

Classes

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Object Oriented Ideas

- Classes v. Objects
- Fields (variables)
- Methods (functions)
- Data hiding
- Alarm clock design
 - Set time - Public
 - Set alarm time - Public
 - Enable/Disable alarm - Public
 - Increment second/minute/hour - Private
 - Sound alarm - Private

Unified Modeling Language

BankAccount
-balance:double
+deposit (amount:double) :void +withdraw (amount:double) :void +getBalance () :double

Class Basics

```
public class BankAccount
{
    private double balance = 0;

    public void deposit(double amount)
    {
        balance += amount;
    }

    public void withdraw(double amount)
    {
        balance -= amount;
    }

    public double getBalance()
    {
        return balance;
    }
}
```

```
public class BankAccountDemo
{
    public static void main(String[] args)
    {
        BankAccount b1 = new BankAccount();
        BankAccount b2 = new BankAccount();

        b1.deposit(50);
        b2.deposit(75);

        b1.withdraw(20);
        b1.withdraw(5);
        b2.withdraw(4.50);

        System.out.println(b1.getBalance());
        System.out.println(b2.getBalance());
    }
}
```

Example

Build and test a Rectangle class. Draw the UML diagram.

- setLength, getLength
- setWidth, getWidth
- getArea()

Constructors

```
public class Rectangle
{
    double width, height;

    public Rectangle(double w, double h)
    {
        width = w;
        height = h;
    }

    //... more methods ...

}
```

Overloading

```
public double add(double num1, double num2)
{
    double result = num1 + num2;
    return result;
}
```

```
public String add(String a, String b)
{
    String result = a + b;
    return result;
}
```

Miscellaneous

- Java provides **default constructor** if you don't write one.
 - Default constructor initializes fields to 0/null
- Constructors can be overloaded
- Make your local variables have different names than instance fields, otherwise **shadowing** occurs

Example

Write a class that represents a BankAccount.
Follow this diagram.

BankAccount
-balance:double
+BankAccount (opening:double) +deposit (amount:double) :void +withdraw (amount:double) :void +getBalance () :double