HITEC UNIVERSITY
Department of Computer Science
BS (Batch 2024), Semester Fall-2025

Assignment No. 02

Subject: *Artificial Intelligence* ***Instructor:*** Mr. Mubashir Iqbal

Marks: *70* ***Last Date of submission:*** *13 Jan 2026, 14:00*

GENERAL INSTRUCTIONS FOR HAND WRITTEN ASSIGNMENT

- *Use Proper Paper: Write on white, lined paper with margin lines on the left.*
- *Headings & Formatting: Use a black marker for main headings. Use a blue marker for subheadings. Write the primary content with a blue or black pen (no other colors).*
- *Submit the assignment before the last date and time.*
- *Draw every possible shape, diagram, graph, and plot.* Keep your handwriting clean and readable. Underline important terms neatly. Avoid cutting or overwriting.
- The first page should be a cover page (like a lab report cover page).
- Before submitting the hard-copy, make a pdf from any mobile app and upload the assignment on GCR.

Course Outcome	Student Outcome
CO-3	SO-2

Discuss these topics
(Lecture 06 [2 PPT files, read both files])

Q1. What is a State Space in AI? Write the components of State Space Search (Initial State, Operators, Goal Test, etc.). Explain the Eight Tile Puzzle problem in simple words. Why is the Eight Tile Puzzle important in AI learning? **[Marks 10]**

Q2. What is Knowledge Representation? Why do we need KR in Artificial Intelligence? Write different approaches of KR (Logic, Semantic Networks, Frames, Rules, Ontologies, Scripts). Give one real-life example of KR. **[Marks 10]**

Q3. Define Propositional Logic with examples. Write the main logical connectives (AND, OR, NOT, →, ↔). Explain De Morgan's Laws with your own example. What is Modus Ponens? Write with a simple example. **[Marks 10]**

Q4. What is First-Order Logic? Write the difference between Propositional Logic and FOL. Explain Universal Quantifier (∀) and Existential Quantifier (∃) with examples. Write one advantage and one limitation of FOL. **[Marks 10]**

Q5. What is Unification in AI? Write the conditions for unification. Show a simple example of unification with substitution. Why is unification important in logic programming? **[Marks 10]**

Q6. What is Forward Chaining? Why is it called data-driven? Write the steps of Forward Chaining with a small example. What is Backward Chaining? Why is it called goal-driven? Write the differences between Forward and Backward Chaining. **[Marks 10]**

Q7. What is a CSP? Write the components of CSP (Variables, Domains, Constraints). Explain the Map Coloring Problem in simple words. Give one real-life example of CSP (like Sudoku or Scheduling). **[Marks 10]**