@combinecs The Extra Step

Artificial Intelligence

FREE

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LIVE MOCK-3 YouTube 3:30pm JULY 11

Discrete Toc

RASHMI PRABHA

Qualified UGCNET, GATE Educator

10+ Years of Experience

CombineCS Schedule

ARE YOU PREPARED?

LIVE MOCK TEST	LIVE DATE	TIMING
UGCNET Artificial Intelligence	Sun, 11th JULY	@ 3:30 pm
UGCNET Data Structure & Algorithm	Sun, 18th JULY	@ 3:30 pm

UPCOMING LIVE SESSIONS	LIVE DATE	TIMING
PAPER – 1 (Concept + PYQ)	DAILY	@ 11 am
PAPER – 2 (Computer Science)	DAILY	@ 7am – 8am

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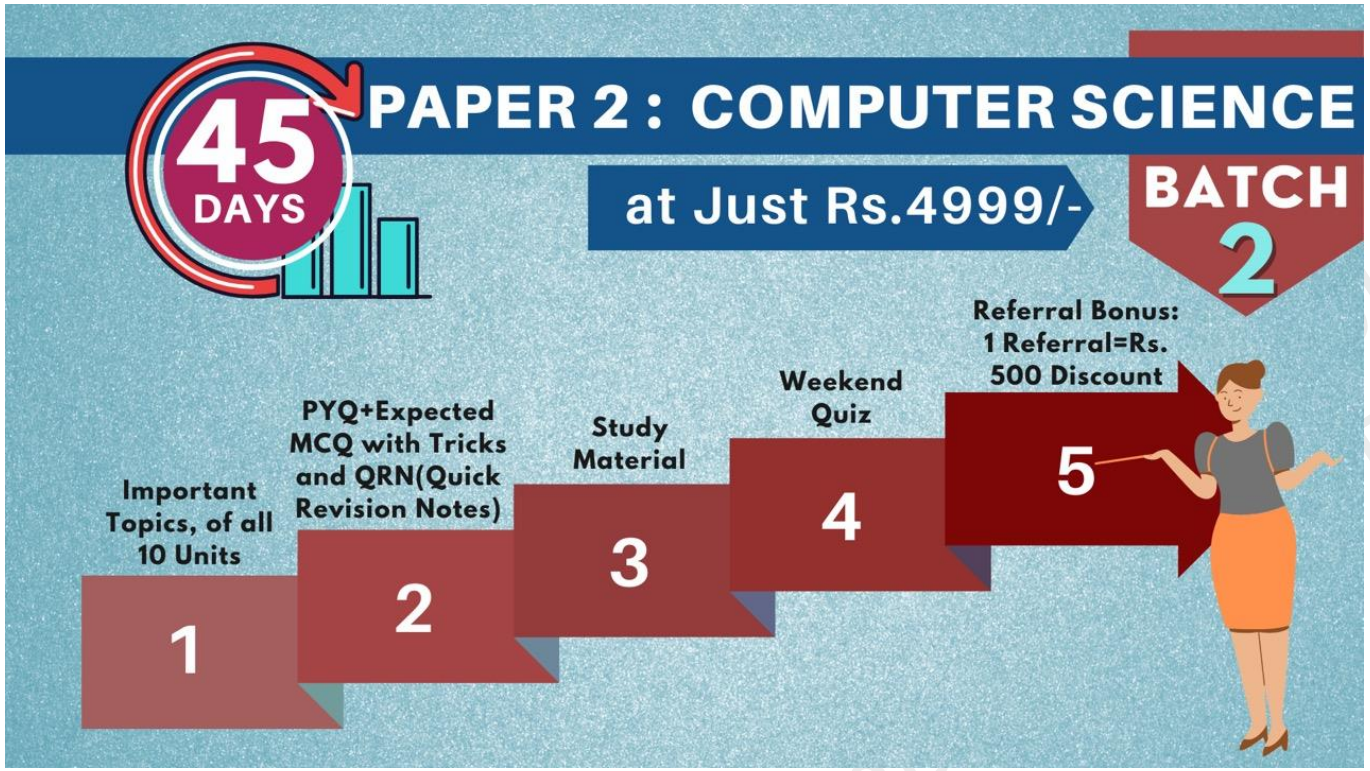

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Last chance to enroll by today

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Q1) Which is/are correct statements for Steepest Ascent Hill Climbing Search algorithm?

1. Among all neighbors selects the first one that optimizes the current cost to be the next node.
2. This evaluates all neighboring nodes at a time and selects the one closest to the solution state.
3. This selects a neighboring node at random, evaluates it and decides whether to move to it or examine another.
4. None of the Above

Q1) Which is/are correct statements for Steepest Ascent Hill Climbing Search algorithm?

1. Among all neighbors selects the **first one** that optimizes the current cost to be the next node. **(Simple Hill Climbing)**
2. This evaluates all neighboring nodes at a time and selects the one closest to the solution state. **(Steepest Hill Climbing)**
3. This selects a neighboring node at random, evaluates it and decides whether to move to it or examine another. **(Stochastic Hill Climbing)**
4. None of the Above

LMN-1

Hill Climbing – Heuristic Search Algorithm

- ✓ Heuristic – may not give optimal solution, but Good solution can be achieved in reasonable time.
- ✓ Solve Optimization Problem
- ✓ It Is Informed Search Technique
- ✓ Heuristic – ALL Path trace
- ✓ Based on Greedy Approach
- ✓ 3 types

a) Simple - First
b) Steepest - ALL
c) Stochastic - Random

Hill Climbing – Problems & Solutions

a) Local Maxima - Backtracking
b) Plateau – Random / Big Jump
c) Ridge – Bi-directional Search

Q2) Branch and Bound Search Technique is generally used for solving ---- ?

1. Optimization problem
2. Minimization Problem
3. Maximization
4. NP-Hard Problems

a) 1 &2
b) 2 & 3
c) 1, 4
d) All

Q2) Branch and Bound Search Technique is generally used for solving ---- ?

1. Optimization problem
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a) 1 &2
b) 2 & 3
c) 1, 4
d) All

LMN-2

Branch and bound algorithms has two parts –

1. Branch – when a search space state splits, it is known as branch. (several choices)
2. Bound – setting minimum cost (bound) to search for a GOAL state, if not found then prune it.

It is the most commonly used tool for solving NP-hard optimization problems like:-

a) TSP problem
b) 0/1 Knapsack problem
c) integer programming.
d) Maximum Satisfiability problem & so on.

LMN-3

Branch and bound algorithms are **used** to find the optimal **solution** for combinatory, discrete, and general mathematical optimization problems. In general, given an NP-Hard problem, a **branch and bound algorithm** explores the entire search space of possible solutions and provides an optimal **solution**.

Branch & Bound (Tree/Graph) –

- ✓ keeps track of all partial path which can be candidate for further exploration.
- ✓ Optimization Problem / NP Hard Problem
- ✓ Used when Greedy & Dynamic Programming Fails
- ✓ Slow method
- ✓ Exponential Complexity

Q3) Match the following

a) Expert System	1) Explanation Facility
b) Planning	2) Means & Analysis
c) Prolog	3) Resolution
d) NLP (natural lang. processing)	4) Pragmatics

1. A – 1, B-2, C-3,D-4
2. A – 2, B-3, C-1,D-3
3. A – 3, B-4, C-1,D-2
4. A – 4, B-1, C-3,D-2

Q3) Match the following

steps.

PYQ-2023

a) Expert System → 1) Explanation Facility
b) Planning → 2) Means & Analysis
c) Prolog → 3) Resolution
d) NLP → 4) Pragmatics

Map b/w Current → Goal (AI, Procedural lang.)

1. **A – 1, B-2, C-3,D-4**
2. **A – 2, B-3, C-1,D-3**
3. **A – 3, B-4, C-1,D-2**
4. **A – 4, B-1, C-3,D-2**

Comment

PROLOG Full form?

Paper!

next

Q4) …… states are possible in State Space representation?

offline

a) 2

b) 3

c) 4

d) 5

Paper 1 ICT

Prolog

① Programming in logic

② Prog. Lang.

Q4) …… states are possible in State Space representation?

a) 2

b) 3

c) 4 (Initial / Goal / Action / Step state)

d) 5

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Practice Session

Q5)

0

Consider $f(N) = g(N) + h(N)$ Where function g is a measure of the cost of getting from the start node to the current node. N and h is an estimate of the additional cost of getting from the current node N to the goal node. Then $f(N) = h(N)$ is used in which one of the following algorithms?

A. A^* algorithm

B. AO^* algorithm

C. Greedy best first search algorithm

D. Iterative A^* algorithm

Read again & twice

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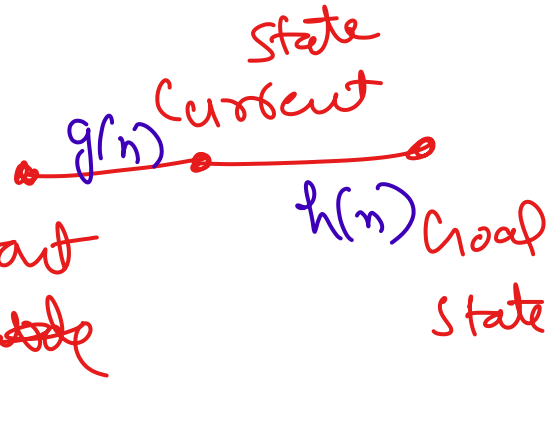
2020, 2019

Q5) Consider $f(N) = g(N) + h(N)$ Where function g is a measure of the cost of getting from the start node to the current node. N and h is an estimate of the additional cost of getting from the current node N to the goal node. Then $f(N) = h(N)$ is used in which one of the following algorithms?

A*

explain



BFS

Greedy" ~~A. A^* algorithm~~ X

Interactive" ~~B. AO^* algorithm~~ (Version of A*)

C. Greedy best first search algorithm

~~D. Iterative A^* algorithm~~

looking for most promising nodes

g(n)

Prune

ignore

Q6) Match the following

1. Fitness Function	a) It creates random changes in genetic codes of the offspring's.
2. Mutation Operator	b) It represents the main requirements of the desired solution problem
3. Crossover Operator	c) It defines the way individual in the current population are selected for reproduction
4. Selection Operator	d) How chromosomes of parents are mixed in order to obtain genetic codes of their offspring’s

i. 1-c , 2-b, 3-a, 4-d

ii. 1-a , 2-c, 3-b, 4-b

iii. 1-b , 2-a, 3-d, 4-c

iv. 1-d , 2-a, 3-c, 4-b

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iii. 1-b , 2-a, 3-d, 4-c

iv. 1-d , 2-a, 3-c, 4-b

Q7) Hill climbing is not an ….. algorithm?

1. Greedy approach
2. Backtracking approach
3. Heuristic search
4. Uninformed search

Q7) Hill climbing is not an ….. algorithm?

1. Greedy approach
2. Backtracking approach
3. Heuristic search
4. Uninformed search

It employs a **greedy approach**: This means that it moves in a direction in which the cost function is optimized.
No Backtracking: A **hill-climbing algorithm** only works on the current state and succeeding states (future). It does not look at the previous states

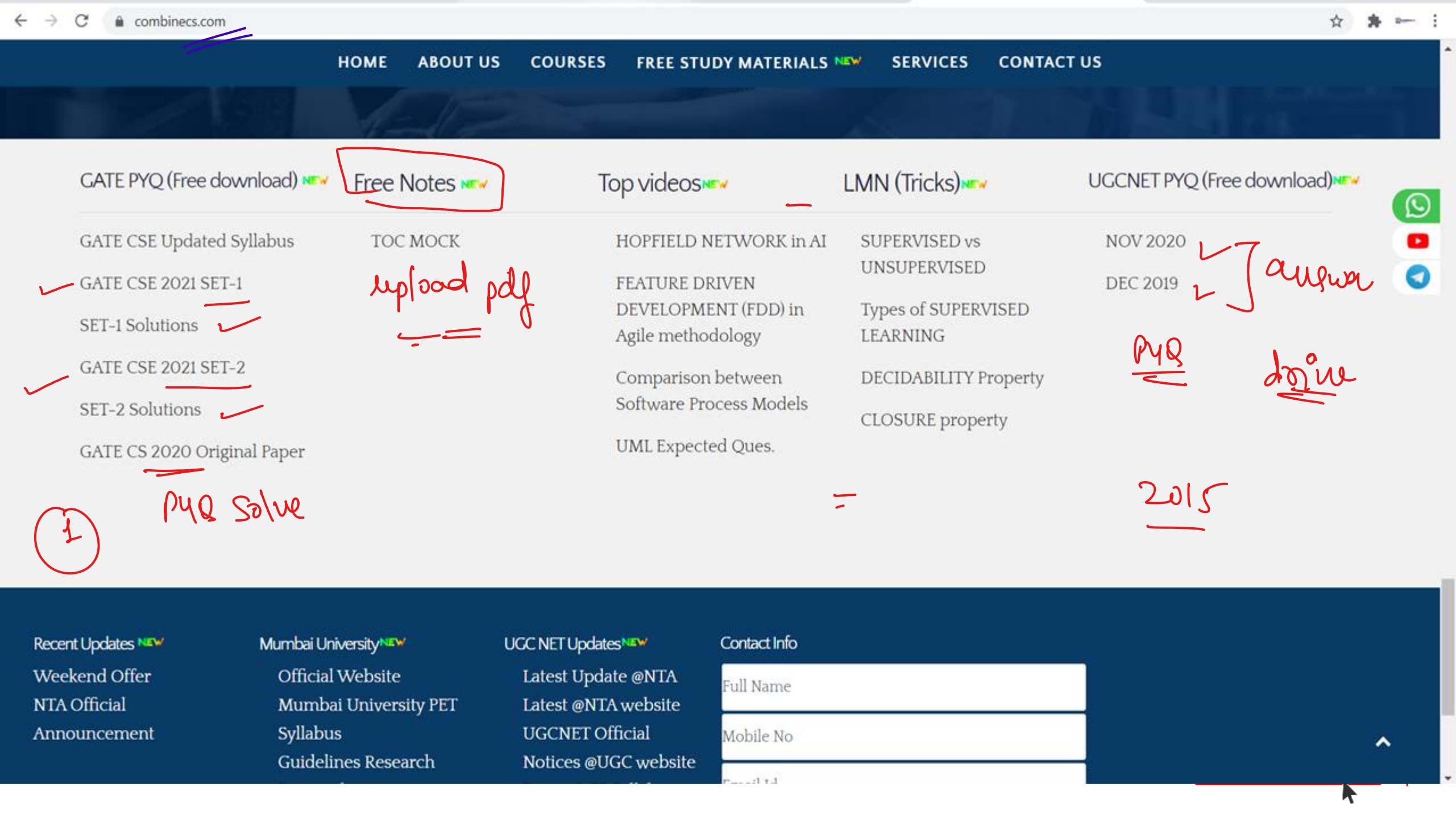
One Liner Notes

Uninformed Search

1. **Breadth-first Search.**
2. **Depth-first Search.**
3. Depth-limited **Search.**
4. Iterative deepening **depth-first search.**
5. Uniform cost **search**
6. Bidirectional **Search**

Informed Search

1. **Best First Search Algorithm(Greedy/Recursive search)**
2. **A* Search Algorithm**
3. **Recursive best-first search**
4. **AO* Search Algorithm**
5. Hill Climbing
6. Genetic Algorithm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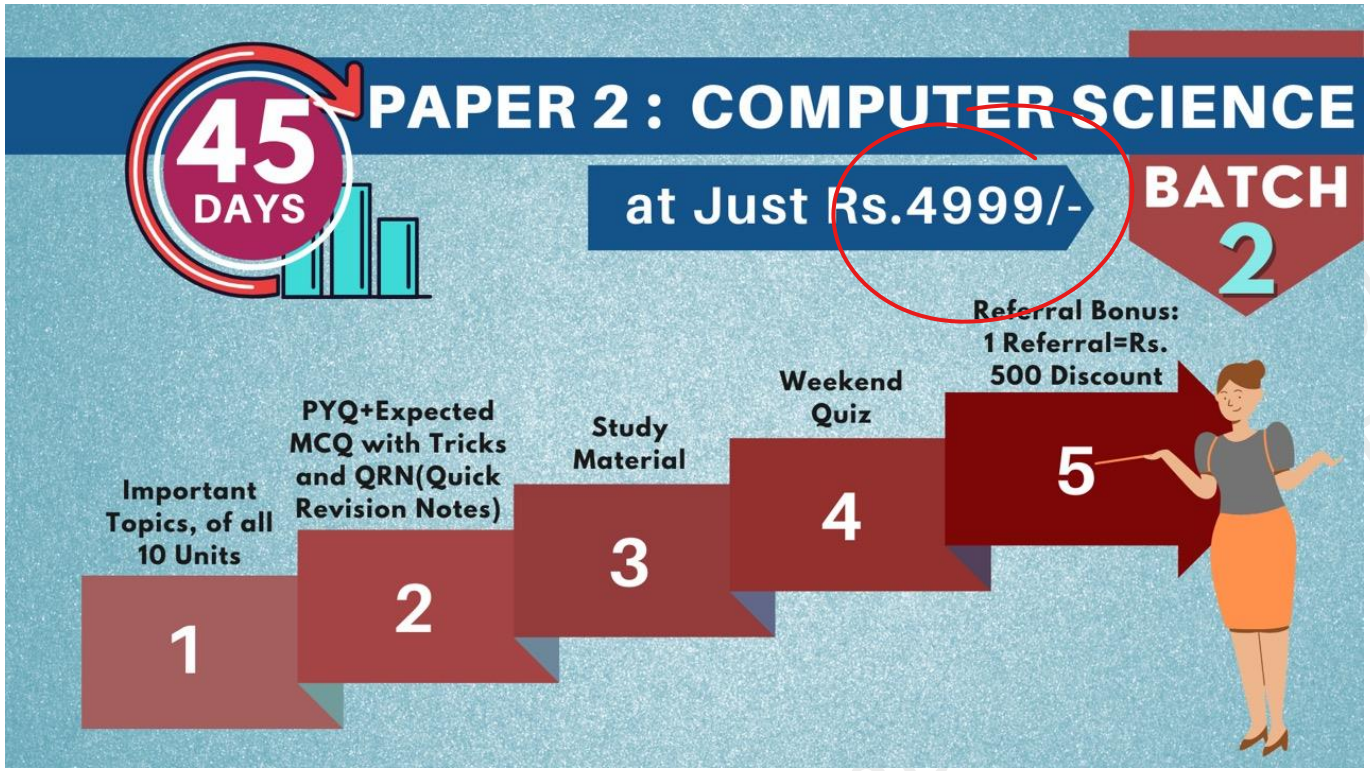

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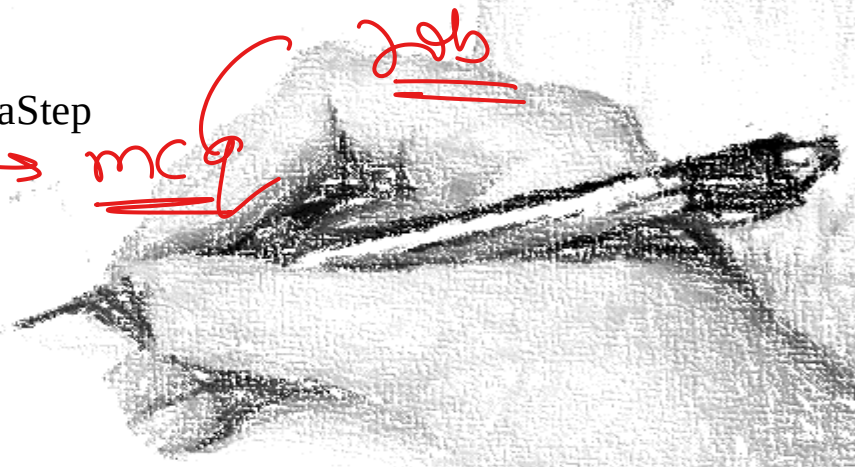

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