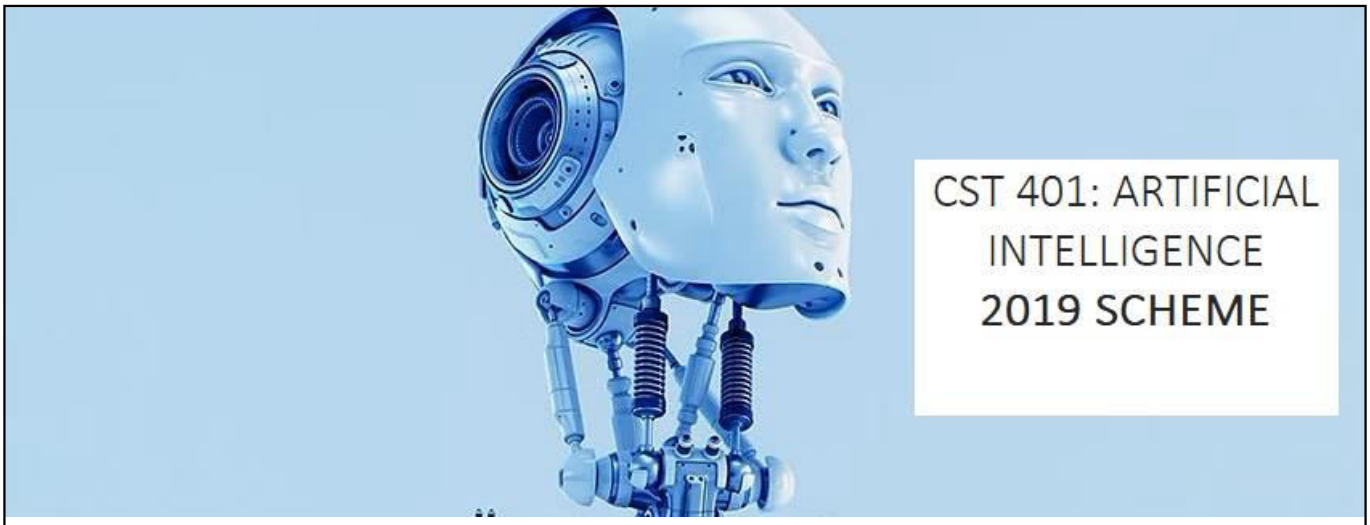


# EXAM SPECIAL VIDEO



# I AM

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# MODULE 1

Introduction- What is Artificial Intelligence

Foundation of AI

History of AI

Applications of AI

Intelligent Agents- Agents and Environment

Good Behaviour

The concept of rationality, nature of environment

Structure of Agents



# IMPORTANT TOPICS

Intelligent Agents- Agents and Environment

Rational Agents

Task Environment PEAS and its types

Types of Agent Programs

# MODULE 1 QUESTIONS FROM SYLLABUS

Explain about the basic types of agent programs in intelligent systems.

For the following activities, give a PEAS description of the task environment and characterize it in terms of the task environment properties.

a) Playing soccer.

b) Bidding on an item at an auction.

What is a rational agent? Explain.

Describe any two ways to represent states and the transitions between them in agent programs.



| | | | |
|---|---|---|---|
| 11. | (a) | Explain the structure Goal-based agents and Utility-based agents with the help of diagrams. | **(8)** |
| | (b) | For the following activities, give a PEAS description of the task environment and characterize it in terms of the task environment properties.<br>a) Playing soccer<br>b) Bidding on an item at an auction. | **(6)** |

**OR**

| | | | |
|---|---|---|---|
| 12. | (a) | Explain the structure Simple reflex agents and Model-based reflex agents with the help of diagrams. | **(8)** |
| | (b) | Discuss about any five applications of AI. | **(6)** |

# MODULE 2

Solving Problems by searching-

Problem solving Agents,

Example problems,

Searching for solutions,

Uninformed search strategies,

Informed search strategies,

Heuristic functions.



# IMPORTANT TOPICS

What is a problem solving agent

Informed and Uniformed Searches--- glance through all Algorithms

Toy and real world problem –3 mark may be

Difference between tree and graph search

A* Search and Best first search imp

Admissible heuristics

# MODULE 2 QUESTIONS FROM SYLLABUS

Differentiate between uninformed and informed search strategies in intelligent systems.

Differentiate between informed search and uninformed search.

Define heuristic function? Give two examples.



| | | | |
|---|---|---|---|
| 13 | (a) | Explain Best First Search algorithm. How does it implement heuristic search? | **(6)** |
| | (b) | Describe any four uninformed search strategies. | **(8)** |

**OR**

| | | | |
|---|---|---|---|
| 14 | (a) | Write and explain A* search algorithm. | **(6)** |
| | (b) | Explain the components of a well defined AI problem? Write the standard formulation of 8-puzzle problem. | **(8)** |

# MODULE 3

Adversarial search - Games,

Optimal decisions in games,

The Minimax algorithm,

Alpha-Beta pruning.

Constraint Satisfaction Problems – Defining CSP,

Constraint Propagation- inference in CSPs,

Backtracking search for CSPs,

Structure of CSP problems.



# IMPORTANT TOPICS

Min Max Algorithm

Alpha beta pruning problem

CSP Problem Definition

inference in CSPs- Node Consistency, Arc Consistency, Path Consistency, K Consistency

AC3 Algorithm

Global Constraint

Back tracking search for CSP

MRV, Degree Heuristic, LCV, Forward Checking, MAC Algorithm, Crypt Arithmetic Problem

Backtracking

# MODULE 3 QUESTIONS FROM SYLLABUS

Illustrate the working of Minimax search procedure.

Solve the following crypt arithmetic problem by hand, using the strategy of backtracking with forward checking and the MRV & least-constraining-value heuristics.

$$\begin{array}{r} T\ W\ O \\ +\ T\ W\ O \\ \hline F\ O\ U\ R \end{array}$$



What are the components of a Constraint Satisfaction Problem? Illustrate with an example.

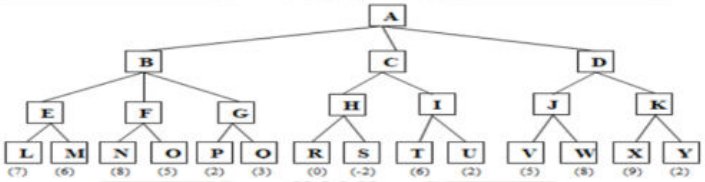
Formulate the following problem as a CSP. Class scheduling: There is a fixed number of professors and classrooms, a list of classes to be offered, and a list of possible time slots for classes. Each professor has a set of classes that he or she can teach.

What is local consistency in CSP constraint propagation? Explain different types local consistencies.

OR

16 (a) Illustrate the use of alpha-beta pruning in games. **(6)**

(b) Consider the following game tree in which static evaluation score are all from the players point of view: static evaluation score range is (+10 to -10) **(8)**




Suppose the first player is the maximizing player. What move should be chosen? Justify your answer.



# MODULE 4

Logical Agents – Knowledge based agents, Logic, Propositional Logic, Propositional Theorem proving, Agents based on Propositional Logic.

First Order Predicate Logic – Syntax and Semantics of First Order Logic, Using First Order Logic, Knowledge representation in First Order Logic.

Inference in First Order Logic – Propositional Vs First Order inference, Unification and Lifting, Forward chaining, Backward chaining, Resolution.

# IMPORTANT TOPICS

Knowledge based Agent

Logic, Inference, Entailment

Propositional Logic– problem

Write contrapositive and inverse

Modus Pones and Modus Tollens, AND elimination, Unit Resolution, Inference in Propositional Logic

FOL– Problem

Unification and Resolution--- very imp

What is forward and backward chaining



# MODULE 4 QUESTIONS FROM SYLLABUS

What is a knowledge based agent? How does it work?

Represent the following assertion in propositional logic:
"A person who is radical (R) is electable (E) if he/she is conservative (C), but otherwise is not electable."

. Prove, or find a counter example to, the following assertion:
If $\alpha \models \gamma$ or $\beta \models \gamma$ (or both) then $(\alpha \wedge \beta) \models \gamma$

. For each pair of atomic sentences, find the most general unifier if it exists:
a) P (A, B, B), P (x, y, z).
b) Q(y, G(A, B)), Q(G(x, x), y).

17. (a) Convert the following sentences into first order logic: **(6)**

Everyone who loves all animals is loved by someone.

Anyone who kills an animal is loved by no one.

Jack loves all animals.

Either Jack or Curiosity killed the cat, who is named Tuna.

Did Curiosity kill the cat?

(b) Give a resolution proof to answer the question "Did Curiosity kill the cat? " **(8)**

18. (a) Prove or find a counter example to the following assertion in propositional logic: **(6)**

If $\alpha \models (\beta \wedge \gamma)$ then $\alpha \models \beta$ and $\alpha \models \gamma$.

(b) For each pair of atomic sentences, give the most general unifier if it exists: **(8)**

Older (Father (y), y), Older (Father (x), John).



# MODULE 5

Learning from Examples –

- Forms of Learning,
- Supervised Learning,
- Learning Decision Trees,
- Evaluating and choosing the best hypothesis,
- Regression and classification with Linear models.

# IMPORTANT TOPICS

Machine Learning Basics, Types of Learning with example

Entropy, information gain

Drawing decision trees

Univariate linear regression Multivariate linear regression



# MODULE 5 QUESTIONS FROM SYLLABUS

1. Consider the following data set comprised of three binary input attributes (A1 , A2 , and A3 ) and one binary output.

| Example | $A_1$ | $A_2$ | $A_3$ | Output $y$ |
|---|---|---|---|---|
| $\mathbf{x}_1$ | 1 | 0 | 0 | 0 |
| $\mathbf{x}_2$ | 1 | 0 | 1 | 0 |
| $\mathbf{x}_3$ | 0 | 1 | 0 | 0 |
| $\mathbf{x}_4$ | 1 | 1 | 1 | 1 |
| $\mathbf{x}_5$ | 1 | 1 | 0 | 1 |

Use the DECISION-TREE-LEARNING algorithm to learn a decision tree for these data. Show the computations made to determine the attribute to split at each node.

2. What is multivariate linear regression? Explain.

Describe the various forms of learning?

State and explain Ockham's razor principle

20. (a) Consider the following data set comprised of two binary input attributes (A1 and A2) and one binary output. **(8)**

| Example | $A_1$ | $A_2$ | Output y |
|---|---|---|---|
| $x_1$ | 1 | 1 | 1 |
| $x_2$ | 1 | 1 | 1 |
| $x_3$ | 1 | 0 | 0 |
| $x_4$ | 0 | 0 | 1 |
| $x_5$ | 0 | 1 | 0 |
| $x_6$ | 0 | 1 | 0 |

Use the DECISION-TREE-LEARNING algorithm to learn a decision tree for these data. Show the computations made to determine the attribute to split at each node.

(b) Explain Linear classification with logistic regression **(6 )**




ALL THE BEST WISHES FOR YOUR EXAMS

THANK YOU