University of Texas at El Paso
Electrical and Computer Engineering Department

EE4178 Laboratory for Microprocessors Systems II

LAB 01B

FreeRTOS: Queue

Goals:

- Given the program template in Listing 1, create a program which will create a queue to send and receive data.
- Send data to the queue from multiple tasks, sending integers 10 and 20.
- Receive and print data from the queue
- The Listing 1 is a demonstration for integer, show a queue for strings “EE4178” and “Fall2021”.

Bonus:

Modify the code by sending structures on a queue. **+10**

Pre-Lab:

- What is the function used to receive data from a queue?
- What is the function used to send data to a queue?
- Which one has higher priority: task that sends to the queue or receives from it?

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```
#include <stdio.h>
#include "sdkconfig.h"
#include "freertos/FreeRTOS.h"
#include "freertos/task.h"
#include "freertos/queue.h"

QueueHandle_t xQueue;
int main( void )
{
	xQueue = xQueueCreate( 5, sizeof( int32_t ) );
	if( xQueue != NULL )
	 {
		xTaskCreate( vSenderTask, "Sender1", 1000, ( void * ) 10, 1, NULL );

		// Sender2 here.

		xTaskCreate( vReceiverTask, "Receiver", 1000, NULL, 2, NULL );

		vTaskStartScheduler();
	 }
	else
	{
	}
}


static void vSenderTask( void *pvParameters )
{
int32_t lValueToSend;
BaseType_t xStatus;

	lValueToSend = ( int32_t ) pvParameters;

	for( ;; )
	{

		 xStatus = xQueueSendToBack( xQueue, &lValueToSend, 0 );
		 if( xStatus != pdPASS )
		 {
			vPrintString( "Could not send to the queue.\r\n" );
		 }
	 }
}

static void vReceiverTask( void *pvParameters )
{
int32_t lReceivedValue;
```

```
BaseType_t xStatus;
const TickType_t xTicksToWait = pdMS_TO_TICKS( 100 );

	for( ;; )
	{
		if( uxQueueMessagesWaiting( xQueue ) != 0 )
		{
			vPrintString( "Queue should have been empty!\r\n" );
		 }

		xStatus = xQueueReceive( xQueue, &lReceivedValue, xTicksToWait );
		if( xStatus == pdPASS )
		{
			vPrintStringAndNumber( "Received = ", lReceivedValue );
		}
		else
		{
			vPrintString( "Could not receive from the queue.\r\n" );
		 }
	 }
}
```

Listing 1. Program template for Lab 1B.