EXP NO:1	LED FLASHING WITH ARM LPC2148 MICROCONTROLLER
DATE	

AIM:

To write and execute the program for LED Flashing with ARM7 (LPC2148) Processor.

HARDWARE & SOFTWARE TOOLS REQUIRED:

S.No	Hardware & Software Requirements	Quantit y
1	ARM Processor LPC2148	1
3	LEDs and Resistors	1
5	Proteus ISIS Software and Keil Software	

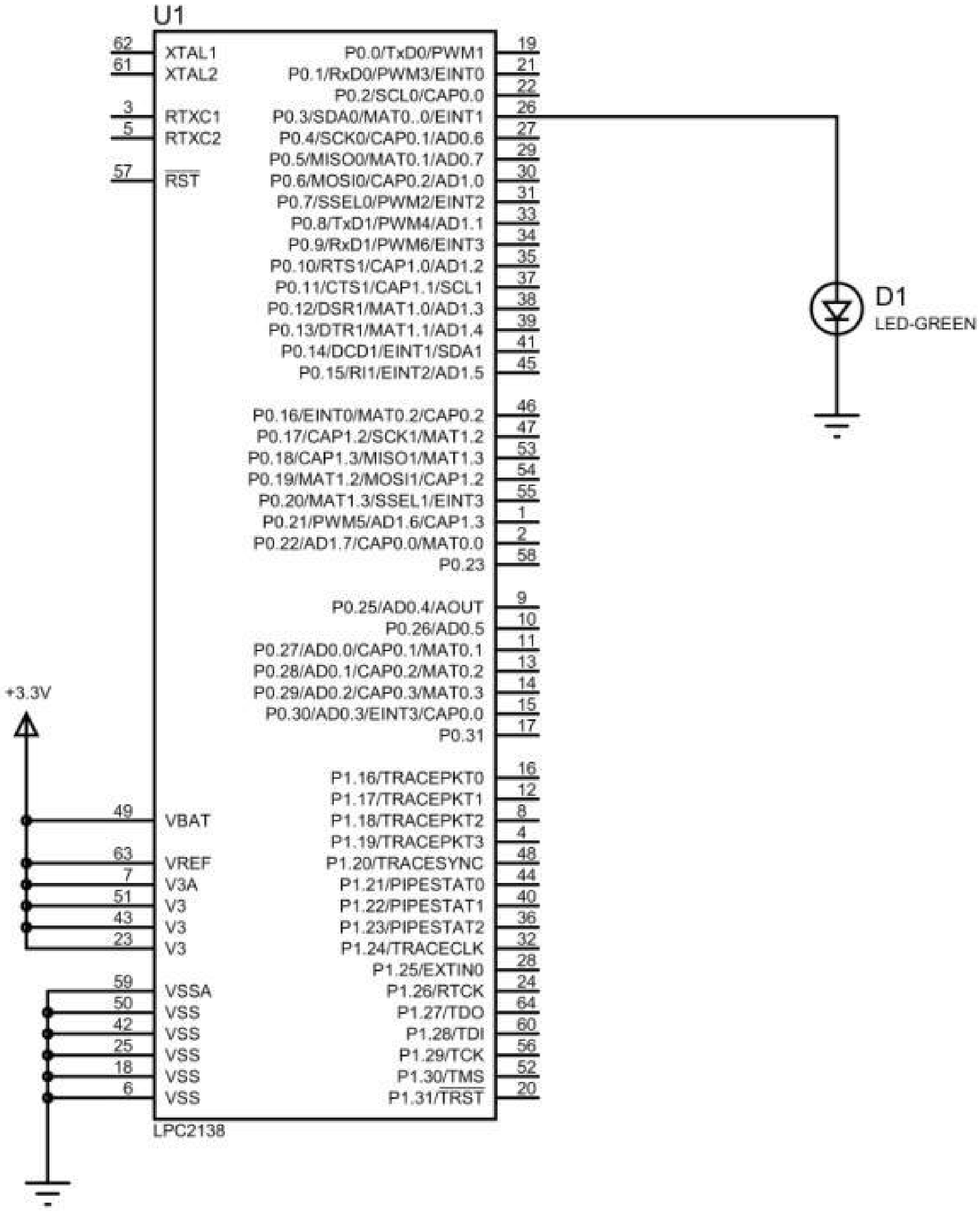
PROCEDURE

1. Create a New project, Go to “Project” and close the current project “Close Project”.
2. Next Go to the Project New μvision Project Create New Project

Select Device forTarget.

3. Select the data base NXP LPC2148.
4. Add Startup file and Next go to “File” and click “New”.
5. Write a program on the editor window and save as “xxxxx.c”.
6. Add this source file to Group and click on “Build Target” or F7.
7. Create a Hex file from “Project” menu and click on “Rebuild all target Files”.
8. Create the circuit diagram in Proteus Software and upload the hex file of your program by double clicking on the microcontroller in Proteus workspace.
9. Debug and run your Proteus file to see the working of the circuit.

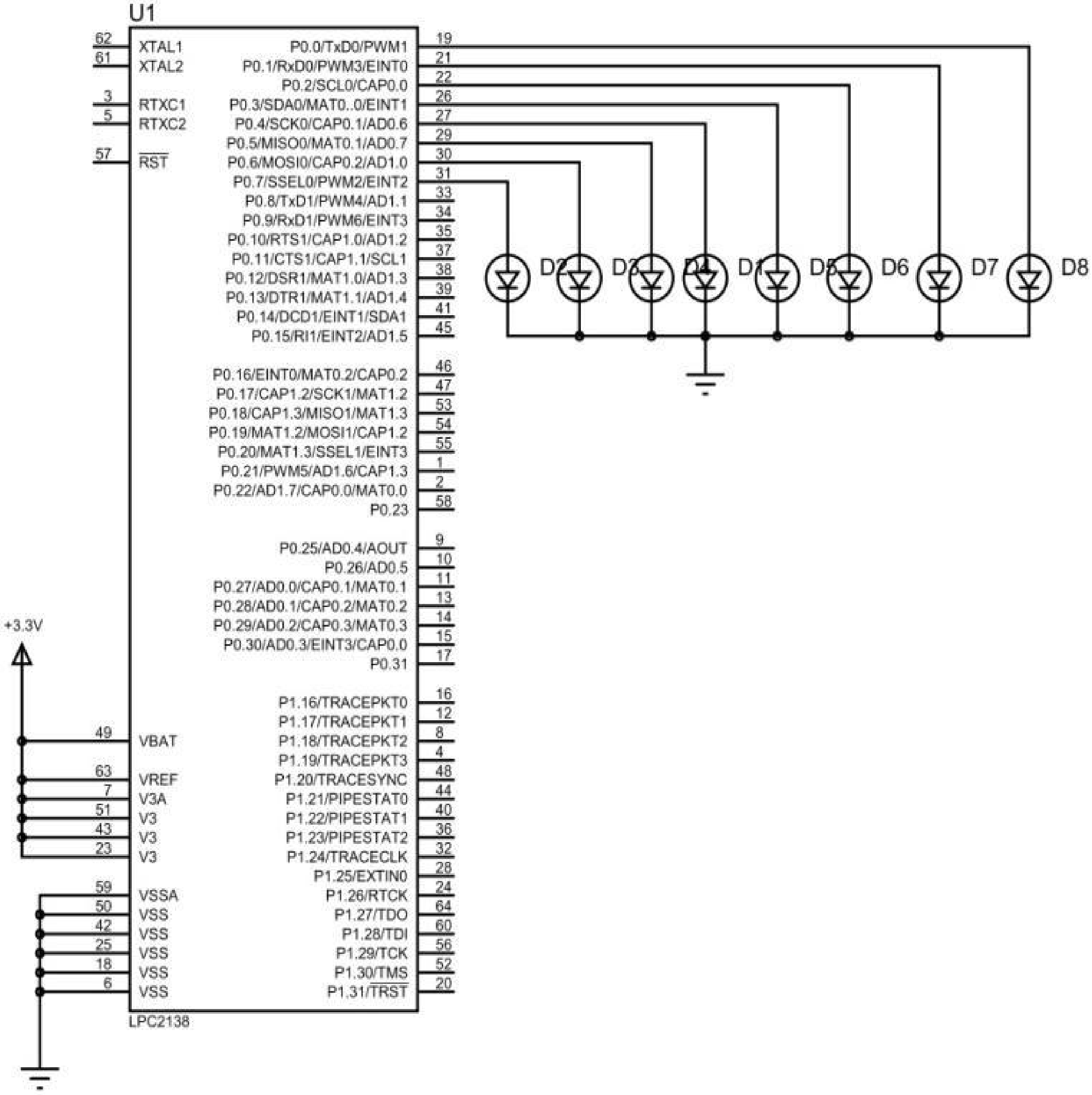
LED INTERFACING CIRCUIT DIAGRAM:



PROGRAM:

```
#include
<lpc214x.h>int i;
int main()
{ IODIR0=(1<<
3);
          while(1)
          {
           IOSET0=(1<<3);
           for(i=0;i<120000;i++);
           IOCLR0=(1<<3);
           for(i=0;i<120000;i++);
          }
}
```

FLASHING OF MORE LEDS



PROGRAM TYPE-I:

```
#include <lpc214x.h>
int i;
int main()
{ IODIR0=0x000000
FF;
          while(1)
          {
           IOSET0=0x000000AA;
           for(i=0;i<120000;i++);
           IOCLR0=0x000000AA;
           for(i=0;i<120000;i++);
          }
}
```

TYPE-II:

```
#include <lpc214x.h>
int i,b;
int main()
{ IODIR0=0x000000FF;
while(1)
 {
 for(b=0;b<8;b++)
    {
            IOSET0=(1<<b);
           for(i=0;i<120000;i++);
           IOCLR0=(1<<b);
           for(i=0;i<120000;i++);
    }
  }
}
```

EXP NO:2	SWITCH CONTROLLED LED
DATE	

AIM:

To write and execute the program for switch controlled LED with ARM7 (LPC2148) Processor.

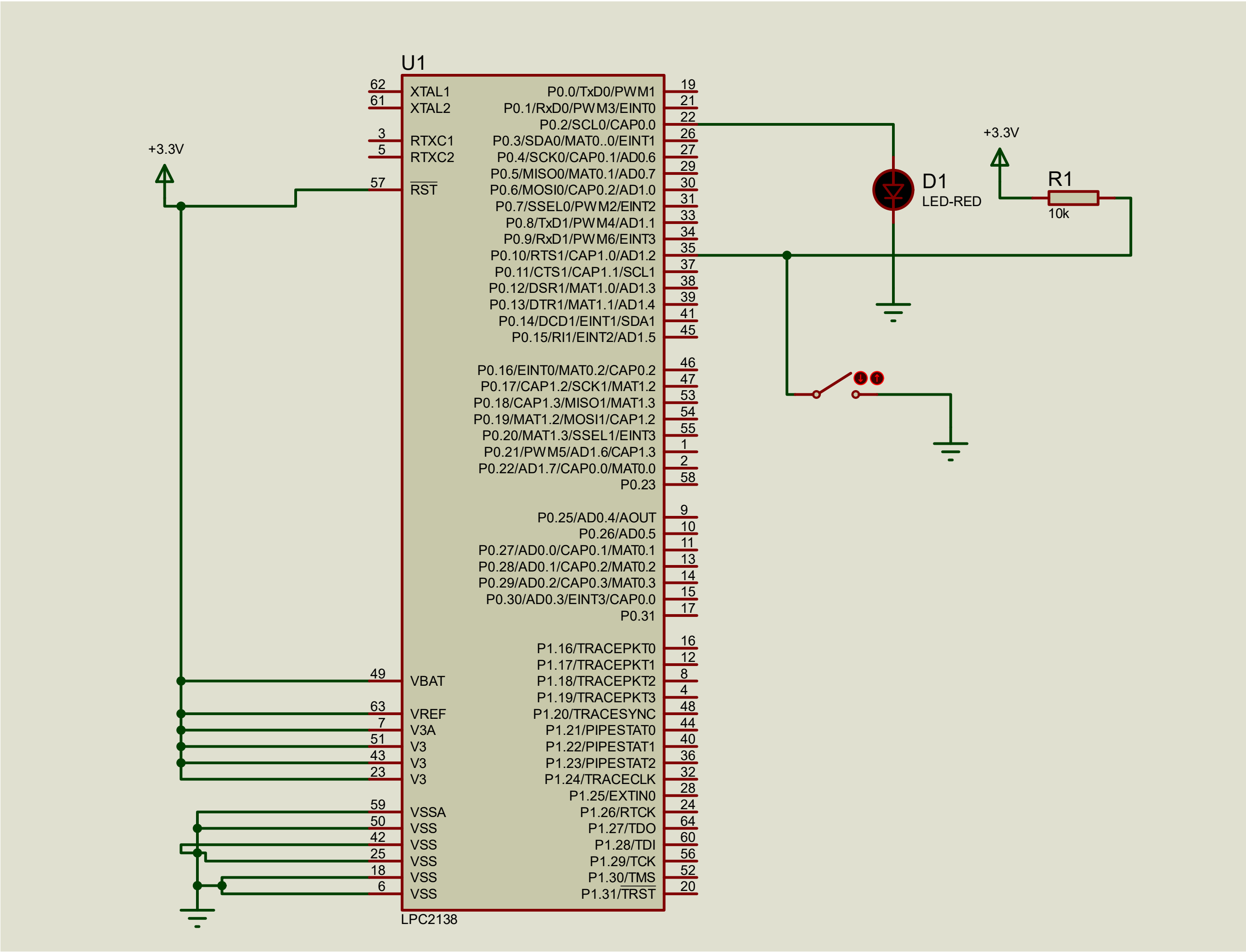
HARDWARE & SOFTWARE TOOLS REQUIRED:

S.No	Hardware & Software Requirements	Quantity
1	ARM Processor LPC2148	1
3	LEDs and Switch	
5	Proteus ISIS Software and Keil Software	

PROCEDURE

1. Create a New project, Go to “Project” and close the current project “Close Project”.
2. Next Go to the Project New µvision Project Create New Project Select Device forTarget.
3. Select the data base NXP LPC2148.
4. Add Startup file and Next go to “File” and click “New”.
5. Write a program on the editor window and save as “xxxxx.c”.
6. Add this source file to Group and click on “Build Target” or F7.
7. Create a Hex file from “Project” menu and click on “Rebuild all target Files”.
8. Create the circuit diagram in Proteus Software and upload the hex file of your program by double clicking on the microcontroller in Proteus workspace.
9. Debug and run your Proteus file to see the working of the circuit.

SWITCH CONTROLLED LED CIRCUIT DIAGRAM:


U1
+3.3V
62 XTAL1
61 XTAL2
3 RTXC1
5 RTXC2
57 RST
49 VBAT
63 VREF
7 V3A
51 V3
43 V3
23 V3
59 VSSA
50 VSS
42 VSS
25 VSS
18 VSS
6 VSS
P0.0/TxD0/PWM1 19
P0.1/RxD0/PWM3/EINT0 21
P0.2/SCL0/CAP0.0 22
P0.3/SDA0/MAT0..0/EINT1 26
P0.4/SCK0/CAP0.1/AD0.6 27
P0.5/MISO0/MAT0.1/AD0.7 29
P0.6/MOSI0/CAP0.2/AD1.0 30
P0.7/SSEL0/PWM2/EINT2 31
P0.8/TxD1/PWM4/AD1.1 33
P0.9/RxD1/PWM6/EINT3 34
P0.10/RTS1/CAP1.0/AD1.2 35
P0.11/CTS1/CAP1.1/SCL1 37
P0.12/DSR1/MAT1.0/AD1.3 38
P0.13/DTR1/MAT1.1/AD1.4 39
P0.14/DCD1/EINT1/SDA1 41
P0.15/RI1/EINT2/AD1.5 45
P0.16/EINT0/MAT0.2/CAP0.2 46
P0.17/CAP1.2/SCK1/MAT1.2 47
P0.18/CAP1.3/MISO1/MAT1.3 53
P0.19/MAT1.2/MOSI1/CAP1.2 54
P0.20/MAT1.3/SSEL1/EINT3 55
P0.21/PWM5/AD1.6/CAP1.3 1
P0.22/AD1.7/CAP0.0/MAT0.0 2
P0.23 58
P0.25/AD0.4/AOUT 9
P0.26/AD0.5 10
P0.27/AD0.0/CAP0.1/MAT0.1 11
P0.28/AD0.1/CAP0.2/MAT0.2 13
P0.29/AD0.2/CAP0.3/MAT0.3 14
P0.30/AD0.3/EINT3/CAP0.0 15
P0.31 17
P1.16/TRACEPKT0 16
P1.17/TRACEPKT1 12
P1.18/TRACEPKT2 8
P1.19/TRACEPKT3 4
P1.20/TRACESYNC 48
P1.21/PIPESTAT0 44
P1.22/PIPESTAT1 40
P1.23/PIPESTAT2 36
P1.24/TRACECLK 32
P1.25/EXTIN0 28
P1.26/RTCK 24
P1.27/TDO 64
P1.28/TDI 60
P1.29/TCK 56
P1.30/TMS 52
P1.31/TRST 20
LPC2138
D1
LED-RED
+3.3V
R1
10k

PROGRAM:

```
#include <lpc214x.h>
#define led (1<<2)      // led label for pin 2 of port0
#define sw (1<<10)      // sw  label for pin 10 of port0


int main(void)
{
  unsigned int x;

  IODIR0|= (~sw); //Configure P0.10 as Input port
  IODIR0|= led;    //Configure P0.2  as Output port

  while(1)
    {
                     x=IOPIN0 & sw;       // save status of sw in variable x
                     if(x==sw)            // if switch open
                            {
                            IOCLR0|=led ;    // LED off
                            }
                            else // if switch close
                            {
                            IOSET0|=led ;    // LED ON
                            }


   }
}
```

EXP NO:3	7-segment LED Display with LPC2148 Microcontroller
DATE	

AIM:

To write and execute the program for seven segment led with ARM7 (LPC2148) Processor.

HARDWARE & SOFTWARE TOOLS REQUIRED:

S.No	Hardware & Software Requirements	Quantity
1	ARM Processor LPC2148	1
3	7seg LED	1
5	Proteus ISIS Software and Keil Software	

PROCEDURE

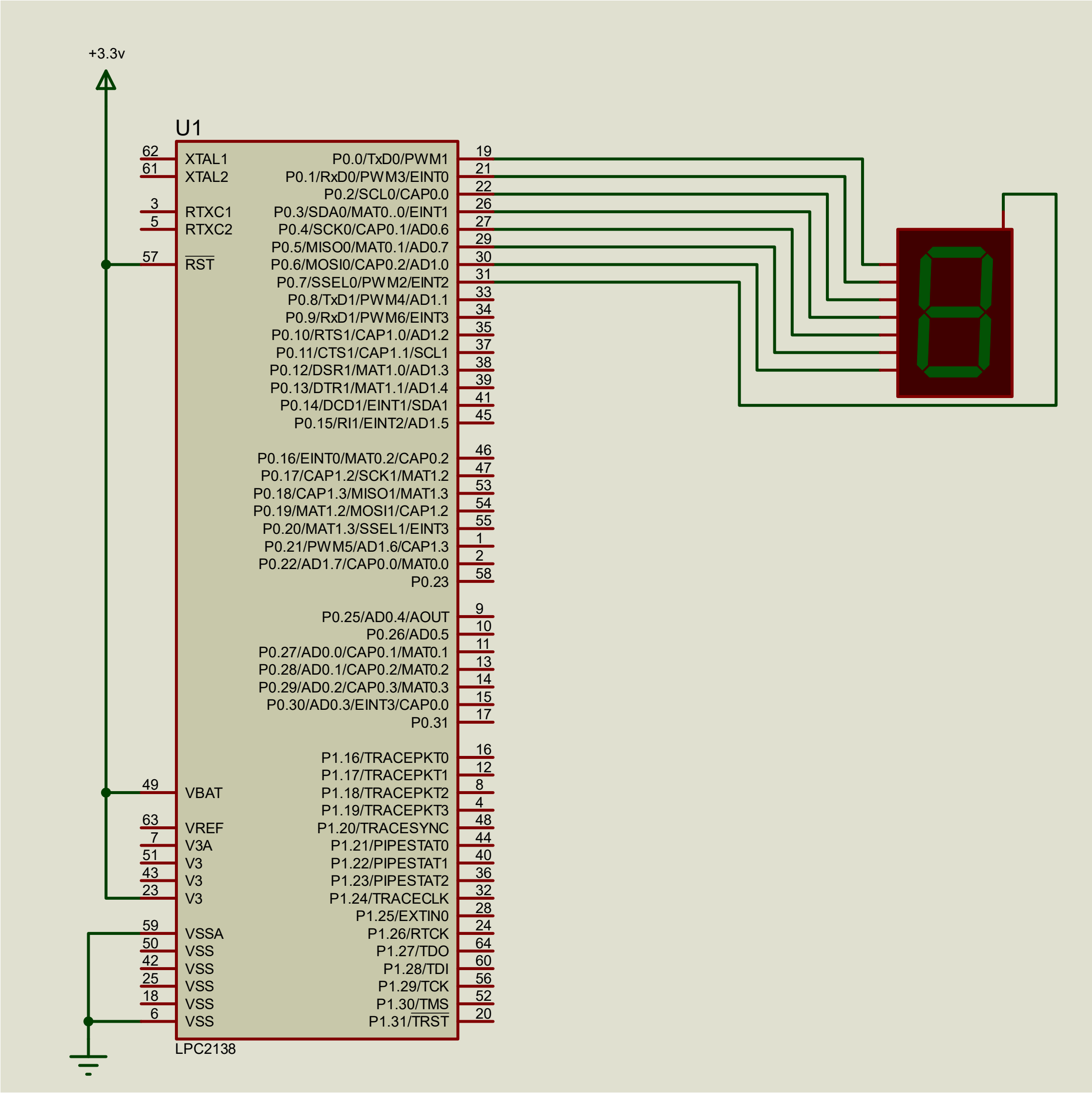
1. Create a New project, Go to “Project” and close the current project “Close Project”.
2. Next Go to the Project New µvision Project Create New Project

   Select Device forTarget.
3. Select the data base NXP LPC2148.
4. Add Startup file and Next go to “File” and click “New”.
5. Write a program on the editor window and save as “xxxxx.c”.
6. Add this source file to Group and click on “Build Target” or F7.
7. Create a Hex file from “Project” menu and click on “Rebuild all target Files”.
8. Create the circuit diagram in Proteus Software and upload the hex file of your program by double clicking on the microcontroller in Proteus workspace.
9. Debug and run your Proteus file to see the working of the circuit.

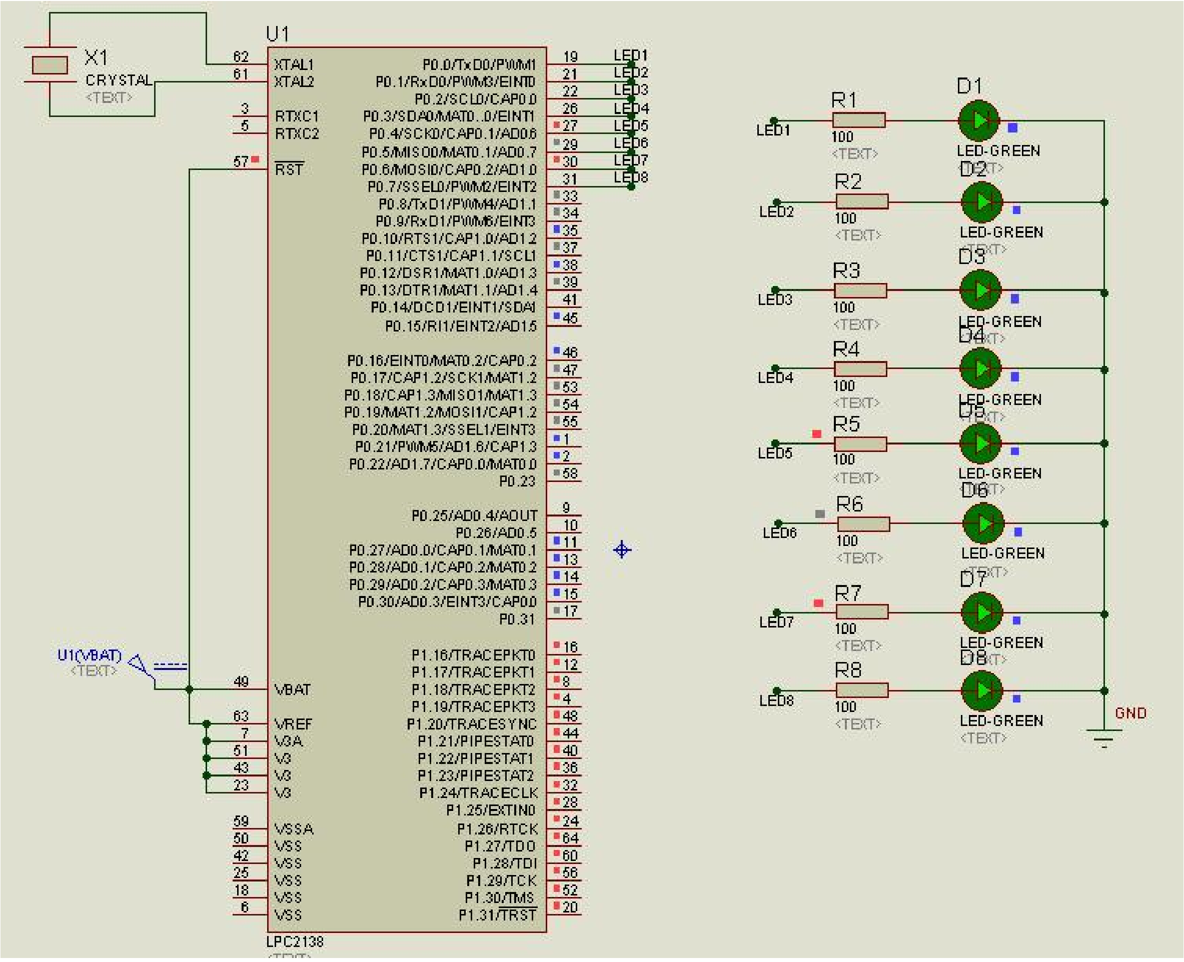
```
#include <lpc214x.h>
 void delay();
 unsigned int i,j,k;
 unsigned int ar[10]={0xc0,0xf9,0xa4,0xb0,0x99,0x92,0x82,0xf8,0x80,0x90};

int main(void)
{
   IODIR0= 0x000000FF; //Configure P0.0 -P0.7 as output port

   while(1)
      {
                                                   for(i=0;i<10;i++)
                                            {
                                                                         IOSET0= ar[i];
                                                                         delay();
                                                                         IOCLR0=ar[i];
                                                                         }
                                                              }
                                                              return 0;
                                                   }
                  void delay()
{ for (j=0;j<1000;j++)
  for (k=0;k<400;k++);
}
```


+3.3v
U1
62 XTAL1
61 XTAL2
3 RTXC1
5 RTXC2
57 RST
49 VBAT
63 VREF
7 V3A
51 V3
43 V3
23 V3
59 VSSA
50 VSS
42 VSS
25 VSS
18 VSS
6 VSS
P0.0/TxD0/PWM1 19
P0.1/RxD0/PWM3/EINT0 21
P0.2/SCL0/CAP0.0 22
P0.3/SDA0/MAT0..0/EINT1 26
P0.4/SCK0/CAP0.1/AD0.6 27
P0.5/MISO0/MAT0.1/AD0.7 29
P0.6/MOSI0/CAP0.2/AD1.0 30
P0.7/SSEL0/PWM2/EINT2 31
P0.8/TxD1/PWM4/AD1.1 33
P0.9/RxD1/PWM6/EINT3 34
P0.10/RTS1/CAP1.0/AD1.2 35
P0.11/CTS1/CAP1.1/SCL1 37
P0.12/DSR1/MAT1.0/AD1.3 38
P0.13/DTR1/MAT1.1/AD1.4 39
P0.14/DCD1/EINT1/SDA1 41
P0.15/RI1/EINT2/AD1.5 45
P0.16/EINT0/MAT0.2/CAP0.2 46
P0.17/CAP1.2/SCK1/MAT1.2 47
P0.18/CAP1.3/MISO1/MAT1.3 53
P0.19/MAT1.2/MOSI1/CAP1.2 54
P0.20/MAT1.3/SSEL1/EINT3 55
P0.21/PWM5/AD1.6/CAP1.3 1
P0.22/AD1.7/CAP0.0/MAT0.0 2
P0.23 58
P0.25/AD0.4/AOUT 9
P0.26/AD0.5 10
P0.27/AD0.0/CAP0.1/MAT0.1 11
P0.28/AD0.1/CAP0.2/MAT0.2 13
P0.29/AD0.2/CAP0.3/MAT0.3 14
P0.30/AD0.3/EINT3/CAP0.0 15
P0.31 17
P1.16/TRACEPKT0 16
P1.17/TRACEPKT1 12
P1.18/TRACEPKT2 8
P1.19/TRACEPKT3 4
P1.20/TRACESYNC 48
P1.21/PIPESTAT0 44
P1.22/PIPESTAT1 40
P1.23/PIPESTAT2 36
P1.24/TRACECLK 32
P1.25/EXTIN0 28
P1.26/RTCK 24
P1.27/TDO 64
P1.28/TDI 60
P1.29/TCK 56
P1.30/TMS 52
P1.31/TRST 20
LPC2138

EXP NO:4	TIMERS
DATE	



PROGRAM;

```
#include <LPC214x.H>
void timer_sec(unsigned int x)
{
 T0MR0 = x;
 T0MCR = 1;
 T0PR = 0x00E4E1C0;
 T0TCR = 0x1;
 while(T0TC < T0MR0);
 T0TCR = 0x0;
 T0TC = 0x0;
}

int main (void)
{
  unsigned int n;
  PINSEL2=0x00000000;
  IODIR0 = 0x00FF;
  while (1)
  {


      IOSET0 = 0x00FF;
      timer_sec(1);
      IOCLR0 = 0x00FF;
      timer_sec(1);

  }
}
```

EXP NO:5	**DC Motor Interfacing**
DATE:	

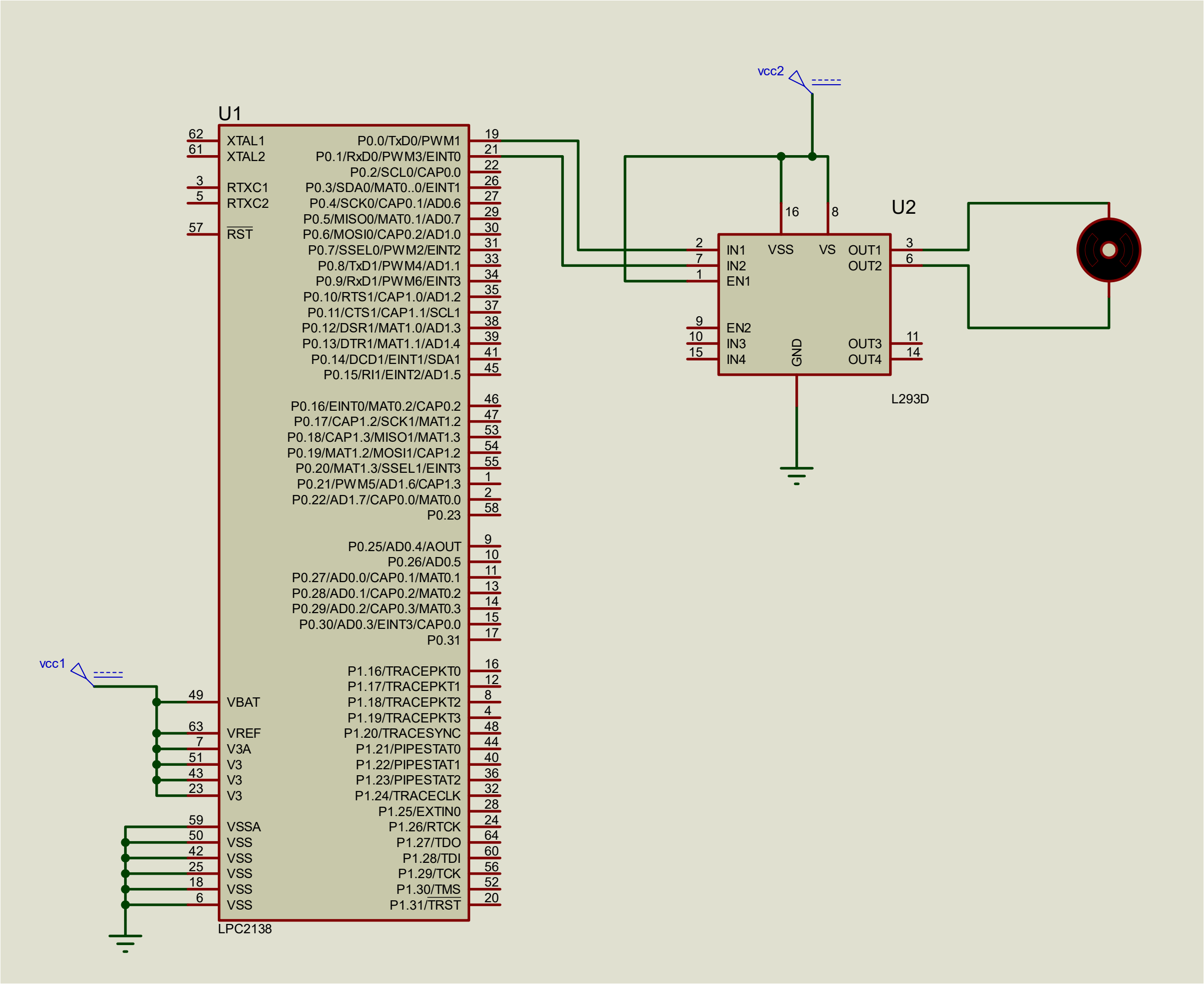
AIM:

To design a circuit and develop a C program for controlling a DC motor.

HARDWARE AND SOFTWARE REQUIRED:

S.No	Hardware & Software Requirements	Quantity
1	ARM Processor LPC2148	1
2	L293D IC	1
3	Proteus Software and Keil Software	-
4	Simple DC Motor active	1

CIRCUIT DIAGRAM:



PROGRAM:

```
#include <lpc214x.h>
void delay();
unsigned int j,k;
void main(void)
{
IO0DIR=0x03;
while(1)
{
IOSET0 = (1<<0);
IOCLR0=(1<<1) ;
delay();
delay();
delay();
delay();
IOCLR0=0x03;
delay();
delay();
delay();
delay();
IOSET0 = (1<<1);
IOCLR0=(1<<0) ;
delay();
delay();
delay();
delay();
IOCLR0=0x03;
delay();
delay();
delay();
delay();
}
}
```

```
void delay()
{ for (j=0;j<1000;j++)
for (k=0;k<400;k++);
}
```

EXP NO:6	**Stepper Motor Interfacing with LPC2138**
DATE:	

AIM:

To design and develop a C program for interfacing Stepper Motor with LPC2138.

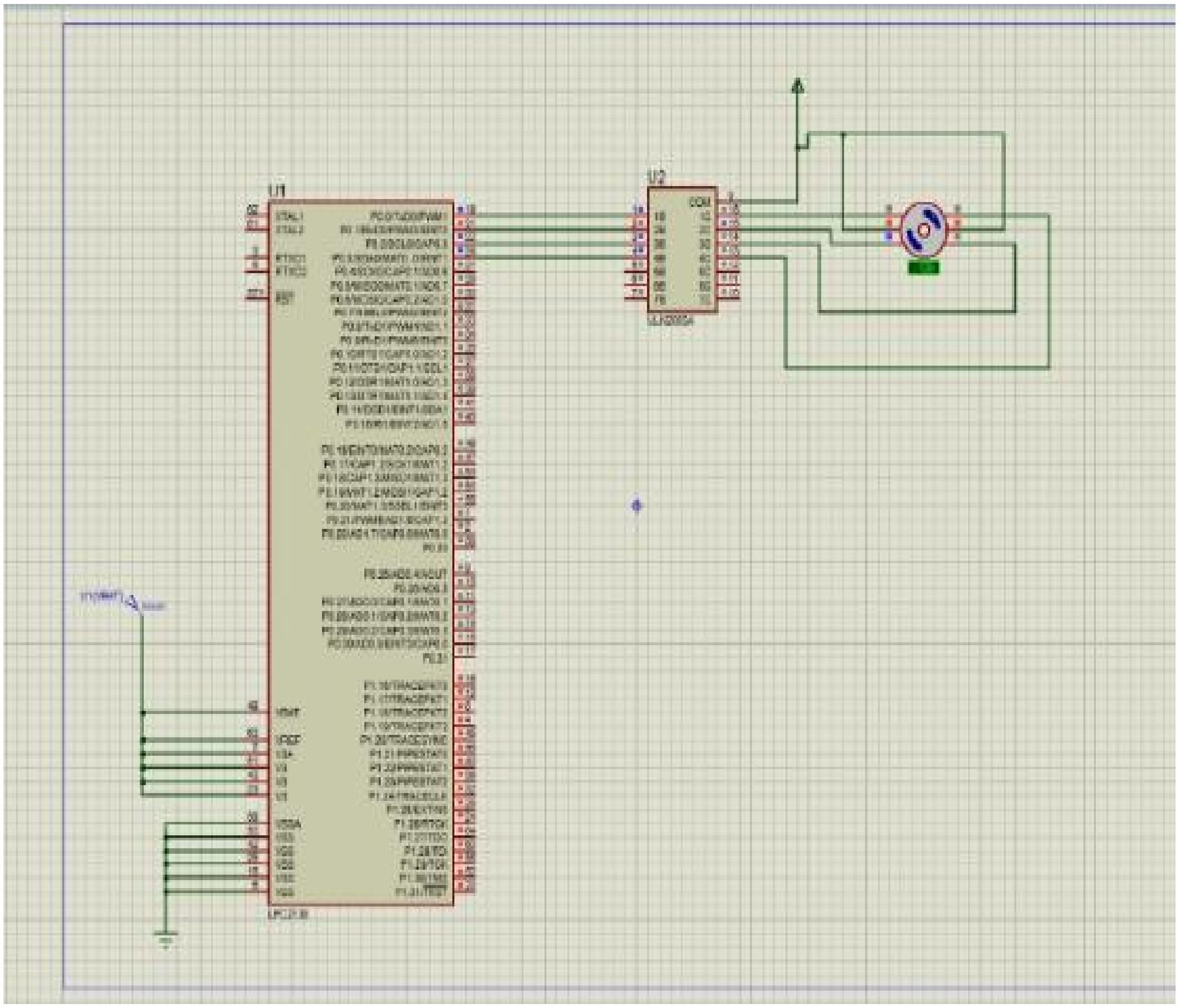
HARDWARE AND SOFTWARE REQUIRED:

S.No	Hardware & Software Requirements	Quantity
1	ARM Processor LPC2138	1
2	ULN2003A	1
3	Proteus Software and Keil Software	-
4	Stepper Motor Animated Unipolar.	1

PROCEDURE:

1. Create a New project, Go to “Project” and close the current project “Close Project”.
2. Next Go to the Project New µvision Project Create New Project Select Device forTarget.
3. Select the data base NXP LPC2148.
4. Add Startup file and Next go to “File” and click “New”.
5. Write a program on the editor window and save as “Main.c”.
6. Add this source file to Group and click on “Build Target” or F7.
7. Create a Hex file from “Project” menu and click on “Rebuild all target Files”.
8. Open Flash magic and select the device LPC2148 in ARM 7
9. Next browse the path of hex file and click ok.
10. Start debugging process and run the simulation for getting output.

CIRCUIT DIAGRAM:



PROGRAM:

```
#include <lpc214x.h>

#include <stdint.h>

uint8_t i,j; void

delay_ms(uint16_t j)

 {

uint16_t x,i;

for(i= 0;

i<j;i++)

 {

 for(x=0; x<6000; x++); /* loop to generate 1 millisecond delay with Cclk = 60MHZ */

}

 }
```

```
int main (void)

 {

IO0DIR = ( IO0DIR | 0x0000000F); /* Configure p0.0-p0.3 as output(used for
controlling stepper motor */

 while(1) {

/ for(j=0; j<12;j++) /


      {

      IOOPIN = 1<<O;

     delay_ms(500);

      IO0PIN = 1<<1;

      delay_ms(500);

     IO0PIN = 1<<2;

     delay_ms(500);

      IO0PIN = 1<<3;

     delay_ms(500);

     / }

      }

     }
```