

# homework 1

Yuchen Hou

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## 1 mitsuku

### 1.1 the conversation

Human: my name is Mitsuku Mitsuku: Ah Mitsuku! Isn't it a lovely name? Human: I don't have a name. Mitsuku: How do people identify you if you have no name? Human: do i have a name? Mitsuku: I don't think you have. You haven't told me. Human: I am Larry Holder. Don't you remember me? Mitsuku: Your name is Larry Holder. Of course I remember you well Larry Holder. We were talking about . Human: liar. Mitsuku: No I am telling the truth. Human: you are no human Mitsuku: I wouldn't want to be. Human: you are an agent. Mitsuku: Perhaps I am. But you are certainly much more of an agent than I am. Human: what is my name? Mitsuku: Hmm. Your name is Larry Holder. Is it not? Human: what is the first time we meet? Mitsuku: Give me a hint. Human: what is the first sentence I said to you? Mitsuku: You introduced yourself by telling me your name. Human: What did I say? Mitsuku: You said what is the first sentence I said to you?. Human: Repeat the first sentence I said to you. Mitsuku: the first sentence you said to me.

### 1.2 the explanation

I told her my name in the 1st sentence, then told her I don't have a name in the 2nd. She failed to recognize this obvious contradictory. Then she said I haven't told her my name, although I had. I also stated she wasn't a human and she even admitted the truth that she is no human.

## 2 tetris

### 2.1 task environment

See Table 1

### 2.2 task environment properties

See Table 2

performance measure	number of horizontal lines filled and cleared
environment	the locations of the remains of previous tetriminos, the location and shape of the current tetriminos, the shape of the next tetriminos
actuators	the interface to the input API of the tetris game: rotate, move left, move right, fall through
sensors	the interface to the output API of the tetris game: score, the locations and shapes of the tetriminos

Table 1: task enviroment

environment property	explanation
fully observable	the sensors give the agent access to the complete state of the environment
single agent	there is no other entity maximizing its performance measure which depends on the agent's behavior
stochastic	the next state (i.e. the next shape) is not completely determined by the current state and the action
sequential	the current decision affects future decisions
dynamic	the environment cannot change when the agent is deliberating
discrete	the states, percepts and actions are all discrete
known	the rule of the game is known to the programmer or agent

Table 2: task enviroment properties

## 2.3 structure of agents

I think utility-based agent is the best structure, because the agent usually has more than one choices of actions that fulfill the goal of clearing more lines, and utility function provides the agent the maximum implementation flexibility in choosing from multiple options.

# 3 wumpus world analysis

In this question, the initialization of the root is not counted toward node generation.

## 3.1 breadth first search

12 nodes (no duplication) are generated, as shown in Figure 1.

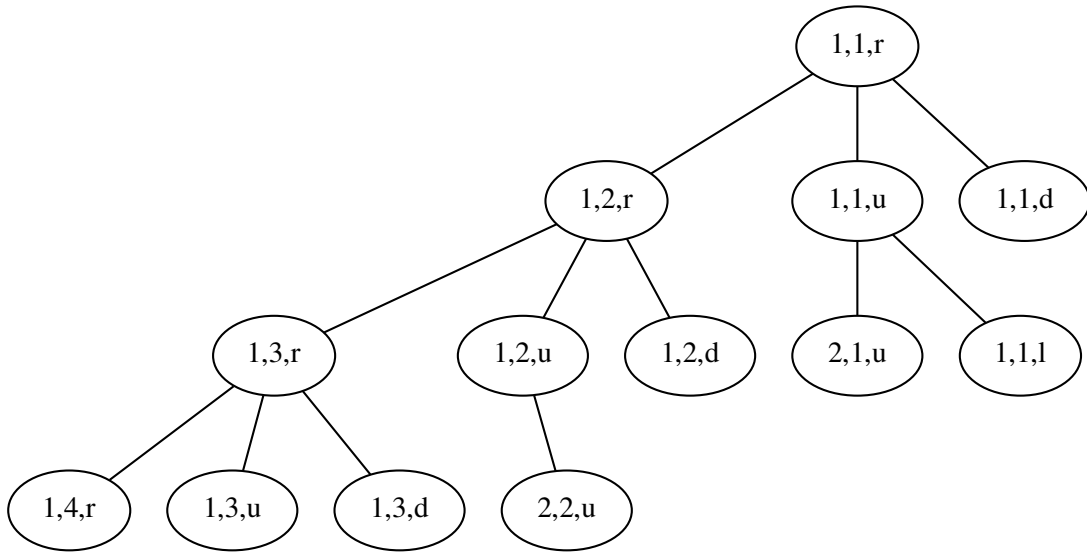


Figure 1: depth first search

### 3.2 iterative deepening search

$$\begin{aligned}
 depth &= 3 \\
 node\_count &= \sum_{n=1}^{depth} (depth - n + 1) \cdot node\_count\_at\_level\_n \\
 &= 3 \cdot 3 + 2 \cdot 5 + 1 \cdot 4 \\
 &= 23
 \end{aligned}$$

## 4 wumpus world simulation