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سكشن : 2

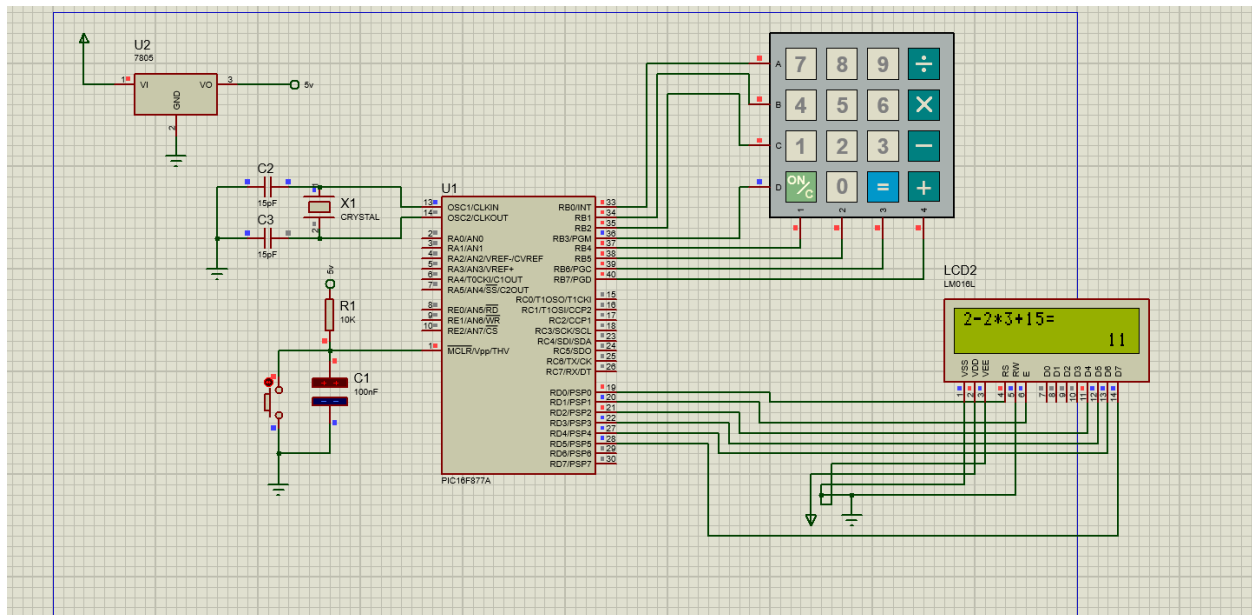
قسم هندسة الحاسبات ونظم التحكم

Challenge 1 – Task

Casio Calculator

.....

Screenshot of the circuit



Code:

```
/*  
 * File:    main.c  
 * Author:  engay  
 *  
 * Created on April 17, 2024, 8:53 PM  
 */
```

```
#include <xc.h>
```

```
#define _XTAL_FREQ (8000000)
```

```
#include "common.h"
```

```
#include "keypad.h"
```

```
#include "lcd.h"
```

```
#define delay __delay_ms
```

```
void Get_Expression(char *equ)
```

```
{
```

```
    lcd_cmd(_LCD_CLEAR);
```

```
    lcd_cmd(_LCD_RETURN_HOME);
```

```
    lcd_cmd(_LCD_CURSOR_OFF);
```

```
    char expr[17]={0};
```

```
    int i;
```

```
    lcd_set_cursor(1,1);
```

```

    for(i=0;i<16;i++)
    {
        expr[i]='\0';
        while(expr[i]!='\0')
        {
            expr[i]=keypad_get_key();
        }
        while(expr[i]==keypad_get_key());
        lcd_chr_cp(expr[i]);

        *(equ+i)=expr[i];
        if(expr[i]=='=')
        {
            break;
        }
        if(expr[i]=='c')
        {
            i=0;
            lcd_cmd(_LCD_CLEAR);
            lcd_cmd(_LCD_RETURN_HOME);
            lcd_cmd(_LCD_CURSOR_OFF);
            continue;
        }
    }
}

void Delete_Pre_Num(char *expr,char i)
{

```

```

    char j=i;
    while(i!=0 && expr[i]!='+' && expr[i]!='-' && expr[i]!='*' &&
expr[i]!='/')
    {
        i--;
    }

    while(i!=j)
    {
        expr[i]='r';
        i++;
    }
}

```

```

int Get_Pre_Num(char *expr,char i)
{
    while(i!=0 && expr[i]!='+' && expr[i]!='-' && expr[i]!='*' &&
expr[i]!='/')
    {
        i--;
    }
    if(expr[i]=='-')
    {
        return -1*atoi(expr+i+1);
    }
    else
    {
        return atoi(expr+i+1);
    }
}

```

```

    }
}

int Solve_Mul_Div(char *expr)
{
    int result=0;
    int i=0;
    while(i<17)
    {
        if(expr[i]=='*' || expr[i]=='/')
        {
            i++;
            if(expr[i-1]=='*')
                result+=(atoi(expr+i)*Get_Pre_Num(expr,i-2));
            else
                result+=(atoi(expr+i)/Get_Pre_Num(expr,i-2));

            Delete_Pre_Num(expr,i-2);

            while( (expr[i]>='0' && expr[i]<='9') && i<17)
            {
                i++;
            }
            i--;
            continue;
        }
        i++;
    }
}

```

```
        return result;
    }

    int Solve_Add_Sub(char *expr)
    {
        int result=0;
        int i=0;
        while(i<17)
        {

            if(expr[i]=='+' || expr[i]=='-')
            {
                i++;
                if(expr[i-1]=='+')
                    result+=(atoi(expr+i));
                else
                    result-=(atoi(expr+i));

                while( (expr[i]>='0' && expr[i]<='9') && i<17)
                {
                    i++;
                }
                i--;
                continue;
            }

            i++;
        }
    }
```

```

        return result;
    }

int Solve_expr(char *expr)
{
    int result=0;
    result+=Solve_Mul_Div(expr);
    result+=Solve_Add_Sub(expr);
    return result;
}

void Print_Result(int result)
{
    char row=2,col=16,flag=0;
    if(result<0)
    {
        result*=-1;
        flag=1;
    }
    while(result!=0)
    {
        lcd_chr(row,col,((result%10)+48));
        col--;
        result/=10;
    }
    if(flag==1)
    {
        lcd_chr(row,col,'-');
    }
}

```

```

    }
}

void main(void) {

    // Initialize LCD and Keypad
    lcd_init();
    lcd_cmd(_LCD_CLEAR);
    lcd_cmd(_LCD_RETURN_HOME);
    lcd_cmd(_LCD_CURSOR_OFF);
    keypad_init();
    int result;

    char expr[18]={0};
    int i;

    while(1)
    {
        for(i=0;i<17;i++)
        {
            expr[i]=0;
        }
        expr[0]='+';

        Get_Expression(expr+1);
        result=Solve_expr(expr);
        Print_Result(result);
        while(keypad_get_key()=='\0');
    }
}

```



```
}  
return;  
}
```