Assignment - Subjective Section

Instructions :

- This section is of 20 marks.
- Question 1 is from the unit Introduction to Data Structures and Algorithms, Question 2 is from the unit Arrays, and Question 3 is from the unit Strings.
- Submit the solution of the assignment as a typed PDF with proper question numbers and sub-sections. Handwritten solutions will not be accepted.
- You have three weeks to complete this assignment. The solution must be submitted on or before 14 November, 11:59pm.
- Step marks will also be awarded, in case the final answer is incorrect or if the answer is incomplete.

Q1 : a) What are the different types of Data Structures ? Give examples of each type. **(2 marks)**

b) Write an Algorithm or pseudocode for checking if a number is palindrome. Palindrome means the reverse of the number is the same as the number. **(2 marks)**

Example : 121 is palindrome.

531 is not palindrome, because its reverse is 135 and 135 is not equal to 531.

c) What is the time and space complexity of the below piece of code. Give a step by step Analysis, **(2 marks)**

```
for(j = 1; j < n; j = j*3)
{
 for(k = 1; k <= n; k = k+2)
 {
  r = i + j + k;
  System.out.println(r);
 }
}
```

Q2 : a) Write at least 2 differences between static and dynamic arrays ? Write some practical used case of multidimensional arrays. **(2 marks)**

b) Write a program in JAVA to input the number of elements in an array and also input the values in the array from the console. Replace all those elements which are even and greater than 5, with -99. Print the final array. **(2 marks)**

Example

Input : Enter number of elements in the array - 4

Enter value in array

8

5

7

20

Output : The final array is

-99 5 7 -99

Constraints : The array should initially not contain -99.

The value of the number of elements should not be greater than 50.

c) Write a detailed pseudocode for performing the following operations on an static array of length 15. It is filled with values only unto index 10 **(2 marks)**

Insert value 7 at the 5th index in the array - **Insertion(7, 5)** // The first parameter is value, the second parameter is index

Delete the element from the 6th index in the array - **Deletion(6)** // This parameter is the index in the array

Q3 : a) Consider the below lines of code

String a = “Harry”;

String b = “Harry”;

String c = new String(“Harry”);

What can be commented about the memory locations about a, b and c ? Justify your answer with proper reasons. (Hint : c uses the “new” keyword. Focus on that). **(2 marks)**

b) Write a program in JAVA to convert a given String into Title case, without using the toTitleCase() function. **(2 marks)**

Input : Enter a Name : harry james potter

Output : The name in Title case is - Harry James Potter

c) Write a program or pseudo code to create an array of First Names. The length of the Array is 5. Define an array of your choice. Output 1 if any 2 names are the same, else 0. It should be case insensitive. **(4 marks)**

Input : names = {“Harry”, “ron”, “HARRY”, “katie”, “Tom”};

Output : 1