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MADE EASY
COMPUTER SCIENCE
Topper Handwritten Notes
ALGORITHM
BY-RAVI SIR

- Theory
- Explanation
- Derivation
- Example
- Shortcuts
- Previous Years Question With Solution

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Algorithm

Algo + DS = 20 to 25 marks

Syllabus :-

1. * Asymptotic Analysis
* Time complexity and space complexity of Recursive Algo / Non Recursive Algorithm
* Methods to solve Recurrence Relations.
4-6 marks
2. Algo Design Techniques.
i) Divide and conquer
ii) Greedy Method
iii) Dynamic programming
6-8 marks
3. Data Structures : * Tree and Graph Represent-
* * * Priority Queue (min Heap / max Heap)
* Set Algorithm (union / Find Algo)
2 marks
4. Sorting Algorithms
5. Tree and Graph Traversal Algo.
2-4 marks

Reference * * *

↳ DS + Algo using "C" Mark Allen Weiss

↳ Algorithm (Sartaj Sahani)

↳ Introduction to Algo (Cormen)
[EX problems].

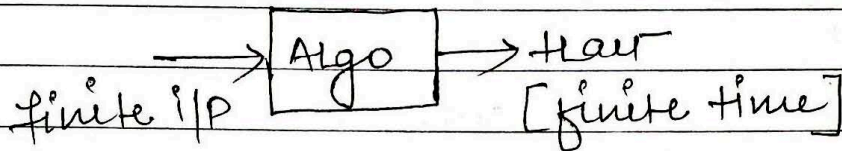
Introduction:—

Algorithm:

Step by step representation of computer program.

Criteria of Algo:—

1. 1. Finiteness:— Algo must terminate in finite amount of time.



2. Definiteness:— Each step of Algorithm must have unique solution.
(also called Deterministic Algo).

3. Efficiency:— Each step of Algorithm must be basic.

Deterministic Algo:—

Each step in Algo must have only unique solution.

|| possible to implement in computers.

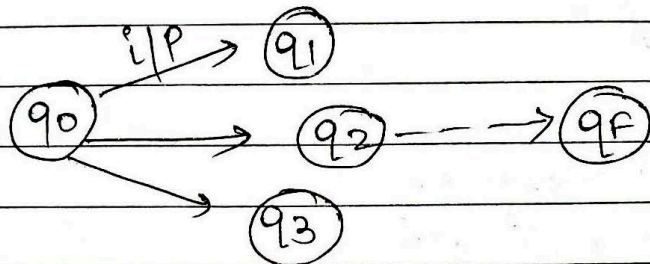
DFA : $(q_0) \xrightarrow{IP} (q_1)$
unique.

- ⇒ All loop or if use in a are deterministic Algorithm.

Non Deterministic Algo. // not possible to implement in comp

Each step in Algo can have finite # of solutions. ~~++~~ Algo should choose correct solution in first attempt.

NFA :



$a[1 \dots n]$ array x is searching element.

Deterministic Algo:

```

for (i=1; i<=n; i++) # of comp = n
{
  if (x == a[i])
    return (i)
}
return (-)
  
```

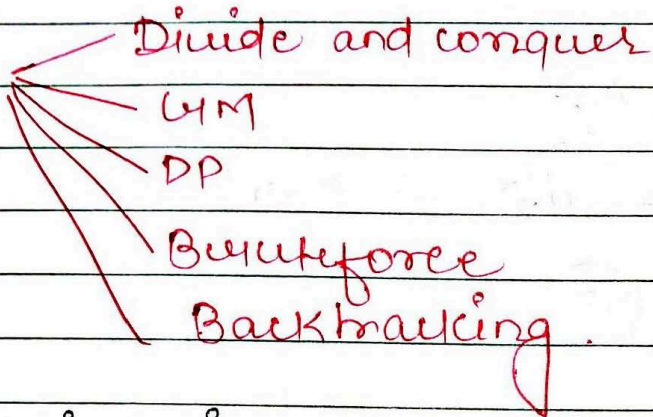
Non Deterministic Algo:

```

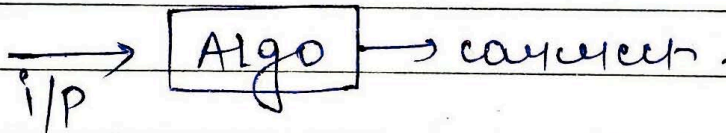
i = choose (1, n)
if (x == a[i])
  return (i);
else
  return (-);
} # of comparison = 1
} faster
  
```

⇒ Step to Design Algo :-

1^o Devise Algo.
Design Algo using best Design technique



2. Validation of Algo.
Test logic of Algo correct or not



3^o Analysis of Algorithm: estimation of cpu execution time and main memory space to complete execution of algorithm.

4^o Testing of program :- test program for all possible i/p's by using system testing method. [Testing tools]