UNIVERSITY OF BOLTON
BSc COMPUTING
COURSEWORK SUBMISSION FORM

Student/Centre to complete:

SURNAME/FAMILY NAME: …… FORENAMES: …….

BOLTON STUDENT ID: …….. EMAIL: ……

DATE OF SUBMISSION: ……

MODULE NO./TITLE:…CPU5008 Data Structures and Algorithms……

TUTOR'S NAME:…….Abdul Razak……..... ……

COURSEWORK TITLE: ……Maps/Enums/Serialisation

Please state if this is your FIRST submission OR REFERRED/DEFERRED submission
OR a REPEAT submission? ☐

……

Declaration
I hereby declare that this work is my own work. I understand that if I am suspected of plagiarism or another form of cheating, my work be referred to Academic Registrar and/or the Board of Examiners, which may result in me being expelled from the programme. I understand once I submit this work, it will automatically belong to the University of Bolton.

Academic staff to complete:

Feedback: ……

……

……

……

Date Issued:……29th November 2016… Hand-In Date: **13th December 2016 @ 12 noon**

Other Relevant Date e.g. Demonstration **13th December 2016 during the practical session**

Received: On Time ☐ Late ☐ (within 5 days of published deadline date)

Mark awarded: ……..% Do not apply mark penalty unless the work was submitted late.

Assessors Name: …A. Razak……..…… Signature:.....

Date:…….
Degree Conversions A: 70-100% B: 60-69% C: 50-59% D: 40-49% F: 0-39%
HND Conversions Pass: 40-49% Merit: 50-66% Distinction: 67-100%

Late submission
For late submission see student handbook:
http://www.bolton.ac.uk/Quality/SE/Student-Handbook/Home.aspx

Creative Technologies

Course / Programme:	**Computing**
Module name and code:	**Data Structures and Algorithms CPU5008**
Tutor:	**Abdul Razak**
Assignment number:	**Two (part 2)**
Assignment title:	**Maps, Enums and Serialisation**
Issue date:	**29th November 2016**
Submission deadline:	**13th December 2016**

Assignment:

For this assignment, you have to use JAVA and Eclipse IDE to design application and implement HashMap and HashSet data structures, Enumerations and Serialisation.

Learning outcomes:

LO 3. Appreciate the need for and be capable of implementing maps and enums.

Specific Assessment Criteria:

- Have solved several problem tasks using the Java language.
- Have shown the ability to decompose a problem and have designed suitable class structures to effect a solution to a given problem.
- Have demonstrated the ability to complete tasks from blank solutions in order to achieve a goal.

Grading

A percentage mark will be provided as feedback. Grading is as follows:

A:	70 – 100%
B:	60 – 69%
C:	50 – 59%
D:	40 – 49%

Marks below 40% will be classed as fail.

Assignment 2 (part 2)

Create a new Java project called **A4_Donald_Duck** replacing ***Donald_Duck*** with your name. Use the underscore (_) to replace any space characters.

Scenario

The DVLA stores information on cars which includes the month the current taxation ends. It also holds information on the registered keeper (car owner) and the car registration number (number plate).

Program Development Stage 1 (15 marks)

Create a Car class with fields as follows:

```
privatefinal String make;
privatefinal String model;
private String colour;
```

Create a Keeper class with fields as follows:

```
private String forename;
private String surname;
private Address address;
```

Create an Address class with fields as follows:

```
private String street;
private String town;
private String postcode;
```

Create a RegNo class (for the car registration number) that implements the Comparable interface and overrides equals() and hashCode(), and has a single field as follows:

```
Private final String regNo;
```

The following methods are required for each class:

1) a parameter constructor that sets all the attribute values based on the parameter values.
2) a toString method to return a suitably formatted string of the attribute value(s).
3) implemented interface methods as appropriate.

The DVLA class will hold map data structures as specified by you. You should make it possible to hold registration number information, car information, and keeper information in appropriate maps.

Provide a method showAllCars that will print all the registration numbers and car details from a HashMap.

Create a class called **Test001** to put information for 3 cars and corresponding registration numbers into the DVLA HashMap, and then call the showAllCars method.

Program Development Stage 2 (15 marks)

Create a class called **Test002** to convert the HashMap to a TreeMap and verify that the tree traversal is now in sorted order according to the registration number.

Program Development Stage 3 (20 marks)

DVLA also needs to map the registration numbers to the keepers. Devise a means of doing this. Create a class called **Test003** to list all the registration numbers and keepers.

Program Development Stage 4 (30 marks)

DVLA needs to record the month where the car tax expires (it will expire at the end of this month). Provide a new field in the Car class:

```
private Month taxExpiresEndMonth;
```

Create a new public enum class called Month and provide it with the enum constants of January – December.

DVLA wish to write a reminder letter to all keepers at the start of the month at which their tax expires. Write a method in the DVLA class that will return a data structure of your choice that will hold the registration numbers, names and addresses of all keepers whose car should be re-taxed at the end of the month in question.

DVLA also wish to send a warning letter to all keepers whose tax has already expired. Write another method in the DVLA class that will return a data structure of your choice that will hold the registration numbers, names and addresses of all keepers whose car taxes have now expired for the month in question.

Hint: To compare months it might be helpful to provide the enum class with a private field and constructor so that each month has an associated int value from 1 – 12.

Create a class called **Test004** to test that reminder letters and warning letters can be sent to the appropriate keepers on any given month.

Program Development Stage 5 (20 marks)
Write the code to save all the data for the warning and reminder letters to a flash drive.
Write code to read the same data from the flash drive.
Create a class called **Test005** to demonstrate the write/read operation.

IMPORTANT
At all stages in the development you should add JavaDoc comments to explain the purpose of the new methods added to the each class.In addition to the JavaDoc comments you should add additional normal style comments where appropriate.

What you must submit

Your must submit the assignment in class by 12.00 noon on the deadline date shown on page 1 of this assignment brief.

Your submission must include:

1) This assignment brief completed and signed on the front page, also complete the table below.
2) UML class diagram
3) Printouts of the code for all the classes
4) The entire Eclipse project on disk (copy the entire project folder from the Eclipse workspace but **do not** change the folder name afterwards)
5) The disc should be clearly identified with your name, student ID, module name and assignment title and secured with the above documentation.

In this assignment I have achieved the following objectives.			
Tick appropriate box *NA – not attempted : Part – part completed : Full - fully completed*	**NA**	**Part**	**Full**
Stage 1 – Creating and populating a HashMap			
Stage 2 – Converting a HashMap to a TreeMap			
Stage 3 – Registration numbers and keepers			
Stage 4 – Month enum and reminder/warning letters			
Stage 5 – Serialisation			

Failure to submit all the above will result in a loss of marks

Assessment Criteria

The mark you get is based on

- the stage of development you have achieved
- the quality of the code provided
  - well structured
  - good use of identifier names
  - good use of comments (both JavaDoc and normal comments)
- clear concise algorithms that uses appropriate Java programming constructs