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// This is the base program for the Fundamentals domain (animatronic
creatures).
// It introduces the structure of a typical Arduino program and lets you
control a servo motor.

////////// CODE COMMENTS //////////

// Anytime you see gray text with // before it, this is called a comment.
Comments let us write notes in regular language,
// and the computer won't think that it's code.

////////// NAMING YOUR SERVO MOTOR //////////

#include <Servo.h> // this tells the computer we want to use special commands
made for controlling servos.
Servo myservo;    // we are telling the computer we are using a Servo motor
and naming it "myservo".

////////// VOID SETUP(): CODE THAT RUNS ONCE //////////

// Underneath this description is an important area in the code called void
setup().
// Any code that we put in the setup() area will run just one time, when the
Arduino starts up.
// After the word setup(), you can see some brackets that look like this: {
}
// We want to put our code that runs just once between these brackets.

void setup() {    // Beginning of setup().

    myservo.attach(9); // this command tells the computer that we have a servo
motor named "myservo" plugged into pin 9.
                        // Change this if you plugged your motor into a different
pin!

}                // End of setup().

////////// VOID LOOP(): CODE THAT RUNS OVER AND OVER //////////

// Underneath this description is another important area in the code called
void loop().
// Any code we put in the loop() area will run over and over again.
// Once the Arduino gets to the end of loop(), it will start over from the
beginning of loop().
// The brackets after loop {      } is where we will put the repeating
"action" parts of our program.

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void loop() {      // Beginning of loop().

//////// SWEEP(): HOW WE MOVE OUR SERVO MOTOR
  // Below, you will see sweep(), which is a command that lets us control the
  speed and position of our servo motor.
  // Inside the (), you have to put three things in order:
  // 1) The name you gave your servo motor (in this case, it's "myservo").
  // 2) The degree you want the motor to move to - servos can move from 0 to
  180 degrees. You can tell it exactly which degree to move to.
  // 3) The speed that you want it to move with. The bigger the number, the
  slower it will go. As an example: 1 is very fast, 10 is medium-slow.

  sweep(myservo, 180, 4);  // move (sweep) our servo to 180 degrees at a
  medium speed.
  delay(500);              // this delay() command tells the computer to wait a
  bit before doing anything else. It uses milliseconds (ms), and 1000 ms = 1
  second.
  sweep(myservo, 0, 9);    // sweep our servo back to 0 degrees at a slower
  speed.
  delay(500);              // wait again before doing anything else.

}                          // End of loop(). The program will start over from the
beginning of loop()!

// Don't change the code under here or your program might break.
// This is some custom code to make the sweeping motion easier to use,
// so that we don't have to use more complicated concepts in our main program.

void sweep(Servo servoName, int targetAngle, int sweepSpeed) {
  int currentPos = servoName.read();

  if (currentPos < targetAngle) {
    for (int i = currentPos; i < targetAngle; i++) {
      servoName.write(i);
      delay(sweepSpeed);
    }
  }

  if (currentPos > targetAngle) {
    for (int i = currentPos; i > targetAngle; i--) {
      servoName.write(i);
      delay(sweepSpeed);
    }
  }
}

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