

Quiz 0: ECS 202 Data Structures and Algorithms

Date: 19th January, 2024

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

- You must use a linux based system.
- The question paper is divided into 2 groups viz “Group Kurt Gödel” and “Group John von Neumann”. Solve the problems corresponding to your assigned group.
- Create a folder ECS202-Quiz-0 on your Desktop.
- Suppose your roll number is 25001, name is *Alan Turing* and your are in 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-Q3-25001.c and VN-Q3-25001.o should correspond to solution for the 3rd question in Group John von Neumann.

- You **should** use the following command for final output.

```
1 #include <stdio.h>
2 int main(void)
3 {
4     int output; // or other relevant declaration
5
6     // Your code does here
7
8     printf("25001\t Alan Turing\t %d", output);
9     //Replace 25001 by your Roll Number and Alan Turing by your name.
10 }
```

- Your program will be evaluated by a script, the only possible marks are 0, 5, 10, 15, or 20. There will not be partial marks for any question.
 - Problems are on the next page.
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Group Kurt Gödel

1. (5 pts) Write a program that takes as input an integer n , followed by an array of n integers, and outputs the maximum difference between any two different integers in it.
2. (5 pts) Write a program that takes as input an integer n and then outputs n^{th} Fibonacci number.
3. (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 that takes as input an integer n , and outputs the number of integers in $\{1, 2, \dots, n\}$ that are neither of the form $7 \cdot x + 4$ nor of the form $4 \cdot y + 7$ for any non-negative integers x, y .
For example, if $n = 15$, then 4, 7, 11 are of the above form. Hence, the answer is 12.
3. (10 pts) Write a program that takes as input an integer n , followed by an array of characters R, B , and Y . Your program should compute minimum number of swaps needed to arrange the array such that all B s appear before all Y s which appear before all R s.