

ECEN 449: Microprocessor System Design  
Department of Electrical and Computer Engineering  
Texas A&M University

Assignment #3

Due Friday, November 09, 2007

1. [15 points.]

For the following set of tasks show how different scheduling algorithms will schedule the tasks. Each task is specified by a triple (arrival time  $a$ , deadline time  $d$ , length of task  $l$ ). The tasks are: A(0, 10, 5), B(0, 8, 3), C(2, 12, 4), D(3, 18, 5), E(4, 18, 1).

- (a) Round Robin scheduling, where each task is given 1 time unit each time it is scheduled
- (b) Round Robin scheduling where each task is run to its completion
- (c) Earliest deadline first scheduling
- (d) First come first serve scheduling.

Show a timeline of what tasks are executed in each time unit for each policy. If there are two tasks eligible for scheduling at the same time (under a given policy), assume the tasks are scheduled in alphabetical order.

2. [15 points.]

Assume a context switch in a system costs about 100 $\mu$ s. What is the maximum number of interrupts the system can handle? Based on these results, can you think of a way to stage a Denial of Service attack on such a system if it acts as a web server?

3. [10 points.]

Consider a PCM communication paradigm. We want to be able to sample the input at 8K samples/sec (a reasonable choice for voice signals). Also, we want each sample to be at least 8bits.

- (a) What is the maximum period for the PCM signal?

- (b) What would the maximum period be in case I want to multiplex 12 such PCM datastreams into a single PCM signal?