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

AUGUST – DECEMBER 2018 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER AND LIBRARY SCIENCE

REGULAR PROGRAMME

CMT 419: SYSTEMS PROGRAMMING

Date: DECEMBER 2018	**Duration: 2 Hours**
INSTRUCTIONS: Answer Question ONE and any other TWO Questions	

Q1. a) Write a user friendly **script** that performs the following actions.

   i)   Prompts the user to enter a name of a directory and create the
        directory on the current working directory.   **(3MARKS)**

   ii) Open the created directory and create a text file called commands.txt

        (2MARKS)

   iii) Display the recently executed commands and redirect the output to the
        file created in a (ii)   **(2MARKS)**

   iv) Append the file in a (ii) with the IP address of the host machine

        (1MARK)

   b) Write a user friendly **script**, to create a bzip compressed archive of a user1's
       home directory called a backup, delete the user1 home directory and then
       extract the backup on the present working directory   **(6MARKS)**

   c) Write a C program to display the process id of a running program using
       relevant system call   **(4MARKS)**

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d) Create a system program to send a message to the users warning them that the system will be shutting down in ten minutes time, shut down the system after the ten minutes and reboot the system at 1pm.   **(4MARKS)**

e) Using a for loop, write a script to calculate the totals for numbers one to five
          (4MARKS)

f) Create a **script** using arrays to create a list of five arbitrary countries, display the list of the countries on the console screen, showing the size of the array.
          (4MARKS)

Q2. a) Fill the following table with relevant Linux Commands to perform the stated tasks.

(10MKS)

Task to be performed	Linux Command
Open a file calculate.sh in read only mode using a vi editor	
Create a user called dan and a group called admin	
Add the user created above as a member of the group sales	
Using octet notation assign the users, groups and others with the rights to read and execute only to a file called execute1.sh	
Display the contents of the file execute1.sh and append its contents to a file called scriptsone.sh	

a) Write a **script** that test if the current logged user is in the file /etc/passwd using relevant positional parameter   **(4MARKS)**

b) Rewrite the following statements into equivalent relational operators
          (4MARKS)

    i)   ["$a" –eq "$b"]

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ii)   ["$a" –ne "$b"]

iii)   ["$a" –lt "$b"]

iv)   ["$a" –ge "$b"]

c) Distinguish between a "shell" and "kernel" as used in Linux System programming **(2MARKS)**

Q3. a)   Define a variable x with value 10 and print it on console screen.**(2MARKS)**

b) Write a **script** that prompts the user to enter the income and expenses and then compute the net profit ,given net profit =income- expenses .The script should display the following: **(8MARKS)**

    i)   If net profit is zero then display a message " You have a breakeven: Income and Expenses are equal "

    ii)   If the net profit is greater than zero it display "You made a profit"

    iii)   If the net profit is less than zero it display "You made a loss"

c) Write a Linux **script** that displays the two powers of numbers one to 10 using a looping control structure **(5MARKS)**

d)   Initialize your first name as a string and do the following.   **(5MARKS)**

    i)   Write a script statement to display the length of your name.

    ii)   Write a script statement to display the first two characters of your name.

    iii)   Write a script statement to display the length of your name.

    iv)   Write a script statement display your name.

Q4. a)   Write a C program that display the running processes with execlp() system call **(5MARKS)**

b) State the purpose of the following commands that as used in processes control. **(3MARKS)**

    i)   ps

    ii)   kill

    iii)   bg

c) Software ownership can either be proprietary or open source. Discuss the two type of ownership citing an example in each case. **(4MARKS)**

d) Explain the following commands as used in vi editor command mode.

(6MARKS)

  i)   "^" and "G"
  ii) "O" and "o"
  iii) "d}" and "d$"

e) State the function of the file **/etc/shadow** as used in Linux user management **(2MARKS)**

Q5. a) Write Linux Command to do the following:- **(4MARKS)**
  i)   To log in as a root when you are in another account
  ii) How to change the password for a user called john
  iii) Terminate a process whose PID is 2340
  iv) Display the processes currently running in the system in real time mode

  b) i)   Describe how system calls works in Linux **(2MARKS)**
  ii) Outline two types of system calls citing an example system call in each case **(2MARKS)**

  c) Illustrate two ways of creating a file in Linux environment **(2MARKS)**

  d) Illustrate how to use octet notation, to assign a script called app.sh with full right for user, and group and others with read-only right. **(2MARKS)**

  e) Illustrate an alternative method to the question 4(d) without using the octet notation. **(2MARKS)**

  f) Write a user friendly script that will display the information about the system below. **(6MARKS)**
  i)   The system uptime and load
  ii) The currently logged users
  iii) The top two memory consuming processes

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iv) File system disk usage

v) Information about the host machine

vi) Free and used memory in the system

END