

For each problem on this test, below “Perfect” gives the percentage who received full credit, “Partial” gives the percentage who received partial credit, and “Zero” gives the percentage of students who received zero credit.

(Due to rounding, values below may be only approximate estimates.)

Problem 1

Perfect: ~49% (~30 students), Partial: ~51% (~31 students), Zero: ~0% (~0 students)

Problem 2

Perfect: ~51% (~31 students), Partial: ~49% (~30 students), Zero: ~0% (~0 students)

Problem 3

Perfect: ~56% (~34 students), Partial: ~43% (~26 students), Zero: ~2% (~1 students)

CS-171, Intro to A.I., Summer Quarter, 2016 — Quiz # 1 — 20 minutes

NAME: _____

YOUR ID: _____ ID TO RIGHT: _____ ROW: _____ SEAT: _____

1. (48 pts total, 4 pts each) Properties of task environments.

See Section 2.3.2 and Fig. 2.5.

For each term or phrase on the left, write in the letter corresponding to the correct definition on the right. The first one is done for you as an example.

| | | | |
|---|------------------|---|---|
| A | Agent | A | Perceives environment by sensors, acts by actuators |
| K | Episodic | B | Sensors give complete state of environment at each time point |
| G | Discrete | C | More than one agent in the task environment |
| I | Static | D | Next state is exactly determined by current state and agent action |
| E | Sequential | E | The current decision could affect all future decisions |
| J | Semidynamic | F | Environment can change while the agent is deliberating |
| D | Deterministic | G | Finite number of states, percepts, and actions |
| B | Fully observable | H | The outcomes (or probabilities) for all actions are given |
| M | Uncertain | I | Environment does not change while the agent is deliberating |
| H | Known | J | Environment does not change while the agent is deliberating, but its performance measure does |
| C | Multiagent | K | A series of atomic episodes, each independent of prior agent actions |
| L | Stochastic | L | Next state not exactly determined by current state and agent action |
| F | Dynamic | M | Not fully observable or not deterministic |

A question arose about 'Stochastic' vs. 'Nondeterministic.' After rereading the definitions in Section 2.3.2, it appears that Nondeterministic is a subset of Stochastic. Stochastic appears to refer to the general case in which an action in a state might not exactly determine the next state, for any of a wide variety of reasons; e.g., for the taxi-driving robot, if the street is wet the braking action might unexpectedly produce a skid state instead of a halt state, if there is a mechanical error in the steering mechanism a steering wheel turn of 90 degrees might unexpectedly produce a different turn angle, if there is a moron in the next lane his sudden and unfortunate lane change into us might unexpectedly produce a crash state instead of a travel state, etc. Nondeterministic appears to refer to a special case of Stochastic, which is analogous to a nondeterministic finite automaton in that a given action in a given state results nondeterministically in one of several possible outcome states (often for reasons unknown to the agent); e.g, the action of eating an unknown mushroom results nondeterministically in either a dead state or a live state (depending on whether or not the mushroom was poisonous).

I agree that this distinction is subtle and confusing (though I believe it is useful). For purposes of this Quiz #1 only, both L and N will be accepted as correct answers to both Stochastic and Nondeterministic. For future tests, we will insist upon the definitions as given your textbook, which for test purposes is a gold standard and a reliable study guide.

2. (48 pts total, 4 pts each) LOGIC CONCEPTS. For each of the following terms on the left, write in the letter corresponding to the best answer or correct definition on the right. **The first one is done for you as an example.**

See Sections 7.1-4.

| | | | |
|---|-------------------------|---|---|
| A | Agent | A | Perceives environment by sensors, acts by actuators. |
| C | Syntax | B | Chain of inference rule conclusions leading to a desired sentence. |
| I | Semantics | C | Specifies all the sentences in a language that are well formed. |
| L | Entailment | D | Describes a sentence that is true in all models. |
| J | Sound | E | Stands for a proposition that can be true or false. |
| K | Complete | F | Represented as a canonical conjunction of disjunctions. |
| E | Propositional Symbol | G | Possible world that assigns TRUE or FALSE to each proposition. |
| D | Valid | H | Describes a sentence that is false in all models. |
| M | Satisfiable | I | Defines truth of each sentence with respect to each possible world. |
| H | Unsatisfiable | J | An inference procedure that derives only entailed sentences. |
| B | Proof | K | An inference procedure that derives all entailed sentences. |
| G | Model | L | The idea that a sentence follows logically from other sentences. |
| F | Conjunctive Normal Form | M | Describes a sentence that is true in some model. |

3. (4 pts total, 1 pt each) TASK ENVIRONMENT. Your book defines a task environment as a set of four things, with the acronym PEAS. Fill in the blanks with the names of the PEAS components.

Performance (measure) Environment Actuators Sensors

See Section 2.3.1.