***“I pledge that the answers in this exam/quiz are my own and that I will***

***not seek or obtain an unfair advantage in producing these answers.***

***Specifically,***

* ***I will not plagiarize (copy without citation) from any source;***
* ***I will not communicate or attempt to communicate with any other person during the exam/quiz; neither will I give or attempt to give assistance to another student taking the exam/quiz; and***
* ***I will use only approved devices (e.g., calculators) and/or approved device models.***

***I understand that any act of academic dishonesty can lead to disciplinary***

***action.”***

Name:

SID:

Section A:

1. A
2. D
3. A
4. D
5. 8
6. B
7. D
8. B
9. C
10. B
11. A
12. 4
13. B
14. D
15. D
16. A
17. A
18. D
19. A, B
20. D
21. FCFS
22. 5min
23. 10.62min
24. C
25. D
26. number of page faults = 6

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | 0 | 1 | 2 | 0 | 3 | 0 | 4 | 2 | 3 | 0 |
| 5 | 5 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | 3 | 3 |
|  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  |  | 1 | 1 | 1 | 1 | 1 | 4 | 4 | 4 | 4 |
|  |  |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| F | F | F | F |  | F |  | F |  |  |  |

1. 2ms
2. A

Section B:

Q 1:

count = 100

Reader1 sends rmsg = 1 to readrequest

Reader1 blocks on receive message from mbox[1]

Controller run if (count > 0), else if (!empty (readrequest))

Controller receives the rmsg=1 and count = 99

Controller sends OK to msg.1

Finally Reader 1 can access.

count = 99

Reader2 sends rmsg = 2 to readrequest

Reader2 blocks on receive message from mbox[2]

Controller run if (count > 0), else if (!empty (readrequest))

Controller receives the rmsg=2 and count = 98

Controller sends OK to msg.2

Finally Reader 2 can access.

count = 98

Writer3 sends rmsg = 3 to writerequest

Writer3 blocks on receive message from mbox[3]

Controller run if (count > 0), else if (!empty (writerequest))

Controller receives the rmsg=3 and count = -2

Controller will block on receive message from finished.

Q 2:



|  |
| --- |
| C - A |
| 0 1 0 0 2 |
| 0 0 1 1 1 |
| 1 0 3 0 0 |
| 0 2 1 0 0 |

If x = 1, the available vector will be {0 0 1 1 1}, which will match the C – A value of B, and B can terminate, which is a safe state.

So, the smallest value of x is 1.



|  |  |  |  |
| --- | --- | --- | --- |
| Available vector | A | B | C |
|  | 2 | 0 | 0 |

No row in the allocation matrix is all zero, thus no process is marked

Mark P3;

P0, P1, P2, P4 are deadlocked.

Q 3:



|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 | 3 |  | 5 |  |  |  |  |  |  |  |  |  |
| T | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|  | 1 | 1 | 1 | 1 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 |

At T = 4,

Process 3 is selected.

At T = 6,

Process 2 is selected.

At T = 6, only Process 4 is left, Process 4 is selected.

1. HRRN will select the next process non-pre-emptively with the greatest ratio with (time spent + expected service time) / expected service time, in order to minimize the normalized turnaround time.

Q 4:

1. Starting at track 345

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| FIFO | 123 | 874 | 692 | 475 | 105 | 376 |
| SSTF | 376 | 475 | 692 | 874 | 123 | 105 |
| SCAN | 123 | 105 | 376 | 475 | 692 | 874 |
| C-SCAN | 123 | 105 | 874 | 692 | 475 | 376 |



|  |  |
| --- | --- |
|  | Total number of tracks travelled |
| FIFO |  |
| SSTF |  |
| SCAN |  |
| C-SCAN |  |

Most effective disk scheduling algorithm is SCAN as it has the smallest total number of tracks travelled.

Q 5:



|  |  |
| --- | --- |
| Logical addresses | Physical address |
| 0001 0000 0100 1000 | 0000 0000 0100 1000 |
| 0011 0000 0110 0011 | 1110 0000 0110 0011 |



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Request | 1 | 4 | 3 | 1 | 2 | 3 | 1 | 4 | 3 |
| Frame 1 | 1\* | 1\* | -> 1\* | -> 1\* | 2\* | 2\* | 2\* | -> 2 | 3\* |
| Frame 2 | -> - | 4\* | 4\* | 4\* | -> 4 | -> 4 | 1\* | 1\* | -> 1 |
| Frame 3 | - | -> - | 3\* | 3\* | 3 | 3\* | -> 3 | 4\* | 4\* |
| Fault | F | F | F |  | F |  | F | F | F |