Department of Robotics and Mechatronics Engineering

University of Dhaka

Laboratory Report

Course: RME 3112 (Advanced Mechatronics Engineering Lab)

Experiment number: 05

Name of the experiment: LED Blinking using STM32 Micro-controller

Group no.: 01

Group members:

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Experiment Performed On : 05 April, 2022

Date of Submission : 13 May, 2022

Name of the Experiment : LED Blinking using STM32 Micro-controller

Objectives :

1. To learn the details about how STM32 Micro-controller works.
2. To learn the configuration of GPIO pins of STM32 microcontroller and how to set the GPIO pin through programming .
3. To learn how to program the STM32 Micro-controller with Keil uVision software.

Theory :

What we done here is actually bare metal programming.

Bare-metal programming is a term for programming that operates without various layers of abstraction or, as some experts describe it, "without an operating system supporting it." Bare-metal programming interacts with a system at the hardware level, taking into account the specific build of the hardware.

The STM32 family of 32-bit microcontrollers based on the Arm® Cortex®-M processor is designed to offer new degrees of freedom to MCU users. It offers products combining very high performance, real-time capabilities, digital signal processing, low-power / low-voltage operation, and connectivity, while maintaining full integration and ease of development.

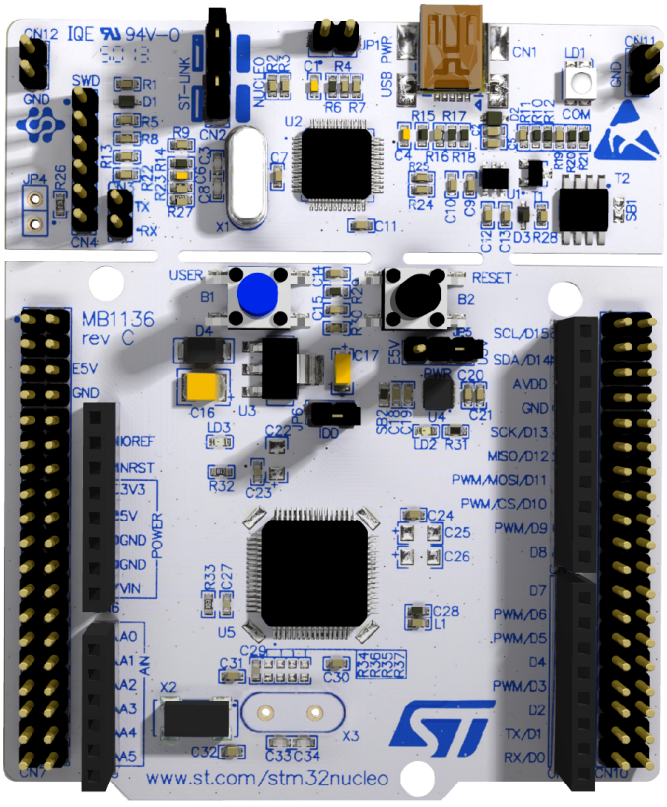


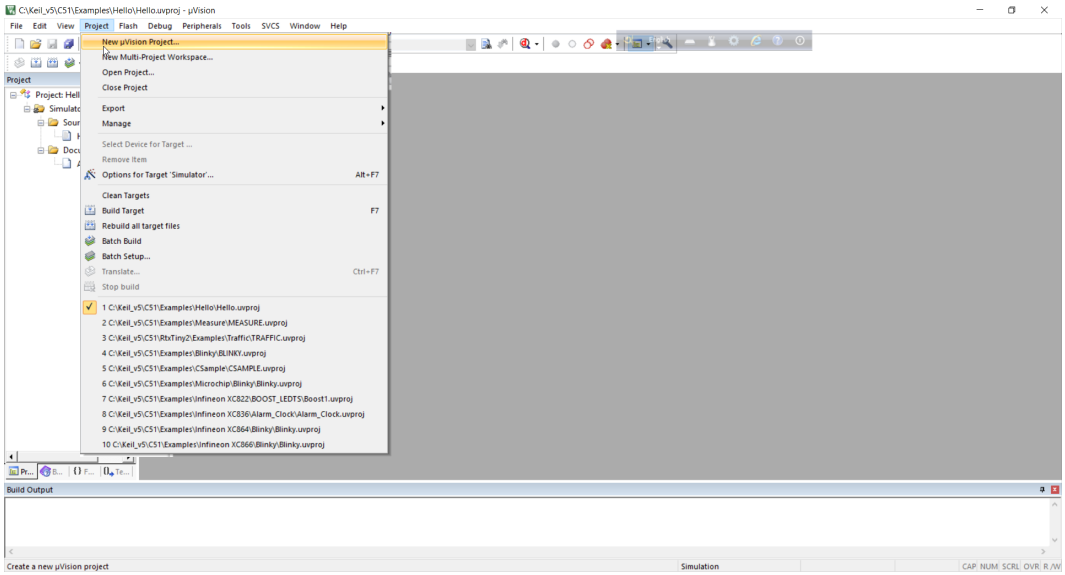
Fig : STM32 Micro-controller

Equipments

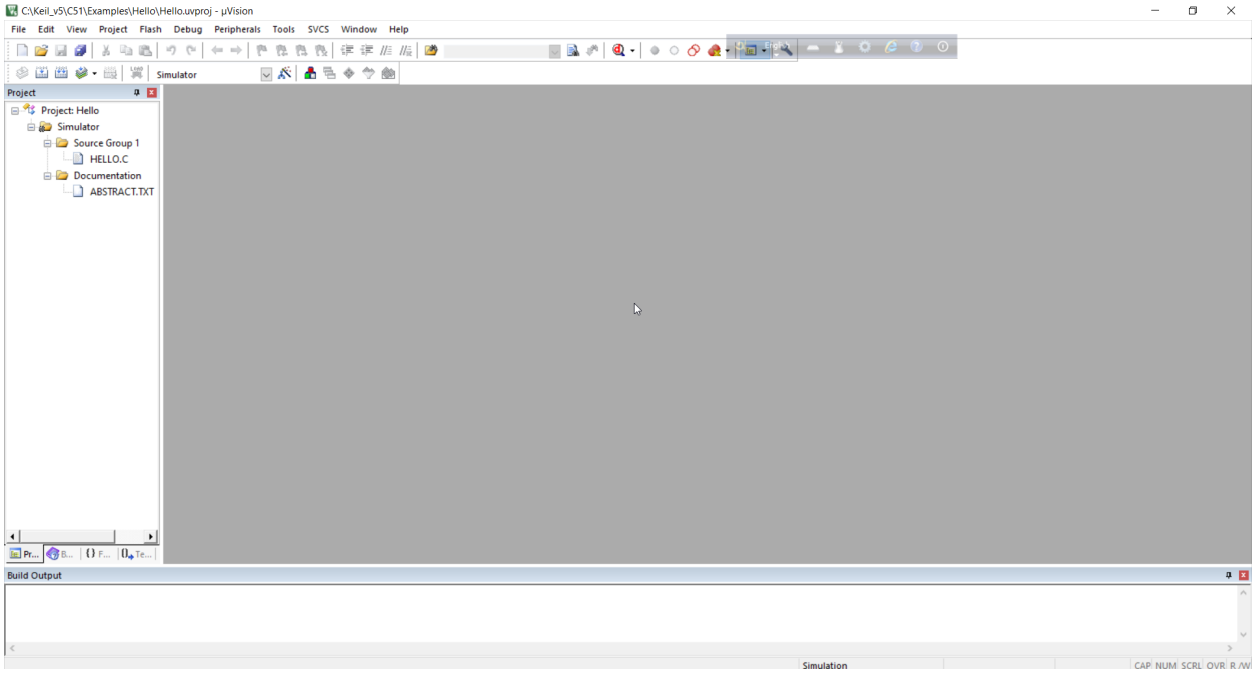
1. Nucleo-F446RE board
2. Some LEDs
3. Jumper wires to connect the circuit
4. A Breadboard
5. Keil uVision5 software

Working Procedure:

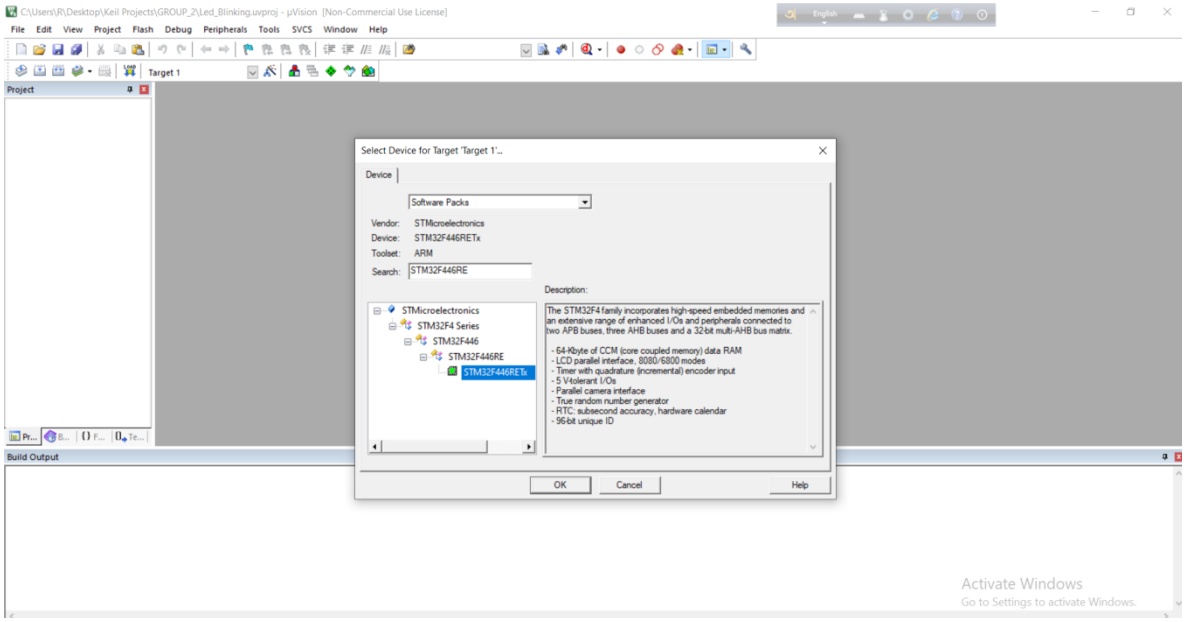
1. Firstly, we open the Keil microvision software.
2. Then we created a new project in the folder “Group1” named ‘Led_Blinking’.



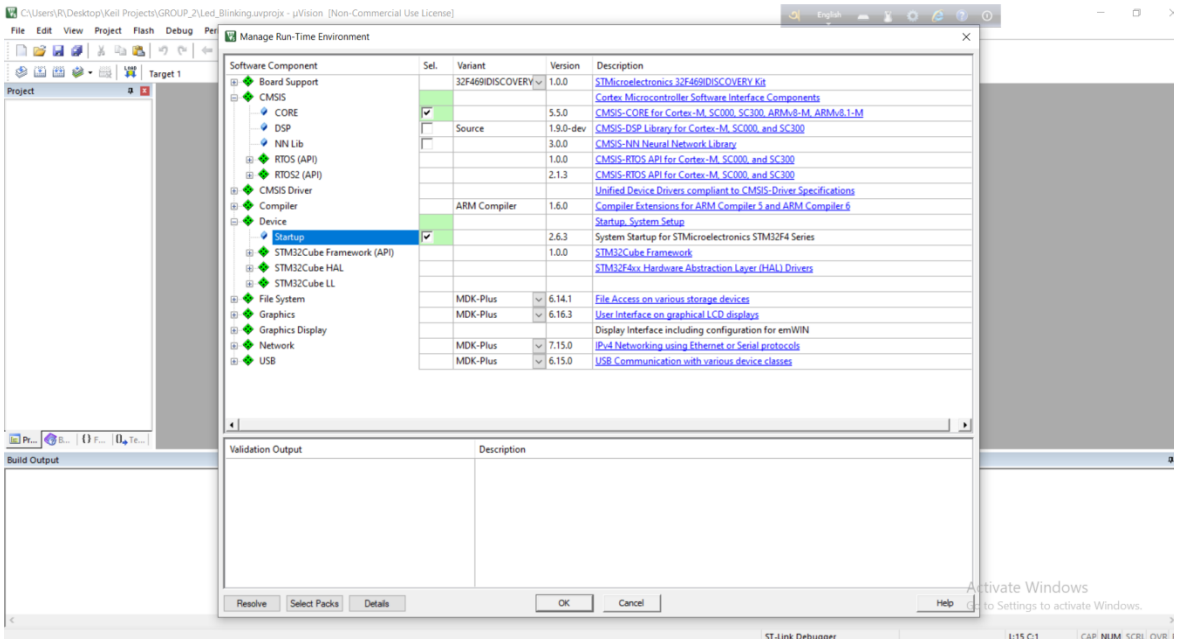
3. Then a window like the one below is created,



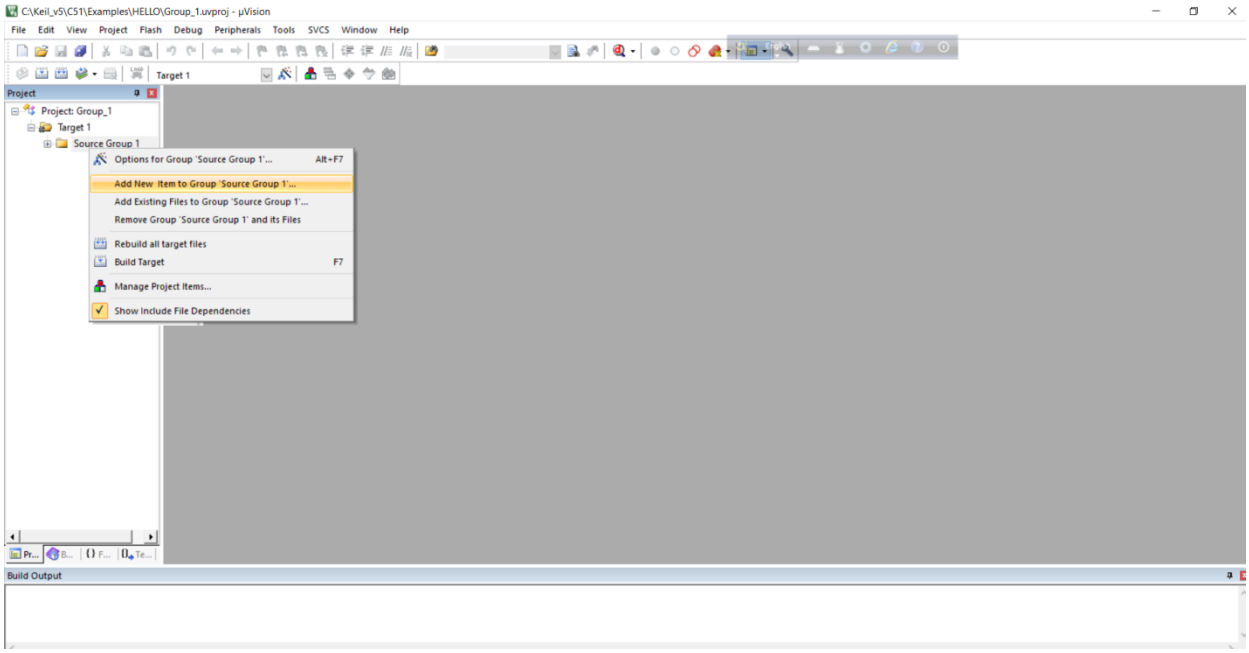
4. Then the following window appeared. And, there we selected ‘STM32F446RE.Tx’ as we’re working with this.



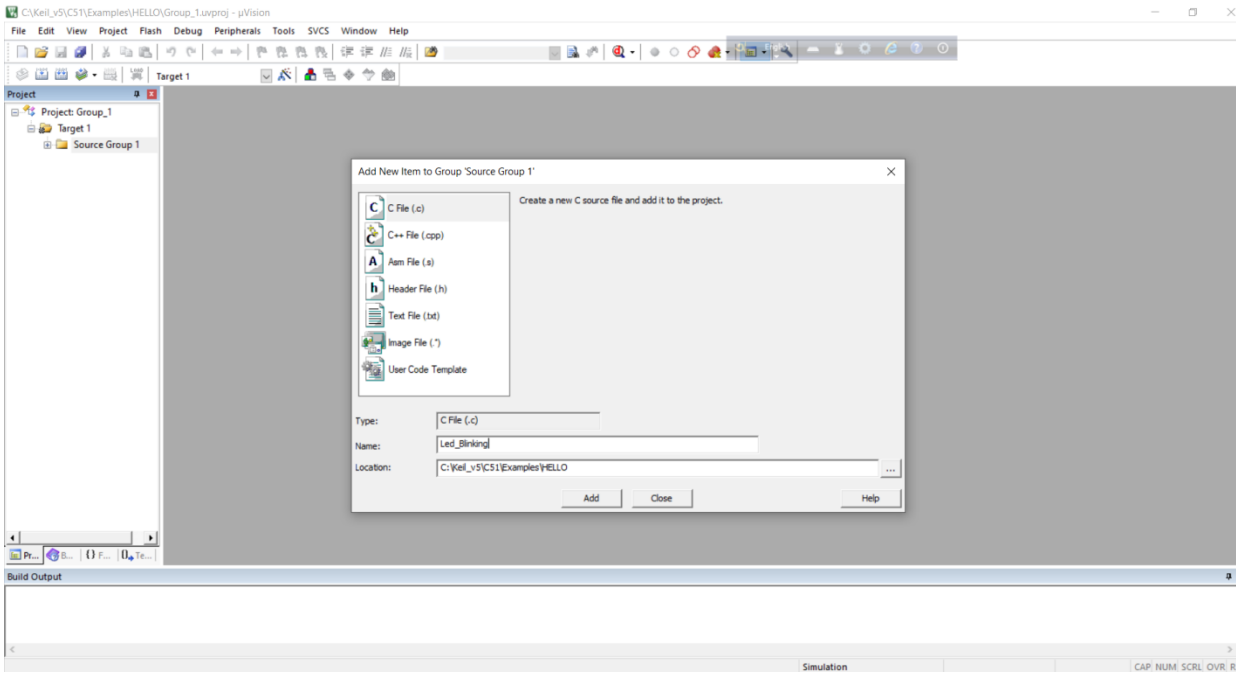
5. Then we turned the CMSS and CORE of Startup Device on.



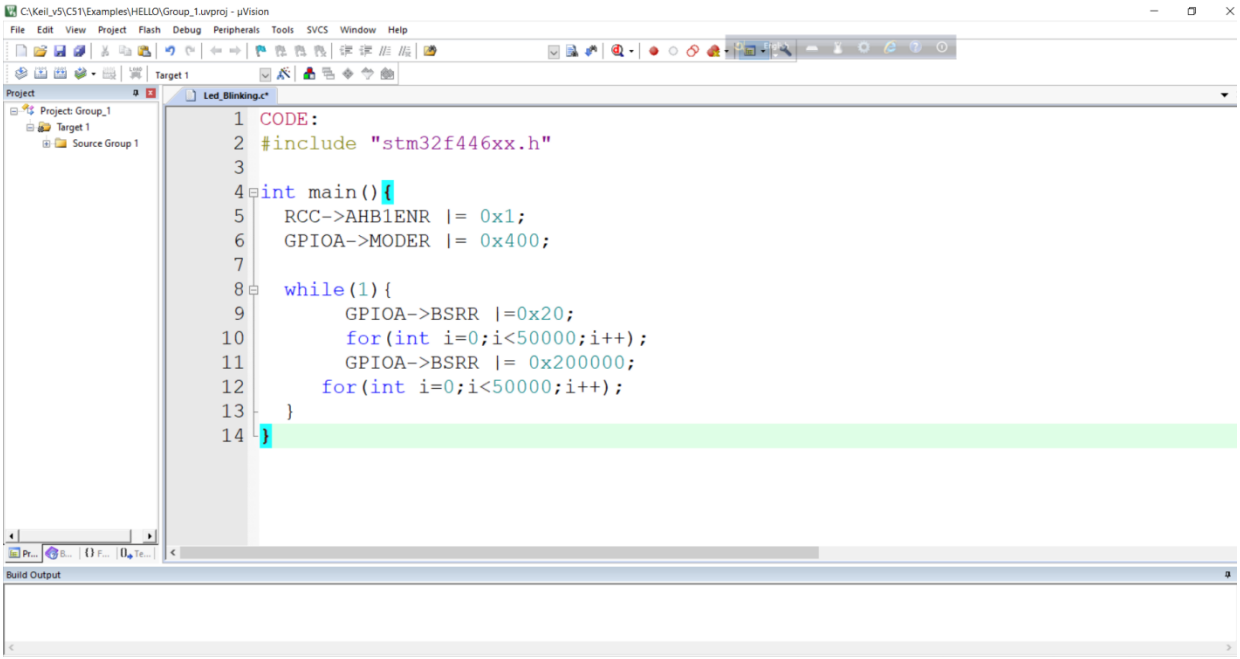
6. Then we added a new item called “Source Group”



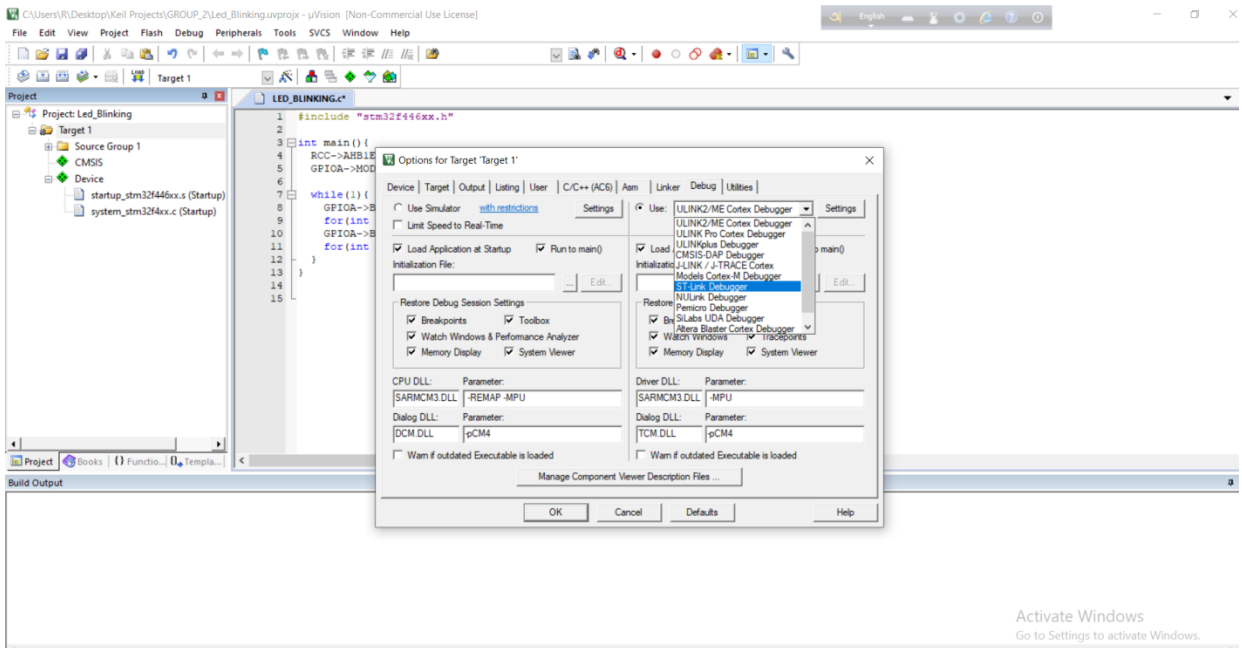
7. Then, we opened a new c file to write the code and named it “Led_Blinking”



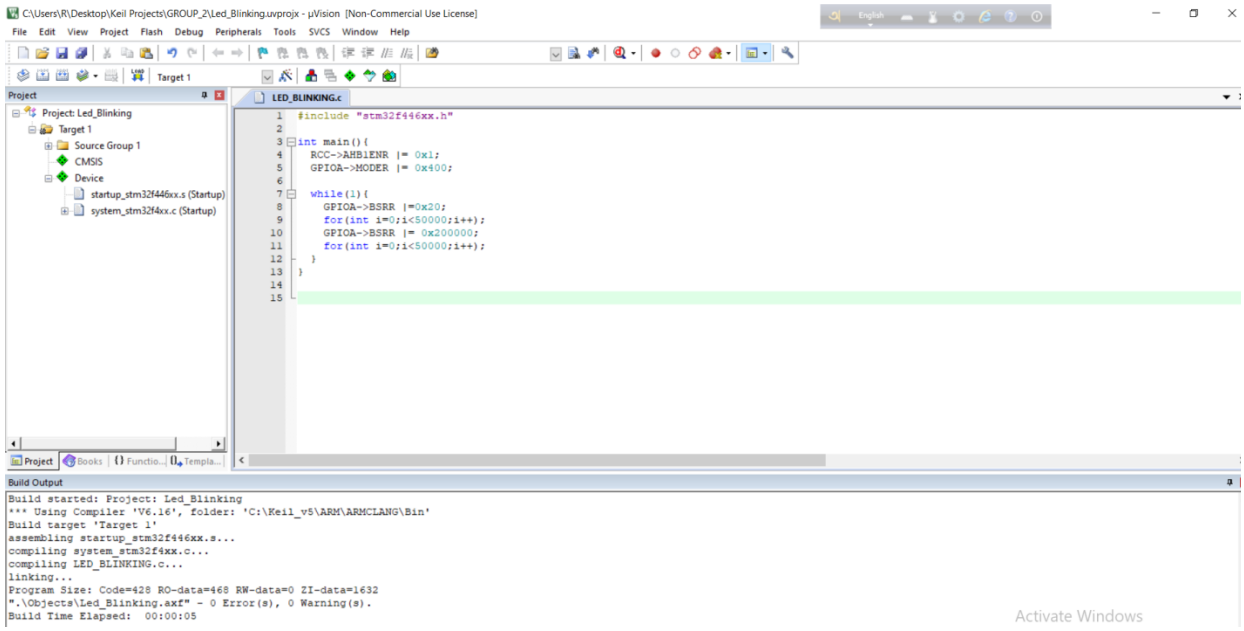
8. Then we wrote the code for the experiment.



9. Then we had to debug the code using S-T Link Debugger.



10. And , while debugging we found “ 0 error” and “ 0 warning”



11. After doing all that, we uploaded the code to the micro-controller.

12. And then in hardware connection. We connected all the wires with the micro-controller and LED correctly. We connected the GND pin with LED’s negative pin and

the positive pin with the PA5 pin of the micro-controller. Then, we gave the power supply to the micro-controller.

13. As we connected everything correctly the result as expected and the LED was blinking.

Discussion:

The experiment was not very easy. Because the code we extracted from the reference manual wasn't working correctly. The LED was not blinking. Because at first, we couldn't identify the register properly. After that, we changed the code successfully can change the hex value. And, this time the code worked well and the LED blinked. If we were aware of how to get register value and how to operate it, it wouldn't be that much of a hassle. Except that, there wasn't any problem like defective LEDs or defective wires etc. So, in this lab, we learned how to operate the exact register of STM32 and how to identify the exact pin value of a micro-controller.

Experiment name- LED blinking using STM32.

Group-1

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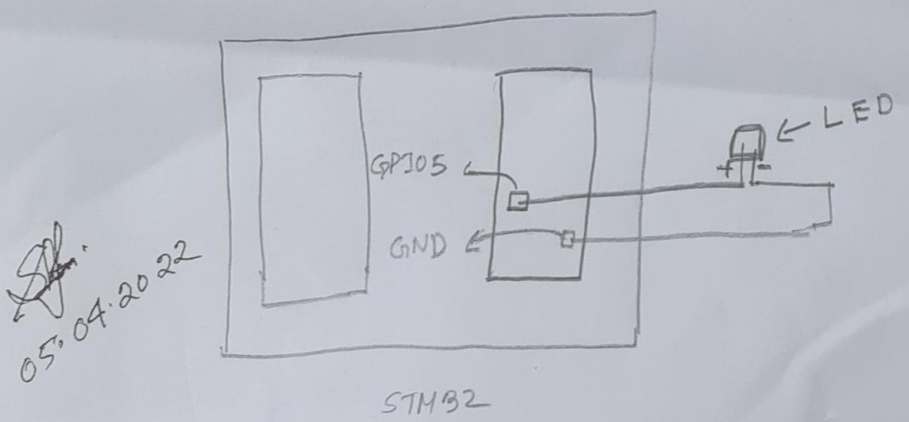

STM32

05.04.2022