

Assignment 4

COM S 352

Due: February 9, 2018

- 1) (20 points) Execute the C programs given in the following. Observe and interpret the results. You will learn about UNIX/Linux Process by performing the experiment.

Run the following program and observe how many processes are created while each one of these programs is executed independently.

Program 1:

```
#include <stdio.h>
#include <unistd.h>
int main() {
    int i;
    for(i=0; i<2; i++) {
        fork();
        printf("%d,%d\n", getppid(), getpid());
    }
}
```

Program 2:

```
#include <stdio.h>
#include <unistd.h>
int main() {
    int i;
    for(i=0; i<2; i++) fork();
    printf("%d,%d\n", getppid(), getpid());
}
```

3.26 (30 points) Design a program using ordinary pipes in which one process sends a string message to a second process, and the second process reverses the case of each character in the message and sends it back to the first process. For example, if the first process sends the message Hi There, the second process will return hI tHERE. This will require using two pipes, one for sending the original message from the first to the second process and the other for sending the modified message from the second to the first process. You can write this program using either UNIX or Windows pipes.

6.16 (30 points) Consider the following set of processes, with the length of the CPU burst given in milliseconds:

<u>Process</u>	<u>Burst Time</u>	<u>Priority</u>
P_1	2	2
P_2	1	1
P_3	8	4
P_4	4	2
P_5	5	3

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 , all at time 0.

- Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, nonpreemptive priority (a larger priority number implies a higher priority), and RR (quantum = 2).
- What is the turnaround time of each process for each of the scheduling algorithms in part a?
- What is the waiting time of each process for each of these scheduling algorithms?
- Which of the algorithms results in the minimum average waiting time (over all processes)?

6.19 (5 points) Which of the following scheduling algorithms could result in starvation?

- First-come, first-served
- Shortest job first
- Round robin
- Priority

6.22 (8 points) Consider a system implementing multilevel queue scheduling. What strategy can a computer user employ to maximize the amount of CPU time allocated to the user's process?

6.24 (7 points) Explain the differences in how much the following scheduling algorithms discriminate in favor of short processes:

- FCFS
- RR