



UNIVERSITY OF GHANA

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BA/B.SC COMPUTER SCIENCE, FIRST SEMESTER EXAMINATIONS:

2016/2017

CSCD315 and CSIT305: OPERATING SYSTEM (3 CREDITS)

INSTRUCTION:

There are TWO SECTIONS to this paper, Sections A and B. **ANSWER ALL QUESTION in SECTION A Plus ANY ONE Question from SECTION B into the Answer booklet provided.**

TIME ALLOWED:

TWO AND A HALF (2½) HOURS

SECTION A

There are 30 objective questions in this section. Answer ALL Questions. One mark for each correct Answer, 30 Marks total.

Instructions: Select the most suitable answer from the options provided in a-d, and write your answer in the answer booklet provided.

1. Which of the following do not belong to queues for processes ?
 - a) Job Queue
 - b) PCB queue
 - c) Device Queue

d) Ready Queue

1. When a process issues I/O request :

- a) It is placed in an I/O queue
- b) It is placed in a waiting queue
- c) It is placed in the ready queue
- d) It is placed in the Job queue

1. When a process terminates : (Choose Two)

- a) It is removed from all queues
- b) It is removed from all, but the job queue

- c) Its process control block is de-allocated
- d) Its process control block is never de-allocated

1. What is a long-term scheduler?

- a) It selects which process has to be brought into the ready queue
- b) It selects which process has to be executed next and allocates CPU
- c) It selects which process to remove from memory by swapping
- d) None of these.

1. Systems which allow only one process execution at a time, are called

- a) uni-programming systems
- b) uni-processing systems
- c) uni-tasking systems
- d) none of the above

2. In operating systems, each process has its own

- a) address space and global variables
- b) open files
- c) pending alarms, signals and signal handlers
- d) all of the above.

1. A process is selected from the _____ queue by the _____ scheduler, to be executed.

- a) blocked, short term

- b) wait, long term
- c) ready, short term
- d) ready, long term

1. The switching of the CPU from one process or thread to another is called :

- a) process switch
- b) task switch
- c) context switch
- d) All of the above.

1. Scheduling is done so as to :

- a) increase CPU utilization
- b) decrease CPU utilization
- c) keep the CPU more idle
- d) None of the above

1. Turnaround time is :

- a) the total waiting time for a process to finish execution
- b) the total time spent in the ready queue
- c) the total time spent in the running queue
- d) the total time from the completion till the submission of a process

1. The relocation register helps in :

- a) providing more address space to processes
- b) a different address space to processes
- c) to protect the address spaces of processes
- d) None of these

1. In contiguous memory allocation :

- a) each process is contained in a single contiguous section of memory
- b) all processes are contained in a single contiguous section of memory
- c) the memory space is contiguous
- d) None of these

1. The idea of overlays is to : (choose all that apply)

- a) enable multiple processes execute at once
- b) enable a process to be larger than the amount of memory allocated to it
- c) keep in memory only those instructions and data that are needed at any given time
- d) All of these

1. The _____ swaps processes in and out of the memory.

- a) memory manager
- b) CPU
- c) CPU manager
- d) user

1. If a higher priority process arrives and wants service, the memory manager can swap out the lower priority process to execute the higher priority process. When the higher priority process finishes, the lower priority process is swapped back in and continues execution. This variant of swapping is sometimes called :

- a) priority swapping
- b) pull out, push in
- c) roll out, roll in
- d) None of these

1. The two ways of aborting processes and eliminating deadlocks are : (choose all that apply)

- a) Abort all deadlocked processes
- b) Abort all processes
- c) Abort one process at a time until the deadlock cycle is eliminated
- d) All of these

1. If we pre-empt a resource from a process, the process cannot continue with its normal execution and it must be :

- a) aborted
- b) rolled back
- c) terminated
- d) queued

1. If the resources are always pre-empted from the same process, _____ can occur.

- a) deadlock
- b) system crash
- c) aging
- d) starvation

1. For a Hold and wait condition to prevail :

- a) A process must be not be holding a resource, but waiting for one to be freed, and then request to acquire it
- b) A process must be holding at least one resource and waiting to acquire additional resources that are being held by other processes
- c) A process must hold at least one resource and not be waiting to acquire additional resources
- d) None of these

1. From the following, which is not a common file permission ?

- a) Write
- b) Execute
- c) Stop
- d) Read

1. Which of the following is least secure method of authentication ?

- a) Key card
- b) fingerprint

- c) retina pattern
- d) Password

1. Which of the following are forms of malicious attack ?

- a) Theft of information
- b) Modification of data
- c) Wiping of information
- d) All of the mentioned

1. What is breach of integrity ?

- a) This type of violation involves unauthorized reading of data
- b) This violation involves unauthorized modification of data.
- c) This violation involves unauthorized destruction of data
- d) This violation involves unauthorized use of resources

1. What is “theft of service” ?

- a) This type of violation involves unauthorized reading of data
- b) This violation involves unauthorized modification of data.
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- d) This violation involves unauthorized use of resources

1. What is the mounting of file system?

- a) creating of a file system
- b) deleting a file system
- c) attaching portion of the file system into a directory structure
- d) removing portion of the file system into a directory structure

1. Mapping of file is managed by

- a) file metadata
- b) page table
- c) virtual memory
- d) file system

1. File system fragmentation occurs when

- a) unused space or single files are not contiguous
- b) used space is not contiguous
- c) unused space is non-contiguous
- d) multiple files are non-contiguous

1. Application layer provides the basis for

- a). Email services
- b). Directory services.
- c). File transfer, access, and management.
- d). Network virtual terminal.

1. Segmentation and reassembly is responsibility of

- a). 7th Layer
- b). 6th Layer
- c). 5th Layer
- d). 4th layer

1. Network layer is responsible for the

- a). Node to node communication
- b). Source to destination
- c). Hop to hop communication
- d). both b and c

SECTION B (40marks)

Answer ANY ONE question (Q1 or Q2) into the Answer booklet provided.

Q1.(40marks)

(a). Distinguish between the following terms 'Closed system' and 'Open system' with reference to computer Network communications (10marks)

(b). Explain the need for an 'Operating system' in a computer system and show the difference between network operating system and distributed operating system

(10marks)

FIG. 1 Computer Network for Company XYZ- Ltd

(c). The diagram in fig.1 above represents the computer network connecting the four branches (A, B, C, and D) of company XYZ-Ltd.

CASE1: If it is **NOT** possible for the operating systems installed in the four branches in fig.1 to communicate, explain why? **(10 marks)**

CASE2: If it is possible for the computers in the four branches in fig.1 to communicate, explain why? **(10 marks)**

Q2.(40marks)

(a) A good understanding of the 'process concept' is fundamental to the study of operating systems. What is the 'Process concept' and 'process state' (6marks)

(b) With the aid of the five state transition diagram, describe how a process goes through these transitions, stating clearly, the conditions that must be satisfied for a process to make a transition. (12marks)

(c) Describe the round-robin job scheduling algorithm (2marks)

(a) Table 1 below shows six processes and their individual arrival times at the CPU for execution.

PROCESS	ARRIVAL TIME	CPU TIME
P1	1	5
P2	2	6
P3	3	7
P4	5	1
P5	7	4
P6	8	3

Table 1: Six process and their arrival times at the CPU

Using the round robin scheduling algorithm with a time quantum of 3,

I. Draw a Gantt chart showing how the processes arrive in memory (4marks)

II. Calculate the waiting time for the six processes. (12marks)

III. Calculate the average waiting time and state its significance (6marks)

