1. How can we differentiate an agent from any other piece of software? What are the special qualities that make it an agent?

The particularity that makes the difference between a normal piece of software and a rational agent, is that any action or sequence of actions performed by the rational agent are focused on maximize its task based on the perception and knowledge that it may have.
On the other hand, we can find pieces of software that do not perceive and perform to get better results, they are only a sequence of actions.

2. Provide 3 examples of task environments. Describe them accordingly to the properties of environments.

Agent Type	Performance Measure	Environment	Actuators	Sensors
Bots In VideoGame	Kills , Heath Points, Damages	Videogame Fully Observable Multiagent Stochastic Sequential Dynamic Known Continuous	Movement of bot, guns and actions, Triggers	Players Entries (Movements, States, …)
Stock Market Bot	Losses, Earnings,	Stock Market Partially Observable Multiagent Stochastic Sequential Dynamic Known continuous	Movements, Exchanges, Transaccion of data, Triggers	New Data Inputs, Changes in prices
Service ChatBots	Client Numbers, Clients Satisfaction	ContactCenter Partially Observable Multiagent Stochastic Sequential Dynamic Known continuous	Display Responses, Suggestions,	KeyBoard Entry, Voice Entry

* The classification may differ according to the problem/approach

3. Are there any parts that are not fundamental for agents? i.e. parts you could take away and have the program remain an agent.

In order to have a rational agent, all the parts (Performance Measure, Environment, Actuator and Sensors) are necessary, because the absence of them will not allow the maximization of the outcome or imply a different agent or an irrational agent.

4. Google the concept of a computational reactive agent, then look in formal sources and write half a page (200 – 250 words) describing what a reactive agent is, and what other types of agents exist. Include your references.

According to Wooldridge and Jennings [1] a reactive agent is one that is capable of maintaining an ongoing interaction with the environment and responding in a timely fashion to changes that occur in it. Note that the term is now widely used to mean a system that includes no symbolic representation or reasoning.

Keeping this in mind we infer two key components to define a reactive agent, the environment and the quick reaction it has to it.

This is one of the classifications that Russell and Norvig [2], suggest:

- Simple reflex agents: These agents select actions on the perception at the moment, ignoring the rest of the percept history, this kind of agent can be mapped in condition-action rules (if...then...)

- Model-based reflex agents: These agents should maintain some sort of internal state that depends on the percept history and thereby reflects at least some of the unobserved aspects of the current state, and the use its condition-action rules to act.

- Goal-based agents: These agents need some sort of **goal** information that describes situations that are desirable. The agent program can combine this with the model to choose actions that achieve the goal, it has a binary approach (True/False)

- Utility-based agents. These are more about the how, instead of the what when we are talking about goals. here we analyze the cost, safety, … that can be evaluated and measured different than the achievement of a goal (Measured) .

- Learning agents: These agents have the particularity of being able to learn to define the actions to take and improve them.

References:

[1] Wooldridge, Michael and Nicholas R. Jennings. Agent Theories, Architectures and Languages: A Survey-Wooldridge and Jennings Eds., Intelligent Agents, Berlin:Springer-Verlag.
[2] S. Russell and P. Norvig, Artificial intelligence, 3rd ed. 2010: Pearson Education,Inc., 2010.