VTU MES LAB PROGRAM → 9-12

Universal Asynchronow

Program: (9): Display "Helloworld" message using Internal Uart.

```
#include<lpc214x.h>    // Header file Included.
void uart_init(void); //Prototype declaration
unsigned int delay; // gobal variable
unsigned char *ptr; // Global pointer of character type variable
unsigned char arr[] = "Hello World \n";
int main()  ------------------> // Main method
{
  while(1)
  {
    uart_init(); // calling function.
    ptr = arr;          // pointer pointing to first address of array.
    while(*ptr != '\0') // Iterator till null character
    {
      U0THR = *ptr++;
      while((U0LSR & 0x20) == 0); // Checking 5th bit for character present or not
      for(delay=0; delay<=600; delay++); // small delay.
    }
    for(delay=0; delay<=600; delay++); // delay.
  }
}
```

```
void uart_init(void)
{
    PINSEL0 = 0x00000005;//Used Pins to work under GPIO.
    U0LCR = 0x83; // To making word length 1 and second bit zero. (0011)
    U0DLM = 0x00;
    U0DLL = 0x13;
    U0LCR = 0x03; //In order access THR register (DLAB=0)
}
```

Program (10): Interface & Control a DC motor:

```
#include<lpc2148.h> // Header file for LPC2148
void clock_wise(void); // no return value.
void anticlock_wise(void); // No return values
unsigned int j=0;

int main()
{
    PINSEL0 = 0X00000000;
    IO0DIR = 0X0000090;

    while(1)
    {
        clock_wise();
        for(j=0;j<1000000;j++);
        anticlock_wise();
        for(j=0;j<1000000;j++);
    }
}
void clock_wise(void)
{
    IO0CLR = 0X00000900; // stop motor
    for(j=0;j<400000;j++); // small delay
    IO0SET = 0X00000800; // clock-wise
}
```

```
void anticlock_wise(void)
{
    IOOCLR= 0X00000900; //stop motor - other running in anticlockwise
    for(j=0; j<400000; j++); // small delay
    IOOSET =0X00000100; // anticlockwise rotation.
}
```

Program (11): Interface a stepper motor and rotate it in clockwise and anticlockwise direction.

```
#include <lpc214x.h>

void clock_wise(void);
void anticlockwise(void);

unsigned long int var1, var2;
unsigned int i=0, j=0, k=0;

int main()
{
    PINSEL0 = 0x00000000;
    IO0DIR = 0x0000F000; // R12 to R15 o/p.

    while(1)
    {
        for(j=0; j<50; j++)  // rotating 50 times.
            clockwise();

        for(k=0; k<650000; k++); //delay

        for(j=0; j<50; j++)
            anticlock_wise();

        for(k=0; k<650000; k++); // delay
    }
}
```

```
void clockwise(void)
{
    ~~var1 = var1 << 1;~~
    var1 = 0x00000800;  // set for clockwise rotation.
    for(i=0; i<=3; i++)
    {
        var1 = var1 << 1; //shifting bit by one for rotation.
        IOPIN = var1;
        for(k=0; k<60000; k++); // delay
    }
}

void anticlockwise(void)
{
    var2 = 0x00010000;
    for(i=0; i<=3; i++)
    {
        var2 = var2 >> 1;
        IOOIN = var2;
        for(k=0; k<60000; k++); //delay
    }
}
```

Program: (12) Interface a DAC and generate Triangular and Square waveforms.

```
#include<lpc214x.h>
unsigned int var;
void delay(void);

int main()
{
    PINSEL1 = 0x00000000; // enable aout the DAC.
    IO0DIR = 0x00ff0000;

    while(1)
    {
        IO0PIN = 0x00000000;
        var = 0x00000000;
        delay();
        IO0PIN = 0x00ff0000;
        var = 0x00ff0000;
        delay();
    }
}

void delay(void)
{
    unsigned int i=0;
    for(i=0; i<95000; i++);
}
```