CloudSim: A Tutorial

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Course:
Simulation and Modeling Techniques

Instructor:
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Agenda

- Introduction to CloudSim
- Reasons for Learning CloudSim
- Prerequisites
- How to use CloudSim with Eclipse
- Sample example on CloudSim

CloudSim

- Motivation
  - provides a generalized and extensible simulation framework that enables modeling, simulation, and experimentation of emerging Cloud computing infrastructures and application services
- CloudSim is developed in the CLOUDS Laboratory, at the Computer Science and Software Engineering Department of the University of Melbourne.
- CloudSim Toolkit 3.0 released at Jan 13, 2012

CloudSim Feature

- Support for modeling and simulation of large scale Cloud computing data centers
- Energy-aware computational resources
- Support for data center network topologies and message-passing applications
- Support for dynamic insertion of simulation elements, stop and resume of simulation
- Support for user-defined policies for allocation of hosts to virtual machines and policies for allocation of host resources to virtual machines

CloudSim Architecture

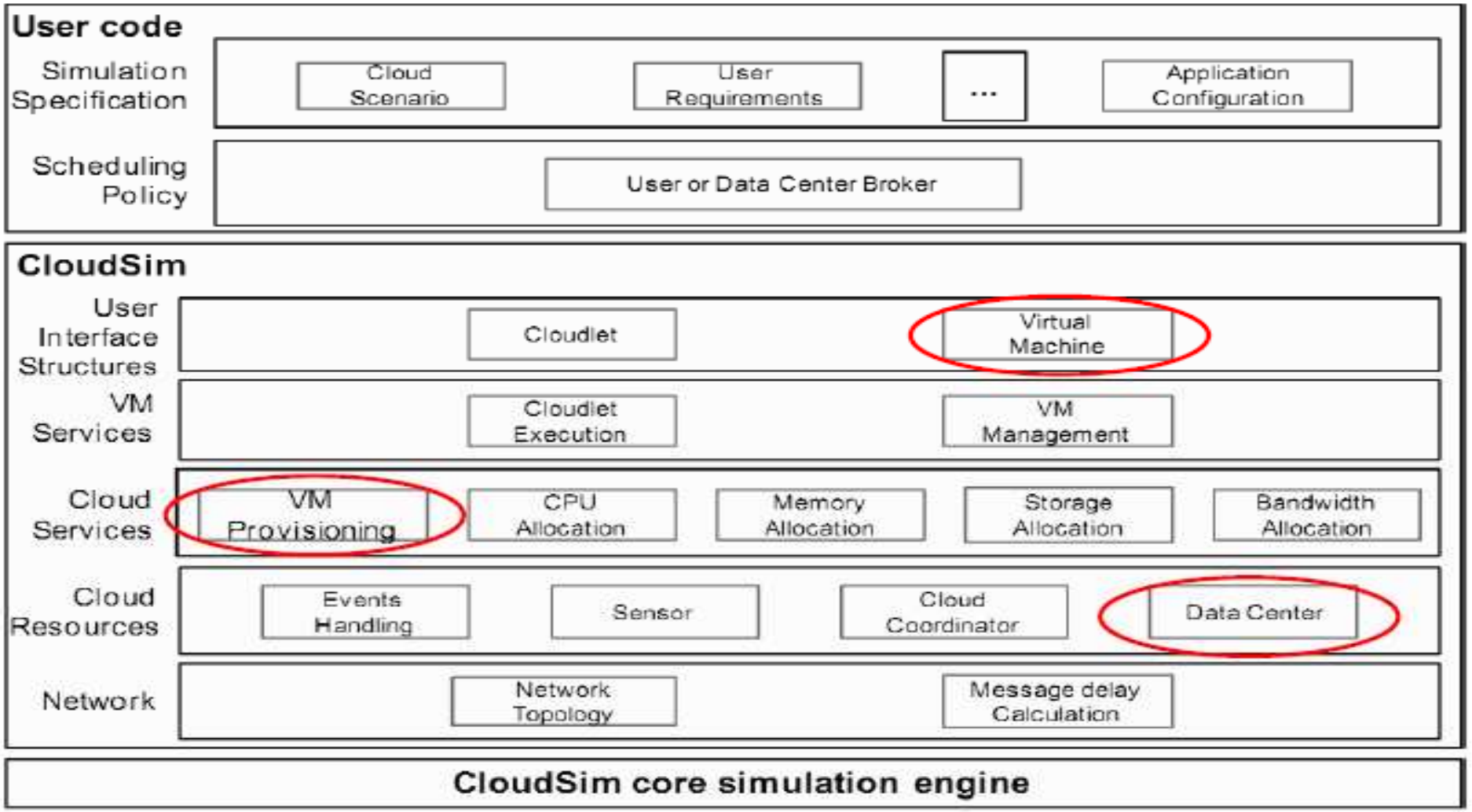


Figure 3. Layered CloudSim architecture.

Reasons for Learning CloudSim

- Cloud resource provisioning
- Energy-efficient management of data center resources
- Optimization of cloud computing
- Research activities
- Limitation: No Graphical User Interface (GUI)

Prerequisites

- We'll need at least basic understanding of how to program in Java
- We'll need some basic OOP concept

How to use CloudSim with Eclipse

- Part 1
  - Setting up Development Environments
- Part 2
  - Use Ecplise with CloudSim
- Part 3
  - Run sample example using CloudSim

Part 1: Setting up Development Environments

- Supported OS
  - Windows XP (32-bit), Vista (32- or 64-bit), or Windows 7 (32- or 64-bit)
  - Mac OS X 10.5.8 or later (x86 only)
  - Linux (tested on Ubuntu Linux, Lucid Lynx)
- Development environment (Eclipse based)
  - Eclipse Classic (versions 3.5.1 and higher)
  - JDK 1.6 or later
  - CloudSim tool kit

Part 1: Setting up Development Environments (cont.)

To set up the development environment, we need:

- Java Development Kit (1.6 is preferable)
- Eclipse IDE (classic)

Part 1: Setting up Development Environment(cont.)

- Java Development Kit (JDK) Download Link: http://www.oracle.com/technetwork/java/javase/downloads/index.html

Download JDK from here and Install JDK

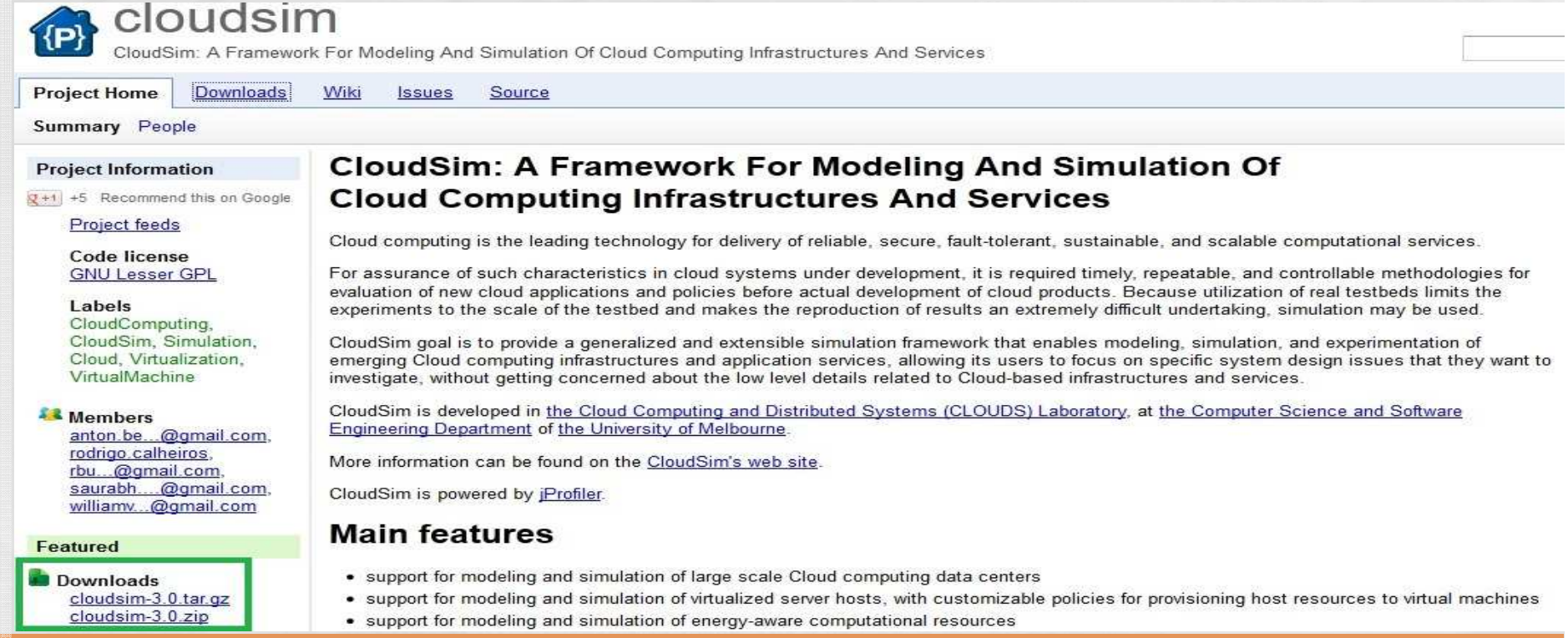
Setting up Development Environment(cont.)

- Eclipse IDE Download Link: http://www.eclipse.org/downloads/

Download the highlighted version of Eclipse IDE

Setting up Development Environment(cont.)

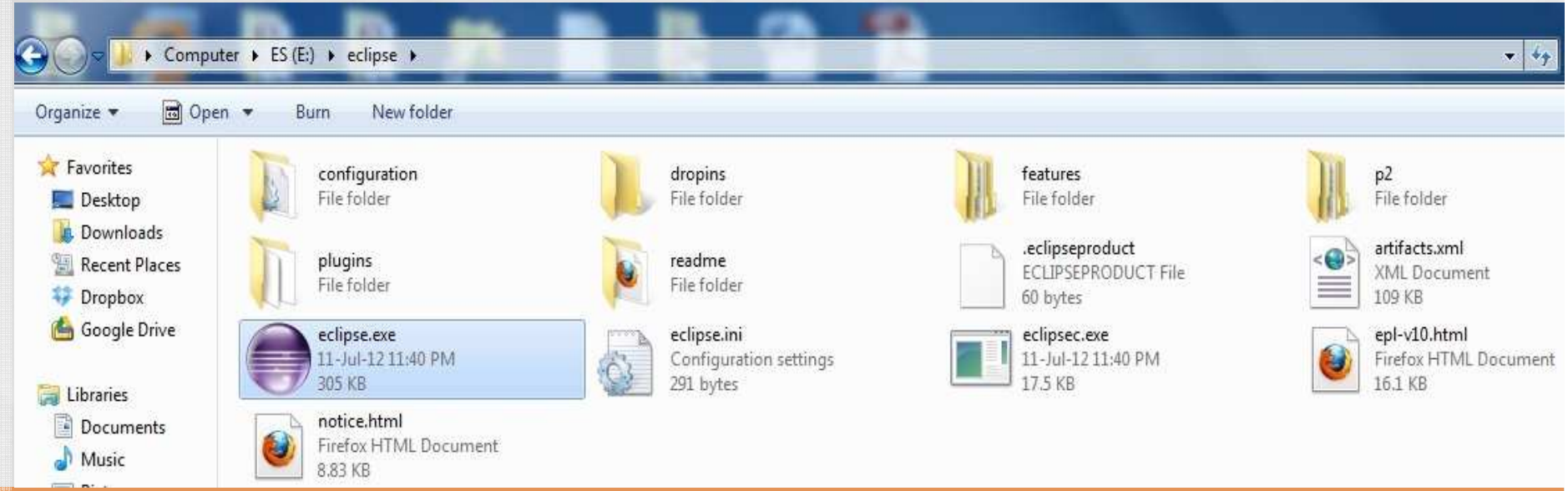
- CloudSim Tool Kit Download Link: http://code.google.com/p/cloudsim/downloads/detail?name=cloudsim-3.0.zip



Download the highlighted version of CloudSim

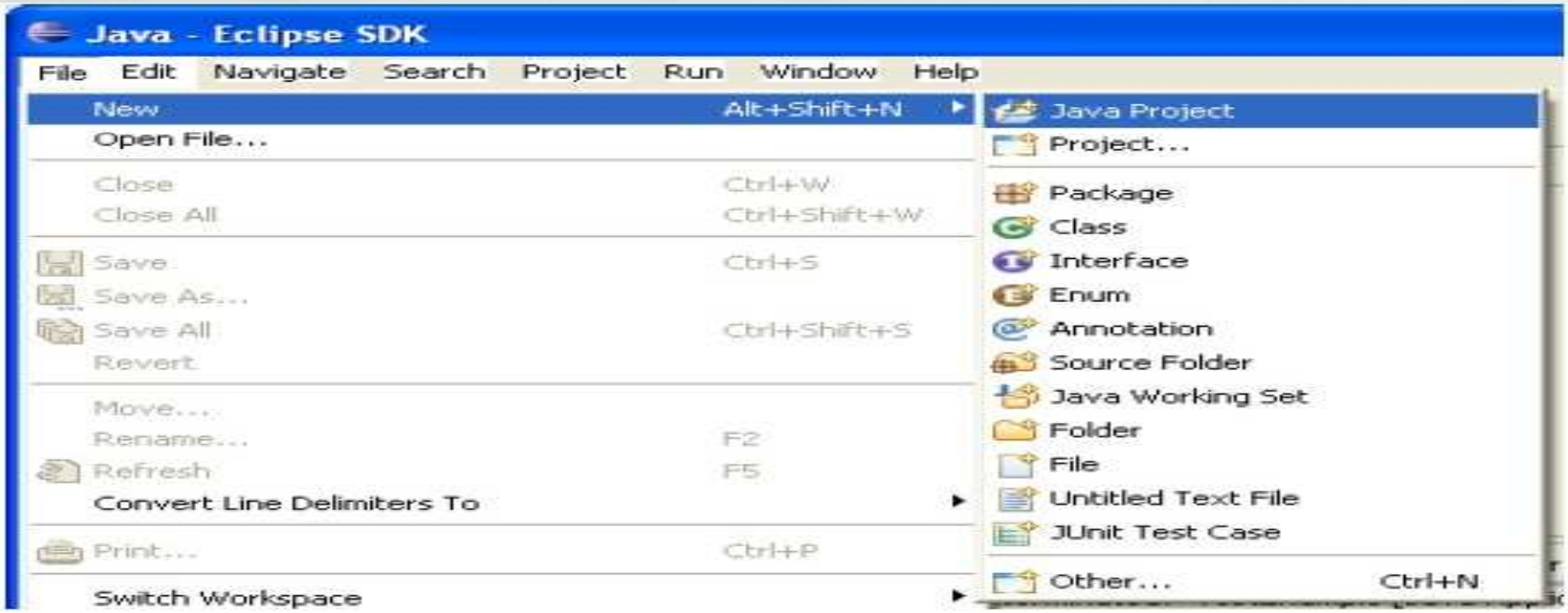
Part 2: How to use Eclipse with CloudSim

- Extract Ecplise (in my case: D:\eclipse)
- Extract cloudsim-3.0.zip (in my case C:\Users\Habib\Downloads)
- To run Ecplise, double click eclipse.exe



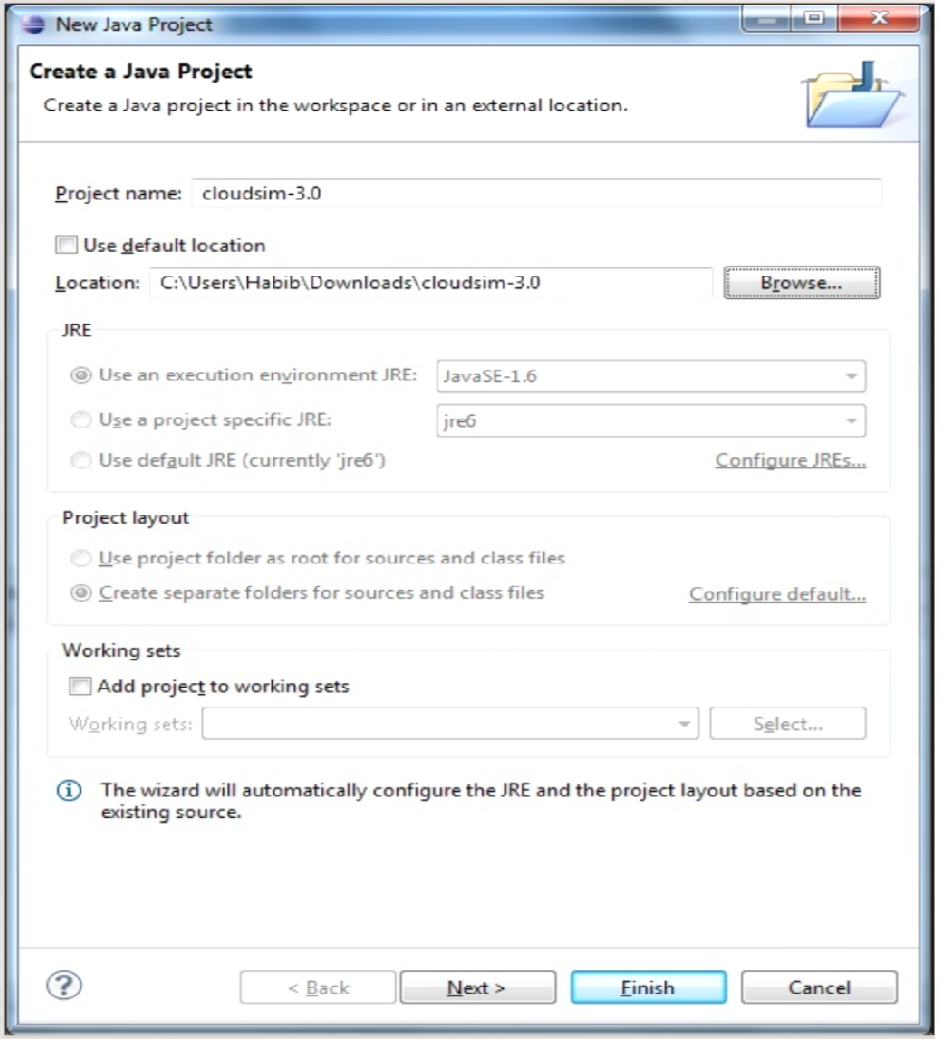
Part 2: How to use Eclipse with CloudSim

- OPEN ECLIPSE -> NEW -> JAVA PROJECT



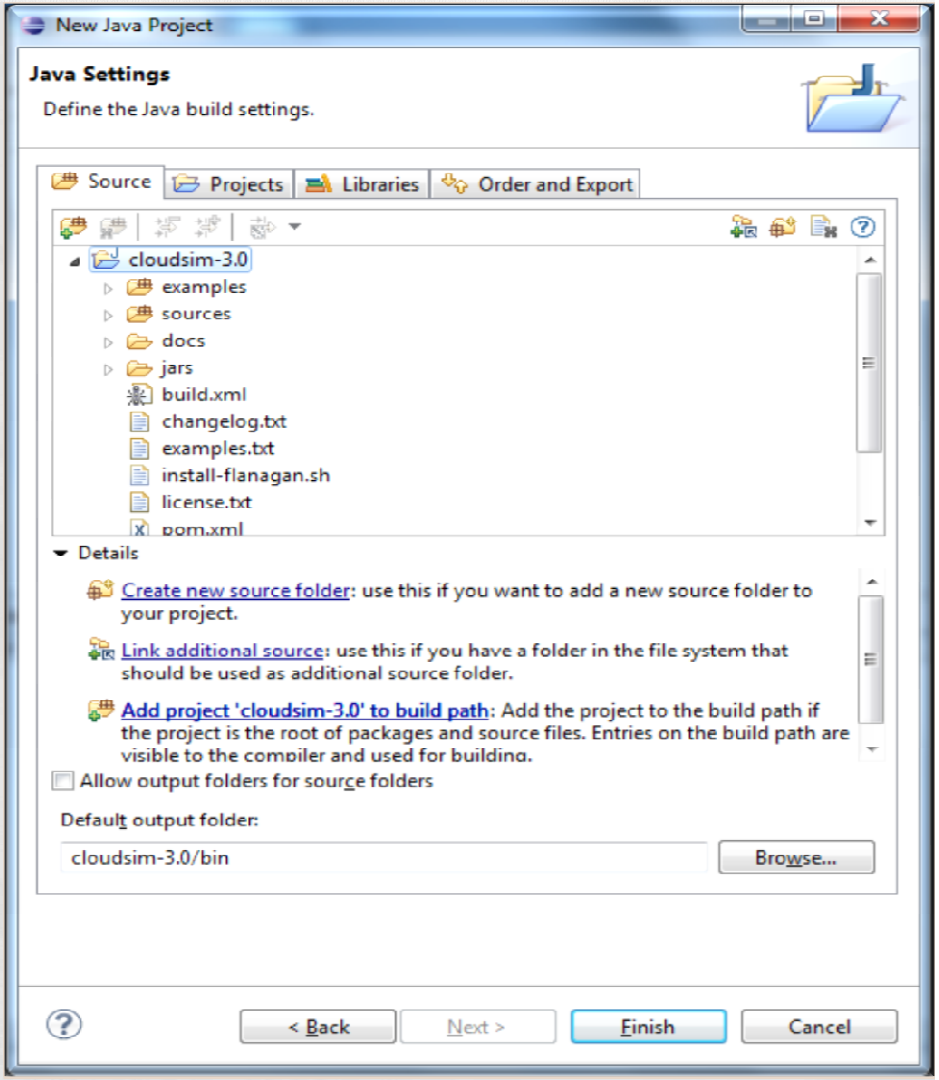
Part 2: How to use Eclipse with CloudSim

- Write the Project Name
- Untick the USE Default Location
- Browse and target it to where you extracted the CloudSim-3.0
- On JRE Select JavaSE-1.6 or JavaSE-1.7
- Project Layout second option
- Click Next



Part 2: How to use Eclipse with CloudSim

- Finally you got the RIGHT screen
- Select Finish

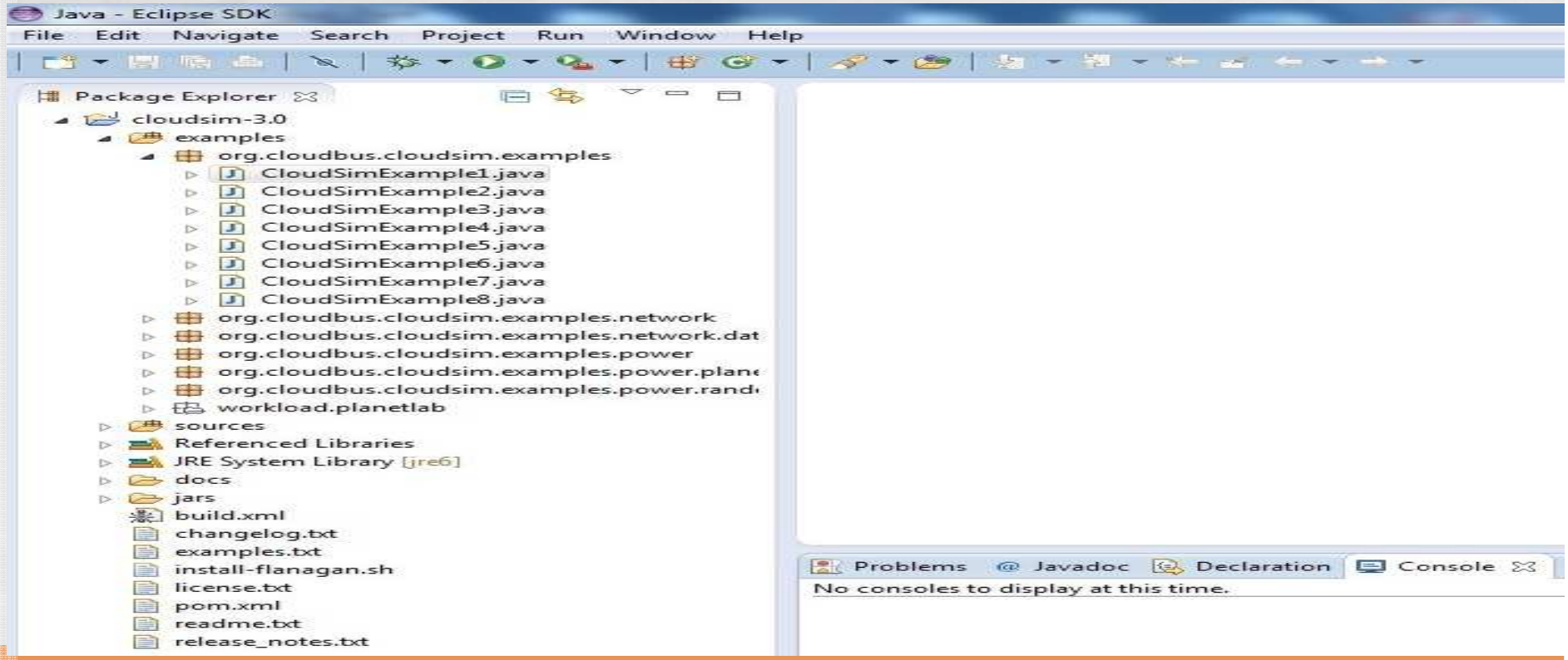


Part 3: Simulation Example

- CloudSimExample1.java : shows how to create a datacenter with one host and run one cloudlet on it
- CloudSimExample2.java : shows how to create a datacenter with one host and run two cloudlets on it

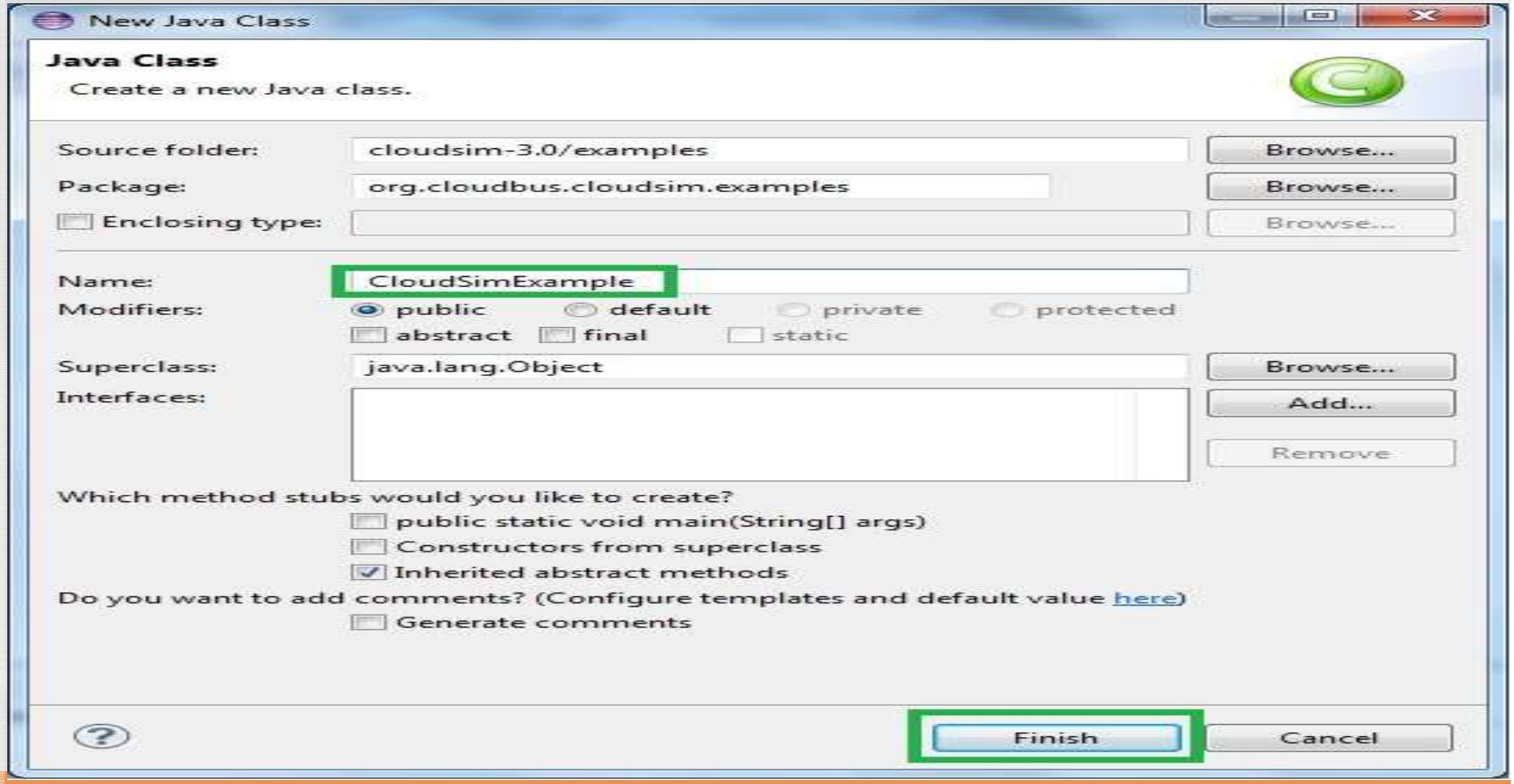
Step1: Run example using CloudSim

- To create class just right click from "org.cloudbus.cloudsim.examples", select "New" then "Class"



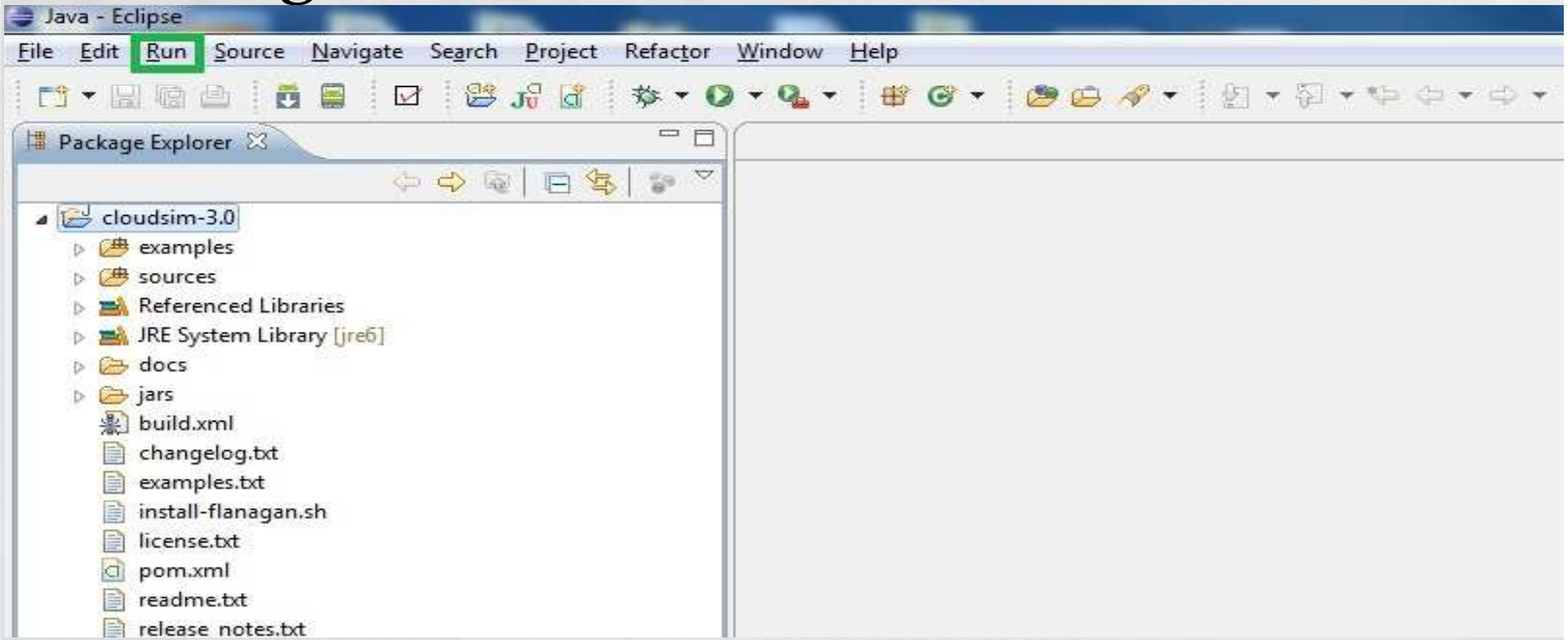
Step2: Run example using CloudSim

- Write Class name and click “Finish”



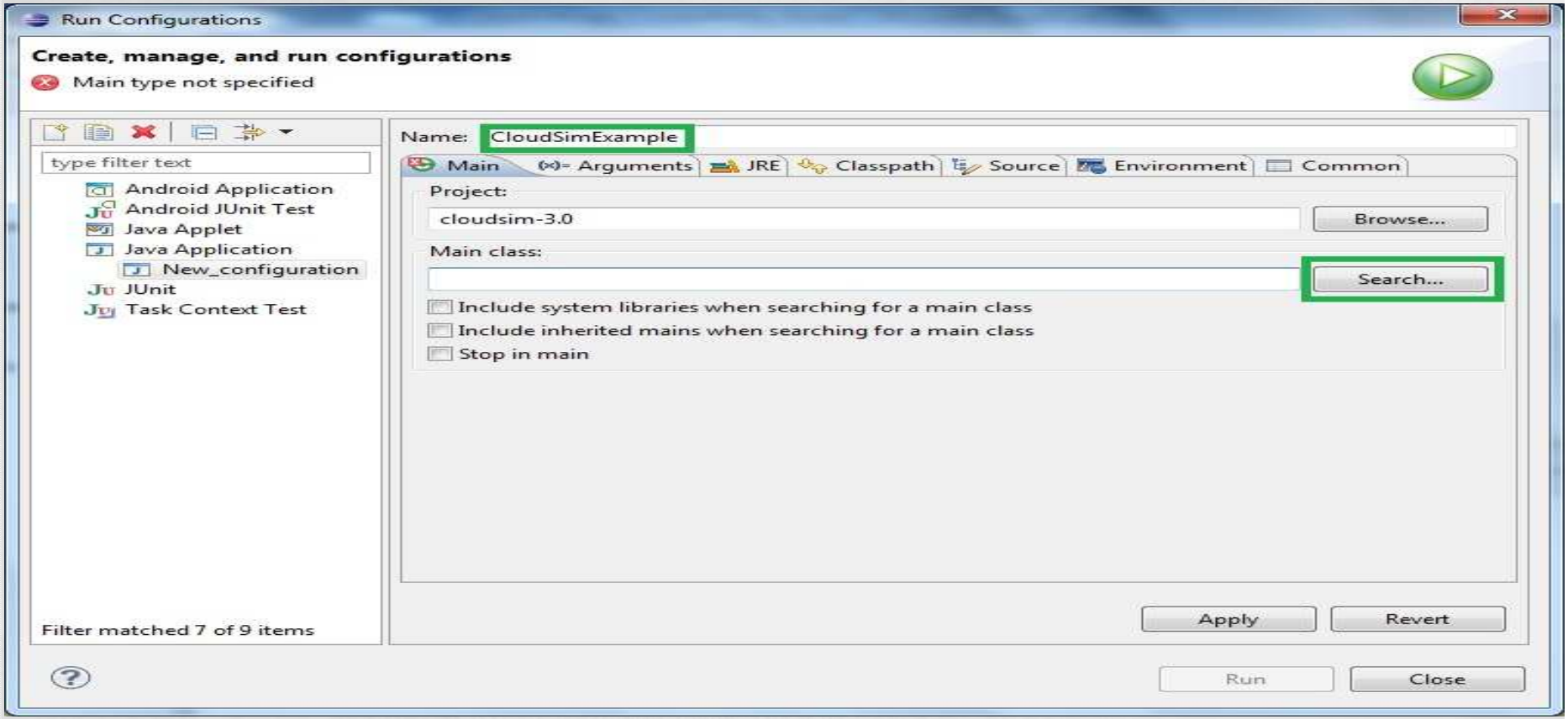
Step3: Run example using CloudSim

- To run simulation Select project
- Click “Run” Menu then select “Run Configurations..”



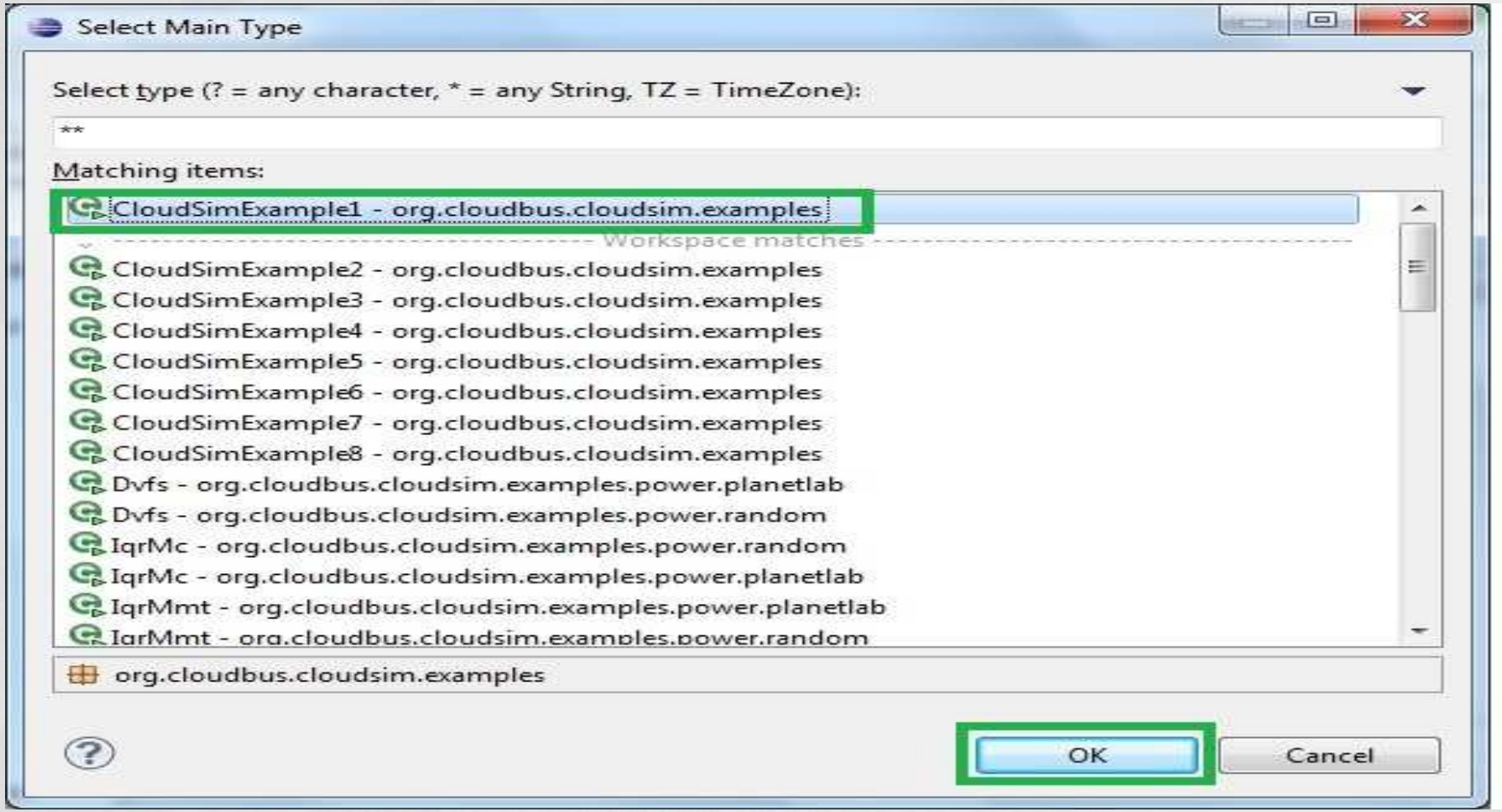
Step4: Run example using CloudSim

- Provide simulation name and select search option to choose an example



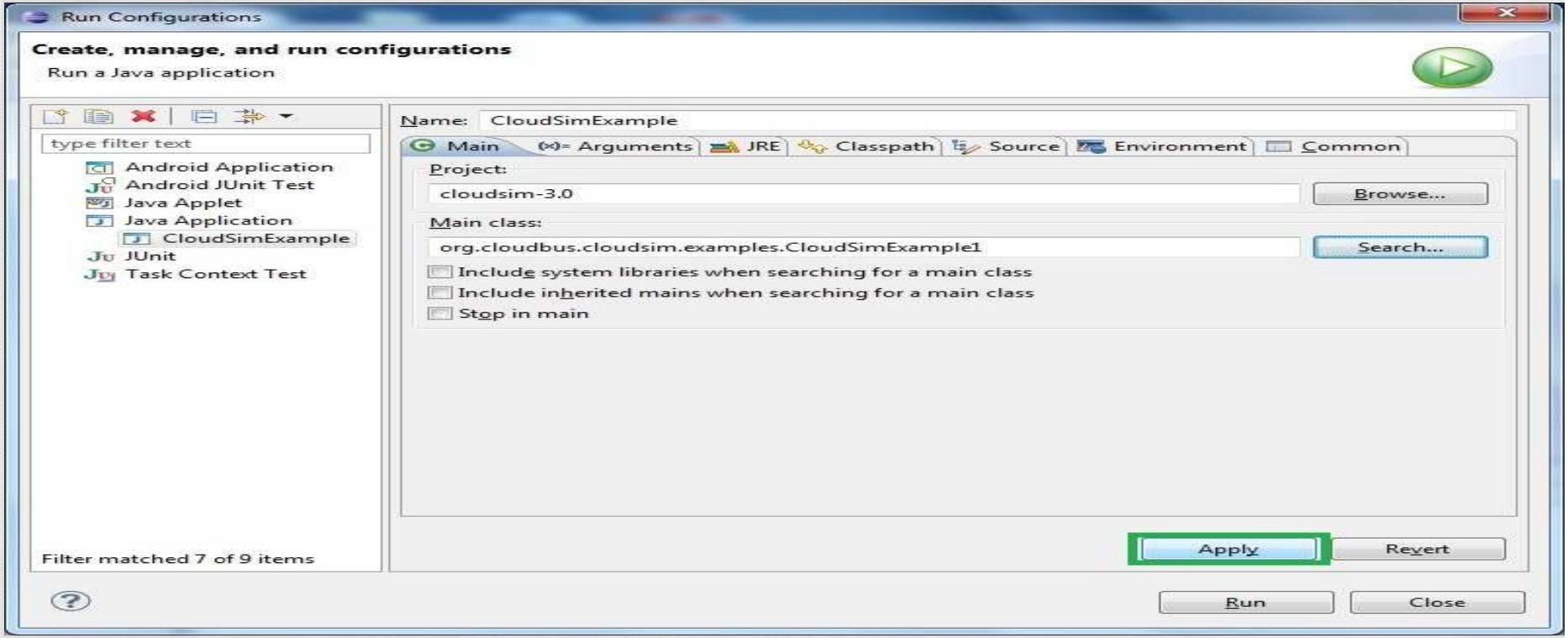
Step5: Run example using CloudSim

- Select specific example and press OK



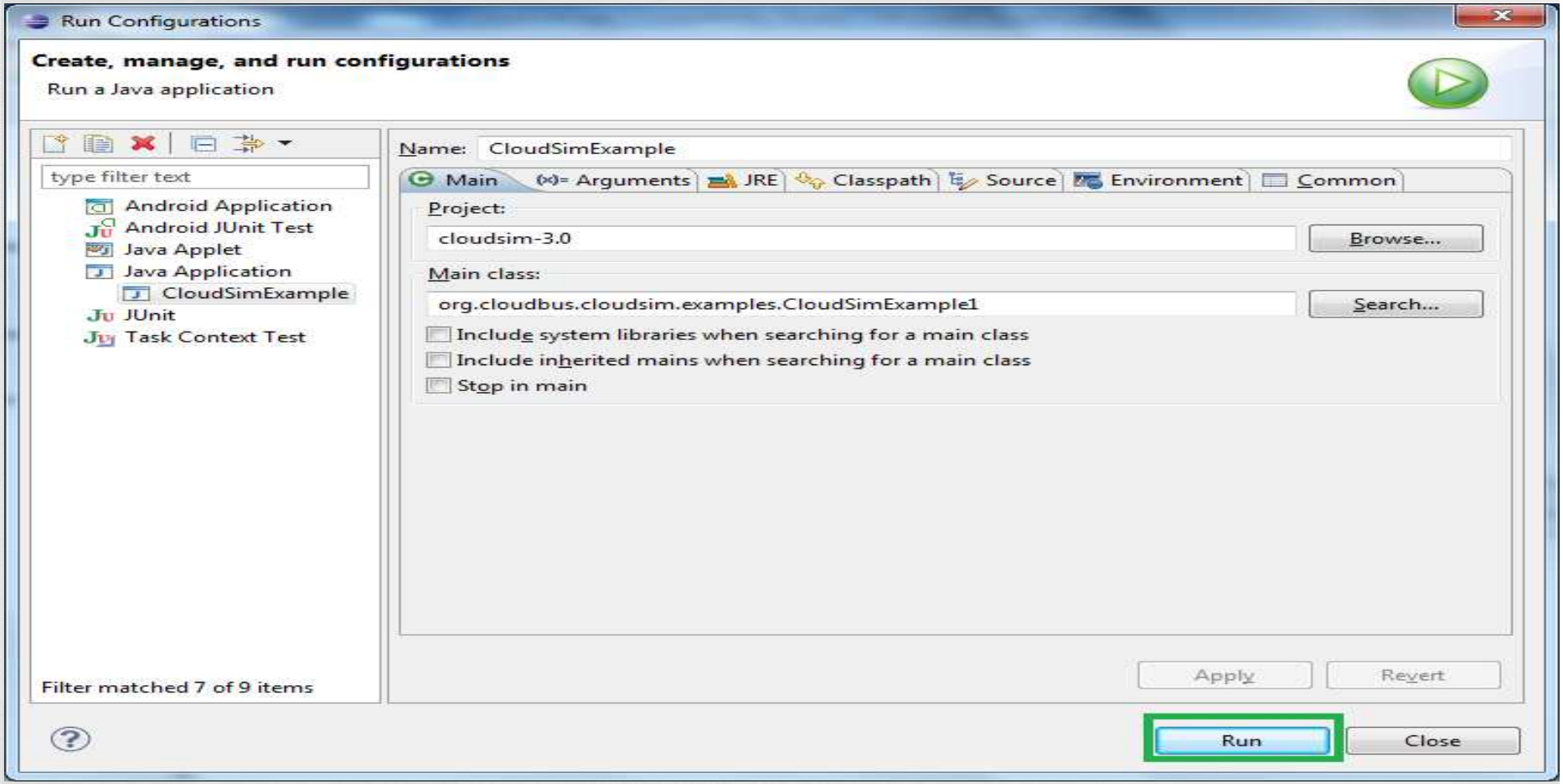
Step6: Run example using CloudSim

- Click “Apply” after select your Main class
- Do Step4 and Step5 if you select another simulation main class for simulation

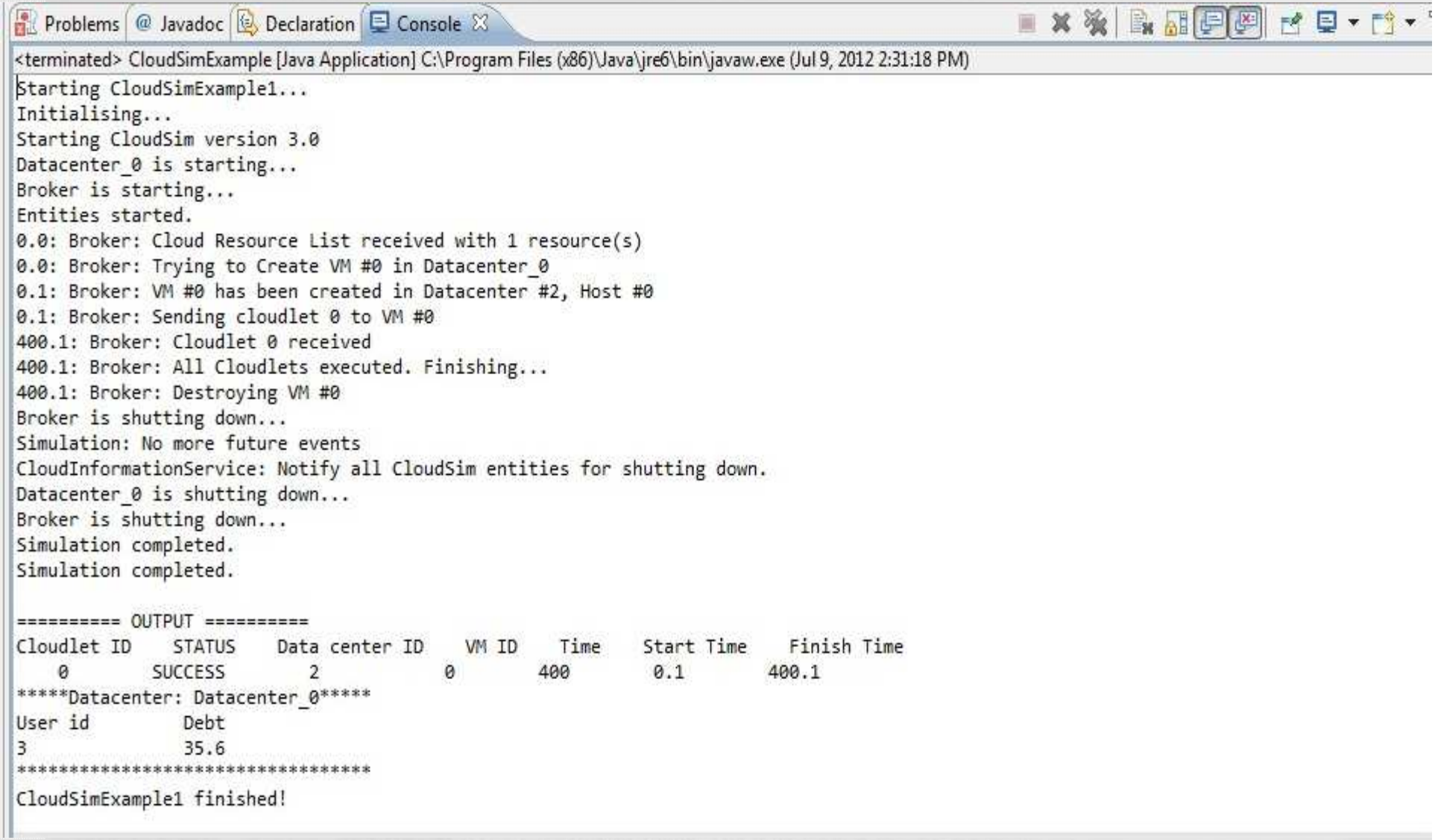


Step7: Run example using CloudSim

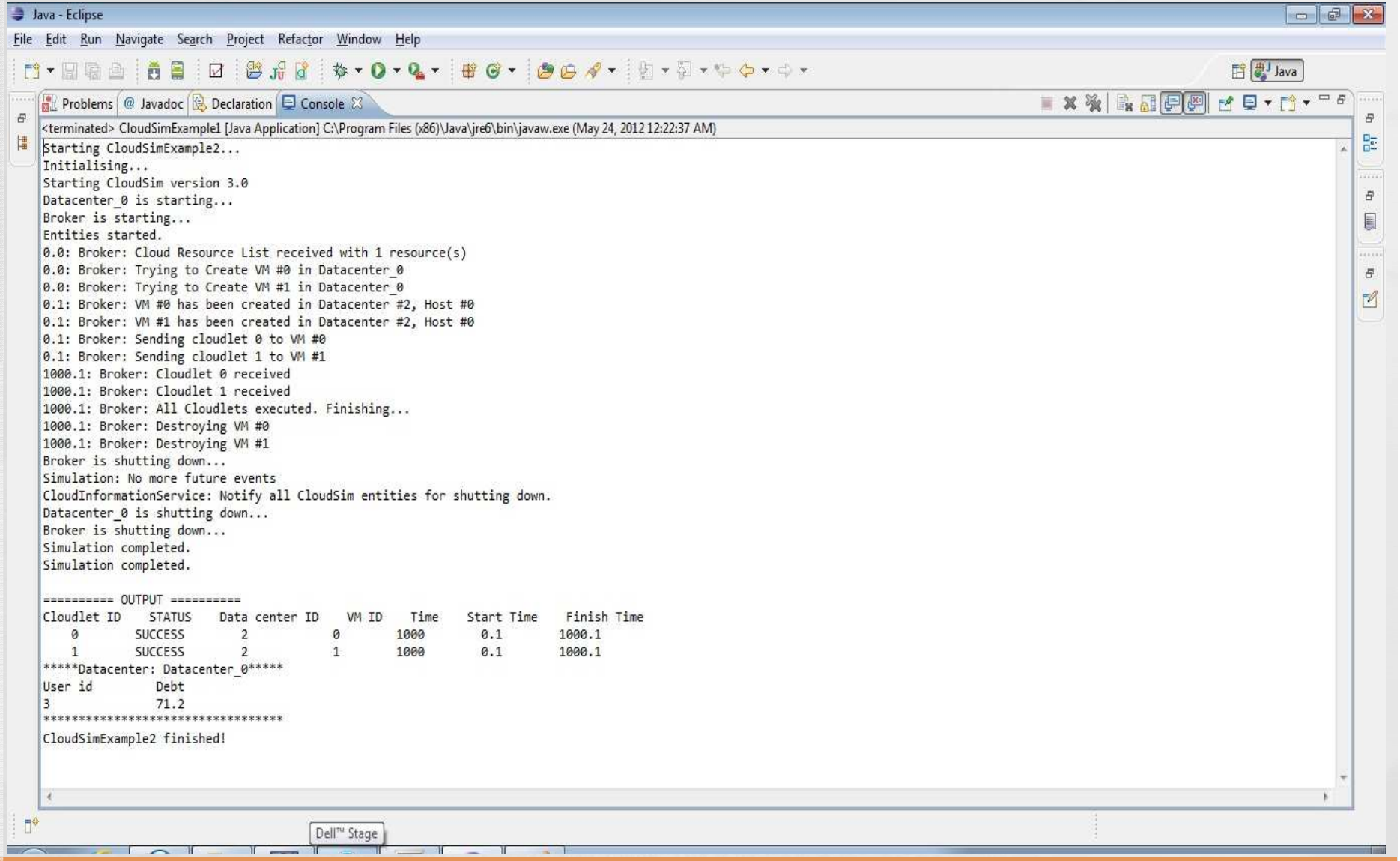
- Click Run to simulate CloudSimExample1



Simulation Result



Simulation Result



Thank you ☺