

Introductory Java Programming

School of Electronic Engineering
and Computer Science

Course Code: EBU4201

Lab Sheet 5: Java Collections – ArrayLists

- For this question, you will need to use and modify the file **CatTest2.java** that you wrote using *arrays* in *Lab Sheet 4 – Q1*. Now you will write a new version of that test class using an **ArrayList** and you will store it in a file called **CatTest3.java**¹. This means that you will also need the **Cat** class that you have written before.² Write code to do the following:
 - Create **5 Cat** objects; create also an **ArrayList** and add the **5 Cat** objects to the list.
 - Print out the details of the **Cat** object at *index 4*.
 - Print out the size (or length) of the **ArrayList**.
 - Remove the **Cat** object at *index 3*.
 - Using a **for** loop, iterate through the **ArrayList** and print out the details of the remaining **4 Cat** objects.
- Download the files **Student.java** and **StudentList.java** from the course area in QMplus and save both files in the same folder.

The file **Student.java** is a complete file (i.e. it compiles and runs) so do NOT modify it. This class defines the **Student** objects, with FOUR attributes representing: first and last names, email and year of registration. It has an *accessor* (or *getter*) for both **firstName** and **lastName**. It also has a **toString()** method to provide a **String** representation of **Student** objects.

You need to modify the **StudentList.java** file. The class contained in this file does NOT currently compile. You need to fill in the THREE incomplete methods so that it produces the output as indicated below, when you run the program³:

```
>java StudentList
John Smith has been added to the student list
Mary Davis has been added to the student list
your_firstname your_lastname has been added to the student list
--Begin--
Name: John Smith   Email: js@qmul.ac.uk   Year: 2016
Name: Mary Davis   Email: md@qmul.ac.uk   Year: 2017
Name: your_firstname your_lastname   Email: your_email   Year: your_year
--End--
Mary Davis has been removed from the student list
--Begin--
Name: John Smith   Email: js@qmul.ac.uk   Year: 2017
Name: your_firstname your_lastname   Email: your_email   Year: your_year
--End--
```

¹ **Note:** You will also need to rename the class from **CatTest2** to **CatTest3**.

² **Hint:** To help you answer *Q1.b) – Q1.e)* of this lab sheet, you will need to check the Java API to find the appropriate **ArrayList** class methods to use.

³ **Note:** The text in *blue italics* should be replaced with your own details.

- i) Complete the code for the method `public void printList()`, such that it prints out each **Student** in the list.
- ii) Complete the code for the method `public void addToList(Student stu)`, such that:
 - the method takes a **Student** object from the input parameter and adds the given **Student** to the list;
 - the method then prints out a message in the format: "**FirstName LastName has been added to the list**".
- iii) Complete the code for the method `public void removeFromList(Student stu)`, such that:
 - the method takes a **Student** object from the input parameter and removes the given **Student** from the list;
 - the method then prints out a message in the format: "**FirstName LastName has been removed from the list**".
- iv) Complete the code for the `main()` method, such that it also creates object **stu3** with your own details.

Ensure that all your programs contain both internal comments and *Javadoc* comments.