Quiz 0.5: ECS 202 Data Structures and Algorithms

Due Date: 9 pm on 19^{th} Feb, 2024

Please read this instructions very carefully. If you deviate from them, your answers might not be registered/evaluated resulting in 0 marks.

- The question paper is divided into 2 groups viz "Group Kurt Gödel" and "Group John von Neumann".
- If your roll number is odd, solve questions from "Group Kurt Gödel", and if your roll number is even, solve questions from "Group John von Neumann".
- Create a folder `ECS202-Quiz-05` on your Desktop. There is no dot (·) in the folder name.
- Suppose your roll number is 25001, name is *Alan Turing*. (Hence, your group is Group Kurt Gödel.) To submit an answer of your first question, you need to have two file named `KG-Q1-25001.c` and `KG-Q1-25001.o` in the folder created above.

  We use similar names for other group and other questions. For example, files `VN-Q3-25002.c` and `VN-Q3-25002.o` should correspond to solution for the 3^{rd} question in Group John von Neumann.
- You **should** use the following command for final output.

```c
#include <stdio.h>
int main(void)
{
    int output; // or other relevant declaration

    // Your code does here

    printf("25001\t Alan Turing\t  %d", output);
    //Replace 25001 by your Roll Number and Alan Turing by your name.
}
```

- Your program will be evaluated by a script. There will not be partial marks for any question.
- Problems are on the next page.
- Create a zip file of your folder (with the same name) and submit it in this Google form.

Group Kurt Gödel

1. (5 pts) Write a program that takes as input an integer n and then outputs n^{th} Fibonacci number.

2. (5 pts) Write a program to read positive integers until –1 is entered and display the multiplication of all the number.

3. (10 pts) Write a program that reads given positive integers until -1 is entered and constructs a binary search tree. Your final output should be height of this tree.

4. (10 pts) Write a program that takes as input an integer D, followed by two arrays of size $D + 1$. Each array represents a polynomial of degree at most D, where i^{th} entry in the array is the co-efficient of x^i in the polynomial. Your program should compute the product of these two polynomial. The final output should be the sum of coefficients in the resulting polynomial.

Group John von Neumann

1. (5 pts) Write a program that takes as input an integer n, followed by an array of n integers, and outputs a maximum possible product of two different elements in it.

2. (5 pts) Write a program to read positive integers until –1 is entered and display the sum of all the number.

3. (10 pts) Write a program that takes as input an integer n, followed by an array of characters R, B, and Y. You program should compute minimum number of swaps needed to arrange the array such that all Bs appear before all Ys which appear before all Rs.

4. (10 pts) Write a program that reads given positive integers until -1 is entered and constructs a binary search tree. Your final output should be sum of the smallest and the largest elements. (There will be unique smallest and unique largest element.)
