

Name _____ Index No. _____ / _____

2920/105
OPERATING SYSTEMS
July 2015
Time: 3 hours

Candidate's Signature _____

Date _____



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

MODULE I

OPERATING SYSTEMS

3 hours



INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided above.

Sign and write the date of examination in the spaces provided above.

Answer any FIVE of the following EIGHT questions in the spaces provided.

All questions carry equal marks.

Candidates should answer the questions in English.

For Examiner's Use Only

Question	1	2	3	4	5	6	7	8	Total Score
Candidate's Score									

This paper consists of 12 printed pages.

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

- (c) Maendeleo Institute is experiencing data privacy problem within it's file system. Explain **two** measures that the institute can put in place to mitigate this problem. (4 marks)

- (d) Multilevel operating systems must include round robin as one of the process scheduling algorithms. Explain **two** advantages of this algorithm. (4 marks)



3. (a) Explain the *semaphore* as used in operating system. (4 marks)

- (b) (i) Describe the term *swapping* as used in memory management. (3 marks)

- (ii) Outline **four** major storage levels that could be found in a memory hierarchy diagram. (4 marks)

- (c) Explain **three** ways in which a new process is created in an operating system. (6 marks)

- (d) Derrick was required to investigate several elements of a process control block. Outline **four** elements that he could have established. (4 marks)



4. (a) Explain each of the following terms as used in operating system: (2 marks)

(i) shell;

(ii) thread. (2 marks)

- (b) AXB Company Ltd. intends to install an operating system with a friendly user interface.

(i) Identify the most appropriate type of operating system for the company justifying your answer. (2 marks)

(ii) Outline **four** drawbacks that the company could realize while using the operating system identified in (i). (4 marks)

(c) (i) Explain the term *dispatcher* as used in operating systems. (2 marks)

(ii) Differentiate between *block-oriented* and *stream-oriented* I/O devices. (4 marks)

(d) A lecturer described goals of I/O module during an operating system class. Outline **four** goals he could have mentioned. (4 marks)



5. (a) (i) Outline **two** memory placement algorithms. (2 marks)

(ii) Differentiate between *short term* and *long term* process scheduling. (4 marks)

(b) (i) Define the term *spatial locality* as used in memory management. (2 marks)

(ii) Describe **two** limitations of dynamic memory partitioning schemes. (4 marks)



(c) Figure 1 shows a directory structure in a typical operating system. Use it to answer the questions that follow.

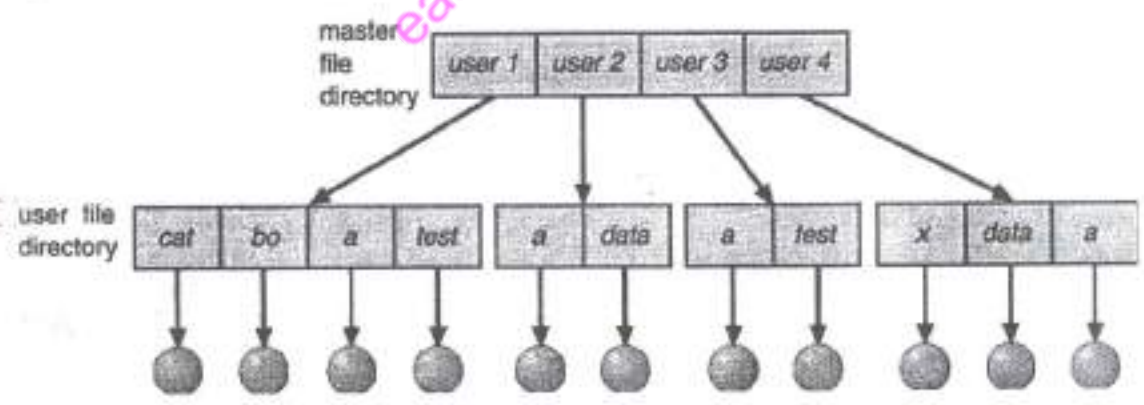


Figure 1

(i) Identify the directory structure depicted in the diagram justifying your answer. (2 marks)

(ii) Outline **two** advantages of the directory structure identified in (i). (2 marks)

(iii) Outline **four** typical directory operations that could be carried out in the directory structure identified in (c) (i). (4 marks)

6. (a) Figure 2 shows a NTFS volume layout diagram. Outline the function of the parts labeled (i) and (ii). (4 marks)



Figure 2

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(b) Most CPUs have interrupt requests for operating system's operations. Explain **two** types of such interrupt requests. (4 marks)

(c) With the aid of a diagram, describe contiguous file allocation method. (4 marks)

(d) (i) Juliet intends to procure an I/O device for her computer. Other than cost, outline **four** factors that she should consider when selecting the device. (4 marks)



(ii) Solomon, a programmer with a certain company was required to explain the roles of clock software to a client. Outline **four** functions that he could have mentioned. (4 marks)

7. (a) (i) Explain the term *linking* as applied in memory management. (2 marks)



- (ii) Differentiate between *logical* address and *physical* address as used in memory management. (4 marks)

- (b) Table 1 shows details of FCFS scheduling algorithm. Use it to answer the questions that follow.

Process	Arrival time	Execution time	Service time
P0	0	5	0
P1	1	3	5
P2	2	8	8
P3	3	6	16

Table 1

- (i) Calculate the wait time for each process labeled P0, P1, P2 and P3. (2 marks)



- (ii) Calculate the average wait time for all the processes. (2 marks)

- (iii) Outline **two** advantages of FCFS scheduling algorithm. (2 marks)

- (c) Risper was required to identify two types of memory fragmentations in operating systems. Explain **two** types that she was likely to have identified. (4 marks)

- (d) Javesh Company Ltd. would like to implement a client-server operating system. Outline **four** benefits the company will derive from this decision. (4 marks)



8. (a) Outline **four** reasons for implementing audit trail on a file system. (4 marks)

- (b) Differentiate between *kernel* and *user* spaces as applied in operating systems. (4 marks)
