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**Real Time Systems – Homework 2**

1. Sol:

For the C simulation, it is required that the fourth column be followed with a space. For example, a valid row is: **a <n spaces> 7 <n spaces> 3 <n spaces> 3 <at least one space>,** n = {1,

2, 3, . . .}.

Compilation is straightforward: **gcc RTS-HW2/RTS-HW2/main.c**

The executable takes 2 command line arguments:

s whether or not to scan for the number of task, default is 3

file path path to the file containing task set information (Users/johndoe/HW2/file1.txt..)

Program Output for the given task set:

**Input: Enter the number of tasks in the taskset**

3

**No. of tasks: 3**

**##################################################**

**Sorting by priority.......**

**Task: c**

**Period: 20.00**

**Computation Time: 5.00**

**Priority 3**

**Response time: 0.00**

**Task: b**

**Period: 40.00**

**Computation Time: 10.00**

**Priority 2**

**Response time: 0.00**

**Task: a**

**Period: 80.00**

**Computation Time: 40.00**

**Priority 1**

**Response time: 0.00**

**##################################################**

**Calculating response times.......**

**i: 1, n: 0, val: 15**

**i: 1, n: 1, val: 15**

**i: 2, n: 0, val: 60**

**i: 2, n: 1, val: 75**

**i: 2, n: 2, val: 80**

**i: 2, n: 3, val: 80**

**Task: c**

**Period: 20.00**

**Computation Time: 5.00**

**Priority 3**

**Response time: 5.00**

**Task: b**

**Period: 40.00**

**Computation Time: 10.00**

**Priority 2**

**Response time: 15.00**

**Task: a**

**Period: 80.00**

**Computation Time: 40.00**

**Priority 1**

**Response time: 80.00**

**Program ended with exit code: 0**

As we can see, the response times for all the tasks <= their deadlines along with the condition win == win+1 met.

Hence, this task set is schedulable by a fixed priority scheduler.

2. Sol:

Assuming higher priority value denotes higher priority:

a. Preemptive Fixed Priority Scheduler

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| T1 | T3 | T4 | T6 | T8 | T1 | T7 | T2 | T5 |

0 3 11 13 15 18 20 21 26 28

Waiting times for

T1 = (0-0) + (18-0)

= 18

T2 = (21-2)

= 19

T3 = (3-3)

= 0

T4 = (11-3)

= 8

T5 = (26-5)

= 21

T6 = (13-10)

= 3

T7 = (20-15)

= 5

T8 = 15 – 15

= 0

Therefore, the required average waiting time =

= (18 + 19+0+8+21+3+5+0) / 8

= 74 / 8

= 9.250 units

b. Non-Preemptive Fixed Priority Scheduler

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| T1 | T3 | T4 | T6 | T8 | T7 | T2 | T5 |

0 5 13 15 17 20 21 26 28

Waiting times for

T1 = 0

T2 = (21-2)

= 19

T3 = (5-3)

= 2

T4 = (13-3)

= 11

T5 = (26-5)

= 21

T6 = (15-10)

= 5

T7 = (20-15)

= 5

T8 = (17-15)

= 2

Therefore, the required average waiting time =

= (0+19+2+11+21+5+5+2) / 8

= 65 / 8

= 8.125 units