Assignment -1

AIM :

a) Define Algorithm. Discuss various properties of algorithm. Enlist the steps for designing an algorithm.

-> Algorithm :- A process or a set of rules to be followed to acheive desired output, especially by a Computer.

Properties :-

• Precision - Each step of an algorithm must be precisely defined.

• Input - An algorithm accepts zero or more inputs.

• Outputs - An algorithm must generate at least one desirable output.

• finiteness - An algorithm must always terminate after a number of steps.

• Effectiveness - All the operations to be performed in the algorithm must be essential & sufficiently basic.

• Generality - The algorithm should be expressed in a generic form & must be applicable to a set of all possible inputs.

AIM :

Step 1 :- Obtain a description of the problem.

Step 2 :- Analyze the problem.

Step 3 :- Develop a high level Algorithm.

Step 4 :- Refine the algorithm by adding more detail.

Step 5 :- Review the Algorithm.

b) Refine Algorithmic Strategies. Mention any five algorithm design techniques.

Algorithmic Strategies

-> It combine several approaches to solving a problem.

-> Recursive Algorithm

-> Backtracking Algorithm

-> Divide & Conquer Algorithm

-> Greedy Algorithm

-> Dynamic programming Algorithm.

c) What are the three ways for representing a set?

1) Statement from

2) Roster or Tabular form

3) Rule or Set Builder form

AIM eg. 1) {odd numbers less than 7 3→1st Method

2) $N = \{1, 2, 3, 4, 5\}$ →2nd Method

3) $P = \{x : x$ is a counting number & greater than 12$\}$ →3rd Method

d) Determine whether R is equivalent relation or not where $A = \{0, 1, 2\}$ & $R = \{\{0, 0\}, \{1, 0\}, \{1, 1\}, \{2, 2\}, \{2, 1\}\}$

→ Reflexive

$\forall a \in A$

aRa

$(a, a) \in R$

$= (0, 0), (1, 1), (2, 2)$

→ Transitive

for any $a, b, c \in A$

$(a, b) \in R$

$(b, c) \in R$, $(a, c) \in R$

$(1, 0)$ $(1, 1)$ $(2, 2)$

$(0, 0)$ $(1, 0)$ $(2, 2)$

$(1, 0)$ $(1, 0)$ $(2, 1)$

•) Symmetry

for any $a, b \in A$

$(a, b) \in R = (b, a) \in R$

This is not symmetric relation because not set In $(b, a) \in R$ therefore given set is not equivalent Relation.

2) Provide an example of Solution to linear Equality

-2 The term inequality is applied to any statement involving one of the symbols. $<, >, \leq, \geq$

-) eg. $3x - 8 + 2x < 12$

$\to 3x - 8 + 2x < 12$

$3x + 2x < 12 + 8$

$5x < 20$

$x < 4$

Ex. $2(8 - P) \leq 3(P + 9)$

$\to 2(8 - P) \leq 3(P + 7)$

$16 - 2P \leq 3P + 21$

$16 - 21 \leq 3P + 2P$

$-5 \leq 5P$

$-1 \leq P$

$P \geq -1$ (a < b is equal to b > a)

1) $x + 7 < 15$

$= x + 7 - 7 < 15 - 7$

$x < 8$

2) $x - 6 > 14$

$x - 6 + 6 > 14 + 6$

$x > 20$

3) $x - 3 + 2 < 10$

$x - 1 < 10$

$x < 11$