Variables and Operators

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Outline

- **What is a Variable?**
- **What is a Type?**
- **Naming Variables**
- **Scopes**
- **Primitive Types**
- **Boxing and Unboxing**
- **Operators**
- **Strings**
- **Arrays**

What is a Variable?

- **Just like a variable in a math equation**
  - $1 + 3 = 4$
  - $1 + x = ?$
- **Without variables programs would be non-interactive**
- **Variables allow us to store data in our program**
- **Opposite of a constant**
  - The number 3 is a constant
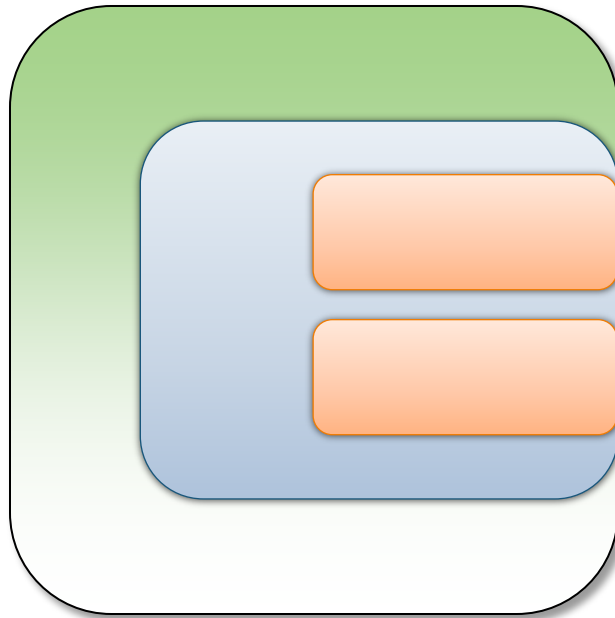 - X is a variable

Syntax

```
// Declaring a variable
int x;

// Initializing a variable
int x = 1;

// Assigning
x = 3;
```

What is a Type?

- **What a variable represents or holds**
- **You probably already understand types**
  - What type is 3?
    - A number, in Java an int (Integer)
  - What type is "Hello"
    - A word, in Java a String
- **Java is strongly typed**
  - Types cannot change
  - Types must be declared

Scope

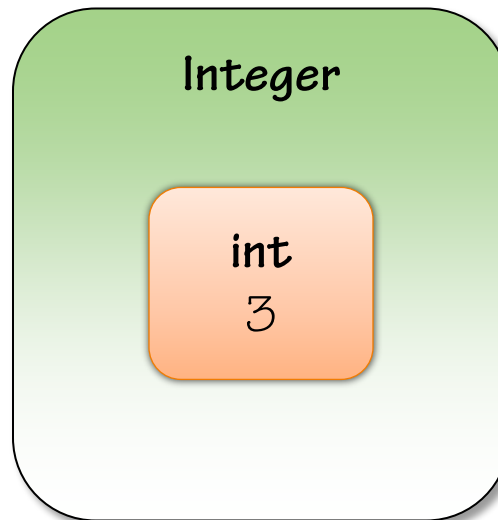- **Variables exist in different contexts**

Primitive Types

- **All other types in Java are objects**
- **Primitive types in Java**
    - byte
    - short
    - int
    - long
    - float
    - double
    - boolean
    - char
    - String (sort of)

Boxing and Unboxing

- **Each primitive type has a corresponding object**
  - int = Integer
  - boolean = Boolean

Operators

- **Not all the operators (basic)**
- **Math**
  - ‐
  - +
  - *
  - /
  - %
  - ++
  - --

Operators

- **Assignment**
  - =
  - +=
  - -=
  - *=
  - /=
  - %=

Operators

- **Relational**
  - >
  - <
  - >=
  - <=
  - ==
  - !=

Operators

- **Logical**
  - &&
  - ||
  - !

Strings

- **The "special" type**
- **Treated like a primitive although it is an object**
- **Immutable**
  - Changing a string results in a new string
- **Java makes it easy to work with Strings**

```
String salutation = "Hello World";
String salutation = new String("Hello World");
```

Summary

- **What is a Variable?**
- **What is a Type?**
- **Naming Variables**
- **Scopes**
- **Primitive Types**
- **Boxing and Unboxing**
- **Operators**
- **Strings**
- **Arrays**

- **Variables / Types**
  - http://download.oracle.com/javase/tutorial/java/nutsandbolts/variables.html
- **Operators**
  - http://download.oracle.com/javase/tutorial/java/nutsandbolts/operators.html
- **Strings**
  - http://download.oracle.com/javase/tutorial/java/data/strings.html
- **Arrays**
  - http://download.oracle.com/javase/tutorial/java/nutsandbolts/arrays.html