2 laboratory work

GPIO READ

1. Aim

- Learn how to use STM32CubeIDE for programming of STM32 microcontrollers.
- Use basic in Embedded C language.
- Learn how to read GPIO.

2. Theory

In this laboratory work, you will need basics knowledge's of if statement and for loop cycles.

if (condition)
{
//Block of C statements here
//These statements will only execute if the condition is true
}
	int x = 20;
	int y = 22;
	if (x<y)
	{
	//"Variable x is less than y
	}

Syntax	Example

for (initialization; condition test; increment or decrement)
{
//Statements to be executed repeatedly
}
	int i;
	for (i=1; i<=3; i++)
	{
	// for will be executed 3 times
	}

Syntax	Example

In the datasheet about Nucleo STM32G070RB you will find information about the HOME button, connected to PC13 pin.

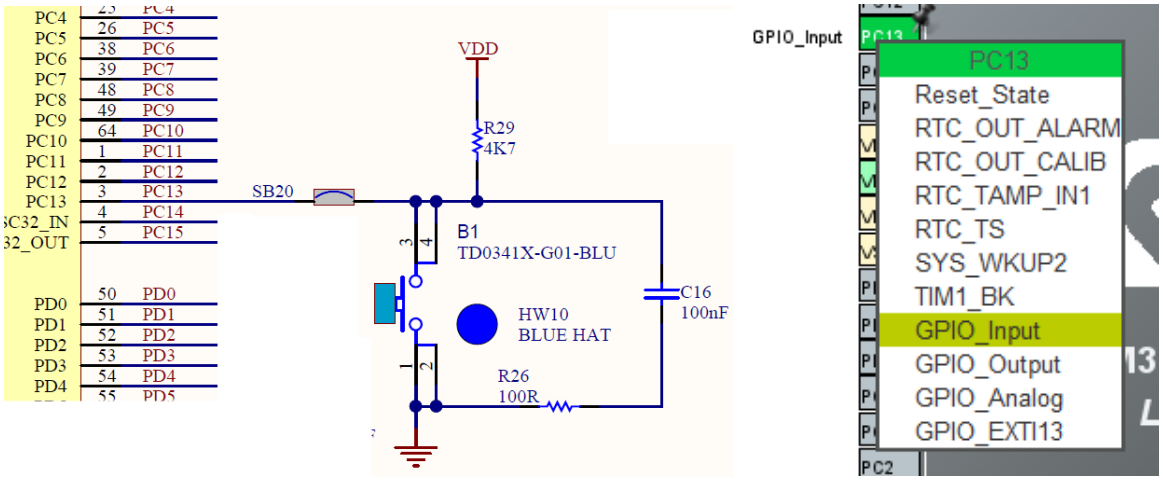

Fig 1. User button setup

Settings of GPIO input you wind bellow.

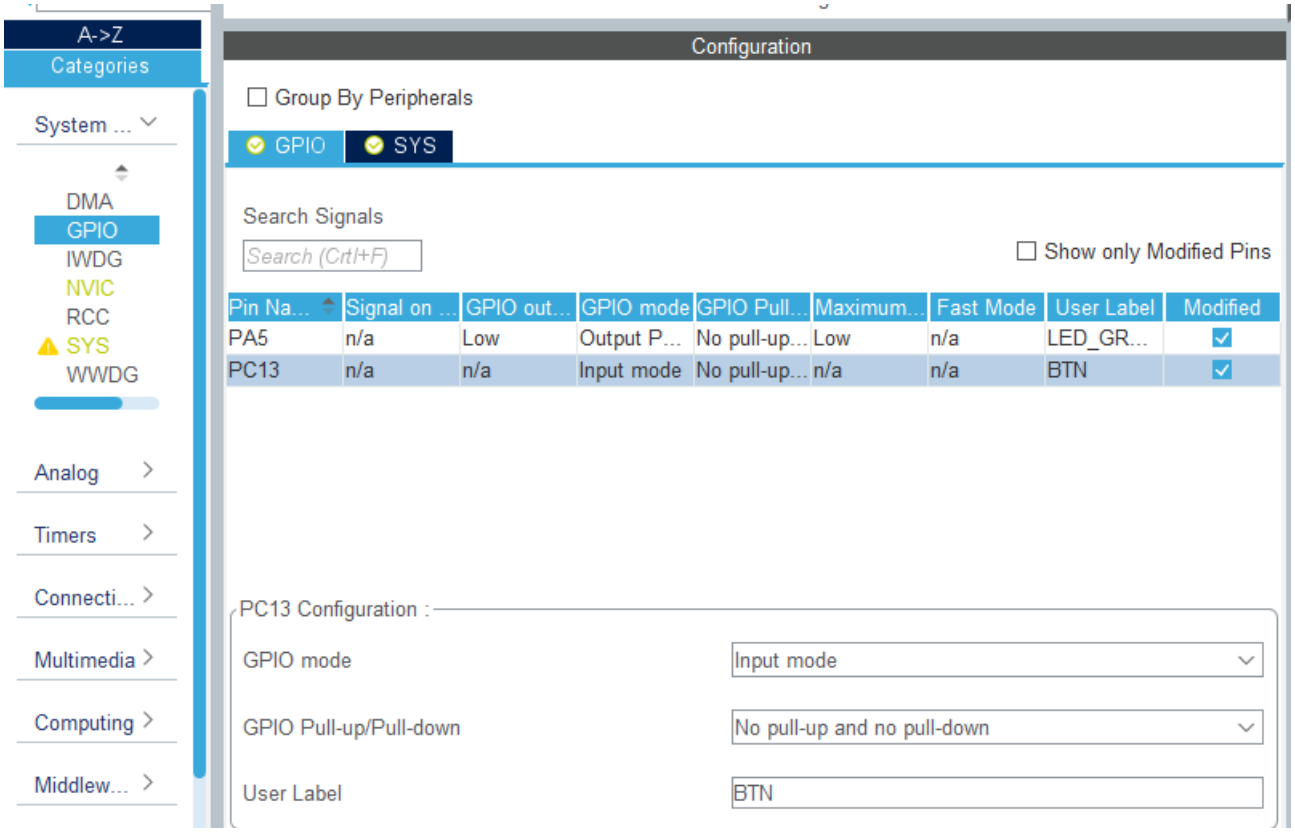

Fig 2. GPIO Input settings

To read the button pin state you can use the code bellow.

```
/* Infinite loop */
 /* USER CODE BEGIN WHILE */
 while (1)
 {
  /* USER CODE END WHILE */

  /* USER CODE BEGIN 3 */
                  if (HAL_GPIO_ReadPin(BTN_GPIO_Port, BTN_Pin)==1)
                  {
                    HAL_GPIO_TogglePin(LED_GPIO_Port, LED_Pin);
                  } }
 /* USER CODE END 3 */
```

main.c

For the push button, you need an Anti-debounce function to filtering mechanical noises while pressing the push button.

```
if (HAL_GPIO_ReadPin(BTN_GPIO_Port, BTN_Pin)==0) {
                  HAL_Delay(100);
                  if (HAL_GPIO_ReadPin(BTN_GPIO_Port, BTN_Pin)==0) {
                                    HAL_GPIO_TogglePin(LED_GPIO_Port, LED_Pin);
                  } }
```

main.c

3. Tasks

3.1. Create and set up STM32G070RB project.

3.2. Write the code for turning LED ON using the USER push button and turning the LED OFF by an external push button.

3.3. Write the code to start blinking the LED after X(as an example 5 times) presses a push button. Continue counting the number of presses and turn LED off when the number reaches X+Y time (as an example 5+5=10). Store the number of presses into a separate global variable.

3.4. Write the code for detecting how many times (until 7) the push-button was pressed and indicate this number of presses in binary on 3 LED's, like:

If 1 press – 001

If 2 presses – 010

An etc.

3.5. Write the code for toggling the LED if the push button was shortly pressed. If the button is pressed and held for 5 seconds, the LED should start blinking.

4. Report content

1) Title.
2) Main blocks of source code for all tasks with comments.
3) Conclusions.

1. References

1. https://www.st.com/content/st_com/en/products/microcontrollers-microprocessors/stm32-32-bit-arm-cortex-mcus/stm32-mainstream-mcus/stm32g0-series/stm32g0x0-value-line/stm32g070rb.html