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**University Examinations 2015/2016**

FIRST YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS INFORMATION TECHNOLOGY

AND

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND BACHELOR OF SCIENCE IN COMPUTER SECURITY AND FORENSICS, BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY, BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY AND BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE

AND

FIRD YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

AND

FOURTH YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

**CIT3200: OPERATING SYSTEMS/OPERATING SYSTEMS I**

**DATE: NOVEMBER 2015 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. Explain three different types of processes scheduler, also, draw a graph (include all schedulers and queues) to indicate the relation between two different queues and processes schedulers. (6 Marks)
2. Describe four page replacement algorithms. Critically compare them with each other. (8 Marks)
3. Describe the two general roles of an operating system, and elaborate why these roles are important. (4 Marks)
4. Explain the term thrashing and state its disadvantages (4 Marks)
5. Describe four general strategies for dealing with deadlocks (8 Marks)

**QUESTION TWO (20 MARKS)**

1. Using a diagram, explain the abstract view of a computer system. (6 Marks)
2. The batch systems were marked with major problems during the historical development of the operating systems discuss some of this problems and the solutions that were offered there on. (6 Marks)
3. Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K, 112K, and 426K (in order)? Which algorithm makes the most efficient use of memory? (8 Marks)

**QUESTION THREE (20 MARKS)**

1. Describe the benefits of a mono-programming operating system. (4 Marks)
2. Describe the general strategy behind *deadlock prevention*, and give an example of a practical deadlock prevention method. (4 Marks)
3. Explain the requirements for mutual exclusion (4 Marks)
4. Identify four security concerns for a computer system for a bank. For each item on your list, state whether this concern relates to physical security, human security, or operating system security. (4 Marks)
5. Explain the elements of the process control block (4 Marks)

**QUESTION FOUR (20 MARKS)**

1. Highlight two advantages and two disadvantages of user-level threads (4 Marks)
2. After a process has been created, it does its job to completion. This process is then terminated immediately or later. Outline the conditions that may lead to the termination of process. (4Marks)
3. Describe the four memory allocation algorithms (4 Marks)
4. Consider the following table showing part of the execution of five process

|  |  |  |
| --- | --- | --- |
| **Process** | **Arrival Time** | **Burst Time** |
| P1 | 0 | 3 |
| P2 | 1 | 5 |
| P3 | 3 | 2 |
| P4 | 9 | 5 |
| P5 | 12 | 5 |

Draw a Gantt chart to show the scheduling of these processes using the following algorithms.

1. Round Robin (2 Marks)
2. Shortest Remaining Time (2 Marks)
3. What is the average turnaround time and average waiting time using the two algorithms? (4 Marks)

**QUESTION FIVE (20 MARKS)**

1. Describe the **five state process model**, describe what transitions are valid between the five states. (10 Marks)
2. Describe the difference between *external* and *internal* fragmentation. Indicate which of the two are most likely to be an issues on;
3. A simple memory management machine sing base limit registers and static partitioning, and
4. A similar machine using dynamic partitioning. (6 Marks)
5. Distinguish between preemptive scheduling and non-preemptive scheduling? What is the issue with the latter? (4 Marks)