

Exercise 4 Multiple thread instances

In this project we will look at creating one thread and then create multiple runtime instances of the same thread.

In the Pack Installer select “Ex 4 Multiple Instances” and copy it to your tutorial directory.

This project performs the same function as the previous LED flasher program. However we now have one led switcher function that uses an argument passed as a parameter to decide which LED to flash.

```
void ledSwitcher (void const *argument) {  
  
    for (;;) {  
        LED_On((uint32_t)argument);  
        delay(500);  
        LED_Off((uint32_t)argument);  
        delay(500);  
    }  
}
```

Then in the main thread we create two threads which are different instances of the same base code. We pass a different parameter which corresponds to the led that will be toggled by the instance of the thread.

First we can create two different thread definitions with different debug names

```
static const osThreadAttr_t ThreadAttr_LedSwitcher1 = {  
    .name = "LedSwitcher1",  
};  
  
static const osThreadAttr_t ThreadAttr_LedSwitcher2 = {  
    .name = "LedSwitcher2",  
};
```

Next we can create two instances of the same thread code

```
led_ID1 = osThreadNew(ledSwitcher,(void *) 1UL, &ThreadAttr_LedSwitcher1);  
led_ID2 = osThreadNew(ledSwitcher,(void *) 2UL, &ThreadAttr_LedSwitcher2);
```

Build the code and start the debugger

Start the code running and open the RTX5tasks and system window

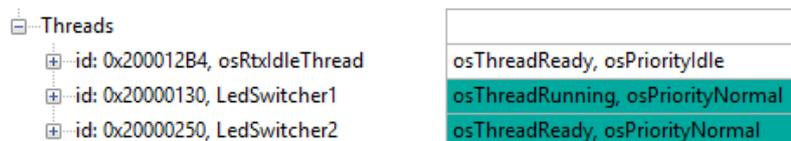


Fig 25 Multiple instances of thread running

Here we can see both instances of the ledSwitcher task each with a different ID.

Examine the Call stack + locals window

ledSwitcher : 0x20000250	0x080001BD	Task
delay	0x080001B8	void f(unsigned int)
count	0x000001F4	param - unsigned int
index	0x0000011F	auto - unsigned int
ledSwitcher	0x080001CE	void f(void *)
argument	0x00000002	param - void *
ledSwitcher : 0x20000130	0x080001BD	Task
delay	0x080001B4	void f(unsigned int)
count	0x000001F4	param - unsigned int
index	0x0000003D	auto - unsigned int
ledSwitcher	0x080001DC	void f(void *)
argument	0x00000001	param - void *

Fig 26 The watch window is thread aware

Here we can see both instances of the ledSwitcher threads and the state of their variables. A different argument has been passed to each instance of the thread.