Ques.1 Definition:

**AGENT:**

Agent is a person or thing that takes an active role or produces a specified effect.

**AGENT FUNCTION:**

The agent function is an mathematical function that maps any given percept sequence to an action. The function is implemented as the agent program. The part of the agent taking an action is called an actuator.

**AGENT PROGRAM:**

The agent program is the actual implementation that running with some physical system. The agent function for an artificial agent will be implemented by an agent program.

**RATIONALITY:**

For each possible percept sequence, a rational agent should select an action that is expected to maximize its performance measure, given the evidence provided by the percept sequence and whatever built-in knowledge the agent has.

**AUTONOMY:**

An autonomous agent is an intelligent agent operating on its own percepts. A rational agent should be autonomous it should learn what it can to compensate for partial or incorrect prior knowledge.

**REFLEX AGENT:**

This is a simple type of agent. These agents select actions on the basis of the *current* percept, ignoring the rest of the percept history.

**MODEL-BASED AGENT:**

A model-based reflex agent is one that uses it percept history and its internal memory to take decisions about an internal “model” of the world around it.

**GOAL-BASED AGENT:**

A goal-based agent operates based on a goal in front of it and makes decision based on how best to reach that goal.

**UTILITY-BASED AGENT:**

Just having goals isn’t good enough because often we may have several actions which all satisfy our goal so we need some way of working out the most efficient one. A utility function maps each state after each action to a real number representing how efficiently each action achieves the goal.

**LEARNING AGENT:**

A learning agent is a tool in AI that is capable of learning from its experiences. It starts with some basic knowledge and is then able to act and adapt autonomously, through learning, to improve its own performance.

Ques.2. Difference between performance measure and utility measure function:

Ans:

A performance measure is used to evaluate the behavior of the agent in environment.Does agent do what it’s supposed to do vs. does agent do it in optimal way.whereas there is always a performance measure function.So in general Performance measure is how we evaluate a agent behavior.

Otherside,A utility function is used by an agent itself to evaluate how desirable states are. Some paths to the goal are better than others.The utility function may not be the same as the performance measure.An agent may have no explicit utility function at all.utility function is a function internally used by the agent to evaluate its performance.

So we can say that,They could be same in some cases but it's not necessarily true. Also a performance measure exists always.,Otherside , A utility function might not.