Data Structures and Algorithms Lab

03. Efficiency Analysis

Lab Code: 19ECSP201 **Lab No:** 03 **Semester:** III

Date: 30 Aug, 2019 **Batch:** C2

Question: Efficiency Analysis of Algorithms

Objective: Understanding Analysisthe the Machine way

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1. Write a recursive program for Towers of Hanoi problem and record the time taken for following given input size. Use a spreadsheet application and plot a graph presenting your results. **[10 Points]**

Si. No.	Number of Disks	Time Taken (sec)
1.	1	
2.	2	
3.	3	
4.	6	
5.	8	
6.	10	

2. Compare and present the orders of growth of linear search and binary search for the worst-case inputs for the given below input sizes. Use rand() function to generate the random array inputs between size 0 to 1000. Present your results using a spreadsheet application with an appropriate graph. **[20 Points]**

Si. No.	Input Array Size N	Time Taken by Linear Search (sec)	Time Taken by Binary Search (sec)
1.	100		
2.	500		
3.	1000		
4.	5000		
5.	10000		
6.	50000		

3. Write a program to find the gcd of two numbers using the following methods:
   a. Traditional
   b. Euclidean Method
   c. Extended Euclidean Method

Plot the graphs for the following input size: **[30 Points]**

Si. No.	GCD(a, b)	Traditional (sec)	Euclidean (sec)	Extended Euclidean (Sec)
1.	2 bits			
2.	4 bits			
3.	8 bits			
4.	16 bits			
5.	32 bits			

4. Write a program to find the length of a string using the following methods:
   a. Standard library function
   b. Using pointers
   c. Using recursion

You can use an online tool to generate random strings of the required length. Populate the below table and plot a graph: **[30 Points]**

Si. No.	Length of String N	Library	Pointers	Recursion
1.	1000			
2.	5000			
3.	10000			
4.	50000			

**** Happy Coding ****