HITEC University Taxila

Admit Card of Mid Term Semester Examinations - Fall Semester 2025

Bachelors of Cyber Security (Entry Fall - 2024)

Name: SALIHA HALEEM Registration #: 24-CyS-011

Course Title: CS-213. : Artificial Intelligence Sec II : 2-0-2

Note: 1. Attach this slip with Answer Book 2. Mobile phones are NOT allowed inside Exam Hall

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Invigilator's Signature_____

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IMPORTANT

This Answer Book should not be used for any purpose other than writing the anser to question in the Examination Hall. Illegal use of answer book or any part of it will lead to action as per rules.

Reg No: 24-CyS-011 Name: SALIHA HALEEM

Program: Cyber security Semester: 03

Subject: Artificial Intelligence. Section: B Date: 02.

INSTRUCTIONS FOR CANDIDATE

1. Before writing answers, please FILL correctly all the particulars mentioned above.
2. This answer book has 1- 6 leaves.
3. Paper to be solved with blue ball point / ink pen.
4. Answer only the require number of questions, Attempting more number of questions(s) will result in discarding the best answer.
5. Write on both sides and on each line of the leaf and cross unused portion.
6. No Answer Book or paper of any kind is to be taken in or removed from the Examination Hall/Room except the Question Paper
7. No leaf from Answer Book will be torn out.
8. This Answer Book must be handed over to the Superintendent/Invigilator, even if no question has been answered.
9. Candidates are not permitted to leave the Examination Hall/Room until the expiry of one third of the allowed time after the distribution of Question paper.
10. Candidates guilty of making appeals to the Examiner in Answer Book will entail the penalty of cancellation of the Answer Book through which such appeal is made.
11. Candidates found using unfair means shall be liable to disciplinary action.
12. Cellular/Mobile Phones, Smart Watches and Programable Calculators are not allowed inside the Examination Hall/Rooms.

Q No	1	2	3	4	5	6	7	Total Marks
Marks Obtained	8	10	4	11				33/50
Q No	8	9	10	11	12	13	14	
Marks Obtained								

Marks Obtained in Words:_____ Signature of the Examiner:_____

Examiner Name:_____ Examiner Name:_____

PLEASE START WRITING ANSWER ON REVERSE OF THIS SHEET

QUESTION 01:-

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Intelligence

Intelligence is what you first observe the situation & then decide what to do.

For Example:-

lets imagine you are walking for class and suddenly it rain start. so 1st ly you can ~~observe~~ fell that you can start wet, then you observe clouds and think if you continuslyy walking you get wet, then you decide to open umberella and take shelter and you learn from experience.

Artificial Intelligence.

Artificial Intelligence is the ability of machines which think, learn and decide like a humans.

For Example:-

AI - Assist Robots Used in surgries ~~for~~ to make surgries more safer and precise.

chatgpt, etc.

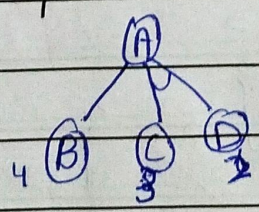
2	Stack	Queue
	Stack is a linear data structure that follow the rule (LIFO)	Queue is a linear data structure that follow the rule (FIFO).
	The element put in last can first out.	The element put in first can first out.
	Example: UNDO, REDO functions	Example:- Banking system. the person can first stand in line can first out.

3	Simple Reflex Based Agent	Goal Based Agent.
	Simple reflex Based Agents are the agents that have no goals, no extra information they are reflexable.	Goal Based agents have set a speciall goal and get proper information before work.

Example:-	Example:-
You can play Puzzle alone (No competition), (No goal)	You work hard to Pass the exam.

4 Optimal Solution	Near optimal solution -
Optimal solutions are the solutions in which the least cost value or Shortest Path are used.	Near optimal solutions are very near to least cost.

For Example:-



$A \to B = 4$

$A \to C \to D \Rightarrow 3 + 2 = 5$

$A \to B$ is optimal solution

but $A \to C \to D \Rightarrow$ is near optimal.

Question NO 02:-

(1)

BFS (Breadth- First Search).

BFS Breadth first Search is a graph search algorithm that search each node (level by level)

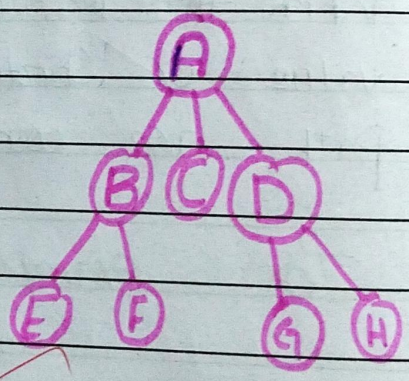
- It consist of Parent nodes and then child node and leaf nodes.

- Depth is start from 0 and level from 1.

Example:-

Start from A

Queue.



[A]	[ ]
[A,B]	[A]
[B,C,D]	[A]
[C,D,E,F]	[A,B]
[D,E,F,G]	[A,B,C]
[E,F,G,H]	[A,B,C,D]

[E, G, H]	{A, B, C, D, E}
[G, H]	{A, B, C, D, E, F}
[H]	{A, B, C, D, E, F, G}
[ ]	{A, B, C, D, E, F, G, H}.

If follow A→B→C→D→E→F→G→H Path.

Advantage:-

(1) Optimal Solution.

Disadvantage:-

(1) It is very slow and donot use for large and complex problem.

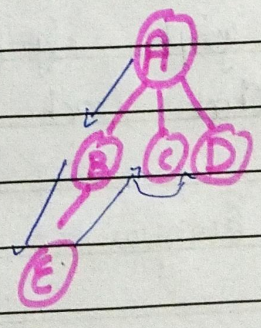
Q2:-

DFS (Depth First Search):-

DFS Depth first Search is a graph searching algorithm which check start node deeply and then go on other. (It go deeper).

How backtracking happen:-

A→B→E→C→D.

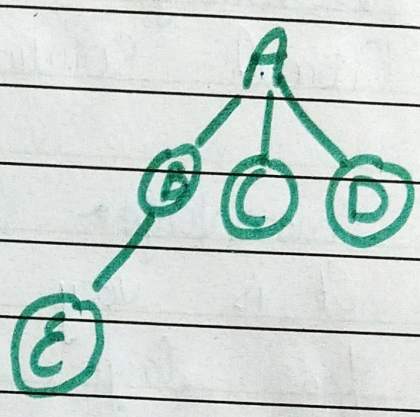


c)

DLS (Depth limit search.

Depth limit search (DLS) is a graph searching algorithm in which limit can set and you don't have authority to go on other nodes.

[A→B→C→D]



We use limit because it can save time and we donot need to check extra nodes also time less use.

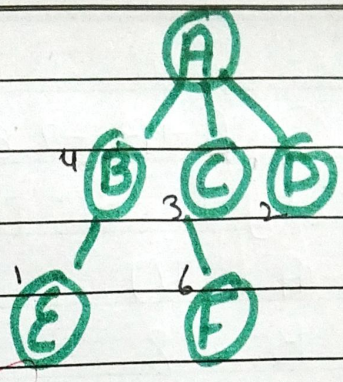
d)

UCS (Uniform cost search):-

UCS is a type of searching graph algorithms which an uniformely check each node (level by level).

Example:-

(A,0), (B,4), (C,3),
(D,2), (E,5), (F,9)



Why differ from BFS:-

UCS uniform cost search is different from BFS because it contain heuristic values and also the working principle change.

It is used for complex Problem
It can solve complex problem as compare to BFS.

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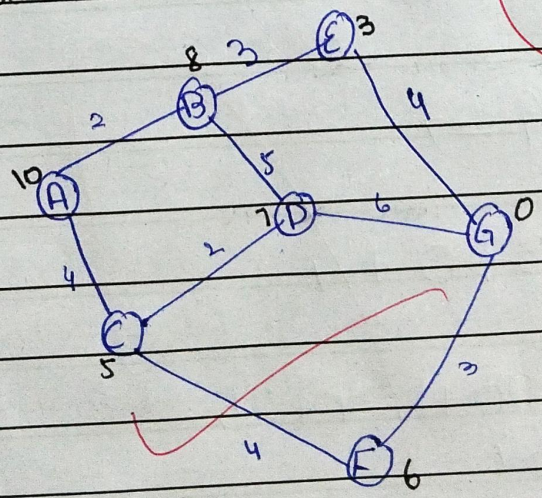
Q:- Concider ---?



Goal A → G.

1st Path

A → B → E → G

Cost of each Node:-

A = 10

B = 8

E = 3

G = 0

A → B ⇒

$f(n) = g(n) + h(n)$

⇒ 10 + 8 + 2

= 20

A → B → E ⇒ 10 + 8 + 3 + 3

= 24

A → B → E → G ⇒

10 + 8 + 3 + 0 + 4

= 25

⇒ 20 + 24 + 25

⇒ 69

24
25
20
69

Total cost from A → B → E → G = 69

2nd Path:-

A → C → F → G

$f(n) = (g(n)) + h(n)$

A → C

$\Rightarrow 10 + 5 + 4$

$= 19$

A → C → F $= 10 + 5 + 6 + 4$

$= 25$

A → C → F → G

$10 + 5 + 6 + 3$

$= 24$

Total cost $= 19 + 25 + 24$

$= 68$

3rd Path:-

A → B → D → G

$f(n) = g(n) + h(n)$

A → B $= 10 + 8 + 2$

$= 20$

A → B → D $= 10 + 8 + 7 + 5$

$= 30$

A → B → D → G $= 10 + 8 + 7 + 6 + 0$

$= 31$

total cost $= 20 + 30 + 31 \Rightarrow 81$

SO

$A \to C \to F \to G = 68$

$A \to B \to E \to G = 69$

$A \to B \to D \to G = 81$

Best optimal Path is

$\{A \to C \to F \to G\}$

what is the value?

Heuristic functions:-

Heuristic functions in Artificial Intelligence Are those who have given value cost.

They guide informed search strategies towards the goal more efficiently than uninform because

Informed Strategies:-

Informed strategies are those who have clear information about enviroment and then they decide what to go.

Advantages:-

These are heuristics.

Fast and more Accurate

Ex:-

AO^* A^*

2:- System should be Able to Detect Passanger flow at different stop using live feed.

We firstly implement a intelligent agent qweory that has features of PEAS. for this purpose we use to measure performance and then share a live location to each Passenger. so it can detect each Passanger at there stop.

Predict bus overcrowding before happen.-

We can use a Sensors which alert the bus driver and that bus are going to over crowding.

3) Agjust bus schedules --?
It uses continious environment that bus uses a dynamically traffic Partherns.

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Uninformed :-

These strategies can ~~brief~~ blindly take decision ~~they~~ have no extra information about goal.

Advantages:-

Low ~~memory~~ space.

Disadvantage:-

It uses alot of space and time slow algorithms.

Example:-

BFS, DFS, DLS etc.

Two Real world Applications --:

AI Planning games (chess) etc.
AI Arm Robots-
GPS systems-

Q3-

Ans:- A city transportation departement want to develop AI-based smart Bus management System.