Homework 1

Part 1: Intelligence and Rationality

1.
    a) **Intelligence** : Intelligence can be defined as the quality of any entity that allows for it to acquire knowledge and use that knowledge as the basis for action in an environment.

    b) **Artificial Intelligence** : Artificial Intelligence can be defined as the ability of an entity to display intelligence or in other words model the behavior of human cognition. In practice, we can say that artificial intelligence is the ability of an entity to use signals from it's environment and compute an action based on some model and those signals.

    c) **Agent** : An entity that has the capacity to sense it's environment and cause a change in it based on what was perceived can be defined as an agent.

2) A rational agent is one which maximizes it's performance measure based on the percept sequence and the knowledge it has acquired. Now in the case of a DVR we need to define it's percepts, a performance measure as well as what sensors and actuators it actually has. Consider the following:
    o Actions: The only available actions are "Record" and "Do not record"
    o Environment: List of all TV Shows are known. But the preference of a user to a particular TV Show is not known.
    o Performance Measure: awards one point for every correctly predicted TV Show, over a certain lifetime of time steps.
    o Sensors could be a binary button to vote for a correctly predicted TV Show.

    In this circumstance we can say that a DVR is a rational agent. But it could be irrational in case the agent continues to record shows that had a negative predictions. Such agents would clearly be irrational.

3) PEAS description of the task environment for

Agent Type	Performance Measure	Environment	Actuators	Sensors
A robotic chess arm	Win ratio, Loss ratio, speed.	Chess board, Chess pieces	Motors, hydraulics, arm	Cameras to recognize chess pieces.
A movie recommendation system	Maximize positive recommendations. Minimize negative recommendations.	Database of movies, movie watcher.	Display	Keyboard entry of user's past favorite movies.

Agent Type	Performance Measure	Environment	Actuators	Sensors
A digital video recorder	Maximize the recordings of user's favorite shows.	TV broadcast signal, Schedule of TV Shows.	Recording media. Video recorder.	Channel name, Name of TV Show,

4)

- A Shoe-in winter: In this case I think the failure on the part of the agent was his judgment on 'what will the world be like if I do action A'.

- An Illuminating story: In this case the failure on the part of the agent was a failure to correctly assess which actions the agent could perform given the state of the world. If he had correctly assessed it, he would have known that messing with electricity in the rain can lead to nothing but disaster

- Barn Raising: In this case I think the failure was on all tree accounts:
  1. failure to correctly assess what the world is like now: He should have known that the support post was a crucial structure.

  2. failure to correctly assess which actions the agent could perform given the state of the world: He should have known that chainsawing this support post is not a viable action.

  3. failure to judge 'what will the world be like if I do action A': He could not judge what would happen in the case when the support post would be cut.