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/*MULTIPLE LEDsMake eight LEDs dance. Dance LEDs, dance!*/

// To keep track of all the LED pins, we'll use an "array".
// An array lets you store a group of variables, and refer to them
// by their position, or "index". Here we're creating an array of
// eight integers, and initializing them to a set of values:

int ledPins[] = {2,3,4,5,6,7,8,9};

// The first element of an array is index 0.
// We've put the value "2" in index 0, "3" in index 1, etc.
// The final index in the above array is 7, which contains
// the value "9".

// We're using the values in this array to specify the pin numbers
// that the eight LEDs are connected to. LED 0 is connected to
// pin 2, LED 1 is connected to pin 3, etc.

void setup()
{
  int index;

  // In this sketch, we'll use "for() loops" to step variables from
  // one value to another, and perform a set of instructions for
  // each step. For() loops are a very handy way to get numbers to
  // count up or down.

  // Every for() loop has three statements separated by
  // semicolons (;):

  // 1. Something to do before starting
  // 2. A test to perform; as long as it's true, keep looping
  // 3. Something to do after each loop (increase a variable)

  // For the for() loop below, these are the three statements:

  // 1. index = 0; Before starting, make index = 0.
  // 2. index <= 7; If index is less or equal to 7,
  // run the following code.
  // (When index = 8, continue with the sketch.)
  // 3. index++ Putting "+" after a variable means
  // "add one to it".
  // (You can also use "index = index + 1".)

  // Every time you go through the loop, the statements following
  // the for() (within the brackets) will run.

  // When the test in statement 2 is finally false, the sketch
  // will continue.

  // Here we'll use a for() loop to initialize all the LED pins
  // to outputs. This is much easier than writing eight separate
  // statements to do the same thing.

  // This for() loop will make index = 0, then run the pinMode()
  // statement within the brackets. It will then do the same thing
  // for index = 2, index = 3, etc. all the way to index = 7.

  for(index = 0; index <= 7; index++)
  {
    pinMode(ledPins[index],OUTPUT);
    // ledPins[index] is replaced by the value in the array.
    // For example, ledPins[0] is 2
  }
}

void loop()
{
  // This loop() calls functions that we've written further below.
  // We've disabled some of these by commenting them out (putting
  // "//" in front of them). To try different LED displays, remove
  // the "//" in front of the ones you'd like to run, and add "//"
  // in front of those you don't to comment out (and disable) those
  // lines.

  oneAfterAnotherNoLoop(); // Light up all the LEDs in turn

  //oneAfterAnotherLoop(); // Same as oneAfterAnotherNoLoop,
  // but with much less typing

  //oneOnAtATime(); // Turn on one LED at a time,
  // scrolling down the line

  //pingPong(); // Light the LEDs middle to the edges

  //marquee(); // Chase lights like you see on signs

  //randomLED(); // Blink LEDs randomly
}

/*oneAfterAnotherNoLoop()This function will light one LED, delay for delayTime, then lighththe next LED, and repeat until all the LEDs are on.

void oneAfterAnotherNoLoop()

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{
    int delayTime = 100; // time (milliseconds) to pause between LEDs
                          // make this smaller for faster switching

    // turn all the LEDs on:

    digitalWrite(ledPins[0], HIGH); //Turns on LED #0 (pin 2)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[1], HIGH); //Turns on LED #1 (pin 3)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[2], HIGH); //Turns on LED #2 (pin 4)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[3], HIGH); //Turns on LED #3 (pin 5)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[4], HIGH); //Turns on LED #4 (pin 6)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[5], HIGH); //Turns on LED #5 (pin 7)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[6], HIGH); //Turns on LED #6 (pin 8)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[7], HIGH); //Turns on LED #7 (pin 9)
    delay(delayTime); //wait delayTime milliseconds

    // turn all the LEDs off:

    digitalWrite(ledPins[7], LOW); //Turn off LED #7 (pin 9)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[6], LOW); //Turn off LED #6 (pin 8)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[5], LOW); //Turn off LED #5 (pin 7)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[4], LOW); //Turn off LED #4 (pin 6)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[3], LOW); //Turn off LED #3 (pin 5)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[2], LOW); //Turn off LED #2 (pin 4)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[1], LOW); //Turn off LED #1 (pin 3)
    delay(delayTime); //wait delayTime milliseconds
    digitalWrite(ledPins[0], LOW); //Turn off LED #0 (pin 2)
    delay(delayTime); //wait delayTime milliseconds
}

/*oneAfterAnotherLoop()This function does exactly the same thing as oneAfterAnotherNoLoop(),but it takes advantage of for() loops and the arra
void oneAfterAnotherLoop()
{
    int index;
    int delayTime = 100; // milliseconds to pause between LEDs
                          // make this smaller for faster switching

    // Turn all the LEDs on:

    // This for() loop will step index from 0 to 7
    // (putting "+" after a variable means add one to it)
    // and will then use digitalWrite() to turn that LED on.

    for(index = 0; index <= 7; index++)
    {
        digitalWrite(ledPins[index], HIGH);
        delay(delayTime);
    }

    // Turn all the LEDs off:

    // This for() loop will step index from 7 to 0
    // (putting "--" after a variable means subtract one from it)
    // and will then use digitalWrite() to turn that LED off.

    for(index = 7; index >= 0; index--)
    {
        digitalWrite(ledPins[index], LOW);
        delay(delayTime);
    }
}

/*oneOnAtATime()This function will step through the LEDs,lighting only one at at time.*/
void oneOnAtATime()
{
    int index;
    int delayTime = 100; // milliseconds to pause between LEDs
                          // make this smaller for faster switching

    // step through the LEDs, from 0 to 7

    for(index = 0; index <= 7; index++)
    {
        digitalWrite(ledPins[index], HIGH); // turn LED on
        delay(delayTime); // pause to slow down
        digitalWrite(ledPins[index], LOW); // turn LED off
    }
}

/*pingPong()This function will step through the LEDs,lighting one at at time in both directions.*/

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void pingPong()
{
  int index;
  int delayTime = 100; // milliseconds to pause between LEDs
                        // make this smaller for faster switching

  // step through the LEDs, from 0 to 7
  for(index = 0; index <= 7; index++)
  {
    digitalWrite(ledPins[index], HIGH); // turn LED on
    delay(delayTime); // pause to slow down
    digitalWrite(ledPins[index], LOW); // turn LED off
  }

  // step through the LEDs, from 7 to 0
  for(index = 7; index >= 0; index--)
  {
    digitalWrite(ledPins[index], HIGH); // turn LED on
    delay(delayTime); // pause to slow down
    digitalWrite(ledPins[index], LOW); // turn LED off
  }
}

/*marquee()This function will mimic "chase lights" like those around signs.*/
void marquee()
{
  int index;
  int delayTime = 200; // milliseconds to pause between LEDs
                        // Make this smaller for faster switching

  // Step through the first four LEDs
  // (We'll light up one in the lower 4 and one in the upper 4)

  for(index = 0; index <= 3; index++) // Step from 0 to 3
  {
    digitalWrite(ledPins[index], HIGH); // Turn a LED on
    digitalWrite(ledPins[index+4], HIGH); // Skip four, and turn that LED on
    delay(delayTime); // Pause to slow down the sequence
    digitalWrite(ledPins[index], LOW); // Turn the LED off
    digitalWrite(ledPins[index+4], LOW); // Skip four, and turn that LED off
  }
}

/*randomLED()This function will turn on random LEDs. Can you modify it so italso lights them for random times?*/
void randomLED()
{
  int index;
  int delayTime;

  // The random() function will return a semi-random number each
  // time it is called. See http://arduino.cc/en/Reference/Random
  // for tips on how to make random() even more random.

  index = random(8); // pick a random number between 0 and 7
  delayTime = 100;

  digitalWrite(ledPins[index], HIGH); // turn LED on
  delay(delayTime); // pause to slow down
  digitalWrite(ledPins[index], LOW); // turn LED off
}

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