



Applications of Object Oriented Programming

What is OOPs ?

Object-Oriented Programming (OOP) is a programming paradigm that relies on the concept of classes and objects. It is used to structure a software program into simple, reusable pieces of code blueprints (usually called classes), which are used to create individual instances of objects. There are many concepts of OOPs such as inheritance, data binding, polymorphism, etc. The programming paradigm where everything is represented as an object is known as a truly object-oriented programming language. Smalltalk is considered the first truly object-oriented programming language

- **Objects:** Any entity that has state and behavior is known as an object, for example, tables, pen etc. It can be defined as an instance of class, it contains an address and takes up some space in memory. They can communicate with each other without knowing the details of each other's data or code.
- **Class:** Collection of multiple objects is called class, It is a blueprint from which you can create an individual object. They represent broad categories that share attributes.
- **Inheritance:** When one class acquires all the properties and behaviors of a parent object, it is known as inheritance. It provides code reusability.
- **Polymorphism:** Polymorphism means having many forms, It is the ability of an object to take on many forms.
- **Abstraction:** It is the property by virtue of which only the essential details are displayed to the user, the non-essential details are hidden from the end users.
- **Encapsulation:** It is defined as the wrapping up of data under a single unit. It is the mechanism that binds together code and the data it manipulates.
- There are many advantages of OOPs like reusability, data redundancy, code maintenance, security, better productivity, and design benefits.

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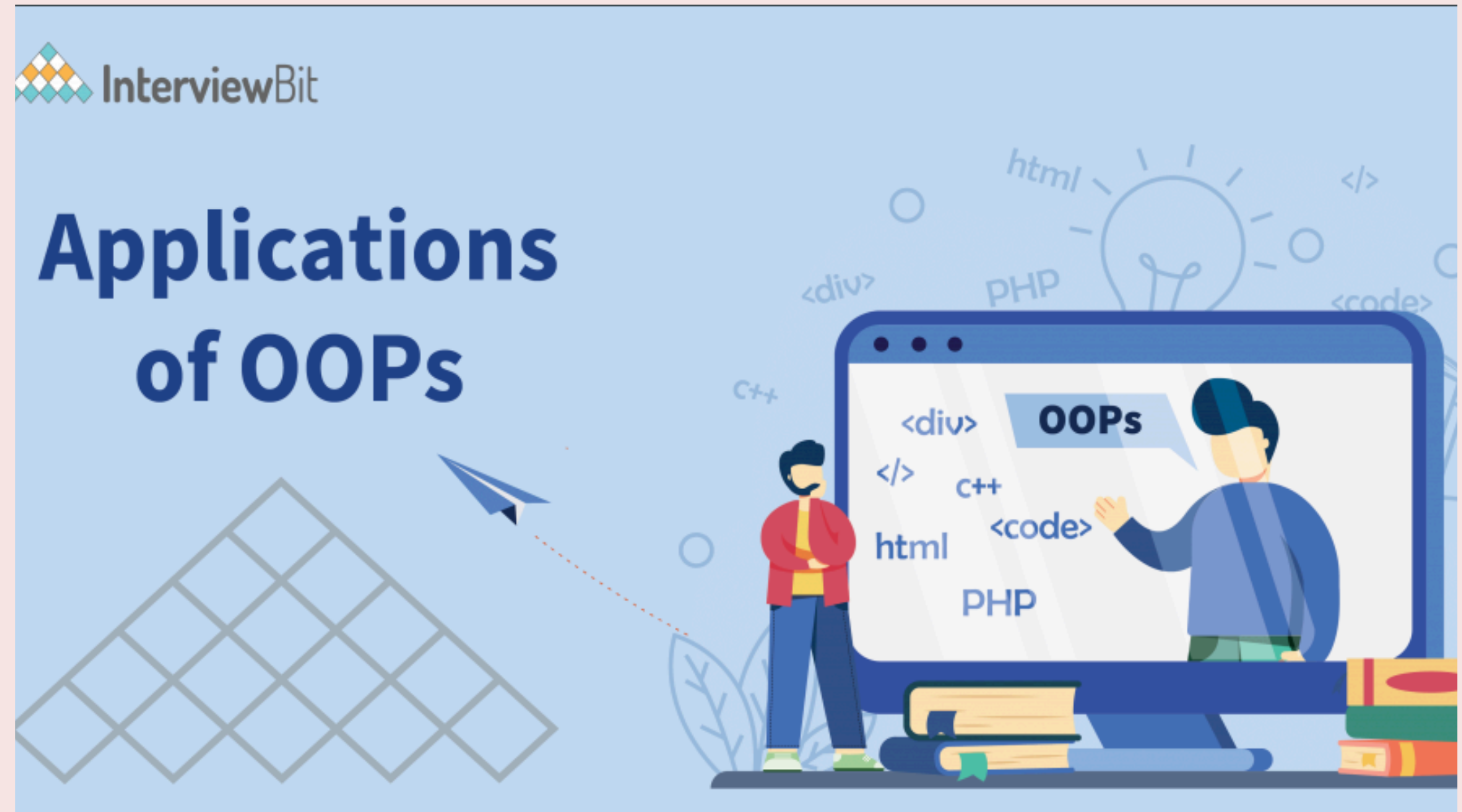
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Applications of OOPs



Real Time Systems

- Real-Time System Definition: A system with hardware and software that performs functions and responds to events within specific and predictable time constraints.
- Key Requirements:
 - Timeliness: The ability to produce results by a specific deadline.
 - Time Synchronization: The capability for agents to coordinate clocks and operate in unison.
- Use of Object-Oriented Technology:
 - Adaptability: Easier to adapt to changes.
 - Ease of Modifications: Simplifies making changes to the system.
 - Reusability: Code can be reused in different parts of the system.
- Complexity Handling: Object-oriented techniques help manage the complexities involved in designing real-time systems.

Client Server System

The client-server systems are those that involve a relationship between cooperating programs in an application. In general, the clients will initiate requests for services and the servers will provide that functionality. The client and server either reside in the same system or communicate with each other through a computer network or the internet.

Object-oriented programming (OOP) is useful in designing these systems, forming the IT infrastructure for object-oriented server internet (OCSI) applications, which include client-server architecture, OOP, and internet technologies.



Hypertext and Hypermedia

Hypertext is a non-linear, multi-sequential tool that connects links to other texts, allowing users to navigate between related topics, as seen in sites like InterviewBit. Hypermedia extends hypertext by incorporating various media forms such as graphics, audio, and video. An example of hypermedia is when clicking a product image on an e-commerce site like Amazon leads to a specific product page. Object-Oriented Programming (OOP) aids in building the framework for both hypertext and hypermedia, enhancing their functionality and organization.

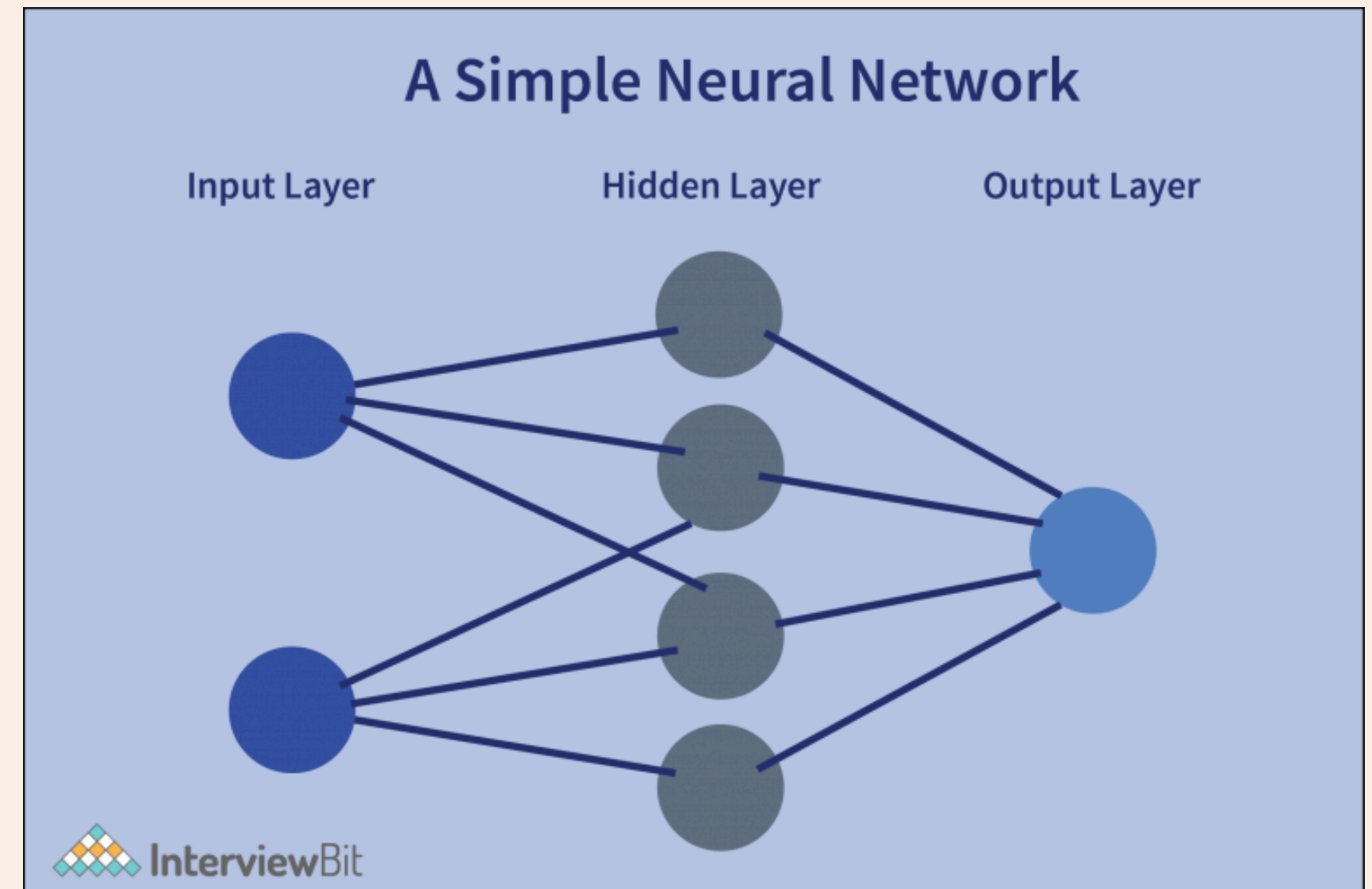
CIM/CAD/CAM Systems

OOP can also be used in manufacturing and designing applications as it allows people to reduce the efforts involved. For instance, it can be used while designing blueprints and flowcharts. So it makes it possible to produce these flowcharts and blueprint accurately.

Neural Networks and Parallel Programming

A neural network is a series of algorithms that endeavors to recognize underlying relationships in a set of data through a process that mimics the way the human brain operates. In this sense, neural networks refer to systems of neurons, either organic or artificial in nature.

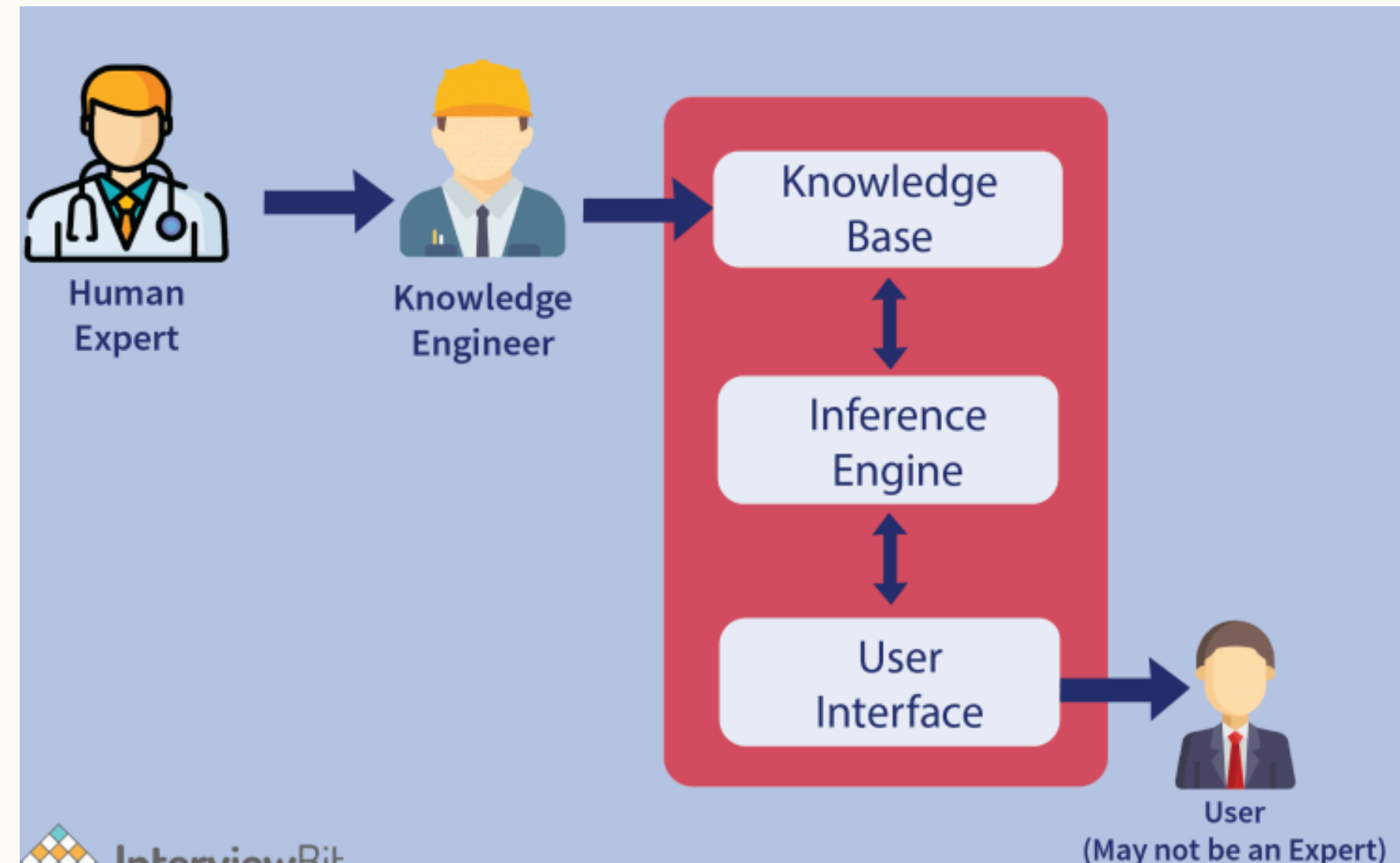
Parallel programming involves the division of a problem into smaller subproblems, the subproblems can be executed at the same time using multiple computing resources. OOPs, are used to simplify the process by simplifying the approximation and prediction ability of the network.



AI Expert Systems

An AI expert system mimics human decision-making using a knowledge base that can be expanded with new rules. For example, PXDES predicts lung cancer types and severity. Many expert systems exist, each tailored to solve specific complex problems.

OOPs, power the development of such AI Expert systems, To AI systems use forward and backward chaining to reach a conclusion. Basically, the chaining involves a chain of conditions and derivations to deduce the outcome. An AI system has to be reliable, highly responsive, and offers a high performance, to power such capabilities OOPs are used.



Simulation and Modeling System

Modeling a complex system is quite difficult owing to the varying specifications of the variables, such types of systems are prevalent in medicine and in other areas of natural science, like zoology, ecology, and agronomic systems. Simulation and modeling systems are the imitations of the real world product. The system's workings can be checked and analyzed using object-oriented programming.

A good example of a simulation and modeling system is of automobiles such as cars, Once the model of the car structure is developed by the engineer's team, as and when they feel that the product is good to go they can release the product. OOP provides an appropriate approach for simplifying these complex models.

Computer Aided Designs

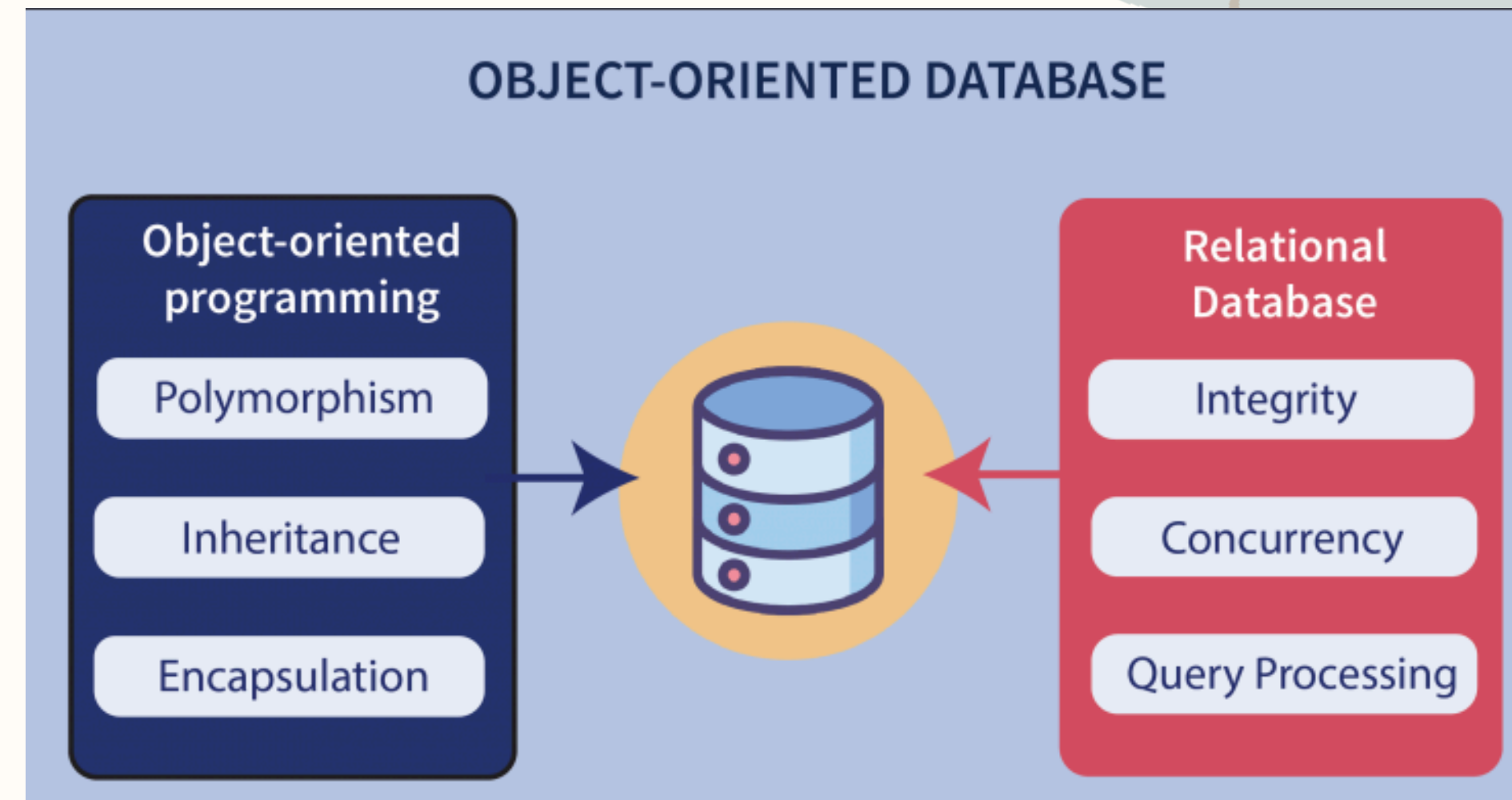
Computer-aided design (CAD) is the use of computers (or workstations) to aid in the creation, modification, analysis, or optimization of a design. In mechanical design, it is known as mechanical design automation (MDA), which includes the process of creating a technical drawing with the use of computer software.

One of the good examples of computer-aided design is Matlab. It is used by the programmers to solve difficult mathematical models, these models are then used in bigger system designs to check whether the system will function as expected or not



Object Oriented Database

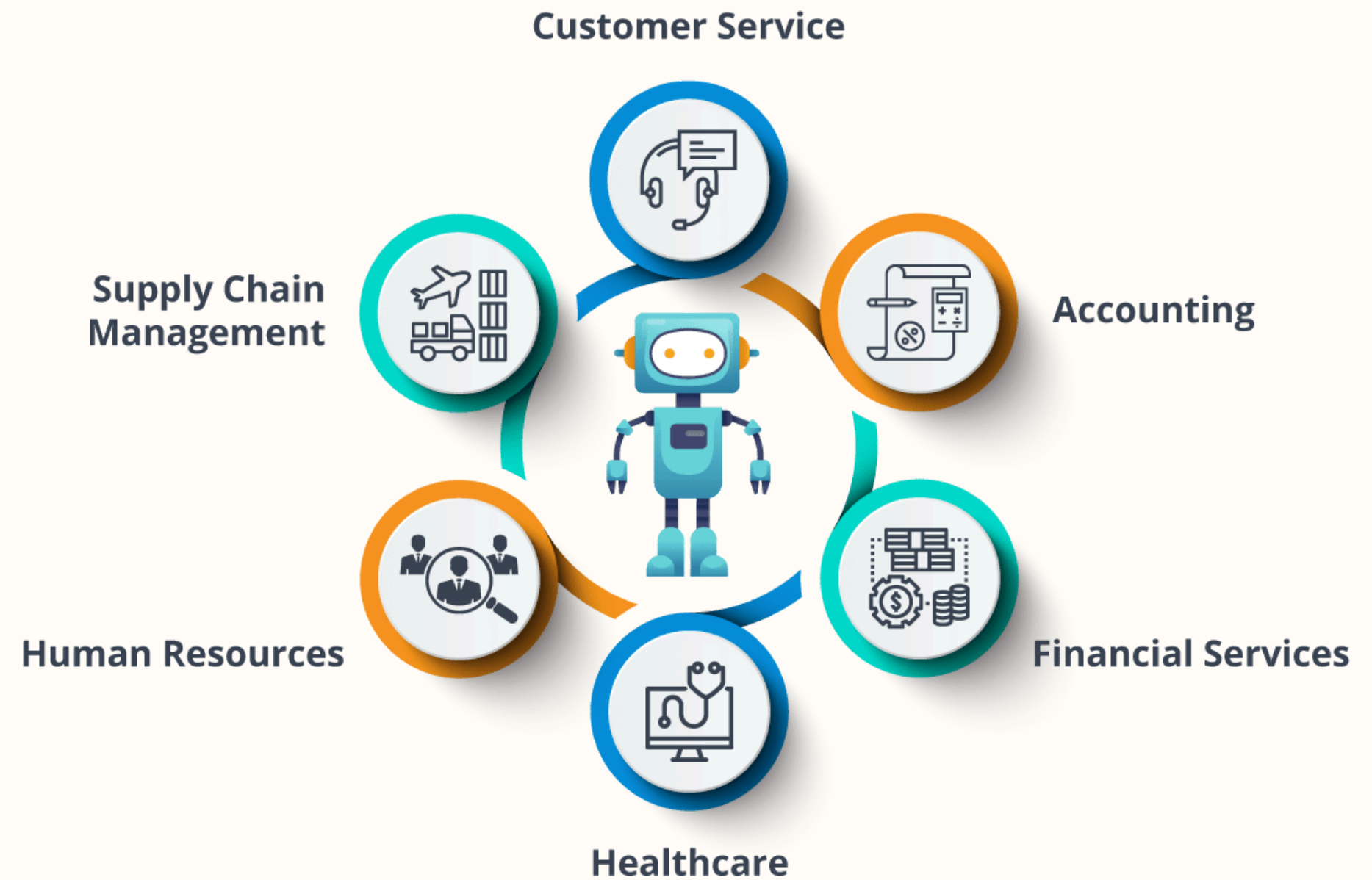
In today's world, all data is stored and processed, and the traditional relational model, which uses tables with rows and columns, becomes cumbersome as complexity increases. This has led to the need for storing data as real-world objects, maintaining a direct correspondence between these objects and database entries to preserve their identity and integrity. Object-oriented databases, like MongoDB, facilitate this approach by allowing data to be identified and operated upon as objects.



Office Automation Systems

Nowadays companies use automated systems to share information and communication to and from the people inside and outside the organization. There are various works in the office for which the employees can be replaced by automated robots and these works are generally time-consuming and hard work. The company can reduce its cost expenses by developing such a system.

To develop office automation systems, robot programming automation or RPA is used. RPA uses Object-oriented programming.





Thank you!