

**COURSE NAME: ARTIFICIAL INTELLIGENCE**

**COURSE CODE: BTCS602-18**

**ASSIGNMENT No: 2**



**DATE OF ALLOTMENT:**

**DATE OF SUBMISSION:**

**COURSE INSTRUCTOR:**

**SUBMITTED BY:**

**REGISTRATION NO:**

CT Group of Institutions, Shahpur			
Assignment No: 2			
Program:	B.Tech CSE	Semester:	6 <sup>th</sup>
Name of Subject:	Artificial Intelligence	Subject Code:	BTCS 602-18
Name of Topic:	Markov Decision Process	Maximum Marks:	10
Date of Allotment:	27/02/25	Date of Submission:	06/03/25

**Scenario:** A student is preparing for a **Mathematics Exam**. Each day, the student can choose one of the following study methods:

1. **Self-Study (S)**
2. **Attending Coaching Class (C)**
3. **Watching Online Tutorials (O)**

The student's performance (marks improvement) depends on the chosen study method, and the process follows a **Markov Decision Process (MDP)** with the following **transition probabilities and rewards**:

#### Transition Probabilities:

- **Self-Study (S):**
  - 60% chance of moving to a **higher level of understanding**.
  - 40% chance of staying at the same level.
- **Coaching Class (C):**
  - 80% chance of moving to a **higher level of understanding**.
  - 20% chance of staying at the same level.
- **Online Tutorials (O):**
  - 50% chance of moving to a **higher level of understanding**.
  - 50% chance of staying at the same level.

#### Reward System:

- **If the student moves to a higher level of understanding:**
  - Self-Study: **+4 marks**
  - Coaching Class: **+6 marks**
  - Online Tutorials: **+3 marks**
- **If the student remains at the same level:**
  - Self-Study: **+1 mark**
  - Coaching Class: **+2 marks**
  - Online Tutorials: **+1 mark**

#### Questions:

1. **Explain the following terms:**
  - **States (S), Actions (A), Transition Probabilities (P), and Rewards (R).**
2. **If the student starts with 50 marks and follows this study plan for 2 days:**
  - **Day 1:** Chooses **Self-Study (S)**
  - **Day 2:** Chooses **Coaching Class (C)**

**What is the expected total marks after 2 days?**

3. If the student starts with 30 marks and follows this study plan for 4 days:

- Day 1: Chooses **Self-Study (S)**
- Day 2: Chooses **Coaching Class (C)**
- Day 3: Chooses **Online Tutorials (O)**
- Day 4: Chooses **Coaching Class (C)**

What is the expected total marks after 4 days?

Prepared by:	Verified by:
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Signature with Date:	Signature with Date: