CSC 240
Computer Graphics

Sara Mathieson
Fall 2016
Smith College

Outline: 9/19

- Review Lab 1

- Polygons

HW 1 due Tuesday
by midnight **(tomorrow)**

Admin: Office Hours

Monday 4-5pm (Ford 015)
Tuesday 4-5pm (Ford 015)

TA hours Sun-Tues:
7:30-9:30pm (241 Ford)

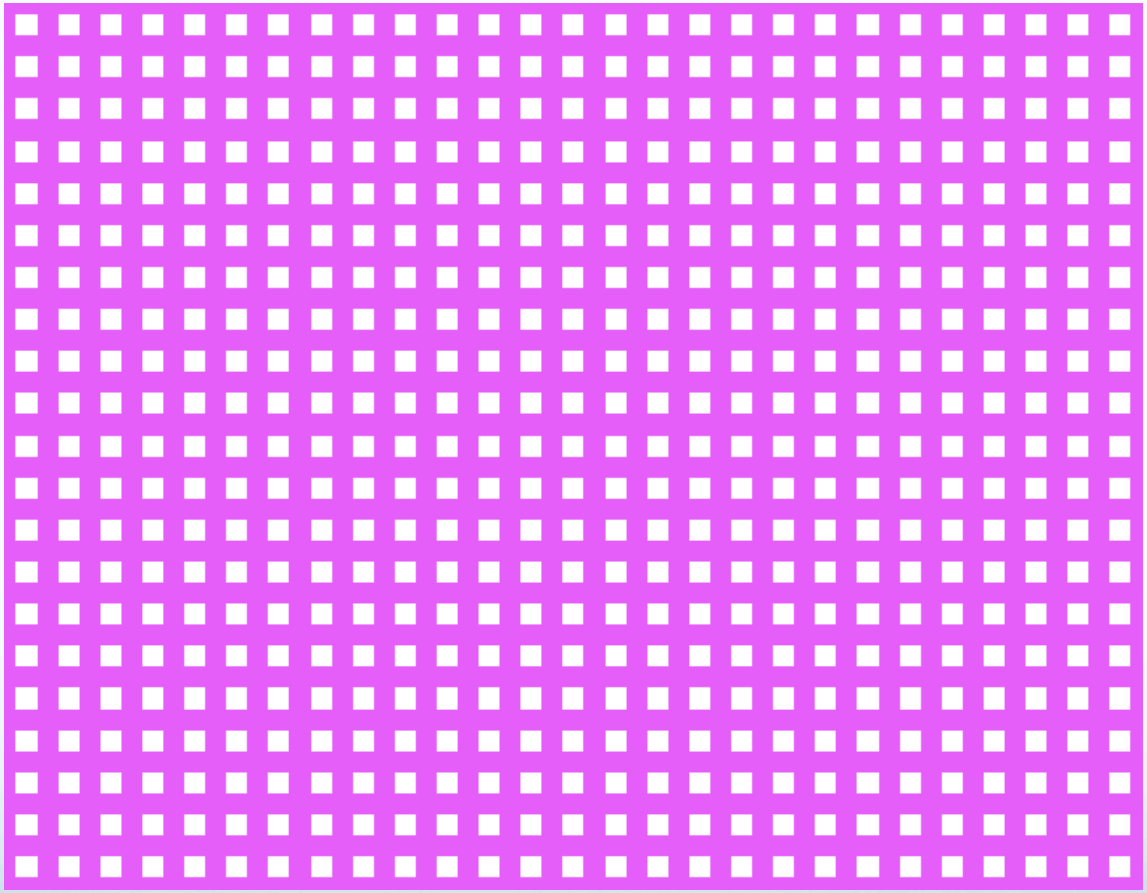
White background slides from Eitan Mendelowitz

By the end of the week...

- Use your line algorithm to draw polygons.
- Draw a regular polygon given its center and side length.
- Fill a convex polygon using two different algorithms.

Review Lab 1

Checkerboard Examples

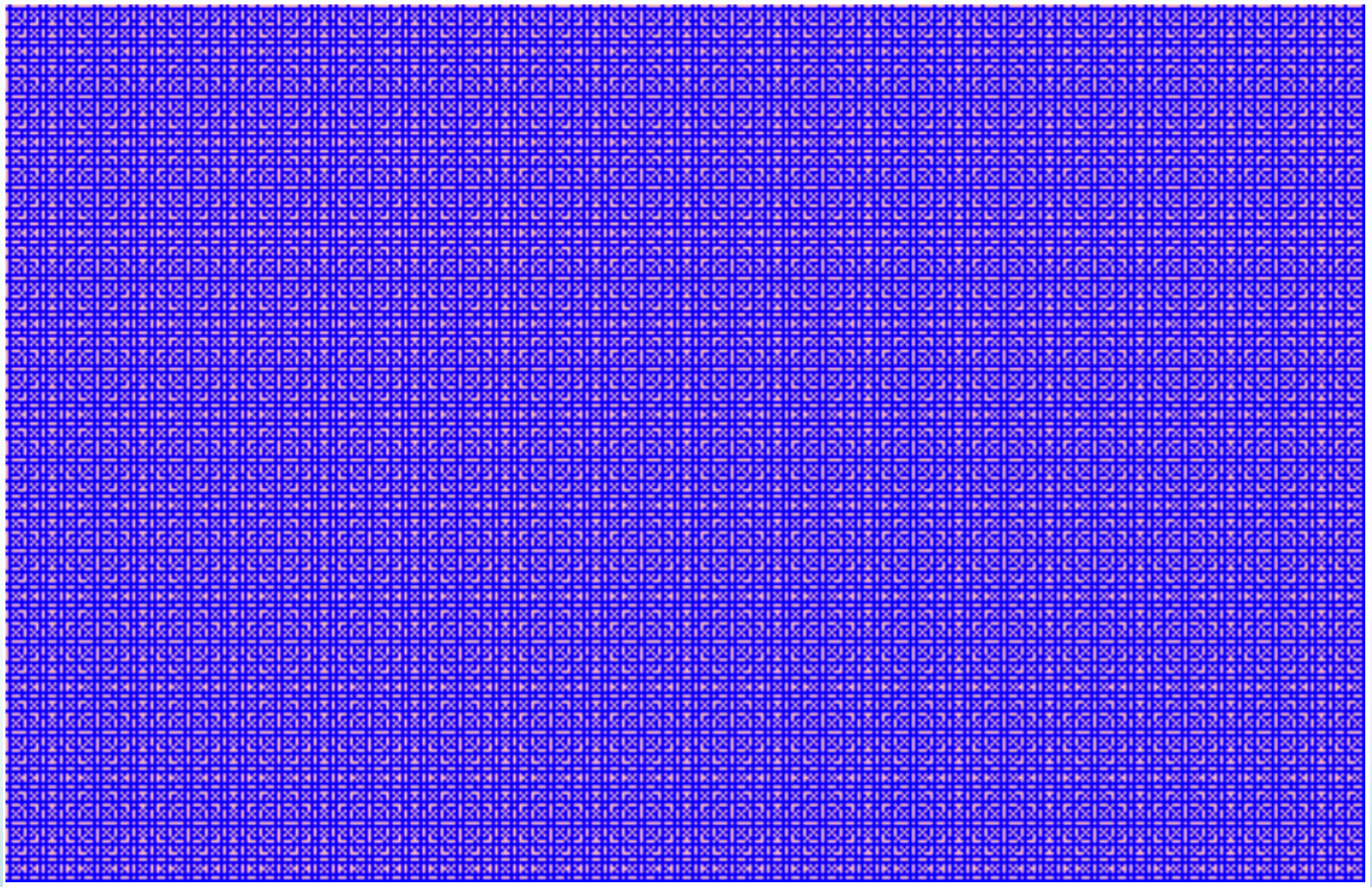


Ji Young

Checkerboard Examples

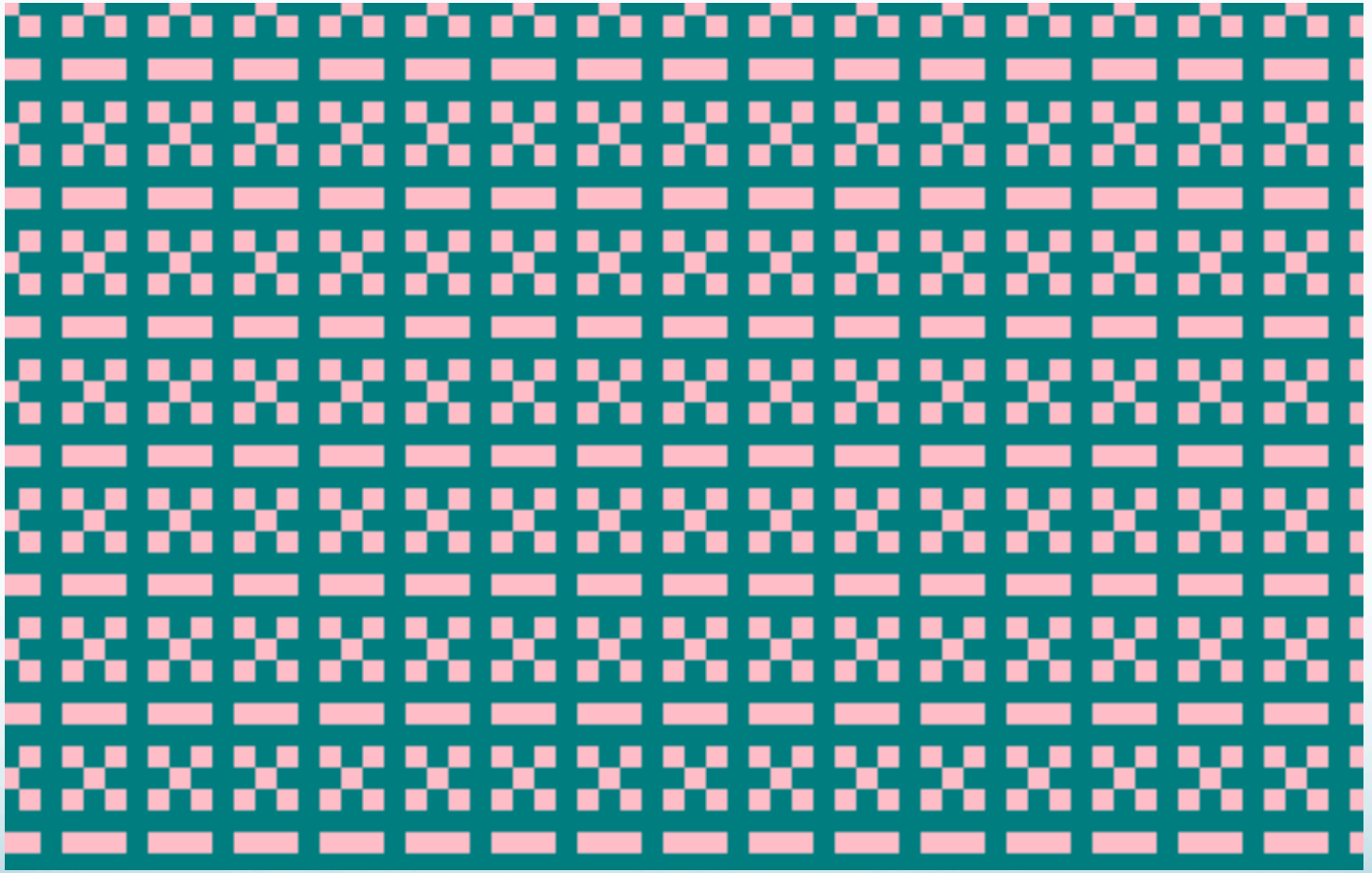
Alex and Miriam

Checkerboard Examples



Amyrah

Checkerboard Examples



Lynn

Lab 1: Example Solution

JavaScript

```
function draw() {
    // draw on the canvas, using the graphics context

    for (var x = 0; x < canvas.width; x++) {
        for (var y = 0; y < canvas.height; y++) {
            var color = pixColor(x,y);
            graphics.fillStyle = color;
            graphics.fillRect(x,y,1,1);
        }
    }
}
```

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Python

```python
def draw():
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    for x in range(canvas.width):
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```

x += 1
x = x + 1

Python

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def draw():
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```

Use "var" every time you create a new variable.

Python

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```

Lab 1: Example Solution

JavaScript

```
var squareSize = 10;

function pixColor(x,y) {
    if (x % (squareSize*2) >= squareSize && y % (squareSize*2) >= squareSize) {
        return "white";
    } else {
        return "purple";
    }
}
```

Lab 1: Example Solution

JavaScript

```javascript
var squareSize = 10;

function pixColor(x,y) {
    if (x % (squareSize*2) >= squareSize && y % (squareSize*2) >= squareSize) {
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Python

```python
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def pixColor(x,y):
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        return "white"
    else:
        return "purple"
```

JavaScript Math

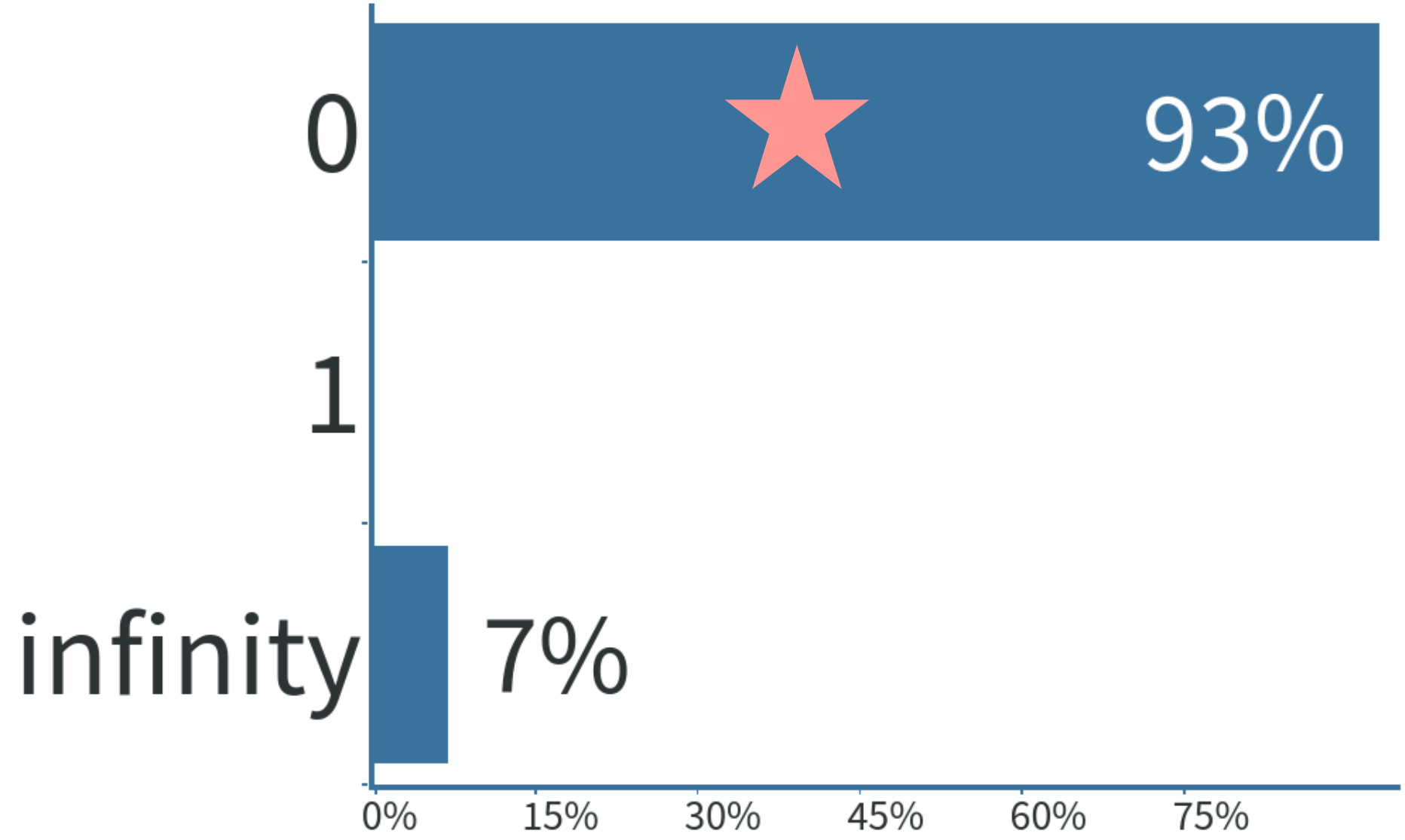
- **Math.round(2.8)** // returns 3
- **Math.min(70,50)** // returns 50
- **Math.max(70,50)** // returns 70
- **Math.random()** // returns a number between 0 and 1
- **Math.sin(x)**, **Math.cos(x)**, **Math.tan(x)**
- **Math.pow(4,2)** // 4^2, returns 16
- **Math.sqrt(16)** // returns 4

Recap Slope

What is the slope of a line with endpoints (50,30) and (70,30)?

When poll is active, respond at **PollEv.com/saramathieso692**

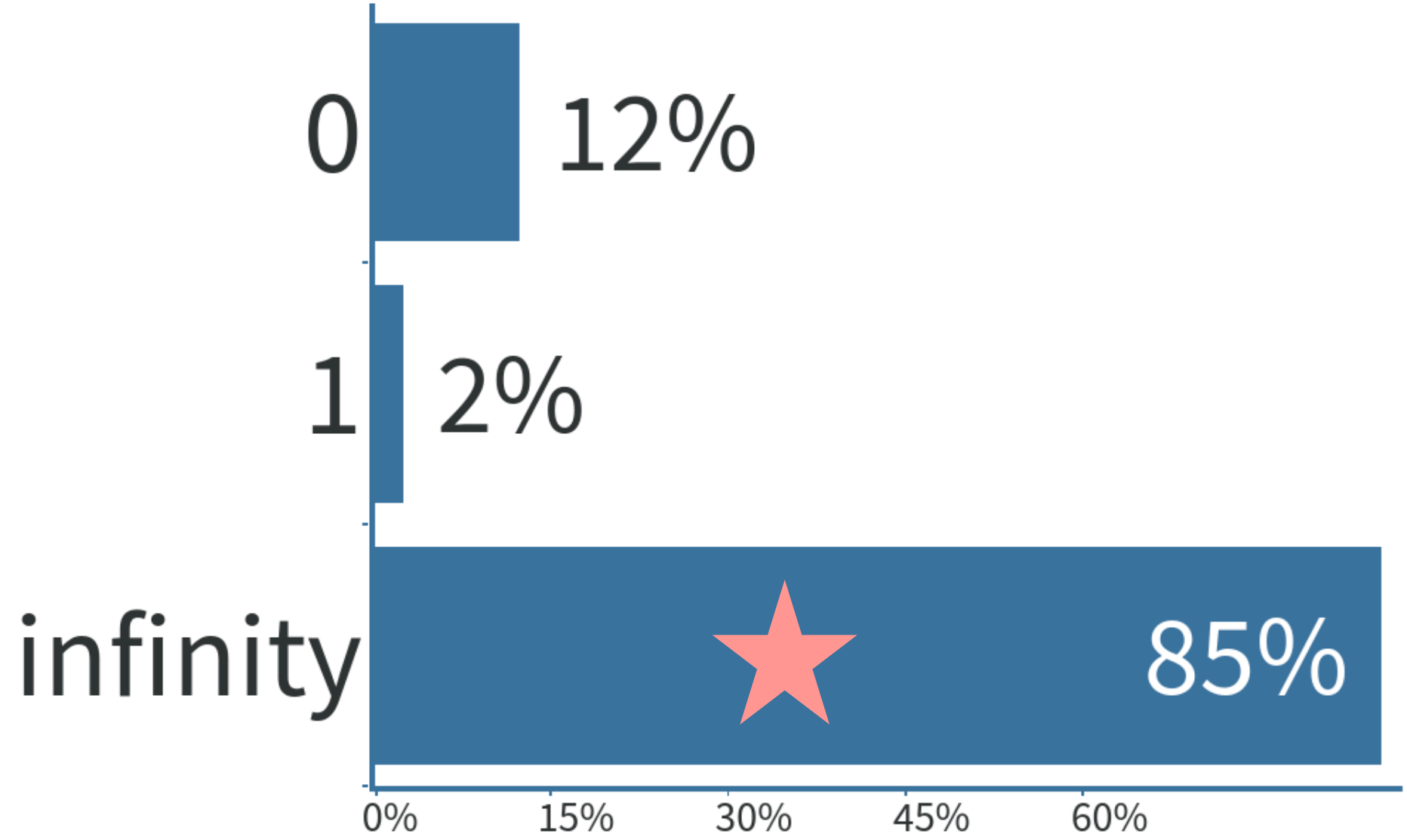
Text **SARAMATHIESO692** to **22333** once to join



What is the slope of a line with endpoints (50,30) and (50,70)?

When poll is active, respond at **PollEv.com/saramathieso692**

Text **SARAMATHIESO692** to **22333** once to join



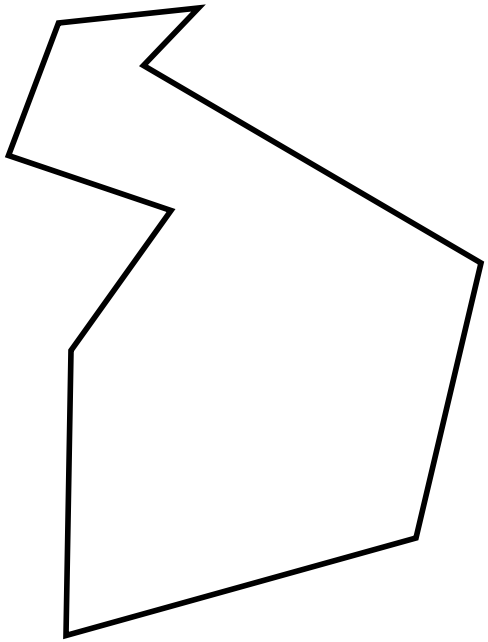
Polygons

Polygon Definition:

A chain of line segments that forms a closed loop

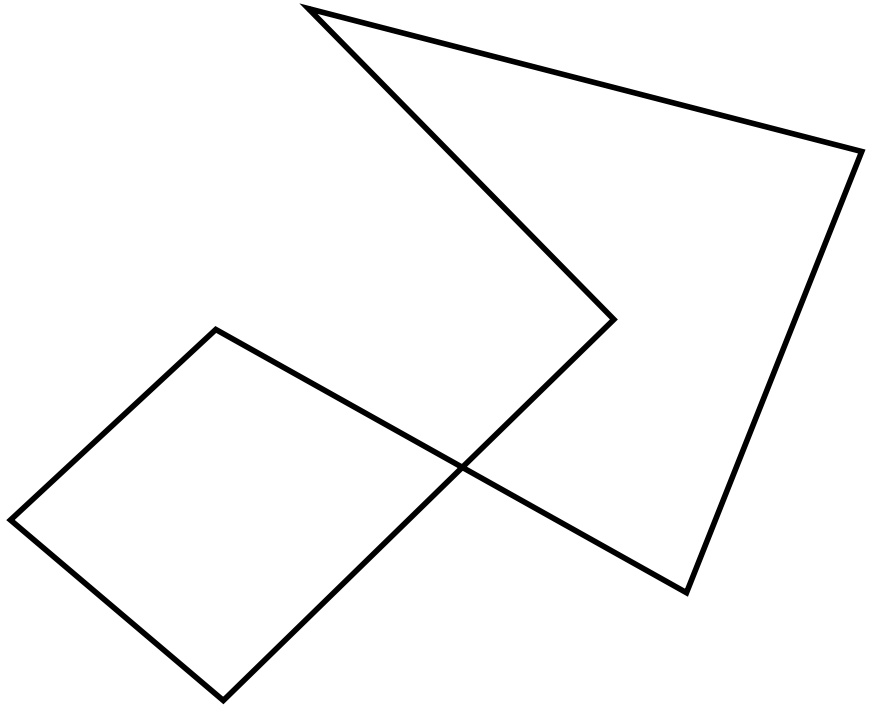
Simple Polygon

- no self intersections



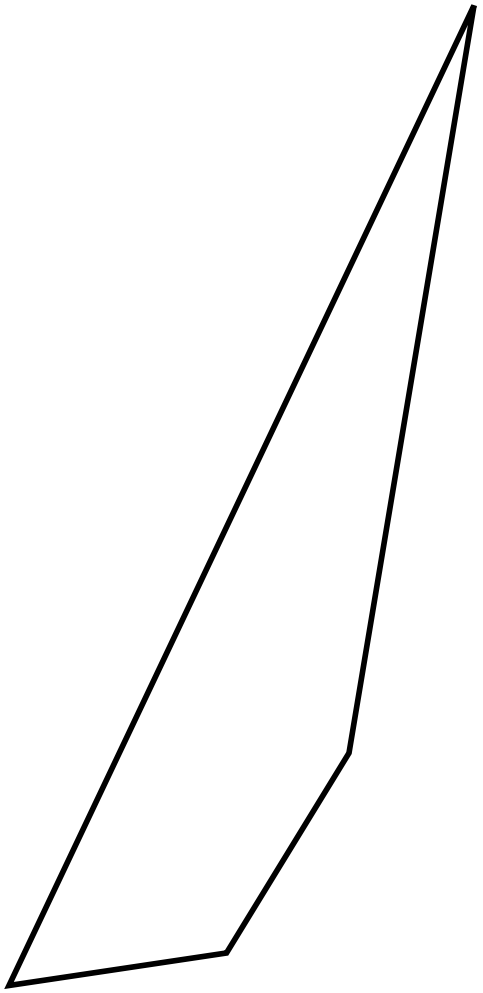
Complex Polygon

- self intersections



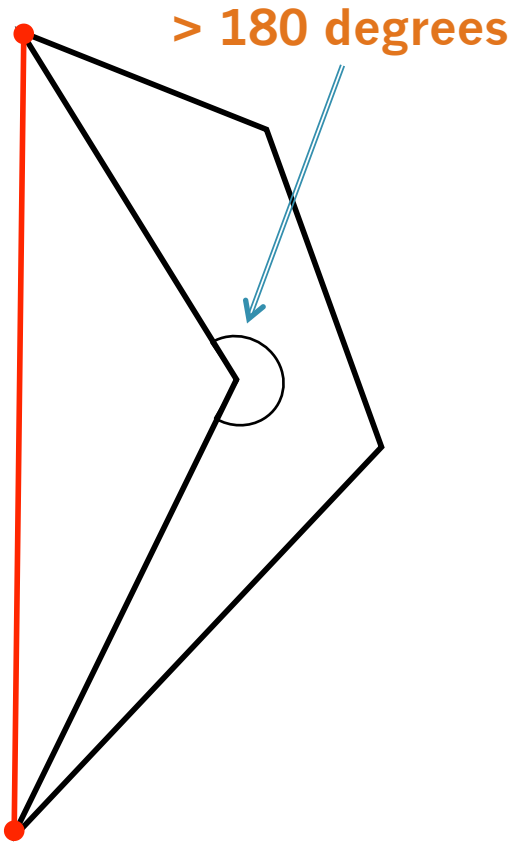
Convex Polygon

- Every internal angle is less than or equal to 180 degrees.
- (all vertices point outward)
- Every line segment between two vertices remains inside or on the boundary of the polygon.
- (no dents)

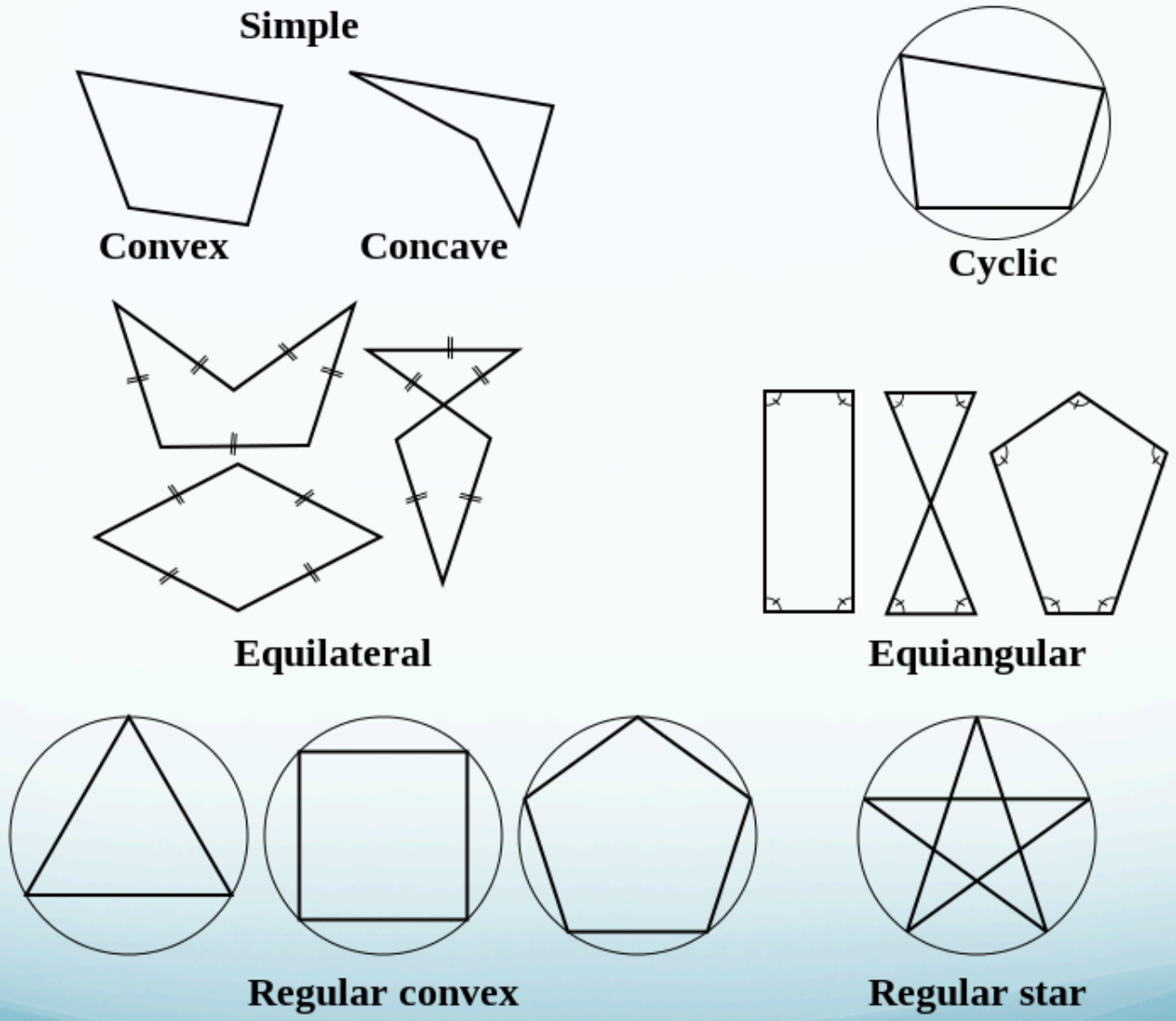


Concave Polygon

- There exist an internal angle is greater than 180 degrees.
- (at least one vertex points inward)
- There exists at least one line segment between two vertices that exits the boundary of the polygon.
- There is a “dent” or “cave”

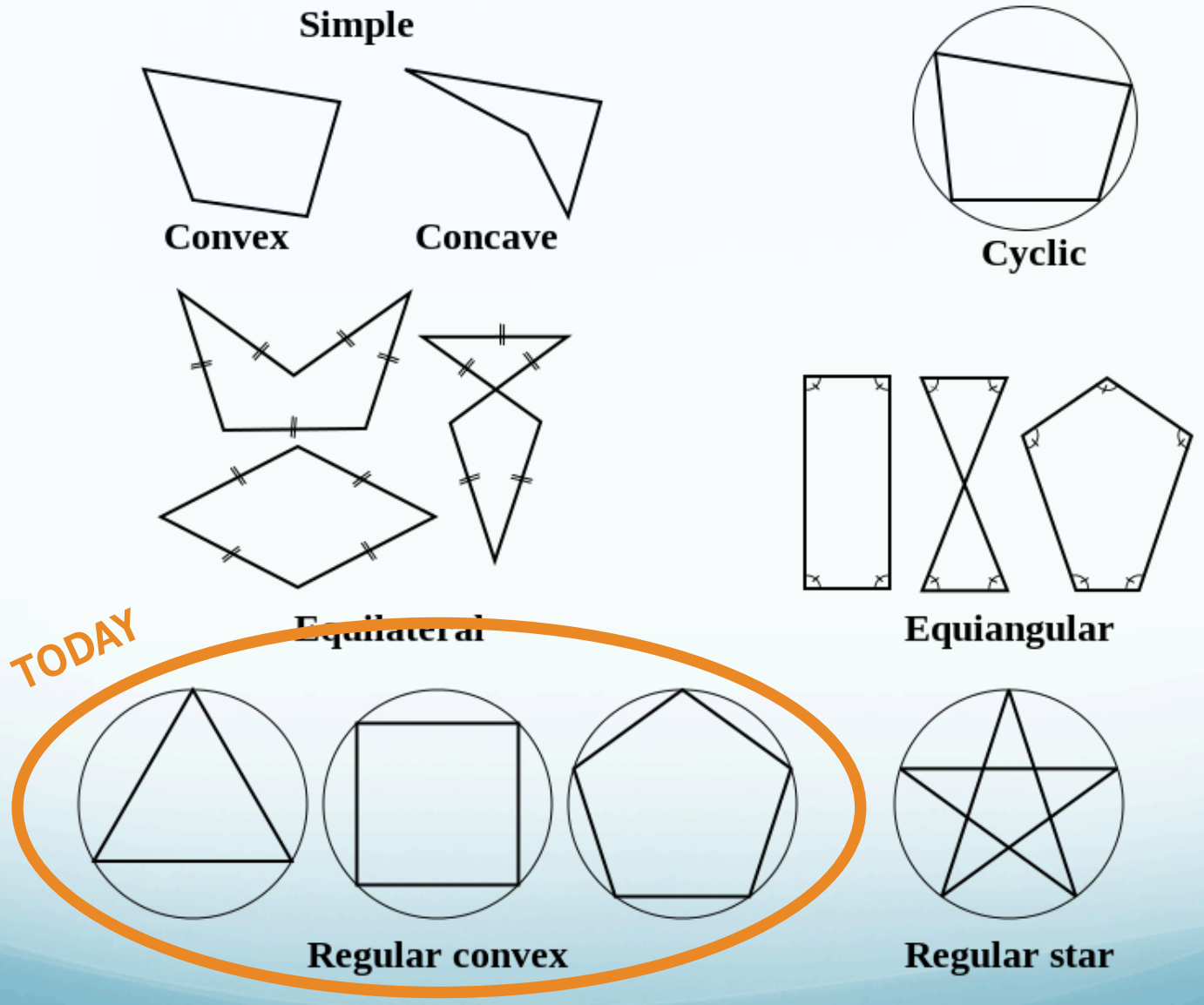


More polygons



"Polygon types" by Salix alba, Wikipedia

More polygons



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Regular Polygon Algorithm

Poll Everywhere