Lecture E3
Variable Tutorial

Computing and Art : Nature, Power, and Limits
CC 3.12: Fall 2007

Functionalia

Instructor

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Course Web Page

`http://www.sci.brooklyn.cuny.edu/~chipp/cc3.12/`

- **HW E**: DUE Wednesday, Nov 14th, 11:59 pm

Office Hours | Extra Help

My Office Hours :

Mondays 12:30 to 1:30 - basement Ingersoll 0317N

Virtual: Tuesdays 9 to 11pm - AIM: chippbot

Bridges Student Resource Center : 0317N

Monday	1:30 to 5pm
Tuesday	1:30 to 3:30
Wednesday	1:30 to 3:30
Thursday	12:45 - 1:45, 2:15 - 3:15

Functionalia

Today:

- Adding Variables to Your Program Step-by-Step

```
void setup() {
  size(400, 400);
}

void draw() {


}
```

1. Start with the Basic Template

```
// Add variables here

void setup() {
  size(400, 400);
}


void draw() {


}
```

2. Add variables at the top of your Program.

```
// Add variables here

int myvar;

void setup() {

   size(400, 400);

}


void draw() {


}
```

3. We will add an integer variable named **`myvar`**. We can name our variables anything we'd like as long as they are ONE word. They are also CASE SENSITIVE. That means, **`myvar`** is NOT the same as **`MyVar`**.

```
// Add variables here

int myvar;

void setup() {

   size(400, 400);

   myvar = 128;

}


void draw() {


}
```

4. Initially we have no idea what the value of our variable is. In `setup` we will set our variable to the value of 128. We can set it to any value that *matches it's type*.

```
// Add variables here

int myvar;

void setup() {
  size(400, 400);
  myvar = 128;
  println(myvar);
}


void draw() {


}
```

5. We can use the `println` function to see the value of `myvar`.

```
// Add variables here
int myvar;
void setup() {
  size(400, 400);
  myvar = 128;
  println("Awesome " + myvar);
}

void draw() {

}
```

6. We can add our own text to the message that is printed out on the screen. Notice our Text message is surrounded by double-quotes. We use the + sign to connect the variable to the text message.

```
// Add variables here
int myvar;
void setup() {
  size(400, 400);
  myvar = 128;
}

void draw() {
  println("Awesome " + myvar);
}
```

7. Since setup only runs once in our program (at the beginning), we would like to know the value of our variables in our draw function.

Why do we see our message printed over and over again in the console?

```
// Add variables here
int myvar;
void setup() {
  size(400, 400);
  myvar = 128;
}

void draw() {
  println("Awesome " + myvar);
  background(myvar);
}
```

8. We can use variables in all of our drawing functions instead of constant number values. Here we are using our variable in the background function.

```
// Add variables here

int myvar;

void setup() {

  size(400, 400);

  myvar = 128;

}


void draw() {

  myvar = myvar + 1;

  println("Awesome " + myvar);

  background(myvar);

}
```

Whoa what happened?

9. The whole point of variables is that they ***change***. Let us have the variable increment by one every time a frame is drawn.

```
// Add variables here

int myvar;

void setup() {

  size(400, 400);

  myvar = 128;

}

void draw() {

  myvar = myvar + 1;

  println("Awesome " + myvar);

  if(myvar > 255) {

    myvar = 128;

  }

  background(myvar);

}
```

10. After the value of 255, our background function draws the same black background. We can add a conditional to reset the value to 128 (or any number we'd like)

Can you have it do the opposite effect (fade out)?

```
// Add variables here

int myvar;

void setup() {

  size(400, 400);

  myvar = 128;

}

void draw() {

  println("Awesome " + myvar);

  if((mousePressed) && (mouseY < 200)){

    myvar = 0;

  }

  background(myvar);

}
```

11. Instead of having the program change the value of the variable for us. Let's change it outselves.

Here the variable is changed when the mouse is pressed on the ***top half of the screen***.

How would you have it change between two grey colors?

12. We can add an additional conditional that is true when the mouse is pressed on the ***bottom-half of the screen***.

```
// Add variables here
int myvar;
void setup() {
  size(400, 400);
  myvar = 128;
}
void draw() {
  println("Awesome " + myvar);
  if((mousePressed) && (mouseY < 200)){
    myvar = 0;
  }
  if((mousePressed) && (mouseY > 200)){
    myvar = 255;
  }

  background(myvar);
}
```

```
// Add variables here
int myvar;
void setup() {
  size(400, 400);
  myvar = 128;
}
void draw() {
  println("Awesome " + myvar);
  if((mousePressed) && (mouseY < 200)){
    myvar = 0;
  }
  if((mousePressed) && (mouseY > 200)){
    myvar = 255;
  }
  background(128);
  fill(myvar);
  rect(20,20,160,160);
}
```

13. Changing the background gets kinda boring. Let's have it change the color of a shape.

Notice I changed the parameter of the background function back to a constant value.

```
// Add variables here
int myvar;
void setup() {
  size(400, 400);
  myvar = 128;
}
void draw() {
  println("Awesome " + myvar);
  if((mousePressed) && (mouseY < 200)){
    myvar = 0;
  }
  if((mousePressed) && (mouseY > 200)){
    myvar = 255;
  }
  background(128);
  fill(myvar);
  rect(20,20, myvar, myvar);
}
```

14. We can use the variable any where we want as long as it makes sense to have an integer data type.
See below we are adding the variable to the size of the rect.

```
// Add variables here
int myvar;
void setup() {
  size(400, 400);
  myvar = 128;
}
void draw() {
  println("Awesome " + myvar);
  if((mousePressed) && (mouseY < 200)){
    myvar = myvar + 1;
  }
  if((mousePressed) && (mouseY > 200)){
    myvar = myvar - 1;
  }
  background(128);
  fill(myvar);
  rect(20,20, myvar, myvar);
}
```

15. Instead of setting the value of the variable, let us increment if the mouse is pressed in the upper portion of the screen. If the mouse is pressed on the bottom portion of the screen, let us decrement the variable.

16. We can add many other variables to our program to be used in changing what we see on the screen.

```
// Add variables here
int myvar;
int anothervar;
void setup() {
   size(400, 400);
   myvar = 128;
   anothervar = 0;
}
void draw() {
   println("Awesome " + myvar);
   println("Another variable " + anothervar);
   if((mousePressed) && (mouseY < 200)) {
      myvar = myvar + 1;
      anothervar = anothervar - 1;
   }
   if((mousePressed) && (mouseY > 200)){
      myvar = myvar - 1;
      anothervar = anothervar + 1;
   }
   background(128);
   fill(anothervar);
   rect(20,20, myvar, myvar);
}
```

HW E Part 2 are exercises to practise adding variables to the program.

HW E has changed - the Color Swatch Problem has changed. You may turn in the original problem for extra credit.