

Intro to Object Oriented Programming



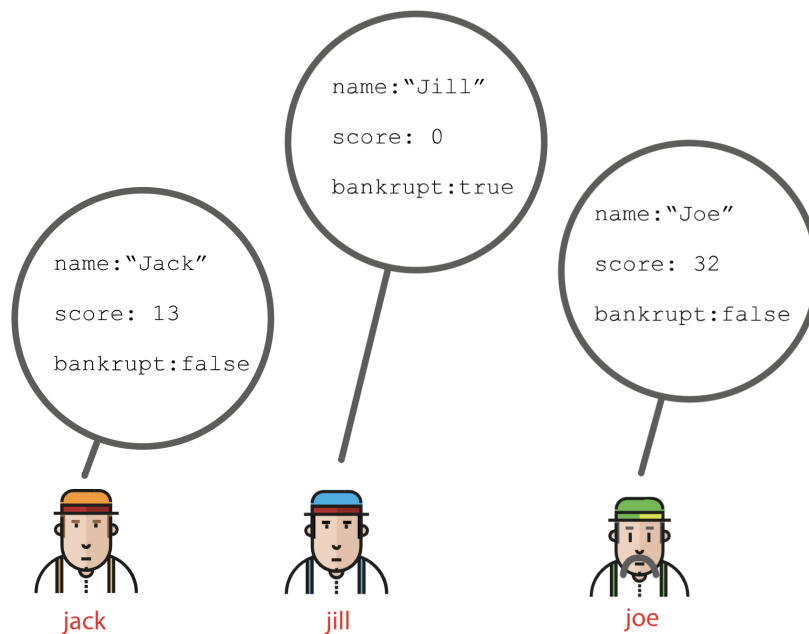
Q1 Does Barmy Farmers appeal to you?

Yes ▾

Q2 Describe Strategy 1 for managing data in a computer program.

Q3 Describe Strategy 2 for managing data in a computer program.

Q4 Strategy 3 suggests that we can construct Farmer objects. Each object has properties which store data about Farmers.



List the 3 properties that Farmer object will store in the Barmy Farmers game:

-
-
-

Q5 Write down the line of code that will be used to **construct** a Farmer object.

Q6 Look at the line of code you wrote down. What is the name of the reference variable?

Q7 What is the data type of the object you constructed in Q5?

Q8 Look at the **method** (function) that you called in Q5 which is used to **construct** the Farmer object. This is known as the **constructor method**. How many **parameters** are required to construct a Farmer object?

Q9 When we analyse a **class**, eg the Farmer class, how do we know which method is the **constructor method**?

Q10 What is the main purpose of a constructor method?

RATE YOUR UNDERSTANDING OF THINGS SO FAR. Circle a star. 5 = *perfect understanding*



Q11 Follow the video and design the entire Farmer class in your IDE. When you have finished, copy and paste your code here:

[Farmer.java]

- Q12 Continue watching the video and let's use the Farmer class to construct some Farmer objects in a Main program. After constructing the objects, make the Farmers speak. Copy and paste your code here:

```
[Main.java]
```

Wow! Look at the computer program. It does not require many lines of code. One advantage of OOP is that code is reusable. For example, every time we want to construct a new Farmer, we simply call the constructor method of the Farmer class.



CONTINUE TO TASK 2 in the Unit Page

Extension - Part A

For the Barmy Farmer game, `Chickens` will lay eggs. Every `Chicken` has an `ID` eg "chick01", an `age` in months eg 4, and it knows how many `eggs` it has laid!

All chickens can dance, squawk and lay eggs!

When an instance of a chicken is first constructed in the game its egg count will be 0. It could be any age between 1 and 10.

Use these ideas to create the `Chicken` class. Be creative! Programming is a creative process.

Remember the steps:

1. Name the class
2. Identify the class properties
3. Design the constructor method and any other `Chicken` behaviour methods



Extension Part B - IDE

Open your IDE and start a new Chicken project. Create a `Main` class and a `Chicken` class. Once you have designed the `Chicken` class, design a program that will construct 2 `Chicken` objects (*2 instances of Chickens*), somehow make them lay eggs and then display the id of the `Chicken` that has laid the most eggs. The winning chicken will squawk and dance!

REVIEW

Object Oriented Programming

Think about the 3 strategies that could solve the Barmy Farmer problem.

The third strategy is very interesting.

We can see that any **properties** and **methods** associated with `Farmer`'s are **encapsulated** in a class/object.

We can then **construct new** instances of a class¹ and process the objects independently of each other.

Each object has the same properties eg:

- name
- score
- bankruptcy status

But different objects can have different values assigned to their properties.

The strategy of encapsulating data in objects is a very useful way of managing data in a computer program.

¹ An "instance of a class" can also be called an "object"

GLOSSARY

class - a file defining an object

property - an item of data stored in an object

instance (of a class) - an object

object - an instance of a class!

construct - we can construct new objects using the **new** keyword

constructor method - the method called construct a new instance of a class

initialize - assign data to a property for the first time, often done in the
constructor method

data type - the type of data a property/variable will store

parameter - data received by a method from an external class

this - refers to a property of a class to remove ambiguity in variable identifiers

assign - we assign data to properties/variables

new - a keyword in Java used when constructing an object for the first time

encapsulate - store data and methods in a class/object. Data is usually hidden²

² More on Data Hiding later

//sample Chicken class

```
public class Chicken {  
  
    //class properties  
    String id;  
    int age;  
    int eggCount;  
  
    //sample constructor method  
    public Chicken(String id) {  
  
        this.id = id;  
        this.age = (int)(Math.random()*10)+1;  
        this.eggCount = 0;  
    }  
  
}
```

Note how the constructor method can use parameters to initialise class properties, or it can assign values directly.

Note: squawk and dance methods not shown

//sample main program

```
public class Main {  
    public static void main(String[] args) {  
        //construct an instance of the Chicken class (a Chicken object)  
        Chicken c1 = new Chicken("Chick1"); //constructor only has 1 String parameter  
  
        //construct another instance of the Chicken class  
        Chicken c2 = new Chicken("Chick2"); //constructor only has 1 String parameter  
  
        System.out.println(c1.id + " will start an egg battle with " + c2.id);  
  
        while(c1.eggCount<10 && c2.eggCount<10) {  
            //update the egg counts of both Chicken objects randomly  
            c1.eggCount = c1.eggCount + (int)(Math.random()*3);  
            c2.eggCount = c2.eggCount + (int)(Math.random()*3);  
        }  
  
        //evaluate the eggCount of both Chicken objects  
        if(c1.eggCount > c2.eggCount) {  
            System.out.println(c1.id+" is the winner!");  
        }else if(c2.eggCount > c1.eggCount) {  
            System.out.println(c2.id+" is the winner!");  
        }else {  
            System.out.println("It is a draw!");  
        }  
    }  
}
```