CSc102 2019
Practical 12 (Object-Oriented Programming)

Before you start a problem, **read the entire problem carefully!**

We have practicals, instead of just giving you homework to do, so that we can help you if you get stuck. If you've been struggling with something for five minutes, *ask a tutor or lecturer for help*! That is why we are here. You can work in groups to talk about *how to approach/solve a problem*, but any code or document that you hand in **must** *be your own work*. Keep non-Computer-Science conversation to a minimum, since it may be distracting for other members of the class.

The Problem

The focus of this week's prac is to explore inheritance and polymorphism in Java.

The Task

i) Develop a class called `Student` that handles undergraduate student information. Your class should have attributes for (at least): name, student number, degree and a list of courses. You should have a constructor that initialises the attributes, a `toString` method that displays something like "Tammy Smith (g19S6583) is registered for a BA", and accessors for the name, student number and course list.

ii) Develop a new *subclass* for postgraduate students that has an additional attribute for the thesis title. The constructor should take the name, student number degree and thesis title, and use the `Student` class constructor to initialise the relevant attributes (just set the course list to null). The postgraduate student class should override the `toString` method to add the fact that the student is a postgraduate: "Postgraduate: Mboneli Ndakunda (g15N0159) is registered for a MSc".

iii) Write a main program that creates a list of students and prints out all their details, something like the following:

```
Students
Tammy Smith (g19S6583) is registered for a BA [Sociology 1, History 1,
German 1, Psychology 1]
Joe Soap (g18S0728) is registered for a BMus
Kauna Ndlangisa (g17N7061) is registered for a BSc [Computer Science 3,
Information Systems 3, Fine Art 1, Music 3]
Postgraduate: Mboneli Ndakunda (g15N0159) is registered for a MSc
Jason Land (g19L1234) is registered for a BA [Psychology 1, English 1,
Music 1]
```

iv) Add a new method to your student classes that prints the information read out at graduation. For undergraduates this is just their name, for postgraduates it is their name and thesis title. Modify your program so that it displays the graduation information for all your students:

```
Graduation List
Tammy Smith
Joe Soap
Kauna Ndlangisa
Mboneli Ndakunda, for a thesis entitled "Distributed PCA Biometric
Identification System"
Jason Land
```

To Hand In:

Your classes for the program (i.e. the two student classes and the program class) must be submitted by 5:00pm next Monday (14 October). In order for your tutor to mark your program, you need to upload it to RUConnected using the submission links. *No submission, no mark.*