

RTS : Lab01

Objective

- To understand how dynamic scheduling is done
 - To implement Earliest Deadline First scheduling
 - To implement Least Laxity First scheduling
-

1] EDF

Complete the following code to implement EDF (Earliest Deadline First) scheduling algorithm with preemption in VxWorks

Assumptions :

- i] Period = Deadline
- ii] Arrival_time = 0

```
#include "vxworks.h"
#include "logLib.h"
#include "taskLib.h"
#include "stdio.h"

// #input params
int C[ ] = {1,2,4}; // original exec times
int T[ ] = {8,5,10}; // original deadline

// relative deadline and execution times
int ret[ ] = {1,2,4};
int rdl[ ] = {8,5,10};
```

```
// #tasks
int N_TASKS = 3;

// end time of simulation
int END_TIME = 30;

// array of task IDs
int tid[3];

// Assign Time Slice in #ticks
int time_slice = 60; // ~= 1 second

void t1(){
    logMsg("*** Task : T1 ***\n",0,0,0,0,0,0);
}

void t2(){
    logMsg("*** Task : T2 ***\n",0,0,0,0,0,0);
}

void t3(){
    logMsg("*** Task : T3 ***\n",0,0,0,0,0,0);
}

void edf_sched(){

    int i;
```

```
// spawn all tasks
```

```
spawnAll();
```

```
for(i=0;i<END_TIME;i++){
```

```
    logMsg("Iteration %d",i,0,0,0,0,0);
```

```
    // Find the highest priority task
```

```
    // If a schedulable task exists
```

```
    // pause the scheduler and run the task
```

```
    /** HINT 1 : run selected task **
```

```
    /* putting current (high-priority)task in delay  
       will switch context to already spawned task  
       that is in the ready queue
```

```
    */
```

```
    /** HINT 2 : Use taskDelay( ) function **  
        to put scheduler to sleep
```

```
    */
```

```
    // Else print IDLE
```

```
    /* update parameters
```

```
        : relative exec time => ret
```

```
        : relative deadline => rdl
```

```
    */
```

```
}
```

```
}
```

Sample Input

```
TaskName(Execution Time, Deadline )  
T0(1,8), T1(2,5), T2(4,10)
```

Sample Output

```
Iteration 0  
*** Task : T1 ***  
  
Iteration 1  
*** Task : T1 ***  
  
Iteration 2  
*** Task : T0 ***  
  
Iteration 3  
*** Task : T2 ***  
  
Iteration 4  
*** Task : T2 ***  
  
Iteration 5  
*** Task : T1 ***  
  
Iteration 6  
*** Task : T1 ***  
  
Iteration 7  
*** Task : T2 ***
```

Iteration 8

*** Task : T2 ***

Iteration 9

*** Task : T0 ***

Iteration 10

*** Task : T1 ***

Reference

<http://www.vxdev.com/docs/vx55man/vxworks/ref/taskLib.html>

http://en.wikipedia.org/wiki/Earliest_deadline_first_scheduling

2] LLF

Modify the EDF code to implement LLF (Least Laxity First) scheduling

Note :

$\text{Slack_time} = \text{Absolute_deadline} - \text{remaining_exec_time} - t$

Sample Input

TaskName(Arrival Time, Execution Time, Deadline)

T0(0,10,33), T1(4,3,28), T2(5,10,29)

Sample Output

Iteration 0

*** Task : T0 ***

Iteration 1

*** Task : T0 ***

Iteration 2

*** Task : T0 ***

Iteration 3

*** Task : T0 ***

Iteration 4

*** Task : T1 ***

Iteration 5

*** Task : T2 ***

Iteration 6

*** Task : T2 ***

...

Iteration 12

*** Task : T2 ***

Iteration 13

*** Task : T1 ***

Iteration 14

*** Task : T1 ***

Iteration 15

*** Task : T2 ***

Iteration 16

*** Task : T0 ***

Iteration 17

*** Task : T0 ***

Iteration 18

*** Task : T2 ***

Iteration 19

*** Task : T0 ***

...

Iteration 22

*** Task : T0 ***

Schedule

Least Laxity First Example

