Embedded OS Implementation, Fall 2022
Homework #1 (due October 12th, 2022 (Wednesday) 12:00)

Hello uC/OS-II

Problem Definition:

(a) Please draw the system flow of "Hello μC/OS-II (the modified main.c in Lab1)" and explain the process (functions). **Note: Please start from the function "OSTaskCreateExt".**

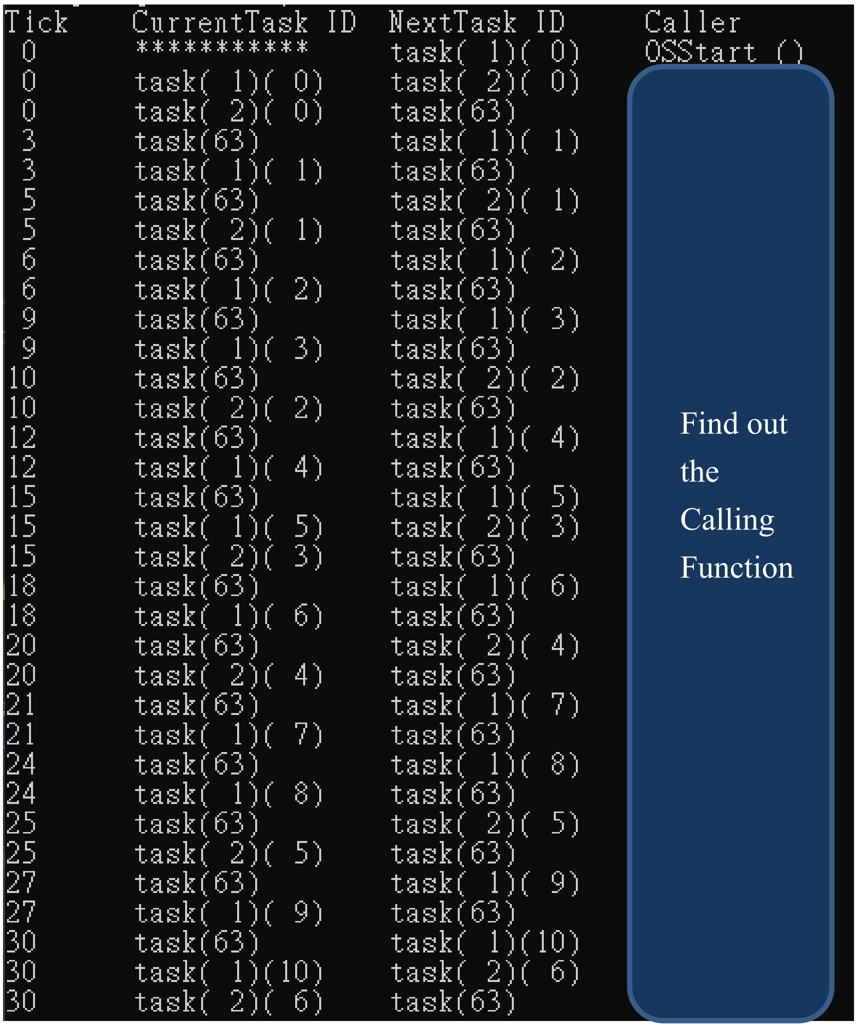
(b) Consider two periodic tasks (τ_1, τ_2) and their delay time are 3 ticks and 5 ticks, respectively. Task priority of two tasks (τ_1, τ_2) are 1 and 2, respectively. Please add some code to the μC/OS-II scheduler **in the kernel level** to observe how the CPU is switched among tasks by means of context switches.

Tick	CurrentTask ID	NextTask ID	Caller
##	***********	**task(ID)(job number)**	**Function_name ()**
##	**task(ID)(job number)**	**task(ID)(job number)**	**Function_name ()**

※ If the task is Idle Task, print "*task(priority)*".

This project is executed on "Visual Studio". Please show the results by using it.

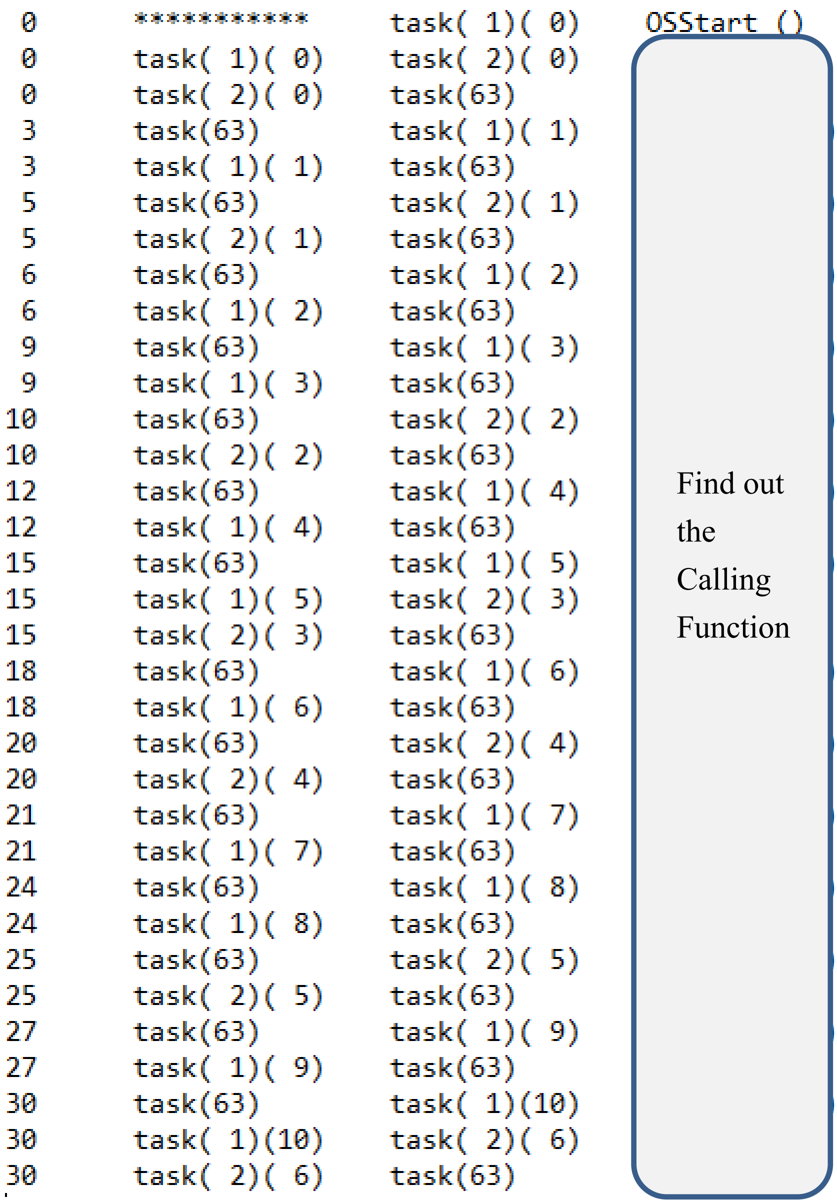
The output results are shown below:



```
Tick     CurrentTask ID  NextTask ID     Caller
 0       ***********     task( 1)( 0)    OSStart ()
 0       task( 1)( 0)    task( 2)( 0)
 0       task( 2)( 0)    task(63)
 3       task(63)        task( 1)( 1)
 3       task( 1)( 1)    task(63)
 5       task(63)        task( 2)( 1)
 5       task( 2)( 1)    task(63)
 6       task(63)        task( 1)( 2)
 6       task( 1)( 2)    task(63)
 9       task(63)        task( 1)( 3)
 9       task( 1)( 3)    task(63)
10       task(63)        task( 2)( 2)
10       task( 2)( 2)    task(63)
12       task(63)        task( 1)( 4)
12       task( 1)( 4)    task(63)
15       task(63)        task( 1)( 5)
15       task( 1)( 5)    task( 2)( 3)
15       task( 2)( 3)    task(63)
18       task(63)        task( 1)( 6)
18       task( 1)( 6)    task(63)
20       task(63)        task( 2)( 4)
20       task( 2)( 4)    task(63)
21       task(63)        task( 1)( 7)
21       task( 1)( 7)    task(63)
24       task(63)        task( 1)( 8)
24       task( 1)( 8)    task(63)
25       task(63)        task( 2)( 5)
25       task( 2)( 5)    task(63)
27       task(63)        task( 1)( 9)
27       task( 1)( 9)    task(63)
30       task(63)        task( 1)(10)
30       task( 1)(10)    task( 2)( 6)
30       task( 2)( 6)    task(63)
```

Find out the Calling Function

Output.txt



```
 0        ***********       task( 1)( 0)    OSStart ()
 0        task( 1)( 0)      task( 2)( 0)
 0        task( 2)( 0)      task(63)
 3        task(63)          task( 1)( 1)
 3        task( 1)( 1)      task(63)
 5        task(63)          task( 2)( 1)
 5        task( 2)( 1)      task(63)
 6        task(63)          task( 1)( 2)
 6        task( 1)( 2)      task(63)
 9        task(63)          task( 1)( 3)
 9        task( 1)( 3)      task(63)
10        task(63)          task( 2)( 2)
10        task( 2)( 2)      task(63)
12        task(63)          task( 1)( 4)
12        task( 1)( 4)      task(63)
15        task(63)          task( 1)( 5)
15        task( 1)( 5)      task( 2)( 3)
15        task( 2)( 3)      task(63)
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20        task( 2)( 4)      task(63)
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21        task( 1)( 7)      task(63)
24        task(63)          task( 1)( 8)
24        task( 1)( 8)      task(63)
25        task(63)          task( 2)( 5)
25        task( 2)( 5)      task(63)
27        task(63)          task( 1)( 9)
27        task( 1)( 9)      task(63)
30        task(63)          task( 1)(10)
30        task( 1)(10)      task( 2)( 6)
30        task( 2)( 6)      task(63)
```

Find out the Calling Function

Crediting :

Your homework needs to show the following information:

- The system flow and the explanation of the process (functions). (45%)
- The screenshot of the result. (10%)
- A report that describes your implementation (please attach the screenshot of the code and **MARK** the modified part). (45%)

Homework submit:

Submit to Moodle.

Submit deadline: October 12th, 2022 (Wednesday) 12:00

File name format: RTOS_ your student ID_HW1.zip

RTOS_ your student ID_HW1.zip inculdes :

※ The report (RTOS_ your student ID_HW1.pdf).

※ Folder with executable μC/OS-II project (Myyyddxxx_RTOS_HW1).

※ Standard input and output filenames in the project are necessary for the checker, please check before submitting.

```
#define INPUT_FILE_NAME "./TaskSet.txt"
#define OUTPUT_FILE_NAME "./Output.txt"
```

※ Plagiarizing is strictly prohibited.

Hints:

1. Call the function **OSTimeSet(0)** before the OS starts to initialize the start time.
2. Use **OSTimeGet()** to get the current tick in the system.
3. Use ‘/t’ to format your code.
4. If your project size is too large for uploading, you can try to delete the “.vs” or the “Debug” folders.