

Homework 6

● Graded

Student

Ashley Leora Cain

Total Points

100 / 100 pts

Question 1

Processor Scheduling Concepts 8 / 8 pts

1.1 Round Robin 2 / 2 pts

✓ + 2 pts Correct

+ 0 pts Incorrect

1.2 I/O Queue 2 / 2 pts

✓ + 2 pts Correct

+ 0 pts Incorrect

1.3 FCFS 2 / 2 pts

✓ + 2 pts Correct

+ 0 pts Incorrect

1.4 Priority Scheduler 2 / 2 pts

✓ + 2 pts Correct

+ 0 pts Incorrect

Question 2

Shortest Remaining Time First (SRTF)

30 / 30 pts

✓ - 0 pts Correct

QUESTION 2

SRTF (CPU Burst remaining only)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CPU	P1	P2		P0	P1	P0	P2		P0						
IO			P1		P2	P0									
	P0	P1	P2		Avg										
Response Time:	14	7	10		10.33										
Wait Time:	5	0	4		3										

SRTF (overall remaining only)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CPU	P2		P1	P0	P2	P0		P0	P1	P0					
IO			P2		P1				P0						
	P0	P1	P2		Avg										
Response Time:	14	10	6		10										
Wait Time:	5	3	0		2.67										

- 5 pts Scheduled the wrong process once

- 5 pts Scheduled the wrong process once (P1 at t = 4 instead of P0, etc.)

- 10 pts Scheduled the wrong process twice

- 15 pts Performs SJF (i.e. Does not preempt a running process)

- 15 pts Preempted IO Queue

- 2 pts Submitted a word document/other file instead of a screenshot or PDF

- 30 pts Blank/no answer/Incorrect

✓ - 0 pts Correct

QUESTION 3

FCFS with preemption

	0	1	2	3	4	5	6	7	8	9	10	11	12
CPU	P0	P1	P0	P2	P1	P1	P2	P2	P2	P2	P2	P2	P2
IO		P0	P1							P2			
	P0	P1	P2							Avg			
Response Time:	4	7	12						7.67				
Wait Time:	0	2	6						2.67				

- 5 pts Scheduled the wrong process once

- 10 pts Schedule the wrong process twice

- 15 pts Schedule the wrong process three times

- 10 pts Uses Non Preemptive FCFS

- 10 pts Incorrect understanding of FCFS (ready queue sorted based on when the process FIRST enters the queue)

- 2 pts Submits something other than a pdf or image

- 30 pts Blank/no answer

Question 4

Waiting and Turnaround Times

32 / 32 pts

4.1 Turnaround Time (Q2)

8 / 8 pts

 - 0 pts Correct (10.33 or 10)**- 8 pts** Incorrect**- 2 pts** Off by 1 (10.33 or 10 +- 1)**- 2 pts** Incorrect P0 turnaround time (14)**- 2 pts** Incorrect P1 turnaround time (7 or 10)**- 2 pts** Incorrect P2 turnaround time (10 or 6)**- 2 pts** Error in averaging**- 8 pts** Wrong formula / calculated something other than turnaround time**- 8 pts** Incorrect answer (no work)**- 8 pts** Blank/no answer**4.2 Waiting Time (Q2)**

8 / 8 pts

 - 0 pts Correct (3 or 2.67)**- 0 pts** Correct**- 8 pts** Incorrect**- 2 pts** Off by 1 (3 or 2.67 +- 1)**- 2 pts** Incorrect P0 waiting time (5)**- 2 pts** Incorrect P1 waiting time (0 or 3)**- 2 pts** Incorrect P2 waiting time (4 or 0)**- 2 pts** Error in averaging**- 8 pts** Wrong formula / calculated something other than waiting time**- 8 pts** Incorrect answer (no work)**- 8 pts** Blank/no answer

4.3 Turnaround Time (Q3) 8 / 8 pts

✓ - 0 pts Correct (7.67)

- 0 pts Correct

- 8 pts Incorrect

- 2 pts Off by 1 (7.67 ± 1)

- 2 pts Incorrect P0 turnaround time (4)

- 2 pts Incorrect P1 turnaround time (7)

- 2 pts Incorrect P2 turnaround time (12)

- 2 pts Error in averaging

- 8 pts Wrong formula / calculated something other than turnaround time

- 8 pts Incorrect answer (no work)

- 8 pts Blank/no answer

4.4 Waiting Time (Q3) 8 / 8 pts

✓ - 0 pts Correct (2.67)

- 0 pts Correct

- 8 pts Incorrect

- 2 pts Off by 1 (3)

- 2 pts Incorrect P0 waiting time (0)

- 2 pts Incorrect P1 waiting time (2)

- 2 pts Incorrect P2 waiting time (6)

- 2 pts Error in averaging

- 8 pts Wrong formula / calculated something other than waiting time

- 8 pts Incorrect answer (no work)

- 8 pts Blank/no answer

4.5 Work 0 / 0 pts

✓ + 0 pts Graded

Q1 Processor Scheduling Concepts

8 Points

Below are some true/false conceptual questions on processor scheduling.

Q1.1 Round Robin

2 Points

Round Robin is a preemptive algorithm:

True

False

Q1.2 I/O Queue

2 Points

The I/O queue is a priority queue that prioritizes on shorter jobs:

True

False

Q1.3 FCFS

2 Points

One may experience a higher variance in response time for FCFS:

True

False

Q1.4 Priority Scheduler

2 Points

Priority Scheduler prevents long-running computations from blocking shorter jobs:

- True
- False

Q2 Shortest Remaining Time First (SRTF)

30 Points

Assume the scheduler uses the Shortest Remaining Time First (SRTF) algorithm. Consider the following three processes which each require **one** CPU burst followed by **one** I/O burst, followed by **one** final CPU burst. The scheduling starts at time T0. **Note:** if there is a tie between the shortest times, please pick the processes with the highest process ID.

Process ID	CPU burst #1 and #2	I/O burst
P0	4	1
P1	1	5
P2	2	2

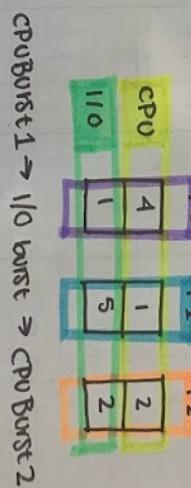
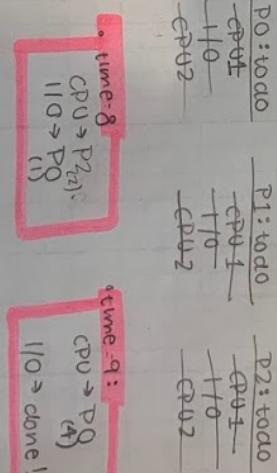
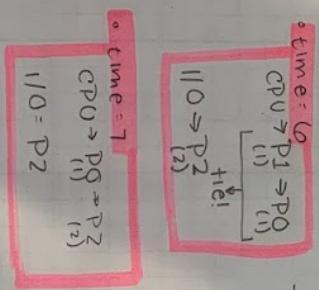
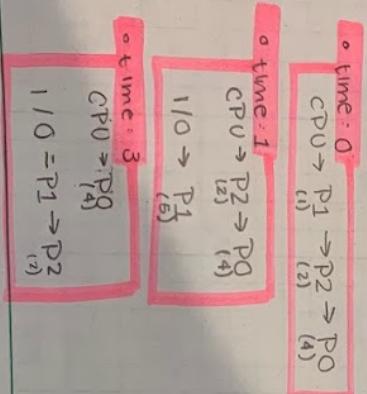
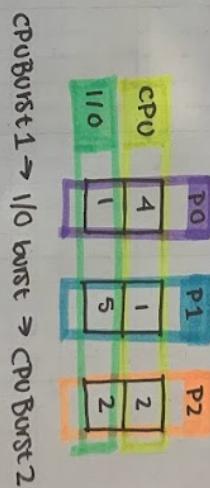
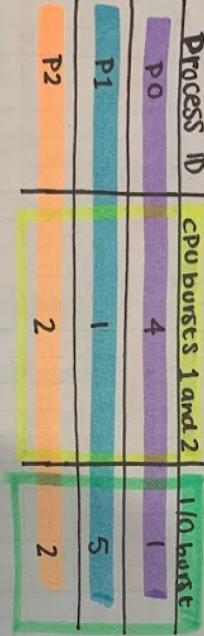
Create a process diagram showing the current process on the CPU and the current process performing I/O at each unit of time. Download the template from Canvas, "Homework 6 - extra downloads" under Modules and fill out the process diagram. Attach a **screenshot (PNG/JPG)** of the complete template to the file attachment tab below.

For an example of what your table should look like, see "Homework 6".

Answer (screenshot of table)

QUESTION 2: SRTF (shortest remaining time first)

TIME	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CPU BURST	P1	P2	P2	P2	P0	P0	P1	P0	P1	P2	P2	P0	P0	P0	P0	P0
I/O BURST					P1	P1	P1	P1	P2	P2	P2	P0				
PROCESS ID	P0	P0	P0	P0	P1	P1	P1	P1	P2	P2	P2	P0	P0	P0	P0	P0
CPU BURSTS 1 and 2 I/O burst	4	1	5	1	1	5	2	2								



Q3 FCFS with Preemption

30 Points

Assume we schedule processes based on the FCFS with preemption algorithm and the process with the smallest ID takes higher priority *when breaking ties*. Consider the following three processes which each require **one** CPU burst followed by **one** I/O burst, followed by **one** final CPU burst.

Process ID	CPU burst #1	I/O burst	CPU burst #2
P0	2	1	1
P1	1	2	2
P2	3	1	2

Create a process diagram showing the current process on the CPU and the current process performing I/O at each unit of time. Download the template from Canvas, "Homework 6 - extra downloads" under Modules and fill out the process diagram. Attach a **screenshot (PNG/JPG)** of the complete template to the file attachment tab below.

For an example of what your table should look like, see "Homework 6 - extra downloads".

Answer (screenshot of table)

QUESTION 3: FCFS WITH Pre-emption

FCFS (First come, first serve): ready queue treated as a FIFO queue
 head → chosen to get scheduled

With pre-emption: able to halt current execution and kick process off the processor, determined when a process's time is done and when the next should go

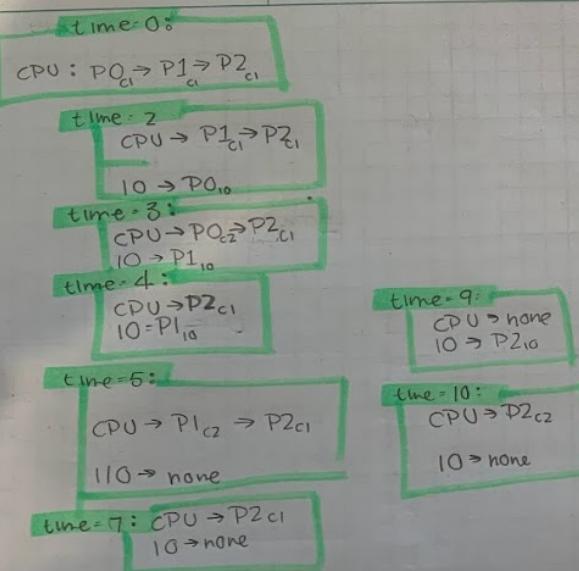
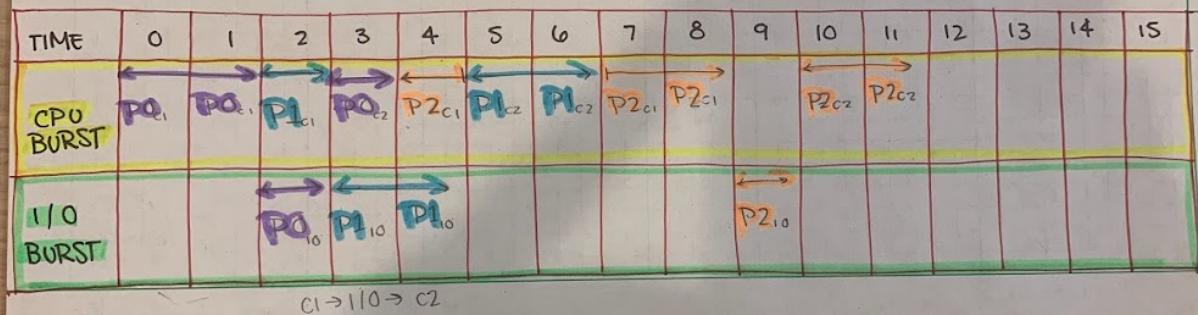
breaking ties: smallest ID takes highest priority

Process ID	CPU burst 1	I/O burst 1	CPU burst 2
P0	2	1	1
P1	1	2	2
P2	3	1	2

CPU burst 1
 CPU burst 2
 I/O burst

P0 P1 P2

Rule: once a process is done in I/O, put back into ready queue for CPU



Q4 Waiting and Turnaround Times

32 Points

The next question is regarding the Waiting Time and Turnaround Time for the Shortest Remaining Time First (SRTF) and FCFS with preemption algorithms shown in Questions 2 and 3.

Q4.1 Turnaround Time (Q2)

8 Points

What is the average turnaround time for the system in Question 2 (Round to 2 decimal places if needed)?

10.33

Q4.2 Waiting Time (Q2)

8 Points

What is the average waiting time for the system in Question 2 (Round to 2 decimal places if needed)?

3

Q4.3 Turnaround Time (Q3)

8 Points

What is the average turnaround time for the system in Question 3 (Round to 2 decimal places if needed)?

7.67

Q4.4 Waiting Time (Q3)

8 Points

What is the average waiting time for the system in Question 3 (Round to 2 decimal places if needed)?

2.67

Q4.5 Work

0 Points

If you would like partial credit in case of a wrong answer, include or attach your work here.

 No files uploaded