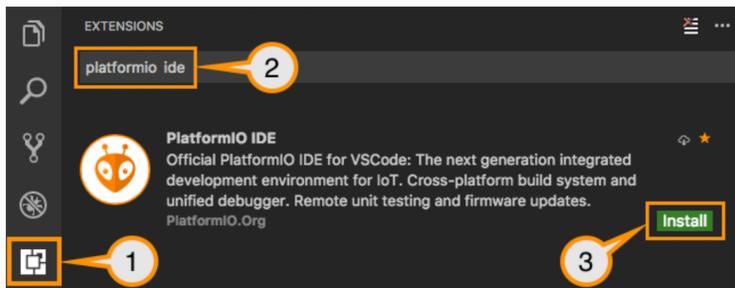


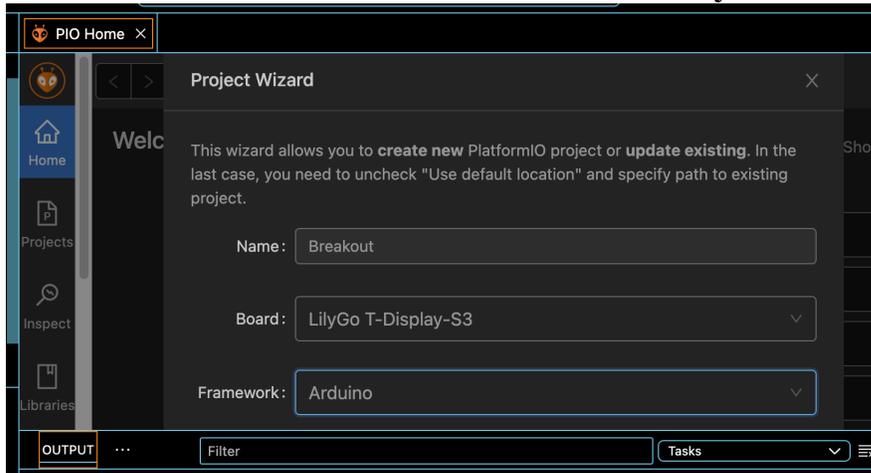
## Tutorial 5 – TTGO Programming and Debugging

### 1. INSTALL Platform IO and the ESP32 Extension

0. [Download](#) and install official Microsoft Visual Studio Code. PlatformIO IDE is built on top of it
1. Open VSCode Package Manager
2. Search for the official [platformio ide](#) extension
3. Install PlatformIO IDE.



### 2. CREATE NEW PROJECT in Arduino Style



Copy TFT Library

```
cp TFT_eSPI ~/.platformio/lib/
```

### 3. COMPILE and UPLOAD sample program

Copy and Paste a sample program, then click compile, then upload.



Compile Upload

```
In file included from src/main.cpp:4:
lib/TFT_eSPI/TFT_eSPI.h:953:8: warning: #warning >>>----->> TOUCH_CS pin not def
ined, TFT_eSPI touch functions will not be available! [-Wcpp]
  #warning >>>----->> TOUCH_CS pin not defined, TFT_eSPI touch functions wi
ll not be available!
  ~~~~~
Retrieving maximum program size .pio/build/lilygo-t-display-s3/firmware.elf
Checking size .pio/build/lilygo-t-display-s3/firmware.elf
Advanced Memory Usage is available via "PlatformIO Home > Project Inspect"
RAM: [ =      ] 6.1% (used 19832 bytes from 327680 bytes)
Flash: [      ] 4.5% (used 293485 bytes from 6553600 bytes)
===== [SUCCESS] Took 1.49 seconds =====
* Terminal will be reused by tasks, press any key to close it.
```

```
Writing at 0x00031c55... (50 %)
Writing at 0x00037539... (60 %)
Writing at 0x0003cb63... (70 %)
Writing at 0x00041f31... (80 %)
Writing at 0x0004790a... (90 %)
Writing at 0x00050cea... (100 %)
Wrote 293856 bytes (162329 compressed) at 0x00010000 in 2.8 seconds
(effective 849.9 kbit/s)...
Hash of data verified.

Leaving...
Hard resetting via RTS pin...
===== [SUCCESS] Took 6.97 seconds =====
* Terminal will be reused by tasks, press any key to close it.
```

## 4. DEBUGGER

Add extra lines to 'platformio.ini', to start Debugger



```
platformio.ini
9 ; https://docs.platformio.org/page/
10
11 [env:lilygo-t-display-s3]
12 platform = espressif32
13 board = lilygo-t-display-s3
14 framework = arduino
15
16 ; change microcontroller
17 board_build.mcu = esp32s3
18
19 ; change MCU frequency
20 board_build.f_cpu = 240000000L
21
22 debug_tool = esp-builtin
23 upload_protocol = esp-builtin
```

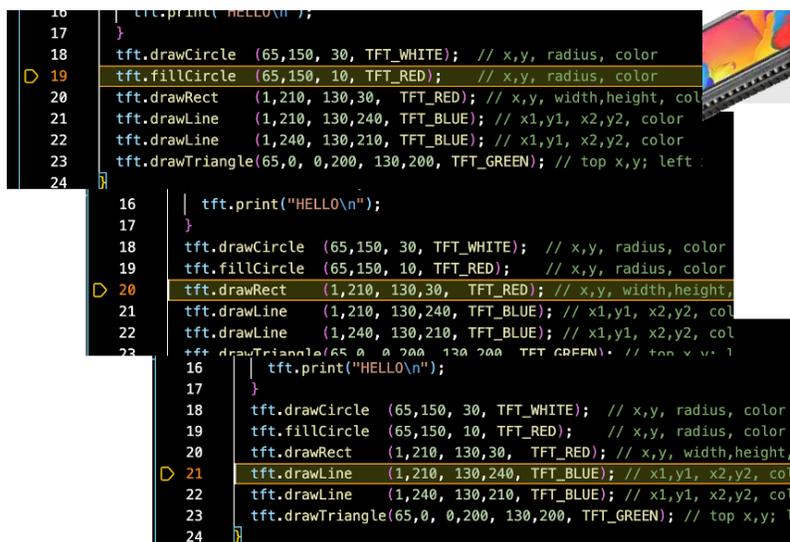
Add lines to .ini file

Debugger buttons



Explore:

- Single Step
- Breakpoints
- Examine variable values



```
16 tft.print("HELLO\n");
17 }
18 tft.drawCircle (65,150, 30, TFT_WHITE); // x,y, radius, color
19 tft.fillCircle (65,150, 10, TFT_RED); // x,y, radius, color
20 tft.drawRect (1,210, 130,30, TFT_RED); // x,y, width,height, color
21 tft.drawLine (1,210, 130,240, TFT_BLUE); // x1,y1, x2,y2, color
22 tft.drawLine (1,240, 130,210, TFT_BLUE); // x1,y1, x2,y2, color
23 tft.drawTriangle(65,0, 0,200, 130,200, TFT_GREEN); // top x,y; left x,y; right x,y
24 }

16 | tft.print("HELLO\n");
17 | }
18 | tft.drawCircle (65,150, 30, TFT_WHITE); // x,y, radius, color
19 | tft.fillCircle (65,150, 10, TFT_RED); // x,y, radius, color
20 | tft.drawRect (1,210, 130,30, TFT_RED); // x,y, width,height, color
21 | tft.drawLine (1,210, 130,240, TFT_BLUE); // x1,y1, x2,y2, color
22 | tft.drawLine (1,240, 130,210, TFT_BLUE); // x1,y1, x2,y2, color
23 | tft.drawTriangle(65,0, 0,200, 130,200, TFT_GREEN); // top x,y; left x,y; right x,y
24 | }
```