

## 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

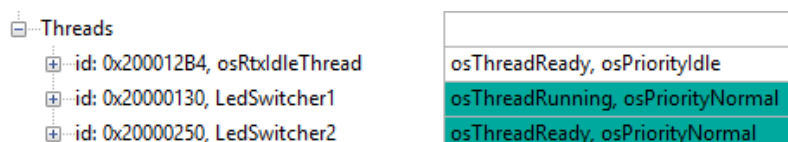
```
static const osThreadAttr_t ThreadAttr_LedSwitcher1 = {  
    .name = "LedSwitcher1",  
};  
  
static const osThreadAttr_t ThreadAttr_LedSwitcher2 = {  
    .name = "LedSwitcher2",  
};
```

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.