Recap CO881 - Collections

Part A - ArrayList

1. Define a function that takes 2 parameters of type int and returns an ArrayList containing a given number of random integers between 1 and a given upper bound.

2. Write Java code to create an ArrayList containing 20 random numbers between 1 and 100 (inclusive) using the function defined in Task 1 and then print out all the numbers in an ascending order.

Part B – HashMap

3. Part of the lyrics of "Sing a Song" by The Carpenters is stored in the string `lyrics` below:

```
String lyrics = "Sing, sing a song/Let the world sing along/" +
                "Sing of love there could be/Sing for you and for me/" +
                "Sing, sing a song/Make it simple to last/" +
                "Your whole life long/Don't worry that it's not/" +
                "Good enough for anyone/Else to hear/" +
                "Just sing, sing a song";
```

   Write the Java code to

   a) Find out the total number of words in `lyrics`.

      Hint: Use the methods of String class to replace '/' with a space, remove any punctuations and extra spaces before splitting lyrics with white space as delimiter.

   b) Calculate the frequency of each unique word in `lyrics` and then print out the words and their frequencies that occur more than once. (Note: Words are not case sensitive, i.e. "Sing" and "sing" are the same.)

      Hint: Use a HashMap<String, Integer> to store the frequency of each word, i.e. the number of times the word occurs in `lyrics`.

   c) Print out the words that occurs the most in `lyrics`.

Part C - Arrays

4. The `ranks`, `suits` and `deck` are defined below:

```
String[] suits = {"Club","Diamond","Heart","Spade"};
String[] ranks = {"A","2","3","4","5","6","7","8","9","10","J","Q","K"};
String[] deck = new String[52];
```

   a) Populate the `deck` with 52 cards of different suits and ranks, e.g. "Club 3", "Spade A".

   b) Write a method to shuffle the cards in the deck, i.e. put the cards in a random order.