Cluster Innovation Centre, University of Delhi, Delhi-110007

Examination	**: End Semester Examination – Nov-Dec 2022**
Name of the Course	**: B. Tech (Information Technology and Mathematical Innovations)**
Name of the Paper	**: Computer and Brain: Knowledge Discovery and Artificial Intelligence**
Paper Code	**: 32861503**
Semester	**: V**
Duration	**: 2 Hours**
Maximum Marks	**: 50**

Instructions:

1. This question paper contains 3 printed pages.

2. Attempt all questions. Parts of a question must be answered together.

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1. Define the following terms: **[3]**
   a. Agent
   b. Rationality
   c. Machine learning

2. Briefly explain Turing Test approach in AI. **[3]**

OR

Briefly explain with the help of example that when would best-first search be worse than simple breadth-first search?

3. Develop a PEAS description for the following: **[6]**
   a. Face authentication system.
   b. Vacuum cleaner agent
   c. Medical diagnosis system

4. Solve the following cryptarithmetic problem using constraint satisfaction: **[6]**

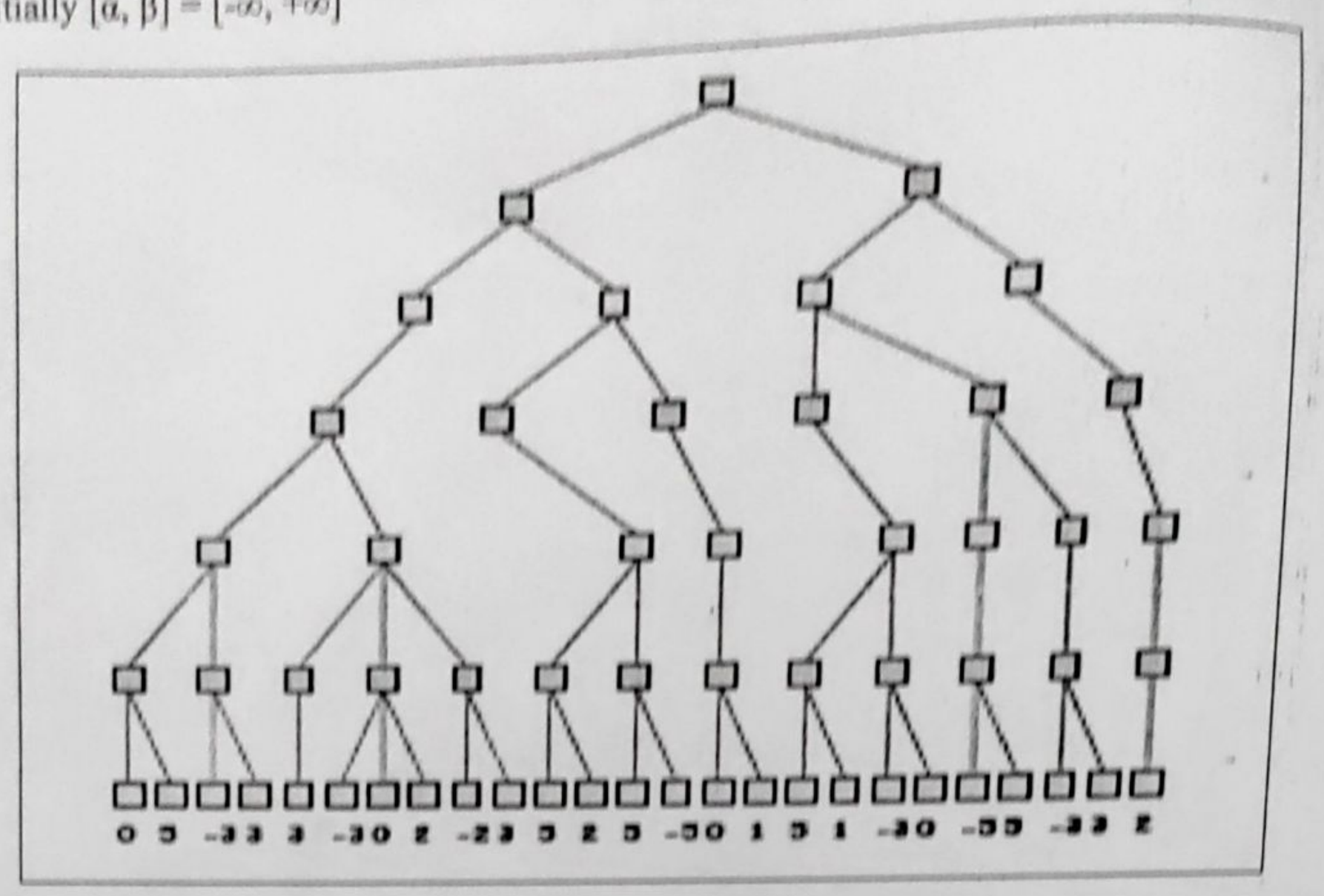
```
  S E N D
+ M O R E
---------
M O N E Y
---------
```

OR

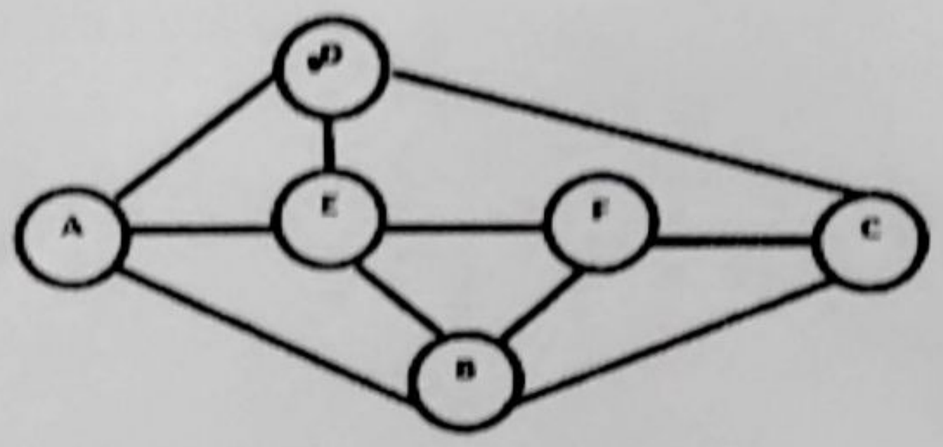
Develop a logic sequence for the following text:
Mary likes all kinds of food.
Some intelligent students study intelligent systems
There is at least one student of intelligent systems, who does not like the AI
Ana eats everything Mary eats.

5. Using minimax technique finds out the value for α and β for the following game tree show each step or state that you have taken for the optimal decision: [6]

Initially [α, β] = [-∞, +∞]

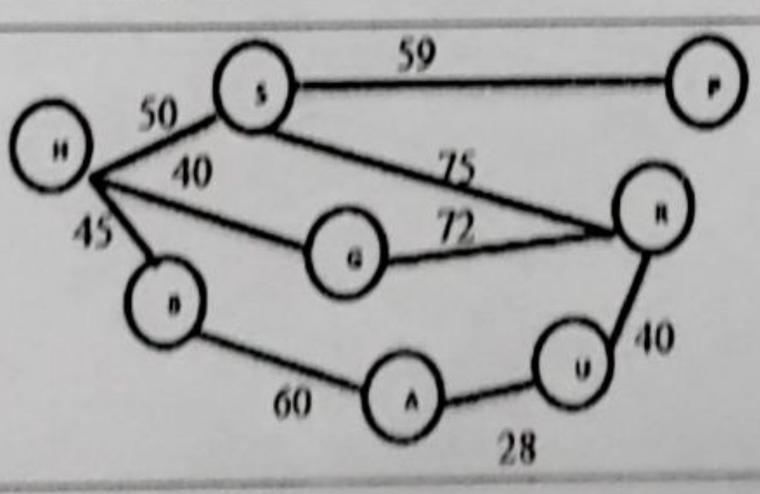


6. For the following constraint graph for map coloring, show step-wise how constraint propagation will occur to reach the final solution. Assume there are 3 colors and adjacent nodes cannot take same colors. [8]



OR

Consider the following graph:



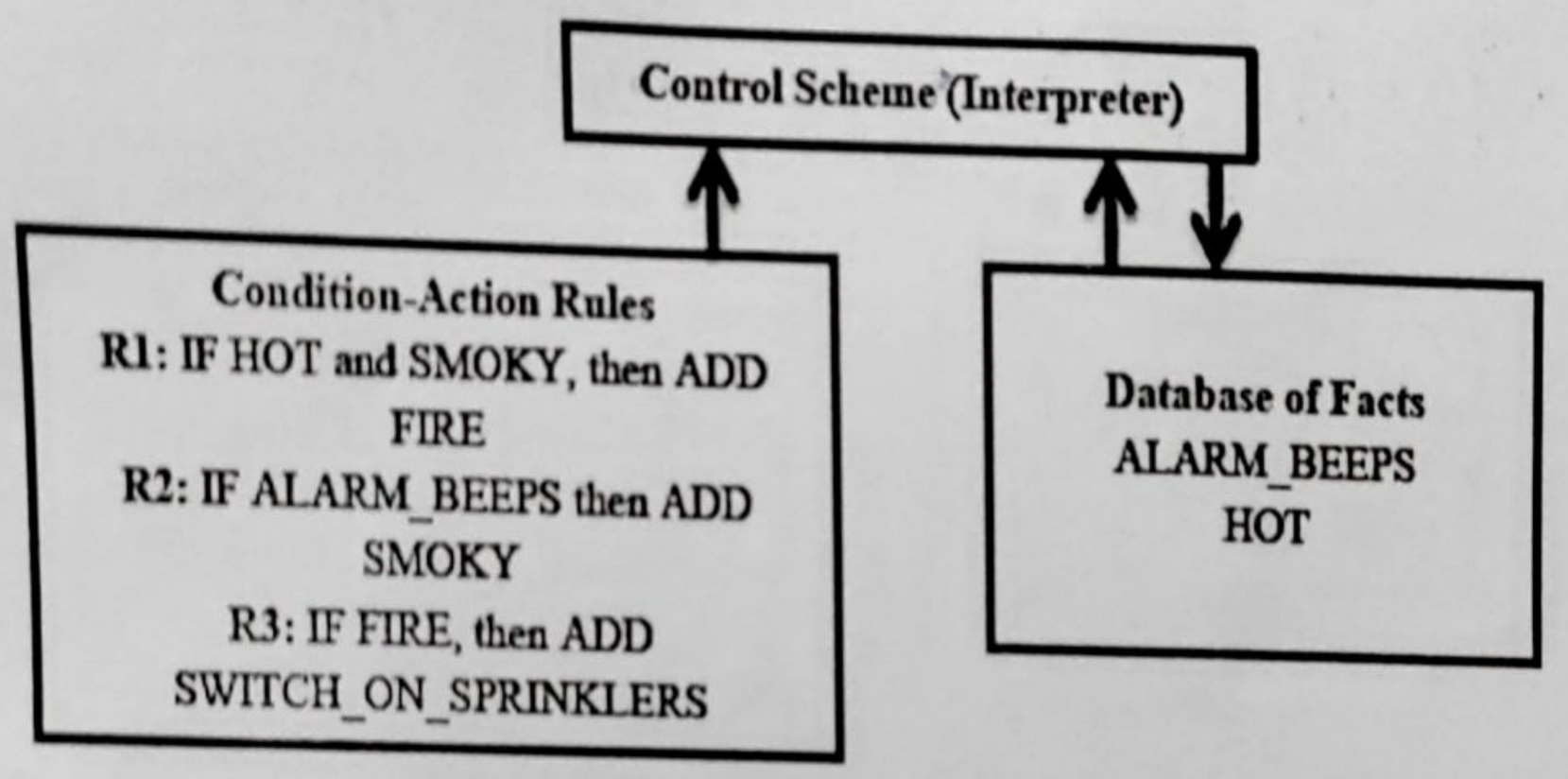
Given that the initial state is H and goal state is U, Also you have given the admissible heuristic as a straight-line distance. Find a solution by using A* approach. Also give the time and space complexity of this technique.

Consider the following case study on **Automatic Car Parking System**: [8]

Parking has always been a very big issue today with the immense rise in the number of vehicles. Imagine you have to reach to your friend's party and the venue is on an overcrowded street; you would be definitely looking for a system that would assist you in parking the car, providing you with the details of the available parking and how long possibly you would have to walk down to the party place after your car is parked! Discuss the role of AI in solving this problem.
It should taking consideration on the following points:

a. What will the system provide?
b. Which parameters are involved in the process?
c. System and the role of AI
d. What are the Inputs?
e. What will be the output?
f. Database structure
g. Intelligent-parking Assistant

8. Consider the following rule-based system architecture: [10]



Given the facts in the working memory apply forward and backward chaining.