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**University Examinations 2015/2016**

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE COMPUTER SCIENCE AND BACHELOR OF SCIENCE INFORMATION TECHNOLOGY

**CCS 3327: SYSTEMS PROGRAMMING**

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

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

**QUESTION ONE – (30 MARKS)**

1. Describe the following terms: (6 Marks)
2. Job
3. Step
4. Process
5. Privileged instruction
6. Multiprogramming
7. Realtime operation system
8. Differentiate between a system program and system programming giving suitable examples. (4 Marks)
9. The process of fixing up a few forward references should involve less overhead than making a complete second pass of the source program. Why don’t all assemblers use the one-pass technique for efficiency? (6 Marks)
10. State whether the following statements are TRUE or FALSE and justify your answer.
11. Relocation is performed by linker. (1 Mark)
12. Transfer vector is used by direct linking loader. (1 Mark)
13. In absolute loader linking is done by programmer (1 Mark)
14. In compile and go loader linking is performed by loader. (1 Mark)
15. Short term scheduler is responsible for ready to running state transition(1 Mark)
16. Write a pseudo C# code for first come first serve job scheduling algorithm (3 Marks)
17. Write C# code to demonstrate the implementation of the producer-consumer paradigm in process synchronization. (6 Marks)

**QUESTION TWO (20 MARKS)**

1. Describe the difference between short-term, medium term and long-term scheduling.

(6 Marks)

1. Comment on the statement: “The weighted turn arounds in First come First serve scheduling are arbitrarily distributed while those in Shortest Job First scheduling increase monotonically.” (4 Marks)
2. Discuss any two facilities to handle system calls errors. (4 Marks)
3. Describe the Execution of a Remote Procedure Call. (6 Marks)

**QUESTION THREE (20 MARKS)**

1. Provide a convincing argument whether the following statements are TRUE or FALSE.
2. Multiple partition memory management scheme supports multiprogramming.

(2 Marks)

1. CPU is responsible for generation logical address of memory. (2 Marks)
2. Fixed memory portioning causes internal fragmentation (2 Marks)
3. Differentiate between:
4. Paging and segmentation (3 Marks)
5. Contiguous and non-contiguous memory allocation. (3 Marks)
6. Explain the best-fit algorithm used for memory allocation. What are the advantages and disadvantages of this algorithm? (8 Marks)

QUESTION FOUR (20 MARKS)

1. Draw a process state transition diagram using the five states and explain the interpretation of each process. (6 Marks)
2. Describe the process control block and the various pieces of information that it contains in regard to process management. (4 Marks)
3. Below is a set of processes available for execution in a multi-programmed environment:

|  |  |  |
| --- | --- | --- |
| Process | Burst Time (Relative Units) | Arrival time at Ready State |
| A | 10 | 0 |
| B | 6 | 1 |
| C | 4 | 3 |
| D | 1 | 4 |

 Show that using Shortest Time Next (SRTN) scheduling algorithm will result in better values for waiting time and turnaround time for each of the process compared to First Come First served (FCFS)

1. Draw a gantt chart showing the timelines. (4 Marks)
2. Find the average waiting times and average turnaround time (4 Marks)
3. Give a conclusion. (2 Marks)

**QUESTION FIVE (20 MARKS)**

1. Differentiate between connection oriented communication and connectionless communication. (4 Marks)
2. Using any suitable pseudo code, describe the concept of the producer and consumer during inter-process communication. (6 Marks)
3. Wire a program in C++ which maliciously accesses a file named studnetfee.txt and clears all existing content and replaces it with your nickname. Explain working of your programs. (10 Marks)