Computer Technology I

Lab. 2 : Subroutines

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Area: Computer Science
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Contents

1 Task 1 - Switch – Ring counter / Johnson counter

Write a program which switch between Ring counter and Johnson counter. You should not use Interrupt in this lab. The pushbutton must be checked frequently, so there is no delay between the button is pressed and the change between Ring/Johnson. Use SW0 (PA0) for the button. Each time you press the button, the program should change counter.

```
;>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
; 1DT301, Computer Technology I
; Date: 2016-09-15
; Author:
; Loic GALLAND
; Leonardo PEDRO
;
; Lab number: 2
; Title: Subroutines
;
; Hardware: STK600, CPU ATmega2560
;
; Function: Describe the function of the program, so that you can
   understand it,
; even if you're viewing this in a year from now!
;
; Input ports: Describe the function of used ports, for example on-
   board switches
; connected to PORTA.
;
; Output ports: Describe the function of used ports, for example on-
   board LEDs
; connected to PORTB.
;
; Subroutines: If applicable.
; Included files: m2560def.inc
;
; Changes in program: (Description and date)
;<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

.includes "m2560def.inc"
ldi r16, 0xFF
out DDRB, r16

ldi r16 , 0b11111011
out portB, r16
```

To be able to light up the LEDs we need 4 lines of code. The first line is to store into the register r16 the value 0xFF. In the second line the register r16 is loaded to DDRB (Data Direction Register of port B). In the third line the desired binary code is stored into register r16. The binary number will determine which LED will light up. In the last line the register r16 is loaded into the PortB (Data Register of Port B).

This is the flowchart of the task 1:

2 Task 2

This is the code for the second task :

```
%your code here
```

3 Task 3

4 Task 4

5 Task 5

6 Task 6