

Operating System and System Administration



Year 02 Semester 01

Department of Information Technology, Faculty of Computing

- 1) Describe the actions taken by a kernel to context switch between processes.
- 2) A process is a program in execution, and therefore a process is more than just the program. Explain why a process is different from a program.
- 3) Consider the following program. What will be the output in Line A?

```
int value = 60;
int main()
{
    pid_t pid;
    pid = fork();
    if (pid == 0) {
        value = value + 20;
    }
    else if (pid > 0) {
        value = value -20;
        printf("PARENT: value= %d \n", value); //Line A
        wait (NULL);
    }
}
```

- 4) Consider the following C program.

// Assume variables i and pid, have been properly defined, and/or initialized and there is no syntax error.

```
int main ( ) {
    for(i =0; i <3; i++) {
        pid=fork ();
    }
}
```

How many child processes are created when the program is executed?

- 5) Describe the difference among short-term, medium-term and long- term scheduling.
- 6) Describe the actions a kernel takes to context switch between processes.
- 7) Draw the diagram showing all possible process states and describe them.
- 8) Give two reasons for the system to select a new process to run.
- 9) What is the process control block? List at least four pieces of information that are included in the PCB.

10)

Consider the following program in writing the answer:

```
void *printme(void *ip) {
    int *i;
    i = (int *) ip;
    printf("Hi. I'm thread %d\n", *i);
    exit(0);
}
main() {
    int i, vals[4];
    pthread_t tids[4];
    void *retval;
    for (i = 0; i < 4; i++) {
        vals[i] = i;
        pthread_create(tids+i, NULL, printme, vals+i);
    }
    for (i = 0; i < 4; i++) {
        printf("Trying to join with tid %d\n", i);
        pthread_join(tids[i], &retval);
        printf("Joined with tid %d\n", i);
    }
}
```

- a) How many threads are created in this program?
- b) What is the purpose of the *pthread_join()* function in the above code?
- c) What is the function name which is executed by each thread?

11) List two advantages of threads over processes.

12) Briefly describe why inter process communication is slower than the interthread communication.