# LAB 1-1
## I/O INTERFACE AND CALCULATION INSTRUCTIONS

### OBJECTIVE:

- Implement I/O Port interface and calculation instructions.

### REFERENCES:

- Lab Manual Chapter 1-2

### EXPERIMENT 1:

a) Connect one AVR port (e.g., PORT A) to a dip switch. Connect another port to a LED bar (e.g., PORT B).

a) Write a program to continuously read the state of the dip switch and send it to the LED. If the switch is in the OFF state, the corresponding LED will turn off.

### EXPERIMENT 2:

a) Write a program to read the value of the port connected to the dip switch, add 5 to it, and send it to the port connected to the LED bar.

b) Change the state of the dip switch and observe the status of the LED bar.

### EXPERIMENT 3:

a) Connect and implement a program to calculate the product of two nibbles (high and low) of PORT A and send it to PORT B. Consider these two nibbles as unsigned numbers.

Example: PORT A = 0b0111_1111, then PORT B = 3 * 15.

b) Change the state of the dip switch and observe the status of the LED bar.

### EXPERIMENT 4:

a) Connect and implement a program to calculate the product of two nibbles (high and low) of PORT A and send it to PORT B. Consider these two nibbles as signed numbers.

Example: PORT A = 0b0111_1111, then PORT B = 3 * (-1).

b) Change the state of the dip switch and observe the status of the LED bar.

### EXPERIMENT 5:

c) Connect PA0 to a single switch and PA1 to a single LED on the LED block (note that they are from the same port).

d) Write a program to turn on the LED if the switch is pressed and turn it off if the switch is released.

# LAB REPORT

*Class group:* *Group:*

*Subject:*

## EXPERIMENT 1

1. Answer the following questions:

a. How do you retrieve values from the two nibbles of PORT A?

b. How do you enable pull-up resistors?

c. When the switch is in the ON/OFF state, what is the pin value of the port?

d. When the port pin is in state 1, is the BAR LED on or off?

e. Source code with comments.

.....

## EXPERIMENT 2

1. Answer the following questions:

a. Source code with comments.

.....

## EXPERIMENT 3

1. Answer the following questions:

a. How do you retrieve values from the two nibbles of PORT A?

b. Source code with comments.

.....

## EXPERIMENT 4

1. Answer the following questions:

a. Source code with comments.

.....

## EXPERIMENT 5

1. Answer the following questions:

a. When the switch is pressed/released, what is the pin value of the port?

b. To make the LED light up, what logic level should the port pin output?

c. Source code with comments.

# LAB REPORT

*Group:*

*Class group:* *Subject:*

.....