	SUBJECT: BSD2513 ARTIFICIAL INTELLIGENCE	**MARKS**: 25(5%)
	TOPIC: Chapter 3: Knowledge Representation System	
	LAB REPORT 3	

CLO	Description	PLO Mapping	Percentage	Marks
CLO1	Acquire the artificial intelligence concepts and methodologies in data science.	PLO1: Knowledge and Understanding C3: Application	1%	5
CLO2	Demonstrate critical thinking ideas of artificial intelligence knowledge in problem-solving situation.	PLO2: Cognitive Skills and Functional work skills with focus on Numeracy skills CLO3: Application	1%	5
CLO3	Develop an artificial intelligence system prototype using appropriate software.	PLO3: Functional work skills with focus on Practical, and Digital skills P4: Mechanism	3%	15

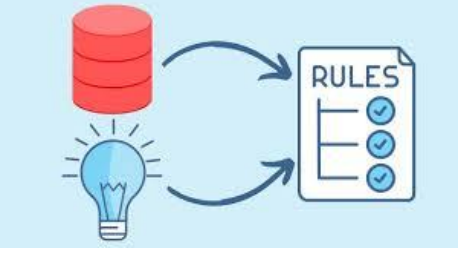
Laboratory Report Objectives

By the end of this lab, students should be able to:

1. articulate AI capability types and their relevance to real deployments;
2. explain how rule-based systems represent knowledge using rules, conditions, and actions; and
3. implement and deploy a minimal, reliable web app (Streamlit) that uses a rule engine to evaluate cases and supports different rule configurations.

CASE STUDY:

A university wants to support its scholarship committee with a transparent decision support tool. Instead of purely manual screening, they decide to use a rule-based system that can be reviewed and adjusted by the academic and financial aid committees.



Each scholarship applicant is described by several facts, such as:

a. Cumulative GPA (CGPA)
b. Monthly family income
c. Co-curricular involvement score (0–100)
d. Community service hours
e. Current semester of study
f. Number of disciplinary actions on record

Question 1
General Knowledge

Discuss three applications of rule-based system in real-world phenomena. Give references.

(5 Marks)
(CO1 PO1)

Question 2
Python: Knowledge Representation System (Rule-Based System)

Generate and implement a rule-based system for scholarship advisory to assist the university in deciding the eligibility and type of scholarship to be awarded to applicants. You are required to consider use EXACTLY these into their JSON editor in the app.

```
[
  {
    "name": "Top merit candidate",
    "priority": 100,
    "conditions": [
      ["cgpa", ">=", 3.7],
      ["co_curricular_score", ">=", 80],
      ["family_income", "<=", 8000],
      ["disciplinary_actions", "==", 0]
    ],
    "action": {
      "decision": "AWARD_FULL",
      "reason": "Excellent academic & co-curricular performance, with acceptable need"
    }
  },
  {
    "name": "Good candidate - partial scholarship",
    "priority": 80,
    "conditions": [
      ["cgpa", ">=", 3.3],
      ["co_curricular_score", ">=", 60],
      ["family_income", "<=", 12000],
      ["disciplinary_actions", "<=", 1]
    ],
    "action": {
      "decision": "AWARD_PARTIAL",
      "reason": "Good academic & involvement record with moderate need"
    }
  },
  {
    "name": "Need-based review",
    "priority": 70,
    "conditions": [
      ["cgpa", ">=", 2.5],
      ["family_income", "<=", 4000]
    ],
    "action": {
      "decision": "REVIEW",
      "reason": "High need but borderline academic score"
    }
  },
  {
    "name": "Low CGPA – not eligible",
    "priority": 95,
    "conditions": [
      ["cgpa", "<", 2.5]
    ],
    "action": {
      "decision": "REJECT",
      "reason": "CGPA below minimum scholarship requirement"
```

```
    }
  },
  {
    "name": "Serious disciplinary record",
    "priority": 90,
    "conditions": [
      ["disciplinary_actions", ">=", 2]
    ],
    "action": {
      "decision": "REJECT",
      "reason": "Too many disciplinary records"
    }
  }
]
```

(5 Marks, CO2PO2)
(15 Marks, CO3PO3)

Save your work in both .py and PDF formats. Name your files using the following format: StudentID_LabX. Submit both files through the Kalam platform by 26th November 2025, 11:59 PM. In addition, deploy your Streamlit application and include the public URL to your deployed app and GitHub repository link inside your report. Late submissions will only be considered with prior approval.

Pusat Sains Matematik UNIVERSITI MALAYSIA PAHANG AL-SULTAN ABDULLAH	**SUBJECT: BSD3513** **INTRODUCTOION TO ARTIFICIAL INTELLIGENCE** **TOPIC:** Chapter 3: Knowledge Representation System **LAB REPORT 3**	**MARKS**: 25(5%)
NAME:	**STUDENT ID:**	**SECTION:**

Mark for CO1: /5

Rubric for CO2.

Instruction: For CO2, assess each item using the given scales.

Demonstrate critical thinking ideas of artificial intelligence knowledge in problem-solving situation.								
Item Assessed (Cognitive)	**Very Poor 0**	**Poor 1**	**Fair 2**	**Good 3**	**Very Good 4**	**Excellent 5**	**Weigh tage**	**Score**
Apply and analyse relevant artificial intelligence knowledge.	The work has not done.	Poorly applied and analysed relevant artificial intelligence knowledge and results.	Applied and analysed relevant artificial intelligence knowledge but failed to achieve successful results.	Applied and analysed relevant artificial intelligence knowledge but arrive at satisfactory results.	Applied and analysed relevant artificial intelligence knowledge to arrive at successful results.	Applied and analysed relevant artificial intelligence knowledge to arrive at excellent results.	0.5	
Using logical, rational or problem-solving appropriate to the artificial intelligence problems.	The work has not done.	The work needs to demonstrate logical, rational or problem-solving understanding appropriate to the artificial intelligence problems.	The work has demonstrated some logical, rational or problem-solving understanding appropriate to the artificial intelligence problems.	The work has demonstrated logical, rational or problem-solving understanding appropriate to artificial intelligence problems.	The work has demonstrated a thorough, logical, rational or problem-solving understanding appropriate to artificial intelligence problems.	The work has demonstrated a thorough and classy logical, rational or problem-solving understanding appropriate to artificial intelligence problems.	0.5	
						Total Score	**1**	**/5**

Rubric for CO3.

Instruction: For CO3, assess each item using the given scales.

CO3: Develop an artificial intelligence system prototype using appropriate software.							
Item Assessed (Cognitive)	**Very Poor 0**	**Poor 1**	**Fair 2**	**Good 3**	**Very Good 4**	**Excellent 5**	**Score**
Utilizing the appropriate tools / software effectively	No relevant tool used.	Tools used but did not enhance solution or information clarity.	Tools used but with limited enhancement; minimal functionality demonstrated.	Tools used appropriately to produce a functional solution with clear output.	Tools used effectively to enhance clarity, performance, and solution quality.	Tools used optimally with advanced features, clear design, and effective interaction to display the solution.	
Code functionality, clarity & structure	No code constructed.	Code incomplete or mostly non-functional; unclear and poorly structured.	Partially functional code; errors present; structure somewhat difficult to follow.	Mostly functional code with minor errors; clear structure and readable.	Fully functional and well-structured code; clearly commented and readable.	Fully functional, optimized, modular, and well-documented code; demonstrates best practices.	
Deployment & Version Control (GitHub + Streamlit or etc)	No deployment and no GitHub repository.	GitHub repo exists but incomplete OR app deploy attempt failed.	GitHub repo available with basic files; deployment page exists but app not functioning correctly.	Working deployment provided; GitHub repo contains main code files.	Working deployment with complete repository (README, code, requirements); clearly accessible.	Fully deployed app with professional GitHub repo (README, screenshots, instructions, modules, tags); live Streamlit app runs smoothly and reliably.	
						Total Score	**/15**