#include "mbed.h"

//#include "mbed2/299/TARGET\_KL25Z/TARGET\_Freescale/TARGET\_KLXX/TARGET\_KL25Z/PinNames.h"

//Create a BusOut connected to the 7 segments

BusOut Disp1(PTC6,PTC5,PTC16,PTA16,PTA17,PTC10,PTC11,PTC13); //Define many output pins: dpGFEDCBA

//Create a DigitalOut connected to 7-seg anode

DigitalOut vdd(PTC17);

void setvdd(); // to set CA to 3.3V

int numb=0;

int numb1=0;

int op=0;

int numb2=0;

int res=0;

//.............................................................

//Display the digit on 7-seg dpGFEDCBA

void key\_1();

void key\_2() ;

void key\_3() ;

void key\_4() ;

void key\_5();

void key\_6() ;

void key\_7();

void key\_8() ;

void key\_9() ;

void key\_equal();

//Display nothing on 7-seg

void key\_nope();

//..........................................................................

//create keypad 8 pins

//Create DigitalIns to probe rows

DigitalIn row1(PTE5, PullUp); // row1 Input

DigitalIn row2(PTE4, PullUp); // row2 Input

DigitalIn row3(PTE3, PullUp); // row3 Input

DigitalIn row4(PTE2, PullUp); // row4 Input

//Create DigitalOuts to scan columns

DigitalOut col1(PTB11);// col1 output

DigitalOut col2(PTB10);// col2 output

DigitalOut col3(PTB9);// col3 output

DigitalOut col4(PTB8);// col4 output

//............................................................................

//Pull all columns Hi

void setColsHi();

//Pul a single column Lo

void setCol1Lo();

void setCol2Lo();

void setCol3Lo();

void setCol4Lo() ;

void write\_7\_seg();

//.........................................................

// Key scan function

void keyscan() ;

void calculator ();

//.............................................

// main program routine

int main() {

setvdd(); // to set CA to 3.3V

while (1) {

calculator();

//keyscan(); //only scanes keypad and assign pressed number to global variable numb

wait(0.1);

}

}

void setvdd() // to set CA to 3.3V

{

vdd=1; //Set CA On.

}

//.............................................................

//Display the digit on 7-seg dpGFEDCBA

void key\_0() {

Disp1=0xC0;

}

void key\_1() {

Disp1=0xF9; //0xF9=11111001 =dpGFEDCBA

}

void key\_2() {

Disp1=0xA4;

}

void key\_3() {

Disp1=0xB0;

}

void key\_4() {

Disp1=0x99;

}

void key\_5() {

Disp1=0x92;

}

void key\_6() {

Disp1=0x82;

}

void key\_7() {

Disp1=0xF8;

}

void key\_8() {

Disp1=0x80; //0x80=10000000, so only dp is OFF.

}

void key\_9() {

Disp1=0x90; //0x90=10010000, so only E dp are FF.

}

void key\_pluse() { //+

Disp1=0xB9;

}

void key\_minus() {

Disp1=0xBF; //-

}

void key\_F() { // false

Disp1=0x8E;

}

void key\_A() { //+

Disp1=0x08;

}

void key\_B() {

Disp1=0xC6; //-

}

void key\_equal() {

Disp1=0xB7; //-

}

//Display nothing on 7-seg

void key\_nope() {

Disp1=0xFF;

}

//............................................................................

//Pull all columns Hi

void setColsHi() {

col1=1;

col2=1;

col3=1;

col4=1;

}

//Pul a single column Lo

void setCol1Lo() {

col1=0;

col2=1;

col3=1;

col4=1;

}

void setCol2Lo() {

col1=1;

col2=0;

col3=1;

col4=1;

}

void setCol3Lo() {

col1=1;

col2=1;

col3=0;

col4=1;

}

void setCol4Lo() {

col1=1;

col2=1;

col3=1;

col4=0;

}

//.........................................................

// Key scan function only scanes keypad and assign pressed number to global variable numb

void keyscan() {

setColsHi(); //Pull all columns Hi

wait(0.1);

for(int i=0 ; i<3 ;i++)

{

while(1)

{

setCol1Lo(); //Pul column 1 Lo

wait(0.2);

if (row1==0) { numb= 1; break;} //1

if (row2==0) { numb= 4; break;} //4

if (row3==0) { numb= 7; break;} //7

if (row4==0) { numb= 100; break;} //F

setCol2Lo(); //Pul column 2 Lo

wait(0.2);

if (row1==0) { numb= 2; break;} //2

if (row2==0) { numb= 5; break;} //5

if (row3==0) { numb= 8; break;} //8

if (row4==0) { numb= 0; break;} //0

setCol3Lo(); //Pul column 3 Lo

wait(0.2);

if (row1==0) { numb= 3; break;} //3

if (row2==0) { numb= 6; break;} //6

if (row3==0) { numb= 9; break;} //9

if (row4==0) { numb= 100; break;} //E

setCol4Lo(); //Pul column 4 Lo

wait(0.2);

if (row1==0) { numb= 150; break;} //A=+

if (row2==0) { numb= 200; break;} //B=-

if (row3==0) {numb= 100; break;} //C

if (row4==0) {numb= 100; break;} //D

}

}

wait(0.1);

write\_7\_seg(); // display the pressed number

}

void write\_7\_seg() // display the assigned number numb

{

if (numb==0) {key\_0(); } //0

else if (numb==1) {key\_1(); } //1

else if (numb==2) {key\_2(); } //2

else if (numb==3) {key\_3(); } //3

else if (numb==4) {key\_4(); } //4

else if (numb==5) {key\_5(); } //5

else if (numb==6) {key\_6(); } //6

else if (numb==7) {key\_7(); } //7

else if (numb==8) {key\_8(); } //8

else if (numb==9) {key\_9(); } //9

else if (numb==150) {key\_pluse(); } //+

else if (numb==200) {key\_minus(); } //-

else if (numb==100) {key\_F(); } //unused botton

else if (numb==101) {key\_A(); }

else if (numb==102) {key\_B(); }

else if (numb==103) {key\_equal(); }

}

void calculator()

{

for (int i=0 ;i<3 ; i++) // call keyscan function 3 times , to assign numb1 op nunb2

{

keyscan();

//write\_7\_seg(); //display pressed number

if (i==0 ){numb1= numb; } // assign first value to numb1

else if (i==1){ op=numb; }// assign 150=+ or 200=- value to op

else if (i==2){ numb2= numb;}// assign 2nd value to numb2

}

//numb=103;

//write\_7\_seg();

//wait(0.5);

if (op == 150) {res = numb1 + numb2;}// if op = 150 ==> operation=+

else if (op == 200) {res = numb1 - numb2 ;} // if op = 200 ==> operation=-

else {numb=100;}

if (res <10 && res >0 ){numb=res;} // check if result is betwwn 0 and 9

else if (res >=10 ) {numb =101; }// if result is above 9 ==> numb =10=A =above

else if (res <0 ) { numb =102; }// if result is below 0 ==> numb =11=B =bellow

else{numb=100;}

for (int i=0 ;i<5 ; i++) // display result with blinking

{

key\_nope();

wait(1);

write\_7\_seg();

wait(1);

}

}