

KENYA TECHNICAL TEACHERS COLLEGE
 DEPARTMENT OF COMPUTER STUDIES
 DIPLOMA IN INFORMATION TECHNOLOGY
 2017CSCS3C MODULE I(SEPTEMBER INTAKE)
 CS 1005: OPERATING SYSTEMS
 CAT II (TAKE AWAY HOLIDAY ASSIGNMENT)

QUESTION 1

1.1 Figure 1 shows layers in computer memory hierarchy. Use it to answer the question that follows.

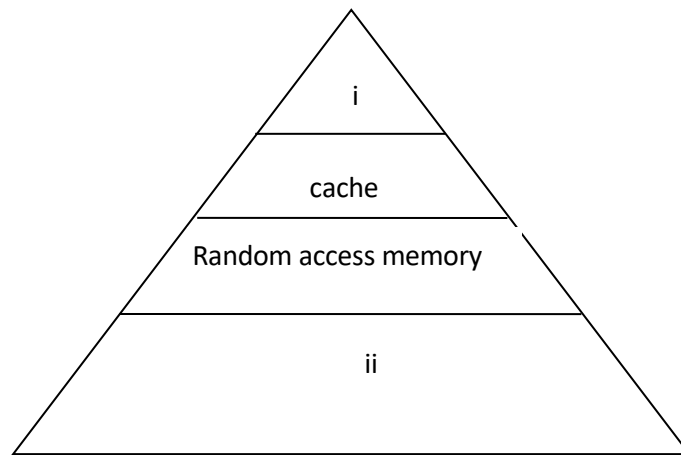


Figure 1

Describe each of the layers labeled (i) and (ii) (4marks)

1.2 Figure 2 shows a typical process model used in operating systems. Use it to answer the questions that follow.

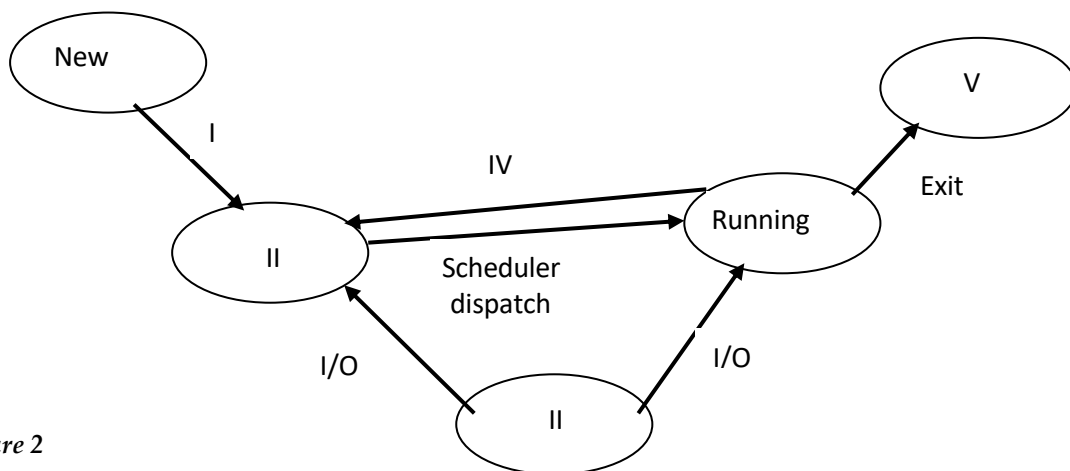


Figure 2

Identify the parts labeled (i),(ii),(iii),(iv) and (v) (5 marks)

1.3 Sly was carrying out a study on benefits of multiprocessor systems. Explain two benefits that she should have established. (4marks)

1.4 Distinguish between long term and short term schedulers as used in process management. (4 marks)

1.5 With the aid of a diagram outline a typical Process Control Block (PCB) diagram as used in operating systems. (5marks)

1.6 Explain FOUR circumstances that would necessitate premature termination of a process of a process execution in operating systems. (8marks)

1.7 Outline FOUR resources required in a process execution. (4marks)

1.8 Differentiate between interrupt and system call as used in operating systems. (4 marks)

1.9 Explain the term context switch as used in operating systems. (2marks)

1.10A lecturer described objectives of process scheduling to an OS class. Explain two objectives that he could have mentioned. (4 marks)

Question 2

(i) Write short notes on the following topics and subtopics under Process Management. (30 marks)

1. Inter process communication

Race conditions
Critical sections
Mutual exclusion with busy waiting
Sleep and wake up
Semaphores
Event counters
Monitors
Message passing
Equivalent of primitives

2. Process scheduling

Job scheduling
Process scheduling
Scheduling algorithms

- SJF
- FCFS
- Round – Robin
- Priority Scheduling
- Pre-emptive Scheduling
- Multiple Queues
- Evaluation of round robin in multiprogramming
- synchronizing performance considerations

3. Deadlocks

Deadlocks
Deadlock detection and recovery
Deadlock avoidance
Deadlock prevention

Description of Error Diagnosis

(ii) Write short notes on the following OS issues:

[9 marks]

- (a) A multiprogramming system necessarily had multiple processors.
- (b) Multitasking can be achieved only through time-sharing.
- (c) Real time systems are time critical systems.

TOTAL 8 MARKS

Question 3

- (a) Explain what is meant by process creation? Explain four common events that lead to the creation of a process. [5 marks]
- (b) What are process states? Explain all the **FIVE** state of a process. [6 marks]
- (c) Define the term system calls. List any three types of system calls. [4 marks]
- (d) Define the following terms as used in operating systems : (1) process (2) Thread [2 marks]
- (e) Explain any two advantages of Threads over Processes. [4 marks]
- (f) Define the term semaphore variable as used in operating system [2 marks]

TOTAL MARKS 23

Question 4

- (a) Operating systems need File Control Blocks (PCB). What is PCB? Explain with examples. [4 marks]
- (b) List types of information Process Control Blocks (PCB) have? Explain any four. [5 marks]
- (c) Operating system acts as a resource manager. What resource does it manage? [4 marks]
- (d) Discuss the inconveniences faced by a user interacting with a computer system without an operating system. [6 marks]

(e) If a process is created by another process, explain how is the first process created? [3 marks]

TOTAL 22 MARKS

Question 5

(a) State the main functions of processor registers [4 marks]

(b) Define the term cache memory [2 marks]

(c) Explain the function of each layer of the structure of the operating system [6 marks]

(d) Explain any *three* objectives of an operating system [3 marks]

(e) Compare the following in relation to operating systems :-

i. Real time and timesharing

ii. Multiprogramming and uniprogramming

[4marks]

TOTAL MARKS 19