Cloud Computing Important Questions for Viva

1. What is a Cloud Technology?

A cloud is a combination of services, networks, hardware, storage, and interfaces that helps in delivering computing as a service. It broadly has three users. These are the end-user, business management user, and cloud service, provider. The end-user is the one who uses the services provided by the cloud. The responsibility of the data and the services provided by the cloud is taken by the business management user in the cloud. The one who takes care of or is responsible for the maintenance of the IT assets of the cloud is the cloud service provider. The cloud acts as a common center for its users to fulfill their computing needs.

2. What are some of the key features of Cloud Computing?

The following are some of the key features of cloud computing:

- **Agility:** Helps in quick and inexpensive re-provisioning of resources.
- **Location Independence:** This means that the resources can be accessed from everywhere.
- **Multi-Tenancy:** The resources are shared amongst a large group of users.
- **Reliability:** Resources and computation can be dependable for accessibility.
- **Scalability:** Dynamic provisioning of data helps in scaling.

3. What do you mean by cloud delivery models?

Cloud delivery models are models that represent the computing environments. These are as follows:

- **Infrastructure as a Service (IaaS):** Infrastructure as a Service (IaaS) is the delivery of services, including an operating system, storage, networking, and various utility software elements, on a request basis.
- **Platform as a Service (PaaS):** Platform as a Service (PaaS) is a mechanism for combining Infrastructure as a Service with an abstracted set of middleware services, software development, and deployment tools. These allow the organization to have a consistent way to create and deploy applications on a cloud or on-premises environment.
- **Software as a Service (SaaS):** Software as a Service (SaaS) is a business application created and hosted by a provider in a multi-tenant model.
- **Function as a Service (FaaS):** Function as a Service (FaaS) gives a platform for customers to build, manage and run app functionalities without the difficulty of maintaining infrastructure. One can thus achieve a "serverless" architecture.

4.What are the different versions of the cloud?

There are two primary deployment models of the cloud: **Public** and **Private**.

- **Public Cloud:** The set of hardware, networking, storage, services, applications, and interfaces owned and operated by a third party for use by other companies or individuals is the public cloud. These commercial providers create a highly scalable data center that hides the details of the underlying infrastructure from the consumer. Public clouds are viable because they offer many options for computing, storage, and a rich set of other services.
- **Private Cloud:** The set of hardware, networking, storage, services, applications, and interfaces owned and operated by an organization for the use of its employees, partners, or customers is the private cloud. This can be created and managed by a third party for the exclusive use of one enterprise. The private cloud is a highly controlled environment not open for public consumption. Thus, it sits behind a firewall.
- **Hybrid Cloud:** Most companies use a combination of private computing resources and public services, called the hybrid cloud environment.
- **Multi-Cloud:** Some companies, in addition, also use a variety of public cloud services to support the different developer and business units – called a multi-cloud environment.

5. What are the main constituents that are part of the cloud ecosystem?

The parts of the cloud ecosystem that determine how you view the cloud architecture are:

- Cloud consumers
- Direct customers
- Cloud service providers

6. Who are the Cloud Consumers in a cloud ecosystem?

The individuals and groups within your business unit that use different types of cloud services to get a task accomplished. A cloud consumer could be a developer using compute services from a public cloud.

7. Who are the Direct customers in a cloud ecosystem?

Users who often take advantage of services that your business has created within a cloud environment. The end-users of your service have no idea that you're using a public or private cloud. As long as the users are concerned, they're interacting directly with the services and value.

8. Who are the Cloud service providers in a cloud ecosystem?

Cloud service providers are the commercial vendors or companies that create their own capabilities. The commercial vendors sell their services to cloud consumers. In contrast to this, a company might decide to become an internal cloud service provider to its own partners,

employees, and customers, either as an internal service or as a profit center. Cloud service providers also create applications or services for such environments.

9. Describe the Cloud Computing Architecture.

The cloud computing architecture is all the components of a cloud model that fit together from an architectural perspective. The figure below depicts how the various cloud services are related to support the needs of businesses. On the left side, the cloud service consumer represents the types of uses of cloud services. No matter what the requirements of the particular constituent are, it is important to bring the right type of services together that can support both internal and external users. Management of the consumers should be able to make services readily available to support the changing business needs. The applications, middleware, infrastructure, and services that are built based on on-premises computing models are within this category. In addition to this, the model depicts the role of a cloud auditor. This organization provides an oversight either by an internal or external group which makes sure that the consumer group meets its obligations.

10. What are the Cloud Storage Levels?

Cloud storage device mechanisms provide common levels of data storage, such as:

- **Files** – These are collections of data that are grouped into files that are located in folders.
- **Blocks** – A block is the smallest unit of data that is individually accessible. It is the lowest level of storage and the closest to the hardware.
- **Datasets** – Data sets organized into a table-based, delimited, or record format.
- **Objects** – Data and the associated metadata with it are organized as web-based resources.

Each of the above data storage levels is associated with a certain type of technical interface. This interface corresponds to a particular type of cloud storage device and the cloud storage service used to expose its API.

11. What are serverless components in cloud computing?

Serverless components in cloud computing allow the building of applications to take place without the complexity of managing the infrastructure. One can write code without having provision to a server.

Serverless machines take care of virtual machines and container management. Multithreading, hardware allocating are also taken care of by the serverless components.

12. What are the advantages and disadvantages of serverless computing?

Serverless computing has the following advantages and disadvantages:
Advantages:

- It is cost-effective.
- The operations on serverless computing are simplified.
- Serverless computing helps boost productivity.
- It offers scaling options.
- It involves zero server management.

Disadvantages:

- Serverless code can cause response latency.
- It is not ideal for high-computing operations because of resource limitations.
- For serverless computing, the responsibility of security comes under the service company and not the consumer, which might be more vulnerable.
- Debugging serverless code is a bit more challenging.

13. What are cloud-enabling technologies?

There are several areas of technology that contribute to modern-day cloud-based platforms. These are known as cloud-enabling technologies. Some of the cloud-enabling technologies are:

- Broadband Networks and Internet Architecture
- Data Center Technology
- (Modern) Virtualization Technology
- Web Technology
- Multitenant Technology
- Service Technology

14. What are Microservices?

Microservices is a process of developing applications that consist of code that is independent of each other and of the underlying developing platform. Each microservice runs a unique process and communicates through well-defined and standardized APIs, once created. These services are defined in the form of a catalog so that developers can easily locate the right service and also understand the governance rules for usage.

15. Why are microservices important for a true cloud environment?

The reason why microservices are so important for a true cloud environment is because of these four key benefits:

- Each microservice is built to serve a specific and limited purpose, and hence application development is simplified. Small development teams can then focus on writing code for some of the narrowly defined and easily understood functions.
- Code changes will be smaller and less complex than with a complex integrated application, making it easier and faster to make changes, whether to fix a problem or to upgrade service with new requirements.

- Scalability — Scalability makes it easier to deploy an additional instance of a service or change that service as needs evolve.
- Microservices are fully tested and validated. When new applications leverage existing microservices, developers can assume the integrity of the new application without the need for continual testing.

16. What is the cloud usage monitor?

The cloud usage monitor mechanism is an autonomous and lightweight software program that is responsible for collecting and processing the IT resource usage data.

Cloud usage monitors can exist in different formats depending on what type of usage metrics these are designed to collect and how the usage data needs to be collected. The following points describe 3 common agent-based implementation formats.

- Monitoring Agent
- Resource Agent
- Polling Agent

17. What is an API Gateway?

An API gateway allows multiple APIs to act together as a single gateway to provide a uniform experience to the user. In this, each API call is processed reliably. The API gateway manages the APIs centrally and provides enterprise-grade security. Common tasks of the API services can be handled by the API gateway. These tasks include services like statistics, rate limiting, and user authentication

What are Containerized Data Centers?

Containerized Data Centers are the traditional data centers that allow a high level of customization with servers, mainframes, and other resources. These require planning, cooling, networking, and power to access and work.

18. What are Low-Density Data Centers?

Low-Density Data Centers are optimized to give high performance. The space constraint is being removed and there is an increased density in these data centers. One drawback it has is that with high density the heat issue also creeps in. These data centers are quite suitable to develop the cloud infrastructure.

19. What are some issues with Cloud Computing?

Following are some of the issues of cloud computing:

- **Security Issues**: As it would be in any other computing paradigms, security is as much of a concern as Cloud computing. Cloud Computing is vaguely defined as the outsourcing of

services, which in turn causes users to lose significant control over their data. With the public Cloud, there is also a risk of seizure associated.

- **Legal and Compliance Issues**: Sometimes, clouds are bounded by geographical boundaries. The provision of different services is not location-dependent. Because of this flexibility Clouds face Legal & Compliance issues. Though these issues affect the end-users, they are related mainly to the vendors.
- **Performance and Quality of Service (QoS) Related Issues**: Paradigm performance is of utmost importance for any computing. The Quality of Service (QoS) varies as the user requirements may vary. One of the critical Quality of Service-related issues is the optimized way in which commercial success can be achieved using Cloud computing. If a provider is unable to deliver the promised QoS it may tarnish its reputation. One faces the issue of Memory and Licensing constraints which directly hamper the performance of a system, as Software-as-a-Service (SaaS) deals with the provision of software on virtualized resources,
- **Data Management Issues**: An important use case of Cloud Computing is to put almost the entire data on the Cloud with minimum infrastructure requirements for the end-users. The main problems related to data management are scalability of data, storage of data, data migration from one cloud to another, and also different architectures for resource access. It is of utmost importance to manage these data effectively, as data in Cloud computing also includes highly confidential information.

20. How does Resource Replication take place in Cloud Computing?

Resource Replication is the creation of multiple instances of the same IT resource. It is typically performed when an IT resource's availability and performance are needed to be enhanced. The virtualization technology is adopted to implement the resource replication mechanism in order to replicate the cloud-based IT resources.

21.Give the best example of open source Cloud Computing.

Open–source cloud is a cloud service or solution built using **open–source software** and technologies. This includes any public, private or hybrid **cloud** model providing SaaS, IaaS, PaaS**,** or XaaS built and operated entirely on **open–source technologies**.
The best example of open source Cloud Computing is **OpenStack.**

This is one of the most frequently asked cloud computing interview questions.

Cloud computing lets us store and access our applications or data over remote computers instead of our computer. First of all, the cloud is just a metaphor for technology. Cloud data centers might be anywhere globally; we can also access them from anywhere with an Internet-connected device. It has the following benefits as given below:

1. **Pay-per-use model**: We only have to pay for the services we use.
2. **24/7 Availability:** It is always online! There is no such time when you simply cannot use our cloud service; you'll use it whenever you want.

3. **Easily Scalable:** it's effortless to proportion and down or turn off as per customers' needs. For instance, if your website's traffic increases only on Friday nights, you can opt for scaling up your servers that particular day and then scaling down for the rest of the week.
4. **Security:** Cloud computing offers excellent data security. Especially if the data is mission-critical, then that data can be wiped off from local drives and kept on the cloud only for your access to stop it from ending up in the wrong hands.
5. **Easily Manageable:** You only have to pay subscription fees; the Cloud Provider entirely maintains all maintenance, up-gradation, and delivery of services. This is backed by the Service-level Agreement (SLA).

Cloud Computing Examples

Further, various places where Cloud Computing is applied as given below:

Big Data Analytics: Cloud computing helps businesses store and analyze many structured, semi-structured, and unstructured data to find underlying relationships. It analyzes customer buying patterns and uses them for marketing and advertising campaigns.

File Storage: the most important advantage of cloud storage is that it's virtually unlimited. Cloud storage will be available for nearly an equivalent or maybe a lesser price, which is 10 times quite your local storage.

Backup: Backup generally requires a storage unit where the data is secure and infinite storage is provided. Both can be achieved by using Cloud Computing.

22.What are system integrators in cloud computing?

System Integrators emerged on the scene in 2006. System integration brings together system components into a whole and ensures that the system performs smoothly.
A person or company specializing in system integration is called a system integrator.

23.List the platforms which are used for large-scale cloud computing.

The timely processing of massive digital collections demands large-scale distributed computing resources and the flexibility to customize the processing performed on the collections.
The platforms that are used for large-scale cloud computing are:

- Apache Hadoop
- MapReduce

24. Mention the different types of models used for deployment in cloud computing.

You need the perfect cloud deployment model to help you gain a competitive edge in the market. You will have access to IT resources and services that can make your business flexible and agile concerning volume and scale.

The different deployment models in cloud computing are

- Private Cloud
- Public Cloud
- Community Cloud
- Hybrid Cloud

25. What is SaaS (software as a service)?

Software as a service (**SaaS**) is a software distribution model in which a third-party provider hosts applications and makes them available to their customers over the Internet. **SaaS** is one of three main categories of cloud computing, alongside infrastructure as a service (IaaS) and platform as a service (PaaS).

26.What is a Private Cloud?

A private cloud delivers similar advantages to public cloud-like scalability and self-service. In the private cloud, this is done using a proprietary architecture, and private clouds focus on the needs and demands of a single organization.

As a result, the private cloud is best for businesses with dynamic or unpredictable computing needs that require direct control over their environments. Security, governance, and regulation are best suited for private cloud services.

Private clouds are used to keep strategic operations and others secure. It is a complete platform that is fully functional and can be owned, operated, and restricted to only an organization or an industry. Nowadays, most organizations have moved to private clouds due to security concerns, and a hosting company is using a virtual private cloud.

This is one of the most frequently asked cloud computing interview questions.

27.What is the Public Cloud?

The primary objective is to deliver internet services in a public or private cloud. Unlike a private cloud, public cloud services are third-party applications that can be used by anybody who wants to access them. The service may be free or sold on demand.
Public clouds are open to people for use and deployment. For example, Google and Amazon, etc.

The public clouds focus on a few layers like cloud application, providing infrastructure, and providing platform markets.

28.What are Hybrid Clouds?

A hybrid cloud is a cloud computing environment where we can use the services available locally and use third-party private and public services to meet the demand. By allowing workloads to move between private and public clouds as computing needs and costs change, a hybrid cloud gives businesses greater flexibility and more data deployment options.

Hybrid clouds are a combination of public clouds and private clouds. It is preferred over both clouds because it applies the most robust approach to implementing cloud architecture. It includes the functionalities and features of both worlds. It allows organizations to create their cloud and give control over someone else as well.

29.What is the difference between cloud computing and mobile computing?

Cloud Computing is when you store your files and folders in a "cloud" on the Internet. This will allow you to access all your files and folders wherever you are in the world, but you need a physical device with Internet access.

Mobile computing is taking a physical device with you, which could be a laptop, mobile phone, or some device. Mobile computing and cloud computing are somewhat analogous, and mobile computing uses the concept of cloud computing. Cloud computing provides users with the data they require. In contrast, applications run on the remote server in mobile computing and give the user access to storage and managing the data.

Google App Engine

1. What is Google App Engine?

Google App Engine is a platform as a service (PaaS) that allows developers to build and run web applications on Google's infrastructure. App Engine provides automatic scaling, load balancing, and a web server environment for your application.

2. What are the main components of Google App Engine?

The main components of Google App Engine are the App Engine SDK, the App Engine API, and the App Engine datastore.

3. What's the difference between a traditional web app and an application running on GAE?

The biggest difference is that GAE apps are designed to run in a scalable, distributed environment, whereas traditional web apps are typically designed to run on a single server. This means that GAE apps need to be designed to take advantage of features like automatic scaling and load balancing, which can make them more complex to develop.

4. Can you explain what static files are in the context of GAE? How do they differ from dynamic files?

Static files are files that are not processed by the App Engine server. This means that they will be served as-is to the client. This is in contrast to dynamic files, which are processed by the server before being served to the client. Static files are typically used for things like images, CSS, and JavaScript, while dynamic files are used for things like PHP, Ruby, and Python.

5. What do you understand by request handlers?

Request handlers are the components of your App Engine application that process incoming HTTP requests and generate responses. Each request handler is associated with a particular URL path, and your app can have as many request handlers as you need to support the functionality of your app.

6. Can you explain how to create cron jobs with GAE?

You can create cron jobs in Google App Engine by using the Cron service. The Cron service allows you to schedule tasks to be run at specific times or intervals. To create a cron job, you will need to create a file called cron.yaml and specify the schedule and the task to be run.

7. What are some common issues that can occur when using GAE?

There are a few common issues that can occur when using GAE. One is that your app can run out of memory if it is not configured properly. Another is that your app can experience high latency if it is not using the proper caching techniques. Finally, your app can also be subject to down time if it is not using the proper scaling techniques.

8. Is it possible to use custom domain names with applications hosted on GAE? If yes, then how?

Yes, it is possible to use custom domain names with applications hosted on GAE. You will need to set up a CNAME record with your DNS provider that points your custom domain name to the GAE application.

9. How can you enable secure connections (SSL) for your GAE hosted website?

You can enable secure connections for your GAE hosted website by using a custom domain name and configuring SSL for that domain.

10. What are some alternatives to GAE if we want to host our own software?

There are a few different options available if you want to host your own software instead of using Google App Engine. One option is to use a traditional web hosting service, which will give you more control over your server and allow you to customize your setup more. However, this can be more expensive and require more maintenance than using a service like GAE.

nother option is to use a cloud hosting service like Amazon Web Services or Microsoft Azure. These services can be more flexible and offer more features than GAE, but they can also be more expensive.

Finally, you could always host your software on your own server. This requires the most work and expertise, but it also gives you the most control.

11. What are Cloud Endpoints?

Cloud Endpoints are a set of tools and services that allow developers to easily create, deploy, and manage APIs for their web applications. With Cloud Endpoints, developers can take advantage of Google's infrastructure and services to build APIs that are scalable, reliable, and easy to use.

12. What are some advantages of using GAE over other similar solutions like AWS Lambda or Microsoft Azure Functions?

Google App Engine is a great solution for developers who want to deploy their applications quickly and easily without having to worry about managing infrastructure. GAE also offers a variety of features and services that can be used to build scalable and reliable applications. Additionally, GAE is backed by Google, so developers can be confident that their applications will be well-supported.

13. What does "index" mean in the context of Google App Engine Datastore?

An index is a way of organizing data in a Datastore to make queries more efficient. When you create an index, you specify the kind of data you want to index and the order in which you want to index it.

14. What types of indexes are supported by Google App Engine Datastore?

There are four types of indexes supported by Google App Engine Datastore: single property, composite, multiple property, and extended. Single property indexes are the most basic, and are used to index a single property of an entity. Composite indexes are used to index multiple properties of an entity, and are useful for querying on multiple properties at once. Multiple property indexes are used to index multiple entities with the same property values, and are useful for querying on multiple entities at once. Extended indexes are used to index entities with multiple properties, and are useful for querying on multiple properties at once.

15. How can you delete data from GAE datastore?

You can delete data from GAE datastore by using the delete() method on the entity you want to delete.

16. Are there any limitations to using GAE in comparison to other platforms like AWS or Azure?

Yes, there are some limitations to using GAE. One such limitation is that GAE does not support all programming languages like AWS or Azure. Additionally, GAE is not as scalable as some of the other options out there.

17. What is scalability?

Scalability is the ability of a system to handle increased load by adding additional resources. Google App Engine is designed to be scalable, so that it can handle increased traffic by adding more servers as needed.

18.What is CloudSim?
CloudSim is an open-source framework, which is used to simulate cloud computing infrastructure and services. It is developed by the CLOUDS Lab organization and is written entirely in Java. It is used for modelling and simulating a cloud computing environment as a means for evaluating a hypothesis prior to software development in order to reproduce tests and results.

19.What are benefits of Simulation over the Actual Deployment:

Following are the benefits of CloudSim:

- **No capital investment involved**. With a simulation tool like CloudSim there is no installation or maintenance cost.
- **Easy to use and Scalable**. You can change the requirements such as adding or deleting resources by changing just a few lines of code.
- **Risks can be evaluated at an earlier stage**. In Cloud Computing utilization of real testbeds limits the experiments to the scale of the testbed and makes the reproduction of results an extremely difficult undertaking. With simulation, you can test your product against test cases and resolve issues before actual deployment without any limitations.
- **No need for try-and-error approaches**. Instead of relying on theoretical and imprecise evaluations which can lead to inefficient service performance and revenue generation, you can test your services in a repeatable and controlled environment free of cost with CloudSim.

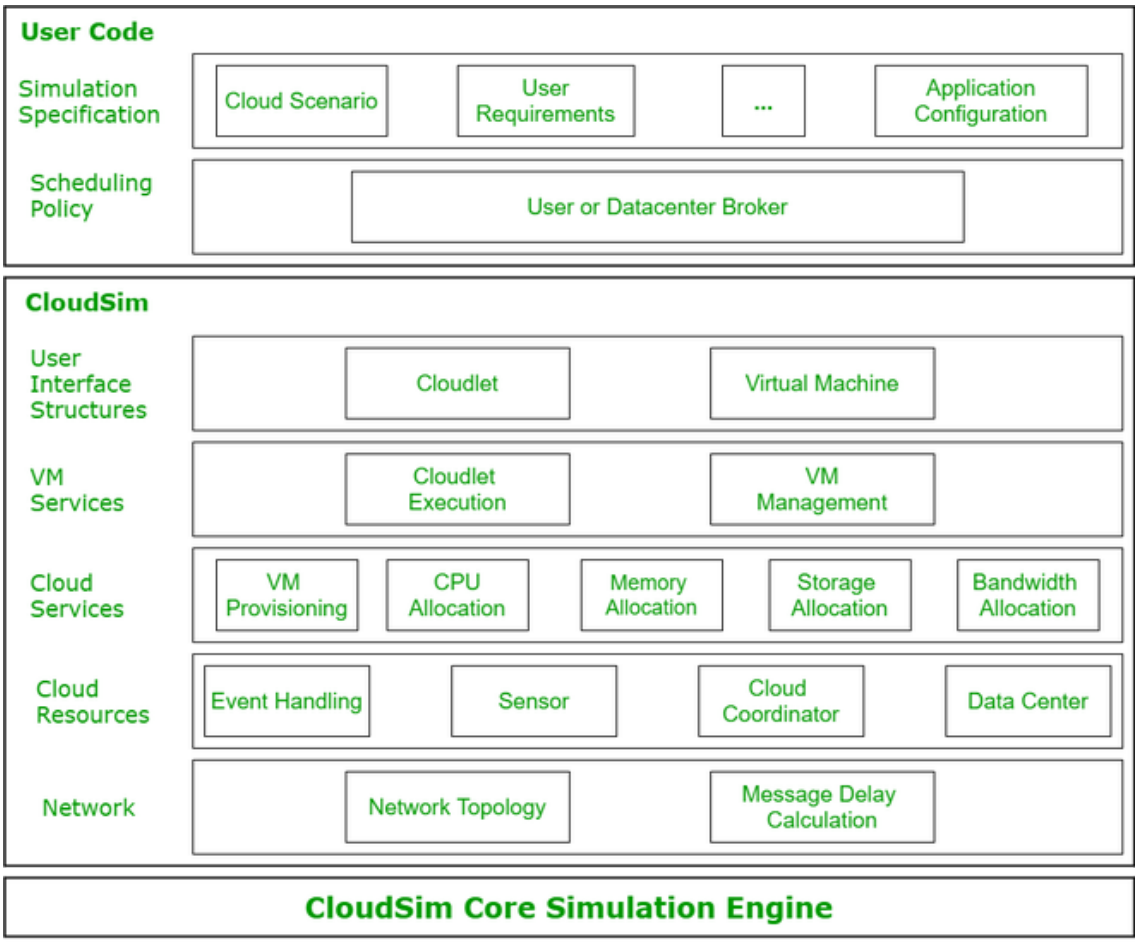
21.Why use CloudSim?

Below are a few reasons to opt for CloudSim:

- Open source and free of cost, so it favours researchers/developers working in the field.

- Easy to download and set-up.
- It is more generalized and extensible to support modelling and experimentation.
- Does not require any high-specs computer to work on.
- Provides pre-defined allocation policies and utilization models for managing resources, and allows implementation of user-defined algorithms as well.
- The documentation provides pre-coded examples for new developers to get familiar with the basic classes and functions.
- Tackle bottlenecks before deployment to reduce risk, lower costs, increase performance, and raise revenue.

CloudSim Architecture:



CloudSim Layered Architecture

CloudSim Core Simulation Engine provides interfaces for the management of resources such as VM, memory and bandwidth of virtualized Datacenters.

CloudSim layer manages the creation and execution of core entities such as VMs, Cloudlets, Hosts etc. It also handles network-related execution along with the provisioning of resources and their execution and management.
User Code is the layer controlled by the user. The developer can write the requirements of the hardware specifications in this layer according to the scenario.
Some of the most common classes used during simulation are:

- **Datacenter**: used for modelling the foundational hardware equipment of any cloud environment, that is the Datacenter. This class provides methods to specify the functional requirements of the Datacenter as well as methods to set the allocation policies of the VMs etc.
- **Host**: this class executes actions related to management of virtual machines. It also defines policies for provisioning memory and bandwidth to the virtual machines, as well as allocating CPU cores to the virtual machines.
- **VM**: this class represents a virtual machine by providing data members defining a VM's bandwidth, RAM, mips (million instructions per second), size while also providing setter and getter methods for these parameters.
- **Cloudlet**: a cloudlet class represents any task that is run on a VM, like a processing task, or a memory access task, or a file updating task etc. It stores parameters defining the characteristics of a task such as its length, size, mi (million instructions) and provides methods similarly to VM class while also providing methods that define a task's execution time, status, cost and history.
- **DatacenterBroker**: is an entity acting on behalf of the user/customer. It is responsible for functioning of VMs, including VM creation, management, destruction and submission of cloudlets to the VM.
- **CloudSim**: this is the class responsible for initializing and starting the simulation environment after all the necessary cloud entities have been defined and later stopping after all the entities have been destroyed.

Features of CloudSim:

CloudSim provides support for simulation and modelling of:

1. Large scale virtualized Datacenters, servers and hosts.
2. Customizable policies for provisioning host to virtual machines.
3. Energy-aware computational resources.
4. Application containers and federated clouds (joining and management of multiple public clouds).
5. Datacenter network topologies and message-passing applications.
6. Dynamic insertion of simulation entities with stop and resume of simulation.
7. User-defined allocation and provisioning policies.

Questions om cloud sim in below link

https://www.geeksforgeeks.org/what-is-cloudsim/