

Project 1 – Part a

IB00398: Introduction to Reinforcement Learning

Instructor: Manyou Ma Due Date: October 9

Name:

Student Number:

Email:

(Home) University:

Year of Entrance:

Specialization / Major:

Project Title:

Please complete this questionnaire to ensure your project topic is well-defined, feasible, unique, and aligned with your goals. You may submit a **TYPED** PDF or directly modify the \LaTeX source code.

Topic Quality

1. Problem Statement

What is your project about? (150 Words)

2. MDP Suitability

Can this problem be modeled with **states, actions, and rewards**? Briefly describe:

States:

Actions:

Rewards:

3. Motivation

Why is this problem interesting and meaningful? (100 Words)

4. Personal Interest

Am I personally interested to work on this problem? Why or why not?

5. Career and Academic Alignment

How does this project connect to my career or academic goals?

Job readiness / skills employers value:

Academic paper or portfolio potential:

6. Degree Program Relevance

Can I use knowledge from my other classes (e.g., mechatronics, cybersecurity, communications, control) in this project? Which course and how?

7. Feasibility

Do I have enough data and domain knowledge to build a simple simulator? What data or approximations will I use?

8. Uniqueness

Is your topic original, or does it go beyond copying an existing GitHub repo/tutorial? What makes it unique?

MDP Components

Your project must include at least **10 states** and **3 distinct actions**. Actions should represent **different categories of decisions**, not just variations of the same one.

- Not acceptable: {move left, move right, move up, move down}
- Better example: {move, pick up object, drop object, wait, signal another agent}

States and actions may be **discrete** (finite categories) or **continuous** (real values).

- Discrete example (traffic light): States = {low, medium, high traffic}, Actions = {switch to green, switch to red}.
- Continuous example (drone): States = (x, y, z, v_x, v_y, v_z) , Actions = thrust vector (f_x, f_y, f_z) , yaw angle θ .

9. States (at least 10)

List possible states for your problem. Mark if they are discrete or continuous.

10. Actions (at least 3 distinct)

List possible actions for your agent. Mark if they are discrete or continuous.

11. Rewards

What is the reward signal? How is success measured?

12. Transitions

Are the transitions between states clear and plausible? Briefly explain how the system evolves.

Literature Survey

13. References

List at least 3–6 related papers or articles you have found.

Note: This questionnaire is for your own benefit. Be honest and specific. If you are unsure about any part, or if you need help finding a suitable topic, please check with me before the due date of this assignment. – Version 0, Sept. 26, 2025