DESIGN & ANALYSIS OF ALGORITHM

PCC-CS402

HOW TO ANALYSE AN ALGORITHM

- Time (Functional Representation)/ Not an absolute value.
- Space
- N.B: DATA CONSUMPTION

OBJECTIVE OF CLASS

To understand the concept of $T_A(n)$ which represent the **functional representation of an algorithm** based on **input instance** n.

FRAME WORK FOR ALGORITHM ANALYSIS -

Framework-What are the things require to analyse an algorithm.

Answer- Input instance and its size.

PROBLEM

- GCD PROBLEM
- SHORTEST PATH
- DICTIONARY SEARCH

- NB- Every problem input – output combination is distinct.

INPUT INSTANCES

- PROBLEM-
  - GCD PROBLEM 36,48 numeric data
  - SHORTEST PATH Technopolis | UEM Array of places
  - DICTIONARY SEARCH “cat” string

SIZE OF AN INPUT INSTANCE

- No of bits require to represent the input instance.
  - GCD 36,48 6+6=12 bits
  - Shortest Path | **Technopolis** | **UEM** | Size of the string present in the 2d array
  - Dictionary “cat” 21 bits

NB- cat /c or a or t ascii value wise size is 7 bit/3*7=21

CONCLUSION

- An algorithm with higher size of input instances – much time.

ALGORITHMIC STATEMENT

	Statement	no of step
1.	A= B + C * D – F	1/4 (no of operation i.e +,*,-,=)
2.	A[i]= B[i] + C[i]	1/4 (operation extract from index,+, extract from index)
3.	C= A[(i-1)m+j]	1/5
4.	FOR I=1 TO N	
	C[I]= A[I] +B[I]	n

ALGORITHMIC STATEMENT

	Statement	Steps
5.	1. i=1	1
	2. IF i> n go to 9	n+1
	3. X=a[i]	
	4. Y=B[i]	(3-6)body - b.n
	5. Z=X+Y	
	6. C[i]= Z	
	7. i=i+1	(7-8) 2.n
	8. GOTO 2	

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	7. I=I+1	(7-8) 2.n
	8. GOTO 2	Total=1+n+1+bn+2n=(b+3)n+2
		so $T_A(n)=(b+3)n+2$

GENERAL ANALYSIS STRATEGY

- $T_A(n)$= maximum time taken by our algorithm A to solve any input instance of size n.

GENERAL ANALYSIS STRATEGY

- Conservative- worst case
- Functional form of T(n) is important (shape)
- Upper bound/lower bound of T(n)
- Large n is important

NEXT CLASS

Frequency Counting Method