DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING
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Experiment 1.3

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Semester: 6th **Date of Performance:31/01/24**
Subject Name: CC and DS Lab **Subject Code: 21CSP-378**

1. **Aim:** Installation of Cloud Sim tool and IDE.

2. **Objective:** To successfully install and configure Cloud Sim, a cloud computing simulation tool, along with the Integrated Development Environment (IDE) necessary for development and experimentation purposes, ensuring seamless functionality and usability for simulating cloud environments and conducting related research or educational activities.

3. **Theory:**

About Cloud Sim:

CloudSim is a simulation toolkit that supports the modeling and simulation of the core functionality of the cloud, like job/task queue, processing of events, creation of cloud entities(datacenter, datacenter brokers, etc), communication between different entities, implementation of broker policies, etc.
This toolkit allows to:
Test application services in a repeatable and controllable environment.
Tune the system bottlenecks before deploying apps in an actual cloud.
Experiment with different workload mix and resource performance scenarios on simulated infrastructure for developing and testing adaptive application provisioning techniques.

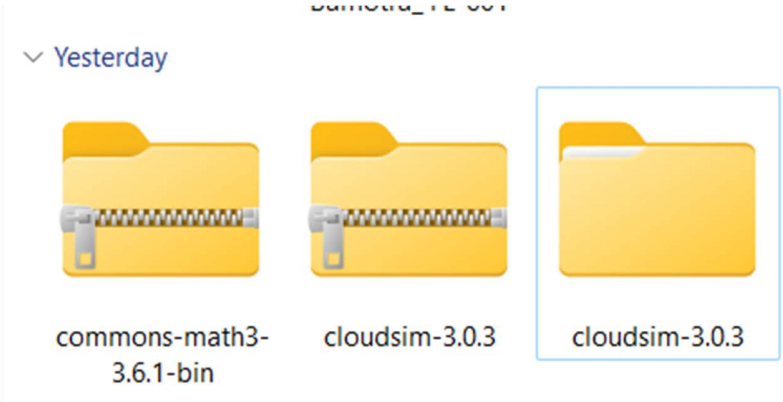
The core features of CloudSim: The Support of modeling and simulation of large-scale computing environments as federated cloud data centers, and virtualized server hosts, with

customizable policies for provisioning host resources to virtual machines and energy-aware computational resources.
• It is a self-contained platform for modeling cloud service brokers, provisioning, and allocation policies.
• It supports the simulation of network connections among simulated system elements.
• Support for simulation of federated cloud environment, that inter-networks resources from both private and public domains.
• Availability of a virtualization engine that aids in the creation and management of multiple independent and co-hosted virtual services on a data center node.
• Flexibility to switch between the space-shared and time-shared allocation of processing cores to virtualized services.

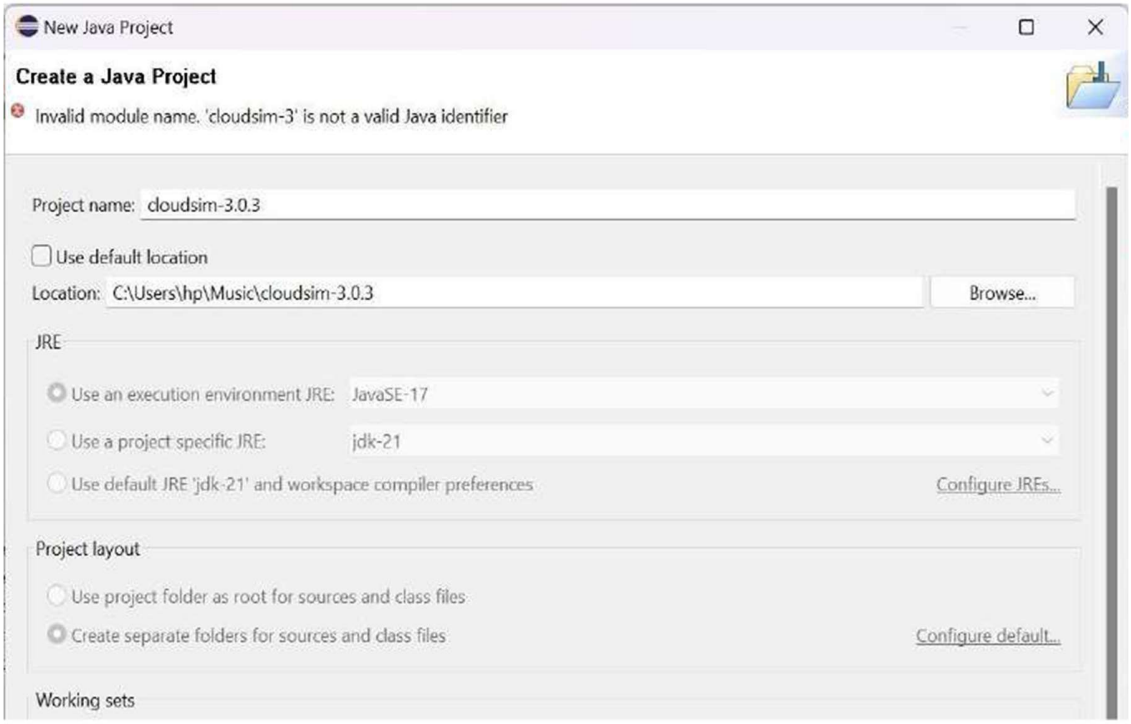
4. Procedure:

Before to set up CloudSim, the following resources must be Installed/downloaded on the local system:

Step 1. Java Development Kit (JDK): As the Cloudsim simulation toolkit is a class library written in the Java programming language, therefore, the latest version of Java (JDK) should be installed on your machine, which can be downloaded from Oracles Java portal. For assistance in the installation process, detailed documentation is provided by Oracle itself and you may follow the installation instructions.

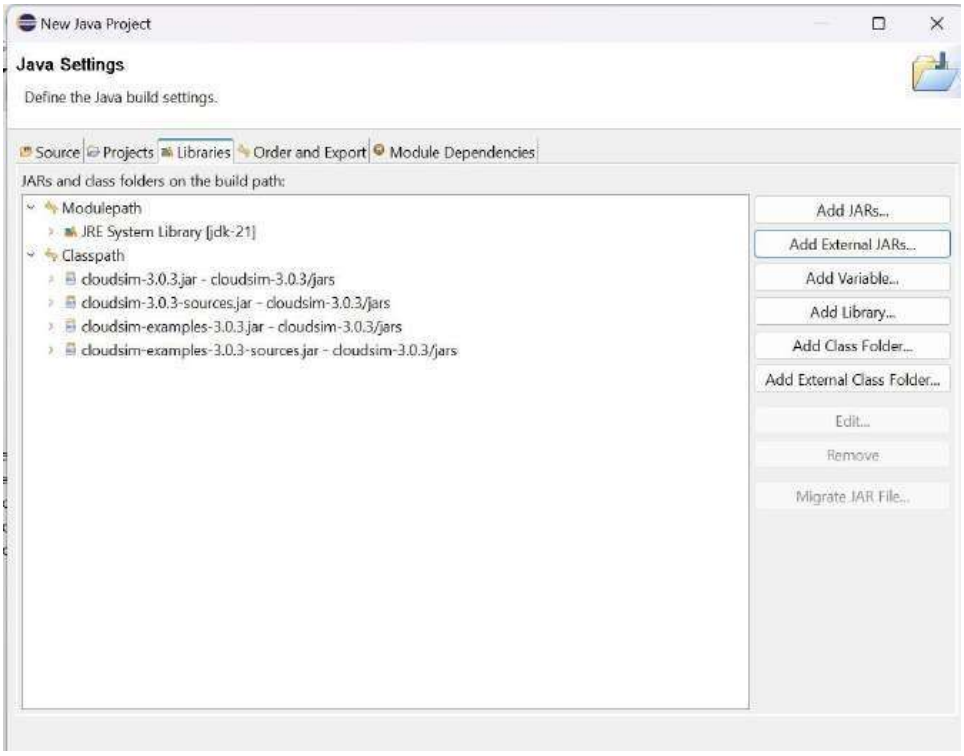


Step 2. Eclipse IDE for Java developers: As per your current installed operating system (Linux/Windows). Before you download make sure to check if the 32-bit or 64-bit version is applicable to your Computer machine.

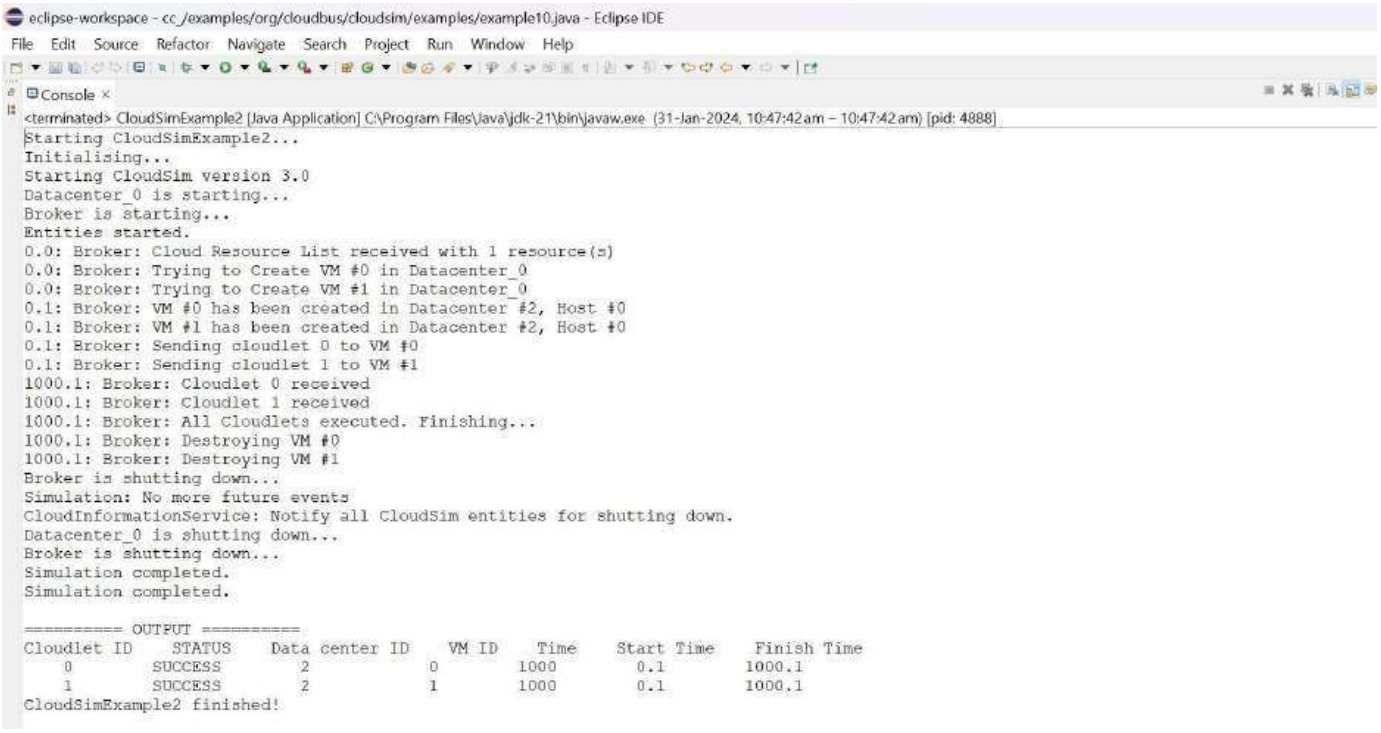


Step 3. Download CloudSim source code: To date, various versions of CloudSim are released the latest version is 5.0, which is based on a container-based engine. Whereas to keep the setup simple for beginners we will be setting up the most used version i.e. 3.0.3

Step 4. One external requirement of Cloudsim i.e. common jar package of math-related functions is to be downloaded from the Apache website.


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:
Modulepath
JRE System Library [jdk-21]
Classpath
cloudsim-3.0.3.jar - cloudsim-3.0.3/jars
cloudsim-3.0.3-sources.jar - cloudsim-3.0.3/jars
cloudsim-examples-3.0.3.jar - cloudsim-3.0.3/jars
cloudsim-examples-3.0.3-sources.jar - cloudsim-3.0.3/jars
Add JARs...
Add External JARs...
Add Variable...
Add Library...
Add Class Folder...
Add External Class Folder...
Edit...
Remove
Migrate JAR File...

5. Output:


eclipse-workspace - cc_/examples/org/cloudbus/cloudsim/examples/example10.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Console
<terminated> CloudSimExample2 [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (31-Jan-2024, 10:47:42 am – 10:47:42 am) [pid: 4888]
Starting CloudSimExample2...
Initialising...
Starting CloudSim version 3.0
Datacenter_0 is starting...
Broker is starting...
Entities started.
0.0: Broker: Cloud Resource List received with 1 resource(s)
0.0: Broker: Trying to Create VM #0 in Datacenter_0
0.0: Broker: Trying to Create VM #1 in Datacenter_0
0.1: Broker: VM #0 has been created in Datacenter #2, Host #0
0.1: Broker: VM #1 has been created in Datacenter #2, Host #0
0.1: Broker: Sending cloudlet 0 to VM #0
0.1: Broker: Sending cloudlet 1 to VM #1
1000.1: Broker: Cloudlet 0 received
1000.1: Broker: Cloudlet 1 received
1000.1: Broker: All Cloudlets executed. Finishing...
1000.1: Broker: Destroying VM #0
1000.1: Broker: Destroying VM #1
Broker is shutting down...
Simulation: No more future events
CloudInformationService: Notify all CloudSim entities for shutting down.
Datacenter_0 is shutting down...
Broker is shutting down...
Simulation completed.
Simulation completed.
========== OUTPUT ==========
Cloudlet ID STATUS Data center ID VM ID Time Start Time Finish Time
0 SUCCESS 2 0 1000 0.1 1000.1
1 SUCCESS 2 1 1000 0.1 1000.1
CloudSimExample2 finished!

6. Learning Outcomes:

- Understand the importance and relevance of simulation tools in cloud computing environments.
- Gain proficiency in navigating the installation process for Cloud Sim tool and IDE on various operating systems (Windows, macOS, Linux).
- Develop the ability to troubleshoot common installation errors and issues that may arise during the installation process.
- Learn how to configure and set up the Cloud Sim tool and IDE to suit specific project requirements and simulation scenarios.