Dear Students!!

In this e-book of 12th class, study material of computer science is being sent to you as per new syllabus (2023-24). You can easily prepare your test / papers by reading these notes and watching the video lectures given below. Following are the links of the video lectures in blue colour. Watch these video lectures by clicking on the relevant link of chapter to have better understanding of various concepts.

12th Class - Monthly distribution of Computer Science Syllabus & Video Lecture Links (Pbi)

Month	Chaper & Its Name	Link of Video Lecture
April	Chapter-1 Office Automation & Typing (Explanation)	https://youtu.be/HEJpX01IwpM
	Chapter-1 Office Automation & Typing (Solution)	https://youtu.be/LwOpv8j92bo
May	Chapter -2 Control Statements (Explanation)	https://youtu.be/T6zvUn61x-k
	Chapter -2 Control Statements (Solution)	https://youtu.be/JXe2kGAJ7WY
July	Chapter -3 Computer Networks	https://youtu.be/6YULI1naDZI
Aug	Chapter -4 Current Trends in Information Technology	https://youtu.be/YHtjpOWi-ZY
Oct	Chapter -5 Artificial Intelligence & Expert System	https://youtu.be/rvn2FpS1PKQ
Nov	Chapter -6 Digitialization	https://youtu.be/galuEBdTkuI
Dec	Chapter -7 E Governance (Part-2)	Under Preparation
Jan	Chapter -8 Image Editing & File Conversion Tools	Under Preparation
Feb	Chapter –9 Audio & Video Editing	Under Preparation

Practical Video Lectures for Chapter -2 (Control Statements)

C Language Practical -1	https://youtu.be/8hg3BJAyBqE
C Language Practical -2	https://youtu.be/v_lw8wmfIP4
C Language Practical -3	https://youtu.be/RBq--darc0I

Following is the Link of Playlist for detailed Lectures on C Programming

https://youtube.com/playlist?list=PLja3EaJFAjmYjeAcDs0ZQdVmx7liCtg5P

PLEASE DO NOT FORGET TO LIKE, SHARE AND SUBSCRIBE OUR YOUTUBE CHANNEL

YouTube **http://youtube.com/c/computersciencepunjab**

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Please use the following link to download the study material/e-books/e-contents for 6th to 12th classes:

http://cspunjab.nirmancampus.co.in/study.php

Chapter 5th

Artificial Intelligence and Expert System

Que1: Multiple Choice Questions

1. Who brought the concept of AI?

a) Victor Allis b) Marvin Minsky c) Alan Turing d) John McCarthy

2. Which type of AI focuses on single set of abilities &performs a particular task?

a) Super AI b) Narrow AI c) General AI d) None of these.

3. Which one of AI type does not have memory for data storage

a) Limited Memory b) Reactive machines c) Things of Mind d) Self Awareness

4. The core of the expert system which by applying set of rules and draw the results of the user question is the function of

a) Inference engine b) Knowledge base c) User Interface d) None of these

5. Place where knowledge from the human expert is collected

a) Domain expert b) Knowledge Base c) User d) All of these

6. Robots which provides help for analyzing the collected data are

a) Healthcare robots b) Domestic robots c) Military robots d) Research robots

Que:2 Fill in the Blanks:

1. Artificial Intelligence is divided into two types _____ and _____
2. _____ is a chess playing computer developed by IBM.
3. _____ is a good example of narrow artificial intelligence.
4. _____ machine have no memory.
5. MYCIN and _____ are examples of earlier expert systems.
6. _____ Generation Robots are smart as humans.

Ans: 1. Type-1, Type-2 2. Deep Blue 3. Apple Siri
4. Reactive 5. Dyndral 6. Fourth

Que:3 Write the Full form of following:

1. AI Artificial Intelligence
2. GAI General Artificial Intelligence
3. NLP Natural Language Processing
4. SAI Strong Artificial Intelligence

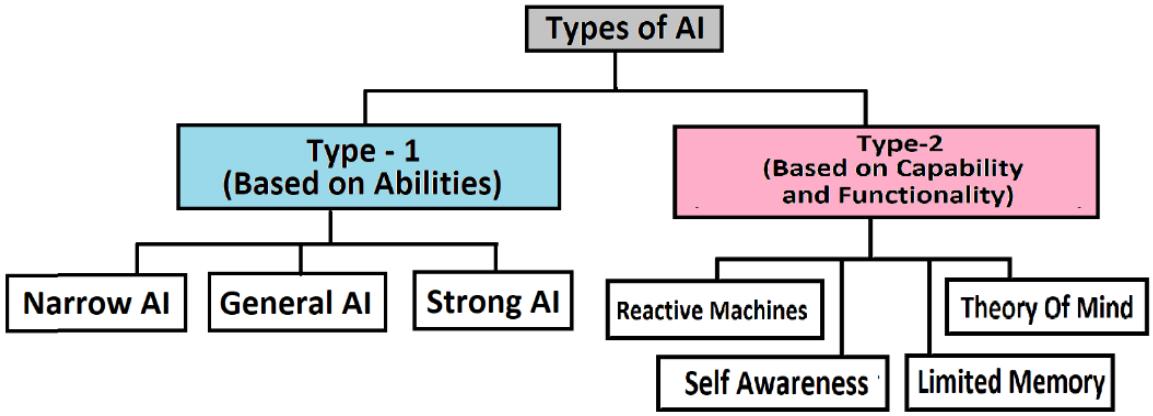
Que:4 Short Answer Type Questions

Q:1 What is artificial intelligence?

Ans: Artificial Intelligence (AI) means the artificial development of intellectual ability. AI is a branch of computer science that enables machines to work as intelligently as humans. Artificial intelligence develops smart machines to make human life easier and more comfortable. Some examples of Artificial Intelligence (AI) are: robots, smart cars, drone systems, Alexa, etc.

Q:2 What are the types and subtypes of AI? Depict them with the help of diagram.

Ans: The following diagram shows types and subtypes of Artificial Intelligence:



Q:3 What do you mean by expert systems? Give examples of expert systems.

Ans: Expert systems are computer software. These softwares fall under the category of Artificial Intelligence which is a branch of computer science. These softwares are primarily developed using AI technology. Such software systems have specialized knowledge of a particular field, subject or skill. Here are some examples of expert systems:

- **DENDRAL: This is an expert system for chemical analysis.**
- **MYCIN: This expert system specializes in the treatment of blood infections.**

Q:4 What is the difference between human system and expert system?

Ans: The differences between the human system and the expert system are as follows:

Human System	Expert System
1. Its capacity decreases with time.	1. Its capacity is permanent.
2. Human outcomes cannot be predicted.	2. The results obtained from these are consistent.
3. They are difficult to transfer.	3. They can be easily transferred.
4. Human experts are expensive.	4. It is a cheaper alternative than a human being.

Q:5 Summarize about some computer languages used in the field of AI?

Ans: Computer Languages used to develop Artificial Intelligence are as follows:

1. **PYTHON: This language is widely used in the field of Artificial Intelligence.**
2. **LISP: LISP is a very old language for the development of AI. It was developed in 1958 by John McCarthy, the father of AI.**
3. **PROLOG: This language is used to work on medical projects and is also used extensively to develop Expert Systems.**
4. **JAVA: Java can also be considered as a good option for the development of AI.**
5. **R: This language is a good choice for statistical analysis.**

Que:5 Long Answer Type Questions.

Q:1 What are the applications of artificial intelligence?

Ans: The major application areas of artificial intelligence are described below:

1. **AI is used to build Intrusion Detection Systems. For example, a firewall program in the operating system that automatically blocks unauthorized websites.**
2. **AI is used in the Gaming field. In particular, it plays an important role in strategic games such as chess, tic-tac-toe.**
3. **AI plays an important role in systems that process Natural Languages. For example: human interactive computer systems that can understand and process human language.**
4. **AI is used to create Vision Systems. These systems are able to understand and analyze the visual input on the computer. Example: Spy Drones**
5. **AI is used in building Expert Systems.**
6. **AI is used to make Intelligent Robots.**
7. **AI is used in building Machine Learning Systems.**

Q:2 What is the importance of AI?

Ans: There are many areas of importance for artificial intelligence. Here is a brief description of some of these key areas:

1. **Game Playing: AI plays an important role in strategic games like Chess, Poker, Tic-Tac-Toe etc. For example: Deep Blue machine developed by IBM for playing the game of chess.**
2. **Voice recognition: AI technology recognizing words spoken by the user and convert them into the text or prerform some operations. It is also called Speech Recognition System. For example: Apple's Siri software also provides voice recognition and answers to questions asked by users.**
3. **Understanding Natural Language: AI is used to understand and analyze natural languages (Punjabi, Hindi, English etc.). The main function of natural language processing is to translate, analyze grammar, etc. For example: Dragon Dictation, Voice Text Messaging, Alexa etc.**

4. **Computer Vision and Analysis: AI plays an important role in computer vision. This system automatically gathers and provides information from pictures and patterns. For Example: Spy Drones**

Q:3 What are the Pros and Cons of Artificial Intelligence?

Ans: The advantages and disadvantages of artificial intelligence are described below:

Benefits of Artificial Intelligence:

1. **AI-based systems increase performance. These systems perform complex tasks without errors.**
2. **AI based systems can work for a long time without having rest. These systems are not as sick as human beings and do not take leave.**
3. **Machines are emotionless so emotional interruptions cannot stop machines or robots to work.**
4. **There is no possibility of error in the operation of these systems.**
5. **These systems can operate in hazardous areas where human life is in danger, such as: work in deep mines, work in space, etc.**

Disadvantages of Artificial Intelligence:

1. **There is no sympathy in machines.**
2. **Excessive use of these systems will increase unemployment.**
3. **If these systems break down, important data stored in them will also be lost.**
4. **These systems can be misused if they fall into the wrong hands.**

Q:4 Discuss the characteristics of expert systems?

Ans: Following are some of the import characgeristics of Expert System:

- **Expertise: Expert systems specialize in a specific area. For example, the MYCIN Expert System specializes in the treatment of blood infections.**
- **Quick Reaction Time: Expert Systems provide quick answers to the questions being asked from them.**
- **Reliability: No mistakes are made by the expert system, so they are trustworthy.**
- **Decision Quality: Expert systems are capable of making high quality decisions.**
- **Consistent: Expert systems always give same answer for the same questions.**
- **Low cost: It reduces the cost of consulting a specialist for various areas such as: medical examination.**
- **Successful Model of Artificial Intelligence: Expert System is a successful model of Artificial Intelligence.**