MCI lab#2 Report

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Lab Task # 1

Code:

```
void myPrintf(char* fmt, ...){
  char buffer[200];
  va_list args;

  va_start(&: args,fmt);
  vsniprintf(buffer, sizeof(buffer), fmt, args);
  va_end(&: args);
  //buffer[sizeof(buffer)-1]='\0';
  HAL_UART_Transmit(huart: &huart2, pData: (uint8_t*)buffer,Size: strlen(buffer),Timeout: HAL
}
int main(void)
{
```

Output:

```
Value of x = 42, y = 3.14
Value of x = 42, y = 3.14
Value of x = 42, y = 3.14
Value of x = 42, y = 3.14
Value of x = 42, y = 3.14
Value of x = 42, y = 3.14
Value of x = 42, y = 3.14
Value of x = 42, y = 3.14
Value of x = 42, y = 3.14
Value of x = 42, y = 3.14
```

Lab Task # 2

Code:

```
myPrintf(fmt: "a = %d, b = %d\r\n",a,b);
myPrintf(fmt: "LHS = %d\r\n",l);
myPrintf(fmt: "RHS = %d\r\n",r);
if(l==r){
  myPrintf(fmt: "Identity has been verified!\r\n");
}
else{
  myPrintf(fmt: "Proof unsuccessful!");
}
HAL_Delay(Delay: 1000);
```

Output:

```
LHS = 900
RHS = 900
Identity has been verified!
a = 10, b = 20
LHS = 900
RHS = 900
Identity has been verified!
a = 10, b = 20
LHS = 900
RHS = 900
Identity has been verified!
```

Lab Task # 3

Code:

```
char msg[]="Microcontrollers";
int key=10270;
char enc[100]; //encrypted
char dec[100]; //decrypted
```

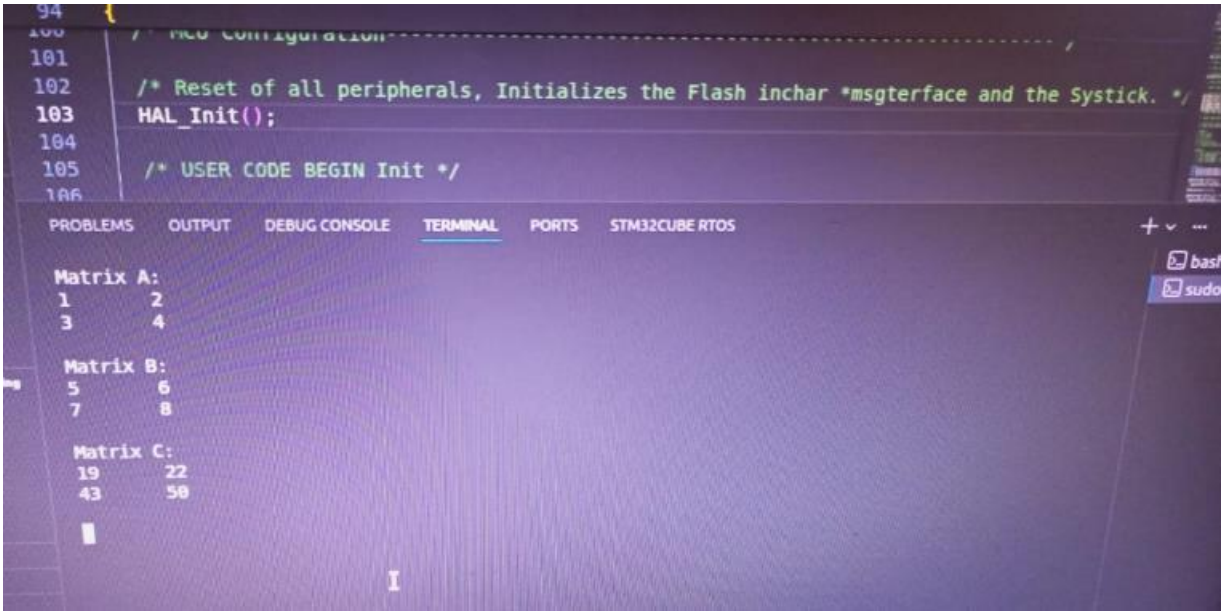
```
//TASK 3
for(int i=0;i<strlen(msg);i++){
  enc[i]=msg[i]+(key%256);
}
enc[strlen(msg)]='\0';

myPrintf(fmt: "Encrypted String: %s\r\n",enc);
for(int i=0;i<strlen(msg);i++){
  dec[i]=enc[i]-(key%256);
}
dec[strlen(msg)]='\0';
myPrintf(fmt: "Decrypted String: %s\r\n",dec);
if(strcmp(msg,dec)==0){
  myPrintf(fmt: "Encryption and Decryption were successful!\r\n");
}
else{
  myPrintf(fmt: "Task Failed!");
```

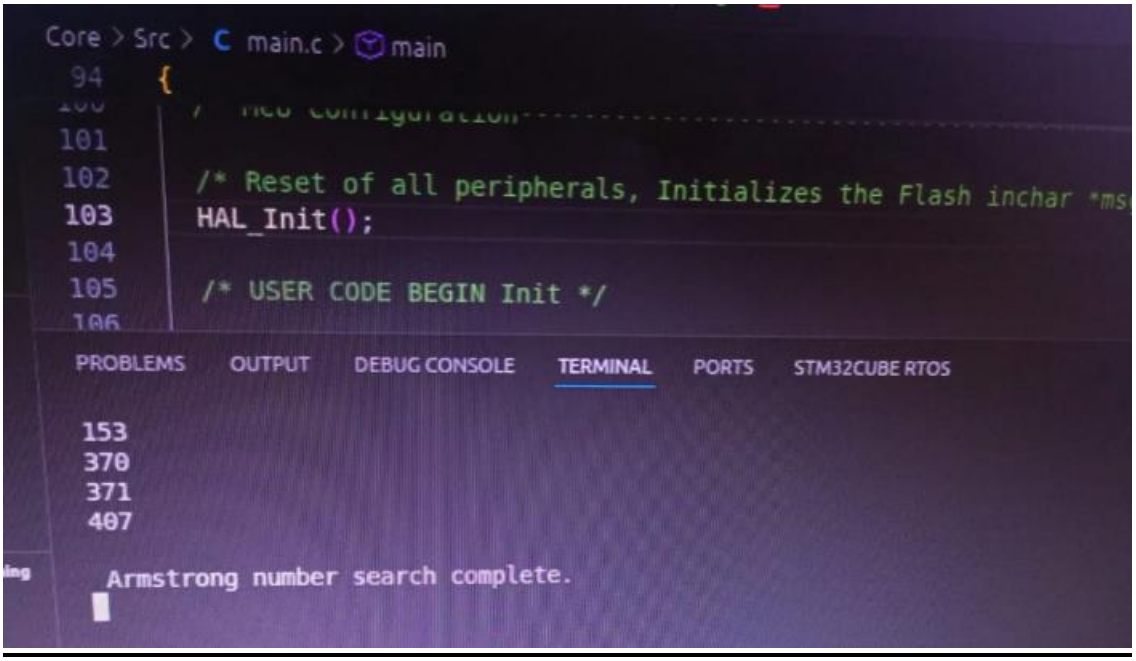
Output:

```
Decrypted String: Microcontrollers
Encryption and Decryption were successful!
Encrypted String: k
Decrypted String: Microcontrollers
Encryption and Decryption were successful!
Encrypted String: k
Decrypted String: Microcontrollers
Encryption and Decryption were successful!
Encrypted String: k
Decrypted String: Microcontrollers
Encryption and Decryption were successful!
```

Lab Task # 4



Lab Task # 5



Evaluation Question:

Explain the role of USART2 in UART communication on the STM32F3 Discovery board. Why must TX and RX lines be crossed when connecting to an external USB-UART module?

On the STM32F3 board, USART2 serves as the hardware interface for UART communication, managing data transmission and reception, including baud rate configuration and status monitoring. It is frequently used to communicate with a PC or other external devices through PA2 (TX) and PA3 (RX). When connecting an external USB-UART module, the TX and RX lines must be crossed—meaning the transmitter of one device connects to the receiver of the other (STM32 TX → USB-UART RX and STM32 RX → USB-UART TX) otherwise, both devices would attempt to send and receive on the same lines, which would block communication.