

-: Unit-5 short questions:- DAA①

Define Deterministic :- In a deterministic algorithm, for a given particular input, the computer will always produce the same output.

$$\begin{array}{rcl} \text{IP} \rightarrow 2+3 & \xrightarrow{+} & \text{Q}_1 \\ \text{Q}_0 & \xrightarrow{+} & \text{Q}_2 \\ 2+3 & = & \end{array} \quad \begin{array}{l} 5 \rightarrow \text{O/P} \\ \text{Same output} \end{array}$$

$2+3=5 \rightarrow$ deterministic algorithm.

Q Define Non-Deterministic:-

In non-Deterministic algorithm, for the same input, the compiler may produce different output.

$$\begin{array}{rcl} 2+3 & = & 4 \\ \text{Q}_0 & \xrightarrow{+} & \text{Q}_1 \\ & \xrightarrow{+} & \text{Q}_2 \\ 2+3 & = & 6 \end{array} \quad \begin{array}{l} \text{Same input} \\ \text{but we get} \\ \text{different output} \\ \text{Non-Deterministic} \\ \text{algorithm.} \end{array}$$

Q:- Define terms related to non-deterministic algorithm?

A:- 1. Choice(X) :- chooses any value randomly from the set X.

2. failure() :- denotes the unsuccessful solution.

3. success() :- the solution is successful and the current thread terminates.

Q:- Define satisfiability / boolean satisfiability?

SAT :- A Boolean satisfiability function

is the problem of determining if a Boolean formula is satisfiable or un-satisfiable. if the output is true for a given input values then it is called satisfiability.

Let $x_i = x_1, x_2, \dots$ denote boolean variables.

→ Let \bar{x}_i denotes negations of x_i

For DNF, ~~TA~~

$$(T \wedge T) \vee (T \wedge T) = T \vee T = \underline{T}$$

For CNF, $(T \vee T) \wedge (T \vee T) = T \wedge T = \underline{T}$

if CNF satisfies, it is SAT

Q:- Define P class :- the computational problems that are solvable is called P-class. 5th unit. Short. ②

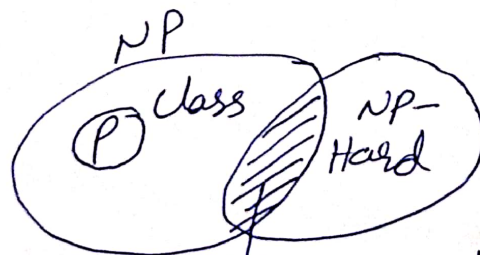
Q:- Define Polynomial Time :- given problems are solvable in a given time.

Ex:- given work time is 1 hour.
In 1 hour we should complete the work is called Polynomial Time (1 hour).

Q:- Define NP-Hard :- problems that not been solved in polynomial time is called NP-Hard.
work not completed in 1 hour given time.

Q:- NP-complete :- problems that can be solved in polynomial time is called NP-complete.

P, NP-hard, NP-complete Diagram :-



Q:- Define NP? :-

The problems that can be solved in non-deterministic machine in polynomial time.

Q:- Define CNF, DNF?

CNF:- "Conjunctive Normal form".

DNF:- "Disjunctive Normal Form".

CNF:- Each variable has exactly 2 values that describe continuous functions.

$$(T \vee T) \wedge (T \vee T) = T \wedge T = \underline{T}$$

DNF:- each variable has either 1 value or no values at all.

$$(T \wedge T) \vee (T \wedge T) = T \vee T = \underline{T}$$