Final Assessment Test (FAT) - APRIL/MAY 2023

Programme	B.Tech	Semester	Winter Semester 2022-23
Course Title	ARTIFICIAL INTELLIGENCE	Course Code	CSE3013
Faculty Name	Prof. Priyadarshini J	Slot	A2+TA2
		Class Nbr	CH2022235000561
Time	3 Hours	Max. Marks	100

Section 1 (6 X 12 Marks)
Answer All questions

01. A) Every investor bought [something that is] stocks or bonds. (mod 4) [12]

    B) If the Dow-Jones Average crashes, then all stocks that are not gold stocks fall.

    C) If the T-Bill interest rate rises, then all bonds fall.

    D) Every investor who bought something that falls is not happy.

    With the give statements,

    Conclude: If the Dow-Jones Average crashes and the T-Bill interest rate rises, then any investor who is happy bought some gold stock.

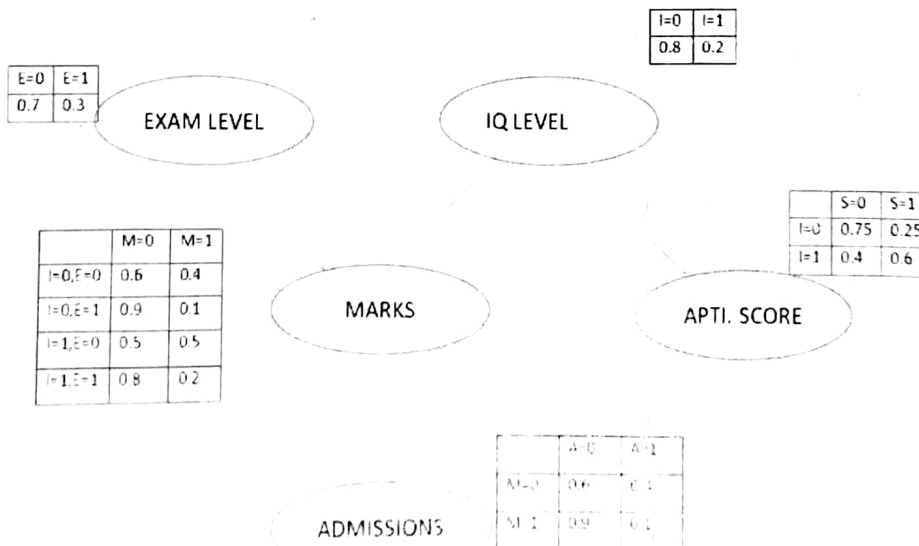   Prove by "proof of conflict and draw the resolution graph"

02. Given the task of modeling a student's marks (m) for an exam he has just given. From the given [12]
    Bayesian Network Graph below, we see that the marks depend upon two other variables. They are. (mod 5)

    · Exam Level (e)– This discrete variable denotes the difficulty of the exam and has two values (0 for easy and 1 for difficult)

    · IQ Level (i) – This represents the Intelligence Quotient level of the student and is also discrete in nature having two values (0 for low and 1 for high)

    Additionally, the IQ level of the student also leads us to another variable, which is the Aptitude Score of the student (s). Now, with marks the student has scored, he can secure admission to a particular university. The probability distribution for getting admitted (a) to a university is also given below.

I=0	I=1
0.8	0.2

E=0	E=1
0.7	0.3

EXAM LEVEL   **IQ LEVEL**

	S=0	S=1
I=0	0.75	0.25
I=1	0.4	0.6

	M=0	M=1
I=0,E=0	0.6	0.4
I=0,E=1	0.9	0.1
I=1,E=0	0.5	0.5
I=1,E=1	0.8	0.2

MARKS   **APTI. SCORE**

	A=0	A=1
M=0	0.6	0.1
M=1	0.9	0.1

ADMISSIONS

A) Calculate the probability that in spite of the exam level being difficult, the student having a low IQ level and a low Aptitude Score, manages to pass the exam and secure admission to the university. (4 marks)

B) Calculate the probability that the student has a High IQ level and Aptitude Score, the exam being easy yet fails to pass and does not secure admission to the university. (4 marks)

C) Calculate the probability of marks =1 (4 marks)

03. Two friends are playing a board game and the result of their game is given as a tree for your perusal (module : 03)   [12]

A) Apply Min-Max to the given tree (4 marks)

B) Cut down the unnecessary branches/visits (8 marks)
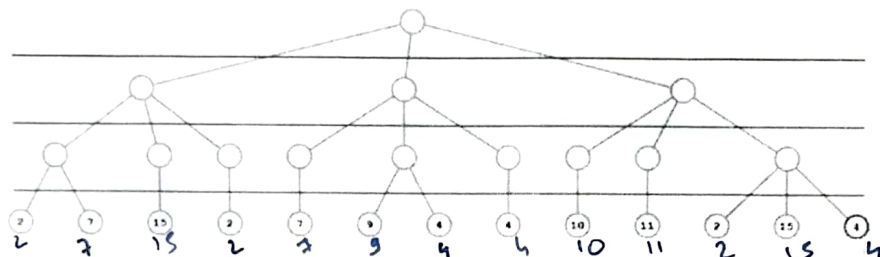
04. Given the initial state of an 8-puzzle problem, reach the goal state with an optimal and the best solution. The goal state can be achieved by 2 methods: a) Number of misplaced tiles b) Number of jumps to reach the goal state for each tile (module : 03)   heuristic
    manhattan distance   [12]

a) Explain and Justify with neat diagrams how to reach goal state by applying both the methods

b) Find the differences between them if any

Initial state

1	2	3
8	6	.
7	5	4

goal state

1	2	3
8		4
7	6	5

05. You are an expert in robotics and creating toys for kids. Assume you are planning to create a personalized robot who can chat with their user alone. (mod 6)   [12]

A) Identify and explain the difficulties in developing such an expert system. (6 marks)

B) Provide solutions for the difficulties identified with proper justification (6 marks)

06. You are an expert in robotics and creating toys for kids. Assume you are planning to create a personalized robot who can chat only with the end user by identifying their voice alone. (mod 6)   [12]

A) List and discuss about the personalized robotic functions needed for a kid to chat upon (4 marks)

B) Identify the categories/classification involved by AI for the toy robot (4 marks)

C) Identify the uncertainty faced while designing such a robot (4 marks)

Section 2 (2 X 14 Marks)
Answer All questions

07. The UPCASE project aims at uncovering user contexts using a set of sensors connected to the user's mobile phone. These sensors can be embedded into personal clothes or items such as backpacks or purses. Sensors include accelerometer, light, sound, and temperature sensors, and also *virtual* sensors to acquire information such as time of day or approximate location via external services. The goal of the project includes the development of robust algorithmic approaches to accurately determine user context. Specifically, we include supervised based   [14]

learning techniques. During a training phase the system collects a sufficient number of data samples for context derivation using decision-tree based techniques. After this training phase the system operates autonomously and unobtrusively automatically deriving contexts.

The sensors and the attributes in the sensor used are as follows

(i) Sound sensor(very loud, Loud, Moderate, Silent, Very silent)

(ii) Light sensor (Very bright, bright, Normal, Dark, Very dark)

(iii) Temperature sensor (Very hot, Hot, Mild, Cold, very cold)

(iv) Accelerometer (Moving fast, moving, not moving)

(v) Time sensor (Night, Afternoon, morning, dawn)

The collected data is given for your perusal in which the representations are as follows a) Sleeping b) Working c) Exercising d) Driving.

A) Based on the sensor data create a dataset (6 marks)

B) Draw the decision tree for the same (6 marks)

C) Automate for 2 new instances (2 marks)

(a)   (b)   (c)   (d)
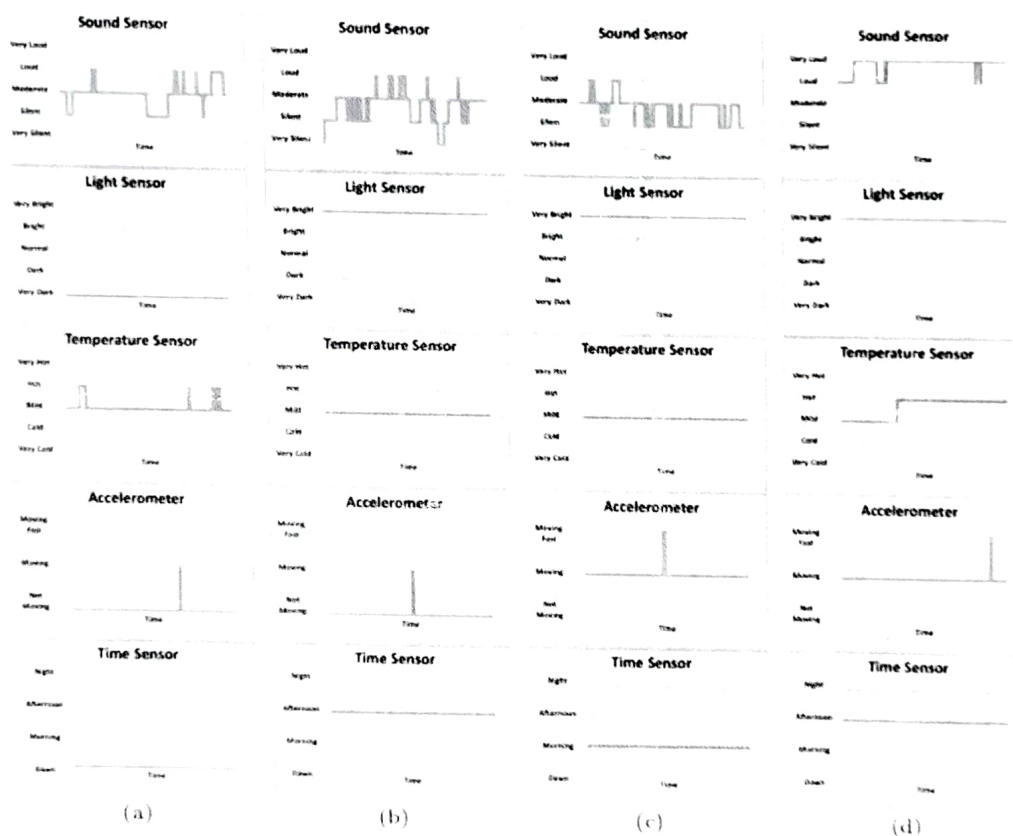
08. In an airplane, there are many sensors: speed, altitude, cabin pressure, fuel level, etc. The [14] monitoring system performs different checks on the sensor data. If a problem is noticed, the system either shows a warning to the pilot (e.g. low on fuel), or in a dangerous situation may react automatically (e.g. by dropping oxygen masks). The system will run on a multi-core machine and should do the checks in near real-time when new sensor data comes in.

A) List and justify all the types of agent related for the above scenario (4 marks)

B) Based on the answer mentioned in A) depict the architecture of monitoring system to which it belongs (4 marks)

C) Tabulate the PEAS component for the agent (2 marks)

D) Will Edge AI become more ubiquitous? comment on it taking 2 real time applications as example. (4 marks)

① Chat gpt xxxx

② smart healthcare devices