ganeshprabhu2005 /

EXPERIMENT--05-SOIL-MOISTURE-SENSOR-INTERFACE-TO-IOT-DEVELOPMENT-BOARD-

Public

forked from vasanthkumarch/EXPERIMENT--05-SOIL-MOISTURE-SENSOR-INTERFACE-TO-IOT-DEVELOPMENT-BOARD-

0 stars 122 forks Branches Tags Activity

Star Notifications

Code Pull requests Actions Projects Security Insights

main 1 Branch 0 Tags Go to file Go to file Code

This branch is 2 commits ahead of
vasanthkumarch/EXPERIMENT--05-SOIL-MOISTURE-SENSOR-INTERFACE-TO-IOT-DEVELOPMENT-BOARD-:main .

ganeshprabhu2005 Update README.md now

README.md Update README.md now

README

EXPERIMENT--05-SOIL-MOISTURE-SENSOR-INTERFACE-TO-IOT-DEVELOPMENT-BOARD-

Aim: To Interface a Analog Input (soil moisture sensor) to ARM IOT development board and write a program to obtain the data on the com port

Components required: STM32 CUBE IDE, ARM IOT development board, STM programmer tool.

Theory

Hardware Overview

A typical soil moisture sensor consists of two parts.

The Probe The sensor includes a fork-shaped probe with two exposed conductors that is inserted into the soil or wherever the moisture content is to be measured.

As previously stated, it acts as a variable resistor, with resistance varying according to soil moisture.

The Module In addition, the sensor includes an electronic module that connects the probe to the Arduino.

The module generates an output voltage based on the resistance of the probe, which is available at an Analog Output (AO) pin.

The same signal is fed to an LM393 High Precision Comparator, which digitizes it and makes it available at a Digital Output (DO) pin.

The module includes a potentiometer for adjusting the sensitivity of the digital output (DO).

You can use it to set a threshold, so that when the soil moisture level exceeds the threshold, the module outputs LOW otherwise HIGH.

This setup is very useful for triggering an action when a certain threshold is reached. For example, if the moisture level in the soil exceeds a certain threshold, you can activate a relay to start watering the plant.

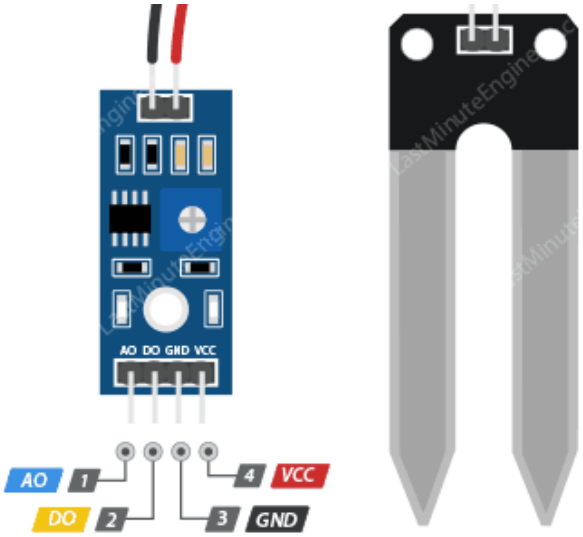
Soil Moisture Sensor Pinout The soil moisture sensor is extremely simple to use and only requires four pins to connect.

soil moisture sensor pinout AO (Analog Output) generates analog output voltage proportional to the soil moisture level, so a higher level results in a higher voltage and a lower level results in a lower voltage.

DO (Digital Output) indicates whether the soil moisture level is within the limit. D0 becomes LOW when the moisture level exceeds the threshold value (as set by the potentiometer), and HIGH otherwise.

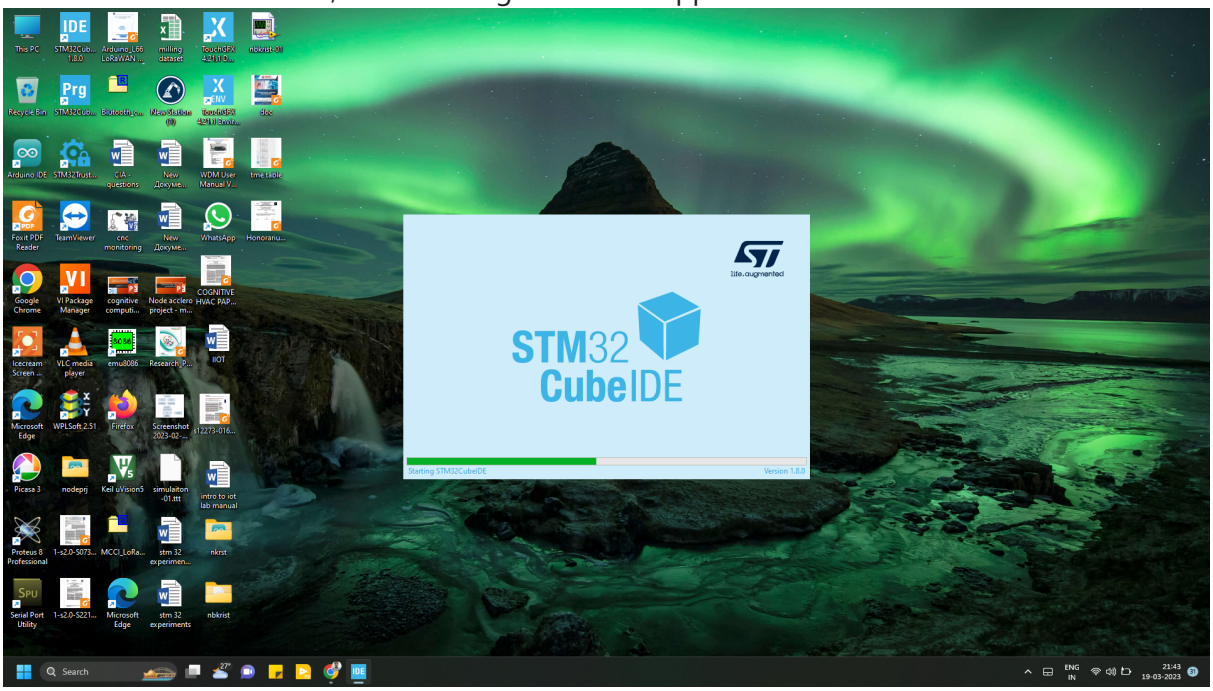
VCC supplies power to the sensor. It is recommended that the sensor be powered from 3.3V to 5V. Please keep in mind that the analog output will vary depending on the voltage supplied to the sensor.

GND is the ground pin.

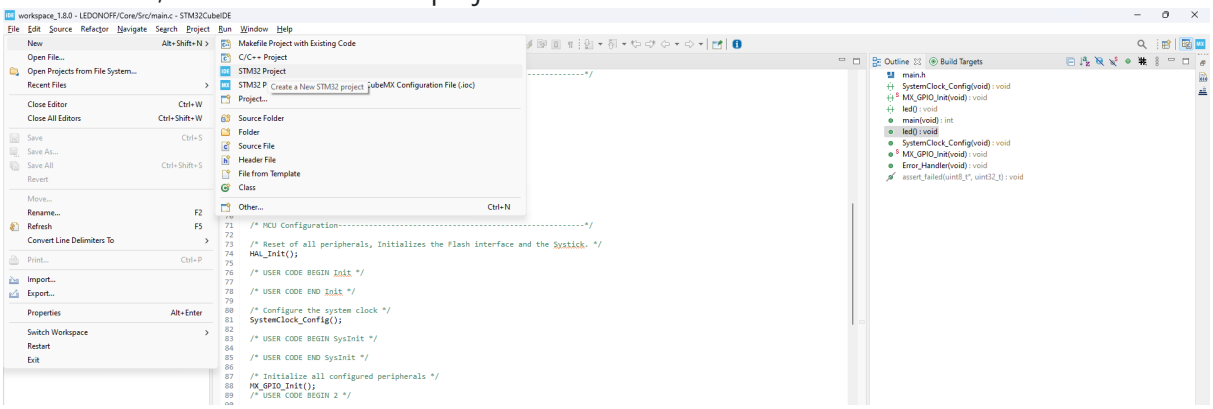


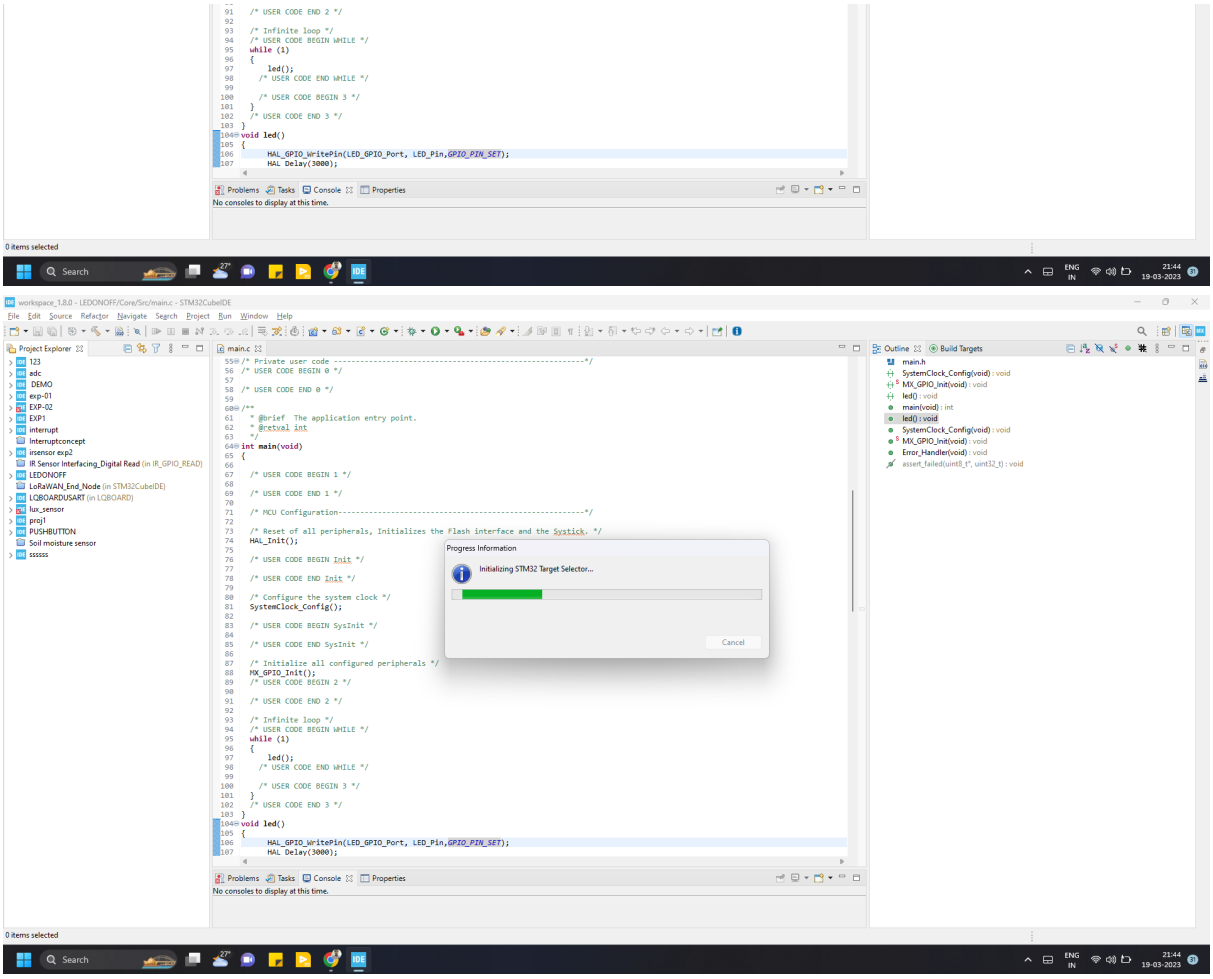
Procedure:

1. click on STM 32 CUBE IDE, the following screen will appear

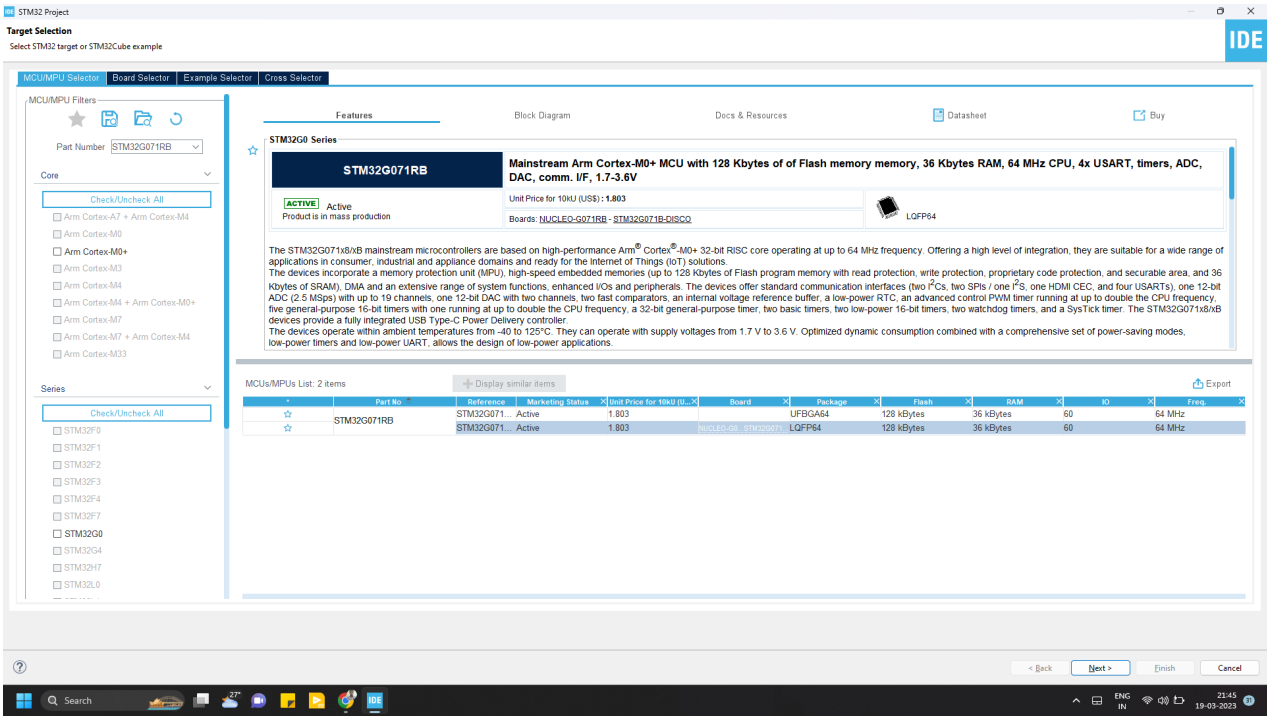


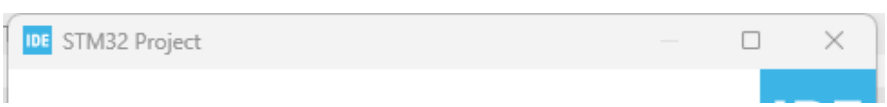
2. click on FILE, click on new stm 32 project



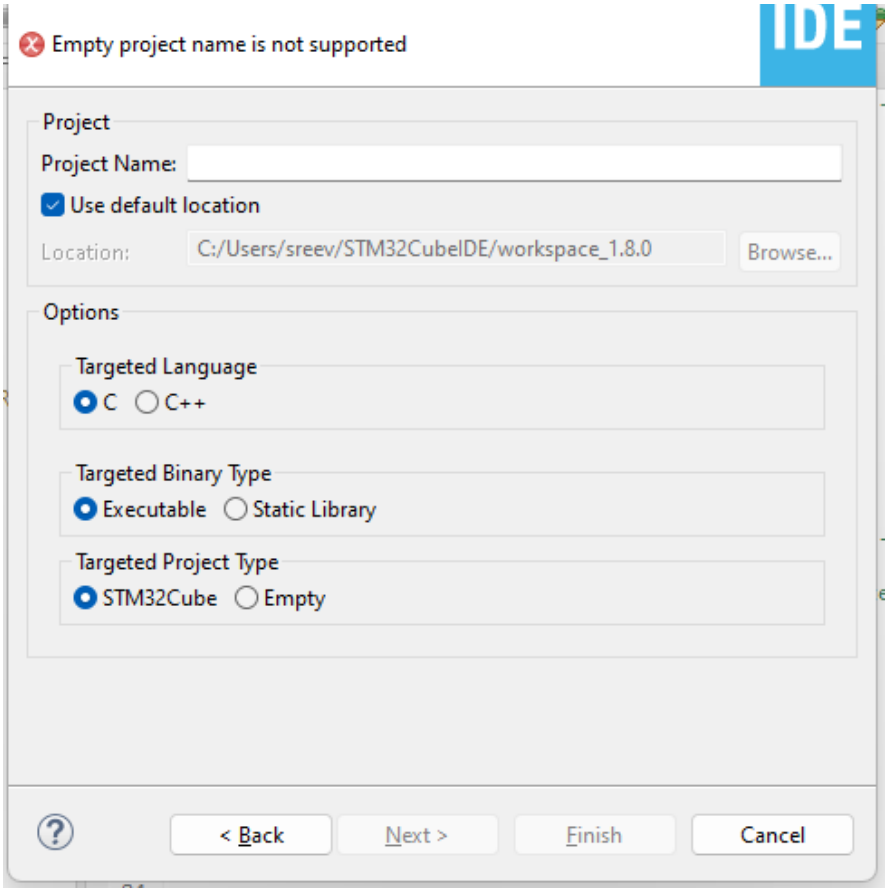


3. select the target to be programmed as shown below and click on next

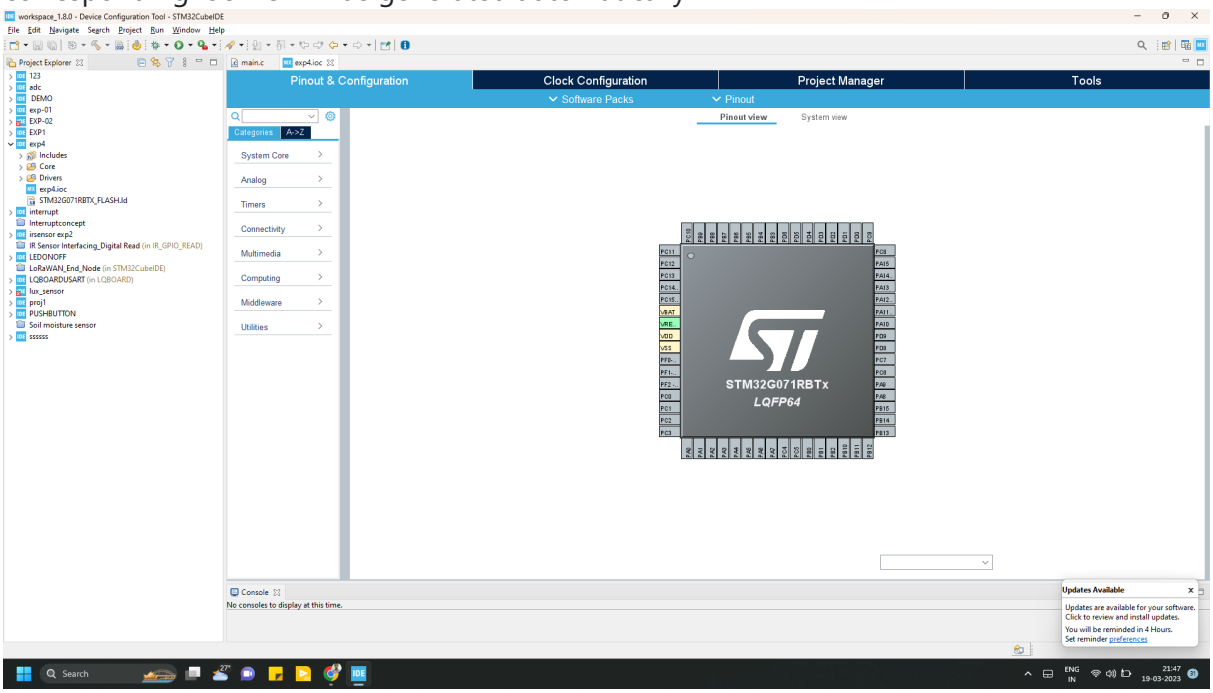




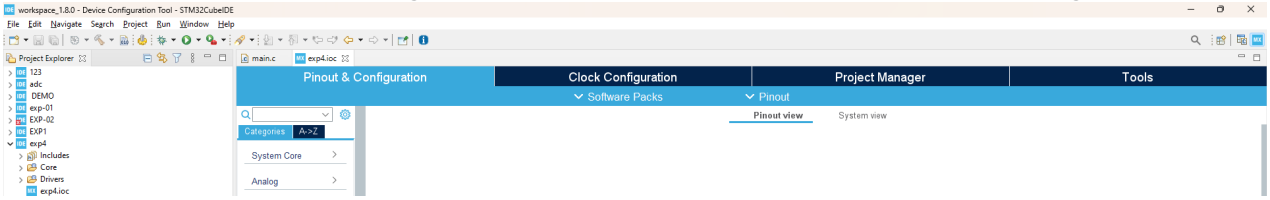
4.select the program name

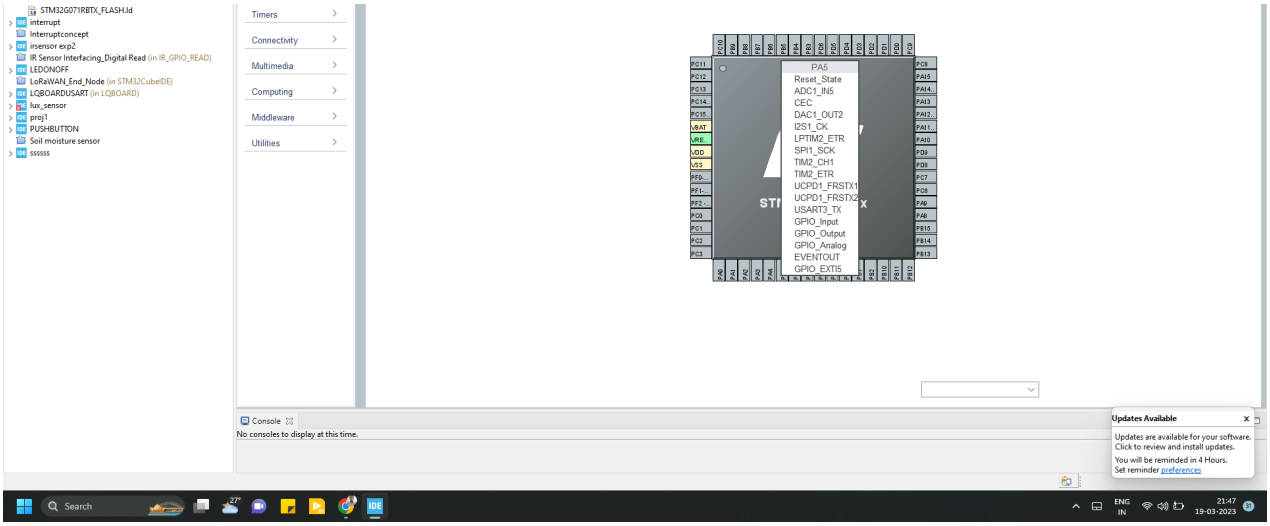


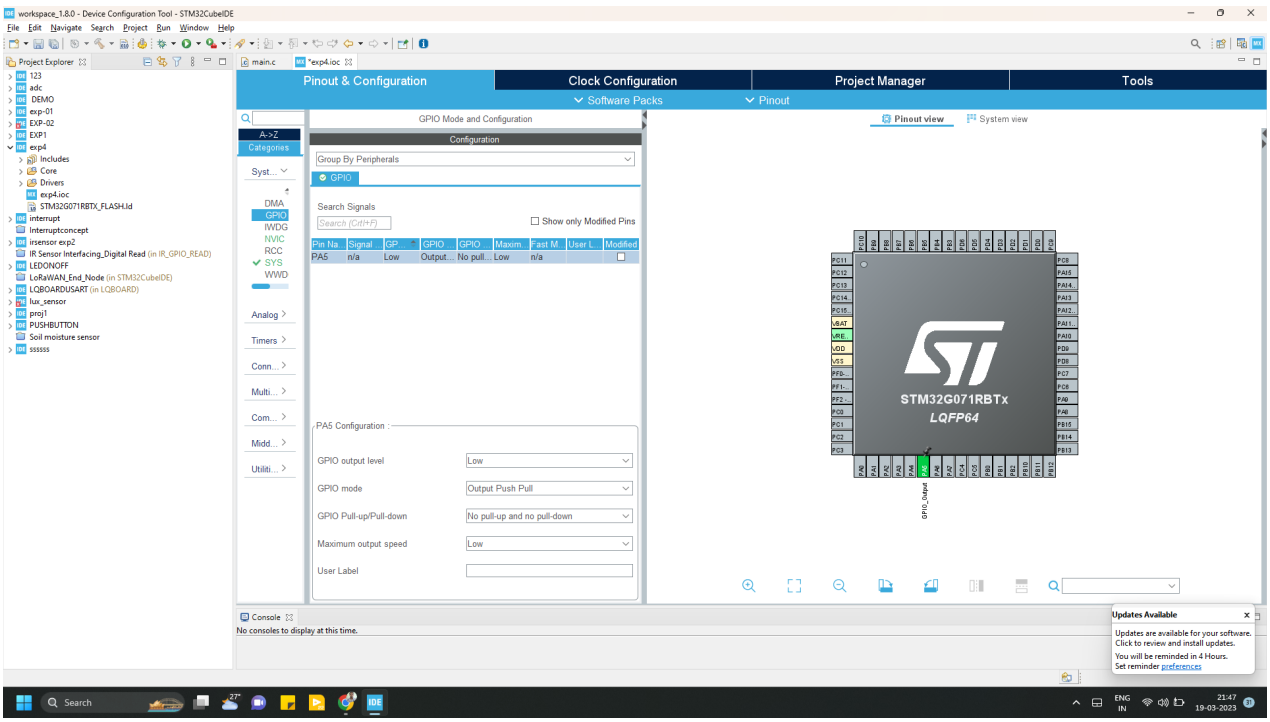
5. corresponding ioc file will be generated automatically



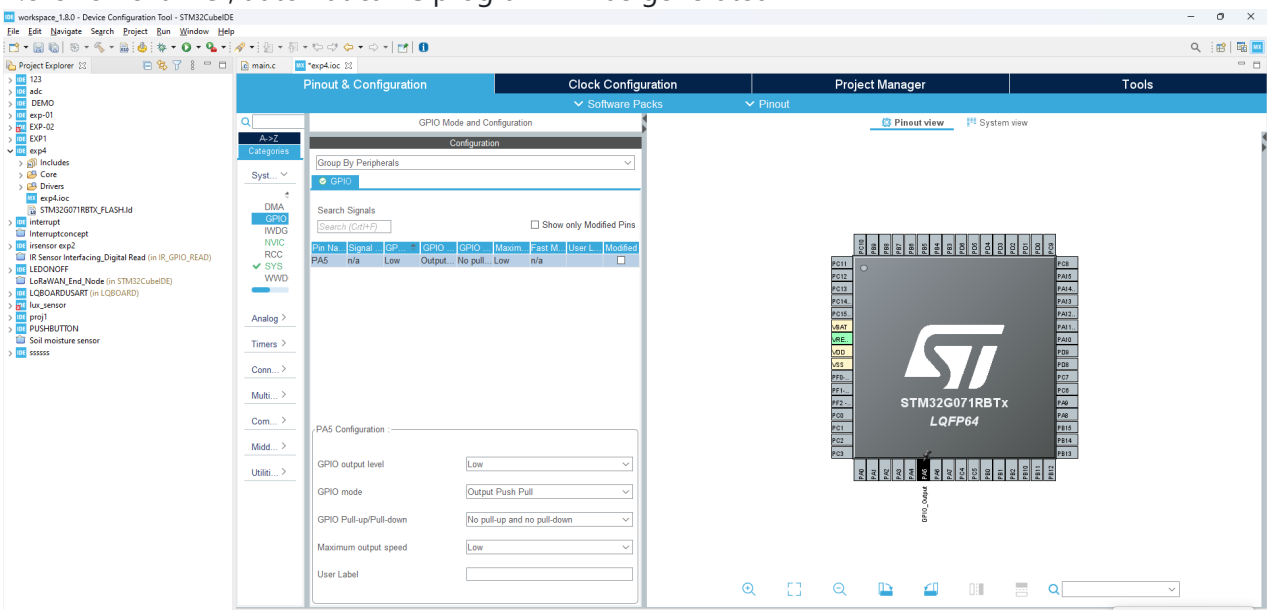
6.select the appropriate pins as gipo, in or out, USART or required options and configure

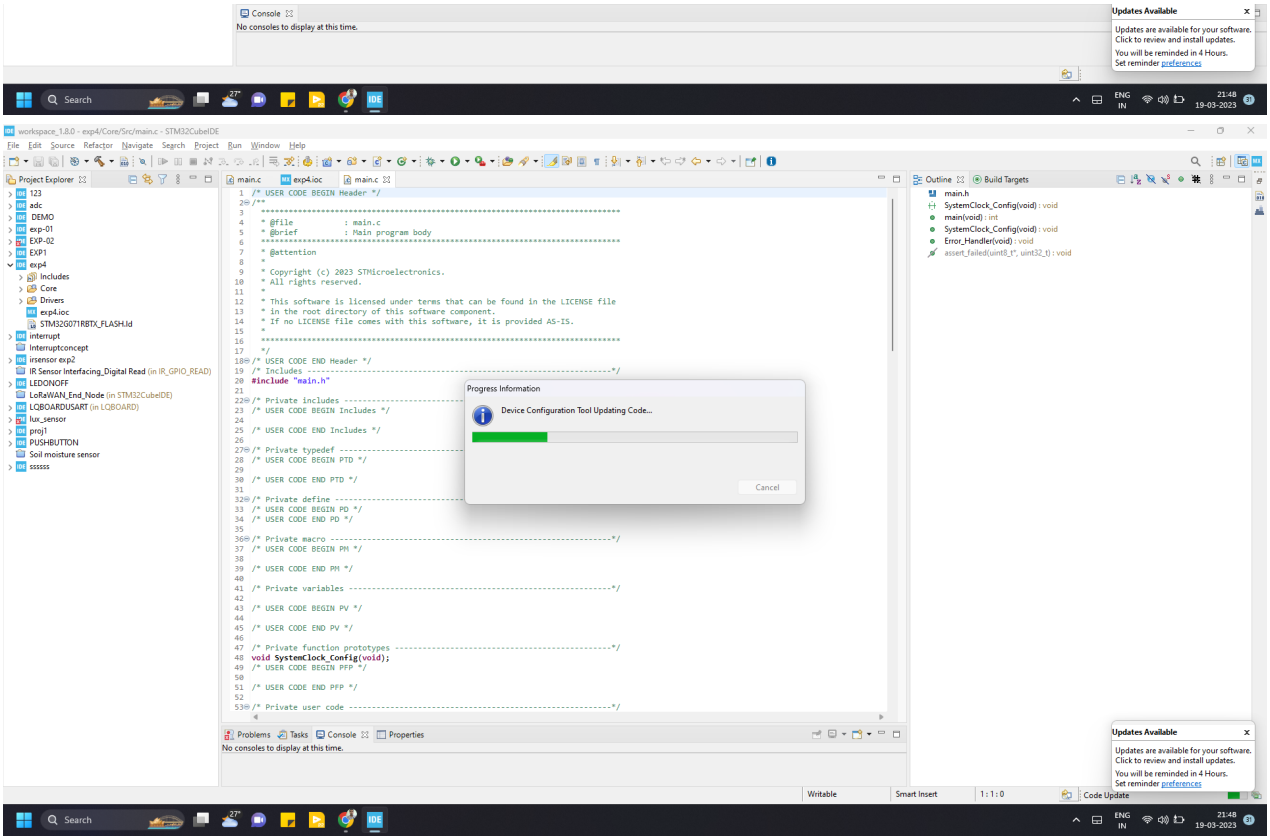




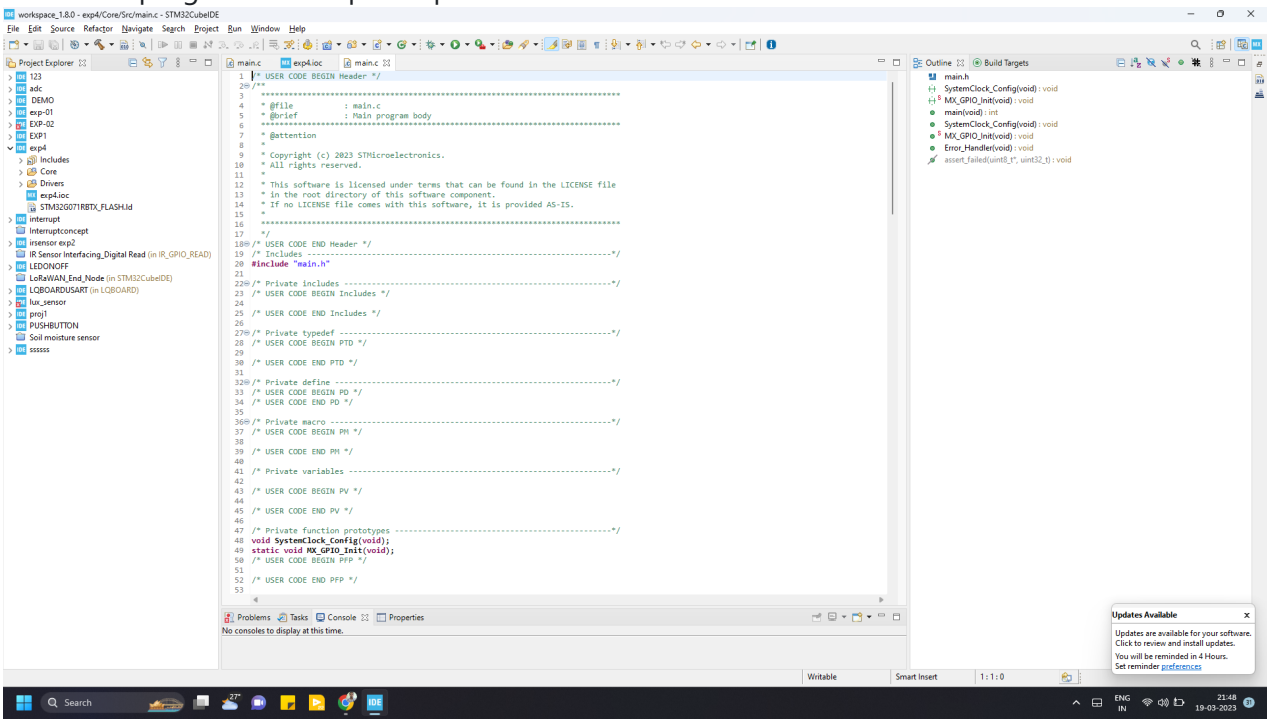


7.click on cntrl+S , automaticall C program will be generated

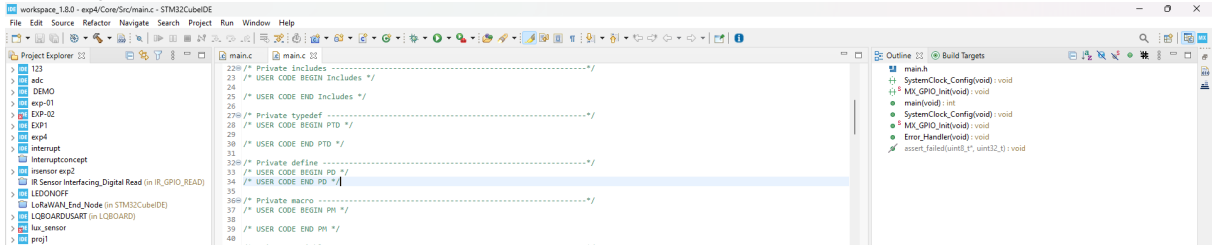


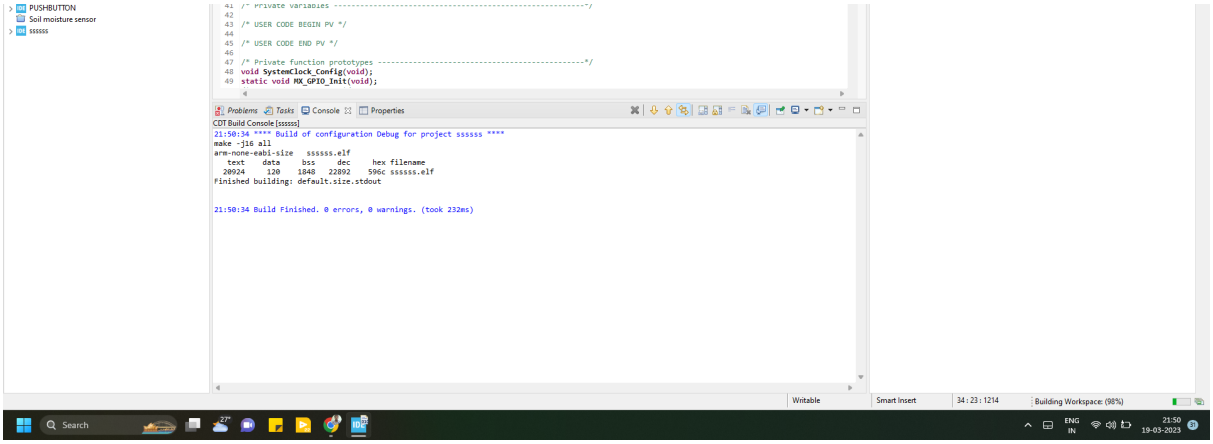


8. edit the program and as per required

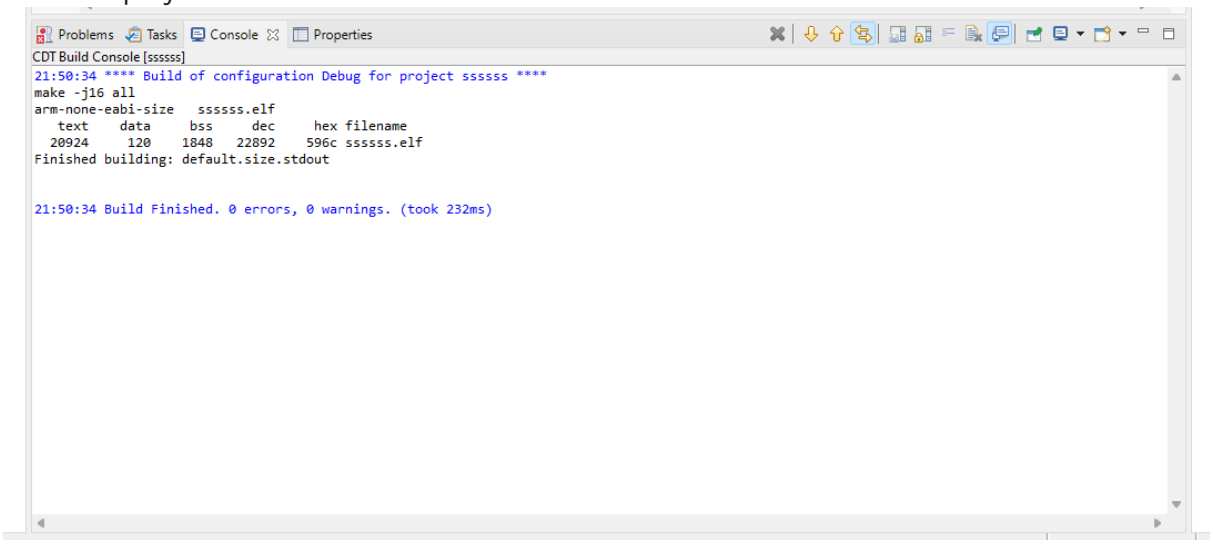


9. use project and build all

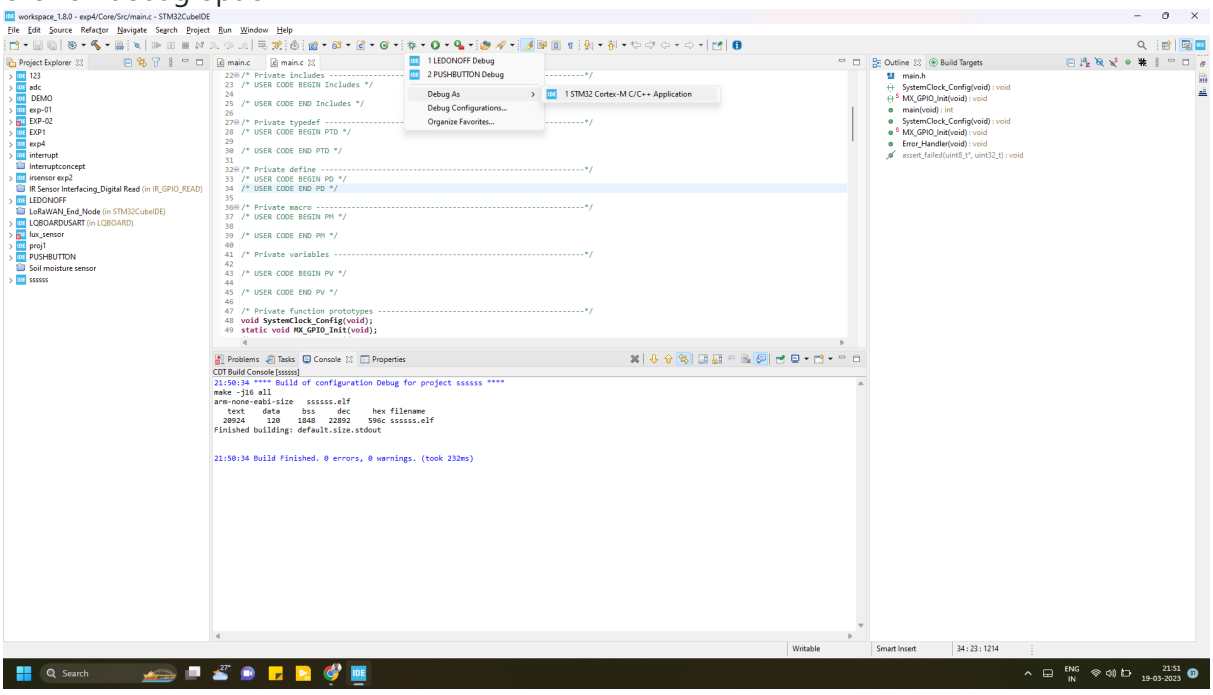




10. once the project is bulild

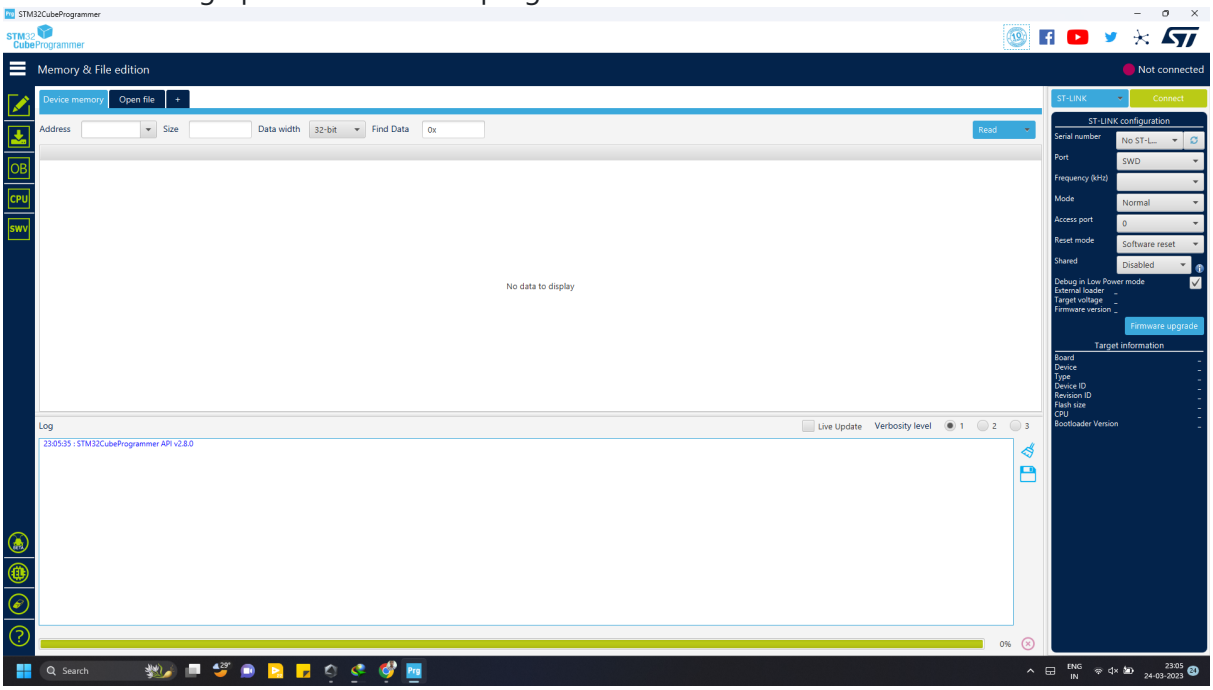


11. click on debug option

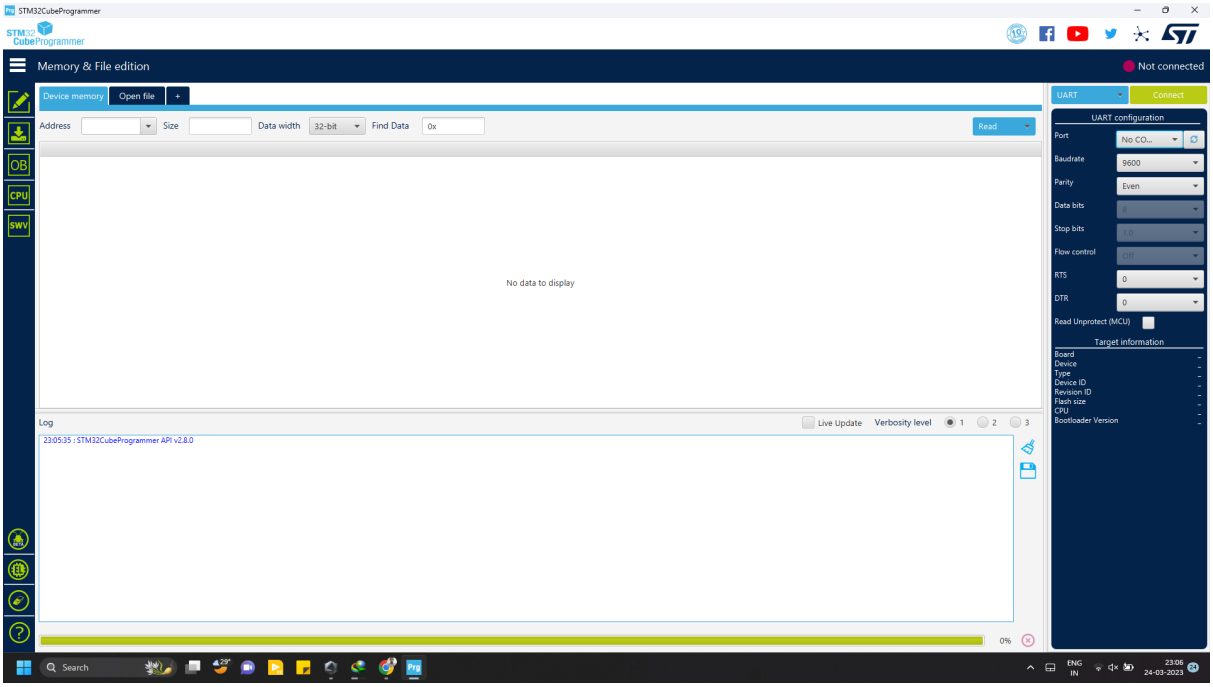


12. connect the iot board to power supply and usb

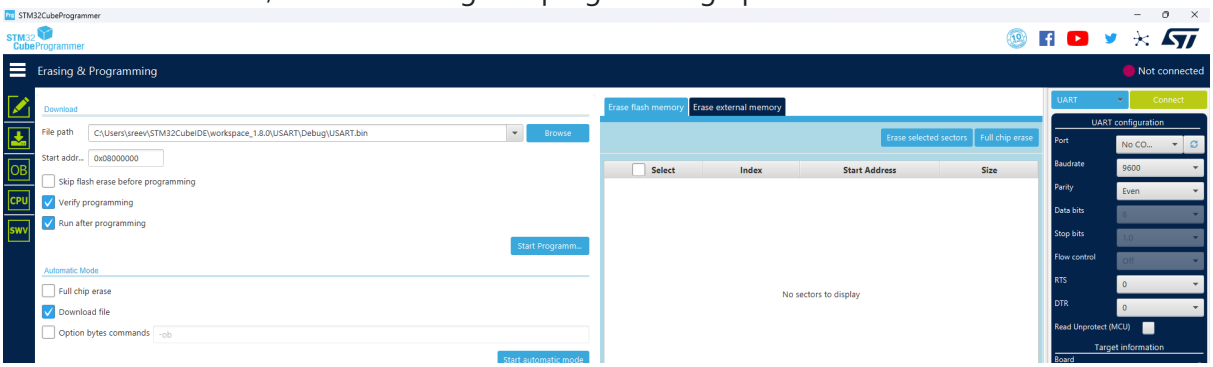
13. After connecting open the STM cube programmer

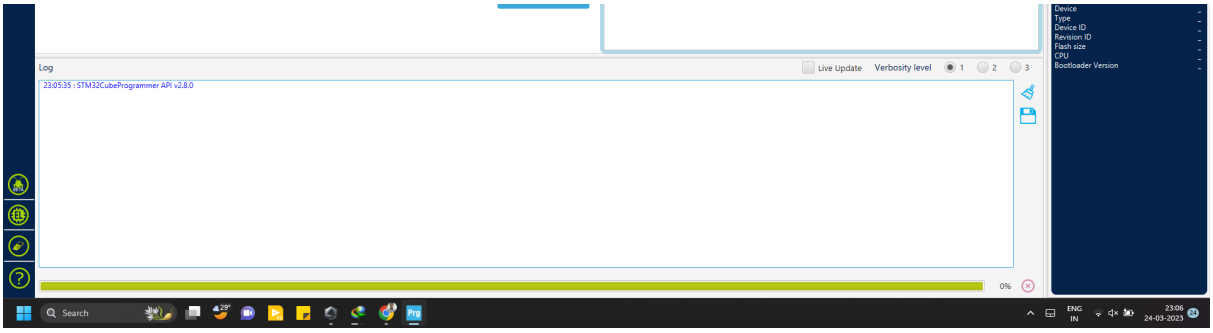


14. click on UART and click on connect

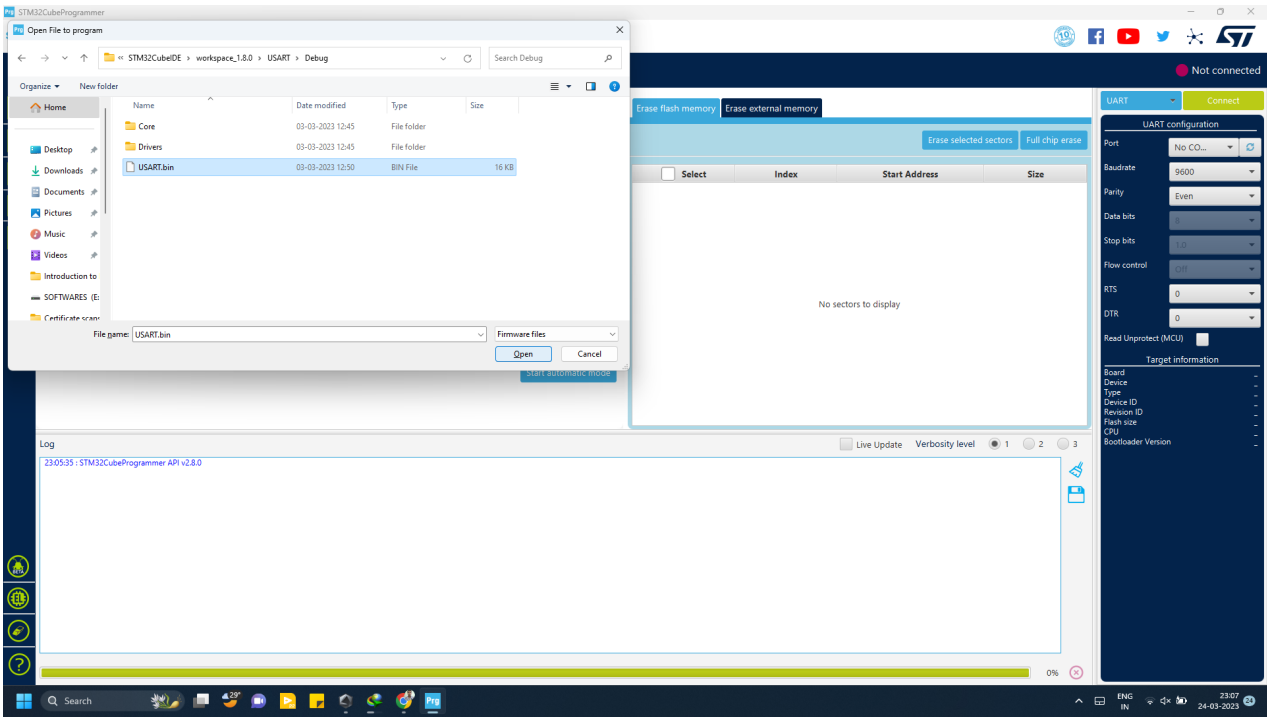


15. once it is connected , click on Erasing and programming option





16. flash the bin or hex file as shown below by switching the switch to flash mode



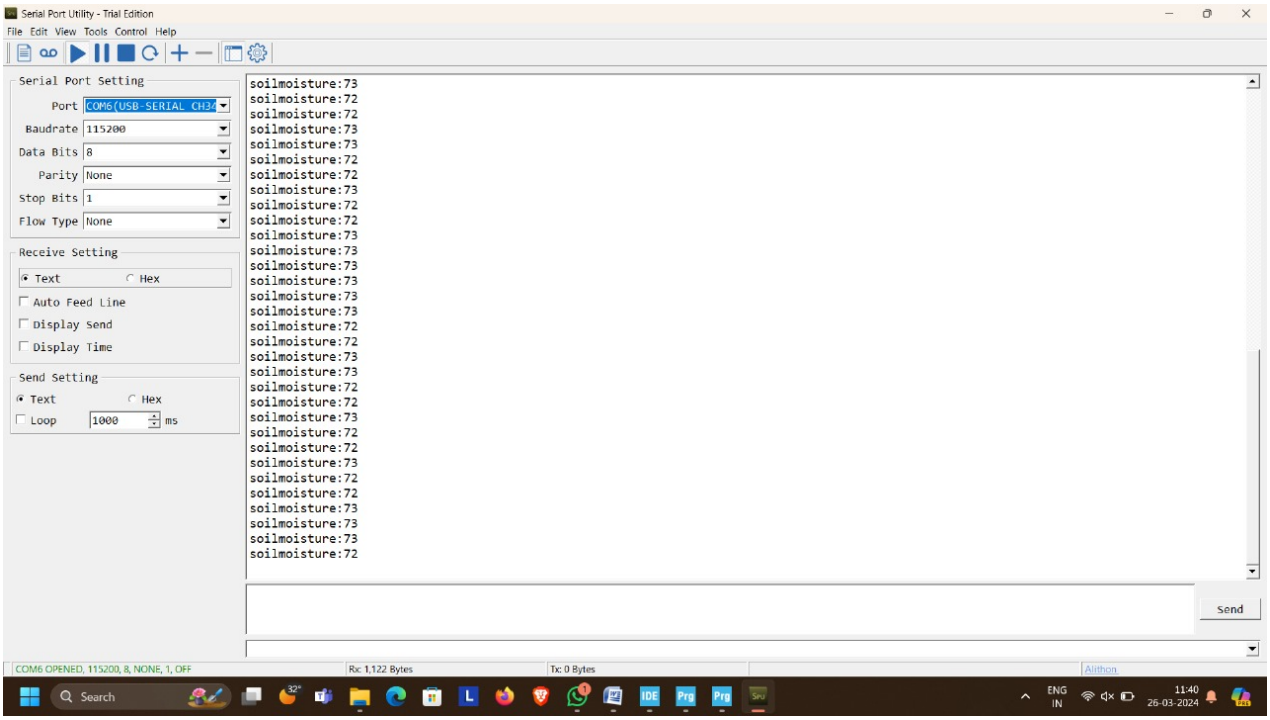
17. check for execution of the output by switching the board to run mode
18. open serial port utility and select appropritate com port, run and verify the reuslts of moisture content .

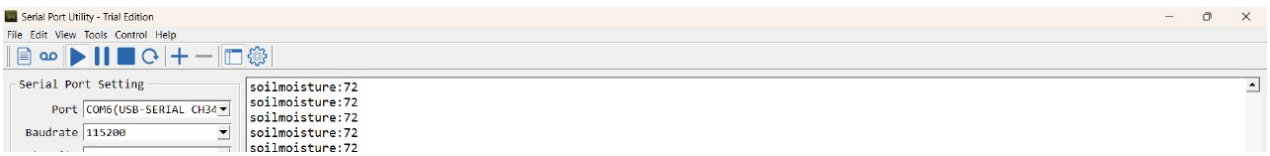
STM 32 CUBE PROGRAM :

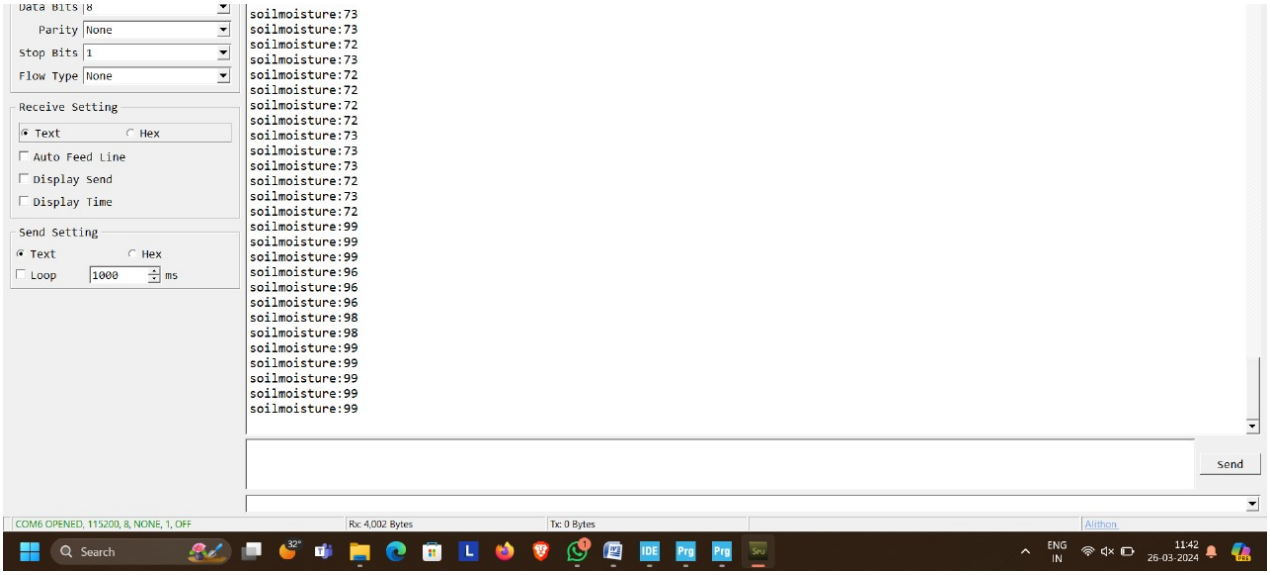
```
#include "main.h"
#include "stdio.h"

#if defined (_ICCARM) || defined (_ARMCC_VERSION)
#define PUTCHAR_PROTOTYPE int fputc(int ch, FILE *f)
#elif defined(_GNUC_)
#define PUTCHAR_PROTOTYPE int __io_putchar(int ch)
#endif

PUTCHAR_PROTOTYPE
{
  HAL_UART_Transmit(&huart2, (uint8_t *)&ch, 1, 0xFFFF);
```

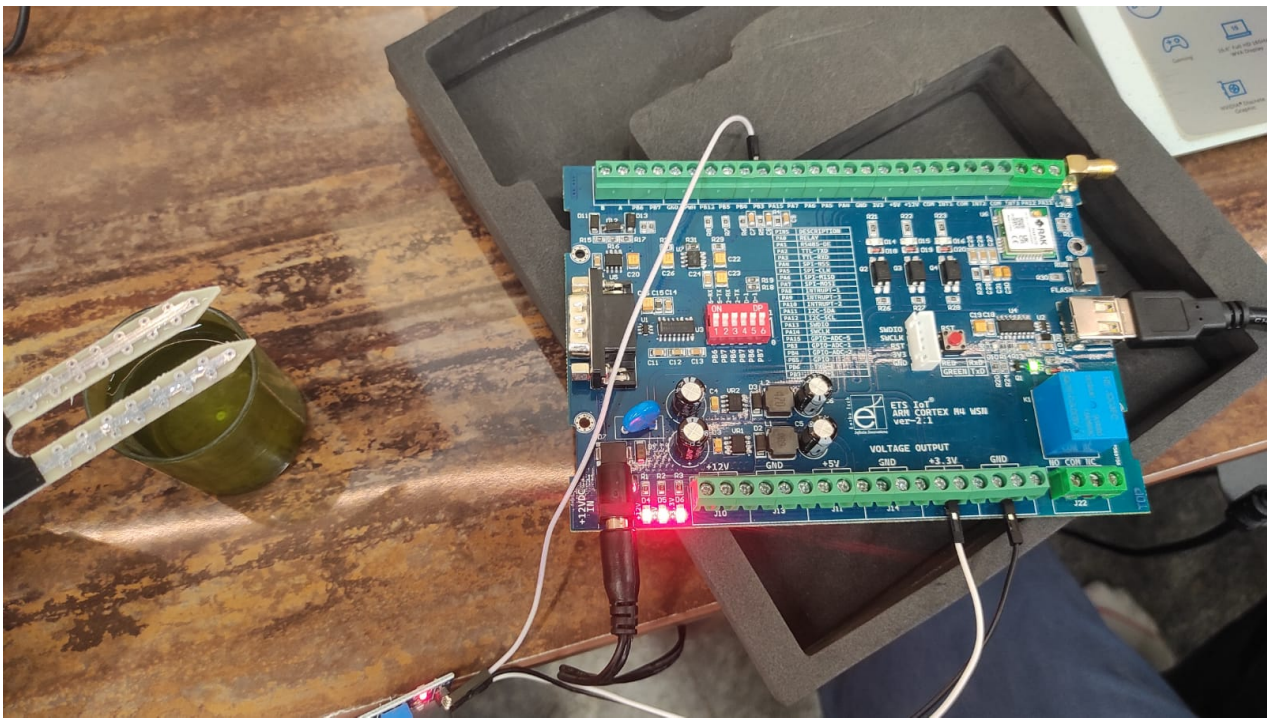
```
  return ch;
}

while (1)
  {
          HAL_ADC_Start(&hadc);
                        HAL_ADC_PollForConversion(&hadc,100);
                        adc_val = HAL_ADC_GetValue(&hadc);
                        uint32_t soilmoisture;
                        soilmoisture=adc_val/10.24;
                        HAL_ADC_Stop(&hadc);
                        HAL_Delay(500);
                        printf("soilmoisture=:%ld\n",soilmoisture);
                        if(adc_val<500)
                        {
                                HAL_GPIO_WritePin(GPIOA, GPIO_PIN_0,
GPIO_PIN_RESET);;
                        }
                        if(adc_val>500)
                        {
                                HAL_GPIO_WritePin(GPIOA, GPIO_PIN_0,
GPIO_PIN_SET);;
                        }
  }
```

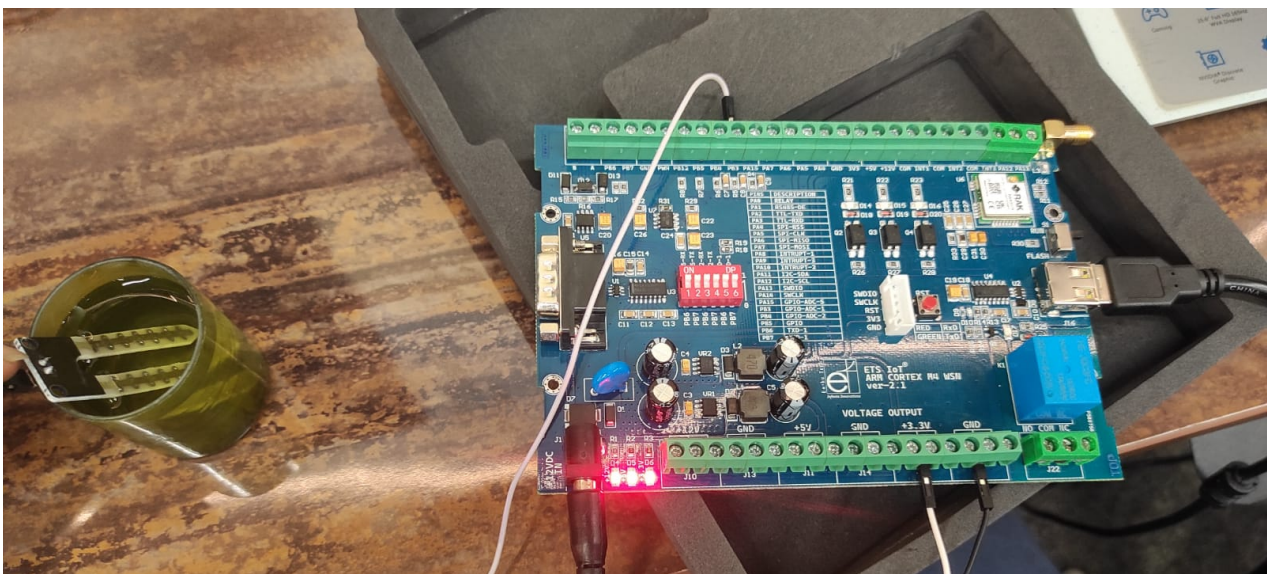
Output screen shots on serial monitor :






Data Bits 8
Parity None
Stop Bits 1
Flow Type None
Receive Setting
Text Hex
Auto Feed Line
Display Send
Display Time
Send Setting
Text Hex
Loop 1000 ms
soilmoisture:73
soilmoisture:73
soilmoisture:72
soilmoisture:73
soilmoisture:72
soilmoisture:72
soilmoisture:72
soilmoisture:72
soilmoisture:73
soilmoisture:73
soilmoisture:73
soilmoisture:72
soilmoisture:73
soilmoisture:72
soilmoisture:99
soilmoisture:99
soilmoisture:99
soilmoisture:96
soilmoisture:96
soilmoisture:96
soilmoisture:98
soilmoisture:98
soilmoisture:99
soilmoisture:99
soilmoisture:99
soilmoisture:99
soilmoisture:99
Send
COM6 OPENED, 115200, 8, NONE, 1, OFF
Rx: 4,002 Bytes
Tx: 0 Bytes
Search
ENG IN
11:42
26-03-2024


ETS IoT ARM CORTEX M4 WSN ver-2.1
VOLTAGE OUTPUT
+12V
GND
+5V
GND
+3.3V
GND
NO COM NC


ETS IoT ARM CORTEX M4 WSN ver-2.1
VOLTAGE OUTPUT
+12V
GND
+5V
GND
+3.3V
GND
NO COM NC

Result :

Interfacing a Analog Input (soil moisture sensor) with ARM microcontroller based IOT development is executed and the results visualized on serial monitor

Releases

No releases published

Packages

No packages published