A close-up of a logo

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**AACS2284 - Mid-Term Test**

| **STUDENT’S DECLARATION OF ORIGINALITY**  By submitting this online assessment. I declare that this submitted work is free from all forms of plagiarism and for all intents and purposes is my own properly derived work. I understand that I have to bear the consequences if I fail to do so.  Mid-Term Test Submission | |
| --- | --- |
| Course : | AACS2284 Operating Systems |
| Signature: |  |
| Name of Student: | Tan Kang Hong |
| Student ID: | 20WMD02959 |
| Programme of Study | DCS2 |
| Tutorial Group | G5 |
| Date & Time: | Saturday, 19 March 2022, 7:00 pm - 8:30 pm |

# Mark Summary

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| **Question 1** |  |
| --- | --- |
| **Question 2** |  |
| **Question 3** |  |
| **Question 4** |  |
| **Question 5** |  |
| **Question 6** |  |
| **TOTAL** |  |

# QUESTION 1 a) (6 marks)

| Non - preemptive. It is because when a critical process enters the ready queue the process running CPU is not disturbed. Once resources(CPU Cycle) are allocated to a process, the process holds it till it completes its burst time or switches to waiting state. Process can not be interrupted until it terminates itself or its time is up. It does not have overheads. The cost is rigib. |  |
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# QUESTION 1 b) (6 marks)

| Deadlock = Jack and Jill are making fried chicken at the same time, and both need a piece of chicken, so they both go to get the chicken and a knife.Jack gets the knife first, and Jill gets the chicken first. Now Jack is trying to find a piece of chicken and Jill is trying to find a knife, but both find that what they need to accomplish their mission is already in use. If they both decide to wait until what they need is no longer in use, they will wait forever for each other. Deadlock.  Starvation = There is only one check-in counter at the airport. There are two queues, one for business class and one for economy class. There are business meetings nearby though, and the business queue is always full. The economic queue does not move at all. If you happen to be in economy class, you will miss your plane. |  |
| --- | --- |

# QUESTION 2 a, b & c) (12 marks)

| 2a.   | A | C | E | B | D | | --- | --- | --- | --- | --- |   0 6 12 14 18 20   | Process | Arrival Time | CPU Burst Time (ms) | Priority | Finish Time | Turnaround time | Wait time | | --- | --- | --- | --- | --- | --- | --- | | A | 0 | 6 | 2 | 6 | 6 | 0 | | B | 2 | 4 | 4 | 18 | 16 | 12 | | C | 4 | 6 | 1 | 12 | 8 | 2 | | D | 6 | 2 | 5 | 20 | 14 | 12 | | E | 8 | 2 | 3 | 14 | 6 | 4 |   Turnaround time = (6 + 16 + 8 + 14 +6) / 5 = 10  Wait time = (0 + 12 + 2 + 12 + 4) / 5 = 6  2b.   | A | C | A | E | B | D | | --- | --- | --- | --- | --- | --- |   0 4 10 12 14 18 20   | Process | Arrival Time | CPU Burst Time (ms) | Priority | Finish Time | Turnaround time | Wait time | | --- | --- | --- | --- | --- | --- | --- | | A | 0 | 6 | 2 | 12 | 12 | 6 | | B | 2 | 4 | 4 | 18 | 16 | 12 | | C | 4 | 6 | 1 | 10 | 6 | 0 | | D | 6 | 2 | 5 | 20 | 14 | 12 | | E | 8 | 2 | 3 | 14 | 6 | 4 |   Turnaround time = (12 + 16 + 6 + 14 +6) / 5 = 10.8  Wait time = (6 + 12 + 0 + 12 + 4) / 5 = 6.8  2c.   | A | B | C | A | D | E | C | | --- | --- | --- | --- | --- | --- | --- |   0 4 8 12 14 16 18 20   | Process | Arrival Time | CPU Burst Time (ms) | Priority | Finish Time | Turnaround time | Wait time | | --- | --- | --- | --- | --- | --- | --- | | A | 0 | 6 | 2 | 14 | 14 | 8 | | B | 2 | 4 | 4 | 8 | 6 | 2 | | C | 4 | 6 | 1 | 20 | 16 | 10 | | D | 6 | 2 | 5 | 16 | 10 | 8 | | E | 8 | 2 | 3 | 18 | 10 | 8 |   Turnaround time = (14 + 6 + 16 + 10 + 10) / 5 = 11.2  Wait time = (8 + 2 + 10 + 8 + 8) / 5 = 7.2 |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

# QUESTION 3 a & b) (8 marks)

| 3a.    3b. No, P1 gets the resource B and executes. P2 gets the resource C after P4 releases resource C. P3 can get resource A after P1 releases A and executes. |  |
| --- | --- |

# QUESTION 4 a & b) (6 marks)

| 4a   | Partition | Process | Internal Fragmentation | | --- | --- | --- | | A (100KB) | 280KB |  | | B (480KB) | 80KB | 400KB | | C (300KB) | 350KB |  | | D (230KB) | 220KB | 10KB | | E (600KB) |  |  | |  | TOTAL | 410KB |   4b   | Partition | Process | Internal Fragmentation | | --- | --- | --- | | A (100KB) | 80KB | 20KB | | B (480KB) | 350KB | 400KB | | C (300KB) | 280KB | 20KB | | D (230KB) | 220KB | 10KB | | E (600KB) |  |  | |  | TOTAL | 450KB | |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

# QUESTION 5 a & b) (6 marks)

| 5a.   | 1 | 4 | 2 | 1 | 3 | 0 | 2 | 4 | 5 | 4 | 0 | 4 | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |  | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |  |  | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 |   H H H H H  Page fault = 7/12  5b.   | 1 | 4 | 2 | 1 | 3 | 0 | 2 | 4 | 5 | 4 | 0 | 4 | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |  | 1 | 1 | 1 | 1 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |  |  | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 |   H H H H H H  Page fault = 6/12 |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

# QUESTION 6) (6 marks)

| Addressing within a 2048 word page requires 10 bits because 2048 = 2^11 . Since the logical address of 4096 = 2^12 pages, the logical address must be 11 + 12 = 23 bits.  Logical address  ←—---------------------------------------23—-------------------------------------->   | Page number | Page offset | | --- | --- |   ←—-------------- 12 —----------------------><------------------ 11 —------------------->  Similarly, since there are 16 = 2^4 frames, physical addresses are 4 + 11 = 15.  Physical address  ←—---------------------------------------15—-------------------------------------->   | Frame number | Frame offset | | --- | --- |   ←—-------------- 4 —----------------------><------------------ 11 —-------------------> |  |
| --- | --- | --- | --- | --- | --- |