

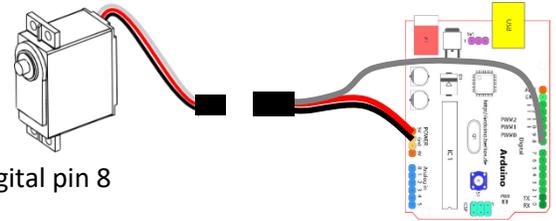


Arduino Tutorial 1

Objectives: Learn basic structure and syntax of Arduino C. Use variable and conditional statements. Practice with servo motors.

Materials and Set Up

- Arduino Uno microcomputer and USB cable
- 1 standard servo motor
- 3 wires connected as follows:
Black/Brown to GND, Red/Orange to 5V, White/Yellow to Digital pin 8



Exercise 1 – Basic structure and syntax

1. Set Board and Ports under Tools dropdown menu
2. Type in this code, and get it to compile (verify).
3. Notice how some words show up in different colors.
4. Run the code and observe the behavior of the servo. Remember to upload after each change.
5. Open the Serial Monitor and set the BAUD rate to 115200
6. Change the positions that the servo will go to.
7. Change the delay time, try 2 different numbers.

```
// servoDB
// this code is starter code for controlling servo motors
// modify it to learn basic coding by creating print
// statements, variables, functions and loops

#include <Servo.h>    // servo library from Arduino

Servo testServo;    // define Servo name

void setup()
{
  Serial.begin(115200);    //setup Serial Monitor
  Serial.println("Servo test code starting..");
  testServo.attach(8);    // set up servos on digital pins 8
} // end of setup()

void loop()
{
  testServo.write(0); // go to specified position in degrees
  delay(1000);        //wait 1 second before the next command
  testServo.write(180);
  delay(1000);
} // end of loop()
```

Exercise 2 – Defining and using Variables

1. Define a **variable** near the top of the code to define the servo positions by inserting these lines before the **void setup()** line. Remember to compile and upload after each change.

```
int startPos = 0;    //start position for the servo
int endPos = 180;   //end position for the servo
int delayTime = 1000; //time between commands

void setup()
{
    ...
}
```

2. Next change the loop() code to use the variables like this:

```
void loop()
{
    testServo.write(startPos);    // go to specified position
    delay(delayTime);            //wait before the next command

    etc.
}
```

3. Change the positions that the servo will go to by changing the variable.
4. Change the delay time and observe how it affects the speed.

Exercise 3 – Conditionals (If statements)

1. Change the range of the servo motion:
 - a. Set the start position to 0 and the end position to 0 when they are declared at the top.
 - b. After each cycle through loop(), increase the end position by 15 as shown here:

```
testServo.write(startPos);
delay(delayTime);
testServo.write(endPos);
delay(delayTime);

if (endPos < 180)
{
    endPos = endPos + 15; //increase end position
}
if (endPos >= 180)
{
    endPos = 0;           // reset end position to 0
}
} // end of loop()
```

2. Vary the delay time, or even make it a function of the endPos (like delayTime = 2000 - endPos * 10)