University of Eldoret

flame of knowledge and innovation

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

REGULAR EXAMINATION

FOR THE DEGREE OF

BACHELOR OF SCIENCE

IN

COMPUTER SCIENCE; ANALYTICAL CHEMISTRY; INFORMATION TECHNOLOGY; EDUCATION SCIENCE; TECHNICAL EDUCATION; COMMERCE; BSC ECONOMICS

COURSE CODE: COMP 224

COURSE TITLE: OPERATING SYSTEMS

DATE: 13TH APRIL, 2022 TIME: 12.00 NOON – 3.00PM

INSTRUCTIONS TO CANDIDATES

- SEE INSIDE

THIS PAPER CONSISTS OF (2) PRINTED PAGES. PLEASE TURN OVER

UNIVERSITY OF ELDORET
SCHOOL OF SCIENCE / SCHOOL OF BUSINESS
BACHELOR OF SCIENCE COMPUTER SCIENCE / ANALYTICAL CHEMISTRY/ INFORMATION TECHNOLOGY/ EDUCATION SCIENCE/ TEHNICAL EDUCATION /COMMERCE / BSC ECONOMICS
APRIL 2022

COMP 224: OPERATING SYSTEMS

Question 1 [16 Mks]

a. Consider performance of FCFS, SJF AND RR (Quantum of 5 seconds) scheduling algorithms for three computer-bound processes. P1 (takes 10 seconds), P2 (takes 6 seconds) and P3 (takes 5 seconds). If arrive in order P1, P2, P3 **one** second apart, what is :- i. Average Waiting Time? ii. Average Turnaround Time? iii. Throughput? [10 Mks]

b. Explain the different states of a process, in each, describe an event that might cause such a transition. [6 Mks]

Question 2 [15 Mks]

a. State the solutions to deadlocks in operating systems. [4 Mks]

b. Give five solutions to any five threats to operating systems of the future? [5 Mks]

c. Name three advantages and three disadvantages of user-level threads. [6 Mks]

Answer any Three Questions from this section

Question 3 [13 Mks]

a. Explain why Ubuntu operating system is safe and not affected by viruses? [5 mks]

b. An operating system has five major responsibilities for managing memory. Explain them. [5 Mks]

c. Briefly explain the concept of swapping and relocation in memory management in operating systems. [3 Mks]

Question 4 [13 Mks]

a. What are three requirements of any solution to the critical sections problem? Why are the requirements needed? [6 Mks]

b. With the help of a diagram, Explain the structure of Linux Operating Systems. [7 Mks]

Question 5 [13 Mks]

a. Explain the four condtions required for deadlock to occur. [4 Mks]

b. For single unit resources, we can model resource allocation and requests as a directed graph connecting processes and resources. Use an example of such a graph to show what is involved in deadlock detection. [4 Mks]

c. In order to achieve efficiency in I/O management, the OS has structured it into layers. Explain these layers briefly. [5 Mks]

Question 6 [13 Mks]

a. Explain any four types of operating systems and justify the need for each. [8 Mks]

b. Describe the four memory allocation algorithms. Which one do you prefer? [5 Mks]

Question 7 [13 Mks]

a. How can a user program disturb the normal functioning of a system? [3 Mks]

b. What is the relationship between threads and processes? [4 Mks]

c. What is the difference between paging and segmentation? [5 Mks]

UNIVERSITY OF ELDORET
SCHOOL OF SCIENCE / SCHOOL OF BUSINESS
BACHELOR OF SCIENCE COMPUTER SCIENCE / ANALYTICAL CHEMISTRY/ INFORMATION TECHNOLOGY/ EDUCATION SCIENCE/ TEHNICAL EDUCATION /COMMERCE / BSC ECONOMICS
APRIL 2022

COMP 224: OPERATING SYSTEMS

Question 1 [16 Mks]

a. Consider performance of FCFS, SJF AND RR (Quantum of 5 seconds) scheduling algorithms for three computer-bound processes. P1 (takes 10 seconds), P2 (takes 6 seconds) and P3 (takes 5 seconds). If arrive in order P1, P2, P3 **one** second apart, what is :- i. Average Waiting Time? ii. Average Turnaround Time? iii. Throughput? [10 Mks]
b. Explain the different states of a process, in each, describe an event that might cause such a transition. [6 Mks]

Question 2 [15 Mks]

a. State the solutions to deadlocks in operating systems. [4 Mks]
b. Give five solutions to any five threats to operating systems of the future? [5 Mks]
c. Name three advantages and three disadvantages of user-level threads. [6 Mks]

Answer any Three Questions from this section

Question 3 [13 Mks]

a. Explain why Ubuntu operating system is safe and not affected by viruses? [5 mks]
b. An operating system has five major responsibilities for managing memory. Explain them. [5 Mks]
c. Briefly explain the concept of swapping and relocation in memory management in operating systems. [3 Mks]

Question 4 [13 Mks]

a. What are three requirements of any solution to the critical sections problem? Why are the requirements needed? [6 Mks]
b. With the help of a diagram, Explain the structure of Linux Operating Systems. [7 Mks]

Question 5 [13 Mks]

a. Explain the four condtions required for deadlock to occur. [4 Mks]
b. For single unit resources, we can model resource allocation and requests as a directed graph connecting processes and resources. Use an example of such a graph to show what is involved in deadlock detection. [4 Mks]
c. In order to achieve efficiency in I/O management, the OS has structured it into layers. Explain these layers briefly. [5 Mks]

Question 6 [13 Mks]

a. Explain any four types of operating systems and justify the need for each. [8 Mks]
b. Describe the four memory allocation algorithms. Which one do you prefer? [5 Mks]

Question 7 [13 Mks]

a. How can a user program disturb the normal functioning of a system? [3 Mks]
b. What is the relationship between threads and processes? [4 Mks]
c. What is the difference between paging and segmentation? [5 Mks]