Part 1: Answers to Concept Questions

1. Higher Priority, Time expired, I/O request
2. The difference between user threads and kernel threads is that user threads are supported above the kernel and are managed without kernel support through the thread API/Library. Kernel threads, on the other hand, are supported and managed directly by the OS.

Regardless of the type of relationship (many-to-one, one-to-one, many-to-many) that OS has between user and kernel threads, user threads must be mapped to an associated kernel thread which may use a lightweight process in order to run on a CPU.

If you wish to achieve multithreading, the OS should have a many-to-many relatioship allowing

1. i)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | P2 | P3 | P4 | P5 |
| 22 | 11 | 12 | 11 | 14 |

Turnaround time = ( (22 – 0) + (33 – 9) + (45 – 12) + (56 - 13) + (70 - 17) ) / 5 = 35 seconds

ii)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P1 | P2 | P3 | P4 | P5 | P1 | P2 | P3 | P4 | P5 | P1 | P2 | P3 | P4 | P5 | P1 | P2 | P3 | P4 | P5 | P1 | P5 | P1 | P1 | P1 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 50 | 53 | 55 | 58 | 61 | 63 | 66 | 69 | 70 |

Turnaround time = (50 + 53 + 55 + 63 + 70) / 5 = 58 seconds

iii)

Turnaround time =

1. s
2. s