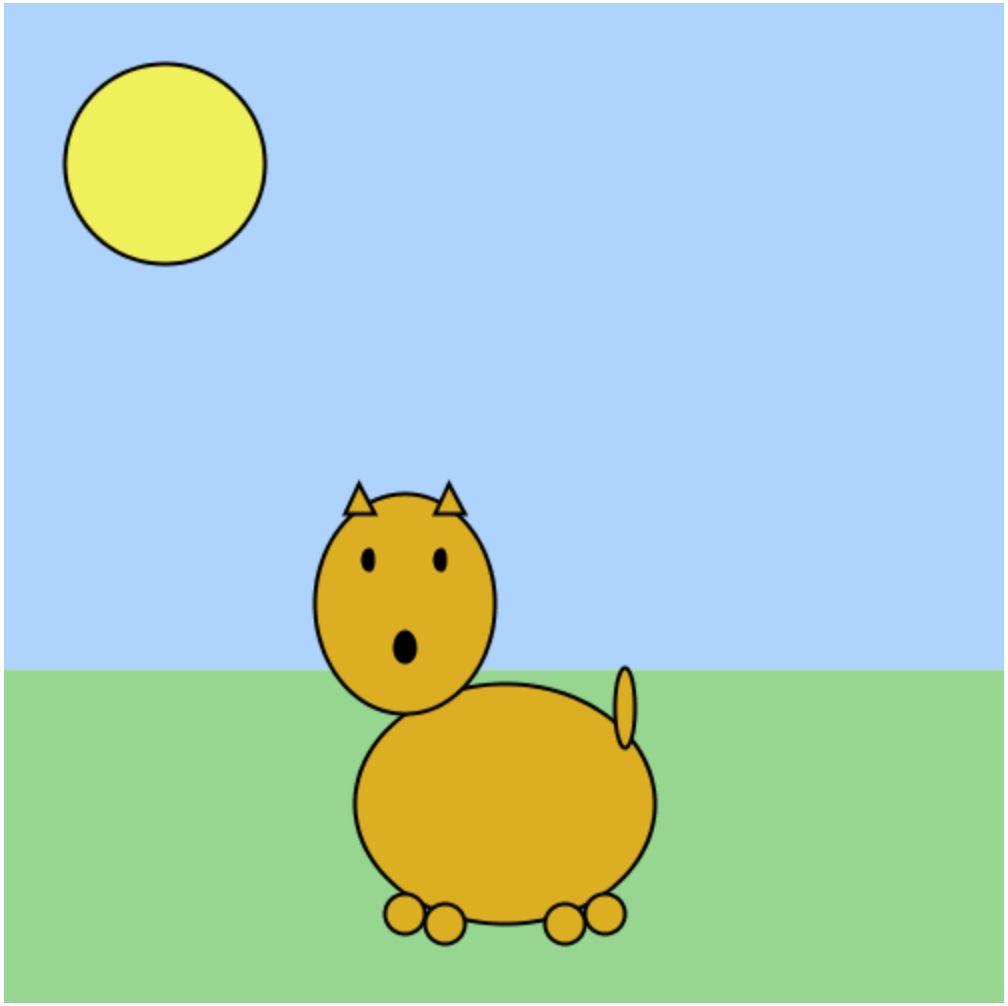
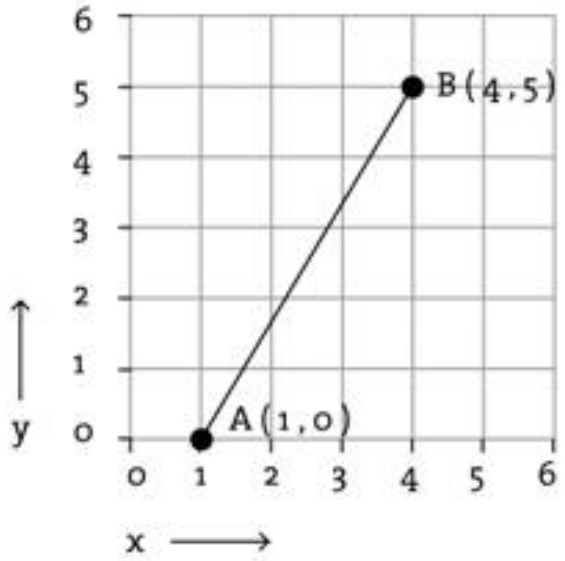
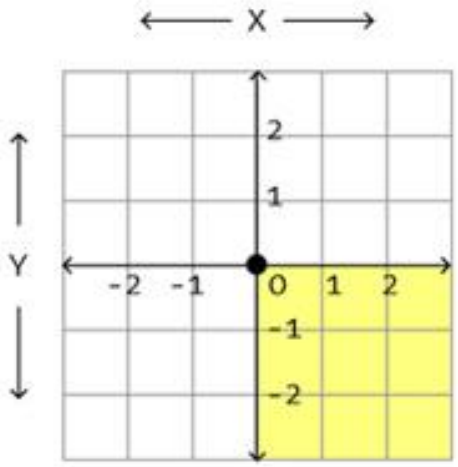
Drawing Pictures with Processing

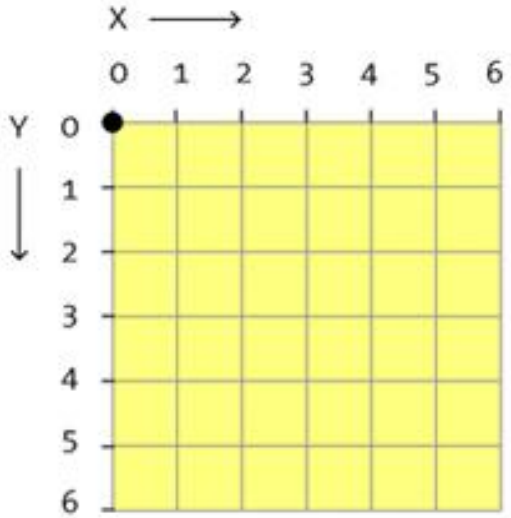
Shapes, Colours, Numeric Data Types, Variables



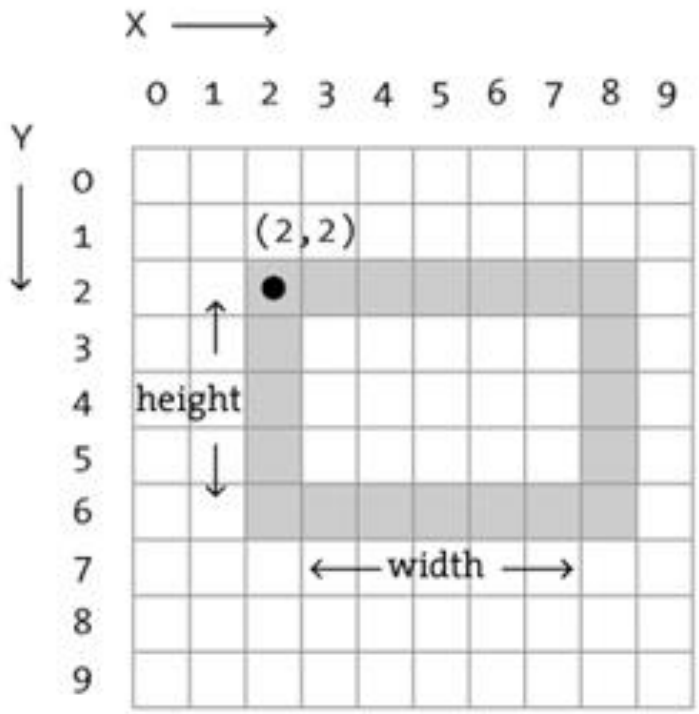

6
5
4
3
2
1
0
y
B(4,5)
A(1,0)
0 1 2 3 4 5 6
x



Eighth Grade



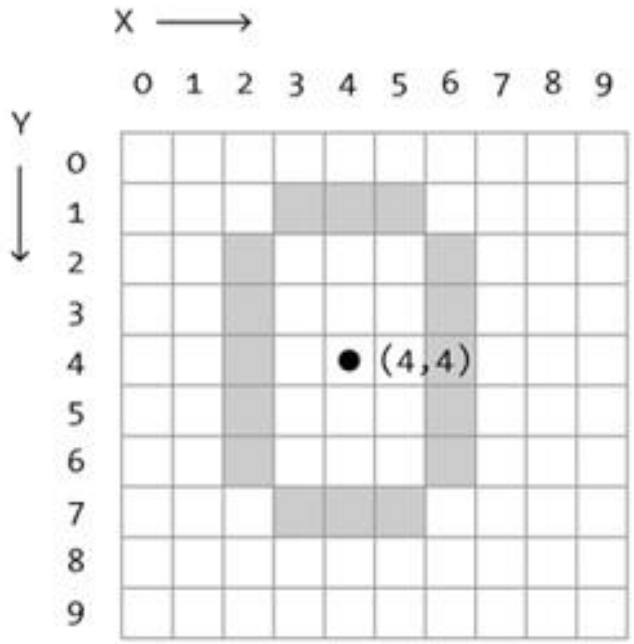
Computer




```
rect(x,y,width,height);
```

Example:

```
rect(2,2,7,5);
```




```
ellipseMode(CENTER);
ellipse(x,y,width,height);
```

Example:

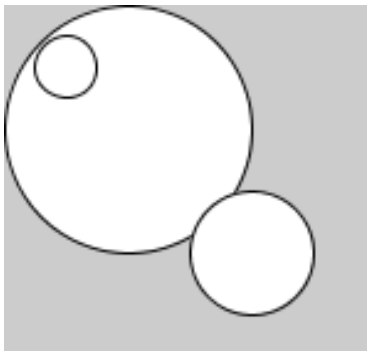
```
ellipseMode(CENTER);
ellipse(4,4,5,7);
```

Poll Everywhere Question:

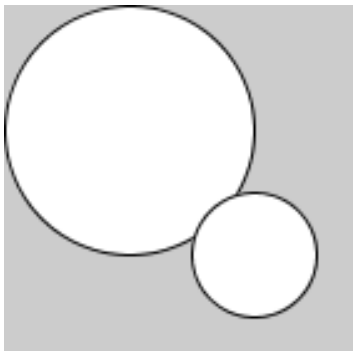
What picture will the following code make?

```
size(130,130);
ellipseMode(CENTER);
ellipse(25, 25, 25, 25);
ellipse(50, 50, 100, 100);
ellipse(100, 100, 50, 50);
```

Text: 37607



929317

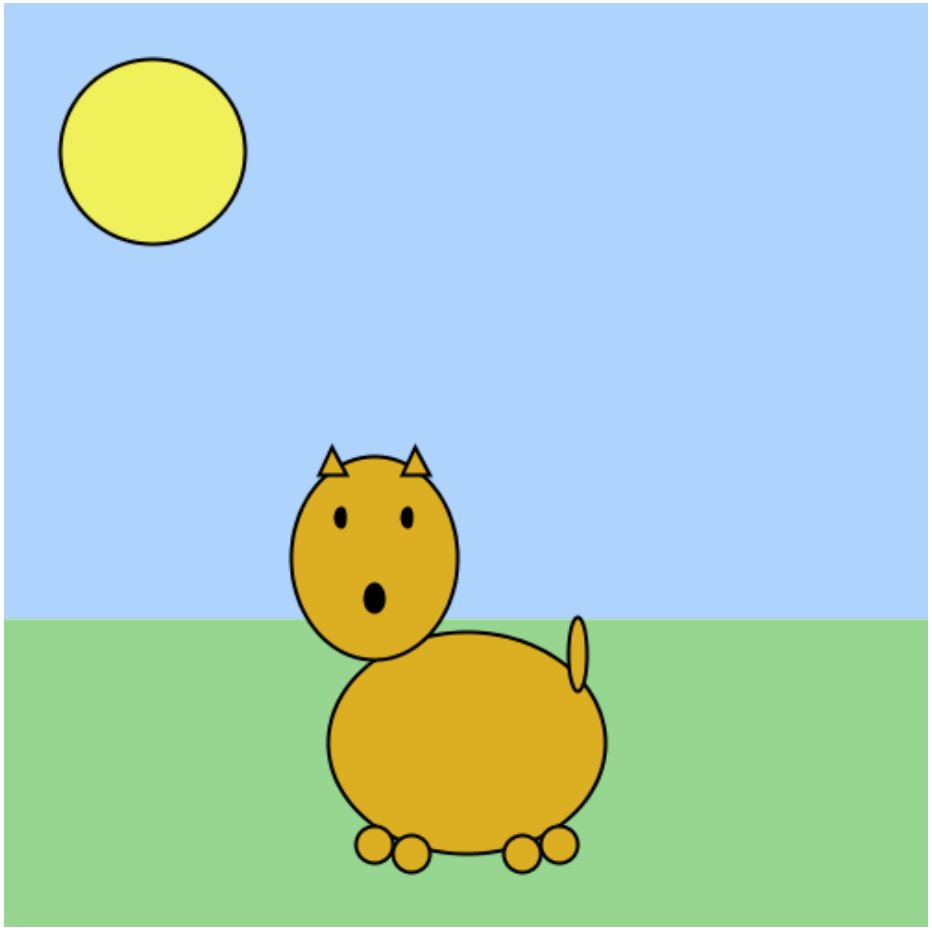


929318

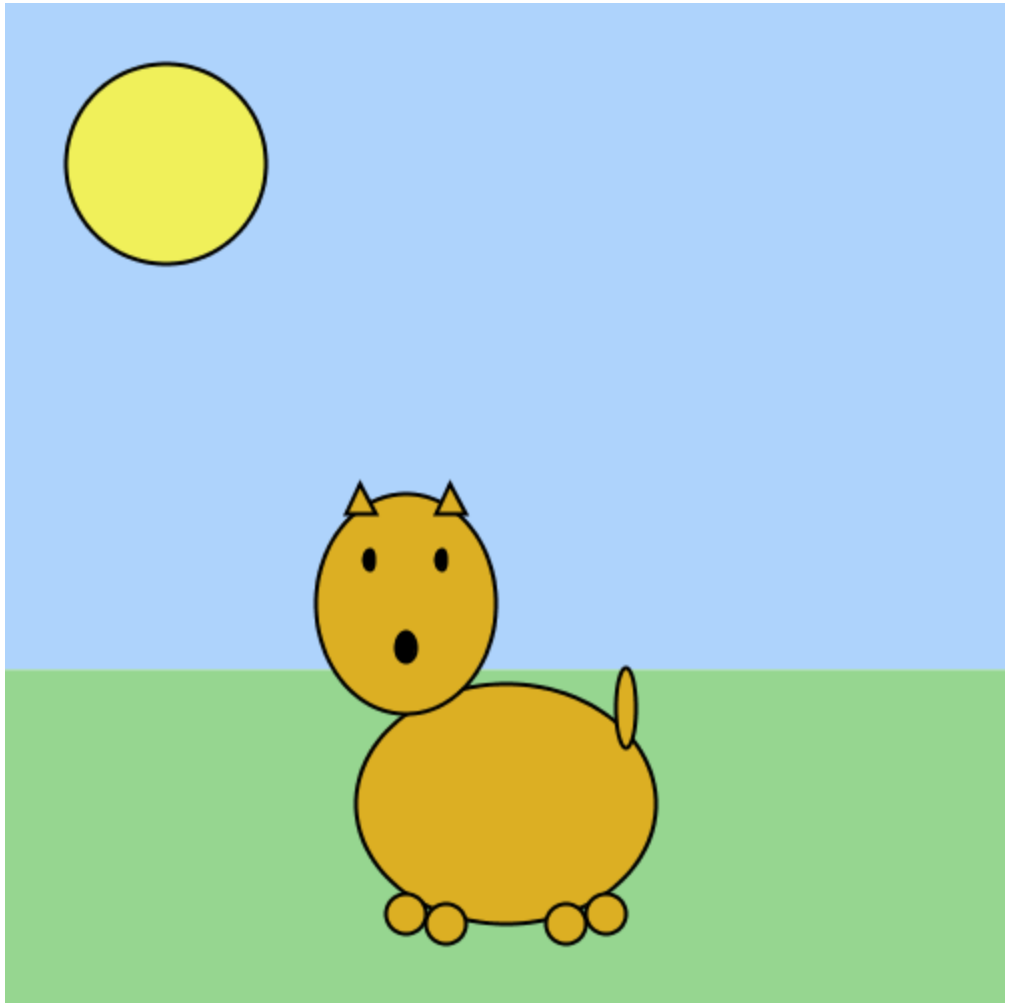
Neither

929319

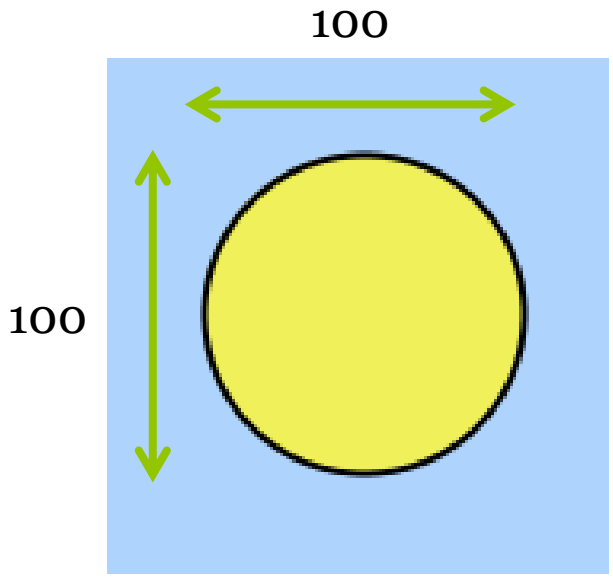
First Step: Make a Plan

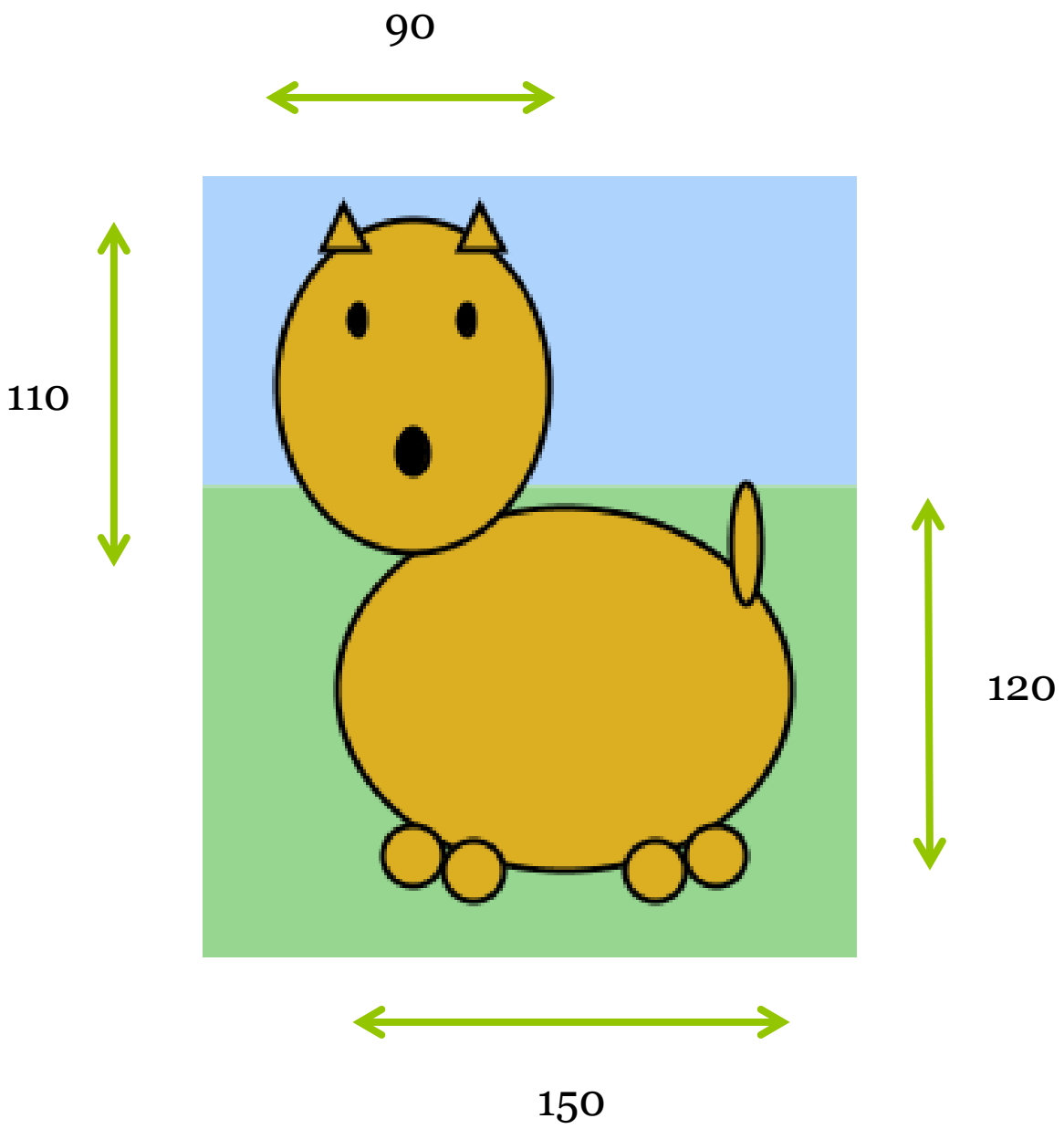


500



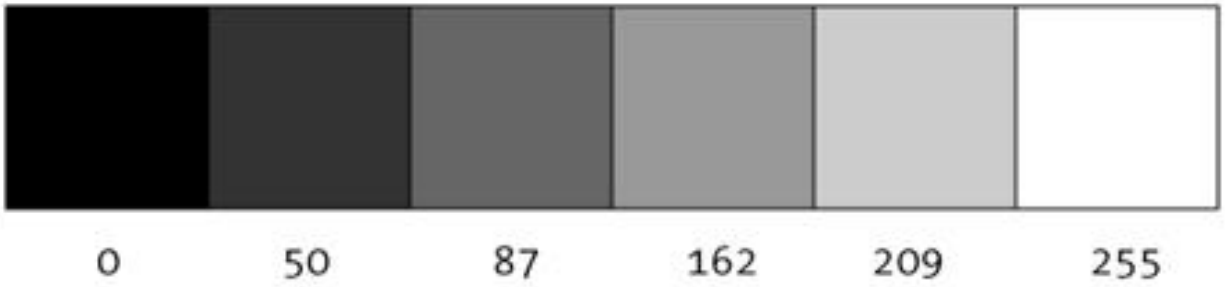
500


100
100

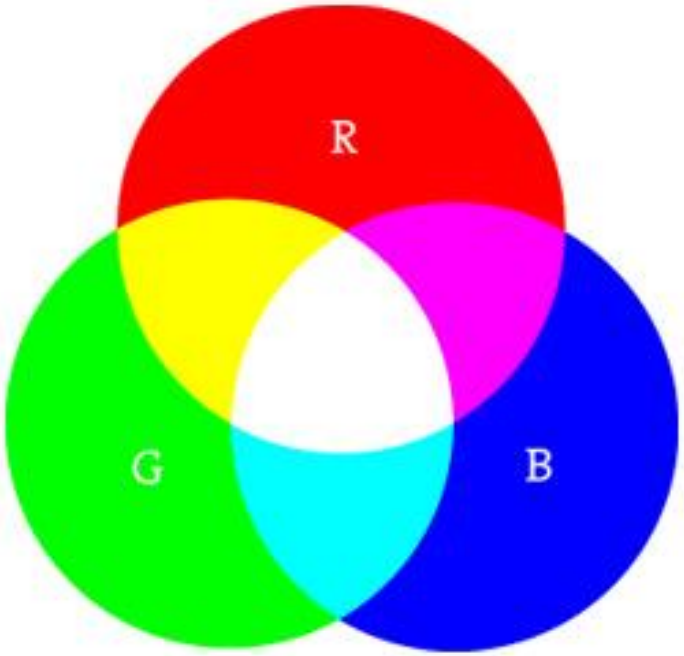

90
110
120
150

Let's get started...

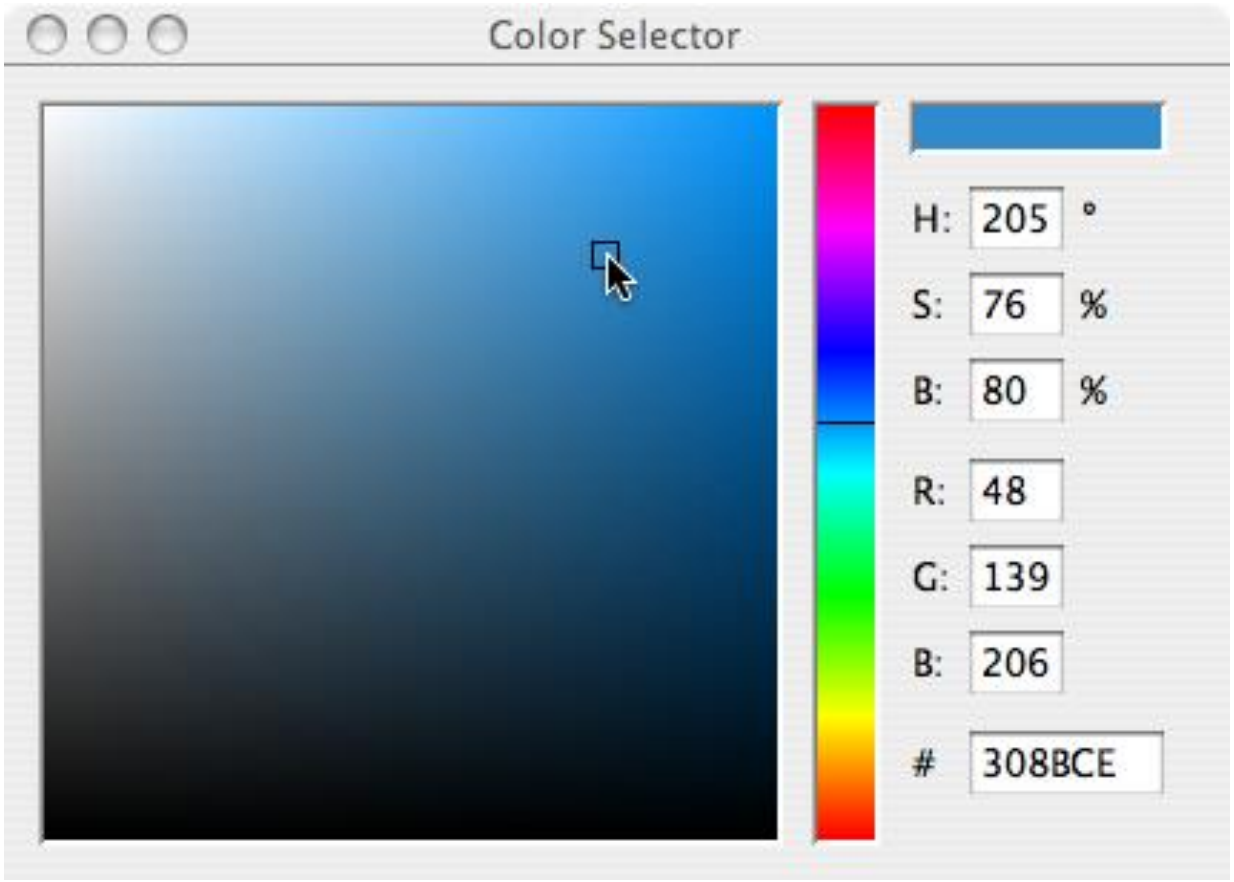
What about color?



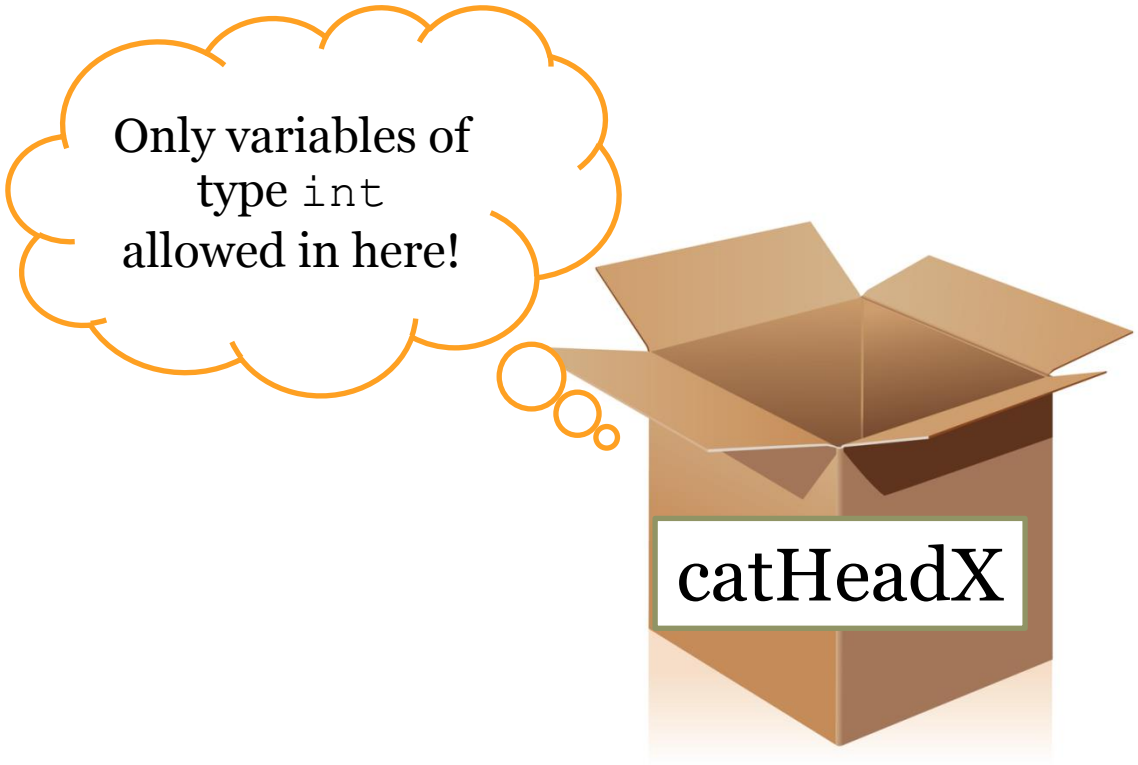
What about color?



What about color?



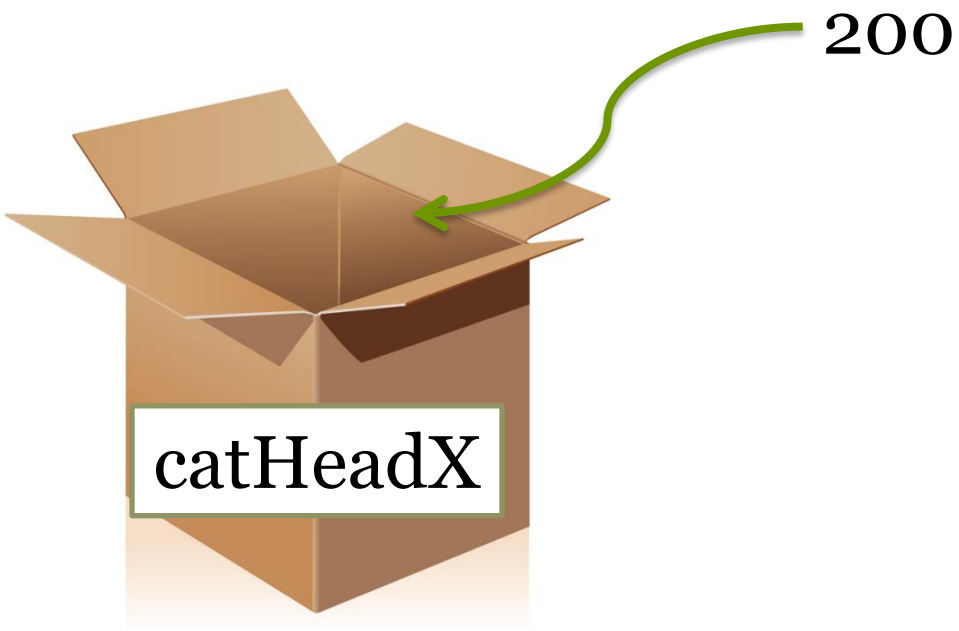
Variables



Variable type → `int catHeadX;`

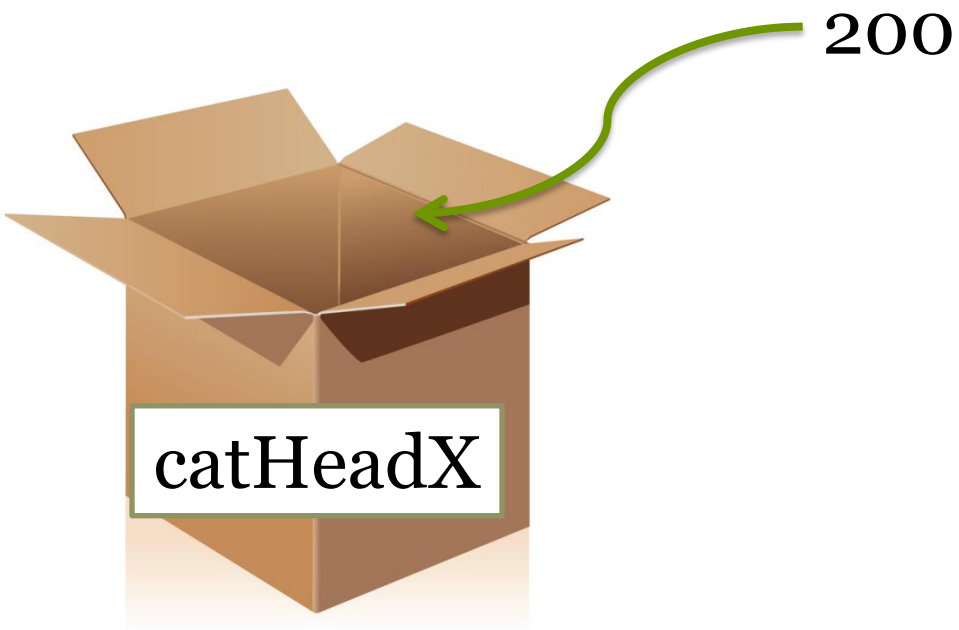
Variable declaration!

Data Type	Values
boolean	true/false
byte	generic 8 bits of data
char	character (‘a’, ‘b’, …)
color	a grayscale or RGB color
double	floating point with double precision
float	floating point (number with a decimal point)
int	integer (whole number)
long	really big integer



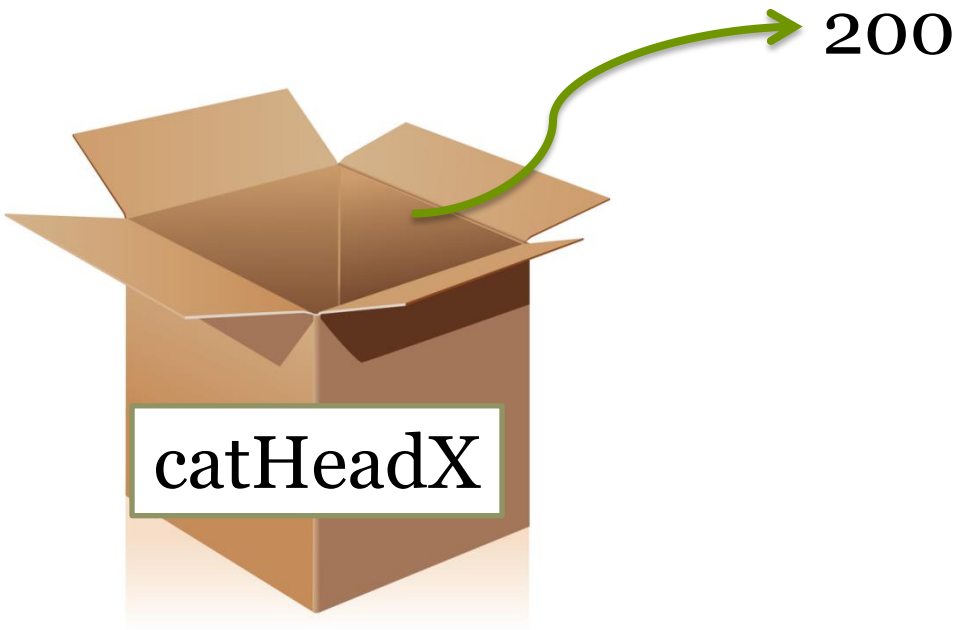

```
catHeadX = 200;
```

Variable assignment!




```
int catHeadX = 200;
```

Variable declaration AND assignment!




```
ellipse(catHeadX, catHeadY, 90, 100);
```

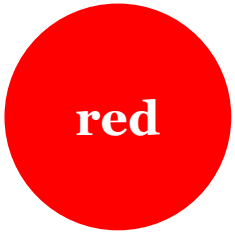
Using the variable's value

Poll Everywhere Question:

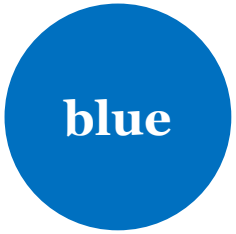
What color will the circle be?

```
color blueColor = color(0,0,255);
color redColor = color(255,0,0);
blueColor = redColor;
redColor = blueColor;
fill(redColor);
ellipse(50,50,75,75);
```

Text: 37607



929705



929706

Neither (syntax error)

929707

Admin Stuff

- Assignment 1 Posted
- How tutorials next week will work
  - Don't forget to submit the quiz after getting the "right" answer!
- Note: tutorials week of October 13 cancelled because of Thanksgiving Monday (now best 9 out of 10)

Why use variables?

To avoid repetition.
To make code easier to read.

Why Variable Names Matter

The Story of the Magician Marcus and His Frustrating Shopping Trip

http://computationaltales.blogspot.ca/2011/11/names-for-ingredients-and-variables.html

Live coding continued…

Identifying Parts of the Code

```
//////
// Draw cat's ears

// These variables are only used here, so keep them
//
int                = 15;
int catEarOffset = 10;

fill(220, 175, 35);

triangle(catHeadX - catHeadWidth/4 + catEarWidth/2, //x1
         catHeadY - catHeadHeight/2 + catEarOffset, // y1
         catHeadX - catHeadWidth/4, //x2
         catHeadY - catHeadHeight/2 - catEarWidth + catEarOffset, // y2
         catHeadX - catHeadWidth/4 - catEarWidth/2, //x3
         catHeadY - catHeadHeight/2 + catEarOffset); //y3
```

comment

Identifying Parts of the Code

```
//////
// Draw cat's ears

// These variables are only used here, so keep them
// close by
int catEarWidth = 15;
int catEarOffset = 10;

                175, 35);

triangle(catHeadX - catHeadWidth/4 + catEarWidth/2, //x1
         catHeadY - catHeadHeight/2 + catEarOffset, // y1
         catHeadX - catHeadWidth/4, //x2
         catHeadY - catHeadHeight/2 - catEarWidth + catEarOffset, // y2
         catHeadX - catHeadWidth/4 - catEarWidth/2, //x3
         catHeadY - catHeadHeight/2 + catEarOffset); //y3
```

data type

Identifying Parts of the Code

```
//////
// Draw cat's ears

// These variables are only used here, so keep them
// close by
int catEarWidth = 15;
int catEarOffset = 10;

fil                                                    ;

tri                - catHeadWidth/4 + catEarWidth/2, //x1
                   - catHeadHeight/2 + catEarOffset, // y1
          catHeadX - catHeadWidth/4, //x2
          catHeadY - catHeadHeight/2 - catEarWidth + catEarOffset, // y2
          catHeadX - catHeadWidth/4 - catEarWidth/2, //x3
          catHeadY - catHeadHeight/2 + catEarOffset); //y3
```

variable name

Identifying Parts of the Code

```
//////
// Draw cat's ears

// These variables are only used here, so keep them
// close by
int catEarWidth = 15;
int catEarOffset = 10;

fill(220, 175

triangle(catH                    th/4 + catEarWidth/2, //x1
         catH                    ght/2 + catEarOffset, // y1
         catHeadX - catHeadWidth/4, //x2
         catHeadY - catHeadHeight/2 - catEarWidth + catEarOffset, // y2
         catHeadX - catHeadWidth/4 - catEarWidth/2, //x3
         catHeadY - catHeadHeight/2 + catEarOffset); //y3
```

integer value

Identifying Parts of the Code

```
//////
// Draw cat's ears

// These variables are only used here, so keep them
// close by
int catEarWidth = 15;
int catEarOffset = 10;
```

variable declaration and assignment

```
eadWidth/4 + catEarWidth/2, //x1
eadHeight/2 + catEarOffset, // y1
eadWidth/4, //x2
eadHeight/2 - catEarWidth + catEarOffset, // y2
    catHeadX - catHeadWidth/4 - catEarWidth/2, //x3
    catHeadY - catHeadHeight/2 + catEarOffset); //y3
```

Identifying Parts of the Code

```
//////
// Draw cat's ears

// These variables are only used here, so keep them
// close by
int catEarWidth = 15;
int catEarOffset = 10;

fill(220, 175, 35);

triangle(catHeadX - catHeadWidth/4 + catEarWidth/2, //x1
         catHeadY - catHeadHeight/2 + catEarOffset, // y1
         catHead                                    //x2
         catHead                    - catEarWidth + catEarOffset, // y2
         catHead                      catEarWidth/2, //x3
         catHead                    + catEarOffset); //y3
```

using a variable's value

Identifying Parts of the Code

```
//////
// Draw cat's ears

// These variables are only used here, so keep them
// close by
int catEarWidth = 15;
int catEarOffset = 10;

fill(220, 175, 35);

triangle(catHeadX - catHeadWidth/4 + catEarWidth/2, //x1
         catHeadY - catHeadHeight/2 + catEarOffset, // y1
         catHead                                    //x2
         catHead                    - catEarWidth + catEarOffset, // y2
         catHeadX - catHeadWidth/4 - catEarWidth/2, //x3
         catHeadY - catHeadHeight/2 + catEarOffset); //y3
```

expression

Identifying Parts of the Code

```
//////
// Draw cat's ears

// These variables are only used here, so keep them
// close by
int catEarWidth = 15;
int catEarOffset = 10;

fill(220, 175, 35);

triangle(catHeadX - catHeadWidth/4 + catEarWidth/2, //x1
         catHeadY - catHeadHeight/2 + catEarOffset, // y1
         catHead                                    //x2
         catHead                    - catEarWidth + catEarOffset, // y2
         catHeadX - catHeadWidth/4 - catEarWidth/2, //x3
         catHeadY - catHeadHeight/2 + catEarOffset); //y3
```

expression

Identifying Parts of the Code

```
//////
// Draw cat's ears

// These variables are only used here, so keep them
// close by
int catEarWidth = 15;
int catEarOffset = 10;

fill(220, 175, 35);

triangle(catHeadX - catHeadWidth/4 + catEarWidth/2, //x1
         catHeadY - catHeadHeight/2 + catEarOffset, // y1
         catHeadX -                                 2
         catHeadY -                                 atEarWidth + catEarOffset, // y2
         catHeadX - catHeadWidth/4 - catEarWidth/2, //x3
         catHeadY - catHeadHeight/2 + catEarOffset); //y3
```

expression

Identifying Parts of the Code

```
//////
// Draw cat's ears

// These variables are only used here, so keep them
// close by
int catEarWidth = 15;
int catEarOffset = 10;

fill(220, 175, 35);

triangle(catHeadX - catHeadWidth/4 + catEarWidth/2, //x1
         catHeadY - catHeadHeight/2 + catEarOffset, // y1
         catHeadX - catHeadWidth/4, //x2
         catHeadY - catHeadHeight/2 - catEarWidth + catEarOffset, // y2
         catHeadX - catHeadWidth/4 - catEarWidth/2, //x3
         catHeadY - catHeadHeight/2 + catEarOffset); //y3
```

expression