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// PROJECT  :KeypadScanning

// PURPOSE  :Present the scanning (aka polling) algorithm behind the Keypad library

// COURSE   :ICS3U

// AUTHOR   :Modified from Arduino Forum post

// DATE     :2023 03 01

// MCU      :328P

// STATUS   :Working  (need to debounce...)

// REFERENCE:https://forum.arduino.cc/t/keypad-without-keypad-library/656198/7

// REFERNCE :https://www.adafruit.com/product/1824

#define C1  10        //Arduino digital pins

#define C2  9

#define C3  8

#define R1  7

#define R2  6

#define R3  5

#define R4  4

#define PAUSE 100

uint8\_t pinCols[3] = {C1, C2, C3};        //pins of the different columns

uint8\_t pinRows[4] = {R1, R2, R3, R4};    //pins of the different rows

uint8\_t numRows = sizeof(pinRows);

uint8\_t numCols = sizeof(pinCols);

int8\_t trueCol;                          //active key pressed

int8\_t trueRow;                          //

char keys[4][3] = {                //correspondence with the keys of the keypad

  {'1', '2', '3'},

  {'4', '5', '6'},

  {'7', '8', '9'},

  {'\*', '0', '#'}

};

void setup() {

  **Serial**.begin(9600);

  while (!**Serial**);

  for (uint8\_t c = 0; c < numCols; c++) {       //Columns as HIGH output pins

    pinMode(pinCols[c], OUTPUT);

    digitalWrite(pinCols[c], HIGH);

  }

  for (uint8\_t r = 0; r < numRows; r++) {       //Rows as input pins

    pinMode(pinRows[r], INPUT);

  }

}

void loop() {

  readKey();                                //scan the matrix

  if (trueRow >= 0 && trueCol >= 0)         //anything?

    **Serial**.println(keys[trueRow][trueCol]); //if so, display the active key

  delay(PAUSE);

}

void readKey() {

  trueRow = -1;                                 //assume nothing

  trueCol = -1;                                 //

  for (uint8\_t i = 0; i < numRows; i++) {

    if (digitalRead(pinRows[i])/\* == HIGH\*/) {  //read each row for a HIGH

      trueRow = i;                              //identified the row! Now,

      for (uint8\_t x = 0; x < numCols; x++) {   //present LOW on all columns

        for (uint8\_t c = 0; c < numCols; c++)   //but 1 while reading the true row

          digitalWrite(pinCols[c], LOW);        //to see what comes through...

        digitalWrite(pinCols[x], HIGH);         //

        //if true row is HIGH we have also discovered the column!

        if (digitalRead(pinRows[trueRow])/\* == HIGH\*/) {

          trueCol = x;

        }

      }

    }

  }

  //restore columns to HIGH

  for (uint8\_t c = 0; c < numCols; c++) {

    pinMode(pinCols[c], OUTPUT);

    digitalWrite(pinCols[c], HIGH);

  }

}