**اسم الطالب : أيمن محمد نبيل محمد**

**سكشن : 2**

**قسم هندسة الحاسبات ونظم التحكم**

**Challenge 1 – Task**

**Casio Calculator**

**……………………………………….**

**Screenshot of the circuit**

**A computer screen shot of a circuit board

Description automatically generated**

**Code:**

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**\* File: main.c**

**\* Author: engay**

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**\* 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;**

**}**