

Software Design & Development

CFS2160

Week 10 – Classes & Refactoring

Session Plan

- An important message
- More on Java classes
- Work on today's worksheet.
- Then work on any outstanding practical / assignment work.
- Take questions about the assignment.

An Important Message

Logbook Hand in.

The log book hand in date is the 19th of December
at 17:00.

Another Important Message

We Only Use Java Version 11!

If you create Java code in a version newer than
V11 it may 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 actions it can perform.

These could include:

- Eat
- Sleep
- Fetch a ball
- Bark

More on methods

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

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");  
}
```

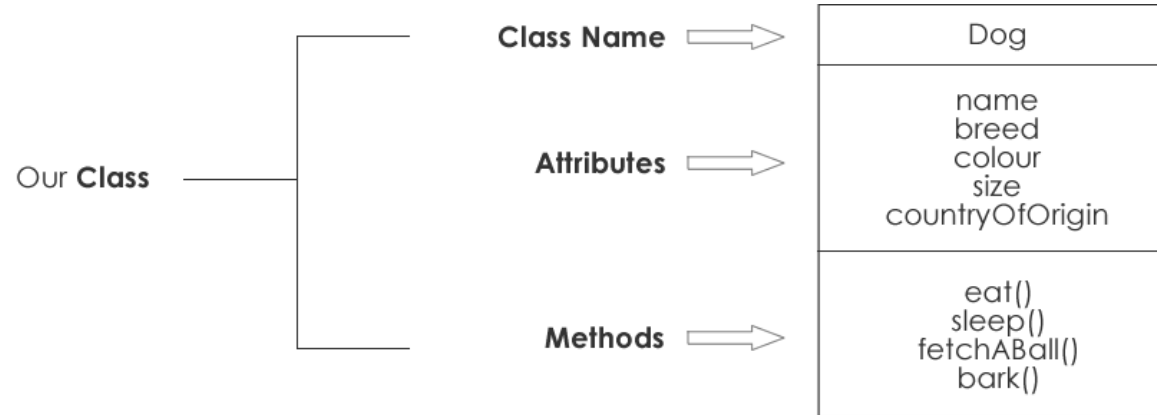
```
Void fetchBall(){  
    System.print("bring ball back");  
}
```

```
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 to 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 repetition of code.

Refactoring Code

You ***might*** have noticed that Tony's demonstrations in his lectures often contain code that is very similar to that required in tutorials, this is not by accident.

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

Be very careful, if you do not understand what a class or code does then you will be better off writing your own so you understand what is happening.

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

- Any questions about Java?
- Look at today's worksheet