Name		Matric number	
Collaborator		Collaborator's matric number	

Instructions:

- *Your solutions for this tutorial must be TYPE-WRITTEN.*
- *Submit your solution(s) to your tutor. You can make another copy for yourself if necessary. Late submission will NOT be entertained.*
- *YOUR SOLUTION TO QUESTION* 1 *will be GRADED for this tutorial.*
- *You can work in pairs, but each of you should submit the solution(s) individually.*
- *Include the name of your collaborator in your submission.*

1. You are tasked with the creation of an interactive agent that would be deployed in an automatic coffee-vending machine. The agent needs to work as a chatbot to converse with the user. Answer the questions below which would be crucial in the design of your agent:
   (a) How would you define the agent's state and action space?
   (b) What would the utility function of the agent involve?
   (c) What kind of exploration actions could the system take?
   (d) For a highly flexible chatbot deployed as the agent, what kind of action should it refrain from taking?

   Solution: User agent's state: [Credit, Chosen Coffee, Machine State]

2. You have been appointed as the lead engineer in the development team of NUSmart Shuttle Bus - the new autonomous shuttle in NUS [1]. Define the characteristics of the task environment in which the shuttle has to be deployed. Support your answer with sufficient reasoning behind your choices.
   (a) Comment on the observability aspect of the environment.
   (b) Is the environment a single-agents, collaborative multi-agent or competitive multi-agent environment? Justify your answer.
   (c) Will the environment be deterministic or stochastic? Give an example scenario to support your answer.
   (d) Would you model the environment to be episodic or sequential? Explain your choice.

Figure 1: NUSmart autonomous shuttle.

[1] `https://uci.nus.edu.sg/oca/latest-news/nusmart-shuttle-a-fully-autonomous-vehicle/`

Solution: Your solution here

3. Are reflex actions (such as flinching your hand from a hot stove) rational? Are reflex actions intelligent?

Solution: Your solution here

4. Weizenbaum's ELIZA program simulates the behavior of a psychotherapist carrying out a conversation with a patient. It basically works by finding keywords in the user's input so as to fire certain rules based on the keywords. Which AI definition does ELIZA fit in? (Thinking humanly? Acting humanly? Thinking rationally? Acting rationally?) Discuss how an ELIZA-like system will behave, if it is modeled according to each of the four agent types, namely, "simple reflex agent", "model-based reflex agent", "goal-based agent", and "utility-based agent".

Solution: Your solution here