

Ex. No. 5

## **INSTALLATION AND CONFIGURATION OF CLOUDSIM IN ECLIPSE IDE**

### **AIM:**

To install and configure the CloudSim in Eclipse IDE and run a java program in it.

### **PROCEDURE:**

#### **1. Java Installation**

- a. Check java in your system.
- b. If java not installed then download Java.
- c. Install java setup.
- d. Set path variable for java.

#### **2. Download CloudSim and additional jar file**

- a. Download CloudSim 3.0.3
- b. Download Commons math 3 jar file.

#### **3. Eclipse IDE Installation**

- a. If java 64 bit Installed then download 64-bit Eclipse otherwise java 32 bit then download 32 eclipse.
- b. Install Eclipse IDE.

#### **4. Run CloudSim in Eclipse**

- a. Put up commons-math-3-3.6.1.jar file into jar folder of Cloudsim3.0.3
- b. Build a new java project with Cloudsim3.0.3 folder.

# cloudsim-3.0.3





## Changes from CloudSim 3.0.2 to CloudSim 3.0.3

### WHAT'S NEW

This is a bug fix and refactoring release. The following updates have been made:

- Removed the dependency on the flanagan library. It is now replaced with Apache Math. The implementation and interface of the MathUtil has been changed accordingly.
- The minimal time between events is now configurable.
- Fixed Issue 44 : UtilizationModelPlanetLabInMemory: use a global constant to define the size of the data field: a new constructor for the classes, allowing definition of data size, was added.
- Fixed Issue 49 : Wrong calculation of debt during migrationL: all references to debt from Datacenter and its subclasses were removed.

#### ▼ Assets 4

 cloudsim-3.0.3.tar.gz	9.9 MB	Mar 19, 2015
 cloudsim-3.0.3.zip	13.1 MB	Mar 19, 2015
 Source code (zip)		May 2, 2013
 Source code (tar.gz)		May 2, 2013

Download the .zip file

MATH

Overview

Downloads

Latest API docs (development)

Javadoc (4.0-beta1 release)

Javadoc (3.6.1 release)

Issue Tracking

Source Repository (current)

Wiki

Developers Guide

Proposal

USER GUIDE

Contents

Overview

Statistics

Data Generation

Linear Algebra

Numerical Analysis

Special Functions

Utilities

Complex Numbers

Distributions

Fractions

Transform Methods

Geometry

Optimization

Curve Fitting

## Download Apache Commons Math

### Using a Mirror

We recommend you use a mirror to download our release builds, but you **must** [verify the integrity](#) of the downloaded files using signatures downloaded from our main distribution directories. Recent releases (48 hours) may not yet be available from all the mirrors.

You are currently using <https://d1cdn.apache.org/>. If you encounter a problem with this mirror, please select another mirror. If all mirrors are failing, there are *backup* mirrors (at the end of the mirrors list) that should be available.

Other mirrors:

It is essential that you [verify the integrity](#) of downloaded files, preferably using the **PGP** signature ( `*.asc` files); failing that using the **SHA512** hash ( `*.sha512` checksum files).

The **KEYS** file contains the public PGP keys used by Apache Commons developers to sign releases.

## Apache Commons Math 4.0-beta1 (requires Java 8+)










### Binaries






<a href="#">commons-math4-4.0-beta1-bin.tar.gz</a>	<a href="#">sha512</a>	<a href="#">pgp</a>
<a href="#">commons-math4-4.0-beta1-bin.zip</a>	<a href="#">sha512</a>	<a href="#">pgp</a>

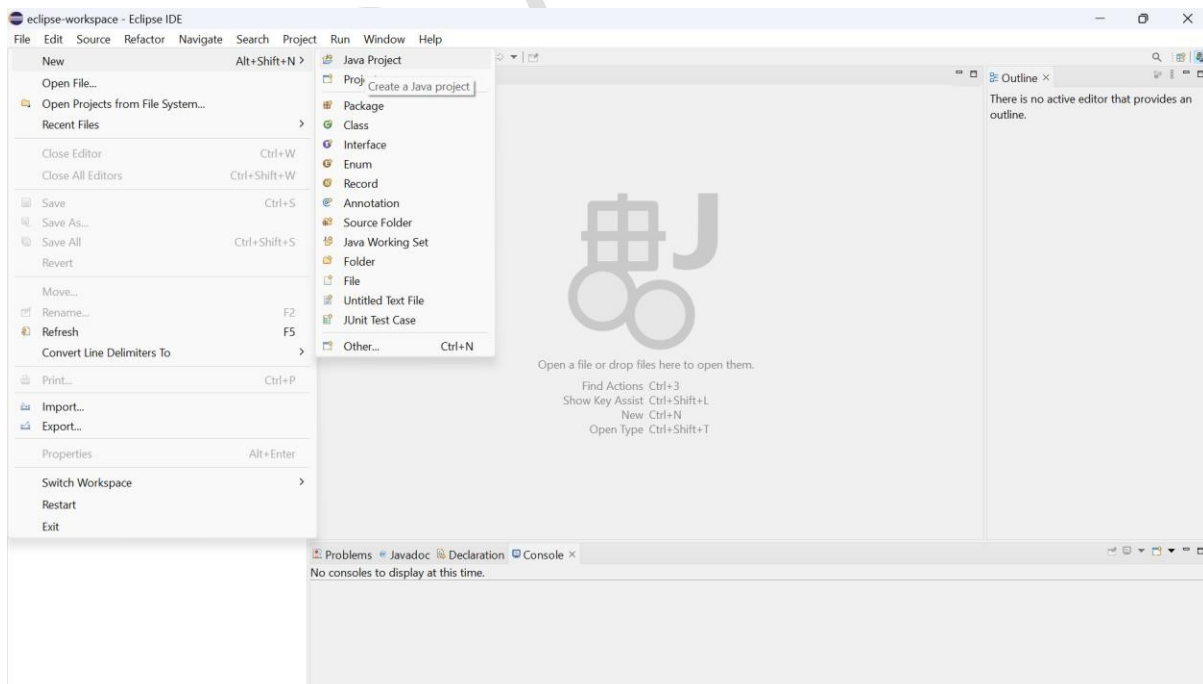
### Source

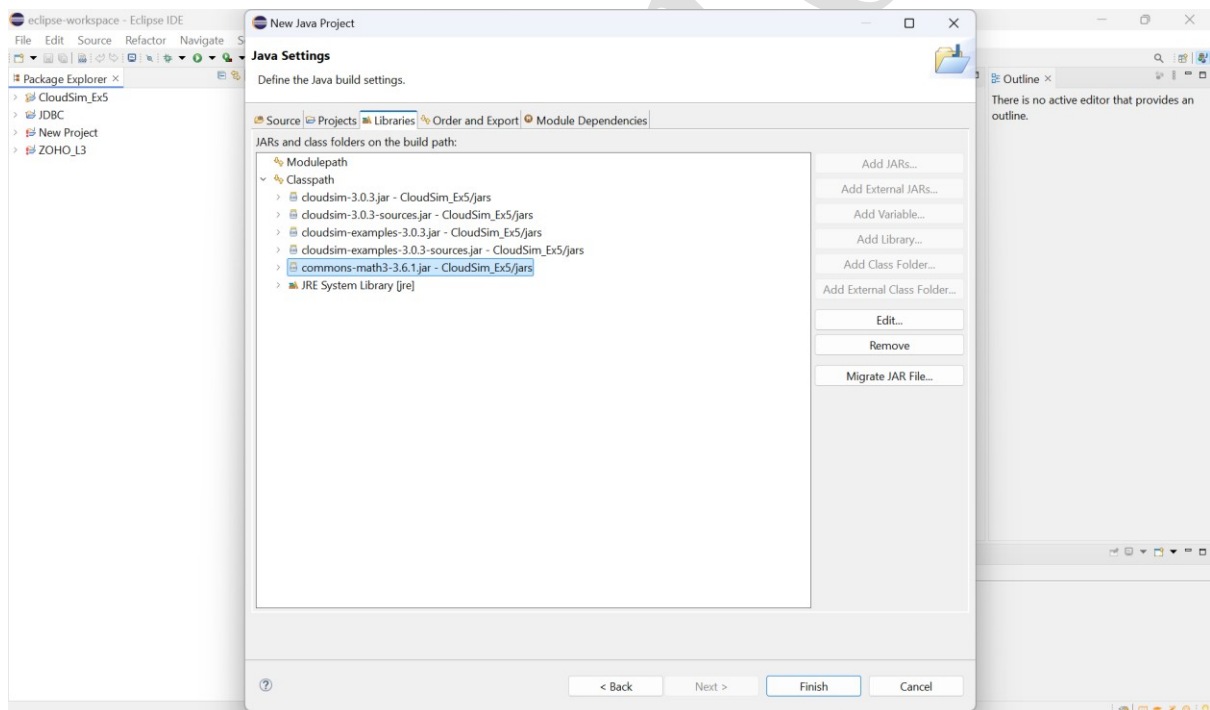
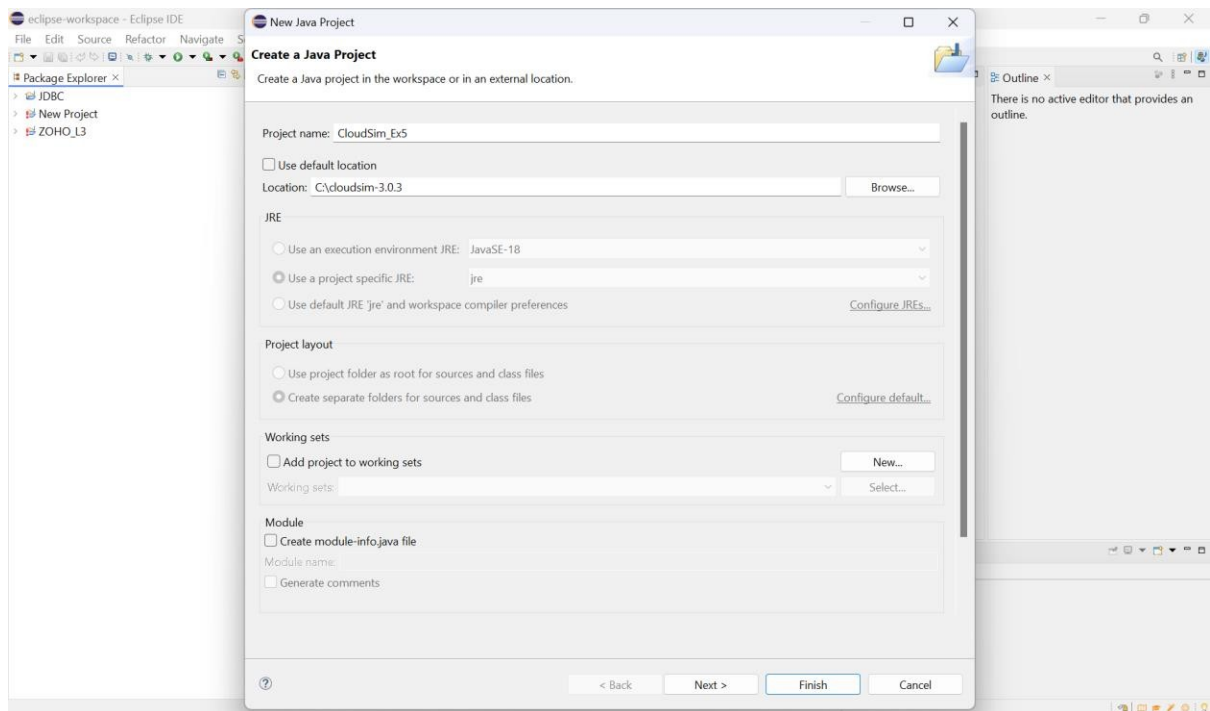
<a href="#">commons-math4-4.0-beta1-src.tar.gz</a>	<a href="#">sha512</a>	<a href="#">pgp</a>
--	------------------------	---------------------

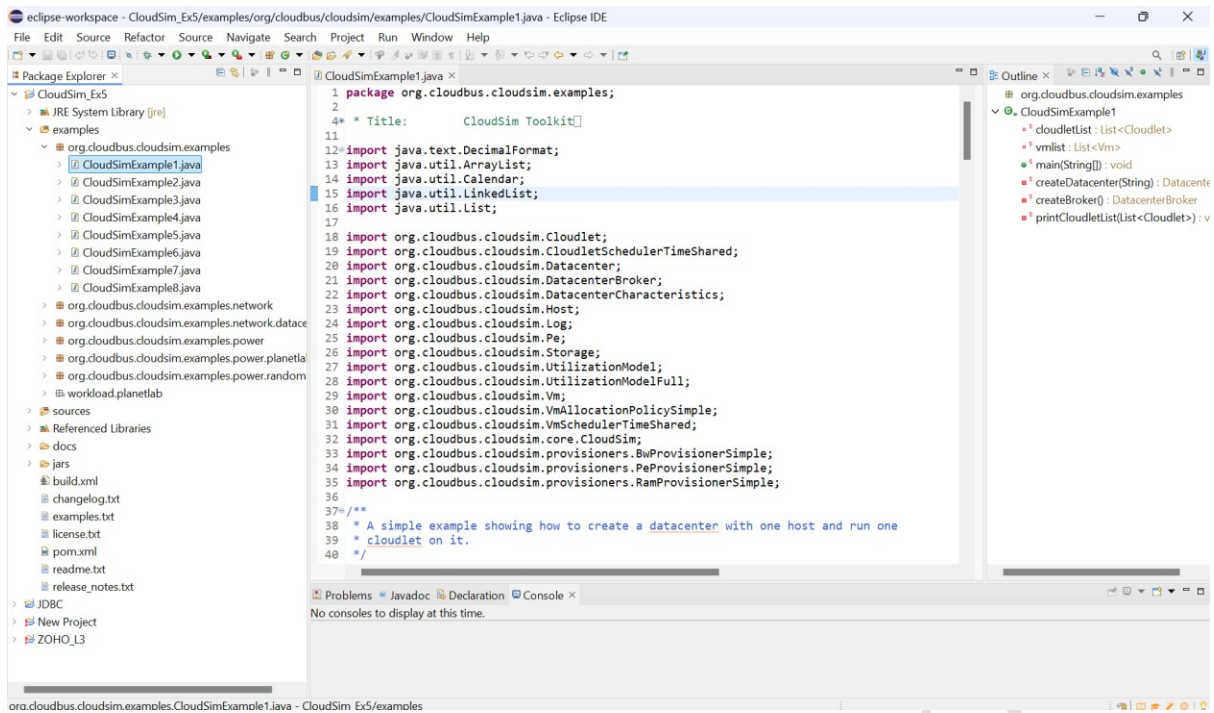
Download the .zip file

Name	Date modified	Type	Size
docs	17-03-2016 12:59	File folder	
 commons-math3-3.6.1	17-03-2016 13:34	Executable Jar File	2,162 KB
 commons-math3-3.6.1-javadoc	17-03-2016 13:34	Executable Jar File	6,680 KB
 commons-math3-3.6.1-sources	17-03-2016 12:59	Executable Jar File	2,456 KB
 commons-math3-3.6.1-tests	17-03-2016 12:59	Executable Jar File	2,906 KB
 commons-math3-3.6.1-test-sources	17-03-2016 12:59	Executable Jar File	1,914 KB
 commons-math3-3.6.1-tools	17-03-2016 13:27	Executable Jar File	12 KB
 LICENSE	19-02-2015 13:38	Text Document	24 KB
 NOTICE	16-03-2016 09:50	Text Document	1 KB
 RELEASE-NOTES	17-03-2016 11:17	Text Document	2 KB

Name	Date modified	Type	Size
 cloudsim-3.0.3	02-05-2013 19:56	Executable Jar File	241 KB
 cloudsim-3.0.3-sources	02-05-2013 19:56	Executable Jar File	232 KB
 cloudsim-examples-3.0.3	02-05-2013 19:56	Executable Jar File	4,953 KB
 cloudsim-examples-3.0.3-sources	02-05-2013 19:57	Executable Jar File	4,945 KB
 commons-math3-3.6.1	17-03-2016 13:34	Executable Jar File	2,162 KB







## PROGRAM:

```
package org.cloudbus.cloudsim.examples;

/* Title:      CloudSim Toolkit */

import java.text.DecimalFormat;
import java.util.ArrayList;
import java.util.Calendar;
import java.util.LinkedList;
import java.util.List;

import org.cloudbus.cloudsim.Cloudlet;
import org.cloudbus.cloudsim.CloudletSchedulerTimeShared;
import org.cloudbus.cloudsim.Datacenter;
import org.cloudbus.cloudsim.DatacenterBroker;
import org.cloudbus.cloudsim.DatacenterCharacteristics;
import org.cloudbus.cloudsim.Host;
import org.cloudbus.cloudsim.Log;
import org.cloudbus.cloudsim.Pe;
import org.cloudbus.cloudsim.Storage;
import org.cloudbus.cloudsim.UtilizationModel;
import org.cloudbus.cloudsim.UtilizationModelFull;
import org.cloudbus.cloudsim.Vm;
import org.cloudbus.cloudsim.VmAllocationPolicySimple;
import org.cloudbus.cloudsim.VmSchedulerTimeShared;
import org.cloudbus.cloudsim.core.CloudSim;
import org.cloudbus.cloudsim.provisioners.BwProvisionerSimple;
import org.cloudbus.cloudsim.provisioners.PeProvisionerSimple;
import org.cloudbus.cloudsim.provisioners.RamProvisionerSimple;

/**
 * A simple example showing how to create a datacenter with one host and run one
 * cloudlet on it.
 */
```



```

public class CloudSimExample1 {

    /** The cloudlet list. */
    private static List<Cloudlet> cloudletList;

    /** The vmList. */
    private static List<Vm> vmList;

    /**
     * Creates main() to run this example.
     *
     * @param args the args
     */
    @SuppressWarnings("unused")
    public static void main(String[] args) {

        Log.println("Starting CloudSimExample1...");

        try {
            // First step: Initialize the CloudSim package. It should be called
            // before creating any entities.
            int num_user = 1; // number of cloud users
            Calendar calendar = Calendar.getInstance();
            boolean trace_flag = false; // mean trace events

            // Initialize the CloudSim library
            CloudSim.init(num_user, calendar, trace_flag);

            // Second step: Create Datacenters
            // Datacenters are the resource providers in CloudSim. We need at
            // list one of them to run a CloudSim simulation
            Datacenter datacenter0 = createDatacenter("Datacenter_0");

            // Third step: Create Broker
            DatacenterBroker broker = createBroker();
            int brokerId = broker.getId();

            // Fourth step: Create one virtual machine
            vmList = new ArrayList<Vm>();

            // VM description
            int vmid = 0;
            int mips = 1000;
            long size = 10000; // image size (MB)
            int ram = 512; // vm memory (MB)
            long bw = 1000;
            int pesNumber = 1; // number of cpus
            String vmm = "Xen"; // VMM name

            // create VM
            Vm vm = new Vm(vmid, brokerId, mips, pesNumber, ram, bw, size, vmm, new Cloud

            // add the VM to the vmList
            vmList.add(vm);

            // submit vm list to the broker
            broker.submitVmList(vmList);

            // Fifth step: Create one Cloudlet
            cloudletList = new ArrayList<Cloudlet>();

            // Cloudlet properties
            int id = 0;
            long length = 400000;
            long fileSize = 300;
            long outputSize = 300;

```

```

UtilizationModel utilizationModel = new UtilizationModelFull();

Cloudlet cloudlet = new Cloudlet(id, length, pesNumber, fileSize, outputSize,
cloudlet.setUserId(brokerId);
cloudlet.setVmId(vmid);

// add the cloudlet to the list
cloudletList.add(cloudlet);

// submit cloudlet list to the broker
broker.submitCloudletList(cloudletList);

// Sixth step: Starts the simulation
CloudSim.startSimulation();

CloudSim.stopSimulation();

//Final step: Print results when simulation is over
List<Cloudlet> newList = broker.getCloudletReceivedList();
printCloudletList(newList);

Log.println("CloudSimExample1 finished!");
} catch (Exception e) {
    e.printStackTrace();
    Log.println("Unwanted errors happen");
}
}

/**
 * Creates the datacenter.
 *
 * @param name the name
 *
 * @return the datacenter
 */
private static Datacenter createDatacenter(String name) {

    // Here are the steps needed to create a PowerDatacenter:
    // 1. We need to create a list to store
    // our machine
    List<Host> hostList = new ArrayList<Host>();

    // 2. A Machine contains one or more PEs or CPUs/Cores.
    // In this example, it will have only one core.
    List<Pe> peList = new ArrayList<Pe>();

    int mips = 1000;

    // 3. Create PEs and add these into a list.
    peList.add(new Pe(0, new PeProvisionerSimple(mips))); // need to store Pe id and

    // 4. Create Host with its id and list of PEs and add them to the list
    // of machines
    int hostId = 0;
    int ram = 2048; // host memory (MB)
    long storage = 1000000; // host storage
    int bw = 10000;

    hostList.add(
        new Host(
            hostId,
            new RamProvisionerSimple(ram),
            new BwProvisionerSimple(bw),
            storage,
            peList,
            new VmSchedulerTimeShared(peList)

```

```

    )
    ); // This is our machine

    // 5. Create a DatacenterCharacteristics object that stores the
    // properties of a data center: architecture, OS, list of
    // Machines, allocation policy: time- or space-shared, time zone
    // and its price (G$/Pe time unit).
    String arch = "x86"; // system architecture
    String os = "Linux"; // operating system
    String vmm = "Xen";
    double time_zone = 10.0; // time zone this resource located
    double cost = 3.0; // the cost of using processing in this resource
    double costPerMem = 0.05; // the cost of using memory in this resource
    double costPerStorage = 0.001; // the cost of using storage in this
    // resource
    double costPerBw = 0.0; // the cost of using bw in this resource
    LinkedList<Storage> storageList = new LinkedList<Storage>(); // we are not adding
    // devices by now

    DatacenterCharacteristics characteristics = new DatacenterCharacteristics(
        arch, os, vmm, hostList, time_zone, cost, costPerMem,
        costPerStorage, costPerBw);

    // 6. Finally, we need to create a PowerDatacenter object.
    Datacenter datacenter = null;
    try {
        datacenter = new Datacenter(name, characteristics, new VmAllocationPolicySimp
    } catch (Exception e) {
        e.printStackTrace();
    }

    return datacenter;
}

// We strongly encourage users to develop their own broker policies, to
// submit vms and cloudlets according
// to the specific rules of the simulated scenario
/**
 * Creates the broker.
 *
 * @return the datacenter broker
 */
private static DatacenterBroker createBroker() {
    DatacenterBroker broker = null;
    try {
        broker = new DatacenterBroker("Broker");
    } catch (Exception e) {
        e.printStackTrace();
        return null;
    }
    return broker;
}

/**
 * Prints the Cloudlet objects.
 *
 * @param list list of Cloudlets
 */
private static void printCloudletList(List<Cloudlet> list) {
    int size = list.size();
    Cloudlet cloudlet;

    String indent = "    ";
    Log.println();
    Log.println("===== OUTPUT =====");
    Log.println("Cloudlet ID" + indent + "STATUS" + indent
        + "Data center ID" + indent + "VM ID" + indent + "Time" + indent

```



```

        + "Start Time" + indent + "Finish Time");

DecimalFormat dft = new DecimalFormat("###.##");
for (int i = 0; i < size; i++) {
    cloudlet = list.get(i);
    Log.print(indent + cloudlet.getCloudletId() + indent + indent);

    if (cloudlet.getCloudletStatus() == Cloudlet.SUCCESS) {
        Log.print("SUCCESS");

        Log.println(indent + indent + cloudlet.getResourceId()
            + indent + indent + indent + cloudlet.getVmId()
            + indent + indent
            + dft.format(cloudlet.getActualCPUTime()) + indent
            + indent + dft.format(cloudlet.getExecStartTime())
            + indent + indent
            + dft.format(cloudlet.getFinishTime()));
    }
}
}
}
}

```

## OUTPUT:

```

Starting CloudSimExample1...
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
0.1: Broker: VM #0 has been created in Datacenter #2, Host #0
0.1: Broker: Sending cloudlet 0 to VM #0
400.1: Broker: Cloudlet 0 received
400.1: Broker: All Cloudlets executed. Finishing...
400.1: Broker: Destroying VM #0
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       400    0.1          400.1
CloudSimExample1 finished!

```

## RESULT:

Thus, the installation and configuration of CloudSim in Eclipse IDE has been successfully completed.