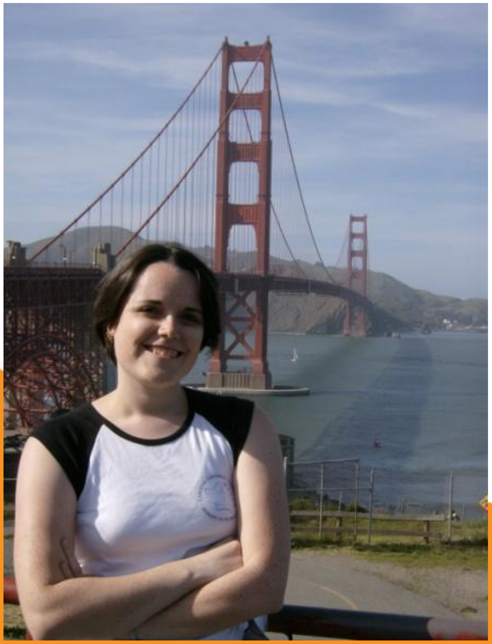
Welcome!

GO
CODE
GIRL
IMAGINE. DESIGN. CREATE.

ABOUT ME



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Who Are You?

- What school do you go to?
- What grade are you in?
- What made you come to the workshop?
- What’s something interesting we can’t tell by looking at you?

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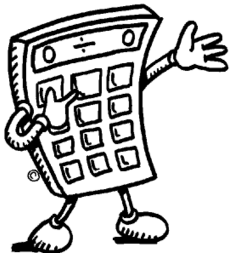
What is Computer Science?



Solving Problems!

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Pathways in Computer Science

http://www.youtube.com/watch?v=jq_EcstLlfE

What About Women in CS?

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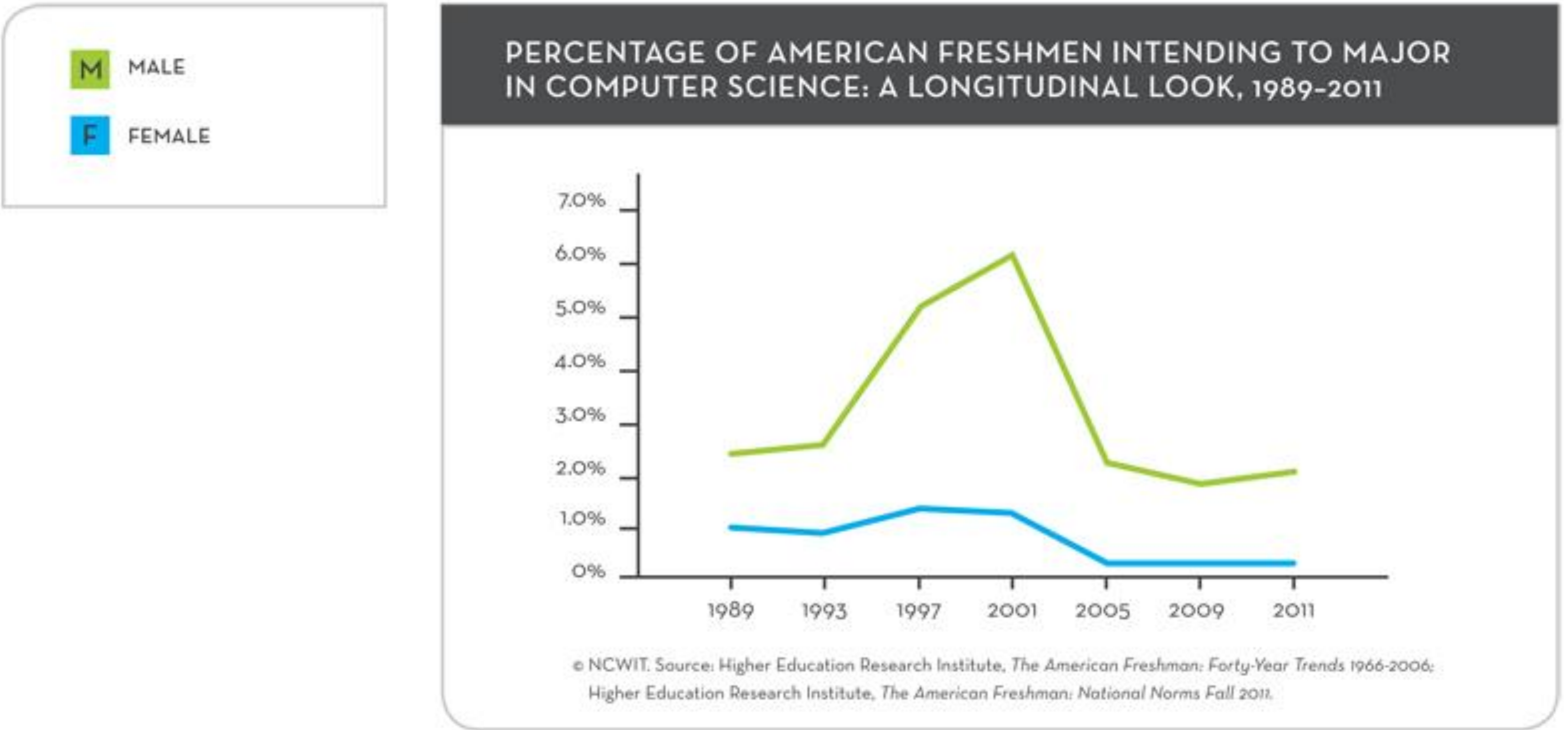

PERCENTAGE OF AMERICAN FRESHMEN INTENDING TO MAJOR IN COMPUTER SCIENCE: A LONGITUDINAL LOOK, 1989–2011

© NCWIT. Source: Higher Education Research Institute, *The American Freshman: Forty-Year Trends 1966-2006*; Higher Education Research Institute, *The American Freshman: National Norms Fall 2011*.

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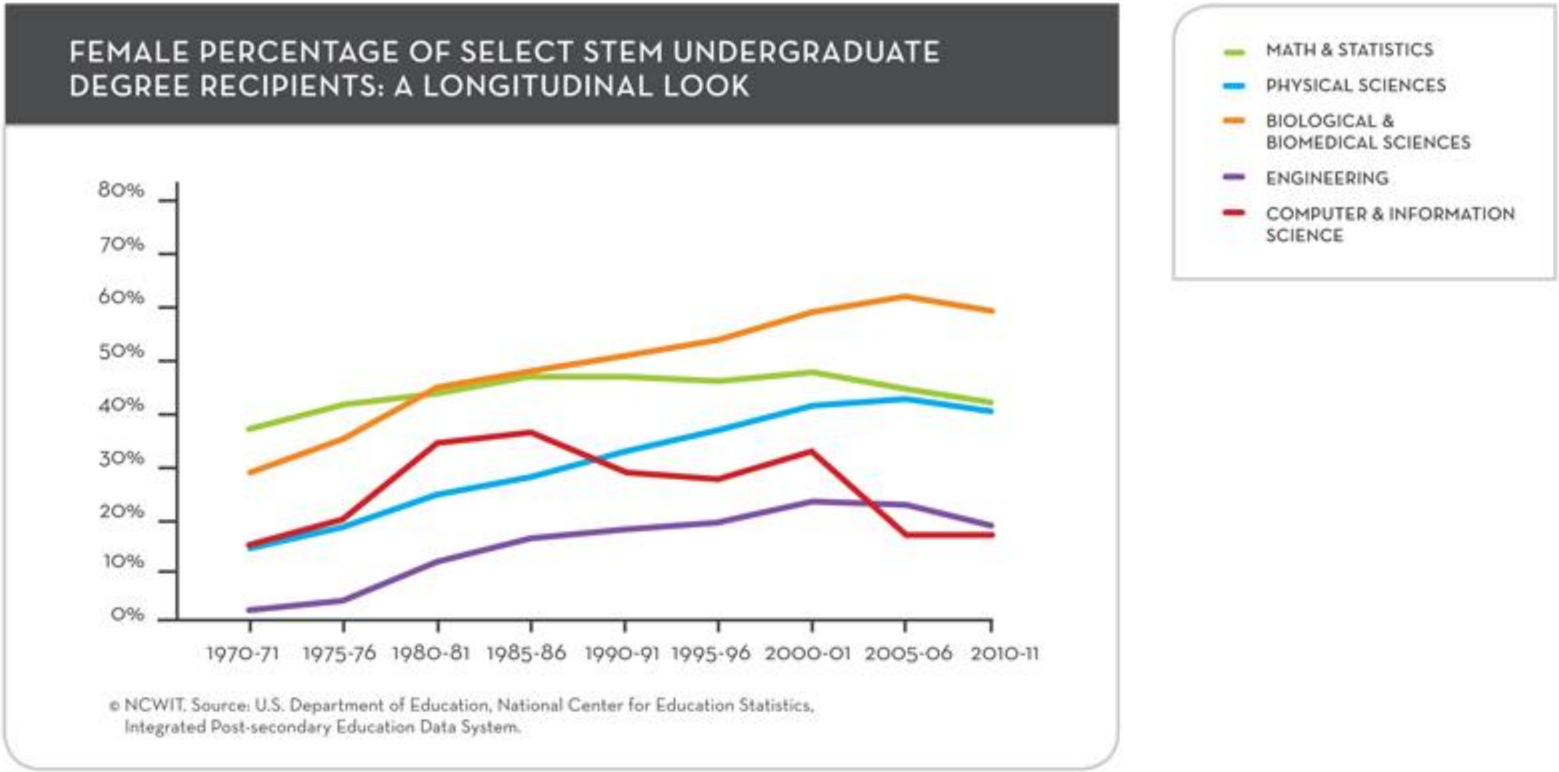

FEMALE PERCENTAGE OF SELECT STEM UNDERGRADUATE DEGREE RECIPIENTS: A LONGITUDINAL LOOK

© NCWIT. Source: U.S. Department of Education, National Center for Education Statistics, Integrated Post-secondary Education Data System.

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Women Earn:

57% of all undergraduate degrees

42% of all undergraduate math and statistics degrees

40% of all undergraduate physical sciences degrees

but only …

18% of all undergraduate computer and information sciences degrees

http://www.ncwit.org/infographic/3435

Why Do We Have This Problem?

- Why don’t girls go into computer science?
- Why is this a bad thing?
- What kinds of things would make you interested in taking computer science in high school and university?

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Endless Possibilities of Computer Science

http://www.youtube.com/watch?v=DYBPotROKC8

Processing Demo!

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http://www.gailcarmichael.com/gocodegirl/demo.html

Variables

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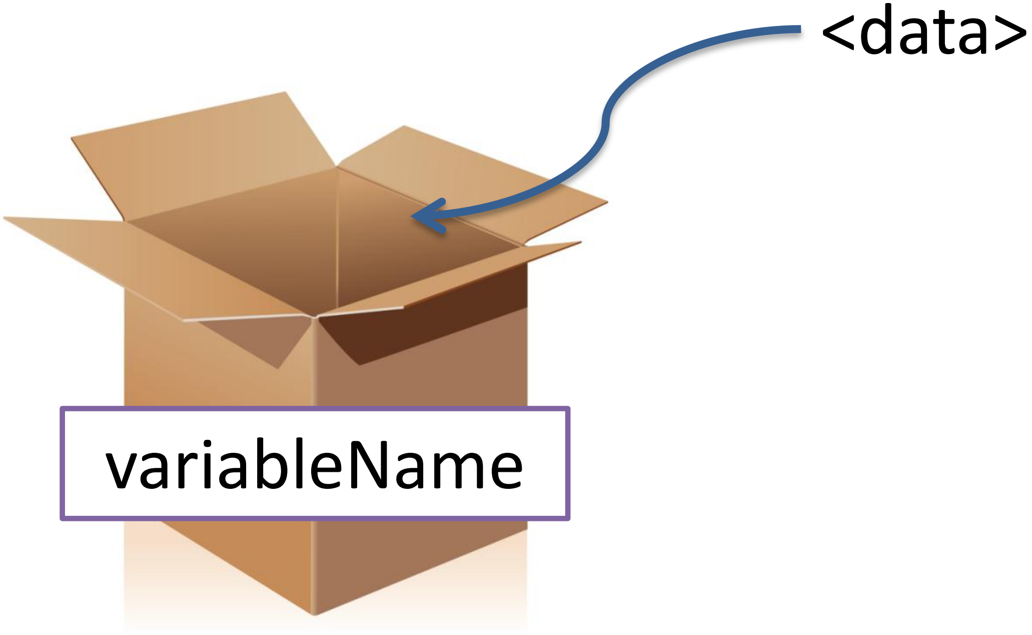
Variables

variableName

```
int currentSequenceLength;
```

Variables

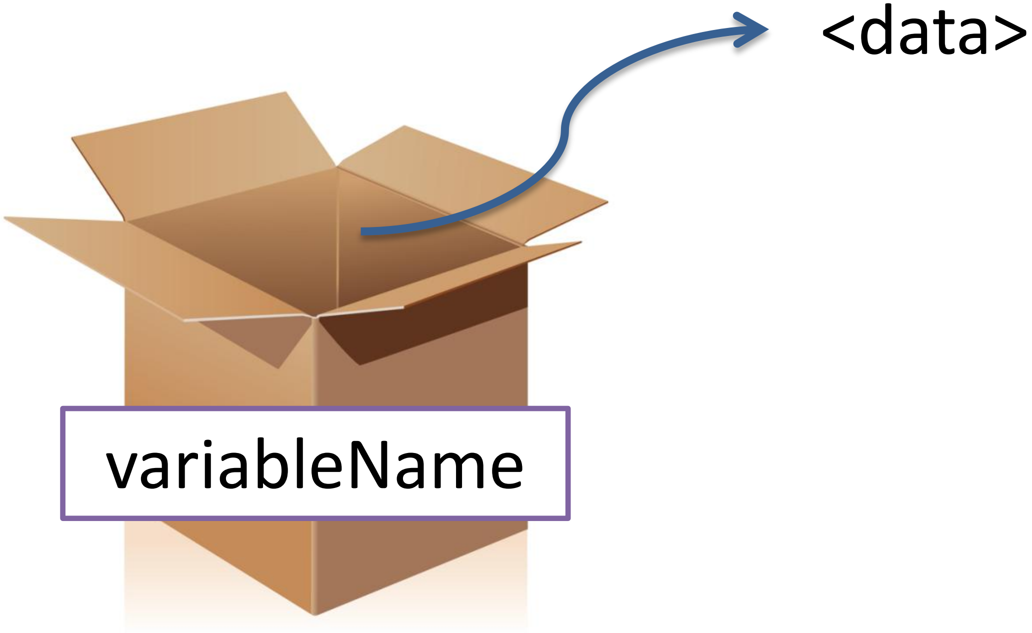


<data>

variableName

```
currentSequenceLength = 2;
```

Variables

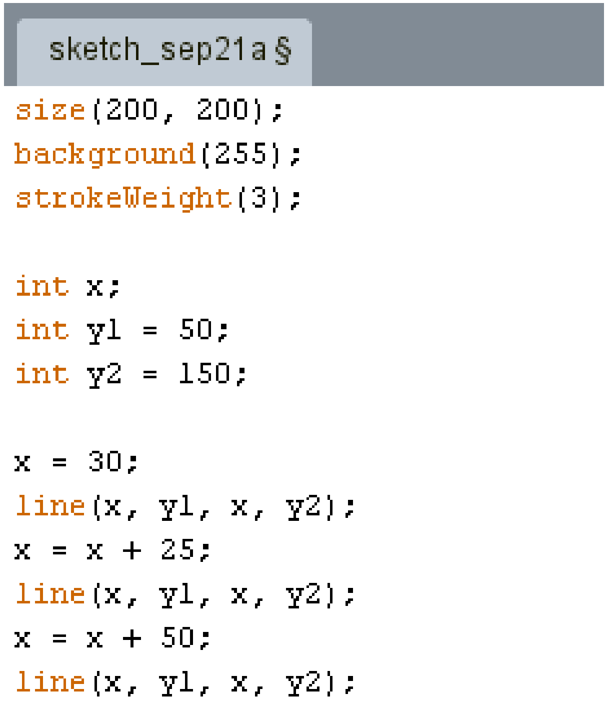


<data>

variableName

```
currentSequenceItemIndex == currentSequenceLength - 1;
```

```
Shape currentClickedItem = null; // for during user-click mode
Shape currentSequenceItem = null; // for showing-thesequence mode

PFont font;
String currentTextStatus;
final String memorizeText = "Memorize this...";
final String clickText = "Now you try.";
```



```
size(200, 200);
background(255);
strokeWeight(3);

int x;
int y1 = 50;
int y2 = 150;

x = 30;
line(x, y1, x, y2);
x = x + 25;
line(x, y1, x, y2);
x = x + 50;
line(x, y1, x, y2);
```

True, False, and If

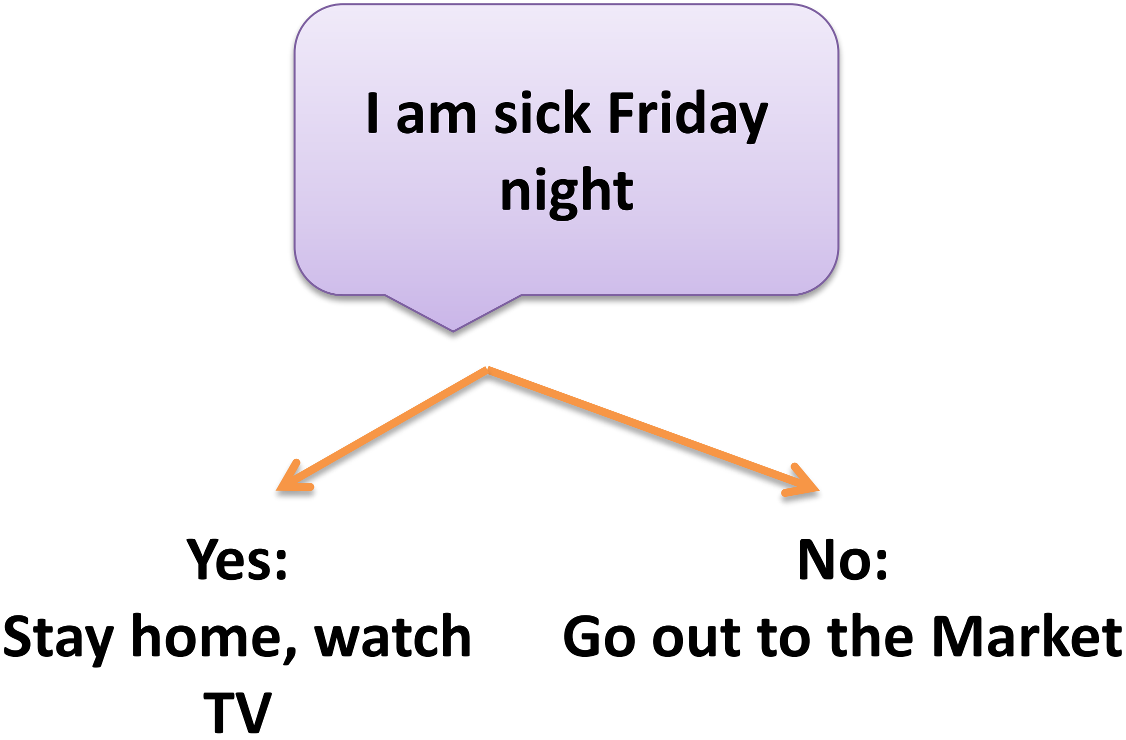
boolean

Yes/
True

or

No/
False

If/Else Statements

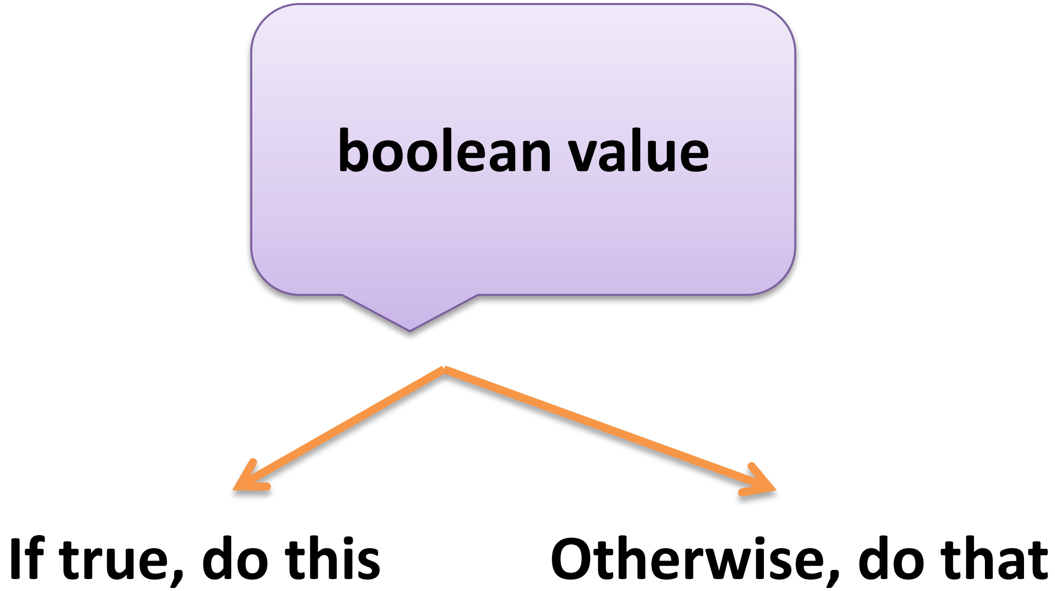


I am sick Friday night

Yes:
Stay home, watch TV

No:
Go out to the Market

If/Else Statements

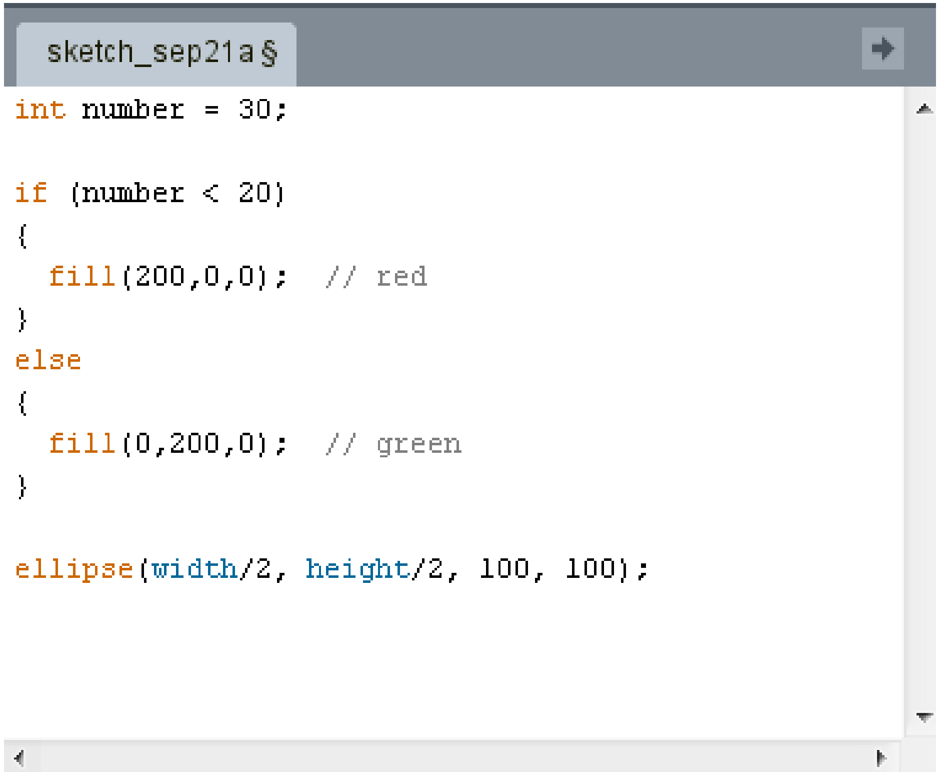


boolean value

If true, do this

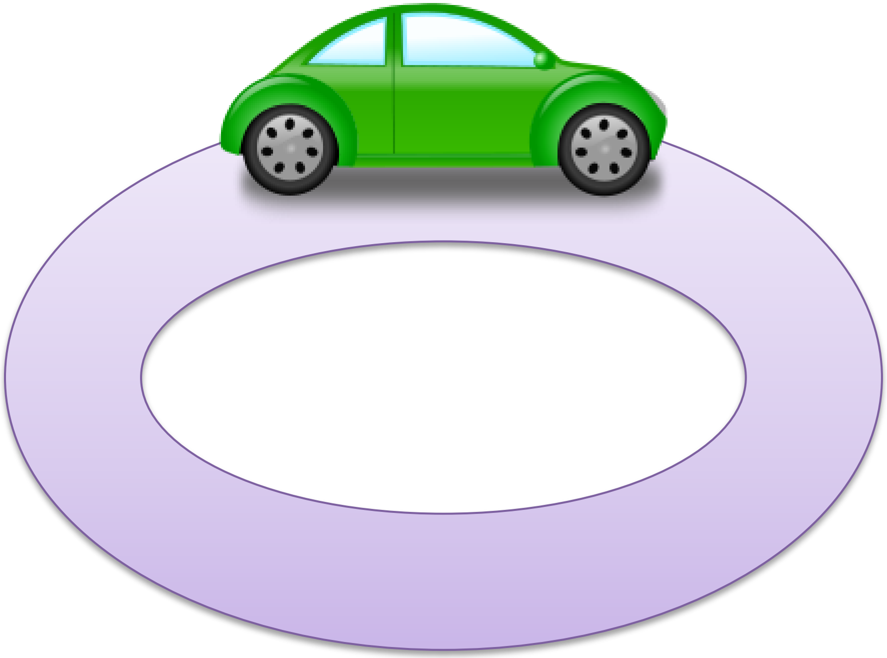
Otherwise, do that

```
if (atEndOfSequence())
{
  // Switch back to showing-sequence mode
  showingSequence = true;
  currentSequenceItemIndex = 0;
  currentSequenceItem = memorySequenceList.get(currentSequenceItemIndex);
  currentTextStatus = memorizeText;
  currentSequenceLength++;
  currentSequenceItem.startTimer();
}
else
{
  // Move to the next item
  currentSequenceItemIndex++;
  currentSequenceItem = memorySequenceList.get(currentSequenceItemIndex);
}
```



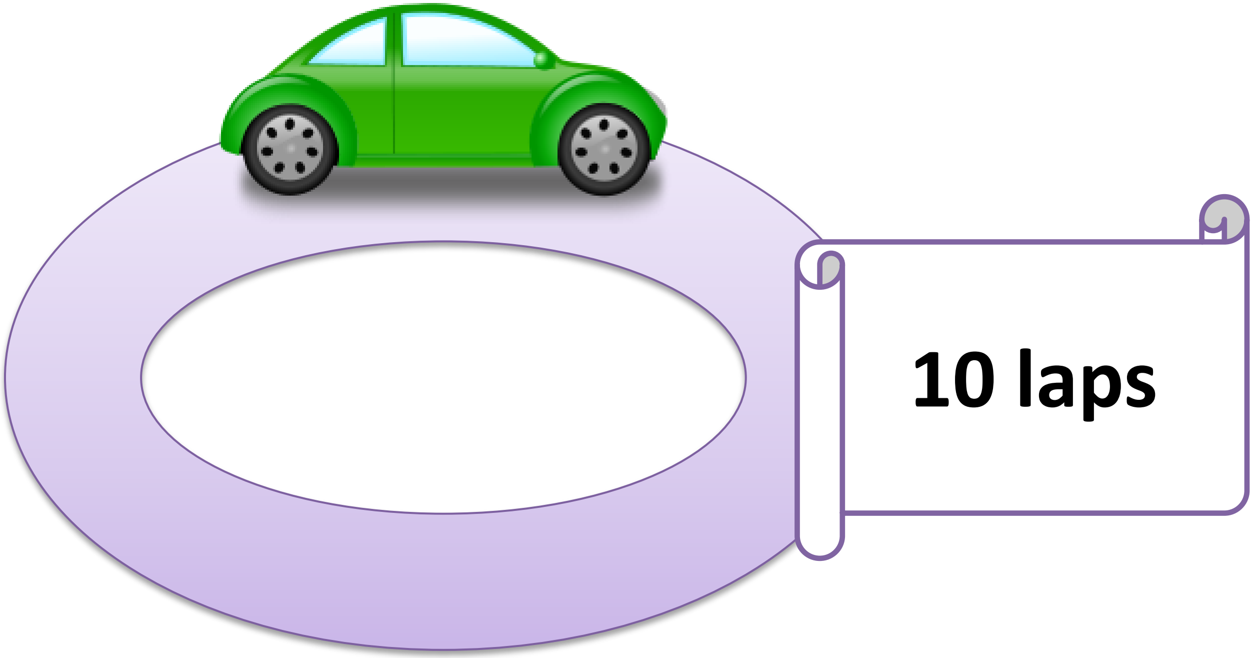
```
int number = 30;

if (number < 20)
{
  fill(200,0,0);  // red
}
else
{
  fill(0,200,0);  // green
}

ellipse(width/2, height/2, 100, 100);
```

Loops



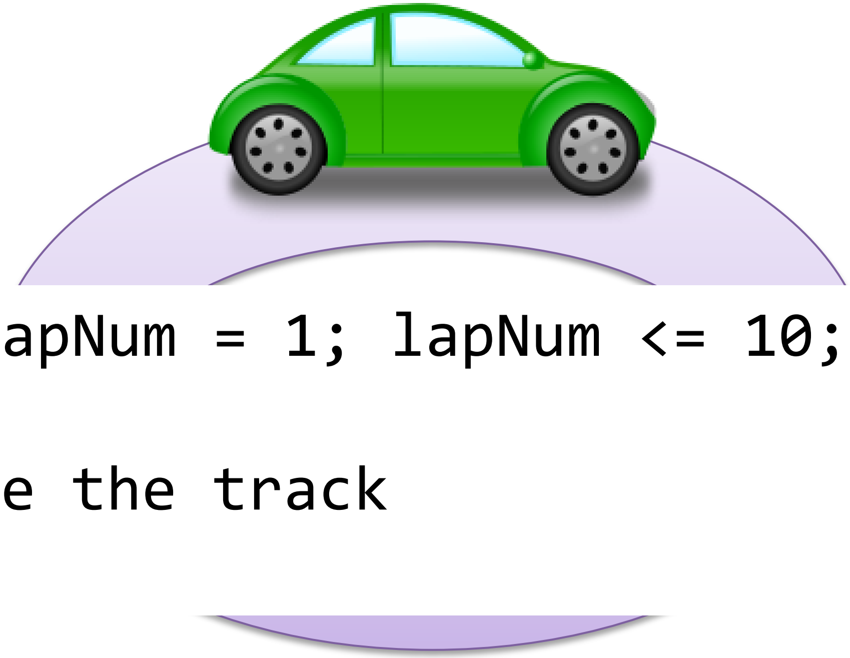
Drive the same track multiple times

for loop



Drive the same track exactly ten times

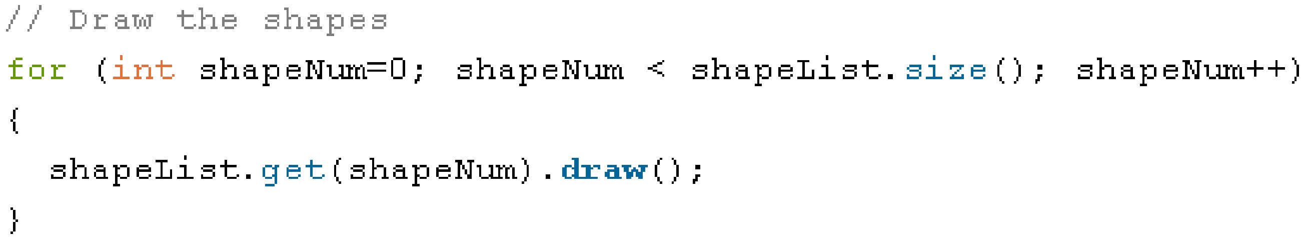
for loop



```
for (int lapNum = 1; lapNum <= 10; lapNum++)
{
   // drive the track
}
```

Drive the same track exactly ten times

for loop



```
// Draw the shapes
for (int shapeNum=0; shapeNum < shapeList.size(); shapeNum++)
{
  shapeList.get(shapeNum).draw();
}
```

while loop

Drive the track while the car still has gas

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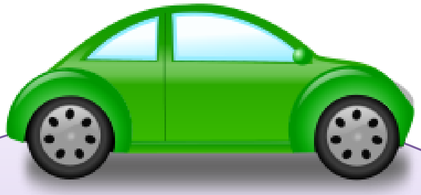
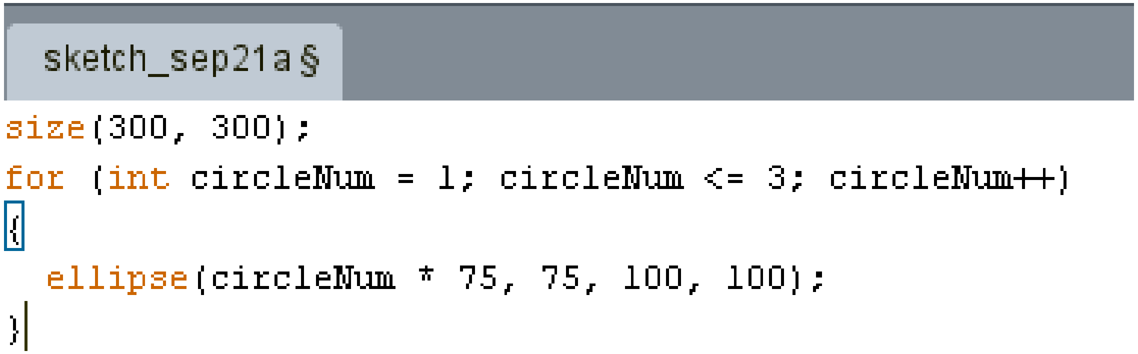
while loop



```
int gas = 100;
while (gas > 0)
{
  gas = gas - 5;
  // drive the track
}
```

Drive the track while the car still has gas

for loop



```
size(300, 300);
for (int circleNum = 1; circleNum <= 3; circleNum++)
{
  ellipse(circleNum * 75, 75, 100, 100);
}
```

What about three rows of circles?

Arrays and Lists

arrays

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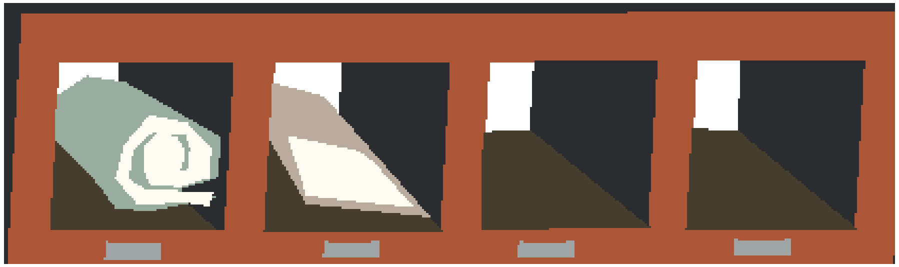
arrays

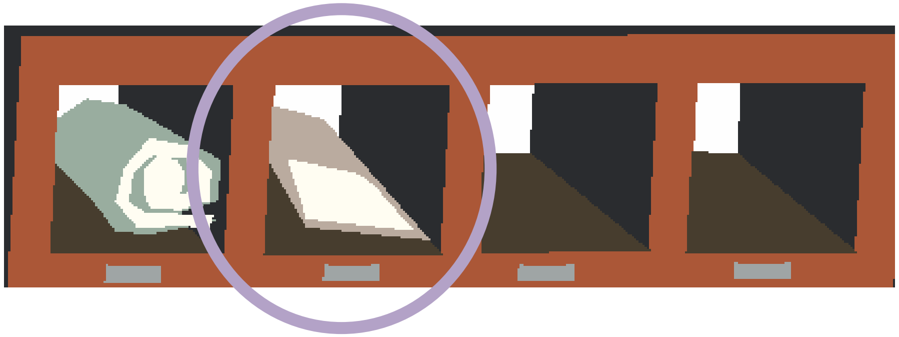
`arrayName`



0 1 2 3

arrays

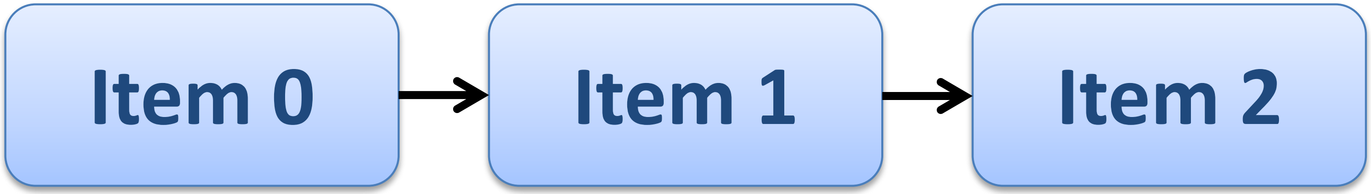
arrayName



0 1 2 3

arrayName[1]

Array List



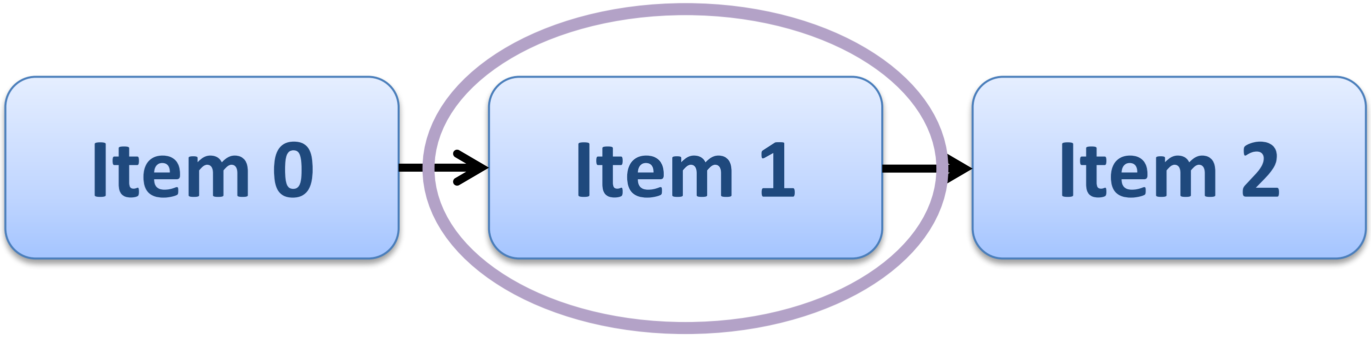
Item 0

Item 1

Item 2

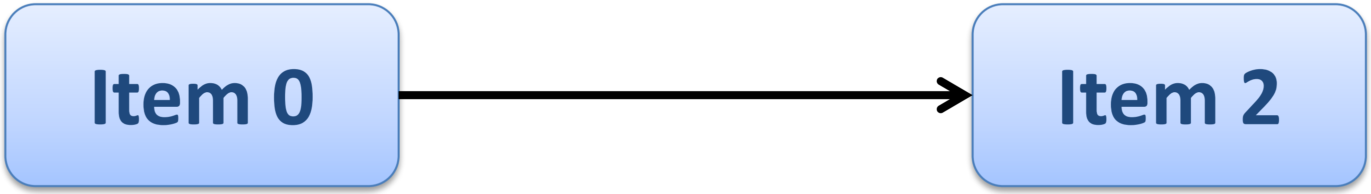
```
ArrayList<Shape> shapeList = new ArrayList<Shape>();
shapeList.add(new Shape()); // item 0
shapeList.add(new Shape()); // item 1
shapeList.add(new Shape()); // item 2
```

Array List



```
shapeList.get(1);
```

Array List

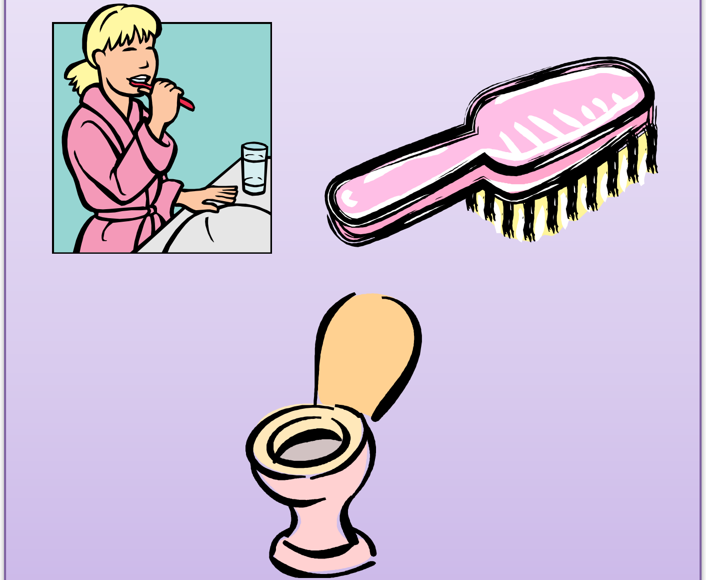


```
shapeList.remove(1);
```

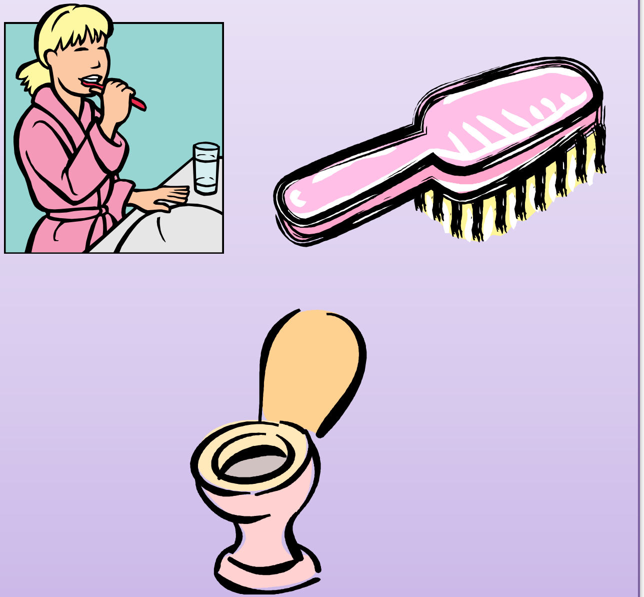
Methods

methods

Morning Routine

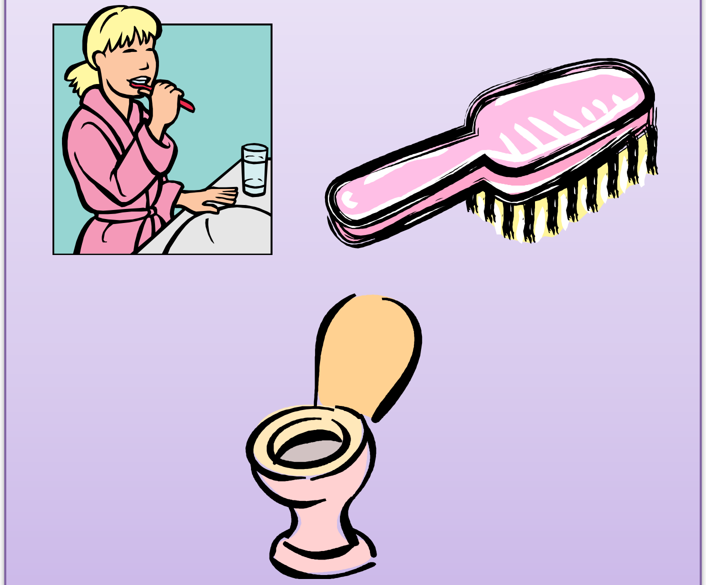


Bedtime Routine

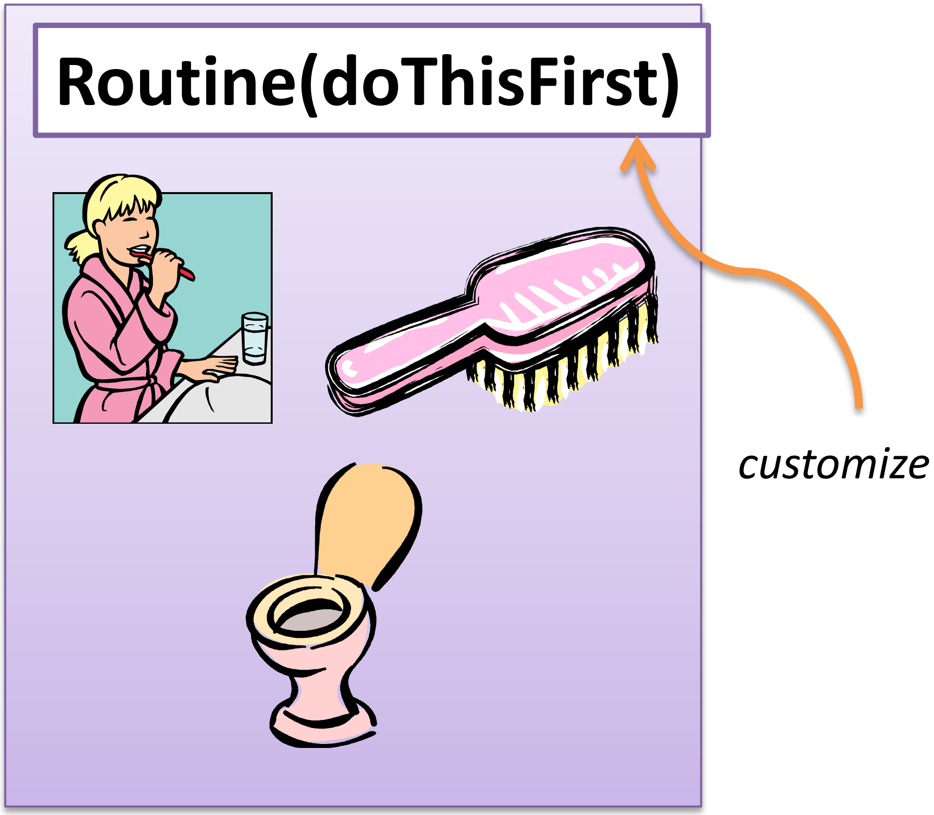


methods

Routine



methods



Routine(doThisFirst)

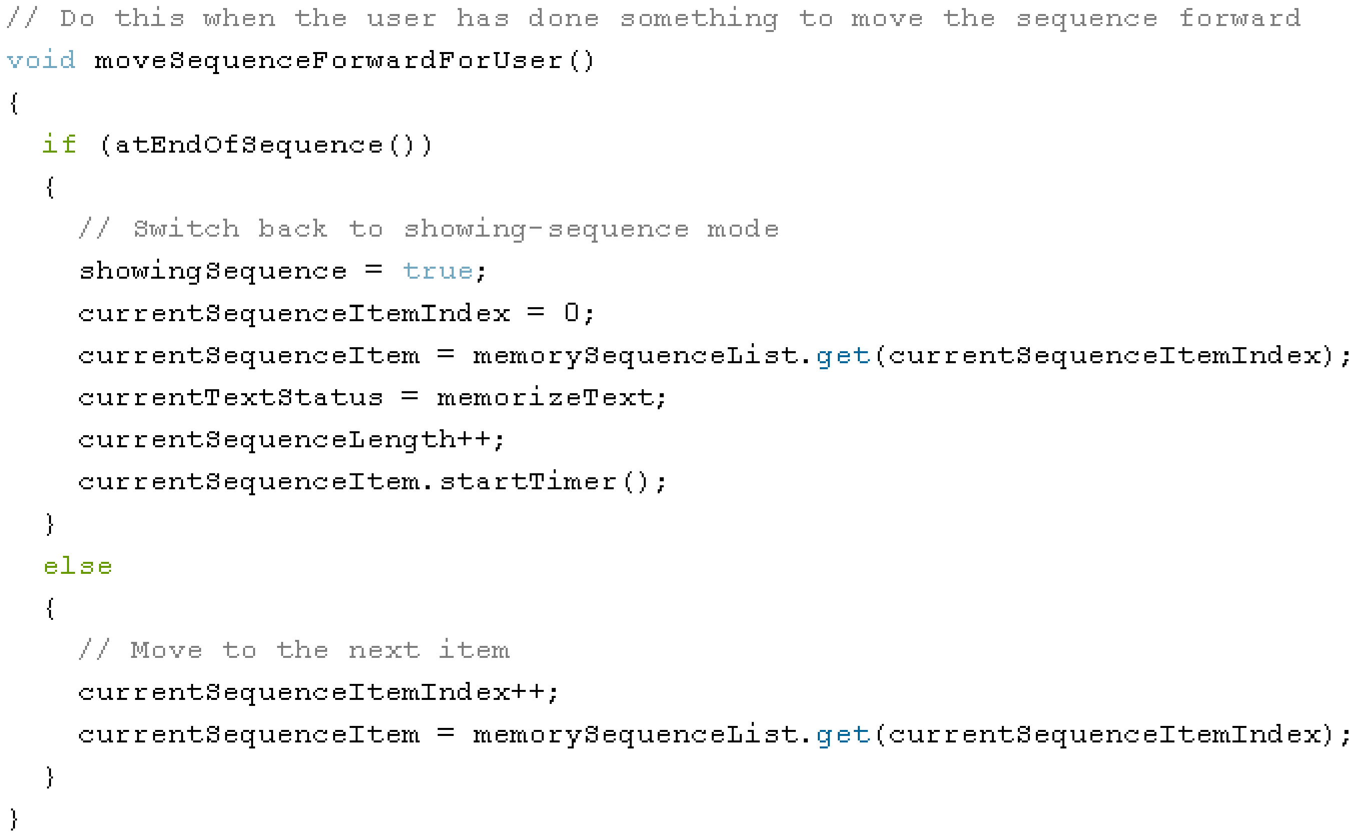
customize

methods

```
void methodName(argumentType argument, …)
{
  // do stuff
}

returnType methodName(argumentType argument, …)
{
  // do stuff
  return <returnType>;
}
```

methods



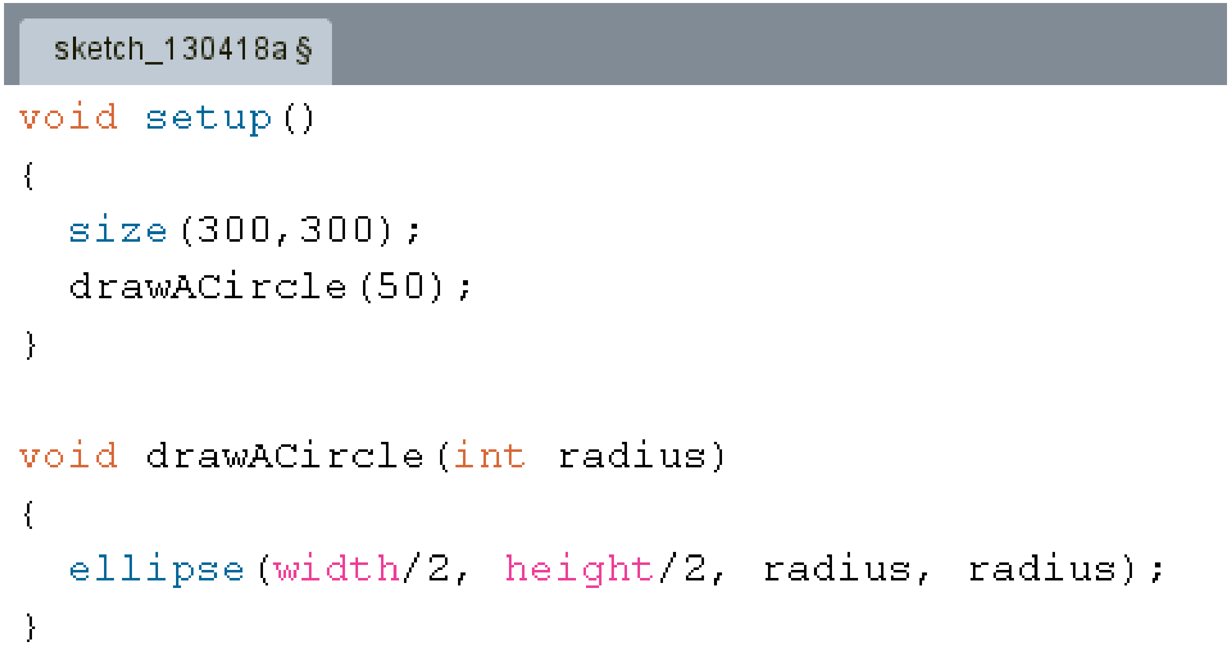
```
// Do this when the user has done something to move the sequence forward
void moveSequenceForwardForUser()
{
  if (atEndOfSequence())
  {
    // Switch back to showing-sequence mode
    showingSequence = true;
    currentSequenceItemIndex = 0;
    currentSequenceItem = memorySequenceList.get(currentSequenceItemIndex);
    currentTextStatus = memorizeText;
    currentSequenceLength++;
    currentSequenceItem.startTimer();
  }
  else
  {
    // Move to the next item
    currentSequenceItemIndex++;
    currentSequenceItem = memorySequenceList.get(currentSequenceItemIndex);
  }
}
```

methods

Special Processing Methods

```
void setup()
void draw()
void mouseClicked()
```

(etc…)



```
void setup()
{
  size(300,300);
  drawACircle(50);
}

void drawACircle(int radius)
{
  ellipse(width/2, height/2, radius, radius);
}
```

Objects

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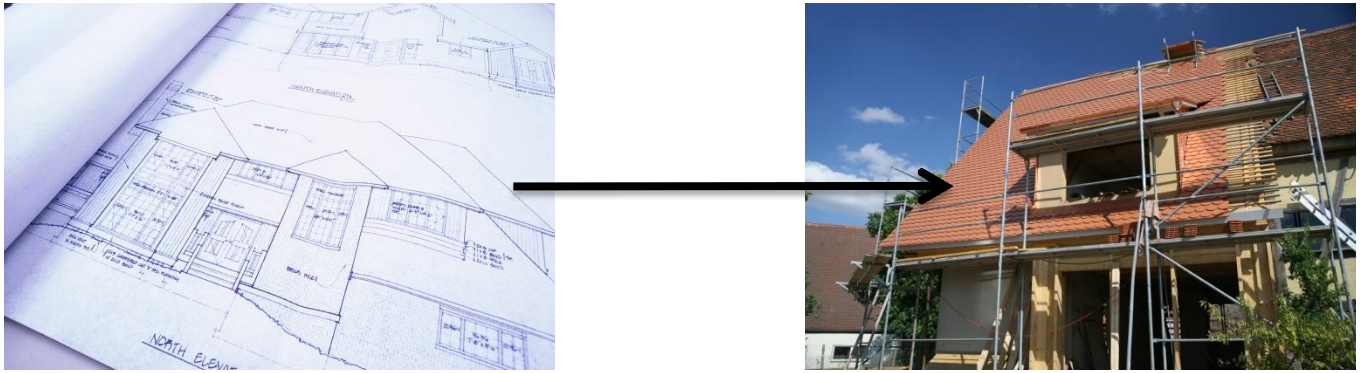
Objects

Objects

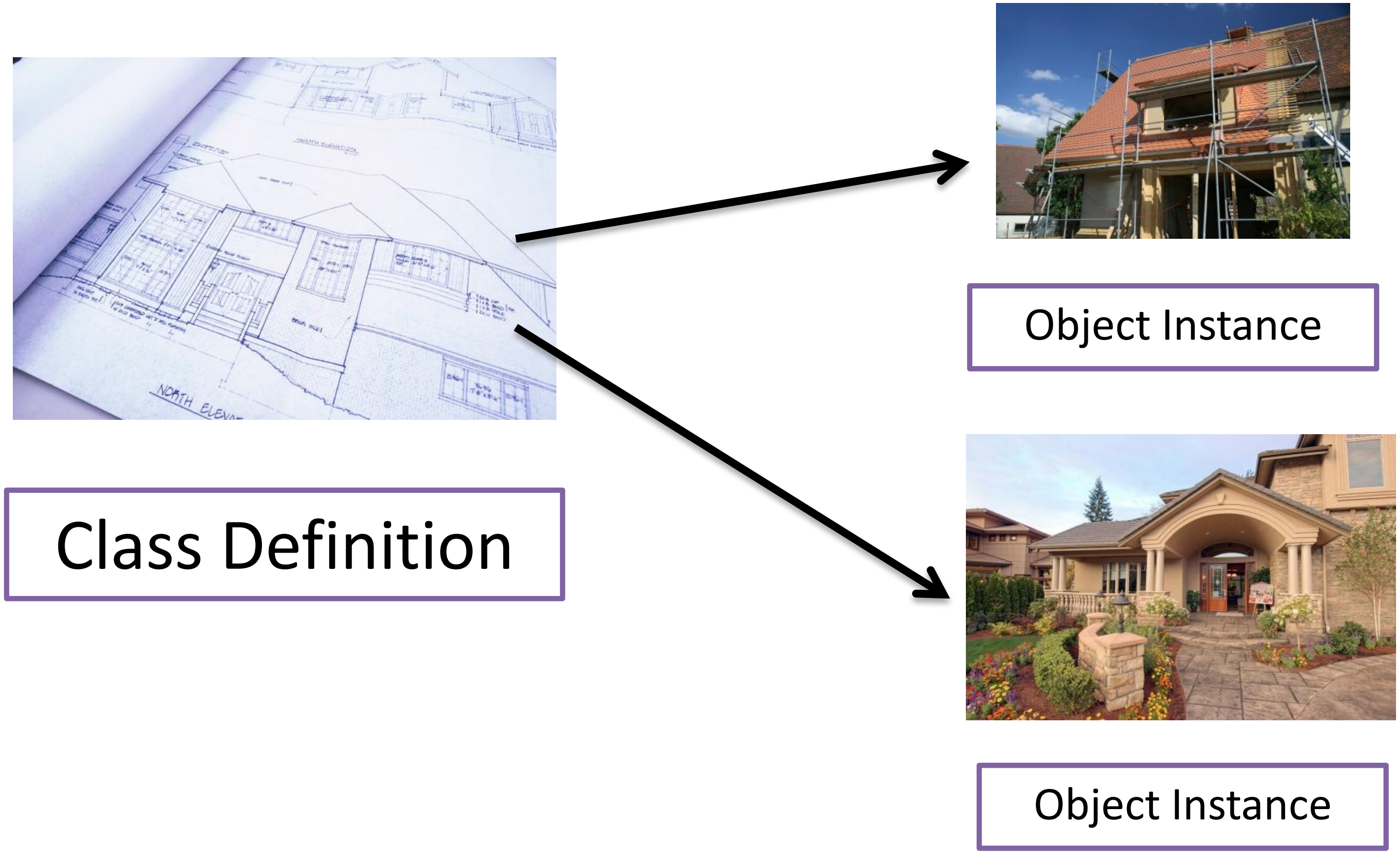
Objects



Class Definition

Object Instance

Objects

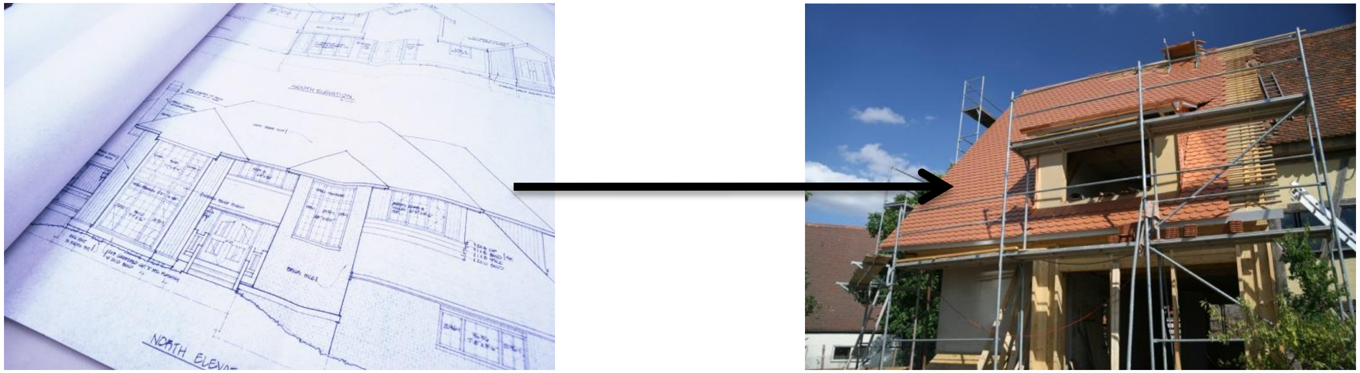


Class Definition

Object Instance

Object Instance

Objects



Class Definition

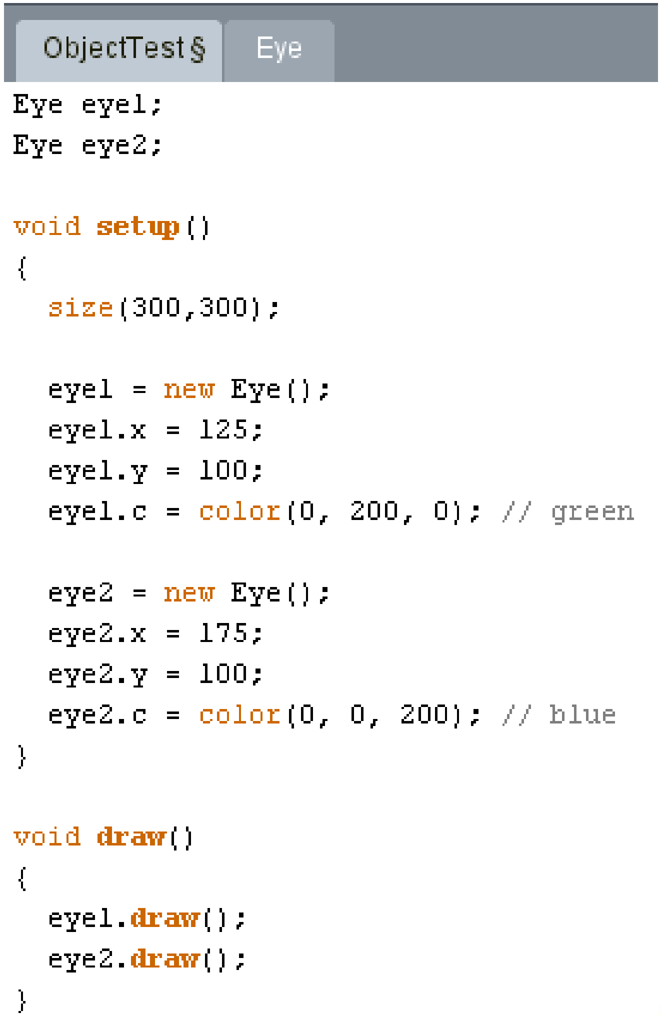
Variables
Methods

Object Instance

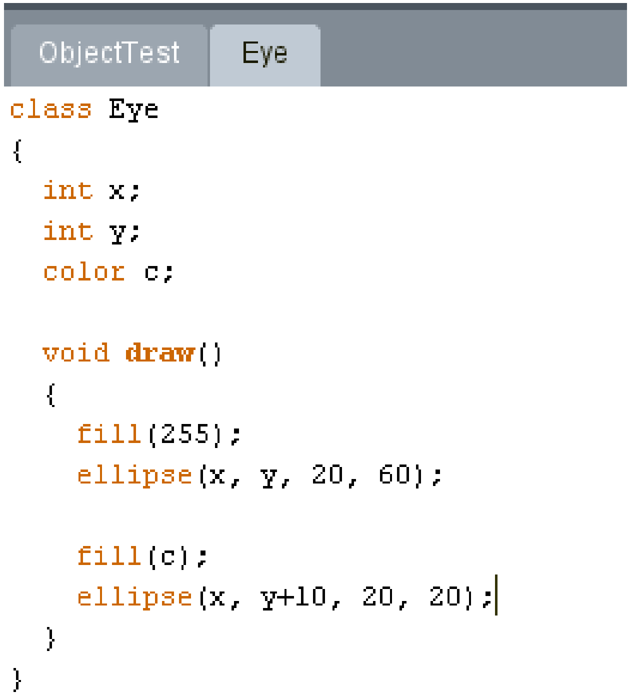
Specific Variables
Specific Methods

```
class Shape
{
 private int x;
 private int y;

 private color fillColor;

 private boolean litUp;
 private boolean pausing;
 private int timerCount;

 private int diameter = 100;

 final int numFramesBetweenShapes = 30 * 1;
 final int numFramesToLightShape = 30 * 1;


 // Constructor
 Shape(int newX, int newY, color c)
 {
   x = newX;
   y = newY;
   fillColor = c;
   litUp = false;
   timerCount = 0;
 }
```

```
shapeList = new ArrayList<Shape>();

// Row 1
shapeList.add(new Shape(100, 100, color(255,139,0)));
shapeList.add(new Shape(250, 100, color(11,73,216)));
shapeList.add(new Shape(400, 100, color(0,214,160)));

// Row 2
shapeList.add(new Shape(100, 250, color(0,132,99)));
shapeList.add(new Shape(250, 250, color(158,86,0)));
shapeList.add(new Shape(400, 250, color(195,212,249)));

// Row 3
shapeList.add(new Shape(100, 400, color(114,155,249)));
shapeList.add(new Shape(250, 400, color(107,249,213)));
shapeList.add(new Shape(400, 400, color(186,124,50)));
```



```
Eye eye1;
Eye eye2;

void setup()
{
  size(300,300);

  eye1 = new Eye();
  eye1.x = 125;
  eye1.y = 100;
  eye1.c = color(0, 200, 0); // green

  eye2 = new Eye();
  eye2.x = 175;
  eye2.y = 100;
  eye2.c = color(0, 0, 200); // blue
}

void draw()
{
  eye1.draw();
  eye2.draw();
}
```



```
class Eye
{
  int x;
  int y;
  color c;

  void draw()
  {
    fill(255);
    ellipse(x, y, 20, 60);

    fill(c);
    ellipse(x, y+10, 20, 20);
  }
}
```