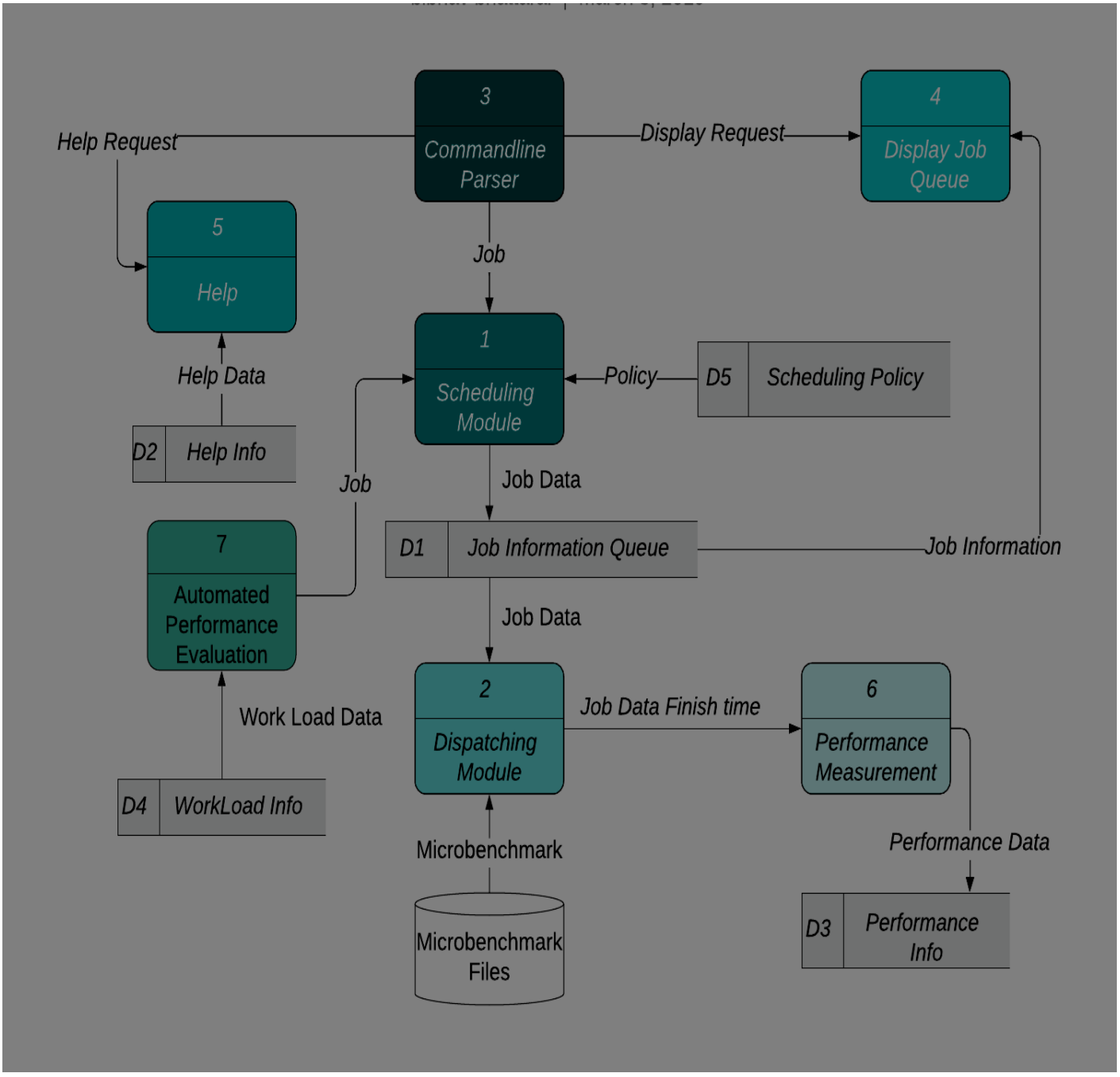
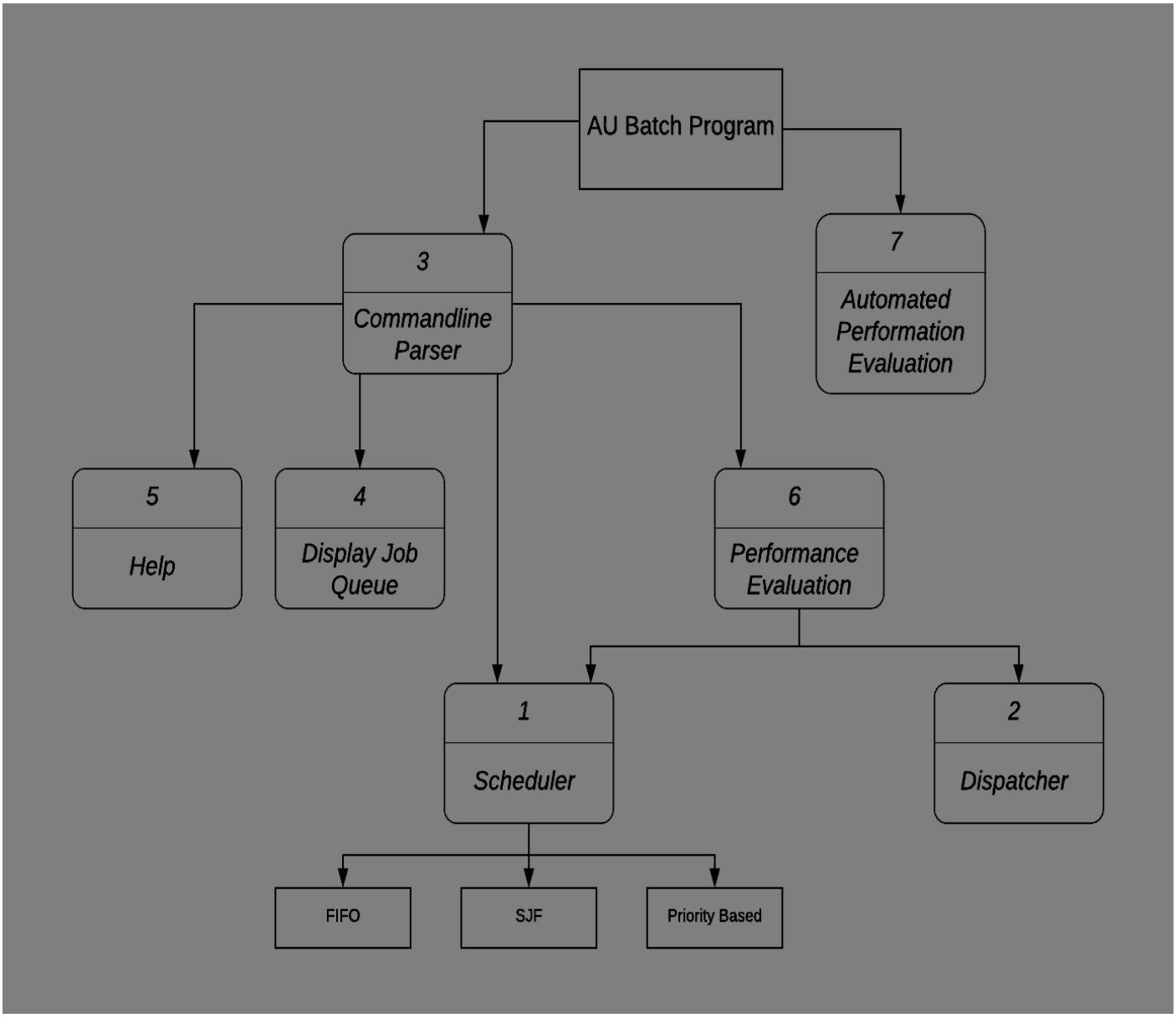
Project 3: AUbatch System

1. Design and Implementation:

A. Data Flow Diagram:



B. Program Structure:



C. Function Prototype:

```
void *scheduling();
void *dispatching();
void run(char command[]);
void fcfs();
void sjf();
void priority();
void perfEvaluate();
void garbageCompute1();
void garbageCompute2();
int splitTime(char time[]);
void help();
```

2. User Manual

Separate Compilation with Makefile:

```
(base) Mousumis-MacBook-Air:AUBatch-v1 mousumiakter$ make
gcc -c -w aubatch.c
gcc -c menu.c
gcc -c -w module.c
gcc aubatch.o menu.o module.o -o aubatch -lpthread
```

Run aubatch:

```
(base) Mousumis-MacBook-Air:AUBatch-v1 mousumiakter$ ./aubatch
Welcome to Mousumi's batch job scheduler version 1.0
Type 'help' to find more about AUBatch commands.
>
```

Help Menu:

```
>help

run <jobname> <burst_time> <priority>: submit a job named <jobname>,
                                       execution time is <burst_time>,
                                       priority is <priority>.
list: display the job status
fcfs: change the scheduling policy to FCFS
sjf: change the scheduling policy to SJF
priority: change the scheduling policy to priority
test <benchmark> <policy> <num_of_jobs> <priority_levels>
     <min_CPU_time> <max_CPU_time>
quit: exit AUBatch
```

Scheduling Policy:

```
>fcfs

Scheduling policy is switched to FCFS. All the 0 waiting jobs have been rescheduled.
```

Job Submission:

```
>run p1 8 1
job p1 was submitted.
Total number of jobs in the queue: 1
Scheduling Policy: FCFS

>run p2 8 3
job p2 was submitted.
Total number of jobs in the queue: 2
Scheduling Policy: FCFS
```

Waiting Job list:

```
>list

Name    CPU_Time        Priority        Arrival_time    Progress
p1      8               1               20:37:26        To be executed
p2      8               3               20:37:31        To be executed
>
```

Switching Scheduling Algorithm:

```
>sjf

Scheduling policy is switched to SJF. All the 1 waiting jobs have been rescheduled.
>priority

Scheduling policy is switched to Priority. All the 1 waiting jobs have been rescheduled.
>fcfs

Scheduling policy is switched to FCFS. All the 1 waiting jobs have been rescheduled.
```

Quit and Perfomance Evaluation:

```
>quit

Total jobs submitted : 2
Average turn around time : 6.000000 seconds
Average CPU time : 10365.000000 seconds
Average waiting time : 6.000000 seconds
Throughput : 0.166667 No./second
```

Lesson Learned:

In this project,

- We have been introduced with multicore programming
- Got hand on experience with different scheduling algorithm and their performance metric
- Have been familiar with separate compilation and been introduced with makefile