Software Design & Development CFS2160

Week 8 – Classes & Refactoring

Session Plan

- An important message

- More on Java classes

- Firstly we are going to look at refactoring an existing class using IntelliJ

- Work on todays worksheet.

- Then work on any outstanding practical work.

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Logbook Hand in.

The log book hand in date is the 13th of December at 12 noon.

Another Important Message

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We Only Use Java Version 8!

If you create Java code in a version newer than V8 it WILL NOT work at uni!

What is a class?

A class is structured code used to describe a real world object within a computer programme. A class should be able describe all instances of similar objects.

Essentially, a class is a template which can be applied to all objects of a given type.

Anything and everything in the world can be described using a class, we can look at a class as a template for any given real world item.

Classes should be intuitive to give a good understanding of an object.

This is a dog

And another dog

Are these dogs the same?

YES?

They are both dogs.

NO?

They are clearly very different!

Are these dogs the same?

YES?

They are both dogs.

NO?

They are clearly very different!

Both answers are correct!

Why?

The two dogs are very different visually, but at the same time they can be viewed as being the same as they are both dogs.

In programming speak we would describe both animals as 'a type of dog'.

Attributes of Dog

Attribute	Dog A	Dog B
Name	**Daisy**	**Prince**
Breed	**Chihuahua**	**Great Dane**
Colour	**Charcoal**	**Tan**
Size	**Small**	**Large**
Country Of Origin	**Mexico**	**Germany**

Attributes of our dogs

Although both dogs have common **attributes**, it's the **values** of the **attributes** that differentiate them from one another (define their state).

We could say

"This dog is a Great Dane. His name is Prince. He is tan in colour. He is large and his species originates from Germany".

A sentence like this can be formed for every domesticated dog*.

*wild dogs generally do not have a name

Methods of Dog

In addition to the attributes that describe a dog, it will also have tasks (known as methods) it can perform.

These could include:

- Eat

- Sleep

- Fetch a ball

- Bark

More on methods

We can also define the tasks a dog undertakes within a class; in programming we call these tasks methods. A method is an operation which is used when we want something to happen.

We can look at the bark of a dog as a method; we start by saying, "When a dog barks a woof sound is made by the dog".

Any methods common to all dogs can be used within a class alongside the dog's attributes.

Example of a class

```
//Declaration of the class
Public class Dog{

    //Attributes of a Dog
    String name;
    String breed;
    String colour;
    String size;
    String countryOfOrigin;

    //Methods for a Dog
    Void bark(){
        System.print("woof woof");
    }

    Void fetchBall(){
        System.print("bring ball back");
    }

    Void eat(){
        System.print("eat food");
    }
    Void sleep(){
        System.print("fall asleep");
    }
}
```
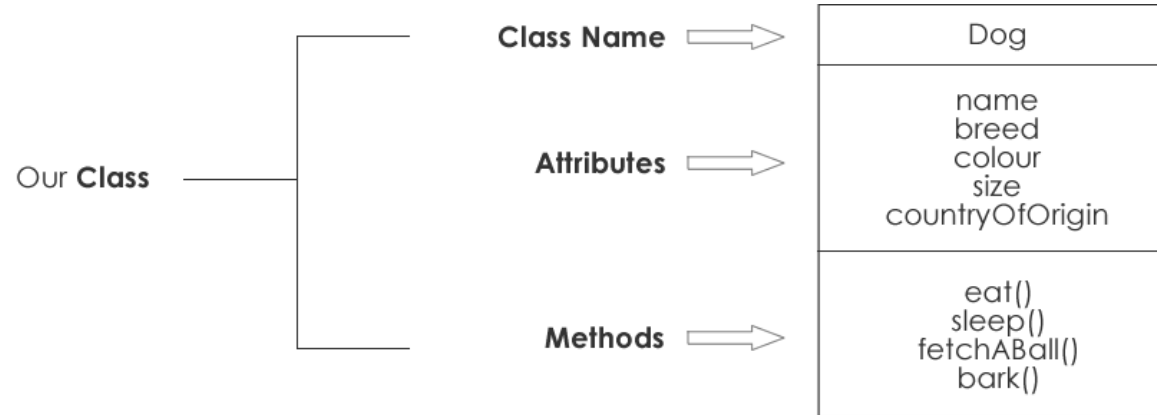
Instances of a dog

Why Classes

We use classes in programming to help us understand and define functionality within the application we are developing. I subscribe to the notion that it helps of model a real world object.

They help us organise the data within the programme.

They ensure data is kept separated from other data as required.

We can reuse classes throughout a programme therefore reducing the amount of coding required and avoiding replication of code.

IntelliJ Demo Time

You *might* have noticed that Tony's demonstrations in his lectures often contain code that is very similar to that required in the tutorial. This is on purpose.

You can usually *refactor* (re-use and rename) some of Tony's lecture code.

I shall now give a brief demonstration on how to do this, all we are doing is adding a check to the existing class to ensure propoer values are entered.

We have done this on Python already.

Finally

From now on, your programming tutorials will be for java ONLY, if you have outstanding Python logbook work you should continue working on this in your own time. You can book 1 to 1 sessions with me for help, **Tony is always available via email for assistance or feedback.**

I will able to help with both Python and Java in my sessions for the next few weeks.

- Any questions about Java?

- Look at todays worksheet