CMPS 272-Operating Systems
Midterm Make-up - Fall 2001-2002
Time: 25 Minutes
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Student Id . . . .

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Instructor Name . . . .

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Question	Max	Grade
G. General	2.5	
H. Scheduling	12.5	
I. Concurrency	12	
Total	25	

Good Work & Good Luck

G. General Questions

On early computers, every byte of data read or written was directly handled by the CPU (i.e., there was no DMA-Direct Memory Access). What impact did this have on multiprogramming?

H. Scheduling

Measurements at a certain computer systems have shown that the average CPU burst is T msec. A process con-text requires S msec which is effectively wasted (overhead) time. The efficiency of the scheduling algorithms is defined as the ratio of useful time to total time (i.e., the percent of time the CPU is doing useful work as opposed to context switching). For a Round Robin schedule with a time quantum Q, give a formula for the efficiency E in terms of Q, T and S for each of the following:

1. $Q = \infty$

2. $Q > T$

3. $S < Q < T$

4. $Q = S$

5. $Q \approx 0$

3. $S < Q < T$

4. $Q = S$

5. $Q \approx 0$

I. Concurrency

The following program is an attempt to solve the mutual exclusion problem for two processes.

```c
#define FALSE 0
#define TRUE  1
#define N     2

void
enter_region (int process)
{
  int other;

  other = 1 - process;
  interested[process] = TRUE;
  turn = process;
  while (interested[other] == TRUE || turn == process)
    {
      /* do nothing */
    }
}

void
leave_region (int process)
{
  interested[process] = TRUE;
}
```

1. Give a sequence of events that will cause a race condition.

2. Correct the program

2. Correct the program.