Workstation 1

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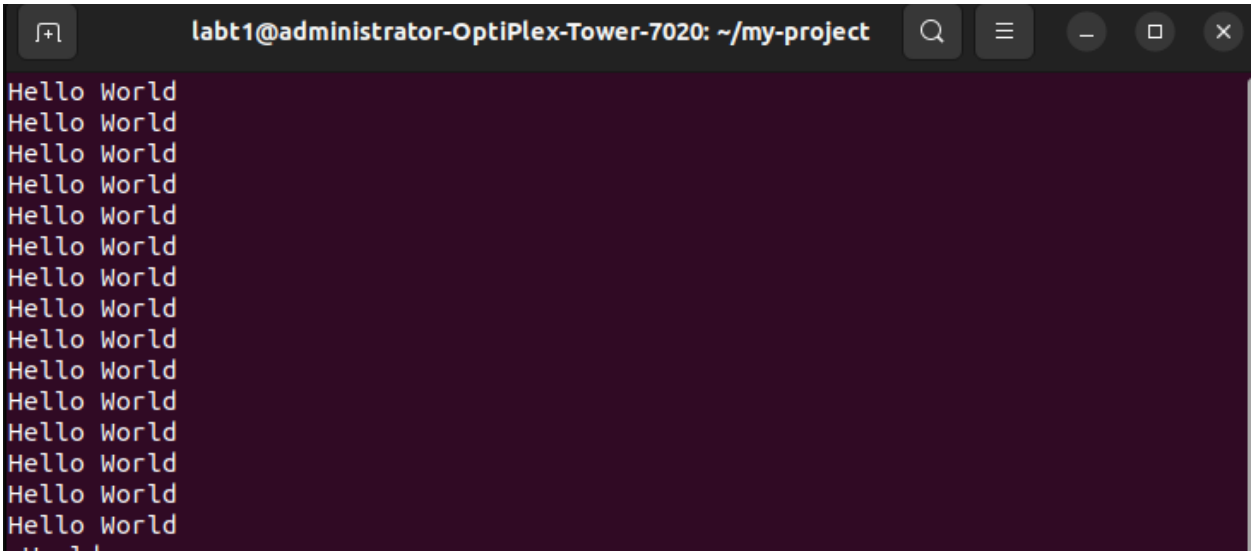
Code change:

```
74  int main(void)
96
97    /* Initialize all configured peripherals */
98    MX_GPIO_Init();
99    MX_I2C1_Init();
00    MX_SPI1_Init();
01    MX_USART1_UART_Init();
02    MX_USB_DEVICE_Init();
03    /* USER CODE BEGIN 2 */
04
05    /* USER CODE END 2 */
06
07    /* Infinite loop */
08    /* USER CODE BEGIN WHILE */
09    while (1)
10    {
11      /* USER CODE END WHILE */
12      uint8_t TXData[] = "Hello World\r\n";
13      uint32_t Delay = 100;
14      HAL_UART_Transmit(huart: &huart1, pData: TXData, Size: sizeof(TXData), Timeout: Delay);
15      HAL_Delay(Delay);
16      /* USER CODE BEGIN 3 */
17    }
18    /* USER CODE END 3 */
19  }
20
21  /**
22    * @brief System Clock Configuration
23    * @retval None
24    */
25  void SystemClock_Config(void)
26  {
27    RCC_OscInitTypeDef RCC_OscInitStruct = {0};
28    RCC_ClkInitTypeDef RCC_ClkInitStruct = {0};
29    RCC_PeriphCLKInitTypeDef PeriphClkInit = {0};
```

Code Explanation: We created a transmit buffer “TXData” of 8 unsigned bits to store the message in form of characters. “HAL_UART_Transmit” call checks if UART is ready, then each bit of TXData is loaded into the UART register for transmission with a timeout of “Delay” milliseconds. Lastly, “HAL_DELAY(Delay)” pauses execution for 100ms otherwise the microcontroller would transmit continuously at maximum speed and flood the terminal.

Terminal result:



Evaluation questions:

(a) In the Hello World task, why is HAL_UART_Transmit() placed inside the while(1) loop, and what could go wrong if it's placed outside?

(b) You used the command screen /dev/ttyACM0 115200 in this lab. What is the purpose of this command, and what would happen if the baud rate specified does not match the one configured in STM32CubeMX?

Answers:

a) while(1) ensures that the loop never terminates and "Hello World" is transmitted repeatedly. If it is placed outside this infinite loop, "Hello World" message would be transmitted just once or it may not even appear on the terminal if the terminal isn't ready yet.

b) This command connects the PC to the STM32CubeMX over the serial terminal. /dev/ttyACM0 indicates the STM32 serial device port and 115200 is the baud rate for receiving and transmitting signals. Mismatch of baud rate will cause output of garbage or no values since sampling will occur at the wrong time and bits will be misinterpreted.