



DesignNews

IoT Designs Using STmicro Microcontrollers

Day 3:

Exploring TouchGFX

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Webinar Logistics

- Turn on your system sound to hear the streaming presentation.
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- Participate in ‘Attendee Chat’ by maximizing the chat widget in your dock.



Fred Eady

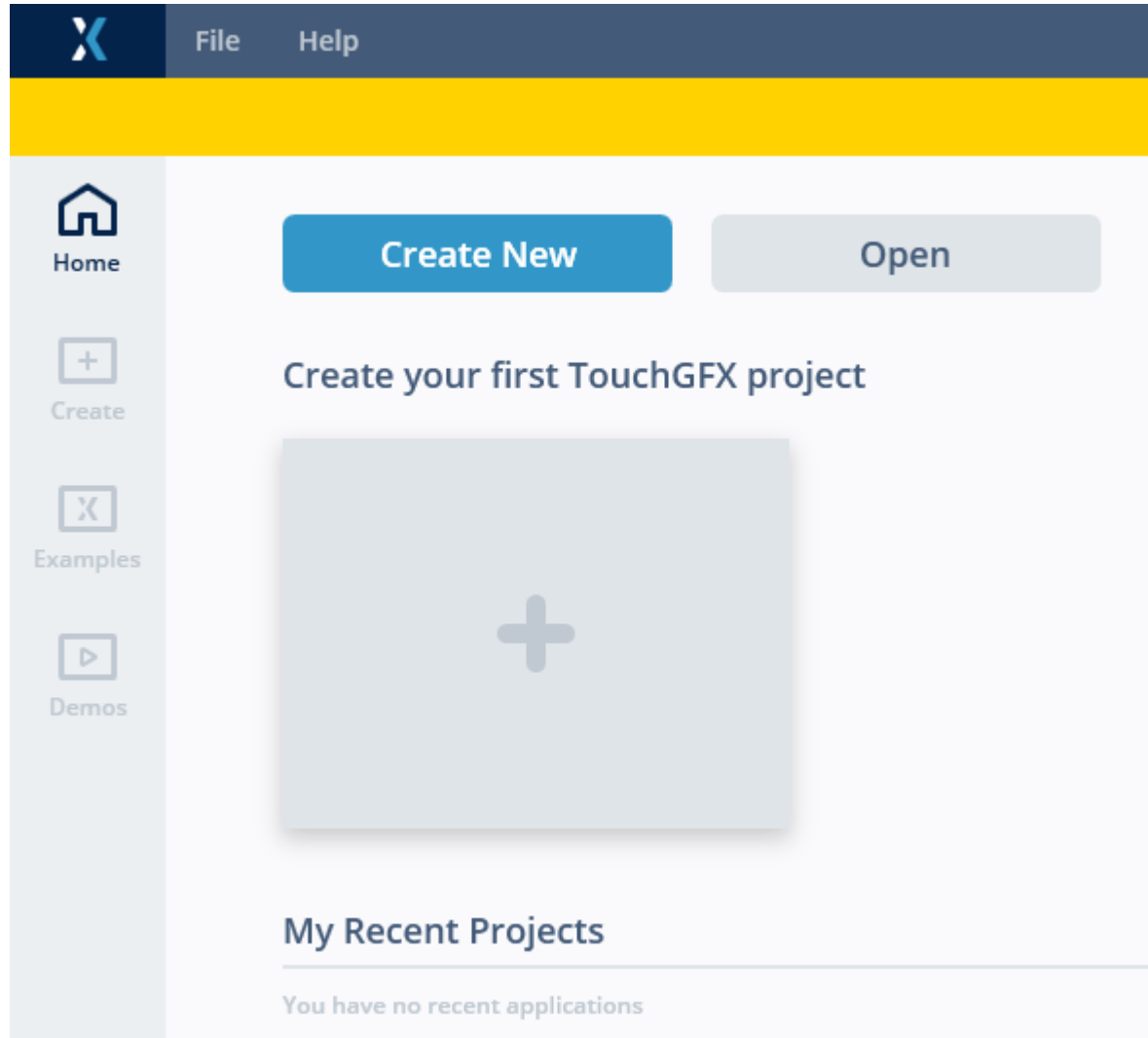
Visit 'Lecturer Profile' in your console for more details.

AGENDA

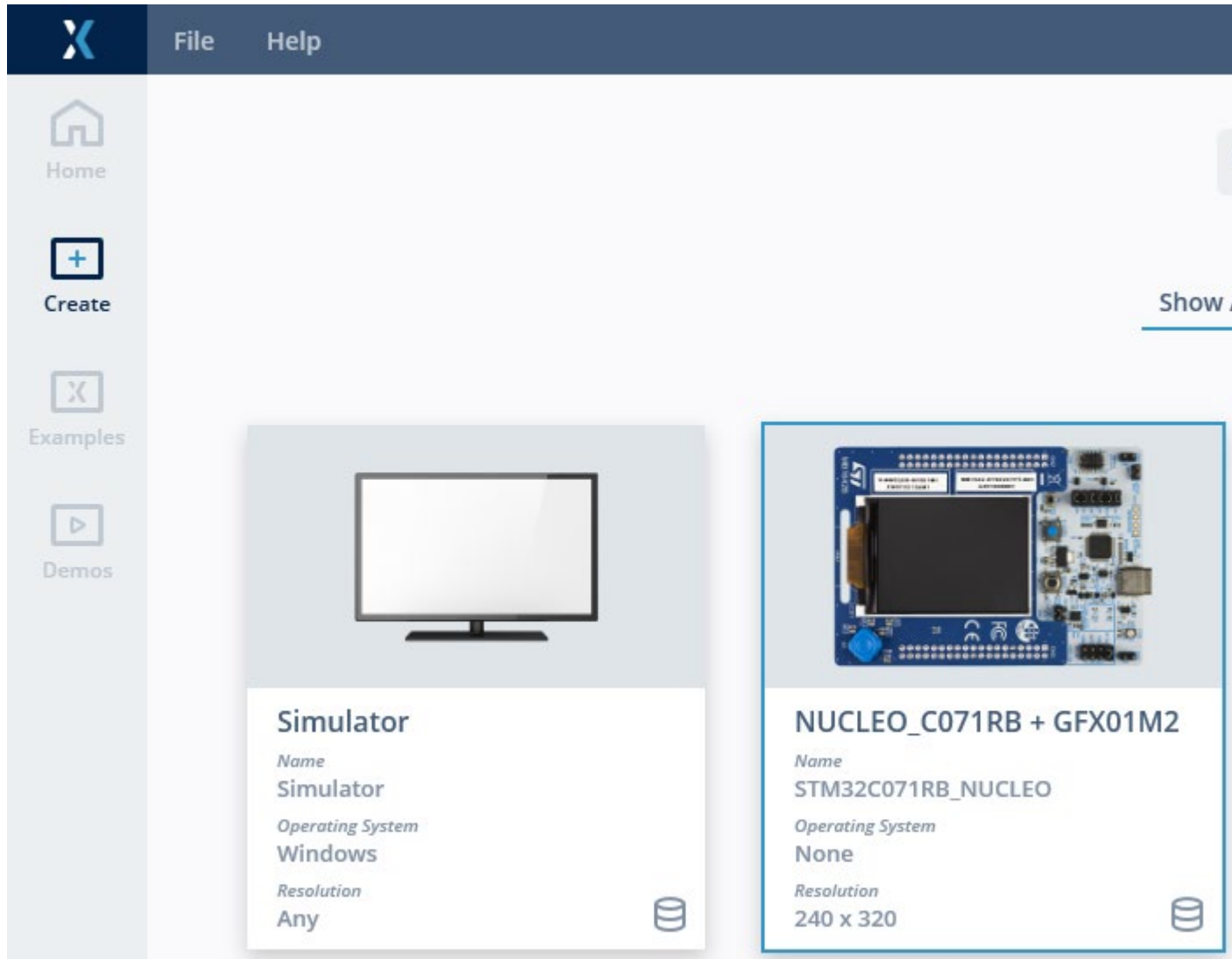
- **Build an X-NUCLEO-GFX01M2 TouchGFX Application**
 - Create a New NUCLEO-C071RB TouchGFX Project
 - **Layout the Screen**
 - **Define the Interactions**
 - **Customize the NUCLEO-C071RB TouchGFX Project**
 - **Program and Run the TouchGFX Project**
- **Build an STM32U5G9J-DK2 TouchGFX Application**
 - **The Song Remains the Same**



Create a New NUCLEO-C071RB TouchGFX Project



Create a New NUCLEO-C071RB TouchGFX Project



File Help

Home

Create

Examples

Demos

Simulator

Name
Simulator

Operating System
Windows

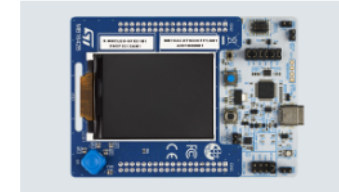
Resolution
Any

NUCLEO_C071RB + GFX01M2

Name
STM32C071RB_NUCLEO

Operating System
None

Resolution
240 x 320



NUCLEO_C071RB + GFX01M2

STMicroelectronics

Operating system: None

Description

This TouchGFX Board Setup is for the NUCLEO-C071RB board with X-NUCLEO-GFX01M2 (version AZ1 and AZ2) mounted on top.

Chip/board specifications:

- 48 MHz CPU
- 24 kB internal SRAM
- 128 kB internal flash
- 8 MB external flash (mounted on X-NUCLEO-GFX01M2)
- 24 MHz SPI display interface

Framebuffer setup:

- Partial framebuffer

Application Name

CEC_Day3

Application Directory

C:\TouchGFXProjects

Color Depth

16 bit

Versions

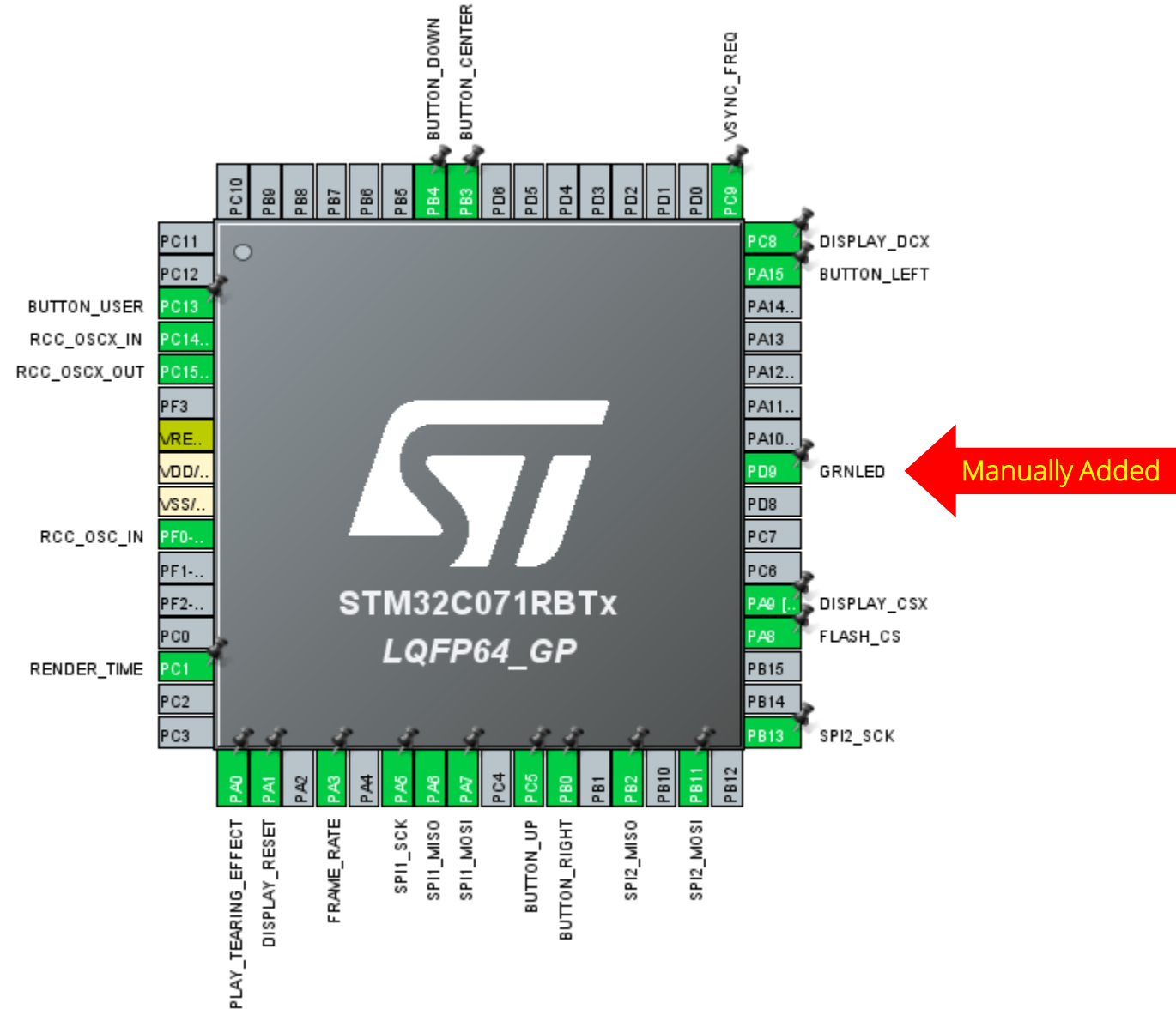
v 3.0.1

Resolution

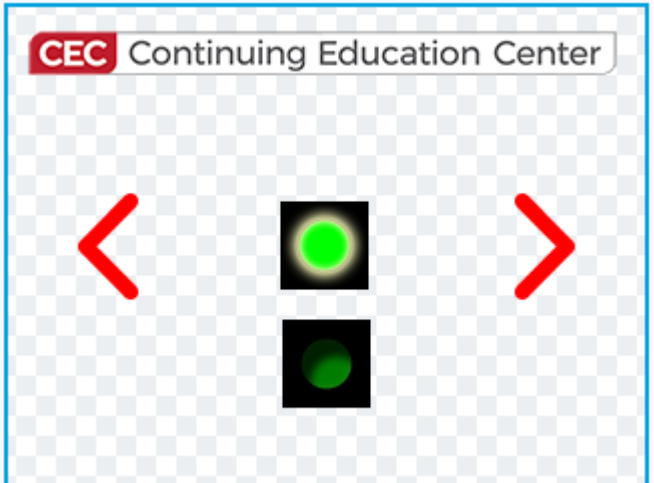
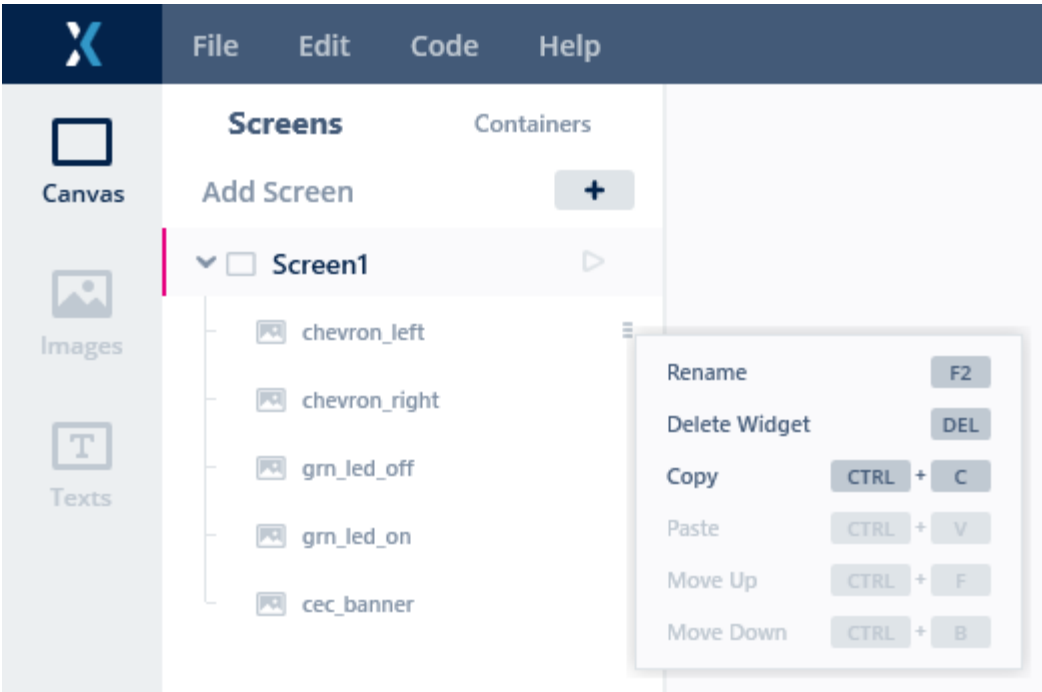
240 x 320 px

Create

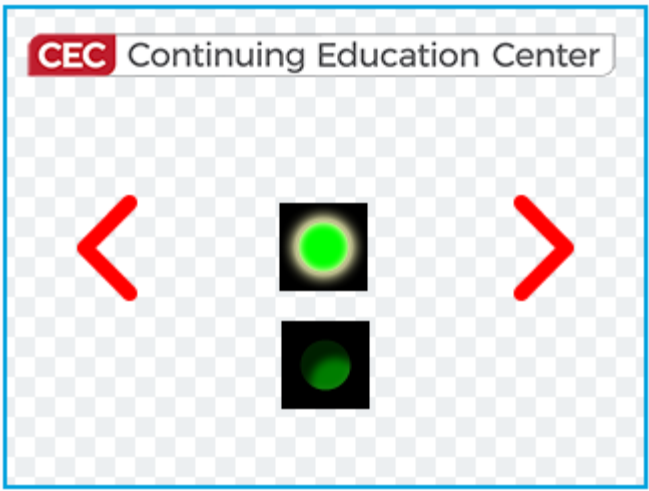
Create a New NUCLEO-C071RB TouchGFX Project



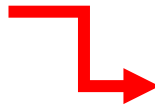
Layout the Screen



Define the Interactions



Key	Code
Left	'4'
Right	'6'
Up	'8'
Down	'2'
Center	'5'
Blue User Button	'0'



LED_ON

Trigger
 Hardware button is clicked

Choose button key
 54 6

Action
 Hide widget

Choose widget to hide
 grn_led_off

Can trigger another interaction

Interaction Name
 LED_ON

Properties

Interactions

+

LED_ON

When hardware button 54 clicked
 hide grn_led_off

✕

LED_OFF

When hardware button 52 clicked
 show grn_led_off

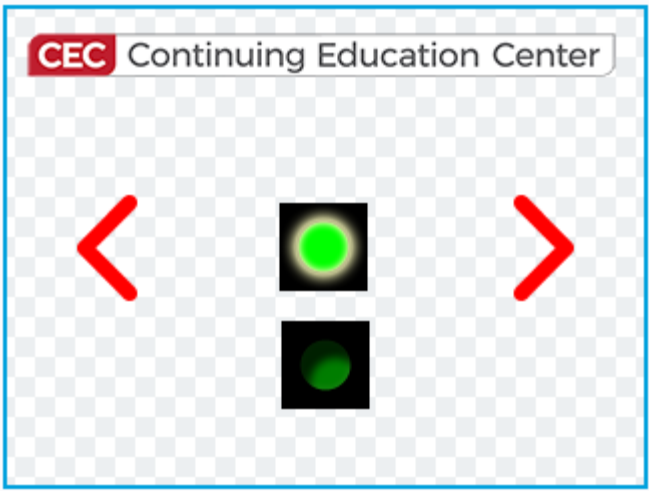
LED_ON_FUNCTION

When LED_ON completed
 call virtual function

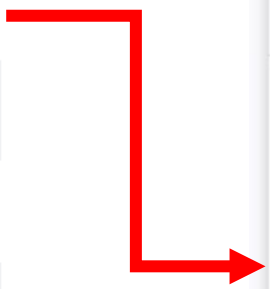
LED_OFF_FUNCTION

When LED_OFF completed
 call virtual function

Define the Interactions



Key	Code
Left	'4'
Right	'6'
Up	'8'
Down	'2'
Center	'5'
Blue User Button	'0'



LED_OFF

Trigger: Hardware button is clicked

Choose button key: 52 4

Action: Show widget

Choose widget to show: grn_led_off

Can trigger another interaction

Interaction Name: LED_OFF

Properties Interactions +

LED_ON
When hardware button 54 clicked
hide grn_led_off

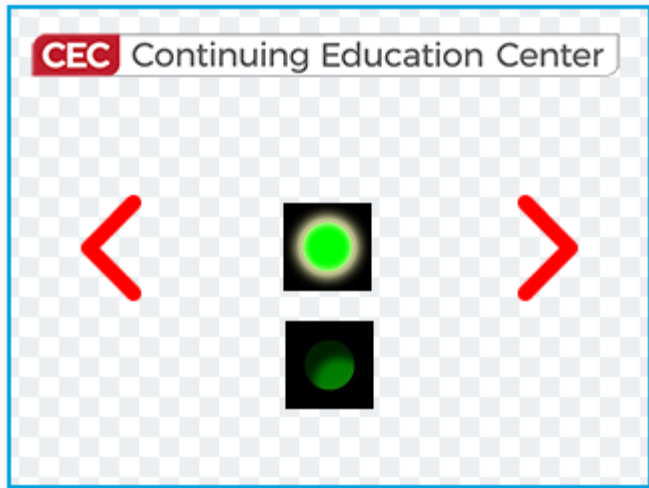
LED_OFF
When hardware button 52 clicked
show grn_led_off X

LED_ON_FUNCTION
When LED_ON completed
call virtual function

LED_OFF_FUNCTION
When LED_OFF completed
call virtual function

Define the Interactions

```
void Screen1View::led_on_function()  
{  
    HAL_GPIO_WritePin(GRNLED_GPIO_Port, GRNLED_Pin, GPIO_PIN_SET);  
}
```



Properties Interactions

+

LED_ON
When hardware button 54 clicked
hide grn_led_off

LED_OFF
When hardware button 52 clicked
show grn_led_off

LED_ON_FUNCTION ×
When LED_ON completed
call virtual function

LED_OFF_FUNCTION
When LED_OFF completed
call virtual function

LED_ON_FUNCTION

Trigger
Another interaction is done

Choose interaction
LED_ON

Action
Call new virtual function

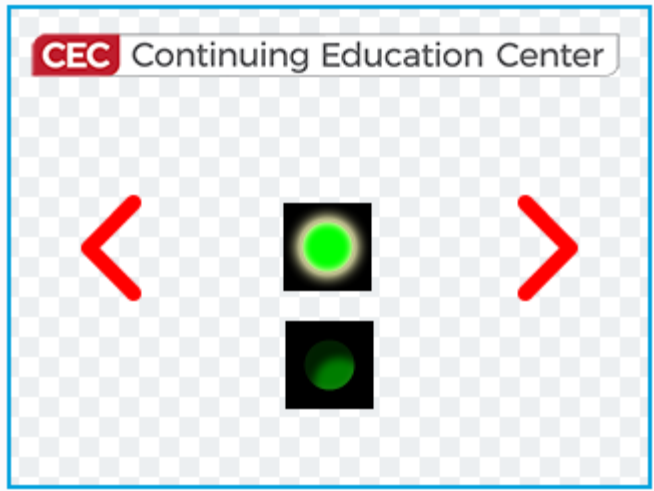
Function Name
led_on_function

Can trigger another interaction

Interaction Name
LED_ON_FUNCTION

Define the Interactions

```
void Screen1View::led_off_function()  
{  
    HAL_GPIO_WritePin(GRNLED_GPIO_Port, GRNLED_Pin, GPIO_PIN_RESET);  
}
```



Properties Interactions

+

LED_ON
When hardware button 54 clicked
hide grn_led_off

LED_OFF
When hardware button 52 clicked
show grn_led_off

LED_ON_FUNCTION
When LED_ON completed
call virtual function

LED_OFF_FUNCTION
When LED_OFF completed
call virtual function

LED_OFF_FUNCTION

Trigger
Another interaction is done

Choose interaction
LED_OFF

Action
Call new virtual function

Function Name
led_off_function

Can trigger another interaction

Interaction Name
LED_OFF_FUNCTION

Customize the NUCLEO-C071RB TouchGFX Project

File Explorer: Local Disk (C:) > TouchGFXProjects > CEC_Day3

Name	Date modified	Type	Size
Core	10/31/2024 11:02 AM	File folder	
Drivers	10/31/2024 11:02 AM	File folder	
EWARM	10/31/2024 11:02 AM	File folder	
gcc	10/31/2024 11:23 AM	File folder	
MDK-ARM	10/31/2024 11:02 AM	File folder	
Middlewares	10/31/2024 11:23 AM	File folder	
STM32CubeIDE	10/31/2024 3:21 PM	File folder	
TouchGFX	10/31/2024 11:23 AM	File folder	
.extSettings	8/27/2024 8:59 AM	EXTSETTINGS File	1 KB
backup_STM32C071RB_NUCLEO.ioc	10/31/2024 11:23 AM	STM32CubeMX	13 KB
changelog.txt	8/27/2024 8:59 AM	Text Document	1 KB
readme.md	8/27/2024 8:59 AM	Markdown Source...	1 KB
STM32C071RB_NUCLEO.ioc	10/31/2024 11:23 AM	STM32CubeMX	13 KB

File Explorer: TouchGFXProjects > CEC_Day3 > STM32CubeIDE

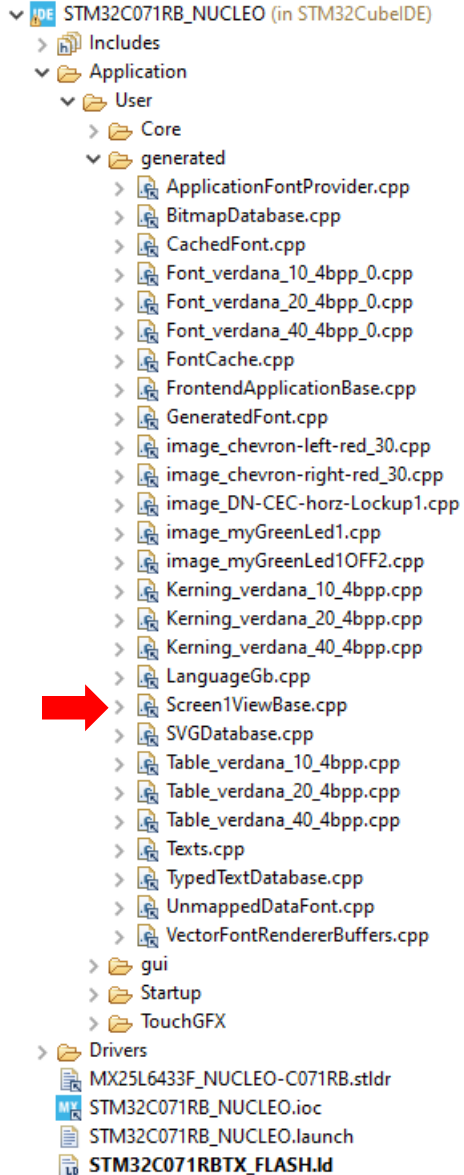
Name	Date modified	Type	Size
.settings	10/31/2024 3:21 PM	File folder	
Application	10/31/2024 11:02 AM	File folder	
Drivers	10/31/2024 3:21 PM	File folder	
IDE .cproject	10/31/2024 3:14 PM	CPROJECT File	37 KB
IDE .project	10/31/2024 3:14 PM	PROJECT File	16 KB
STM32C071RB_NUCLEO.launch	8/27/2024 8:59 AM	LAUNCH File	10 KB
STM32C071RBTX_FLASH.ld	8/27/2024 8:59 AM	LD File	6 KB

Config

Files

C:\TouchGFXProjects\CEC_Day3\TouchGFX

Customize the NUCLEO-C071RB TouchGFX Project



```
Screen1ViewBase::Screen1ViewBase()
```

```
{
    __background.setPosition(0, 0, 320, 240);
    __background.setColor(touchgfx::Color::getColorFromRGB(0, 0, 0));
    add(__background);

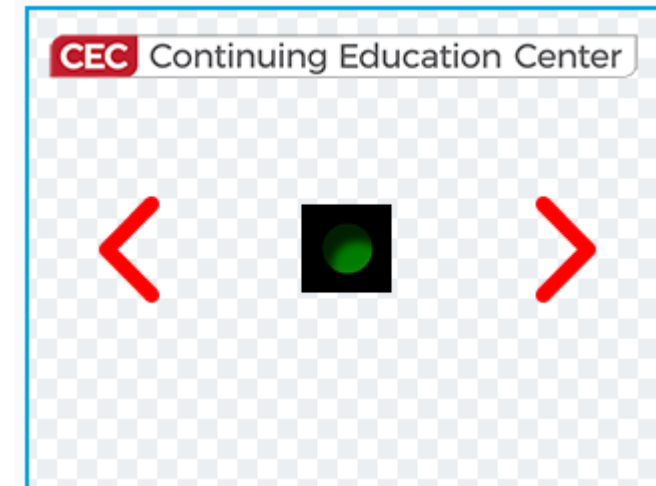
    cec_banner.setXY(9, 7);
    cec_banner.setBitmap(touchgfx::Bitmap(BITMAP_DN_CEC_HORZ_LOCKUP1_ID));
    add(cec_banner);

    grn_led_on.setXY(137, 98);
    grn_led_on.setBitmap(touchgfx::Bitmap(BITMAP_MYGREENLED1_ID));
    add(grn_led_on);

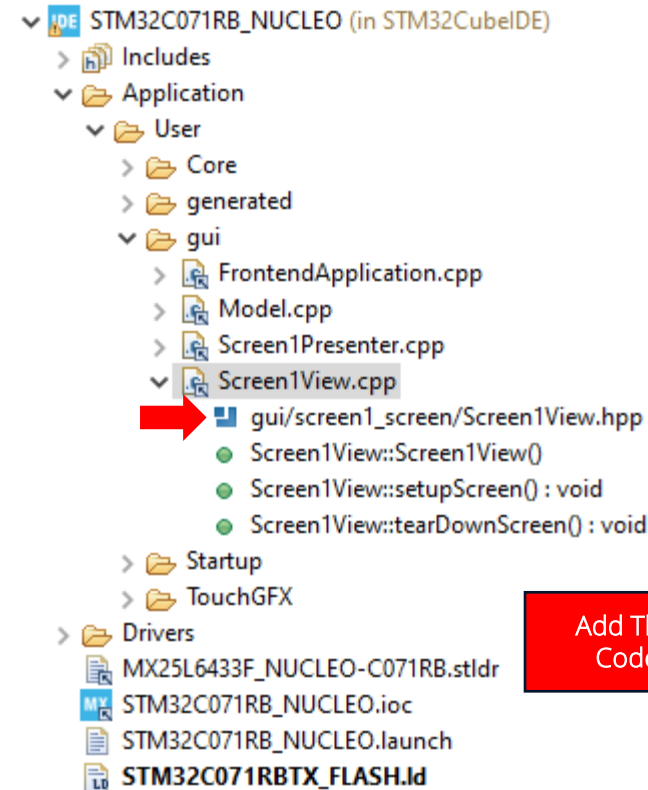
    grn_led_off.setXY(138, 98);
    grn_led_off.setBitmap(touchgfx::Bitmap(BITMAP_MYGREENLED1OFF2_ID));
    add(grn_led_off);

    chevron_right.setXY(254, 94);
    chevron_right.setBitmap(touchgfx::Bitmap(BITMAP_CHEVRON_RIGHT_RED_30_ID));
    add(chevron_right);

    chevron_left.setXY(36, 94);
    chevron_left.setBitmap(touchgfx::Bitmap(BITMAP_CHEVRON_LEFT_RED_30_ID));
    add(chevron_left);
}
```



Customize the NUCLEO-C071RB TouchGFX Project



```

#ifndef SCREEN1VIEW_HPP
#define SCREEN1VIEW_HPP

#include <gui_generated/screen1_screen/Screen1ViewBase.hpp>
#include <gui/screen1_screen/Screen1Presenter.hpp>

class Screen1View : public Screen1ViewBase
{
public:
    Screen1View();
    virtual ~Screen1View() {}
    virtual void setupScreen();
    virtual void tearDownScreen();
    virtual void led_on_function();
    virtual void led_off_function();
protected:
};

#endif // SCREEN1VIEW_HPP

```

Properties

Interactions

+

LED_ON

When hardware button 54 clicked
hide grn_led_off

LED_OFF

When hardware button 52 clicked
show grn_led_off

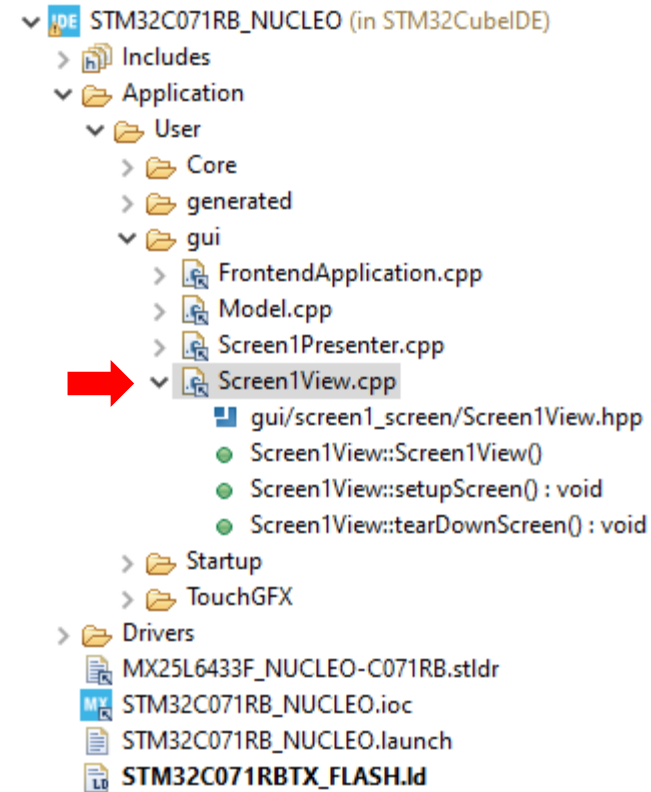
LED_ON_FUNCTION

When LED_ON completed
call virtual function

LED_OFF_FUNCTION

When LED_OFF completed
call virtual function

Customize the NUCLEO-C071RB TouchGFX Project



Add This Code

```
#include <gui/screen1_screen/Screen1View.hpp>
#include "main.h"
```

```
Screen1View::Screen1View()
{
}
```

```
void Screen1View::setupScreen()
{
  Screen1ViewBase::setupScreen();
}
```

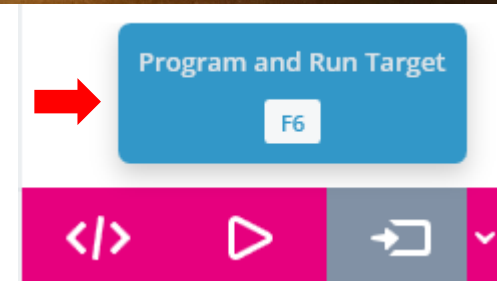
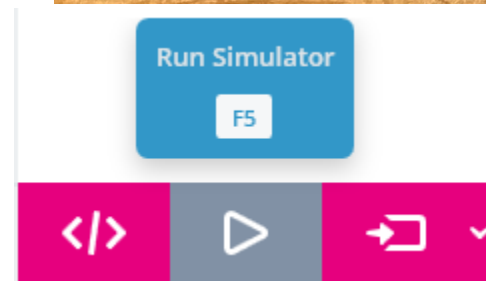
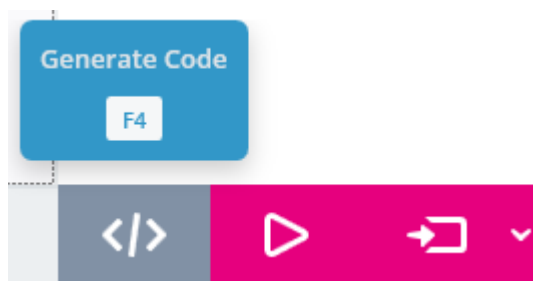
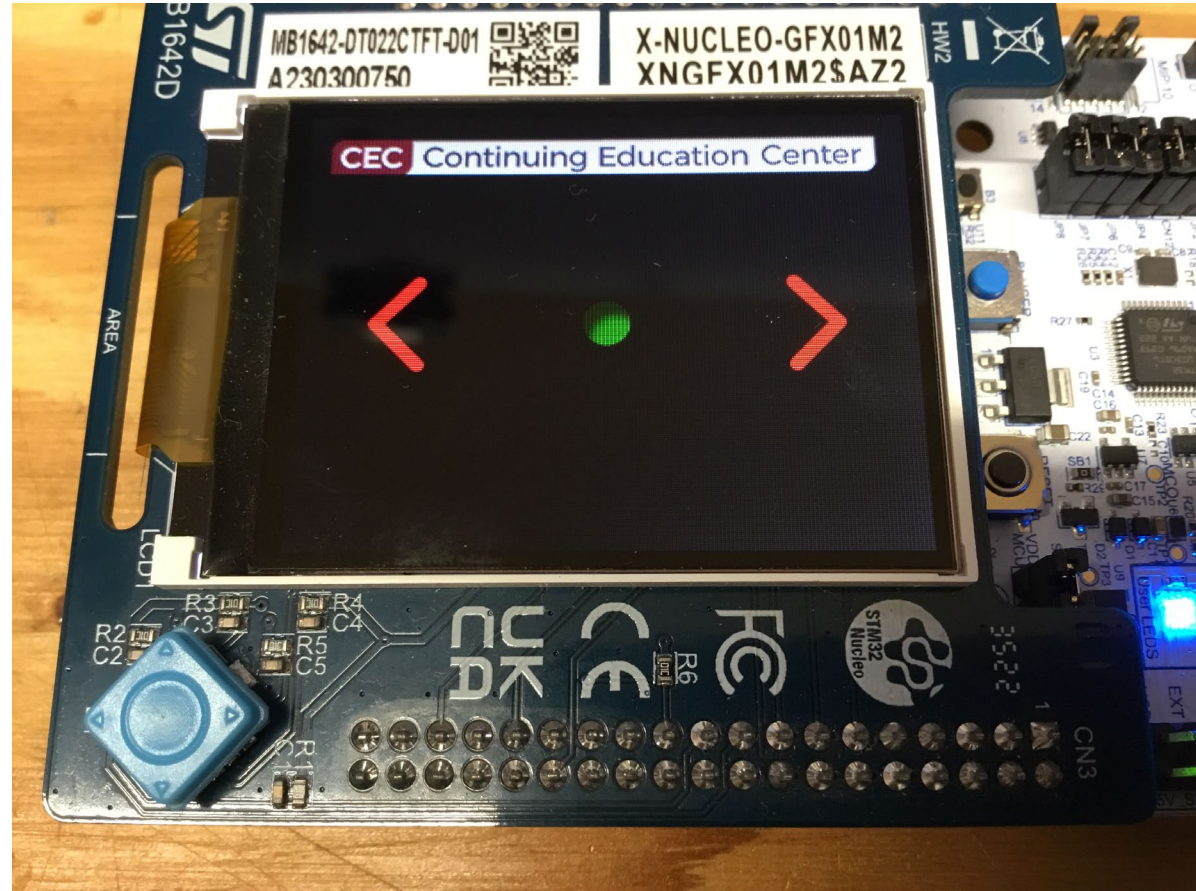
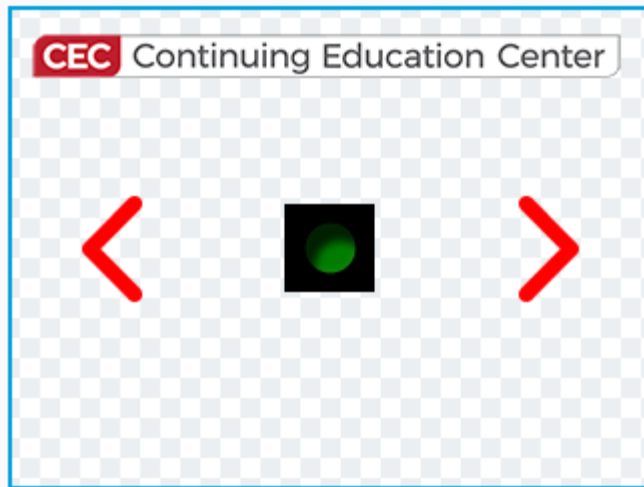
```
void Screen1View::tearDownScreen()
{
  Screen1ViewBase::tearDownScreen();
}
```

```
void Screen1View::led_on_function()
{
  HAL_GPIO_WritePin(GRNLED_GPIO_Port, GRNLED_Pin, GPIO_PIN_SET);
}
```

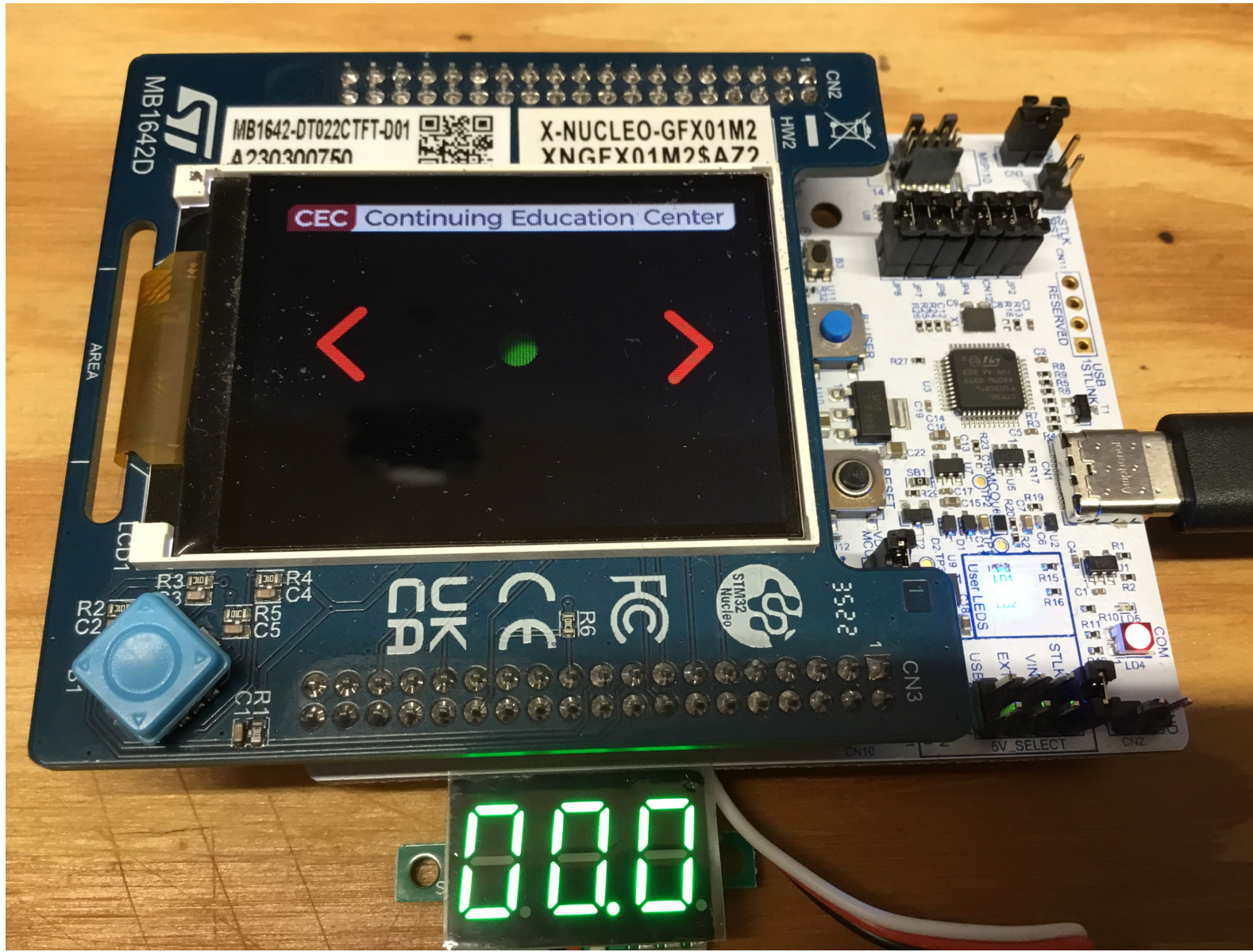
```
void Screen1View::led_off_function()
{
  HAL_GPIO_WritePin(GRNLED_GPIO_Port, GRNLED_Pin, GPIO_PIN_RESET);
}
```

Add This Code

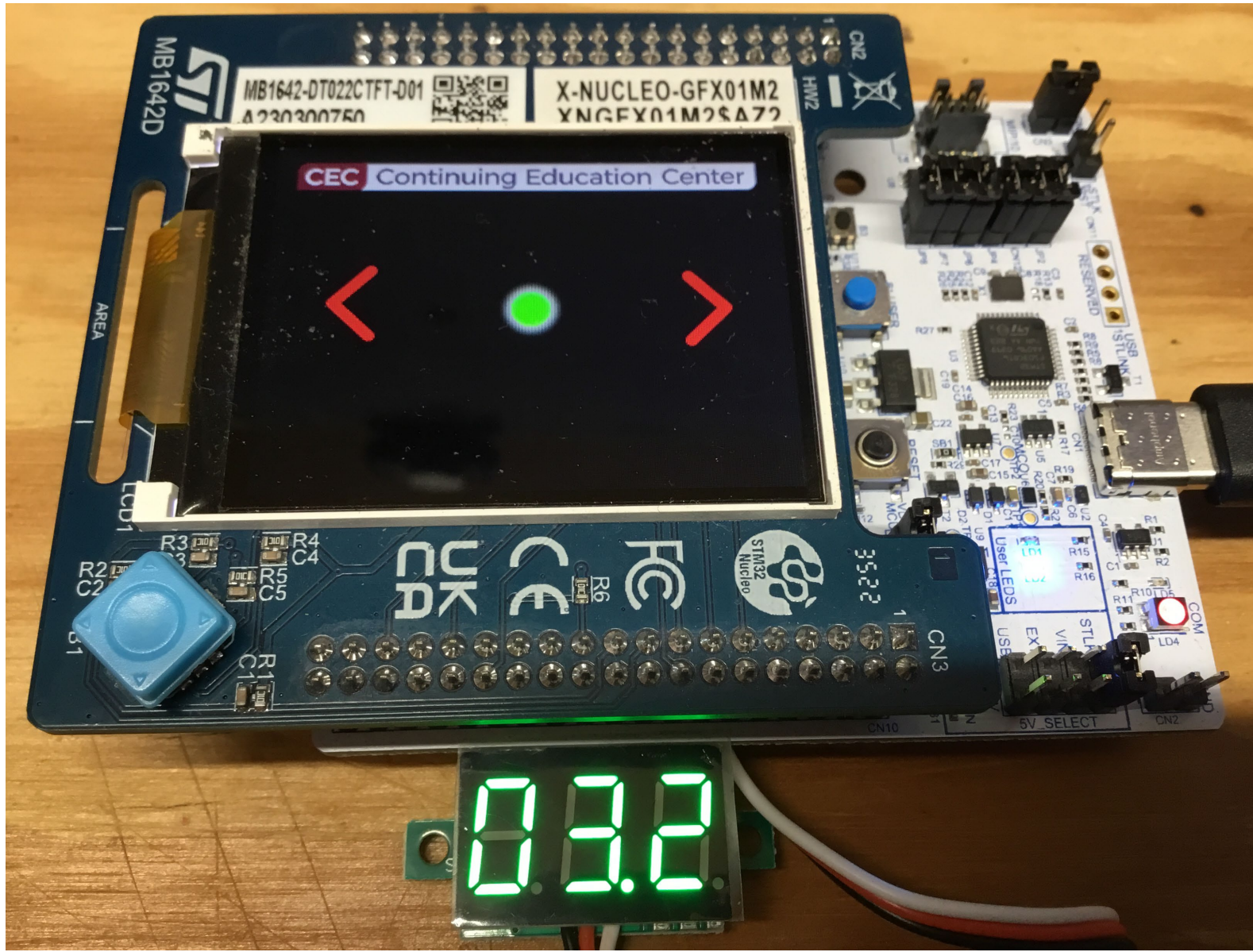
Program and Run the TouchGFX Project



Program and Run the TouchGFX Project



Program and Run the TouchGFX Project



Create a New STM32U5G9J-DK2 TouchGFX Project



STM32U5G9J DK2

STMicroelectronics

Operating system: FreeRTOS

Description

Chip/board specifications:

- 160 MHz CPU
- Chrom-ART
- NeoChromVG GPU
- 3 MB internal SRAM
- 4 MB internal flash
- 128 MB external O-SPI flash
- RGB display interface

Framebuffer setup:

- Double framebuffers in internal SRAM
- 800 x 480 px resolution
- 16-bit color depth

Software tools:

Application Name

Application Directory

Color Depth

16 bit

Versions

v 3.0.6

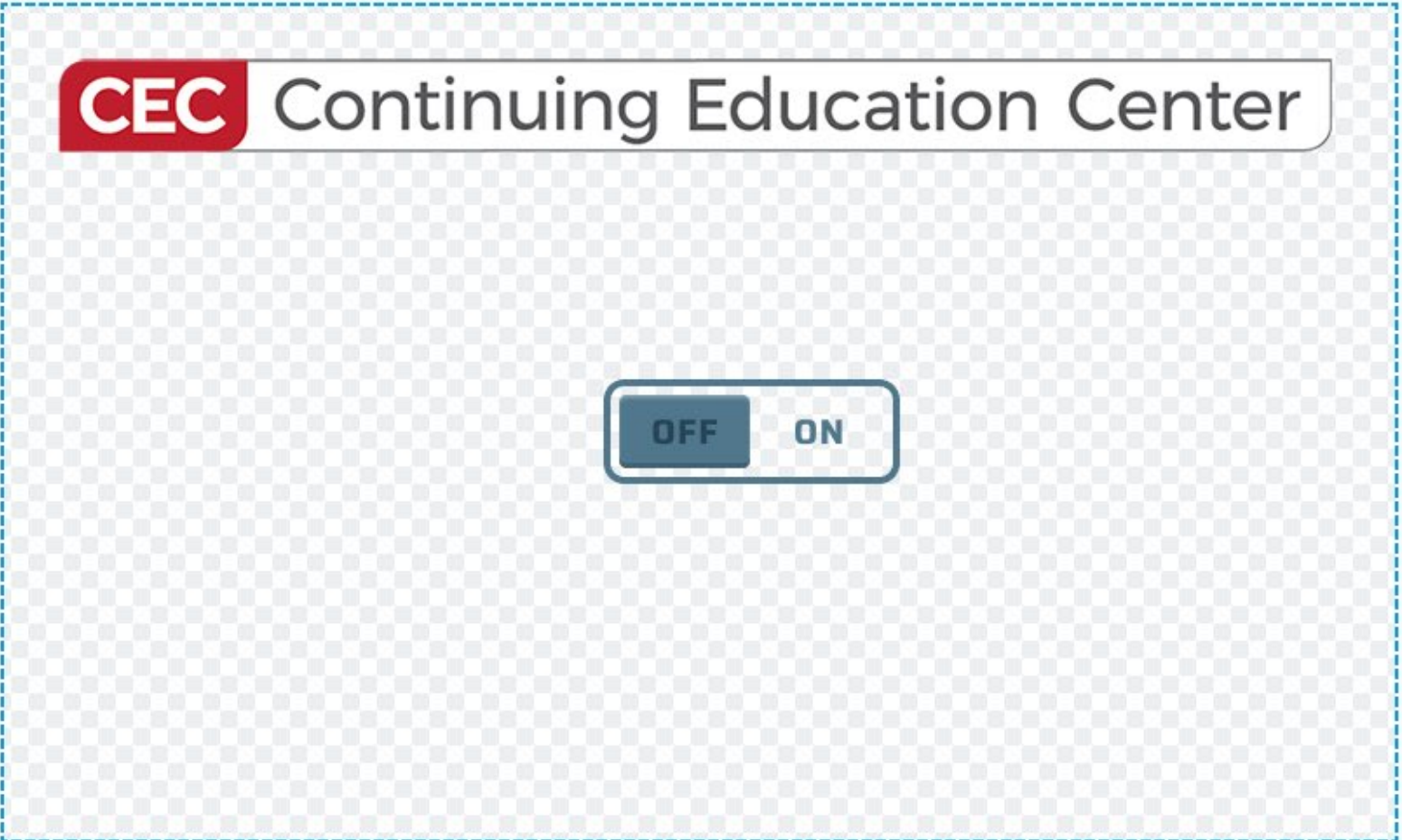
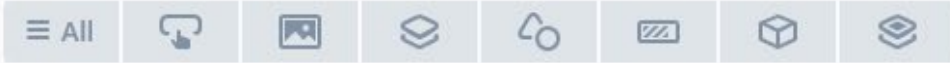
Resolution

800 x 480 px

Create



Layout the Screen and Define the Interactions



TOGGLE_LED

Trigger
Button is clicked

Choose clicked source
btnToggle

Action
Call new virtual function

Function Name
toggle_led

Can trigger another interaction

Interaction Name
TOGGLE_LED

Properties Interactions

TOGGLE_LED
When btnToggle clicked call virtual function

Customize the STM32U5G9J-DK2 TouchGFX Project

```
class Screen1View : public Screen1ViewBase
{
public:
    Screen1View();
    virtual ~Screen1View() {}
    virtual void setupScreen();
    virtual void tearDownScreen();
    virtual void toggle_led();
protected:
};

void Screen1View::toggle_led()
{
    HAL_GPIO_TogglePin(GPIOD, USER_LD3_GREEN_Pin);
}
```

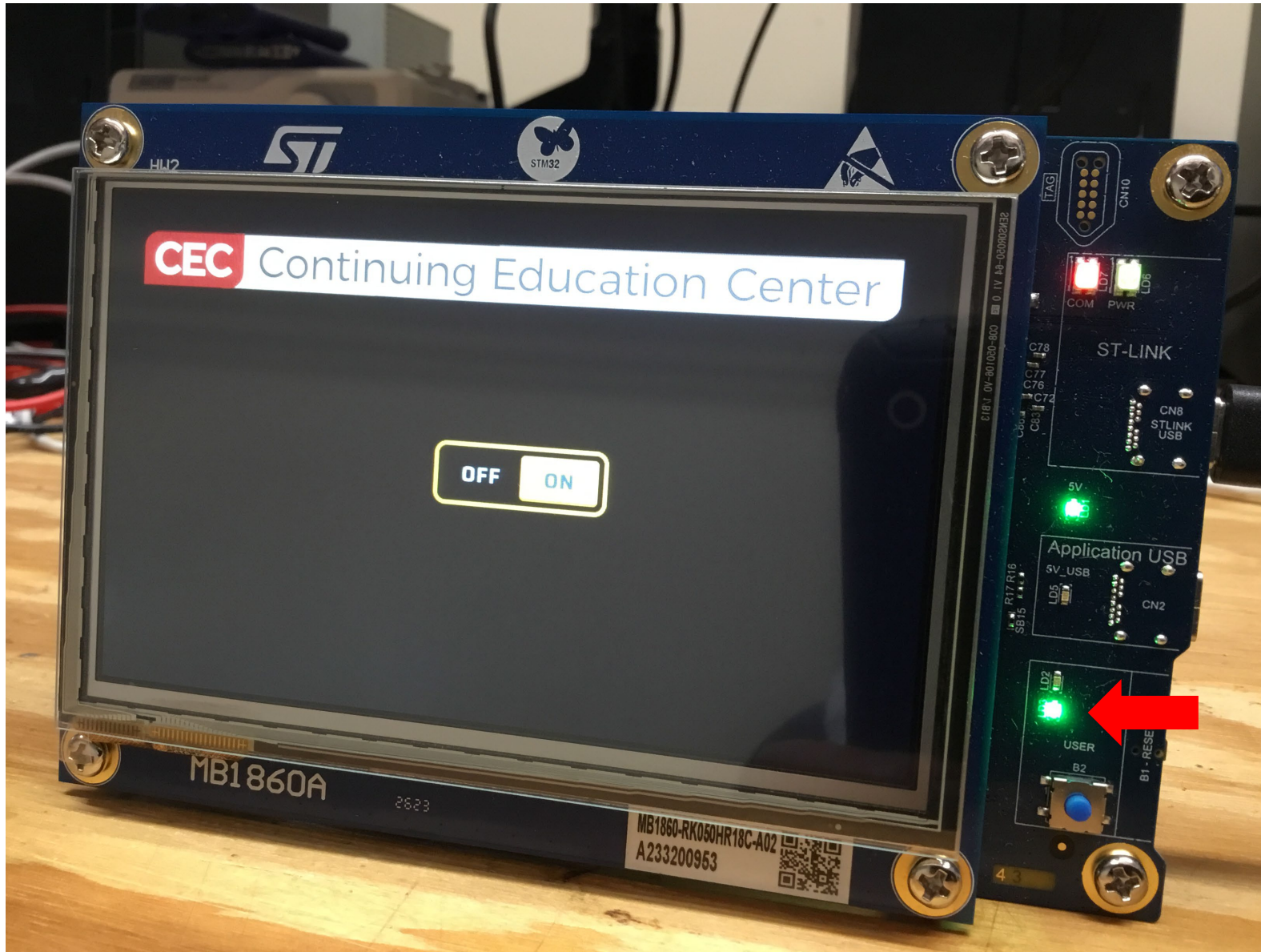
Add



Program and Run the Project



Program and Run the Project



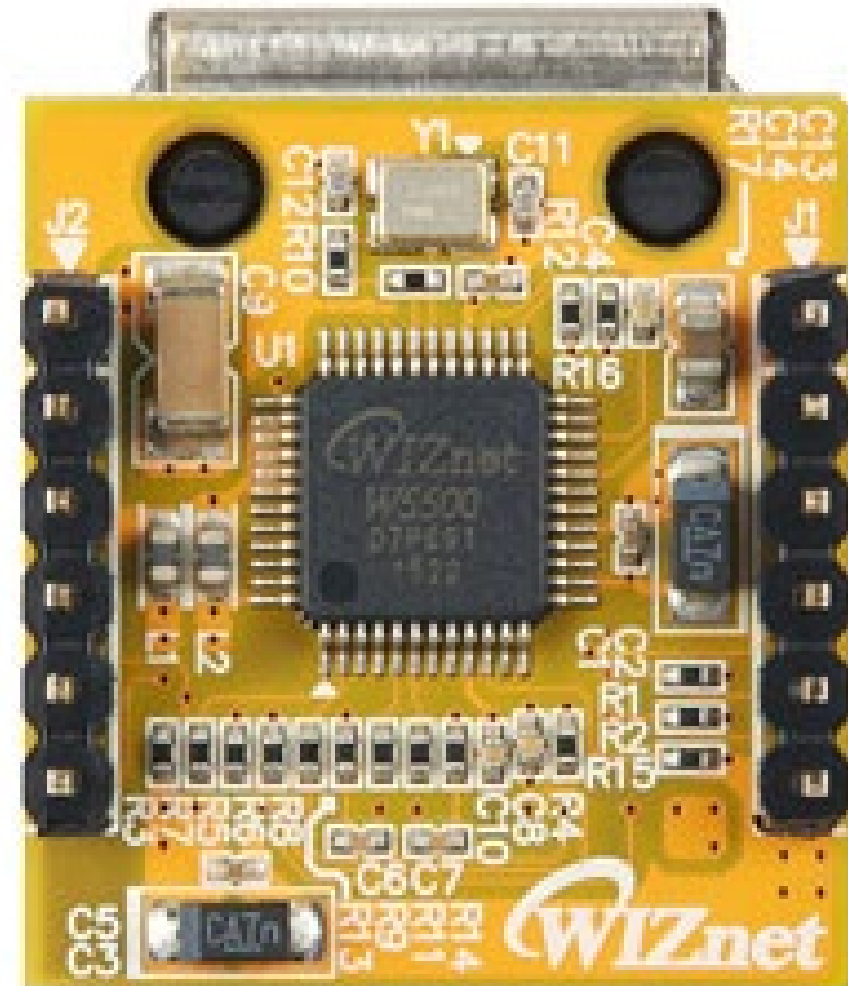
Next Time...

MORE TO COME..

Thank you for attending!!!

Please consider the resources below:

- [Today's Download Package](#)
- [STM32C071RB Datasheet](#)
- [NUCLEO-C071RB Schematic](#)
- [STM32U5G9J-DK2 User Manual](#)
- [STM32U5G9J Schematic](#)





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