Lab 2 for uC/OS-II: EDF Scheduler

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Objective

- To implement an EDF scheduler in uC/OS-II

Fixed-Priority Scheduling

- uC/OS-II supports fixed-priority scheduling
  - Easy to implement RM

- There is no EDF support
  - Tasks have dynamic priorities
  - Job’s “urgency” are determined upon their arrivals
  - Must associate every job with a deadline

Adding Support for EDF

- Identify where/when scheduling decisions are made
  - OS_Sched(), OSIntExit(), OSStart()
- Add proper deadline information to task information (i.e., in TCB)
- Add code to pickup a ready job with the earliest deadline at the re-scheduling points

Deadlines and Priorities

- On re-scheduling points, your scheduler will pick up a ready task whose deadline is the earliest
  - Unlike priorities, the value domain of deadlines are infinite; the best practice would be using a priority queue like a heap
  - But in this lab, you are excused to use linear search (bad practice but for simplicity…)

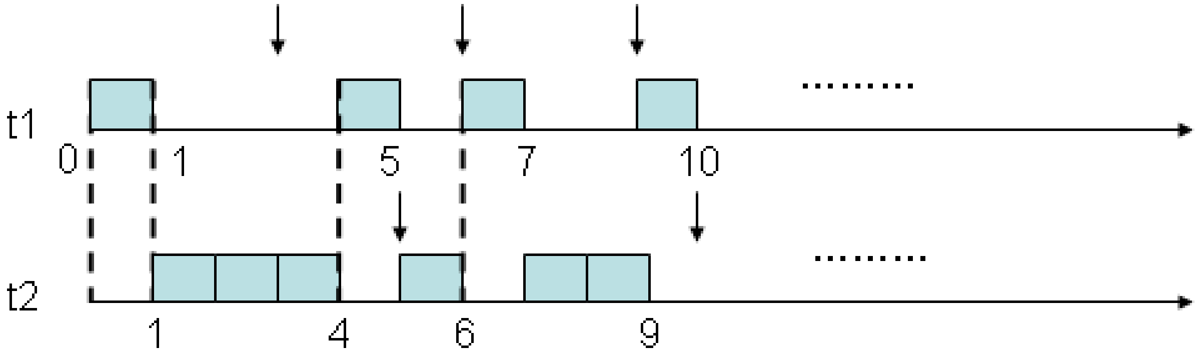
Periodic Tasks

- Reuse your code of Lab 0 to simulate periodic tasks

```
while(1)
{
     while(OSTCBCur->CompTime > 0)
     {
          // do nothing
     }
     ...
     OSTimeDly(...);
}
```

Taksets for Test

- Task set1={ t1(1,3) , t2(3,5) }

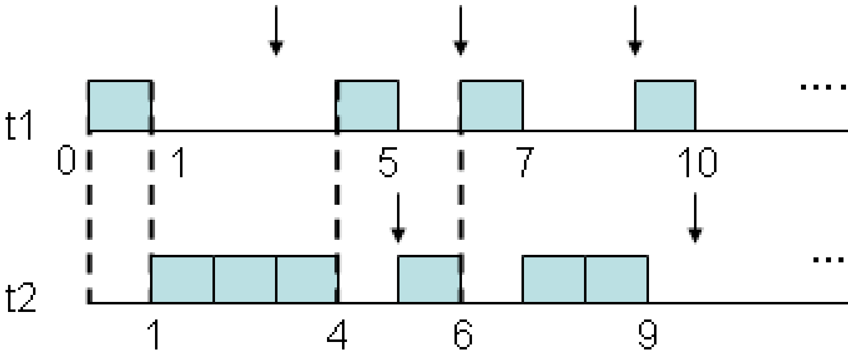


- Task set2={ t1(1,4) , t2(2,5) , t3(2,10)}

Output

- Following the same format of Project 0

Time	**event**	**from**	**to**
0	Preempt	63	1
1	Complete	1	2
4	Complete	2	1
5	Complete	1	2
6	Preempt	2	1



More Hints

- Add deadline information in the TCB
  - You can pass them to tasks upon creation via the user-provided parameter
- Upon re-scheduling, visit the TCB list linearly; find the ready task whose deadline is the earliest
  - ptcb->OSTCBStat is OS_STAT_RDY?
  - Rescheduling points are OSIntExit, OS_Sched, OSStart
  - Linear search is actually a bad practice… but is excused here…
- Before a task delays for the next period, advance its deadline to the next period