

Configuration Manual

MSc Research Project
Msc Cloud Computing

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National College of Ireland

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National College of Ireland
MSc Project Submission Sheet
School of Computing



Student Name: Rohit Rajesh Salvi.....
Student ID: 21127336.....
Programme: Msc Cloud Computing..... **Year:** Jan 2022.....
Module: Msc Research Project.....
Lecturer: Rashid Mijumbi.....
Submission Due Date: 15/12/2022.....
Project Title: Optimizing the load balancing efficiency using enhanced genetic algorithm in cloud computing.....
Word Count: 1126..... **Page Count:** 11.....

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.

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Signature: Rohit Rajesh Salvi.....
Date: 14/12/2022.....

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Configuration Manual

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21127336

1 Introduction

Using an enhanced genetic algorithm, load balancing is implemented as shown in this Configuration Manual.

2 Prerequisites

1. Java JDK 17
2. Eclipse IDE
3. CloudSim 3.0.3 Framework

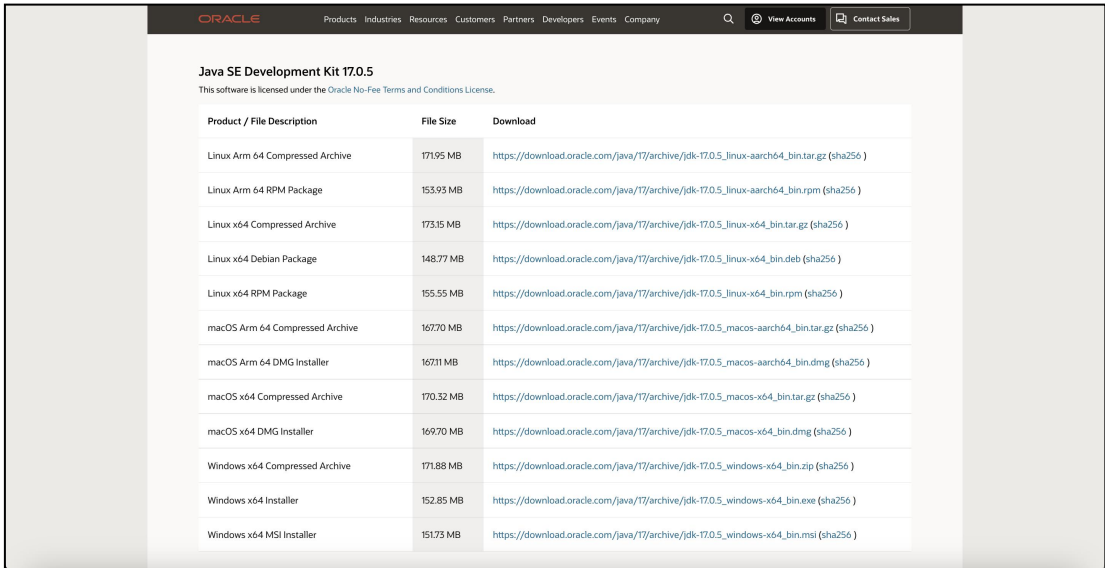
Note: Please follow the specific instruction for your OS to install the prerequisites as these prerequisites were installed and ran on MacOS (M1 edition).

3 Prerequisite Installation

3.1 Java JDK 17

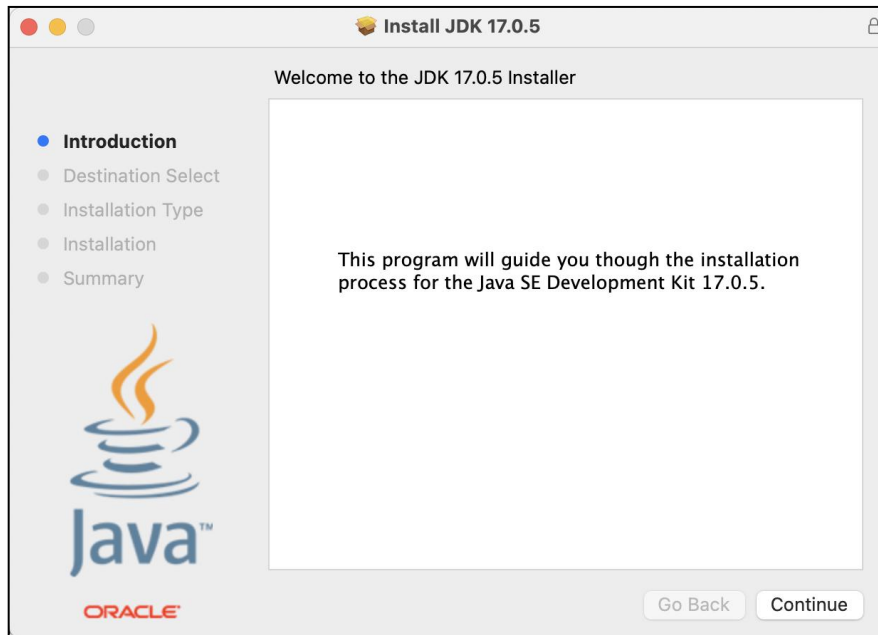
Step 1: Download Java JDK 17.0.5 for your appropriate OS.

<https://www.oracle.com/java/technologies/javase/jdk17-archive-downloads.html>



Product / File Description	File Size	Download
Linux Arm 64 Compressed Archive	171.95 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_linux-aarch64_bin.tar.gz (sha256)
Linux Arm 64 RPM Package	153.95 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_linux-aarch64_bin.rpm (sha256)
Linux x64 Compressed Archive	173.15 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_linux-x64_bin.tar.gz (sha256)
Linux x64 Debian Package	148.77 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_linux-x64_bin.deb (sha256)
Linux x64 RPM Package	155.55 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_linux-x64_bin.rpm (sha256)
macOS Arm 64 Compressed Archive	167.70 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_macos-aarch64_bin.tar.gz (sha256)
macOS Arm 64 DMG Installer	167.11 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_macos-aarch64_bin.dmg (sha256)
macOS x64 Compressed Archive	170.32 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_macos-x64_bin.tar.gz (sha256)
macOS x64 DMG Installer	169.70 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_macos-x64_bin.dmg (sha256)
Windows x64 Compressed Archive	171.88 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_windows-x64_bin.zip (sha256)
Windows x64 Installer	152.85 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_windows-x64_bin.exe (sha256)
Windows x64 MSI Installer	151.73 MB	https://download.oracle.com/java/17/archive/jdk-17.0.5_windows-x64_bin.msi (sha256)

Step 2: Install JDK



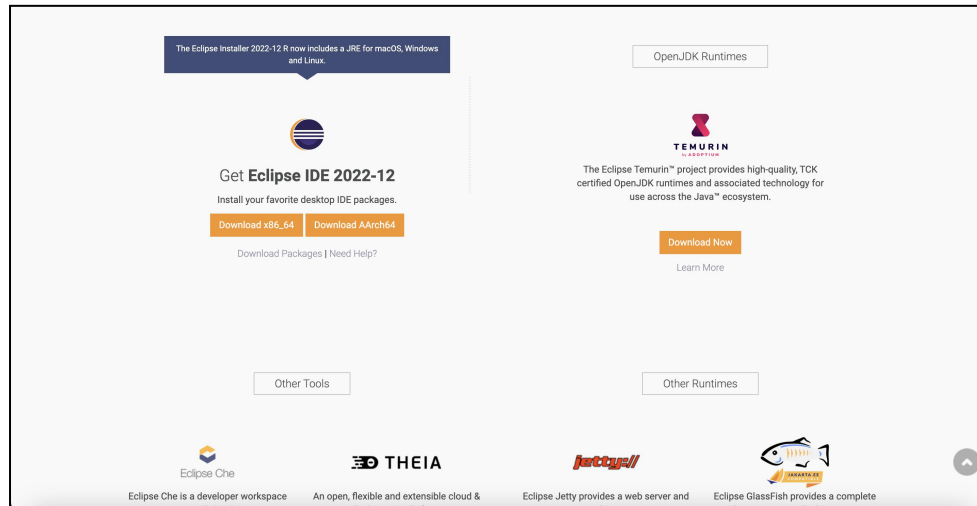
Step 3: Click on “Install” to install JDK.



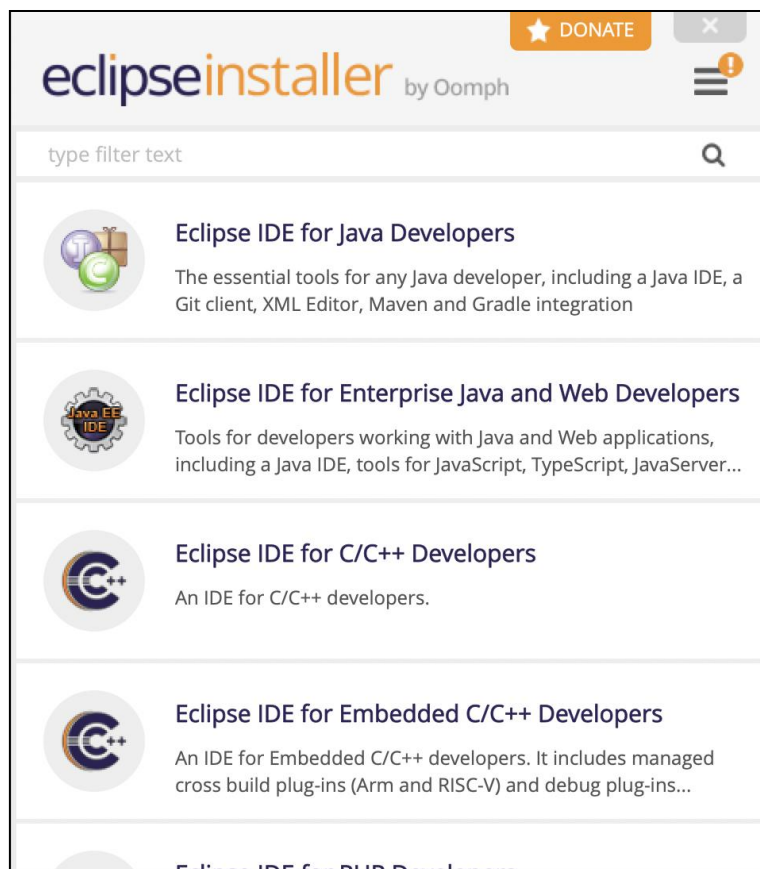
3.2 Eclipse IDE

Step 1: Download Eclipse IDE from the following link.

<https://www.eclipse.org/downloads/>



Step 2: Select “Eclipse IDE for Java Developers”.



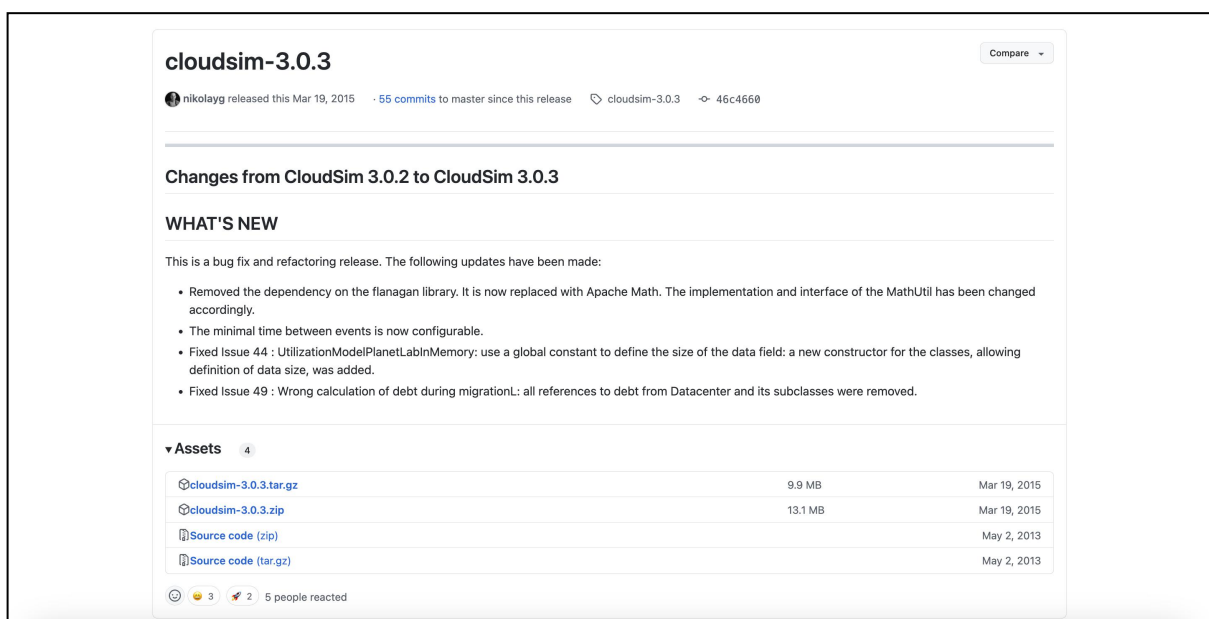
Step 3: Select the JDK path where you installed the Java JDK and the installation folder. Click on install to install.



3.3 CloudSim v3.0.3

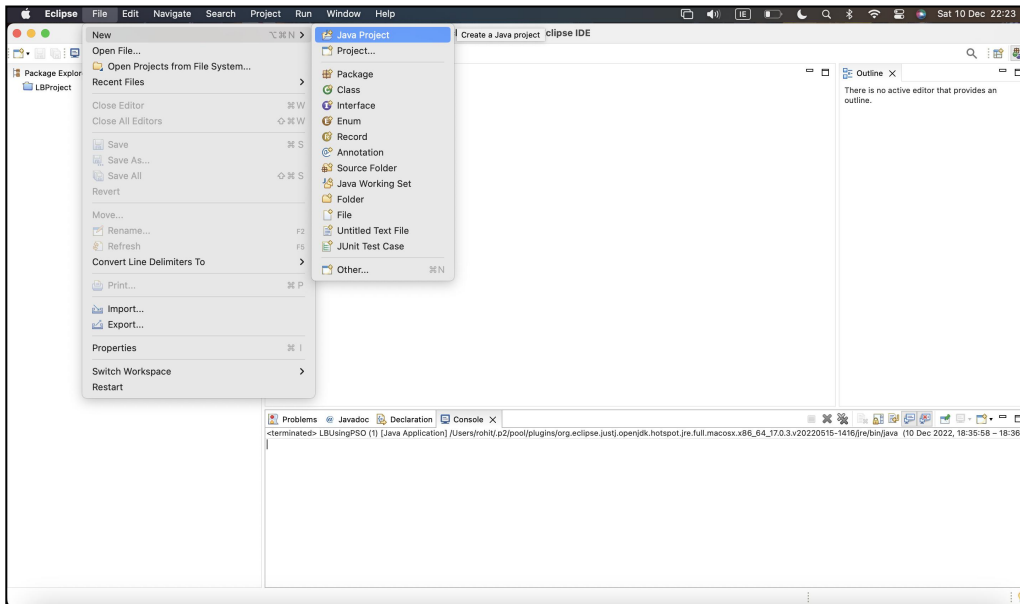
Step 1: Download CloudSim v3.0.3 from the following link.

<https://github.com/Cloudslab/cloudsim/releases/tag/cloudsim-3.0.3>

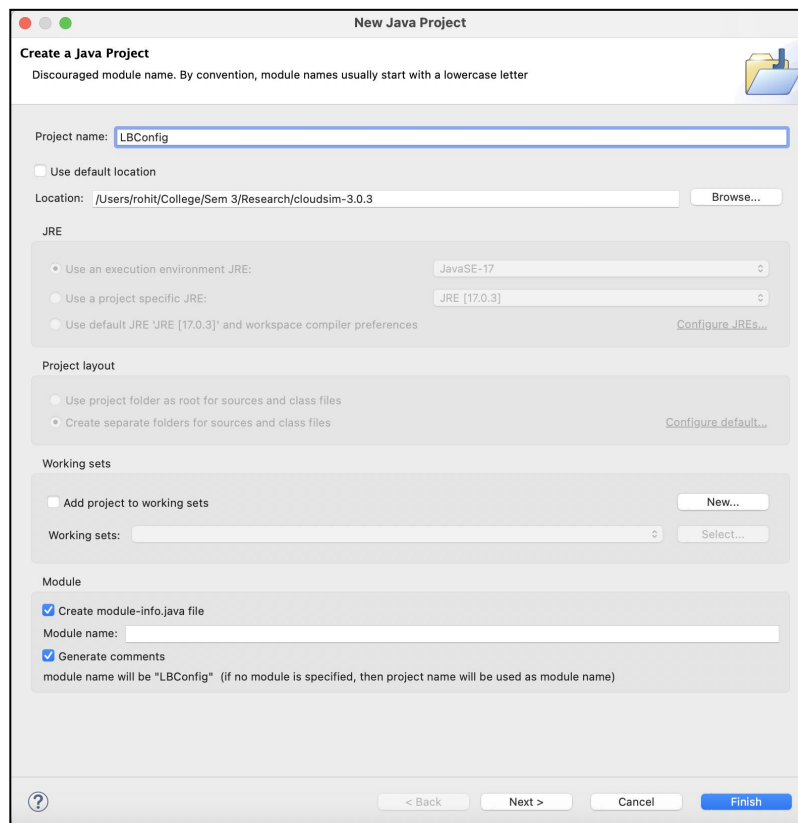


4 Running the proposed code

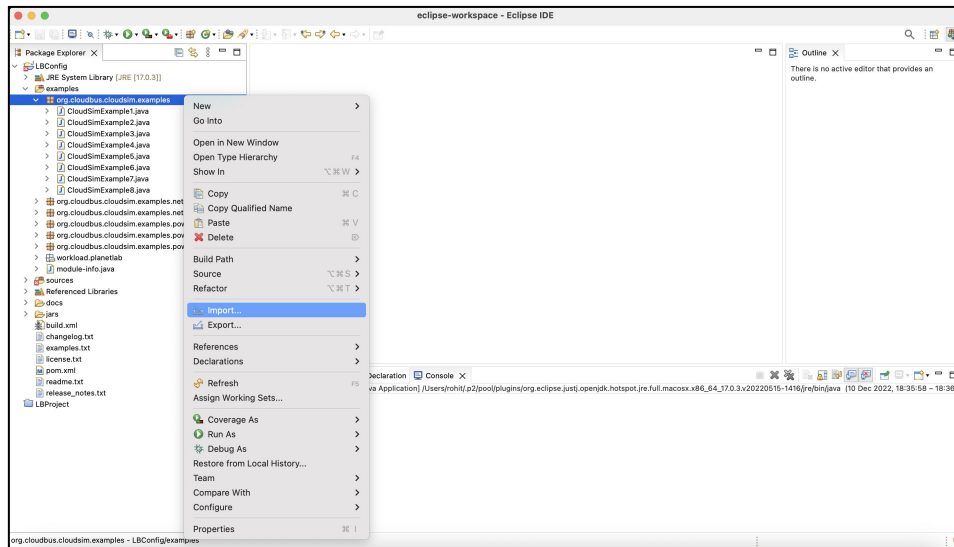
Step 1: Create a new Java Project. Click on “File” → “New” → “Java Project”.



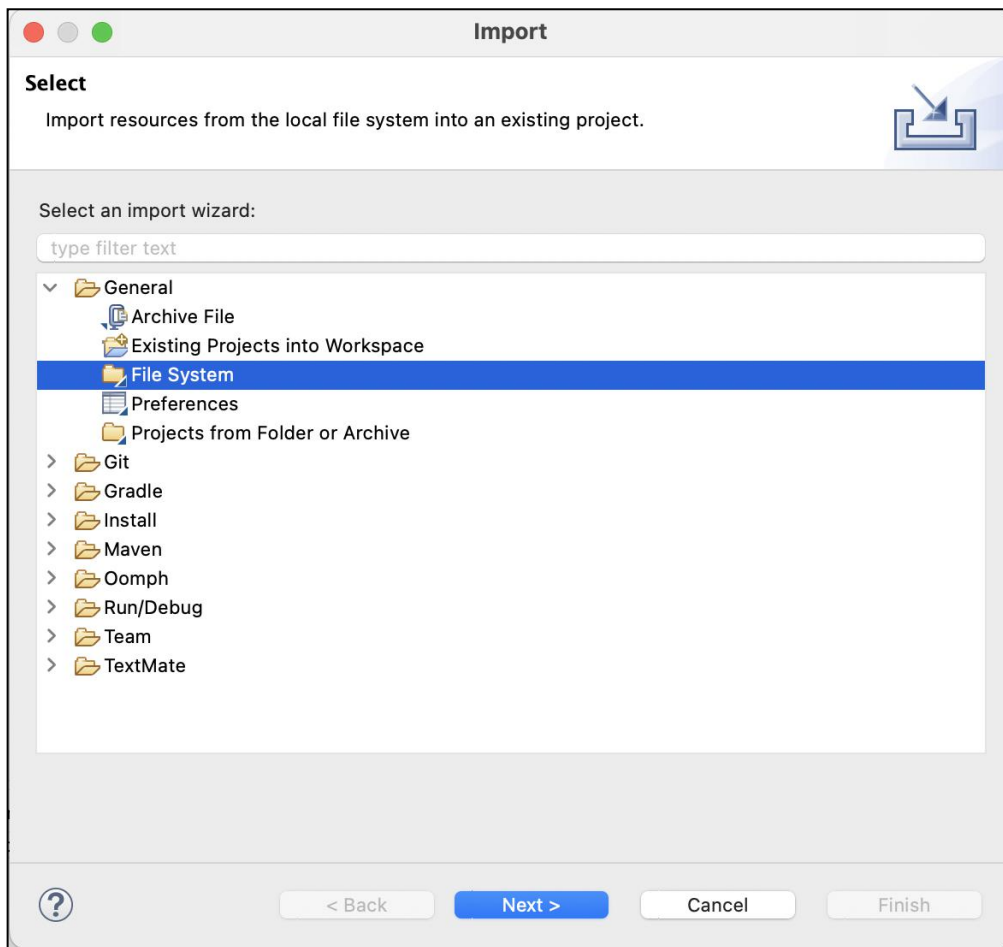
Step 2: Give your project a name in the field “Project Name” and untick the option “Use default location”. Click on “Browse” to select the path where you have download CloudSim v3.0.3. Then click on “Finish”.



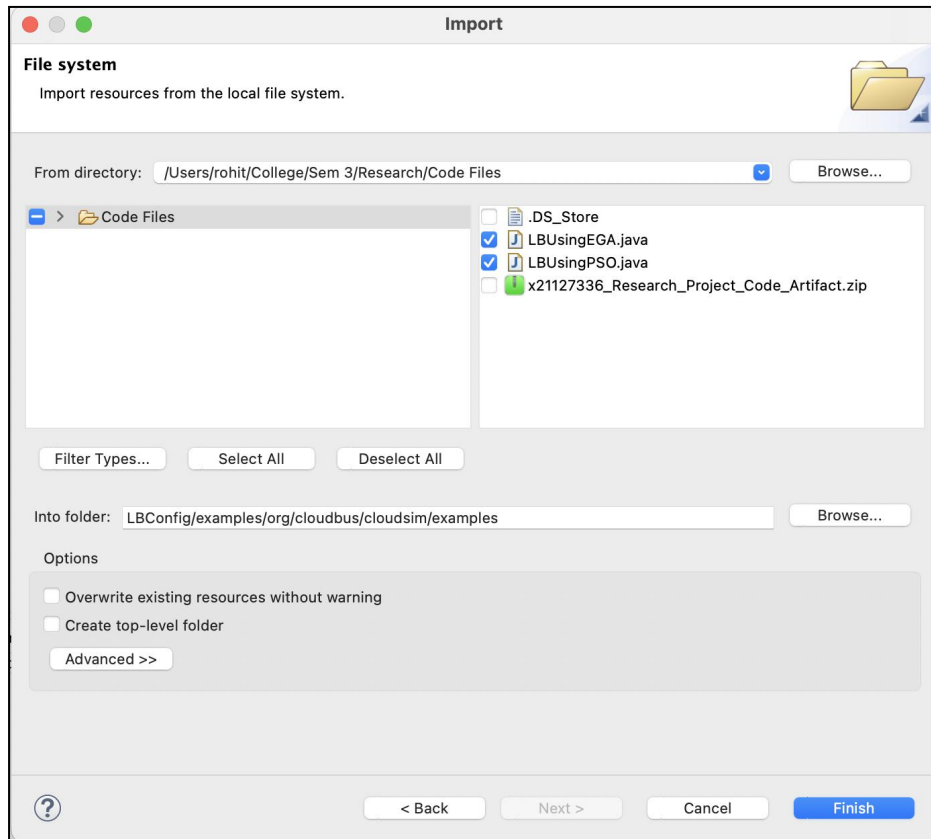
Step 3: Open the examples, right click on “org.cloudbus.cloudsim.examples” and select “Import”.



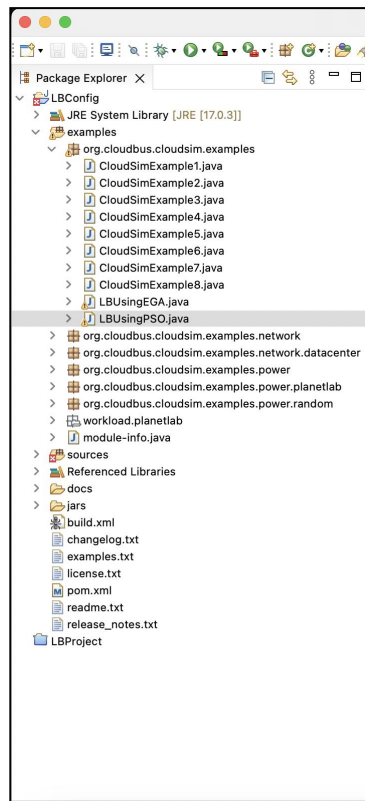
Step 4: Select “General” → “File System” and click on Next.



Step 5: Click on “**Browse**” and select the folder where the two files are located named “**LBUsingEGA.java**” and “**LBUsingPSO.java**”. Tick the two files and click on “**Finish**”.



Step 6: Double click on files to open them.

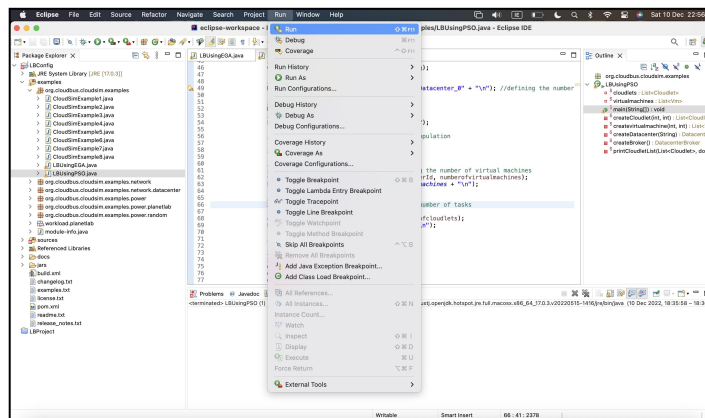


Step 7: For PSO, open the file and go to line 66. Here you define the number of cloudlets.

```

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```

Step 8: Click on “Run” → “Run” to run the code.



Step 9: The results are obtained in “Console” tab.

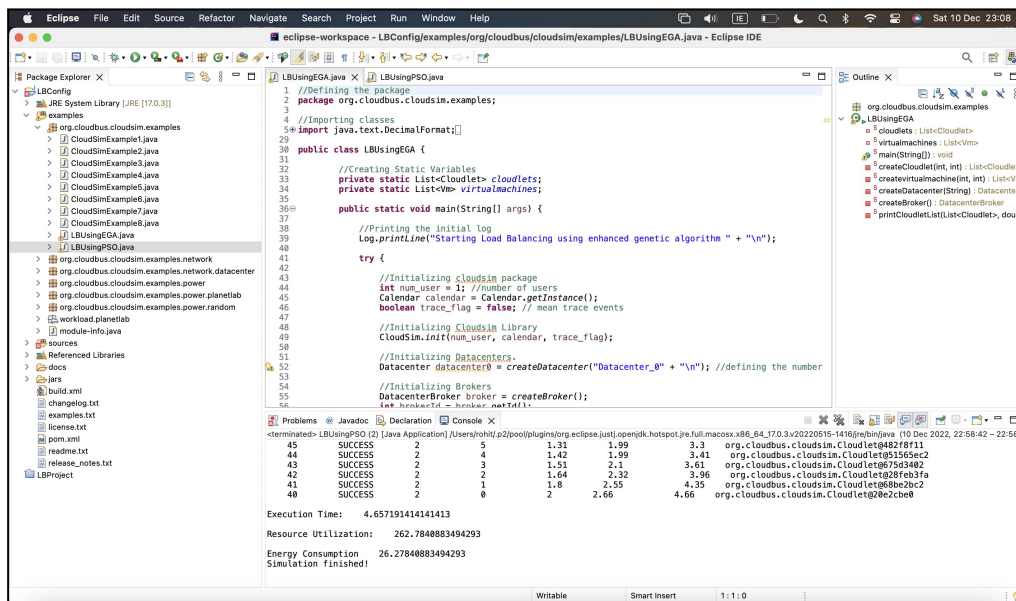
```

<terminated> LBUsingPSO (2) [Java Application] /Users/rohit.p2/pool/plugins/org.eclipse.justi.openjdk.hotspot.jre.full.macosx.x86_64_17.0.3.v20220515-1416/jre/bin/java (10 Dec 2022, 22:58:42 - 22:58:44)
45 SUCCESS 2 5 1.31 1.99 3.3 org.clodbus.clodbusim.Cloudlet@482f8f11
44 SUCCESS 2 4 1.42 1.99 3.41 org.clodbus.clodbusim.Cloudlet@51555ec2
43 SUCCESS 2 3 1.51 2.1 3.61 org.clodbus.clodbusim.Cloudlet@675d3402
42 SUCCESS 2 2 1.64 2.32 3.96 org.clodbus.clodbusim.Cloudlet@28feb3fa
41 SUCCESS 2 1 1.8 2.55 4.35 org.clodbus.clodbusim.Cloudlet@68be2bc2
40 SUCCESS 2 0 2 2.66 4.66 org.clodbus.clodbusim.Cloudlet@20e2cbe0

Execution Time: 4.657191414141413
Resource Utilization: 262.7840883494293
Energy Consumption 26.27840883494293
Simulation finished!
    
```

Step 10: Similarly change the number of cloudlets to 75, 100, 125, and 150 respectively and run the simulation to obtain the results for it.

Step 11: Similarly run the code for 50, 75, 100, 125, 150 number of cloudlets for EGA and obtain the results. The below screenshot is the results obtained after simulating for 50 cloudlets.

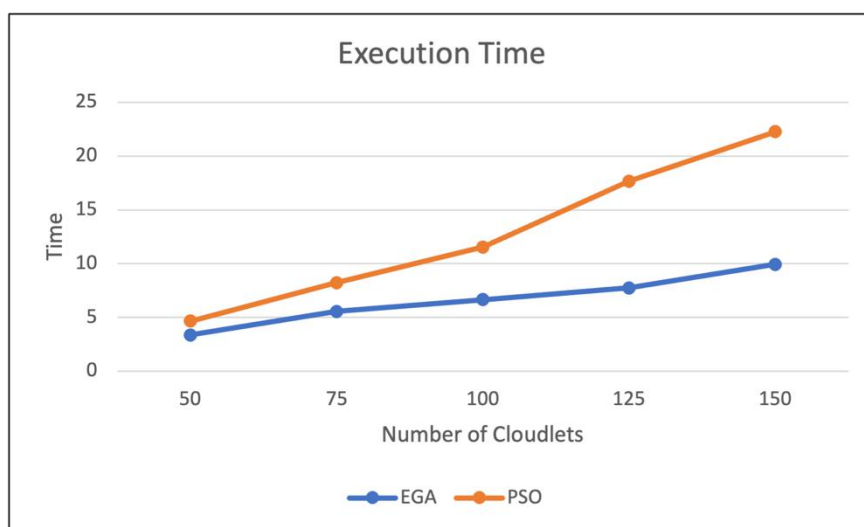


5 Results

After running 5 sets of simulations for both the algorithms for given number of cloudlets, the obtained results are compiled in a Line Graph.

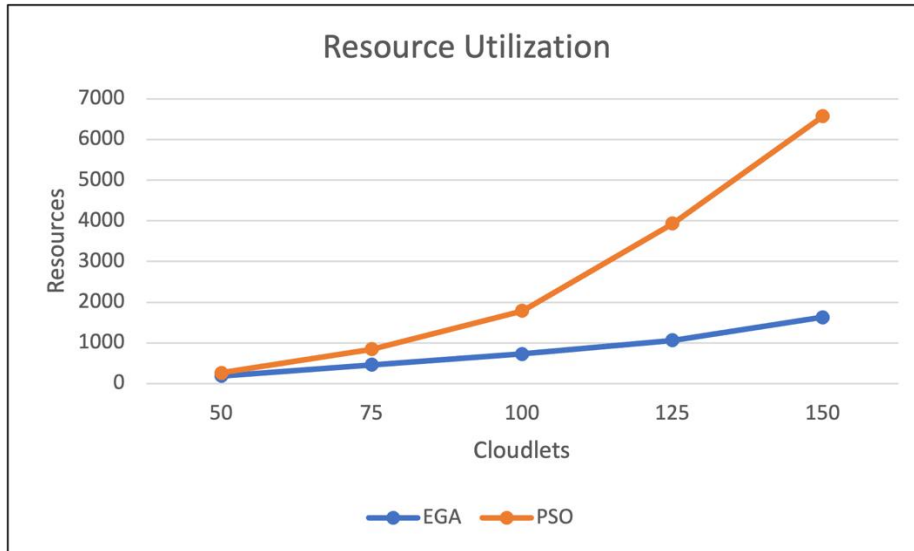
5.1 Execution Time:

The results demonstrated that EGA executes more quickly than PSO.



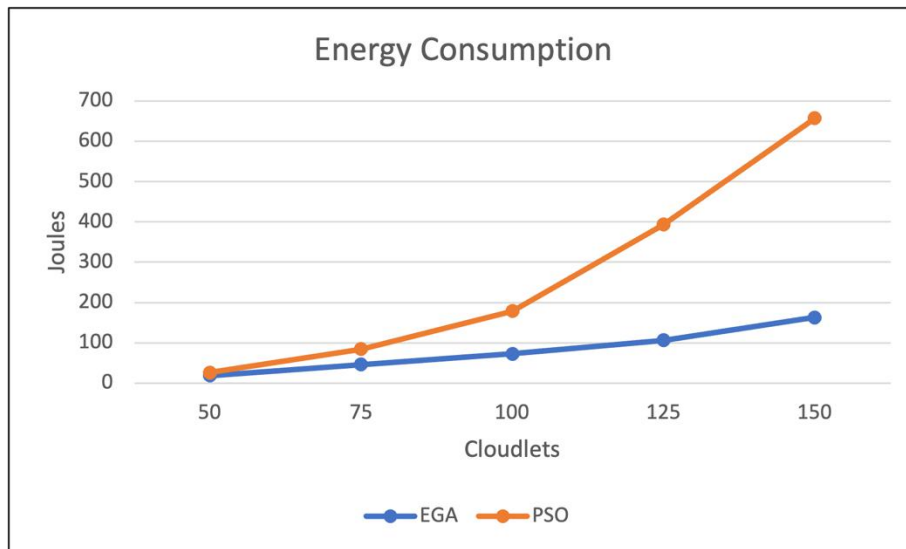
5.2 Resource Utilization

The results show that PSO uses a lot more resources than EGA.



5.3 Energy Consumption

The results demonstrated that EGA consumes less energy than EGA.



References

Cloudslab (no date) *Releases · Cloudslab/cloudsim, GitHub*. Available at: <https://github.com/Cloudslab/cloudsim/releases> (Accessed: December 10, 2022).

Eclipse installer 2022-12 R (no date) *Eclipse Installer 2022-12 R | Eclipse Packages*. Available at: <https://www.eclipse.org/downloads/packages/installer> (Accessed: December 10, 2022).

Installing the JDK software and setting JAVA_HOME (no date) *Installing the JDK Software and Setting JAVA_HOME (Using the GlassFish ESB Installation CLI)*. Available at: https://docs.oracle.com/cd/E19182-01/820-7851/inst_cli_jdk_javahome_t/#:~:text=a%20Windows%20System-,Install%20the%20JDK%20software.,Program%20Files%5CJava%5Cjdk1. (Accessed: December 10, 2022).