Embedded OS Implementation, Fall 2025

Homework #1 (due October 9th, 2025 (Thursday) 08:00)

Hello uCOS-II

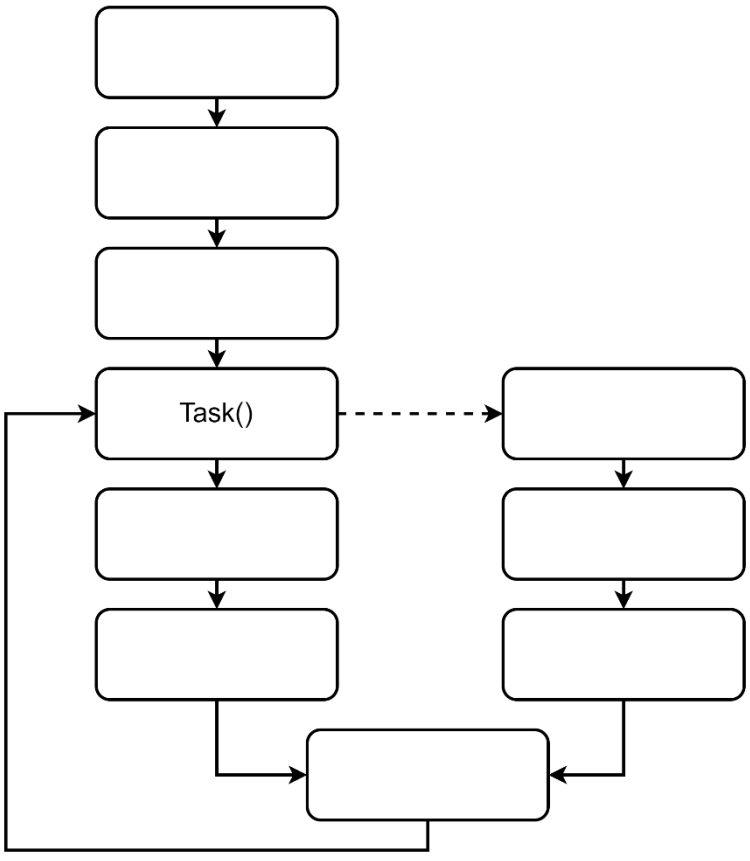
Subsequent project assignments will be developed as extensions of this one.

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: You should complete the provided diagram by filling in the blanks with µC/OS-II functions.**

(b) Consider two periodic tasks (τ_1 ,τ_2) and their delay time are 3 ticks and 4 ticks, respectively. Task priority of two tasks (τ_1 ,τ_2) are 1 and 2, respectively. Please add some code to the uCOS-II scheduler **in the kernel level** to observe how CPU is switched among tasks by means of context switches. **Note: You should add a printf statement to print "Task(ID) is running " message from within each task's main loop.**

System flow diagram example:



Tick	CurrentTask ID	NextTask ID	Number of ctx switch
##	**********	task(ID)(job number)	##
##	task(ID)(job number)	task(ID)(job number)	##
##	Task(ID) is running		

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

```
0   ***************  task(  1)(  0)      0
0   task(  1) is running
0   task(  1)(  0)  task(  2)(  0)      0
0   task(  2) is running
0   task(  2)(  0)  task( 63)           1
3   task( 63)       task(  1)(  1)      2
3   task(  1) is running
3   task(  1)(  1)  task( 63)           3
4   task( 63)       task(  2)(  1)      4
4   task(  2) is running
4   task(  2)(  1)  task( 63)           5
6   task( 63)       task(  1)(  2)      6
6   task(  1) is running
6   task(  1)(  2)  task( 63)           7
8   task( 63)       task(  2)(  2)      8
8   task(  2) is running
8   task(  2)(  2)  task( 63)           9
9   task( 63)       task(  1)(  3)      10
9   task(  1) is running
9   task(  1)(  3)  task( 63)           11
12  task( 63)       task(  1)(  4)      12
12  task(  1) is running
12  task(  1)(  4)  task(  2)(  3)      13
12  task(  2) is running
12  task(  2)(  3)  task( 63)           14
15  task( 63)       task(  1)(  5)      15
15  task(  1) is running
15  task(  1)(  5)  task( 63)           16
```

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

Crediting :

Your homework need to show the following information.

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

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
5. The task example

```
static void task(void* p_arg) {
    /*
     ...
     */
    while (1) {
        /****************************** HW 1 *********************************/
        // print task running message here !!!
        /*********************************************************************/
    }
    /*
     ...
     */
}
```

Homework submit:

Submit to Moodle

Submit deadline : October 9th, 2025 (Thursday) 08:00

File name format : RTOS_ your student ID_HW1.zip

RTOS_ Student ID_HW1.zip includes :

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

※ Folder with executable µC/OS-II project (**RTOS_ your student ID _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.

※ RTOS_Myyyddxxx_HW1.zip must be including files as follow: