## FJWU | E-Counselling Portal For Students

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**Submitted To:**

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**Section:**

**BSE V-B**

**Department:**

**Software Engineering**

**Course Title:**

**Artificial Intelligence**

## Question 1:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Activity | Performance Measure | Environment | Actuators | Sensors | Task Type |
| Playing soccer | Number of goals, teamwork, winning the game | Soccer ground, ball, other players, referee | Legs, feet, head, body | Eyes, ears, sense of balance | Multi-agent, dynamic, partially observable |
| Exploring Titan’s subsurface oceans | Area explored, samples collected, working safely | Titan’s water, rocks, unknown conditions | Robotic arms, propellers | Cameras, sonar, temperature sensors | Single-agent, dynamic, partially observable |
| Shopping for used AI books online | Finding good books at low price, safe purchase | Internet, online stores, seller ratings | Mouse, keyboard (to search and buy) | Monitor, search results | Single-agent, static, deterministic |
| Playing a tennis match | Points scored, accuracy, winning the match | Tennis court, opponent, referee, ball | Arms, legs, racket | Eyes, ears, body movement | Multi-agent, dynamic, partially observable |
| Practicing tennis against a wall | Ball control and accuracy | Court, wall, ball | Arms, legs, racket | Eyes, ears | Single-agent, dynamic, continuous |
| Performing a high jump | Height cleared, technique | Field, bar, track | Legs, arms | Eyes, balance | Single-agent, episodic, continuous |
| Knitting a sweater | Accuracy, neatness, completion of sweater | Yarn, needles, workspace | Hands, fingers | Eyes, touch | Single-agent, static, sequential |
| Bidding at an auction | Winning the item at a good price | Auction site or room, other bidders | Keyboard, mouse, or voice | Screen, auction timer | Multi-agent, sequential, dynamic |

## Question 2:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Activity | Performance Measure | Environment | Actuators | Sensors | Task Type |
| Performing gymnastics routine | Points, balance, accuracy | Gym floor, judges, audience | Arms, legs, full body | Eyes, inner ear (balance) | Single-agent, continuous, episodic |
| Exploring Titan’s oceans | Data collected, safety, distance covered | Titan’s ocean, rocks, obstacles | Propellers, robotic arms | Sonar, camera | Single-agent, dynamic, partially observable |
| Playing soccer | Goals scored, teamwork, victory | Ground, ball, players | Legs, head, feet | Eyes, ears | Multi-agent, dynamic, partially observable |
| Shopping for AI books online | Lowest price, best condition, safe transaction | Online store environment | Keyboard, mouse | Screen, price details | Single-agent, static, discrete |
| Practicing tennis with wall | Consistency, control | Court, wall | Racket, legs, arms | Eyes, ears | Single-agent, dynamic, continuous |
| Performing high jump | Jump height, landing safety | Ground, pole, bar | Legs, arms | Eyes, body balance | Single-agent, episodic, continuous |
| Bidding in auction | Winning bid at fair price | Auction platform or hall | Keyboard, mouse | Display, signals | Multi-agent, sequential, dynamic |

## Question 3:

Agent: An agent is anything that can sense its surroundings and take actions to reach its goal.

Agent Function: It is like a rule or mapping that tells what action the agent should take for each situation it sees.

Agent Program: The program or code that actually runs on the agent’s system to make decisions.

Rationality: Choosing the best possible action based on what the agent knows at that moment.

Autonomy: When an agent can make its own decisions and learn from experience instead of depending on others.

Reflex Agent: An agent that reacts quickly to what it sees right now, without remembering the past.

Model-Based Agent: An agent that keeps a record of what happened before to understand the world better.

Goal-Based Agent: An agent that takes actions to achieve a particular goal or target.

Utility-Based Agent: An agent that tries to pick the action that gives it the most benefit or satisfaction.

Learning Agent: An agent that improves itself over time using its own experience and feedback.

## Question 4:

1. Yes, one agent function can be made using many different programs. Example: Sorting numbers can be done with different sorting algorithms, but the final output is the same.

2. Yes, some functions cannot be made into programs because they would need unlimited memory or time.

3. Yes, with one fixed architecture, every program performs one specific function only.

4. If a machine has n bits of memory, then there can be 2^n different programs. But the number of possible agent functions is much bigger.

5. Making the machine faster will not change what it does, only how quickly it does it.