Practical -11

Installation of cloud sim.

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.

Why use 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.

Features of CloudSim:

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

Installation of CloudSim.

- Download JDK AND Eclipse
- **Installation:**
- **Prerequisites:**
- Knowledge of Core Java language features such as OOP and Collections.
  https://www.geeksforgeeks.org/collections-in-java-2/

- Basics of Cloud Computing.
- https://www.geeksforgeeks.org/cloud-computing/

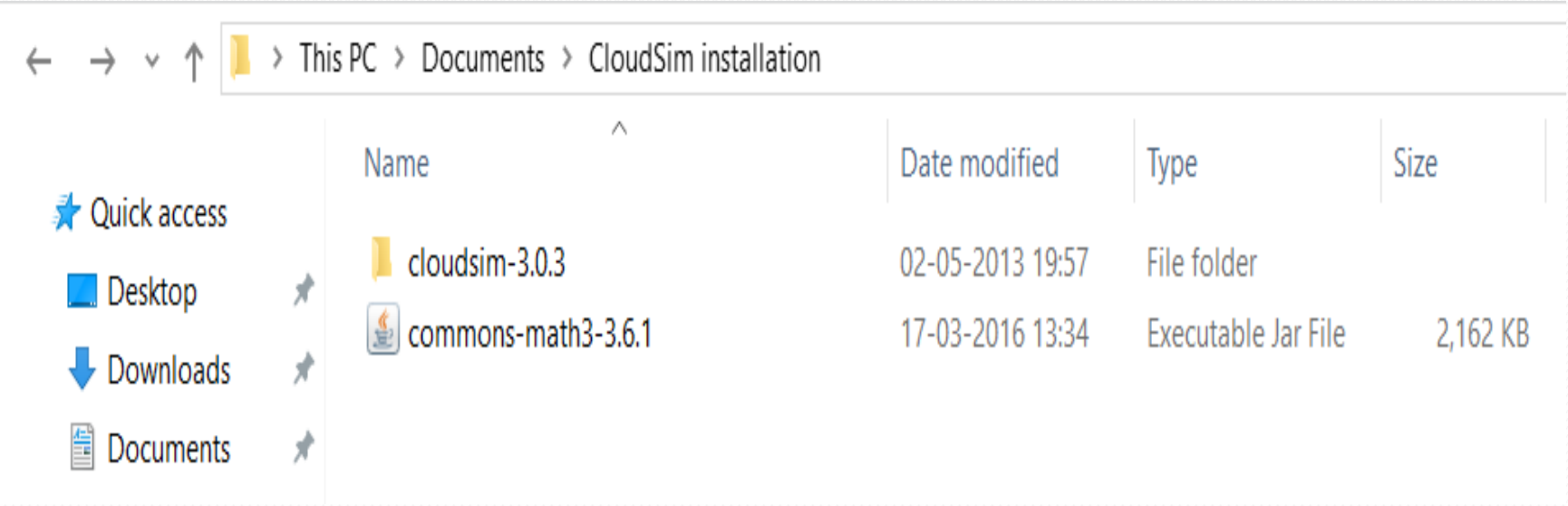
- CloudSim is available for download here.
  https://github.com/Cloudslab/cloudsim/releases.

- For this tutorial, we have downloaded zip file of CloudSim 3.0.3.

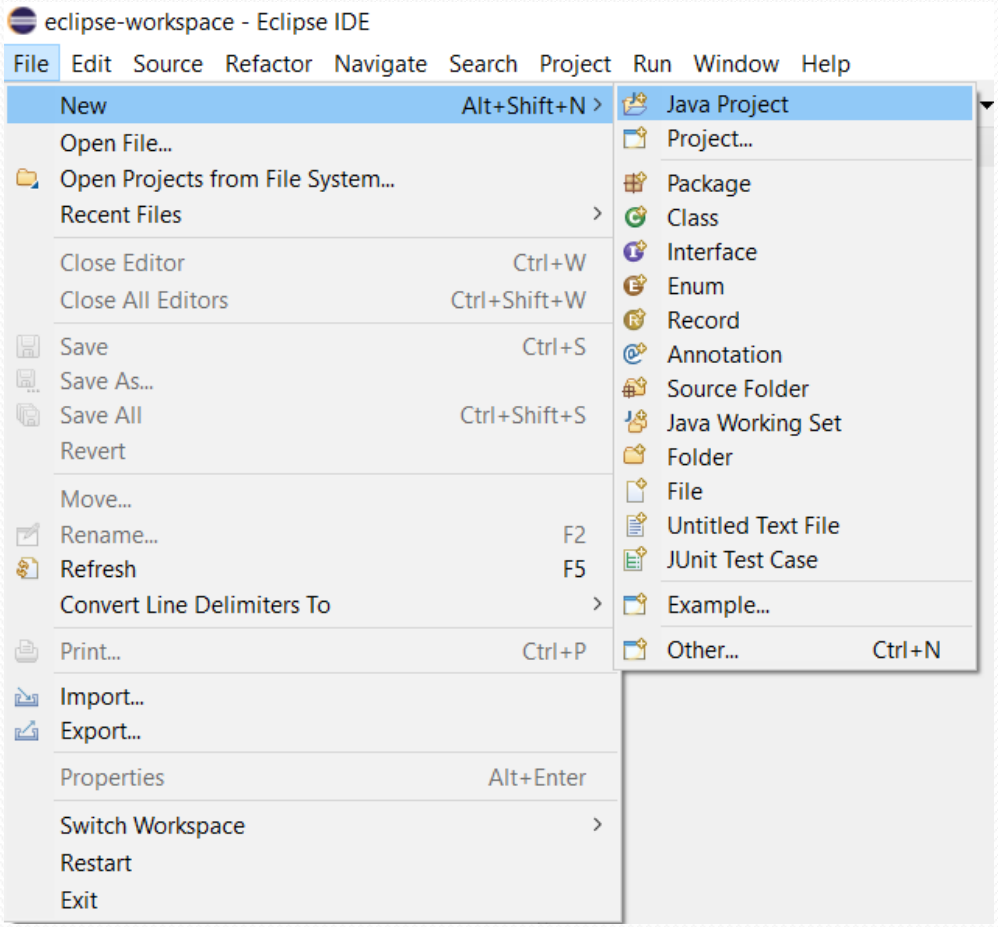
Installation of clousim.

- Note: CloudSim also uses some utilities of Apache's commons-math3 library. Download its Binaries zip file from here.
- https://commons.apache.org/proper/commons-math/download_math.cgi

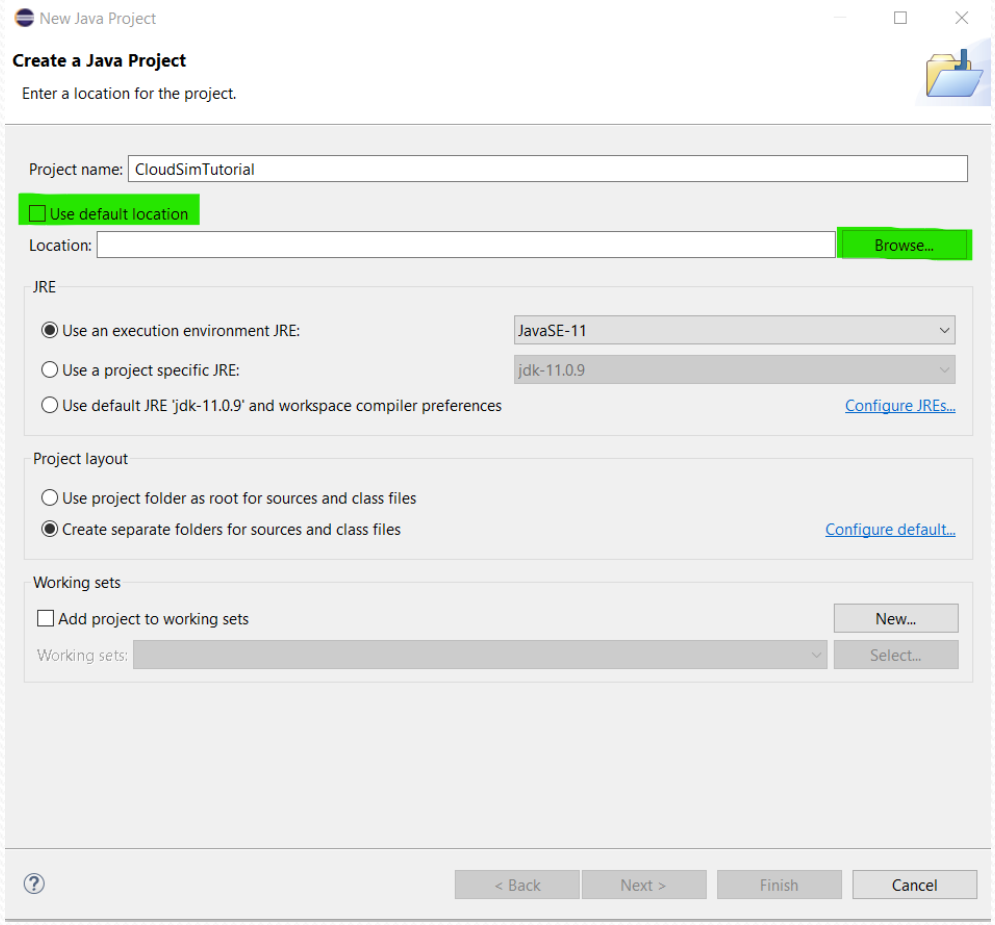
Step 1: From the zip folder extracts *cloudsim-3.0.3* into a folder. Also, extract the *commons-math3-3.6.1 jar* into the same folder.



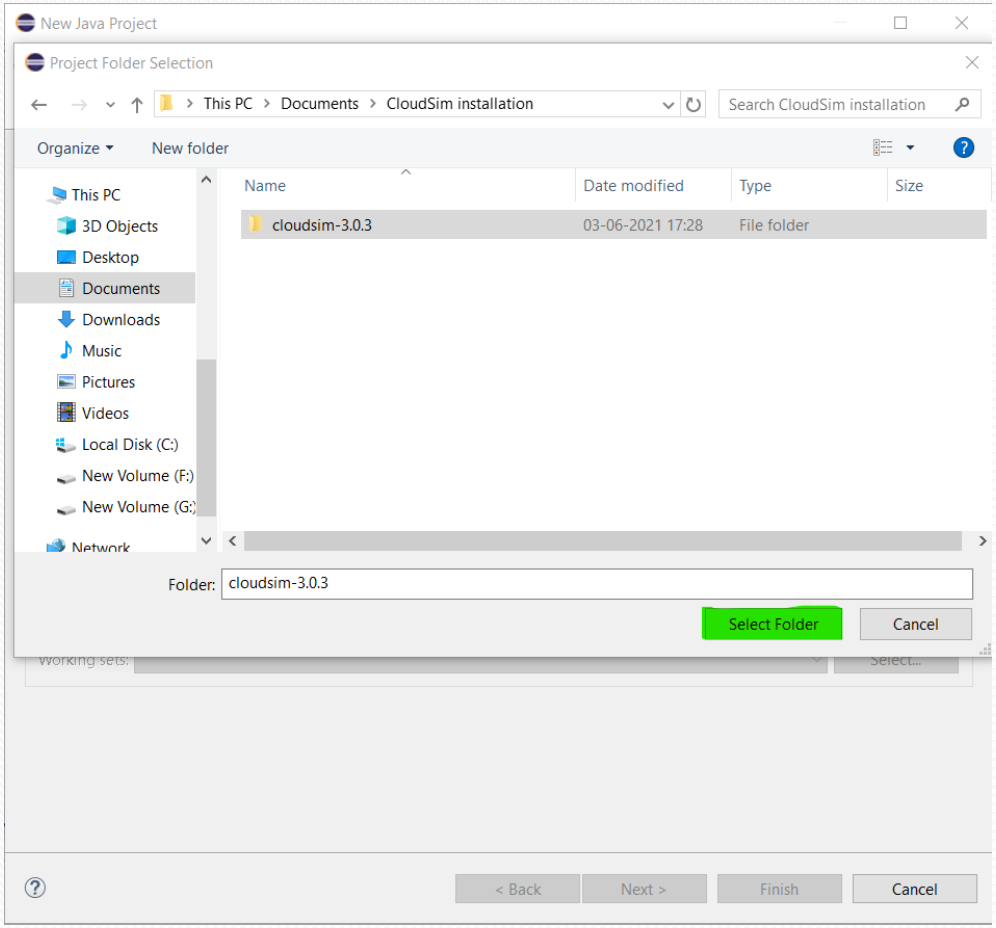
Step 2: Open Eclipse IDE and go to *File -> New -> Java Project.*



Step 3: Enter any name for your project and then uncheck the *Use default location* box just under it and click on *Browse*.



Browse to the folder where you extracted your files and select the *cloudsim-3.0.3* folder. Don't click on *Finish* yet, because we need to add a jar file to our project.



- **Step 4** Click *Next* and go to ***Libraries*** -> ***Add External JARs***. Now browse to the same folder where you extracted your *commons-math3* jar file and *Open* it.

New Java Project

Java Settings

Define the Java build settings.

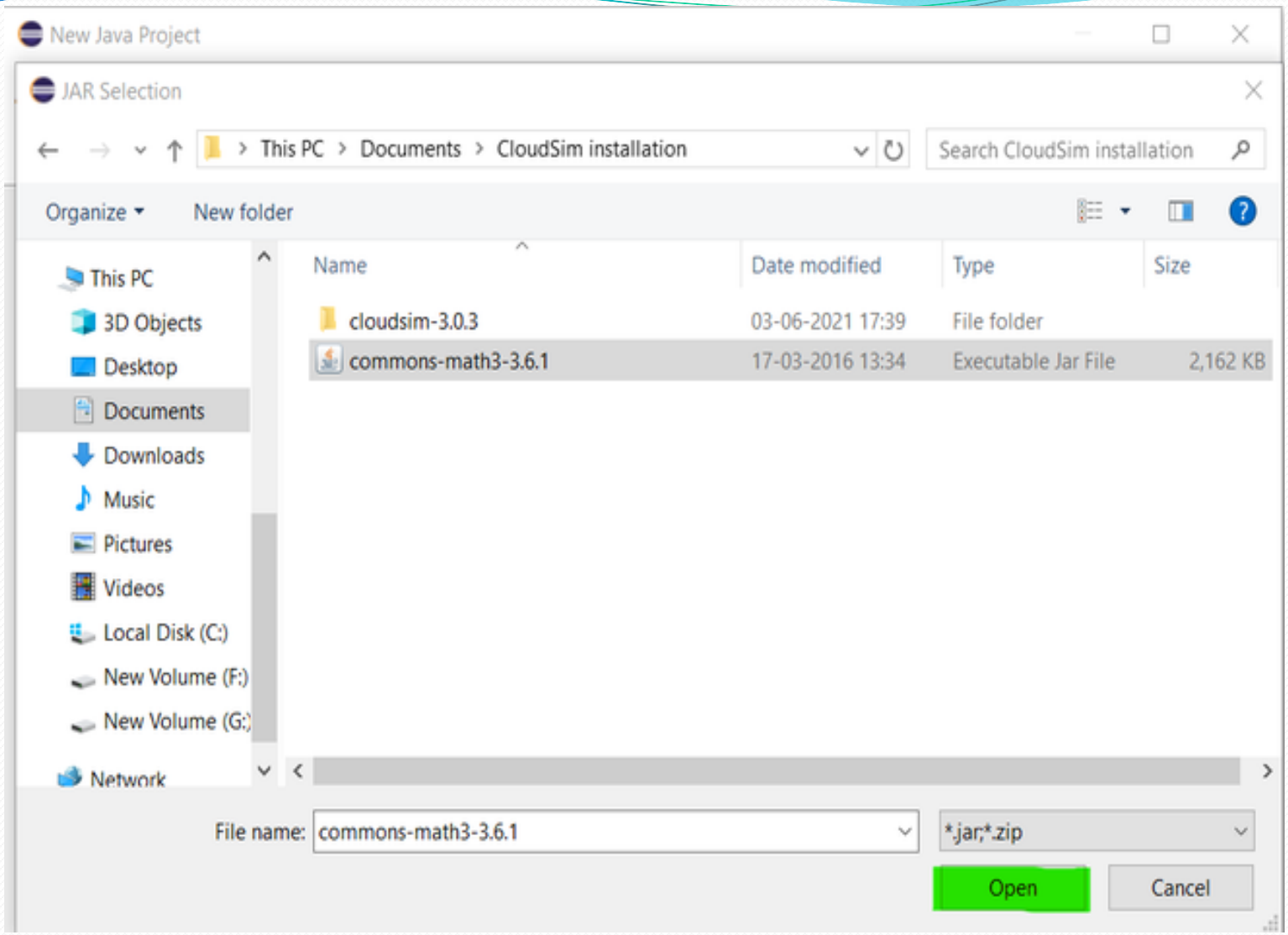
Source | Projects | Libraries | Order and Export | Module Dependencies

JARs and class folders on the build path:

- cloudsim-3.0.3.jar - CloudSimTutorial/jars
- cloudsim-3.0.3-sources.jar - CloudSimTutorial/jars
- cloudsim-examples-3.0.3.jar - CloudSimTutorial/jars
- cloudsim-examples-3.0.3-sources.jar - CloudSimTutorial/jars
- JRE System Library [jdk-11.0.9]

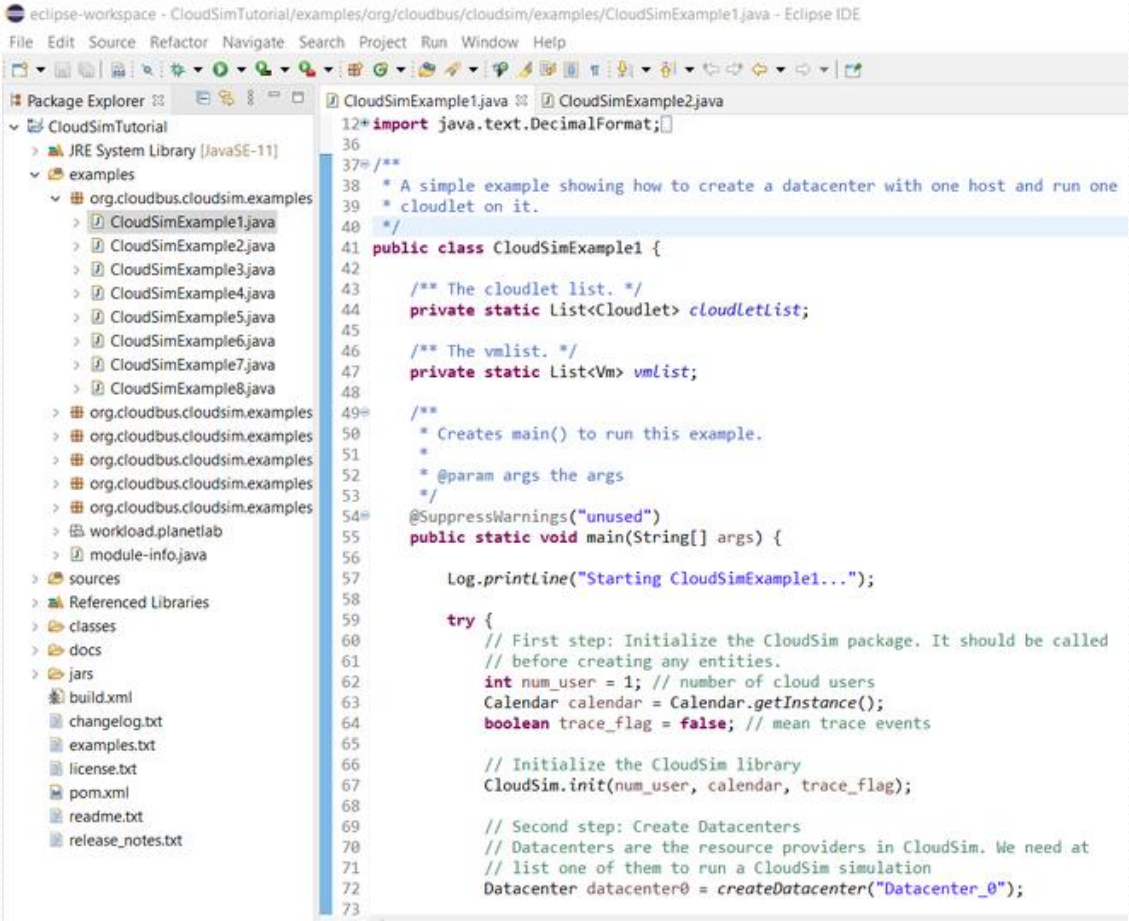
Add JARs...
Add External JARs...
Add Variable...
Add Library...
Add Class Folder...
Add External Class Folder...
Edit...
Remove
Migrate JAR File...

< Back | Next > | Finish | Cancel


New Java Project
JAR Selection
This PC > Documents > CloudSim installation
Search CloudSim installation
Organize
New folder
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Local Disk (C:)
New Volume (F:)
New Volume (G:)
Network
Name
Date modified
Type
Size
cloudsim-3.0.3
03-06-2021 17:39
File folder
commons-math3-3.6.1
17-03-2016 13:34
Executable Jar File
2,162 KB
File name:
commons-math3-3.6.1
.jar;.zip
Open
Cancel

Step 5 - Finally click on *Finish* and wait for the project to build. After the project has been built, from the *Project Explorer* you can click on your project and from the dropdown go-to *examples* -> *org.cloudbus.cloudsim.examples* where you can find pre-written sample codes and try to run them.

Step 5 Finally click on *Finish* and wait for the project to build. After the project has been built, from the *Project Explorer* you can click on your project and from the dropdown go-to *examples -> org.cloudbus.cloudsim.examples* where you can find pre-written sample codes and try to run them.



Download the examples.

- **References:**
- http://www.cloudbus.org/cloudsim/

Some of the most common classes used during simulation are:

- 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.

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Thanks