



# THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

**A. M. E. C. E. A**

P.O. Box 62157  
00200 Nairobi - KENYA  
Telephone: 891601-6  
Fax: 254-20-891084  
E-mail: academics@cuea.edu

**MAIN EXAMINATION**

**JANUARY – APRIL 2015 TRIMESTER**

**FACULTY OF SCIENCE**

**DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE**

**REGULAR PROGRAMME**

**DIT 005: FUNDAMENTALS OF OPERATING SYSTEM**

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|--|--------------------------|
| <b>Date: April 2015</b>  | <b>Duration: 2 Hours</b> |
| <b>INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions</b> |                          |

- Q1. a) Define:
- i) Operating system (1 mark)
  - ii) Bootstrap program (1 mark)
  - iii) Parallelization (1 mark)
  - iv) Kernel (Micro Kernel) (1 mark)
  - v) Process (1 mark)
- b) Explain the main functions of the operating system. (8 marks)
- c) Define Deadlock and discuss in details **THREE** methods of handling deadlocks. (9 marks)
- d) Briefly explain any **FOUR** reasons that can cause process suspension. (8 marks)
- Q2. a) Differentiate between:
- i) Primary and secondary storage
  - ii) Instruction Registers (I.R) and Program Counter (PC)
  - iii) Multiprogramming and Time sharing (6 marks)

- b) Define CPU/Processor scheduling and outline the aim of scheduling. **(6 marks)**
- c) Outline any **TWO** characteristics of non-preemptive scheduling. **(4 marks)**
- d) Briefly discuss the role of operating system from the view of user and system. **(4 marks)**
- Q3. a) Give an example showing why FIFO isn't an appropriate CPU scheduling scheme for interactive users. **(4 marks)**
- b) Using the example form (a) above; show why round robin is a better scheme for interactive users. **(6 marks)**
- c) Define scheduler and discuss the **FOUR** types of scheduling. **(10 marks)**
- Q4. a) Discuss **FIVE** reasons for process termination. **(5 marks)**
- b) Using a well labeled diagram, explain the **FIVE** state model of a process. **(5 marks)**
- c) Discuss the **FOUR** major goals of scheduling mechanisms in modern operating systems. **(8 marks)**
- d) The scheduling algorithms can be divided into two categories with respect with how they deal with clock interrupt. Differentiate between preemptive and non-preemptive scheduling. **(2 marks)**
- Q5. a) Discuss any **FIVE** scheduling algorithms and give examples where applicable. **(10 marks)**
- b) Using dining philosopher's problem, discuss how deadlocks can be avoided. **(10 marks)**

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