











Why does color go from 0 to 255?

- Computers represent all data combinations of bits
- Bit can be 0 (off/false) or 1 (on/true)
- Numbers represented by multiple bits

	$2^2 = 4$	$2^1 = 2$	$2^0 = 1$	#
s	0	0	0	0
r	0	0	1	1
	0	1	0	2
	0	1	1	3
	1	0	0	4
	1	0	1	5
	1	1	0	6
	1	1	1	7





Variable

- Must *declare* variable before use
- Called variable declaration
- <type of variable> <name of variable>;
- e.g.:
- int count;

boolean finished;

Variable Types

Type Name	Data it Holds
short	Small integer
int	Integer
long	Large integer
float	Decimal number
double	Decimal number with double precision (twice the digits)
char	A single character
byte	A byte!
boolean	True or False

Variable Names

 Single word, can include underscore, characters, non-leading numbers

- No reserved words (e.g. already used words)
- int count;
- 🛯 int int; 🗴
- boolean 1choice; x
- boolean choice1; ✓
- int back count x
- int backCount; 🗸
- int back_count; ✓
- int back-count; x

Variable Assignment

- Assign values with =
- int a;
- a = 3;
- a = 4*7/2;
- Variables can be used in expressions or as arguments

int b;

b = a + 45;

rect(100, 100, b, a);

More Complex Variable Types

- Can create your own variable types
- These may hold multiple values. e.g.:
- color type in processing
 - > Holds a color value (RGB)
 - > fill(<color>);
 - > color c = get(10,15);//get a pixel's color



fill(c2); rect(25, 0, 25, 100); color c3 = get(10, 50); fill(c3); rect(50, 0, 50, 100);

http://www.processing.org/reference/color_datatype.html

Variable Scope

- A variable is only visible in the section of code in which it is defined (e.g. within a function { })
- Globals
 - > Defined at start of code
 - > Visible anywhere



Variables - examples

- Variables are useful whenever something might change
 - > Example 1: Used for layout
 - > Example 2: Make something depend on something else
 - > Example 3: Used to vary something over time