

# Homework 4

(Due date: Nov. 17<sup>th</sup>)

## PROBLEM 1 (30 PTS)

- Refer to Activity 1 in the *High-Performance Embedded Programming with the Intel® Atom™ platform* → Tutorial 8
- First Application (Setup, then catch a `SIGINT` signal): Execute the application on the Terasic DE2i-150 Development Kit. Provide a screenshot of the execution in the Terminal. (10 pts)
  - ✓ Based on the completion of this first application, answer the following questions (6 pts):
    - What is the purpose of the line `signal (SIGINT, sig_handler)`? Mark the correct answer:
      - a) Generate a signal of type `SIGINT` that will execute the function `sig_handler`.
      - b) Configure the signal `SIGINT` so that when received, it executes the function `sig_handler`.
    - If the user enters *Ctrl-c*, what signal does it generate?      `SIGINT`      `SIGALRM`      `SIGQUIT`
    - If the user enters *Ctrl-\*, what signal does it generate?      `SIGINT`      `SIGALRM`      `SIGQUIT`
- Second Application (Setup, then catch a `SIGALRM` signal): Execute the application on the Terasic DE2i-150 Development Kit. Provide a screenshot of the execution in the Terminal. (10 pts)
  - ✓ Based on the completion of this second application, answer the following questions (4 pts):
    - What is the purpose of the line `signal (SIGALRM, sig_handler)`? Mark the correct answer:
      - a) Generate a signal of type `SIGALRM` that will execute the function `sig_handler`.
      - b) Configure the signal `SIGALRM` so that when received, it executes the function `sig_handler`.
    - If the user enters *Ctrl-c*, what happens?
      - a) A signal of type `SIGINT` is issued that executes the function `sig_handler`.
      - b) A signal of type `SIGINT` is issued, and it causes to exit the program.

## PROBLEM 2 (10 PTS)

- Given the following code snippet:

```
#include<stdio.h>
#include<unistd.h>
#include<signal.h>

void sig_handler(int signum){
    printf("Inside handler function\n");
}

int main(){
    int i;
    signal(SIGALRM, sig_handler);
    alarm(4); // Scheduled alarm after 4 seconds
    alarm(1); // Scheduled alarm after 1 seconds

    for(i=1; i++;){
        printf("%d : Inside main function\n", i);
        sleep(1);
    }
    return 0;
}
```

- ✓ Answer whether the following statements are True or False:
  - Two alarms will be issued: one in 1 second, and the other 3 seconds after the first. (T) (F)
  - An alarm will be issued in 4 seconds. (T) (F)
  - An alarm will be issued in 1 second. (T) (F)

### PROBLEM 3 (10 PTS)

- Given the following code snippet:

```
#include<stdio.h>
#include<unistd.h>
#include<signal.h>

void sig_handler(int signum){
    printf("Inside handler function\n");
}

int main() {
    int i;
    signal(SIGALRM, sig_handler);
    alarm(2);
    alarm(0);

    for(int i=1;;i++) {
        printf("%d : Inside main function\n",i);
        sleep(1); }
    return 0;
}
```

- ✓ Answer whether the following statements are true or false:

- An alarm will be issued in 2 seconds. (T) (F)
- An alarm will never be issued. (T) (F)

### PROBLEM 4 (10 PTS)

- Given the following code snippet:

```
#include<stdio.h>
#include<unistd.h>
#include<signal.h>

void sig_handler(int signum) {
    printf("Inside handler function\n");
    alarm(2);
}

int main(){
    signal(SIGALRM, sig_handler);
    alarm(2);

    for(int i=1;;i++) {
        printf("%d : Inside main function\n",i);
        sleep(1); }
    return 0;
}
```

- ✓ Answer whether the following statements are true or false:

- An alarm is issued (and the `sig_handler` executed) every 2 seconds. (T) (F)
- A 2-second alarm is only issued once. (T) (F)

### PROBLEM 5 (20 PTS)

- Refer to Activity 2 in the *High-Performance Embedded Programming with the Intel® Atom™ platform* → Tutorial 8
  - ✓ Activity 2 – RTC Configuration: Execute the application on the Terasic DE2i-150 Development Kit. Provide a screenshot of the execution in the Terminal. You need to be `root` to execute it. (10 pts)
  - ✓ In your own words, briefly describe the following interrupts:

<i>Update Interrupts</i>	
<i>Alarm Interrupts</i>	
<i>Periodic Interrupts</i>	

## PROBLEM 6 (20 PTS)

- Attach your Project Status Report (no more than 3 pages, single-spaced, 2 columns, only one submission per group). This report should contain the current status of your project. For formatting, use the provided template (`Final Project - Report Template.docx`). The sections included in the template are the ones required in your Final Report. At this stage, you are only required to:
  - ✓ Include a more detailed project description and provide details as to how you plan to implement your project (flowchart, pseudocode, etc.).
- Only student is needed to attach the report (make sure to indicate all the team members).