

Java Objects: Declare, Init, Use

Declaration

Java is a strongly-typed language, meaning all variables need to be declared as a particular type. This includes:

local variables, parameters, data members, even return value of function.

Programming languages have **built-in types and programmer-defined types**

built-in types are scalars. In Java: int, float, double, char, boolean, string

When you write a class, you create a programmer-defined type.

With a declaration, the programmer specifies the existence and type of a variable

```
int x; // int is the type, x is the variable name
```

```
Person person; // Person is the type, person the variable(instance)
```

Shorthand: You can declare and initialize on the same line:

```
int x = 3;  
Person person = new Person();
```

Initialization

You can initialize a variable after the call to new, e.g.

```
Person p = new Person();  
p.age=30;  
p.name="Bob";
```

Sometimes it's more elegant to use a constructor with parameters.

A constructor is a special method in Java. It is special because:

It has the same name as the class.

It has no type associated with it.

It is called in a special way: when an object is created with new.

Often, a class will have multiple constructors:

One with no parameters that sets default values for data members

Others with parameters that allows the data members to be set on new.

Using an object once it's initialized.

Once you have an object, you can:

1. set/get its data members

```
person.age=56;
```

2. call methods on it.

```
old= person.older(otherPerson)
```

3. print it

```
System.out.println(person)
```

Note that the Java equivalent to Python's `__str__` is `toString`:

```
public String toString()
{
    // return a string that should be printed out for the object
    // often this is a concatenation of data members
    // if we were in class Person...
    return this.name+":"+this.age
}
```

Instructor code sample

Write a class `Car` that represents a car in a race.

Declare data members: `startPosition`, `currentPosition`

Write a sample main creating a car and setting data members

Write a constructor to make it easier.

Write a `toString()` method