Slide 1

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Simple Data Visualization

Slide 2: Recall
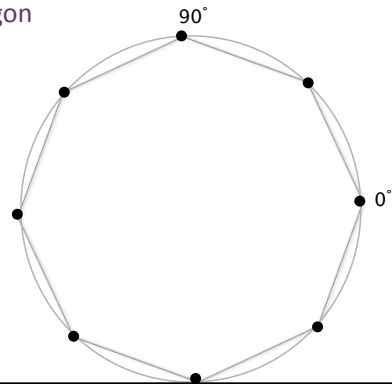
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Recall

- TileGrid

```
for(int i = 0; i < numRect; ++i) {
  for(int j = 0; j < numRows; ++j) {
    fill(255);
    rect(initX + i*xDist, initY + j*yDist,
        xWidth, yHeight);
    fill(0);
    textSize(30);
    textAlign(CENTER,CENTER);
    text(i + "," + j, initX + i*xDist,
        initY + j*yDist, xWidth, yHeight);
  }
}
```

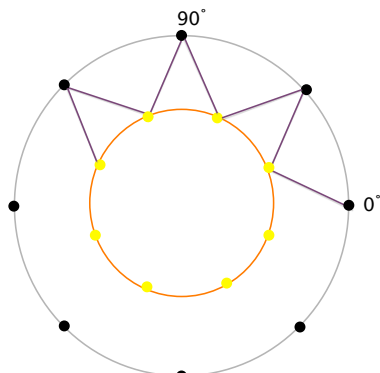## Slide 3: Numbered

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Numbered

- TileGrid numbered

```
for(int i = 0; i < numRect; ++i) {
  for(int j = 0; j < numRows; ++j) {
    fill(255);
    rect(initX + i*xDist, initY + j*yDist,
        xWidth, yHeight);
    fill(0);
    textSize(30);
    textAlign(CENTER,CENTER);
    text("" + (j*numRect+i+1),
        initX + i*xDist, initY +
        j*yDist,xWidth,yHeight);
  }
}
```

Slide 4: Polygon

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Polygon

Slide 5: Star

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Star

Slide 6: What is an Array?

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What is an Array?

- An array has 3 roles:
  - holds a group of values
  - a limited example of an object
  - Array variables are references, not values.
- Limited example of an object
  - must use new to instantiate it
  - has length as a field
  - When a variable represents an array it is always a reference.

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);
```

http://cs.brynmawr.edu/cs110dc/colors.html

Example: BallDrop Array

Functions Informally (reminder)

- A function A function is like a subprogram, a small program inside of a program.
- The basic idea – we write a sequence of statements and then give that sequence a name. We can then execute this sequence at any time by referring to the name.
- Function definition: this is where you create a function and define exactly what it does
- Function call: when a function is used in a program, we say the function is *called*.
- A function can only be defined once, but can be called many times.

Variable Scope

The part of the program from which a variable can be accessed.

Rules:

1. Variables declared in a block are only accessible within the block.
2. Variables declared in an outer block are accessible from an inner block.
3. Variables declared outside of any function are considered global (available to all functions).
4. Arrays and classes are passed by reference instead of copied

array functions

- Make a function void zeros(int[] changeMe) that takes an array of ints and sets all of its values to 0;
- Make a function float[] zeros(int size) that creates a float array of length size, sets all of the values to 0.0, and returns the array.
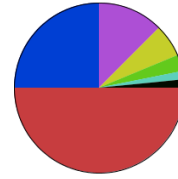
Plots

- Bar graphs
- Pie Charts
- Line Charts

+ Snowfall in Bryn Mawr, PA

Date	Snowfall in inches
Feb 8	0.2
Feb 9	0.3
Feb 10	0.4
Feb 11	0.0
Feb 12	0.2
Feb 13	0.0
Feb 14	0.0
Feb 15	1.0

+ Pie Chart

Example Pie Chart

Legend

- 50.0%
- 25.0%
- 12.5%
- 6.25%
- 3.125%
- 1.5625%
- 1.5625%