Task 1:

Explain the relations between different paradigms of AI. Would the solutions in one paradigm be applicable to solve problems in another?

Task 2:

Let us examine the rationality of various vacuum-cleaner agent functions.

A. Show that the simple vacuum-cleaner agent function described in the lecture (under the given assumptions) is indeed rational.

B. Describe a rational agent function for the modified performance measure that deducts one point for each movement. Does the corresponding agent program require internal state?

C. Discuss possible agent designs for the cases in which clean squares can become dirty and the geography of the environment is unknown. Does it make sense for the agent to learn from its experience in these cases? If so, what should it learn?

Task 3: Develop a PEAS (performance measure, environment, actuators, sensors) description of the task environment for:

a) Robot soccer player

b) Internet book-shopping agent

Task 4: For each agent type above, characterize the properties of the task environment and select a suitable agent design.

Task 5: Referring to the utility-based agents described in the lecture, both the performance measure and the utility function measure how well an agent is doing. Explain the difference between the two.

Extra questions:

Task 6:

Research a number of applications with potential use of AI. E.g., driverless car, SIRI, expert systems, web search engine, decision support systems, etc.

A. What AI paradigm would be most suitable for such applications?

B. Describe your own ideas on how the problem can/should be solved. What knowledge/skills do you lack if you are required to build such applications?

Task 7:

Various subfields of AI have held contests by defining a standard task and inviting researchers to do their best. Examples include the DARPA Grand Challenge for robotic cars, the International Planning Competition, the Robocup robotic soccer league, the TREC information retrieval event, and contests in machine translation, speech recognition, etc. Investigate at least three of these contests and describe the

progress made over the years. To what degree have the contests advanced the state of the art in AI? To what degree do they hurt the field by drawing energy away from new idea?