Parameterized Shapes

Color
- A data type that represents an RGB color
  color oliveGreen = color(85, 107, 47);
- Functions that return a color component
  - red()
  - green()
  - blue()
  color c = color(20, 20, 140);
  float r = red(c);
  float g = green(c);
  float b = blue(c);
  fill(r, g, b);
  fill(color(r, g, b));
  fill(c);

Example
- gradient

So far...
- A program consists of actions:
  - call drawing functions
    - line, rect, ellipse, etc.
  - change the drawing state
    - size, background, stroke
  - compute
    - *, /, %, cos, etc.
  - input
    - mouse
    - keyboard
- Actions are done on:
  - literals
    - 1, 2, 3, 'a', "hello", 1.0, true, etc.
  - variables
    - int x;
    - boolean test;
    - etc.
- Actions happen sequentially unless
  - if(condition){}
  - while(condition){}
  - functionCall();

Variables
- New concept
  - store a group of values
- A sequence or collection of values
  - (1, 2, 3, 4)
  - (2, 4, 6, 8)
  - (1, 3, 5, 7)
  - (1, 2, 3, 4, 1, 1, 1, 1, 5, 6, 7, 2, 3, 2, 2, 7, 7, 7, 6, 5, 4, 4)

Array, Variable Grouping
- a fixed size
- one type of value
- declare an array
  - int[] intervals;
  - float[] temps;
- instantiate an array
  - intervals = new int[10];
  - temps = {1.0, 3.2, 0.2, 12.0};
- assign values to elements of an array
  - intervals[0] = 10;
  - temps[2] = -300.0;
Arrays

• A special kind of variable that holds not one, by many data items of a given type.
• Declared like variables, only type is followed by a pair of brackets.
  float[] xs;
• Can be instantiated using a special syntax involving the new keyword, the type, and a size in brackets.
  int[] primes = new int[10]; // Ten primes
• Or initialized with a list of values
  int[] primes = {2, 3, 5, 7};

Arrays

• Individual data items are accessed with an index and square brackets.
  – primes[0], primes[1], etc
  – indexes start at 0!
• The length of an array can be determined using its length property.
  – primes.length
  – The length of an array is one greater than the last valid index.
• Arrays can be passed to, and returned from functions.

Array as parameter of a function

void drawCircles(int diameter[]) { 
  for (int i=0; i < diameter.length; i++) { 
    // draw the circle
    ellipse(random(width), random(height),
           diameter[i], diameter[i]);
  }
}

int[] diameters = new int[10];
void setup() { 
  size(500, 500);
  // fill with random values between 0 and width/2
  for (int i=0; i<diameters.length; i++) { 
    diameters[i] = int(random(width/2));
  }

  fill(255, 0, 0);
  for (int i=0; i<diameters.length; i++) { 
    ellipse(random(width), random(height),
            diameters[i],
            diameters[i]);
  }
}