# TASK 3.2

**Question:** You must have heard of or used ChatGPT at some point in the last year, maybe even before. It's like Janet from the Good Place, it always has the answers to your question. Unlike Janet, this may not be 100% correct but does get the job done. But it wasn't always like this. Earlier stages of ChatGPT used to give bogus answers all the time, but over time it learnt how to give appropriate answers, relevant to the context, being as accurate as it possibly can. This is done through a method called ***Reinforcement Learning***. For this task, you must understand and explain the working of reinforcement learning. Additionally, list some other examples and explain how they work.

**Reinforcement learning (RL) tells you how to make the best decisions, sequentially, within a context, to maximize a real-life measure of success. The decision-making entity learns this through trial and error. It is not told which decisions to make, but instead it must learn by itself, by trying them. Reinforcement learning is kind of how we as humans are raised by our parents based on reward and punishment system, as in, if we do something that is, for example, good for the environment or for the neighborhood we are given felicitation or something like that which is like a sweet toffee for our brain and works as a reward system, while we do something which may not be in the favour of the above given example , we may receive backlash for our work or words which works as a punishment mechanism. This is just the basic understanding of RL.**

**The agent is the entity that makes decisions. This could be your child, some software, or a robot, for example. The reward encodes the challenge. This feedback mechanism tells the agent which actions led to success (or failure). The reward signal is typically numeric but only needs to reinforce behavior; genetic learning strategies delete underperforming agents, rather than providing no reward.**

**RL works best when decisions are sequential and actions lead to exploration in the environment. Take robotics, a classic RL application. The goal of a robot is to learn Reinforcement Learning | 5 how to perform unknown tasks.RL's primary advantage is that it optimizes for long-term, multistep rewards. A secondary benefit is that it is very easy to incorporate metrics used by the business.**

**I show you all the different places where RL is applicable:**

**• The field of robotics has many applications, including improving the movement and manufacturing, playing ball-in-a-cup, and flipping pancakes.6 Autonomous vehicles are also an active topic of research.7**

**• You can use RL to improve cloud computing. One paper optimizes applications for latency,8 another power efficiency/usage.9 Datacenter cooling, CPU cooling, and network routing are all RL applications in use today.10,11,12**

**• The financial industry uses RL to make trades and to perform portfolio alloca- tion. And there is significant interest in optimizing pricing in real time.**

**• The amount of energy used by buildings (through heating, water, light, and so on) can be significantly reduced with RL. And electric grids can leverage RL to deal with situations where demand is complex; homes are both producers and consumers.**

**• RL is improving traffic light control and active lane management.Smart cities also benefit.**

***No business sector is left untouched: gaming, technology, transport, finance, science and nature, industry, manufacturing, and civil services all have cited RL applications.***