UNIVERSITY OF BUEA FACULTY OF ENGINEERING AND TECHNOLOGY FIRST SEMESTER EXAMINATION 2013/2014	
DEPT: COMPUTER ENGINEERING	COURSE INSTRUCTOR: Nde Nguti / Ngatchu Damen
DATE: 01/03/2014	COURSE CODE: CEF 305
TIME ALLOWED: 3 Hours	TIME: 08:00 – 11:00
Answer **ALL** Questions	CREDIT VALUE: 4

PLEASE GIVE ONLY BRIEF ANSWERS TO ALL QUESTIONS

SECTION A

Question 1 *(5 marks)*

The command:

find / -name "*libm.*" -print

is executed at the command line on a linux system and the following results are obtained:

....

/usr/lib/i386-linux-gnu/libm.so

/usr/lib/i386-linux-gnu/libm.a

....

a) What is the goal of the search?

b) Explain the difference between the two files in terms of shared libraries and static libraries?

c) Explain the nomenclature (the way of naming) of a library file under linux/unix.

Question 2 *(5 marks)*

The following shell script was written by a student.

```
#!/bin/sh
        echo "Is it morning? Please answer yes or no"
        read timeofday
        case "$timeofday" in
                yes) echo "Good Morning";;
                no ) echo "Good Afternoon";;
                y ) echo "Good Morning";;
                n ) echo "Good Afternoon";;
                * ) echo "Sorry, answer not recognized";;
        esac
exit 0
```

a) Explain the overall goal of the program.

b) If the input to the script is the word "morning" what would the output of the program be?

Question 3 *(10 marks)*

The linux/unix operating system uses systems calls to access device drives.

a) Explain the terms system call and device driver giving examples.

b) Give at least two limitations of system calls as used in a program and explain how library functions can help solve these limitations.

c) Each process has a number of file descriptors associated with it: Explain the meaning of (i) a process as used under linux/unix and ii) file descriptor.

d) What are the default file descriptors associated with every running program and what are they used for?

e) What will the following program do?

```
#include <unistd.h>
#include <stdlib.h>
int main()
{
        if ((write(1, "Here is some data\n", 18)) != 18)
        write(2, "A write error has occurred on file descriptor 1\n",46);
        exit(0);
}
```

Question 4 *(25 marks)*

You are required to write a database application that will read data from a mysql database and format it in various ways before presenting to the user. For now you only want to test that you application can connect to the database server which is on the same machine as the client application you are writing. Assume that the database is called "venus" and you use the username "foo" and password "bar" to logon to the database. Write the program that will print the statement "connection successful" if your application successfully connects to the venus database and print "connection failed" otherwise.

Section B

Answer all questions. Code fragments must be written in the C programming Language. Penalty for wrong English and poor presentation of answers. Extra marks shall be awarded for the originality of your responses.

Question 1

(a) What is a process? **(1mark)**

(b) Distinguish between a process and a thread **(3marks)**

(c) Briefly describe the following as used with threads in C programming

i. `pthread_t` **(1mark)**

ii. `pthread_create(&thread2, NULL, (void *) do_another_thing, (void *) &r2);` **(3marks)**

iii. `pthread_join(thread1, NULL);` **(2marks)**

(d) In a project, code named BLTN2002, A programmer is charge with the task of writing a code fragment to randomly select four integers `(N1, N2,N3,N4)` between 15 and 35 and send to four different functions (`BLTN_fnx1(...), BLTN_fnx2(...), BLTN_fnx3(...), BLTN_fnx4(...)`) simultaneously. Without bothering about the definition of these functions, write a C program to perform this task given that each of these functions runs in a separate thread. **(8marks)**

Question 2

(a) *Interprocess communication(IPC) is defined as the transfer of data among different processes. Different programming environments implement this concept in different ways.* Briefly describe four ways in which IPC can be implemented in C **(8marks)**

(b) The program below implements IPC. Study it carefully and answer the questions that follow

```
#include<stdlib.h>
#include<stdio.h>
#include<string.h>
#include<errno.h>
#include<unistd.h>
#include<sys/msg.h>

struct my_msg_st {
 long int my_msg_type;
 char some_text[BUFSIZ];
};

int main() {
 int running = 1;
 int msgid;
 struct my_msg_st some_data;
 long int msg_to_receive = 0;

 msgid = msgget( (key_t)1234, 0666 | IPC_CREAT);
 if (msgid == -1) {
   fprintf(stderr, "failed to get:\n");
   exit(EXIT_FAILURE);
 }
 while (running) {
     if(msgrcv(msgid, (void *)&some_data, BUFSIZ,msg_to_receive,0)  == -1) {
       fprintf(stderr, "failedto receive: \n");
       exit(EXIT_FAILURE);
     }
     printf("You Wrote: %s", some_data.some_text);
     if(strncmp(some_data.some_text, "end", 3) == 0) {
         running = 0;
       }
 }
 if (msgctl(msgid, IPC_RMID, 0) == -1) {
     fprintf(stderr, "failed to delete\n");
     exit(EXIT_FAILURE);
 }
 exit(EXIT_SUCCESS);
}
```

i. What IPC does the code implement? **(2marks)**

ii. When does the program stop? **(2marks)**

iii. Briefly describe the use of `my_msg_st` in the program. **(5marks)**

15 + Rand()%35