



UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

END OF SEMESTER ONE EXAMINATIONS

ACADEMIC YEAR 2022/2023

DEPARTMENT: ICT

SEMESTER: ONE

PROGRAMME(S): DIPLOMA IN COMPUTER SCIENCE (DCS)

YEAR OF STUDY: ONE

COURSE: OPERATING SYSTEMS

COURSE CODE : CSC112

DATE: SATURDAY 25TH, MARCH 2023

TIME: 9:00 AM – 12:00 NOON

DURATION: 3 HOURS

INSTRUCTIONS:

- (i) This paper contains two Sections: A (40 marks) & B (60 marks).**
- (ii) Attempt ALL questions in Section A, and ONLY THREE questions in Section B.**
- (iii) All questions in Section B carry equal marks.**
- (iv) Credit will be given for use of relevant examples and illustrations.**
- (v) Begin each number in Section B on a new page of the answer sheet.**
- (vi) DO NOT write on this question paper.**

SECTION A [40 MARKS]

Attempt **ALL** the Questions in this Section.

1. Which of the following is not an operating system?
(a) Linux (b) DOS (c) Windows 10 (d) . Cisco
2. Access of records following a particular order is known as:
(a) Direct access (b) Duplicate access (c) Sequential access (d) Random access.
3. Compaction refers to:
(a) a technique used to map logical memory address to physical address.
(b) a technique used to overcome external fragmentation.
(c) a paging technique.
(d) a technique for deleting unnecessary data.
4. A reusable resource can be:
(a) Used by one process at a time and is not depleted by that use.
(b) used by more than one process at a time.
(c) Shared between various threads.
(d) None of the above.
5. The result of perpetual denial of necessary resources is called:
(a) Starvation (b) Deadlock (c) Aging (d) Inversion
6. The number of resources requested by a process must:
(a) always be less than the total number of resources available in the system.
(b) not exceed the total number of resources available in the system
(c) always be equal to the total number of resources available in the system.
(d) exceed the total number of resources available in the system.
7. What is the ready state of a process?
(a) When the process is using the CPU.
(b) When the process is unable to run until a certain task is performed.
(c) When the process can be allocated to the CPU for execution
(d) When a process is in the blocked queue.

- .8. A process can be terminated due to:
(a) normal exit (b) arithmetic error (c) insufficient memory (d) All of them
9. The following are states in the five state process model except:
(a) Terminated (b) Ready (c) Running (d) Not running
10. The entry of all process control blocks (PCB) of the current processes is found in:
(a) Process register (b) Process unit. (c) Process table (d) Program counter
11. Which of the following state transitions is not possible?
(a) Ready to running (b) running to blocked (c) Blocked to running (d) Blocked to ready.
12. The CPU fetches the next instruction from memory according to the value of:
(a) Status Register (b) Instruct Register (c) Program counter (d) Program Status Word.
13. The address generated by the CPU is called:
(a) Absolute address (b) Logical address (c) Physical address (d) MAC address.
14. The strategies such as “first fit”, “best fit”, “worst fit” are used to select a:
(a) process from a queue to put in storage
(b) free hole from a set of available holes..
(c) processor to run the next process.
(d) process from a queue to put in memory
15. The hardware mechanism a device uses to notify the CPU is called:
(a) Interrupt (b) Polling (c) Driver (d) Swapping
16. The following are functions of the operating system except:
(a) Sound management (b) Process management (c) Memory management (d) File management
17. Which one of the following is a mobile device operating system?
(a) Android (b) Linux (c) Oracle. (d) Macintosh
18. The following are used to compare scheduling algorithms except:
(a) CPU Utilization (b) Round Robin (c) Waiting time (d) Response time..
19. Reusable resources include the following except:
(a) CPU cycles (b) Memory space (c) Long term scheduler (d) Files.
20. Identify any one activity of an operating system in regard to process management
(a) Deadlock handling

- (b) Allocate and de-allocate memory space
 - (c) Creation and deletion of files
 - (d) Scheduling the requests for memory access
21. Which of the following qualify to be memory management requirements
- (a) Protection and Relocation
 - (b) Sharing and physical organization
 - (c) a) and b)
 - (d) None of the options
23. The most important and complex tasks of an operating system is
- (a) Memory management
 - (b) Process management
 - (c) Time management
 - (d) Event management
24. Which of these is a Unit of resource ownership
- (a) Program
 - (b) Process
 - (c) Operating system
 - (d) None of the above
25. CPU switching from one process to another requires saving the state of the current process and loading the latest state of the next process. This is known as a ____.
- (a) Program Switch
 - (b) Context Switch
 - (c) Process Switch
 - (d) OS Switch
26. When is a context switch necessary
- (a) Multitasking
 - (b) Interrupts
 - (c) a) and b)
 - (d) None of the options

SECTION B [60 MARKS]

Attempt **ONLY THREE** Questions in this Section.

Question 1

- (a) Define the term a *process* as used in operating systems. (2 Mks)
- (b) Describe the five state transition model (10 Mks)
- (c) Given three processes P_1 , P_2 and P_3 with burst times indicated against each as shown below:

Process	Burst Time
P_1	24
P_2	3
P_3	3

Suppose the processes arrive in the order P_2 , P_1 and P_3 .

Determine the average waiting time if the scheduling follows:

- (i) First Come First Served Algorithm (4 Mks)
- (ii) Shortest Job First Algorithm . (4 Mks)

Question 2

- (a) Define a deadlock as used in device management (2 Mks)
- (b) Describe any four strategies for dealing with deadlocks (8 Mks)
- (c) brief explain what is meant by the following as applied to hard disks :
 - (i) latency (2 Mks)
 - (ii) transfer time and (2 Mks)
 - (iii) seek time (2 Mks)
- (d) Describe the criteria used to assess CPU scheduling algorithms. (4 Mks)

Question 3

- (a) Define the term file as used in Operating Systems. (2 Mks)
- (b) Briefly describe the following file access methods:
 - (i) Random Access (2 Mks)
 - (ii) Sequential Access (2 Mks)
- (c) Describe any four functions performed by the operating system. (8 Mks)
- (d) State any three types of operating systems (6 Mks)

Question 4

Distinguish the following terms as applied to Operating systems

- (a) A page and frame (4 Mks)
- (b) Swapping and compaction. (4 Mks)
- (c) Long Term Scheduling and Short Term Scheduling (4 Mks)
- (d) Segmentation and Fragmentation (4 Mks)
- (e) Real Memory and Virtual Memory (4 Mks)

Question 5

- (a) Briefly explain the following types of devices:
 - (i) Dedicated Devices (2 Mks)
 - (ii) Shared Devices and (2 Mks)
 - (iii) Virtual Devices (2 Mks)
- (b) Explain any two factors that determine Access Time. (6 Mks)
- (c) Describe the following terms as used with hard disks:
 - (i) Disk platter (ii) Disk arm (iii) Track (iv) Sector (8 Mks)

Question 6

- (a) Identify and describe the Components of the I/O Subsystem (8 Mks)
- (b) State 3 conditions that may result into Switching Process (6 Mks)
- (c) Distinguish between contiguous and non-contiguous memory (4 Mks)
- (d) What is *swapping* as used in memory management? (2 Mks)