Assignment 1

Due Time: 22- July

Data Structure and Algorithms (ENSF 594)

Description:

Recall the definition of Fibonacci Sequence. In this assignment, we are going to implement an efficient algorithm to compute the Fibonacci numbers. Also, in the second part of the assignment, you are asked to implement an efficient algorithm for computing GCD of two numbers.

Part-1:

Problem Description

Task. Given an integer n, find the nth Fibonacci number F_n.

Input Format. The input consists of a single integer n.

Constraints. $0 \leq n \leq 45$.

Output Format. Output F_n.

Sample 1.

Input:

```
10
```

Output:

```
55
```

$F_{10} = 55$.

Part-2:

Problem Description

Task. Given two integers a and b, find their greatest common divisor.

Input Format. The two integers a, b are given in the same line separated by space.

Constraints. $1 \leq a, b \leq 2 \cdot 10^9$.

Output Format. Output GCD(a, b).

Sample 1.

Input:

```
18 35
```

Output:

```
1
```

18 and 35 do not have common non-trivial divisors.

Sample 2.

Input:

```
28851538 1183019
```

Output:

```
17657
```

$28851538 = 17657 \cdot 1634$, $1183019 = 17657 \cdot 67$.

What to upload:

1- Your manuscript in Java Programming Language.
2- A pdf file as a report. (include some screenshots of your output)