1920/106
OPERATING SYSTEMS
July 2023
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN INFORMATION TECHNOLOGY

MODULE I

OPERATING SYSTEMS

3 hours

INSTRUCTIONS TO CANDIDATES

*This paper consists of **TWO** sections: **A** and **B**.*
*Answer **ALL** the questions in section **A** and any **FOUR** from section **B** in the answer booklet provided.*
Candidates should answer the questions in English.

This paper consists of 4 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A (40 marks)

*Answer **ALL** the questions in this section.*

1. Outline **four** features of a multiuser operating system. (4 marks)

2. Dan uses sequential method to organise files in his computer. Outline **four** challenges he is likely to encounter. (4 marks)

3. Sarah installed drivers for a new computer hardware. Explain **two** reasons for this installation. (4 marks)

4. Explain **two** circumstances that could lead to the use of the long-term scheduler in a computer system. (4 marks)

5. Explain each of the following terms as used in operating systems:
   (i) kernel; (2 marks)
   (ii) interrupt. (2 marks)

6. A computer system uses dynamic partitioning in the memory management. Explain **two** advantages of this type of partitioning. (4 marks)

7. Outline **four** challenges of First Come First Served (FCFS) process scheduling algorithm. (4 marks)

8. Differentiate between *CLOOK* and *CSCAN* disk arm scheduling algorithms. (4 marks)

9. Explain each of the following terms as used in file protection:
   (i) access control; (2 marks)
   (ii) audit trail. (2 marks)

10. Isaac installed an operating system software in a new computer. Outline **four** advantages of this software. (4 marks)

SECTION B (60 marks)

*Answer any **FOUR** questions from this section.*

11. (a) Outline **four** advantages of paging as used in memory management. (4 marks)

(b) A computer system uses linked list file allocation technique. Explain **three** limitations of this technique. (6 marks)

(c) With the aid of a diagram, describe the three-process state of a computer process. (5 marks)

12. (a) Outline **three** components of a hard disk. (3 marks)

(b) Consider requests from processes in the given order; 200kB, 90kB, 30kB, 70kB and 45kB. There are two blocks of memory of sizes 160kB and 300kB. Allocate the processes to the available memory using each of the following partition allocation schemes:

(i) first fit; (3 marks)

(ii) best fit; (3 marks)

(c) James intends to transfer data from a disk. Explain **three** factors that would determine the disk access time. (6 marks)

13. (a) (i) Define the term dumb terminal as used in operating systems. (2 marks)

(ii) Outline **three** characteristics of a good scheduling algorithms. (3 marks)

(b) Explain **two** circumstances when batch operating system is the most appropriate. (4 marks)

(c) A technical institute uses client server operating system model.

(i) With the aid of a diagram, describe its structure. (4 marks)

(ii) Outline **two** advantages of this model. (2 marks)

14. (a) Explain each of the following directory structure:

(i) single level; (2 marks)

(ii) tree. (2 marks)

(b) Distinguish between *pre-emptive* and *priority* scheduling algorithms. (4 marks)

(c) A virtual memory is an important part of a computer system. Describe **two** functions of this memory. (4 marks)

(d) A technician detected a deadlock in a computer during troubleshooting. Outline **three** recoveries that could be used to recover from this deadlock. (3 marks)

15. (a) Alice created a file in her computer system. Outline **four** attributes that this file could possess. (4 marks)

(b) Explain **two** functions of the clock software in a computer system. (4 marks)

(c) Figure 1 shows a diagram of a scheduling algorithm. Use it to answer the questions that follow:

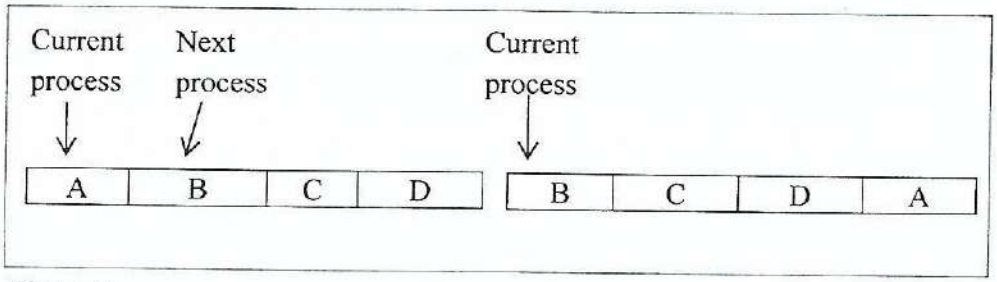

Figure 1

(i) Identify the scheduling algorithm depicted in the figure. (1 mark)

(ii) Explain **three** advantages of the algorithm identified in (i). (6 marks)

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