

Lab Mid

Course Code: CL205	Course Name: Operating Systems Lab
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Student Roll No:	Section:

"If there is something, you don't know today. You will surely learn afterwards. Life is not an exam hall."
BEST OF LUCK!

Instructions

- Rules are made to break them. So, invent yours and I'll break.

Time: 90 minutes

Max Marks: 60 points

Write single bash command in first line and also `execvp()` system call for that command in second line for each of the following: **(10 marks)**

1. Display the contents of 'file1', 'file2' and 'studentList' files

2. List all files with extension '.mp3' present in a directory 'song' which is in '/home/user/Document/Music'

3. Create shortcut of the directory 'song' which is in '/home/user/Document/Music' in '/home/user/Desktop'

4. List files and folders in long list format and in recursive order of the directory 'planetData'

5. Change owner of the directory 'Idea99' to the username 'peter'

Below is the code of shell script which is incorrect. Mark the error and correct them. **(5 marks)**

```
read -p "Enter a number: " num
read -p "Enter a name to create the directory: " dirName
mkdir $dirName
if [[ $?=2 ]]; then
    echo "ERROR in creating directory!"
else
    until (( $num-eq0 ))
    do
        touch "$dirName/file$num.txt"
        if $?=3 ; then
            echo "Error in creating directory file$num.txt"
        if
        (($num--))
    done
```

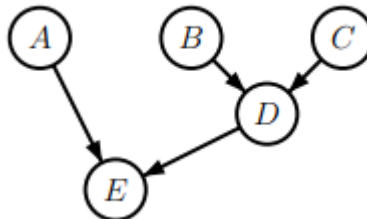
This program will create ____ child processes and ____ threads? **(4 marks)**

```
int main()
{
    fork();
    pthread_create(&tid, NULL, thread, NULL);
    fork();
    pthread_create(&tid, NULL, thread, NULL);
    fork();
    pthread_create(&tid, NULL, thread, NULL);
    return 0;
}
```

In which pattern pthread_create and pthread_join can create a serial execution of threads and parallel. Illustrate by writing code for 5 threads. **(3 marks)**

Suppose that we have five C functions that together solve some problem. Suppose these Functions depend on each other according to the following graph. For example, the edge from node B to node D means that functionB must be called, and must return, before functionD can be called.

Write a sketch of a C program that uses Pthreads to execute the five functions in a way that is maximally parallel, but adheres to the above dependency graph. **(7 marks)**



True or false: Code in an OpenMP program that is not covered by a pragma is executed by all threads. **(1 marks)**

You have a computer with 4 cores. Use OpenMP to parallelize a for-loop that initializes to zero the upper triangle of a 100×100 matrix and initializes 1 to the lower triangle. **(5 marks)**

The following code outlines a synchronization pattern. Assume that the two threads begin at the same time. In what way are the two threads synchronized? Give your answer in terms of how the three calculations, A, B, and C, are ordered in time. Explain carefully what role each of the three semaphores plays in the synchronization. **(3 marks)**

```
void *thread1(void *vargp)
{ while(1)
{ << do Calculation A >>
sem_post(&semaphore1);
<< do Calculation B >>
sem_post(&semaphore2);
sem_wait(&semaphore3);
} }
void *thread2(void *vargp)
{ while(1)
{ sem_wait(&semaphore1);
<< do Calculation C >>
sem_post(&semaphore3);
sem_wait(&semaphore2);
} }
```

```
sem_t semaphore1, semaphore2, semaphore3;
int main()
{ pthread_t tid;
sem_init(&semaphore1, 0, 0); // not signaled
sem_init(&semaphore2, 0, 0); // not signaled
sem_init(&semaphore3, 0, 0); // not signaled
pthread_create(&tid, NULL, thread1, NULL);
pthread_create(&tid, NULL, thread2, NULL);
while(1){ Sleep(1000); }
}
```

The classic problems of producers (such as CPUs) and consumers (such as printers) concerns one or more process data that one or more process consumes later through a single buffer. Systems must make sure that the producer won't try to add data to full a buffer, and the consumer won't try to make withdrawals from an empty buffer. And for the integrity of data only one process must be allowed to access the buffer at a time. Assume buffer contain 5 files maximum, design the procedures and consumers processes using semaphores. **(7 marks)**

How /proc is different from others?

(15 marks)

- 1.
- 2.

What is the sequence of start, stop, next, show in any sequence file execution?

What is the difference between single_release and seq_release?

What is the difference between pos and v ?

Inode stores?

What is the purpose of

module_init(ct_init)

MODULE_AUTHOR()

MODULE_DESCRIPTION()

KERN_NOTICE

KERN_DEBUG

What is the difference between SIGINT and SIGSTOP?

What is the difference between SIGKILL and SIGTERM?

Write a code snippet which sets default behavior of ctrl+\, ignores ctrl+Z and assign func to ctrl+C.

What is the command of communication between two processes using signals?