NAME :- KRUNAL RANK

ROLL NO :- U18CO081

CLASS - B TECH 3RD YEAR

COMPUTER ENGINEERING

SEMESTER :- 6

EXAM :- MID SEMESTER EXAM

Ans 1:

Ans 1:

Ans 2:

Ans 4: 3D

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Ans 1: Suppose a program contains a GUI and two long processes. Then a single thread can handle the GUI responsiveness and a set of two threads or a single thread based on the developer how the software is developed can be used for the long processes.

The main advantage of this practice is that the GUI won't "FREEZE" when the long processes are run. Also, the user will be able to interact with GUI and initiate new processes without waiting for the long processes to complete.

Apart from that thread has some more advantages such as:-

- Minimizes context switching time.
- Efficient communication.
- More economical in terms of resource usage.
- Allows complete utilization of multiprocessor architecture.
- Resources are shared
- Scalable system can be made.

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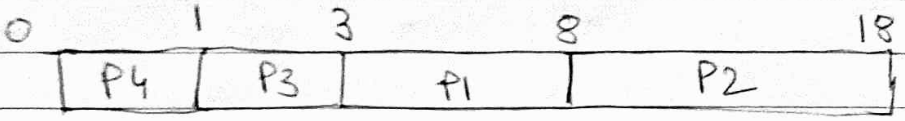
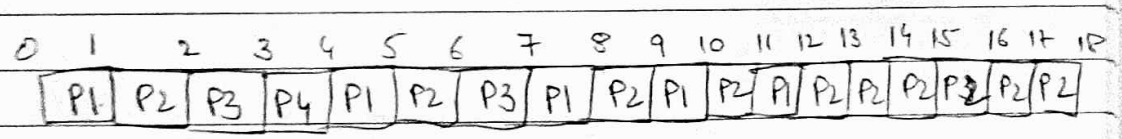
Given,

Process	Burst time
P1	5
P2	10
P3	2
P4	1

i) For SJF, the Gantt chart is as follows:-



For Round Robin (Quantum = 1),



ii) For SJF,

Process	Waiting time
P1	3
P2	8
P3	1
P4	0

For Round Robin,

P1	7
P2	8
P3	5
P4	3

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iii) Average waiting time = $\frac{3+8+1+0}{4}$ = 3 units
(For SJF)

Average waiting time = $\frac{7+8+5+3}{4}$ = 5.75 units
(For Round Robin)

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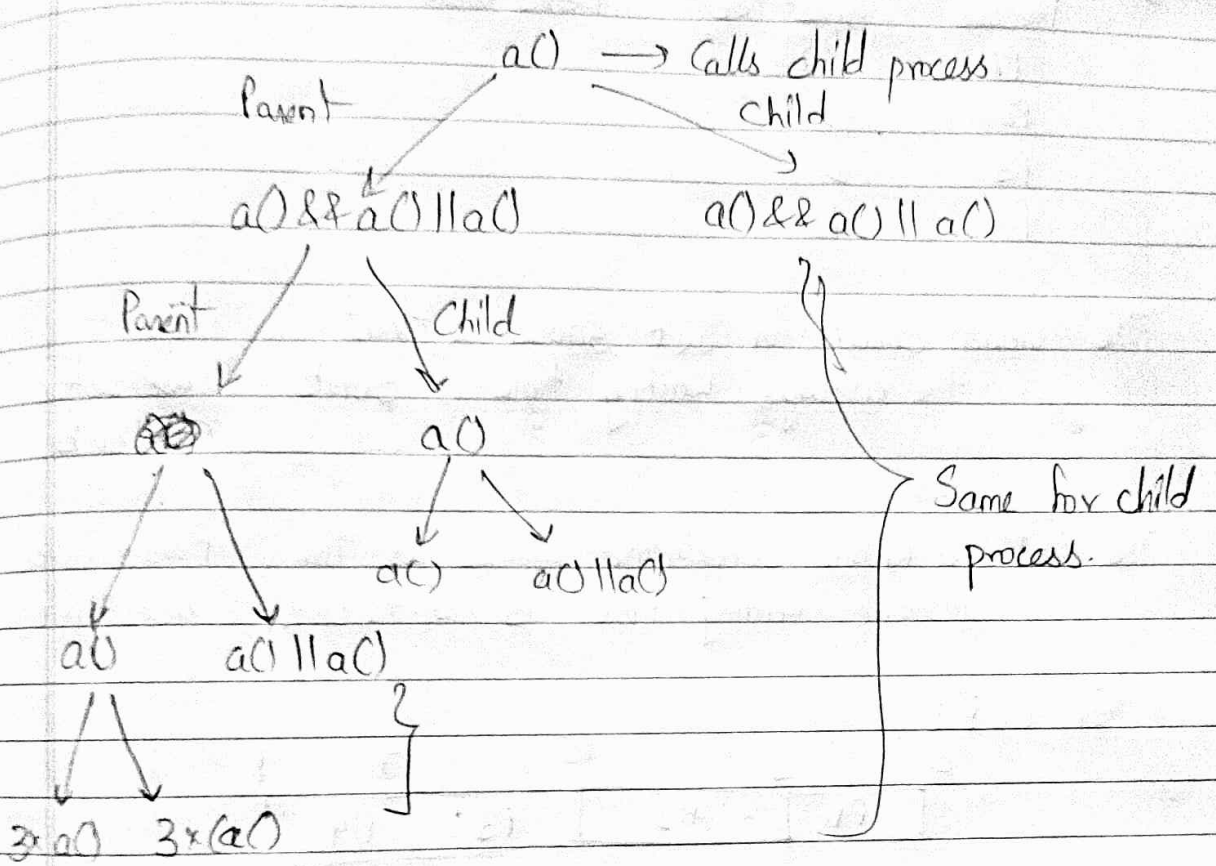
As we can see in the example,



Hence, total calls = 10+10 = 20.

Hence, the Print action will be done 20 times.

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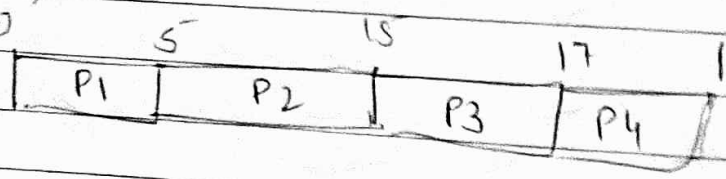
Ans d) Let us take the following example, FCFS Wait

Process	Burst time
P1	5
P2	10
P3	2
P4	1

The Gantt chart for SJF shows us that the average waiting time is 3 units (Please refer question b).

The Round Robin scheduling allows us the average waiting time is 5.75 units (Please refer question b).

For FCFS,



Clearly, Average waiting time $= \frac{0+5+15+17}{4}$

$= \frac{27}{4} \simeq 6.75$ units

For Priority scheduling, if no priority is given, it is same as FCFS
Hence, from the above example, it is clear that Shortest Job First is the scheduling algorithm that has least average waiting time

When threads are implemented in user space, if one thread of a process executes a blocking system call, entire process is blocked.

Some of the solutions that can be implemented are as follows:-

- Use a pre defined amount for the thread to execute and set a timeout in case the thread runs more than that, stop it.
- Use an Thread interrupts to set an alarm for the blocking thread.
- Terminate the blocking thread using IOU mechanisms of the thread.