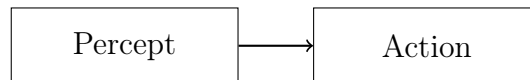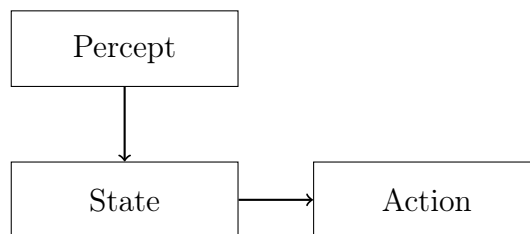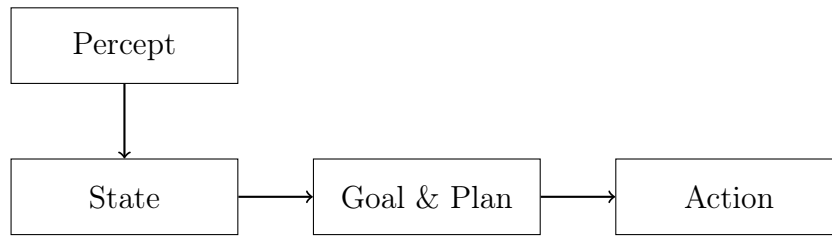# Assignment 1 Answer

Question 1(a)

- Reflex agent

  - Reflex agent only makes a decision by looking at the current situation, which means it does not remember what happened before.

  - And it follows simple rules like "if something happens, do this action"

  - For example, a robot vacuum starts cleaning the room when it sees dust.

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┌─────────────┐        ┌─────────────┐
│   Percept   │───────▶│   Action    │
└─────────────┘        └─────────────┘
```

- Reflex agent with state

  - This agent looks at the current situation, and also remembers past information, which means it keeps a record of what it has seen or done before

  - This helps the agent when it can not see everything at the same time

  - For example, a robot vacuum remembers which room it has already cleaned

```
┌─────────────┐
│   Percept   │
└─────────────┘
       │
       ▼
┌─────────────┐        ┌─────────────┐
│    State    │───────▶│   Action    │
└─────────────┘        └─────────────┘
```
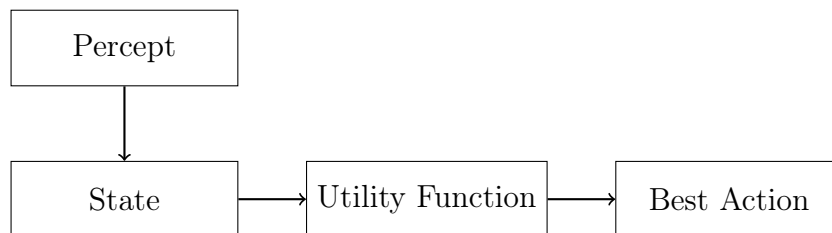
- Goal-based agent

  - A goal-based agent works to reach a goal, it makes plans and thinks about what steps will help reach the goal

  - It does not just follow a simple rule.

  - For example, GPS plans the best way to get to the destination.

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┌─────────────┐
│   Percept   │
└──────┬──────┘
       │
       ▼
┌─────────────┐    ┌──────────────┐    ┌─────────────┐
│    State    │───▶│  Goal & Plan │───▶│   Action    │
└─────────────┘    └──────────────┘    └─────────────┘
```

- Utility-based agent

    - A utility-based agent looks for the best result, not just any goal.

    - It uses a utility score to decide which choice is better or worse, and also think about different risks or benefits before acting.

    - For example, a self-driving car chooses the safest and fastest path, not just the shortest one.

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┌─────────────┐
│   Percept   │
└──────┬──────┘
       │
       ▼
┌─────────────┐    ┌──────────────────┐    ┌─────────────┐
│    State    │───▶│ Utility Function │───▶│ Best Action │
└─────────────┘    └──────────────────┘    └─────────────┘
```

Question 1(b)

- Customer Service Representatives

    - Description

        * AI is replacing customer service representatives by using chatbots and voice assistants to handle basic customer questions. For example, AI systems can answer questions like checking order status, resetting passwords, or explaining policies. Many companies use these tools to save money and handle more customers at the same time without needing more staff. AI can answer simple questions quickly, and only sends harder questions to human agents when needed (Hoffman, 2025).

    - PEAS Analysis

        * Performance Measure

            · Number of successful answers, customer satisfaction, response time, and cost savings.

        * Environment

            · Online websites, phone systems, customer accounts, company databases.

        * Actuators

            · Text messages on chat windows, voice through phone systems, emails.

        * Sensors

· Customer questions from chat, voice input, customer data from the database.

– Task Environment Characteristics

* Observable
  · Partially Observable, because AI can only see the customer's input, not their real emotions or full context.
* Single-agent or Multi-agent
  · Multi-agent, because there are many customer agents and AI agents interacting at the same time.
* Deterministic or Stochastic
  · Stochastic because Customer responses can be unclear or unexpected, so the result is not always predictable.
* Episodic or Sequential
  · Episodic because each customer question is independent from the next one.
* Static or Dynamic
  · Dynamic because new customer data or changing policies can affect answers.
* Discrete or Continuous
  · Discrete because AI handles one message or call at a time.

- Warehouse Pickers / Inventory Clerks

  – Description
  * AI is replacing warehouse pickers and inventory clerks with autonomous robots and automated systems. For example, companies like Amazon use robots to pick, move, and organize items in warehouses. These robots use sensors and navigation systems to find items and transport them to packing stations. This reduces the need for human workers and increases efficiency, especially during high-demand times like holidays (Hoffman, 2025).

  – PEAS Analysis
  * Performance Measure
    · Speed and accuracy of item picking, fewer errors, reduced delivery time
  * Environment
    · Warehouse floor, storage racks, loading docks
  * Actuators
    · Robotic arms, wheels, conveyor belts
  * Sensors
    · Cameras, barcode/RFID scanners, LIDAR for navigation

  – Task Environment Characteristics
  * Observable
    · Fully observable because AI systems have access to warehouse layout, stock data, and sensor feedback

* Single-agent or Multi-agent
  · Multi-agent, because there are many robots working together in the same warehouse.
* Deterministic or Stochastic
  · Mostly deterministic because robot actions produce expected outcomes, but small errors or obstacles can occur
* Episodic or Sequential
  · Sequential because each picking task depends on warehouse state and item location
* Static or Dynamic
  · Dynamic because inventory and item locations can change due to restocking or customer orders
* Discrete or Continuous
  · Discrete because tasks like picking and placing items are clearly defined steps

References

Hoffman, E. (2025, March). *48 jobs ai will replace by 2025: Check if yours is at risk.* Winssolutions. Retrieved May 7, 2025, from https://www.winssolutions.org/jobs-ai-will-replace-challenge-opportunities/