ACCRA INSTITUTE OF TECHNOLOGY

The University of the Future

END OF SUMMER EXAMINATIONS

SUMMER 2022

DATE: MAY 2022

COURSE CODE: CS306

COURSE TITLE: COMPUTER ARCHITECTURE LAB

LECTURER'S NAME: BAYOR REX ALPHONSUS

	COURSE OUTLINE (MAIN TOPICS)	QUESTION NO.
MajorTopic-1	Basics of Operating System (Computer System Operation)	
MajorTopic-2	Storage Structure	
MajorTopic-3	Input/Output Structure	
MajorTopic-4	Computer System Architecture	
MajorTopic-5	Operating system Structure	
MajorTopic-6	Operating System Services	
MajorTopic-7	System Calls	

PART A

FOUR QUESTIONS ANSWER TWO

Question 1

a) Computer systems can be categorized into various types based on the number of general purpose processors they support. Identify these categories and explain the concept of each as applied to the Computer System Architecture.

Computer System architecture	APP	10

b) A Single Processor System typically consists of a single processor executing all instructions. How would you justify the concept of a Single Processor System consisting of a main CPU and other special purpose processors executing instructions?

Computer System architecture	EV	7

c) List and explain the advantages of a Multiprocessor System and describe how each contributes to the performance of the computer system.

Computer System architecture	UN	8

TOTAL SCORE: 25 Marks

Question 2

a) Operating Systems vary greatly in their make-up internally. However, all operating systems are capable of performing some basic activities which are common to all operating systems. Identify these common activities and explain how they influence the Operating System structure in general.

Operating System Structure	EV	10

b) Generally, an operating System provides services such as an environment for the execution of programs. It also provides certain services to programs and to users of those programs.

Identify these services and briefly explain them.

Operating System Structure	**AP**	**7**

c) Discuss the difference between Symmetric and Asymmetric Structure in a Clustered Computer System?

Operating System Structure	**UN**	**8**

TOTAL SCORE: 25 Marks

Question 3

a) With a well labeled diagram, briefly describe the "Simple Structure" of the Operating System

Structures of Operating system	**UN**	**7**

b) Discuss the other structures of the operating system, identify their unique characteristics and briefly explain them. (No diagrams required)

Structures of Operating system	**EV**	**9**

c) Explain the categories of the System Call feature of the Operating System

Structures of Operating system	**UN**	**9**

TOTAL SCORE: 25 Marks

Question 4

a) System Call, is a very important feature in the Operating System. It provides an interface to the services mode available by an Operating System. In this feature, there are two important modes of operations that a program can be executed.

i. Discuss these modes of operations and

ii. Discuss their relevance to the System Call process

System Calls	**AP**	**7** **8**

b) Explain the process involved in a System Call sequence for writing a simple program to read data from one file (Source file) and copy them to another file (destination file).

System Calls	**UN**	**10**

TOTAL SCORE: 25 Marks

PART B

TWO QUESTIONS ANSWER ALL

Question 5

a) Some aspects of computer architecture describes the capabilities and programming model of a computer but not a particular implementation. However, two main types of architecture are widely implemented in the design of most computer systems.

With the aid of diagrams describe the general operation of each of these architectures in terms of data processing

Computer Architecture	EV	10

b) How does the modified Harvard Architecture operate? Explain based on the most common modifications made.

Computer Architecture	UN	7

c) Access to data in the data memory is faster than access to instructions in the instruction memory. Which of the architectures has this mechanism and why?

Computer Architecture	EV	8

TOTAL SCORE: 25 Marks

Question 6

a) The Central Processing Unit (CPU) is made up of two main units namely the Control Unit and Arithmetic Logic Unit. Each unit performs a specific function but mostly they work hand in hand in a never ending cycle during their operation in the computer system.

Describe the general operation of each of these units

Operating System Services	EV	8

b) Explain the interaction that goes on between them to ensure effective performance of the CPU

Operating System Services	**AP**	**7**

c) Some of the most important pieces of data stored in the RAM are the instruction which basically tells the CPU what to do at a particular time. Explain the concept of Instruction Set in the CPU and how it works

Operating System Services	**UN**	**10**

TOTAL SCORE: 25 Marks