EXPERIMENT 5

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SUBJECT: ESRTOS

AIM: UART and ADC. To use the UART and ADC Protocols in KEIL.

THEORY:

UART: UART stands for Universal Asynchronous Receiver/Transmitter. It's not a communication protocol like SPI and I2C, but a physical circuit in a microcontroller, or a stand-alone IC. A UART's main purpose is to transmit and receive serial data.

ADC: In electronics, an analogue-to-digital converter (ADC, A/D, or A-to-D) is a system that converts an analogue signal, such as a sound picked up by a microphone or light entering a digital camera, into a digital signal.

REGISTERS USED:

1. **U0LSR**
2. **U0THR**
3. **U0DLL**
4. **U0DLM**
5. **U0LCR**
6. **ADDR REGISTER**
7. **ADCR REGISTER**
8. **PINSEL REGISTER**

ALGORITHM:

- **Add a new micro vision project file.**
- **Add the UART, ADC, Header and Main file with the extension .C**
- **The main file for initializing and calling the functions for Analogue to Digital Conversion and then display the result using UART.**

- **The value of ADC can be displayed by separating it and then sending it bit by bit to the UART.**

Code of the Program:

Header File:

```
void Uart_Init(void);
 void Uart_Data(unsigned char data);
void Uart_String(unsigned char *dat);
void ADC_Init(void);
int ADC_read(void);
```

UART:

```
#include</pc21xx.h>
#include "header.h"
void Uart_Init(void)
PINSELO = 0x00000005;
VOLCR= 0x9B;
 VODLL=0x62;
 VODLM= 0x00;
 VOLCR= 0x1B;
void Uart_Data(unsigned char data){
 VOTHR = data;
 while((UOLSR & 0X20)!= 0X20);
void Uart_String(unsigned char *dat){
 while(*dat!='\0') {
 Uart_Data(*dat);
dat++;
```

ADC File:

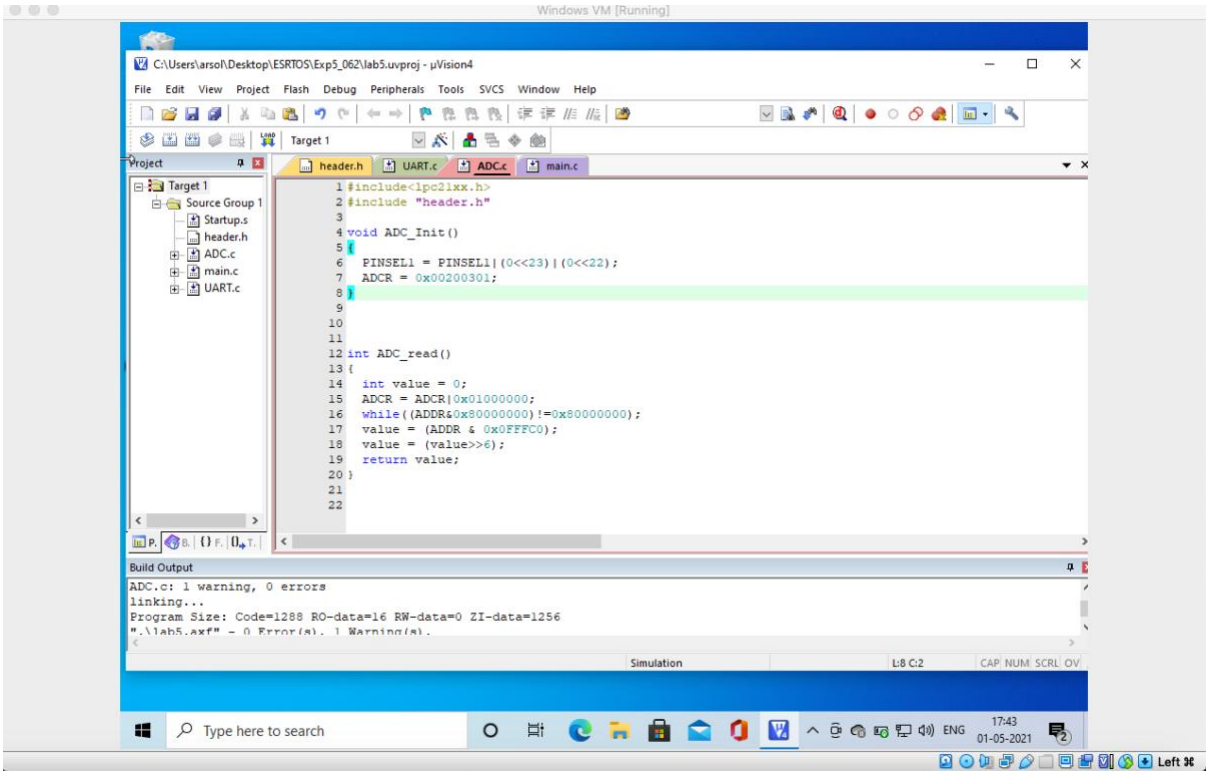
```
#include<lpc21xx.h>
 #include "header.h"
void ADC_Init()
PINSEL1 = PINSEL1 | (0<<23) | (0<<22);
 ADCR = 0x00200301;
int ADC_read()
int value = 0;
 ADCR = ADCR | Ox01000000;
 while((ADDR&0x80000000) != 0x80000000);
 value = (ADDR & OxOFFFCO);
value = (value>>6);
 return value;
```

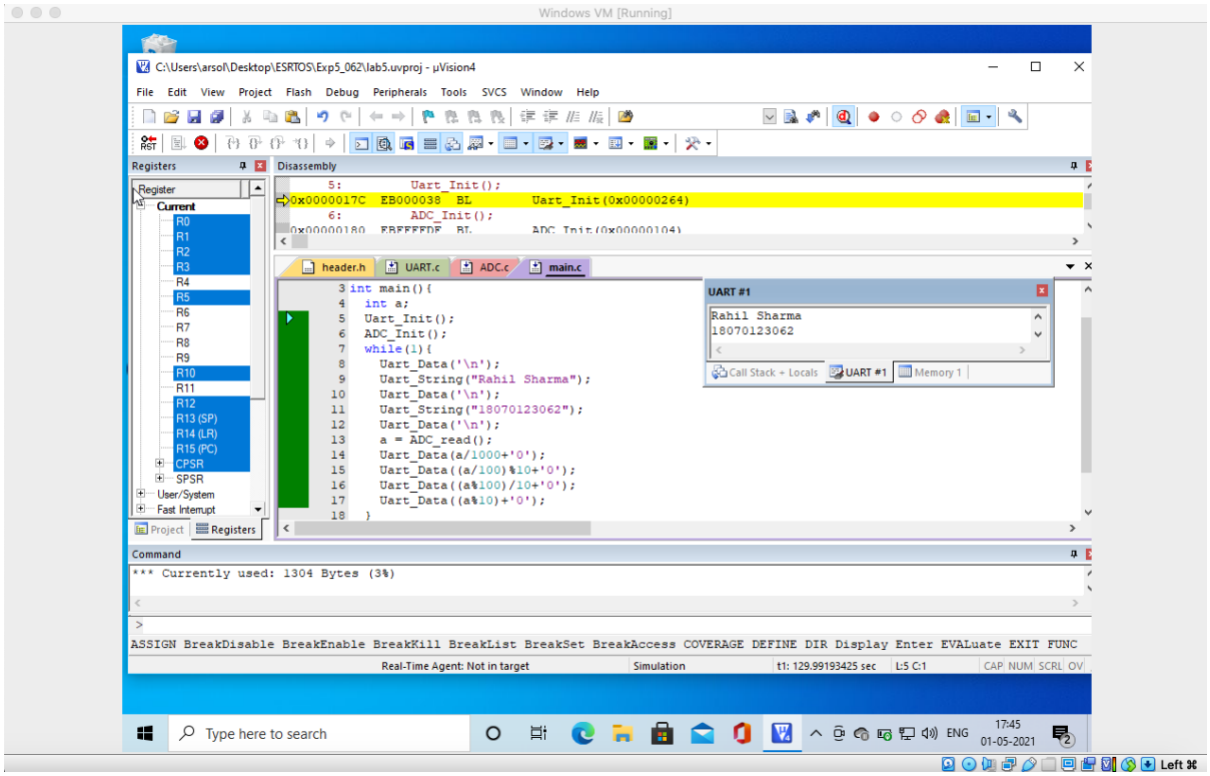
Main File:

```
#include<lpc21xx.h>
#include "header.h"
int main(){
int a;
Uart_Init();
ADC_Init();
 while(1){
```

```
 Uart_Data("\n');
 Uart_String("Rahil Sharma");
 Uart_Data("\n');
 Uart_String("18070123062");
 Uart_Data("\n");
 a = ADC_read();
 Uart_Data(a/1000+'0');
Uart_Data((a/100)%10+'0');
 Uart_Data (a%100)/10+'0');
 Uart_Data((a%10)+'0');
```

Screenshots of the Program and Output:





<u>CONCLUSION:</u> From this experiment we have learnt about the implementation of UART and ADC Protocols in a single project.