**Introduction**

In previous experiments, we learned how to use a 7-segment display and control LEDs by a button. In this lesson, we will use a 7-segment display and a button together to create a simple digital dice.

**Components**

- 1 \* SunFounder Uno board

- 1 \* Breadboard

- 1 \* USB cable

- 1 \* Button

- 1 \* Resistor (10KΩ)

- 8 \* Resistor (220Ω)

- 1 \* 7-segment display

- 1 \* 104 ceramic capacitor

- 1 \* 74HC595

- Jumper wires

**Principle**

The idea behind a digital dice is very simple: a 7-segment display circularly jumps from 1 to 7 rapidly. When the button is pressed, the jumping will slow down until it stops on a number. When the button is pressed again, the process will repeat.

The schematic diagram



**Experimental Procedures**

**Step 1:** Build the circuit



**Step 2**: Open the code file

**Step 3:** Select correct Board and Port

**Step 4:** Upload the sketch to the SunFounder Uno board

You can now see the 7-segment display jump between numbers from 1 to 6. Press the button, and the jumping will slow down until it stops three seconds later. Press the button again, and the process will repeat.



**Code**

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| //Digital Dice/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \* You can now see the single 7-segment display jump between numbers from 1 to 6. \* When the button is pressed, the jumping will slow down until it stops three seconds later. \* If the button is pressed again, the process will repeat. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*///Email:support@sunfounder.com//Website:www.sunfounder.com//2015.5.7/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/const int latchPin = 12;//Pin connected to ST\_CP of 74HC595const int clockPin = 8;//Pin connected to SH\_CP of 74HC595 const int dataPin = 11; //Pin connected to DS of 74HC595const int ledPin = 13; //ledPin attach toconst int keyIn = 2; //keyIn attach toint num = 0;//display 0,1,2,3,4,5,6,7,8,9,A,b,C,d,E,Fint datArray[16] = { 252, 96, 218, 242, 102, 182, 190, 224, 254, 246, 238, 62, 156, 122, 158, 142};long randNumber;/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/void setup(){ pinMode(latchPin,OUTPUT); //set the latchPin as an output pinMode(clockPin,OUTPUT); //set the clockPin as an output pinMode(dataPin,OUTPUT); //set the dataPin as an output pinMode(ledPin,OUTPUT); //set the ledPin as an output pinMode(keyIn,INPUT); //set the keyIn as an input Serial.begin(9600); // start serial port at 9600 bps: //initialize the random number generator with a fairly random input A0 randomSeed(analogRead(0)); }/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/void loop(){ int stat = digitalRead(keyIn); //store value read from keyIn if(stat == HIGH) // check if the pushbutton is pressed { num ++; if(num > 1) { num = 0; } } Serial.println(num); // print the num on serial monitor  if(num == 1) //when pushbutton is pressed { randNumber = random(1,7); //Generate a random number in 1-7  showNum(randNumber); //show the randNumber on 7-segment delay(1000); //wait for 1 second  while(!digitalRead(keyIn)); //When not press button,program stop here int stat = digitalRead(keyIn); if(stat == HIGH) // check if the pushbutton is pressed { num ++; digitalWrite(ledPin,HIGH); //turn on the led delay(100); digitalWrite(ledPin,LOW); //turn off the led delay(100); if(num >= 1) { num = 0; } }  } //show random numbers at 100 microseconds intervals // If the button has not been pressed randNumber = random(1,7); showNum(randNumber); delay(100);}/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*///the function to drive 7-segment show numbersvoid showNum(int num){ digitalWrite(latchPin,LOW); //ground latchPin and hold low for transmitting shiftOut(dataPin,clockPin,MSBFIRST,datArray[num]); //return the latch pin high to signal chip that it  //no longer needs to listen for information digitalWrite(latchPin,HIGH); //pull the latchPin to save the data}/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/ |