Problem Session 8: Processes and Scheduling

Wednesday, March 31, 2021

1. How many lines of output does the following function print? Give your answer as a function of n.

```
void foo(unsigned n){
    for(unsigned i = 0; i < n; i++){
        fork();
    }
    printf("hello\n");
}
```

2. Consider the following program:

```
void f(){
    printf("2");
}

int main(){
    int check = 0;

    if(fork() == 0){
        check = 1;
    }

    if(fork() == 0){
        printf("0");
    } else {
        printf("1");
    }

    if(check){
        f();
    }
    exit(0);
}
```

Which of the following outputs are possible:

(a) 112002

(b) 211020

(c) 102120

(d) 122001

(e) 100212

3. Given the following jobs, compute the latency and response time for each job, along with the average reponse time, for FIFO, STCF, and RR scheduling algorithms. Assume a time slice of 10 for RR.

			FIFO		STCF		RR	
Job	Length	Arrival Time	Latency	Response	Latency	Response	Latency	Response
0	85	0						
1	30	10						
2	35	15						
3	20	80						
4	50	85						
		Average:						

4. Consider a set of three jobs, A, B, and C, running concurrently on a computer system:

- Job A arrives first at time 0 and uses the CPU for 50ms before finishing.

- Job B arrives at time 1. Job B loops five times; for each iteration of the loop, B uses the CPU for 2ms and then does I/O for 8ms.

- Job C arrives at time 2. Job C is identical to Job B except for the arrival time.

Assuming there is no overhead to doing a context switch, identify when A, B, and C will finish for each of the following scheduling algorithms:

- RR with a 1ms time slice

- RR with a 20 ms time slice

- Multilevel feedback queue with four levels with a time slice of 10 in the highest priority queue, 20 in the next, 40 in the next, and 80 in the lowest priority queue. Priorities reset every 200ms.