

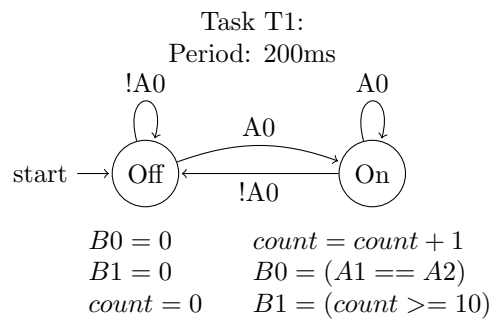
# CS122A: Intermediate Embedded and Real Time Operating Systems Homework #1

**Due:** Monday, October 27, 2014

## 1 Utilization of a single task (20 pts)

Given:

- Microcontroller executes 100 instr/sec
- 3 assembly instructions for simple C assignment statement, like  $cnt = 0$  or  $B1 = cnt + A0$ .
- 2 assembly instructions for a C comparison, like  $cnt \geq 3$ .



Calculate the utilization of the microcontroller executing this SM:\_\_\_\_\_

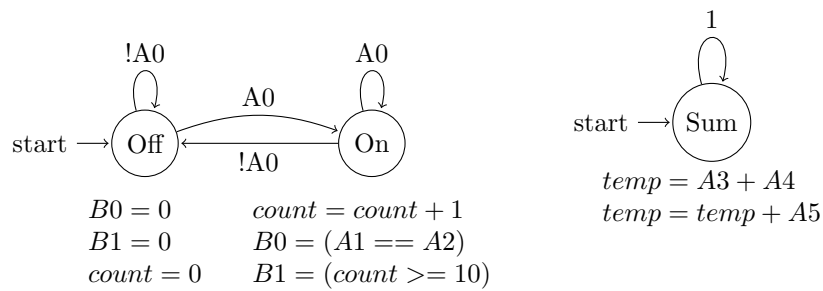
## 2 Utilization of multiple tasks (40 pts)

Given:

- Microcontroller executes 100 instr/sec
- 3 assembly instructions for simple C assignment statement, like  $cnt = 0$  or  $B1 = cnt + A0$ .
- 2 assembly instructions for a C comparison, like  $cnt \geq 3$ .

Task T1:  
Period: 200ms

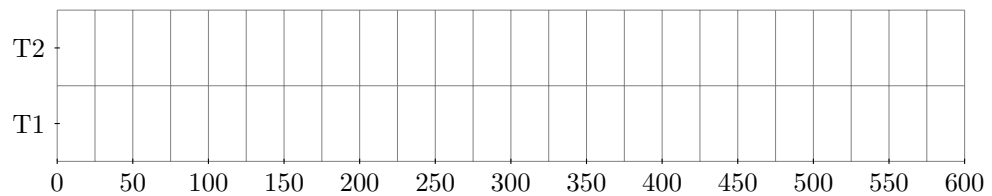
Task T2:  
Period: 300ms



Calculate the utilization of the microcontroller executing these SMs:\_\_\_\_\_

Does the microcontroller experience timer overrun? Yes/No

Now draw the schedule in the space provided:



### 3 Preemptive Scheduler (40 pts)

Given:

- Task T1:
  - WCET: 50ms
  - Period: 150ms
  - Priority: Medium
- Task T2:
  - WCET: 75ms
  - Period: 200ms
  - Priority: High
- Task T3:
  - WCET: 50ms
  - Period: 250ms
  - Priority: Low

Determine the **hyperperiod** of the system:\_\_\_\_\_

Draw the schedule:

