

Assignment -1 (DAA)

1.1. Why algorithms analysis is needed? Explain .

1.2. Analyze the following algorithms using RAM model and express the time and space complexities using Big Oh notation.

a)

```
findSum(a,n){  
    sum= 0;  
    for (i= 0; i < n; i++)  
        sum += a[i];  
    return sum;  
}
```

b)

```
doThis(){  
    for(i = n; i>=1; i=i/2){  
        print("Good");  
    }  
}
```

1.3. What do you mean by amortized analysis of algorithm? Discuss in detail about aggregate method of amortized complexity analysis with suitable example.

1.4. Solve the following recurrence relation using recurrence tree method.

$$\begin{aligned} T(n) &= 3T(n/4) + cn^2 \quad \text{for } n > 1 \\ &= 1 \quad \text{for } n = 1 \end{aligned}$$

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Assignment -2 (DAA)

Assignment should be submitted in loose sheet physically. [Deadline: 2078/08/26 (December 12, 2021)]

(Refer book: Introduction to Algorithms, 3rd Edition by Thomas H. Cormen ; page number 926 to 972. You may follow other resources but focus on book)

- a) Write short notes on following number theoretic notations
 - i. Divisibility and divisors
 - ii. Prime and composite numbers
 - iii. The division theorem, remainders, and modular equivalence
 - iv. Common divisors and greatest common divisors
 - v. Relatively prime integers
 - vi. Unique factorization
 - vii. Modular linear equations
 - viii. The Chinese remainder theorem
- b) Write the recursive Euclidian algorithm to find GCD and analyze it's complexity
- c) Write the Extended Euclidian algorithm and analyze it's complexity
- d) Discuss about the use of Extended Euclidian algorithm to solve modular linear equation. Write the algorithm and analyze it. (Algorithm: MODULAR-LINEAR-EQUATION-SOLVER)
- e) What do you mean by primality testing? Define pseudoprimalty testing.
- f) Discuss about the Miller-Rabin randomized primality test with algorithm and analysis.

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