 Avalon Way EB

Ø 6 Quakerbridge Road NB

1 Phases 1+6 may be skipped in the absence of vehicular demand

2 Phase 4 may be skipped in the absence of vehicular demand

3 The signal shall rest in Phases 2+6

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|-----------|----|----|----|----|----|----|----|-------|--------|---------------------------|
| 1 | 14 (LEAD) | 82 | | 19 | | 96 | | | 115 | 4 | Start of Yellow Phase 2+6 |
| 2 | 12 (LEAD) | 57 | | 26 | | 69 | | | 95 | 44 | Start of Yellow Phase 2+6 |
| 3 | 14 (LEAD) | 79 | | 27 | | 93 | | | 120 | 26 | Start of Yellow Phase 2+6 |
| 4 | 13 (LEAD) | 40 | | 37 | | 53 | | | 90 | 0 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Quakerbridge Road (CR 533) and Village Road/Lawrence Sq Blvd N

Lawrence Township, Mercer County, New Jersey

File:

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|
| MINIMUM | 5 | 24 | 5 | 5 | 5 | 24 | 5 | 5 |
| EXTENSION | 2 | | 2 | 2 | 2 | | 2 | 2 |
| MAX I | 18 | 49 | 10 | 20 | 23 | 49 | 22 | 20 |
| MAX II | | | | | | | | |
| PED WALK | | 24 | | | | 24 | | |
| PED CLEAR | | | | | | | | |
| AMBER | 3 | 5 | 3 | 4 | 3 | 5 | 3 | 4 |
| RED | 2 | 2 | | 2 | 2 | | | 2 |
| MIN RECALL | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| PED RECALL | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| MAX RECALL | OFF | ON | OFF | OFF | OFF | ON | OFF | OFF |
| MEMORY | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |

Ø 1 Quakerbridge Road NB LEFT
 Ø 2 Quakerbridge Road SB
 Ø 3 Lawrence Sq Blvd N EB LEFT
 Ø 4 Village Road WB
 Ø 5 Quakerbridge Road SB LEFT
 Ø 6 Quakerbridge Road NB
 Ø 7 Village Road WB LEFT
 Ø 8 Lawrence Sq Blvd N EB

1 Phases 1+5 may be skipped in the absence of vehicular demand
 2 Phases 1+5 opposing left turns are to operate separately and independently with the non-conflicting through movement
 3 Phases 3+7 and 4+8 may be skipped in the absence of vehicular demand
 4 The signal shall rest in Phases 2+6

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|-----------|----|-----------|----|-----------|----|-----------|----|-------|--------|---------------------------|
| 1 | 26 (LEAD) | 45 | 11 (LEAD) | 33 | 26 (LEAD) | 45 | 11 (LEAD) | 33 | 115 | 39 | Start of Yellow Phase 2+6 |
| 2 | 23 (LEAD) | 43 | 11 (LEAD) | 18 | 23 (LEAD) | 43 | 11 (LEAD) | 18 | 95 | 87 | Start of Yellow Phase 2+6 |
| 3 | 17 (LEAD) | 67 | 13 (LEAD) | 23 | 32 (LEAD) | 52 | 13 (LEAD) | 23 | 120 | 64 | Start of Yellow Phase 2+6 |
| 4 | 23 (LEAD) | 40 | 11 (LEAD) | 16 | 18 (LEAD) | 40 | 11 (LEAD) | 16 | 90 | 37 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Quakerbridge Road (CR 533) and Lawrence Sq Blvd S

Lawrence Township, Mercer County, New Jersey

File:

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|----|-----|----|-----|-----|-----|----|----|
| MINIMUM | | 23 | | 5 | 5 | 23 | | |
| EXTENSION | | | | 2 | 2 | | | |
| MAX I | | 50 | | 18 | 8 | 50 | | |
| MAX II | | | | | | | | |
| PED WALK | | 23 | | 22 | | 23 | | |
| PED CLEAR | | | | | | | | |
| AMBER | | 5 | | 4 | 3 | 5 | | |
| RED | | 2 | | 3 | | 2 | | |
| MIN RECALL | | OFF | | OFF | OFF | OFF | | |
| PED RECALL | | OFF | | OFF | OFF | OFF | | |
| MAX RECALL | | ON | | OFF | OFF | ON | | |
| MEMORY | | OFF | | OFF | OFF | OFF | | |

Ø 2 Quakerbridge Road NB

Ø 4 Lawrence Square Blvd S EB

Ø 5 Quakerbridge Road NB LEFT

Ø 6 Quakerbridge Road SB

1 Phase 2+5 may be skipped in the absence of vehicular demand

2 Phase 4 may be skipped in the absence of vehicular demand

3 The signal shall rest in Phases 2+6

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|----|----|----|----|-----------|----|----|----|-------|--------|---------------------------|
| 1 | | 69 | | 16 | 10 (LEAD) | 59 | | | 85 | 50 | Start of Yellow Phase 2+6 |
| 2 | | 80 | | 15 | 13 (LEAD) | 67 | | | 95 | 56 | Start of Yellow Phase 2+6 |
| 3 | | 77 | | 13 | 11 (LEAD) | 66 | | | 90 | 49 | Start of Yellow Phase 2+6 |
| 4 | | 67 | | 13 | 10 (LEAD) | 57 | | | 80 | 56 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Quakerbridge Road (CR 533) and Hughes Drive

Hamilton Township, Mercer County, New Jersey

File:

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|----|-----|----|-----|----|----|
| MINIMUM | 5 | 25 | | 5 | | 25 | | |
| EXTENSION | 2 | | | 2 | | | | |
| MAX I | 15 | 30 | | 15 | | 30 | | |
| MAX II | | | | | | | | |
| PED WALK | | 7 | | 7 | | 7 | | |
| PED CLEAR | | 29 | | 21 | | 29 | | |
| AMBER | 3 | 5 | | 4 | | 5 | | |
| RED | | 2 | | 3 | | 2 | | |
| MIN RECALL | OFF | OFF | | OFF | | OFF | | |
| PED RECALL | OFF | ON | | OFF | | ON | | |
| MAX RECALL | OFF | OFF | | OFF | | OFF | | |
| MEMORY | OFF | OFF | | OFF | | OFF | | |

Ø 1 Quakerbridge Road SB LEFT

Ø 2 Quakerbridge Road NB

Ø 4 Hughes Drive WB

Ø 6 Quakerbridge Road NB

OVLP B Hughes Drive WB RIGHT

1 Phase OVLP B omitted if Phase 1 is skipped in the absence of vehicular demand. Demand on OVERLAP B shall extend Phases 1+6.

2 The signal shall rest in Phases 2+6

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|-----------|----|----|----|----|----|----|----|-------|--------|---------------------------|
| 1 | 15 (LEAD) | 55 | | 15 | | 70 | | | 85 | 56 | Start of Yellow Phase 2+6 |
| 2 | 15 (LEAD) | 65 | | 15 | | 80 | | | 95 | 85 | Start of Yellow Phase 2+6 |
| 3 | 22 (LEAD) | 56 | | 12 | | 78 | | | 90 | 80 | Start of Yellow Phase 2+6 |
| 4 | 15 (LEAD) | 51 | | 14 | | 66 | | | 80 | 76 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Quakerbridge Road (CR 533) and Youngs Road

Hamilton Township, Mercer County, New Jersey

File: HA26

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|----|-----|-----|-----|----|-----|
| MINIMUM | 5 | 20 | | 5 | 5 | 20 | | 5 |
| EXTENSION | 2 | 2 | | 2 | 2 | 2 | | 2 |
| MAX I | 7 | 30 | | 28 | 7 | 30 | | 28 |
| MAX II | | | | | | | | |
| PED WALK | | 7 | | 7 | | 7 | | 7 |
| PED CLEAR | | 16 | | 19 | | 16 | | 19 |
| AMBER | 3 | 5 | | 4 | 3 | 5 | | 4 |
| RED | | 2 | | 3 | | 2 | | 3 |
| MIN RECALL | OFF | OFF | | OFF | OFF | OFF | | OFF |
| PED RECALL | OFF | ON | | OFF | OFF | ON | | OFF |
| MAX RECALL | OFF | OFF | | OFF | OFF | OFF | | OFF |
| MEMORY | OFF | OFF | | OFF | OFF | OFF | | OFF |

Ø 1 Quakerbridge Road NB LEFT
 Ø 2 Quakerbridge Road SB
 Ø 4 Youngs Road EB
 Ø 5 Quakerbridge Road SB LEFT
 Ø 6 Quakerbridge Road NB
 Ø 8 Youngs Road WB

1 Phases 1+5 may be skipped in the absence of vehicular demand
 2 Phases 4+8 may be skipped in the absence of vehicular demand
 3 The signal shall rest in Phases 2+6

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|-----------|----|----|----|-----------|----|----|----|-------|--------|---------------------------|
| 1 | 13 (LEAD) | 47 | | 25 | 13 (LEAD) | 47 | | 25 | 85 | 0 | Start of Yellow Phase 2+6 |
| 2 | 12 (LEAD) | 60 | | 23 | 12 (LEAD) | 60 | | 23 | 95 | 0 | Start of Yellow Phase 2+6 |
| 3 | 11 (LEAD) | 57 | | 22 | 11 (LEAD) | 57 | | 22 | 90 | 0 | Start of Yellow Phase 2+6 |
| 4 | 9 (LEAD) | 53 | | 18 | 9 (LEAD) | 53 | | 18 | 80 | 0 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Quakerbridge Road (CR 533) and Nami Lane

Hamilton Township, Mercer County, New Jersey

File: -

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|----|-----|----|-----|----|-----|----|-----|
| MINIMUM | | 22 | | 5 | | 22 | | 5 |
| EXTENSION | | | | 2 | | | | 2 |
| MAX I | | 30 | | 15 | | 30 | | 15 |
| MAX II | | | | | | | | |
| PED WALK | | 7 | | 7 | | 7 | | 7 |
| PED CLEAR | | 15 | | 16 | | 15 | | 16 |
| AMBER | | 4 | | 3 | | 4 | | 3 |
| RED | | 2 | | 3 | | 2 | | 3 |
| MIN RECALL | | OFF | | OFF | | OFF | | OFF |
| PED RECALL | | ON | | OFF | | ON | | OFF |
| MAX RECALL | | OFF | | OFF | | OFF | | OFF |
| MEMORY | | OFF | | OFF | | OFF | | OFF |

Ø 2 Quakerbridge Road SB

Ø 4 Nami Lane EB

Ø 6 Quakerbridge Road NB

Ø 8 Nami Lane WB

1 Phases 4+8 may be skipped in the absence of vehicular demand

2 The signal shall rest in Phases 2+6

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|----|----|----|----|----|----|----|----|-------|--------|---------------------------|
| 1 | | 72 | | 13 | | 72 | | 13 | 85 | 70 | Start of Yellow Phase 2+6 |
| 2 | | 80 | | 15 | | 80 | | 15 | 95 | 62 | Start of Yellow Phase 2+6 |
| 3 | | 77 | | 13 | | 77 | | 13 | 90 | 61 | Start of Yellow Phase 2+6 |
| 4 | | 67 | | 13 | | 67 | | 13 | 80 | 2 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Quakerbridge Road (CR 533) and Quakerbridge Plaza, Terrill Avenue

Hamilton Township, Mercer County, New Jersey

File:

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|----|-----|-----|-----|----|-----|
| MINIMUM | 5 | 20 | | 5 | 5 | 20 | | 5 |
| EXTENSION | 2 | | | 2 | 2 | | | 2 |
| MAX I | 10 | 30 | | 15 | 10 | 30 | | 15 |
| MAX II | | | | | | | | |
| PED WALK | | 7 | | 7 | | 7 | | 7 |
| PED CLEAR | | 19 | | 20 | | 19 | | 20 |
| AMBER | 3 | 5 | | 4 | 3 | 5 | | 4 |
| RED | | 2 | | 2 | | 2 | | 2 |
| MIN RECALL | OFF | OFF | | OFF | OFF | OFF | | OFF |
| PED RECALL | OFF | ON | | OFF | OFF | ON | | OFF |
| MAX RECALL | OFF | OFF | | OFF | OFF | OFF | | OFF |
| MEMORY | OFF | OFF | | OFF | OFF | OFF | | OFF |

Ø1 Quakerbridge Road NB LEFT
 Ø2 Quakerbridge Road SB
 Ø4 Quakerbridge Plaza EB
 Ø5 Quakerbridge Road SB LEFT
 Ø6 Quakerbridge Road NB
 Ø8 Terrill Avenue WB

1 Phases 1+5 may be skipped in the absence of vehicular detection
 2 The signal shall rest in Phases 2+6

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|-----------|----|----|----|-----------|----|----|----|-------|--------|---------------------------|
| 1 | 10 (LEAD) | 61 | | 14 | 10 (LEAD) | 61 | | 14 | 85 | 50 | Start of Yellow Phase 2+6 |
| 2 | 13 (LEAD) | 64 | | 18 | 13 (LEAD) | 64 | | 18 | 95 | 27 | Start of Yellow Phase 2+6 |
| 3 | 11 (LEAD) | 61 | | 18 | 11 (LEAD) | 61 | | 18 | 90 | 69 | Start of Yellow Phase 2+6 |
| 4 | 12 (LEAD) | 55 | | 13 | 12 (LEAD) | 55 | | 13 | 80 | 11 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Quakerbridge Road (CR 533) and Sloan Avenue

Hamilton Township, Mercer County, New Jersey

File: HA25

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|----|-----|-----|-----|-----|-----|
| MINIMUM | 5 | 18 | | 10 | 5 | 18 | 5 | 10 |
| EXTENSION | 2 | | | 2 | 2 | | 2 | 2 |
| MAX I | 15 | 32 | | 40 | 15 | 32 | 40 | 35 |
| MAX II | | | | | | | | |
| PED WALK | | 7 | | 7 | | 7 | | |
| PED CLEAR | | 26 | | 22 | | 26 | | |
| AMBER | 3 | 5 | | 5 | 3 | 5 | 5 | 5 |
| RED | | 2 | | 2 | | 2 | 2 | 2 |
| MIN RECALL | OFF | OFF | | OFF | OFF | OFF | OFF | OFF |
| PED RECALL | OFF | OFF | | OFF | OFF | OFF | OFF | OFF |
| MAX RECALL | OFF | ON | | OFF | OFF | ON | OFF | OFF |
| MEMORY | OFF | OFF | | OFF | OFF | OFF | OFF | OFF |

| | | |
|-----|--|---------------------------------------|
| Ø 1 | Quakerbridge Road NB LEFT | 1 The signal shall rest in Phases 2+6 |
| Ø 2 | Quakerbridge Road SB | |
| Ø 4 | Sloan Road EB | |
| Ø 5 | Quakerbridge Road SB LEFT | |
| Ø 6 | Quakerbridge Road NB | |
| Ø 7 | Sloan Road Dummy phase to call overlap (avoids conflict during preemption) | |
| Ø 8 | Flock Road WB | |

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|-----------|----|----|----|-----------|----|----|----|-------|--------|---------------------------|
| 1 | 15 (LEAD) | 40 | | 48 | 15 (LEAD) | 40 | 48 | 47 | 150 | 0 | Start of Yellow Phase 2+6 |
| 2 | 10 (LEAD) | 40 | | 29 | 10 (LEAD) | 40 | 29 | 21 | 100 | 0 | Start of Yellow Phase 2+6 |
| 3 | 24 (LEAD) | 40 | | 50 | 24 (LEAD) | 40 | 50 | 36 | 150 | 0 | Start of Yellow Phase 2+6 |
| 4 | 14 (LEAD) | 40 | | 27 | 14 (LEAD) | 40 | 27 | 24 | 105 | 0 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 6 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 7 | 6-7 | 08:00 | 4 | WEEKEND PEAK |
| 8 | 6-7 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY

Sloan Avenue and Fairlawn Avenue, AMC Driveway

Hamilton Township, Mercer County, New Jersey

File:

Controller: ASC/3-2100

Monitor: EDI NSM-12



TIMING

| FLASH | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 |
|------------|-----|-----|----|-----|----|-----|-----|-----|
| MINIMUM | 5 | 14 | | 5 | | 14 | 10 | 5 |
| EXTENSION | 2 | | | 2 | | | 2 | 2 |
| MAX I | 18 | 50 | | 17 | | 50 | 17 | 14 |
| MAX II | | | | | | | | |
| PED WALK | | 7 | | 7 | | 7 | 7 | 7 |
| PED CLEAR | | 15 | | 29 | | 15 | 29 | 29 |
| AMBER | 3 | 5 | | 3 | | 5 | 3 | 3 |
| RED | | 2 | | 2 | | 2 | 2 | 2 |
| MIN RECALL | OFF | OFF | | OFF | | OFF | OFF | OFF |
| PED RECALL | OFF | OFF | | OFF | | OFF | OFF | OFF |
| MAX RECALL | OFF | ON | | OFF | | ON | OFF | OFF |
| MEMORY | OFF | OFF | | OFF | | OFF | OFF | OFF |

Ø 1 Sloan Road WB LEFT

1 The signal shall rest in Phases 2+6

Ø 2 Sloan Avenue EB

Ø 4 AMC Driveway NB

Ø 6 Sloan Avenue WB

Ø 7 AMC Driveway NB LEFT

Ø 8 Fairlawn Avenue SB

PROGRAM

| PROGRAM/
SPLITS | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø7 | Ø8 | CYCLE | OFFSET | OFFSET REFERENCE |
|--------------------|-----------|-----|----|----|----|-----|----|----|-------|--------|---------------------------|
| 1 | 8 (LEAD) | 111 | | 16 | | 119 | 16 | 15 | 150 | 50 | Start of Yellow Phase 2+6 |
| 2 | 10 (LEAD) | 62 | | 15 | | 72 | 15 | 13 | 100 | 27 | Start of Yellow Phase 2+6 |
| 3 | 15 (LEAD) | 95 | | 25 | | 110 | 25 | 15 | 150 | 38 | Start of Yellow Phase 2+6 |
| 4 | 15 (LEAD) | 57 | | 20 | | 72 | 20 | 13 | 105 | 28 | Start of Yellow Phase 2+6 |

WEEKLY PROGRAM CHART

| EVENT | DAY | TIME | PROGRAM | REMARKS |
|-------|-----|-------|---------|------------------------|
| 1 | 1-5 | 00:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 2 | 1-5 | 06:00 | 1 | WEEKDAY AM |
| 3 | 1-5 | 10:00 | 2 | WEEKDAY MIDDAY |
| 4 | 1-5 | 14:00 | 3 | WEEKDAY PM |
| 5 | 1-5 | 22:00 | FREE | FREE/WEEKDAY OVERNIGHT |
| 6 | 6-7 | 09:00 | 4 | WEEKEND PEAK |
| 7 | 6-7 | 20:00 | FREE | FREE/WEEKDAY OVERNIGHT |

Day 1 = MONDAY