Ain Shams University Faculty of Engineering
CSE345/CSE347: Embedded Systems

# Lab 7 - Semaphores in FreeRTOS

## Lab Objective:

- In this lab, you should get introduced to the usage of semaphores
- Know the working mechanism of the semaphore
- Implement the semaphore in FreeRTOS.

## Lab Mission:

1) Create an Init Task to Initizalize the UART0 and 1 push buttons.

```
void InitTask(void *){
....
....
}
```

P.S : Use the following to unlock PORTF using the Tivaware ( if needed )

```
#include "inc/hw_memmap.h"
#include "inc/hw_types.h"
#include "inc/hw_gpio.h"

HWREG(GPIO_PORTF_BASE+GPIO_O_LOCK) = GPIO_LOCK_KEY;
HWREG(GPIO_PORTF_BASE+GPIO_O_CR) |= 0x01;
```

2) Create a Queue using the FreeRTOS APIs
3) Create a Counting Semaphore using the FreeRTOS APIs

4) Create a Task that checks the Push Button and gives the semaphore after sending a value to the queue

```
void BTN1_CHK_TASK(void *){
        static uint8 IncrementingCounter;
....
....
}
```

5) Create a UART Task that periodically tries to get the semaphore, and send that data via UART to PC if the semaphore was taken successfully.

```
void UART_TASK(void *){
....
....
}
```