

# **MAD Worksheet 1**

## **Introduction to Kotlin**

### **1. Hello World.**

For this introductory, non-Android Kotlin session, we are going to be using the online "Repl" site (<https://repl.it>) This allows you to write and run simple Kotlin programs in an IDE within the browser, and save them for later retrieval.

You can login to this using your GitHub, Google or Facebook account.

Logging in will allow you to save your work online, and retrieve it later.

Create a Hello World program. Write the code, and make sure you save it! Then, run it.

### **2. Loops and ifs - basic**

a) Within repl, create a new program, ex2.kt. The program should ask the user to input their name and then should print it 10 times.

b) Modify the program so that it also asks how many times they want to display their name. HINT: you might need to look at the nullability section.

### **3. Looping through an array**

a) Again within Repl, create a new program which stores an array of your favourite music artists.

The program should then prompt the user to ask the user to input an artist name. If the name is in the array, the program should say "Yes! (artist name) is one of my favourite artists!" and if not, say "No! (artist name) is not my favourite artist! Try again". Initially, the program should then stop.

Modify the program so that the user is given 10 attempts to guess one of your favourite artists.

#### 4. when

Write a program which uses a "when" statement to print the grade (A, B, C, D, E, or F) equivalent to a given percentage. \*Make the 'when' act as an expression, i.e. you should get it to return a value and then print that value.\*

Grades are as follows:

A - 70-100

B - 60-69

C - 50-59

D - 40-49

E - 30-39

F - 0-29

The program should also display "Error - invalid percentage" if the percentage is below 0 or greater than 100.

**Hint:** you can use the "in" keyword with a range (e.g. 1..10) as a condition inside "when".

#### 5. Classes and objects

Create a Car class. It should have properties for make, model, engine capacity (cc), top speed, and current speed (mph or km/h - up to you). The first four should be passed in via the constructor.

Set the current speed to 0 when the car initialises.

Add accelerate() and decelerate() methods. These should increase and decrease the speed by a value passed into the method **as a parameter**. decelerate() should ideally check to make sure that the speed doesn't go below 0 and accelerate() < should ideally check to make sure that the speed doesn't go above the top speed.

Add a toString() method to **return** a string representation of the car.

Write a main() function. In main(), try creating two car objects. Display the car objects, accelerate them, display them again, decelerate them again, and display them once more.

## 6. Inheritance

*You need to look at the further notes to answer this question.*

Create an inheritance hierarchy involving Employees, Programmers and Managers.

The Employee class should have attributes for name, job title and salary.

The Programmer class, inheriting from Employee, should in addition have an attribute for favourite language (which should be a String) and current project (a String).

The Manager class, also inheriting from Employee, should in addition attributes for companyCar (a Car - borrow the class from the previous exercise) and number of shares in the company.

Give each class a printDetails() method which prints the full details of objects of that class.

Write a main() function to test your inheritance hierarchy.

**Enhancement:** change Programmer so that the favourite language String is replaced by an array of Strings for multiple favourite languages (e.g. Kotlin, Java, PHP, Python and JavaScript).