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| **SESSION** | **APRIL 2025** |
| **PROGRAM** | **MASTER OF COMPUTER APPLICATIONS (MCA)** |
| **SEMESTER** | **II** |
| **COURSE CODE & NAME** | **DCA6301** [**ARTIFICIAL INTELLIGENCE**](https://learning.onlinemanipal.com/d2l/home/14283) |
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**Set-I**

**Q1. Differentiate between Breadth First Search and A\* Algorithm with numerical example. 10**

**Ans 1.**

**Search Algorithms in AI**

Search algorithms are foundational in artificial intelligence for navigating through a problem space or graph to find the optimal solution or path. Two such algorithms commonly used for solving pathfinding problems are Breadth First Search (BFS) and A\* Search Algorithm. Both offer unique advantages and are suitable for different types of problems.

**Breadth First Search (BFS) – Characteristics and Working**

Breadth First Search is an uninformed search strategy that explores all nodes at the present depth

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**Q2. Explain the Architecture of Intelligent Systems. Explain different types of Software Agents. 5+5**

**Ans 2.**

**Intelligent Systems Architecture**

An intelligent system is designed to mimic human-like decision-making by perceiving its environment, reasoning about it, and taking action. The architecture of such a system refers to its structural framework, consisting of various components that perform tasks like sensing, planning, and responding. This modular design helps in building systems that are adaptive, goal-driven, and capable of learning.

**Core Components of Intelligent Systems**

* **Sensor and Perception Module** This component collects data from the environment. In

**Q3. Explain different types of Machine Learning Techniques with suitable examples. 10**

**Ans 3.**

**Machine Learning Techniques**

Machine Learning (ML) is a core component of Artificial Intelligence that enables systems to learn patterns from data and improve performance without being explicitly programmed. ML techniques are generally classified into four major types: Supervised, Unsupervised, Semi-Supervised, and Reinforcement Learning. Each has specific use cases and underlying

**Set-II**

**Q4. What is Natural Language Processing? Explain its concepts by its labeled architecture. Elaborate the Applications and significance of NLP. 1+4+5**

**Ans 4.**

**Natural Language Processing (NLP)**

Natural Language Processing (NLP) is a branch of artificial intelligence that focuses on enabling machines to understand and process human languages. It involves developing algorithms that allow computers to comprehend, interpret, and respond to human speech or text. NLP integrates both computer science and linguistics to facilitate effective communication between humans and machines.

**Concepts of NLP**

The primary objective of NLP is to bridge the gap between human communication and machine

**Q5. Differentiate between Fuzzy and CRISP. Discuss the Fuzzy Inference System in detail. 5+5**

**Ans 5.**

**CRISP and Fuzzy Logic**

CRISP logic, also known as classical logic, is based on binary decisions where a statement is either true or false. It is used in systems that require absolute values and deterministic outputs. In contrast, fuzzy logic allows for varying degrees of truth. It handles imprecise or uncertain

**Q6. Elaborate different ethical and societal implications of AI.**

**Ans 6.**

**AI Ethics and Society**

Artificial Intelligence is revolutionizing various sectors, from healthcare to finance. However, the widespread integration of AI into human life raises significant ethical and societal concerns. These issues revolve around fairness, accountability, transparency, privacy, and the broader impact on employment, safety, and equality.

**Bias and Discrimination in AI Systems**

One of the foremost ethical concerns is bias in AI algorithms. AI systems trained on biased