Faculty of Engineering, University of Jaffna

Department of Computer Engineering

EC5080: Software Construction

Lab 02: Data collections (containers)

You need to follow the good programming practices learned and it will be considered when grading your program.

Paste the outputs and write the answers on a file and upload it as a pdf. Also, you need to upload the source code.

For each question and/or parts,

1. First, create an IntelliJ Java project and name it as EC5080_Lab2_RegNo

2. Starting at the topmost line of the file, insert the following under the comments. You need to choose one of them. If you get any assistance from anyone/book/internet please include that. (This is to have good practice of writing bibliographical reference).

Certificate of Authenticity: (choose one from below)

// I certify the code of this lab is entirely my own work.

(or)

// I certify the code of this lab is entirely my own work,

// but I received assistance from [insert name (Instructor)].

// Follow this with a description of the type of assistance (Other than given documents).

Question 01:

Part1

To understand the concept Generics implement the following program and answer the questions.

```
public class exCast {
    Object data;
    public exCast(Object data) {
        this.data = data;
    }
    public Object getData() {
        return data;
    }
}
```

1. Implement the given lines of code.
2. Explain the output when adding the following lines of code in the main.

```
exCast intCast = new exCast(42);

exCast strCast = new exCast("hi");

int x = (Integer) strCast.getData();
```

3. Give a solution to find the previous problem at compile time without Generics.
4. Use Generics for question 5.

Part 2

Implement the following bubblesort program.

```
public class BS
{
    public static<//extend parameterized interface that will help to use the Java's sorting algorithms (Bounded Type Parameters) > void BS(E [] arr)
    {
        boolean Pass = ; //fill
        int n = arr.length;
        for (int i = 0; i < n && Pass; i++)
        {
            Pass = ; //fill
            for (int j = 0; j < n - i-1; j++)
```

```
                {
                        if (//compare) > 0)
                        {
                                //call the swap method
                                Pass = true;
                        }
                }
        }
}
public static void swap(int i , int j,Object [] arr)
{
//Fill (Swap by handling temporary variable)
}
public static void print(Object arr[])
{
//Fill
}
public static void main(String args[])
{
        Integer[] intArray = {34,6,7,5,32,77,78,55};
        Double[] doubleArray = {5.7,89.8,43.0,42.5,2.4,1.5};
        String[] stringArray = {"alpha","gamma","beta","delta"};
        BS(intArray);
        BS(doubleArray);
        BS(stringArray);
        print(intArray);
        print(stringArray);
        print(doubleArray);
```

```
    }
}
```

1. Fill in the blanks regarding the comments. (Do not change the place of boolean variable pass). You may add more lines of code anywhere but no new methods.
2. Compile and paste the output.
3. Execute and paste the output.

Question 02:

For each given purpose you need to find the correct JCF (Java Collection) and implement it (Consider Java Generics when implement).

1. Purpose: Find the duplicate elements.

    a. Which collection can be used?

    b. Implement the program.

    c. Paste the output.

2. Purpose: Read the cards and test the following JCF algorithms.

Cards:
“ClubsA","SpadeK","HeartsQ","DiamondJ","Clubs10","Spade9","Hearts8","Diamond7","Clubs 6", "Spade5","Hearts4","Diamond3".

Algorithms: Sort the cards, Shuffle the cards, Reverse the cards, Shuffle the cards again.

    a. Which collection can be used?

    b. Implement the program.

    c. Paste the output.

3. Purpose: Print the number of occurrences of each word for a given sentence.

    a. Which collection can be used?

    b. Implement the program.

    c. Paste the output.

Create a zip file in a format of Regno-Coursecode including all your code folders and pdf answer sheets.

Upload the zip file on/before given deadline via team.

Any plagiarized work will be given 0 marks.