National College of Ireland

# Configuration Manual

MSc Research Project
MSc. Cloud Computing

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**National College of Ireland**

**MSc Project Submission Sheet**

**School of Computing**

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|---|---|
| **Student Name:** | Shantanu Malviya |
| **Student ID:** | 22248978 |
| **Programme:** | MSc. Cloud Computing **Year:** 2023-2024 |
| **Module:** | MSc. Research Project |
| **Lecturer:** | Shreyas Setlur Arun |
| **Submission Due Date:** | 12th August, 2024 |
| **Project Title:** | Enhancing Load Balancing Efficiency In Dynamic Workload Environments Using Enhanced Genetic Algorithm and Machine Learning |
| **Word Count:** | 399 **Page Count:** 6 |

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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Assignments that are submitted to the Programme Coordinator Office must be placed into the assignment box located outside the office.

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| Signature: | |
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# Configuration Manual

Shantanu Malviya
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# 1 Introduction

The steps to implement load balancing with Enhanced Genetic Algorithm, CloudSim along with the steps to implement Machine Learning models on Azure Cloud have been listed in this configuration manual.

# 2 Prerequisites

Below are the prerequisites to implement Enhanced Genetic Algorithm with CLoudSim setup.

- Eclipse IDE
- Java JDK 17
- CloudSim 3.0.3 Framework

  Note: This was setup was done and installed on a device with Windows 11 as the Operating System with 16 GB of RAM and 512 GB SSD storage.

Below are the prerequisites to implement and train the Machine Learning models on Azure Cloud.

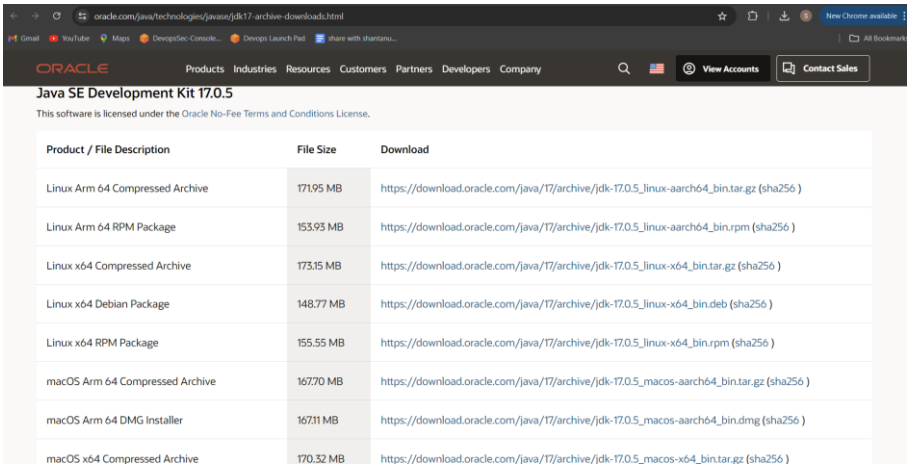
- Azure Cloud Subscription
- Azure ML Studio subscription
- Azure ML Resource Group and workspace

  Note: This was implemented using a Azure Student Account subscription provided by the National College of Ireland, Dublin.

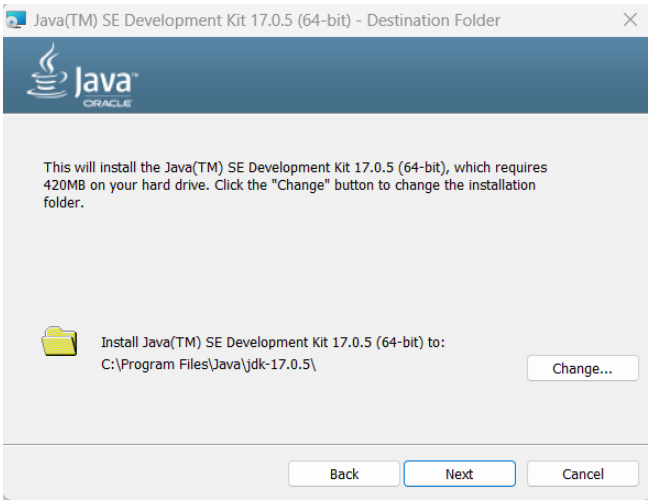
# 3 Installation of the Setup

## 3.1 Java JDK 17

Step 1: For the system's operating system, download the JDK version 17.0.5
URL: https://www.oracle.com/java/technologies/javase/jdk17-archive-downloads.html




Step 2: Run the setup file and install JDK



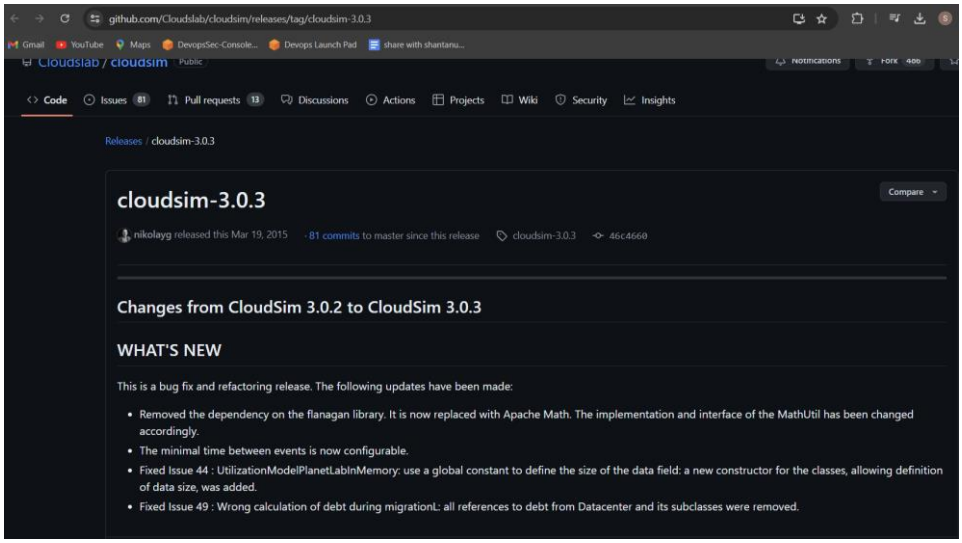

## 3.2 Setup Eclipse IDE and CloudSim

Step 1: Download and install the setup file for Eclipse IDE for Java Developers (4.32.0)

URL: https:// www.eclipse.org/downloads/

Step 2: Using the below link of GitHub repository, CloudSim can downloaded on the system.

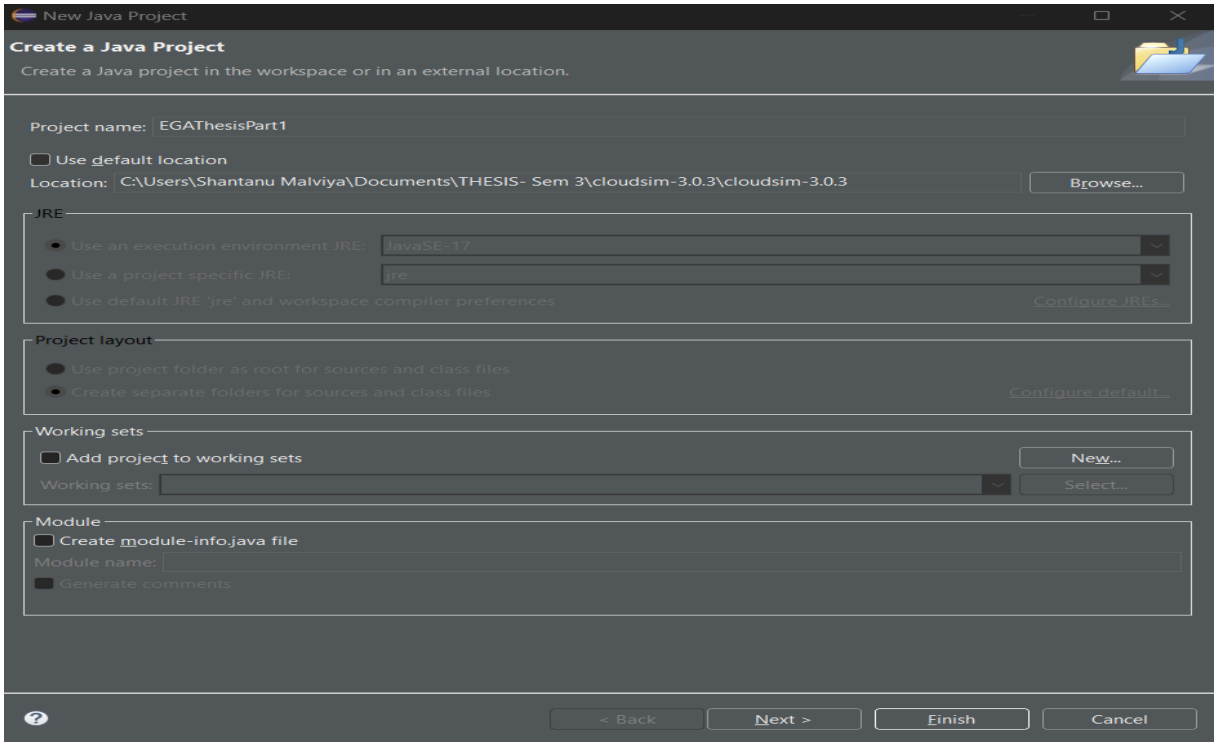
URL: https://github.com/Cloudslab/cloudsim/releases/tag/cloudsim-3.0.3




# 4 Steps for Executing the EGA and ML models

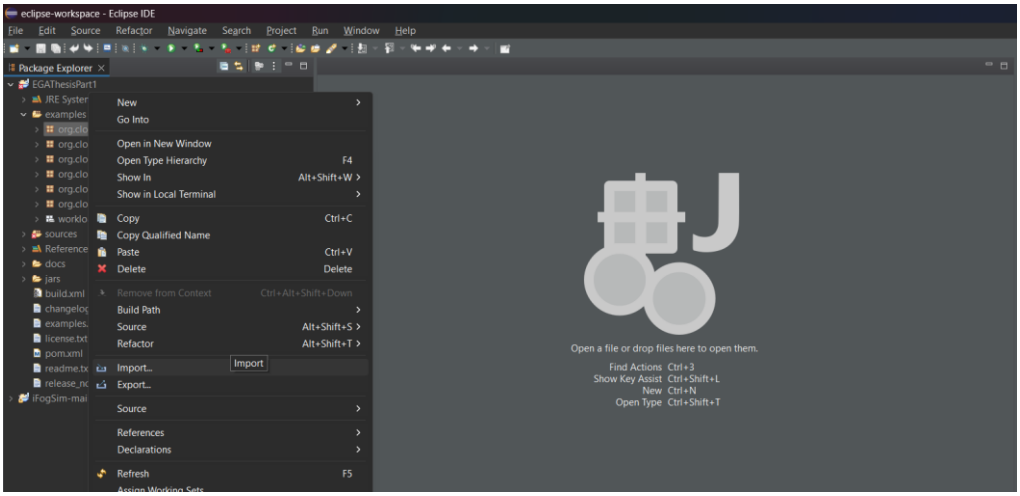
## 4.1 Part-1 EGA

Step 1: Open Eclipse IDE and create a new Java Project. Click on File > New> Java Project

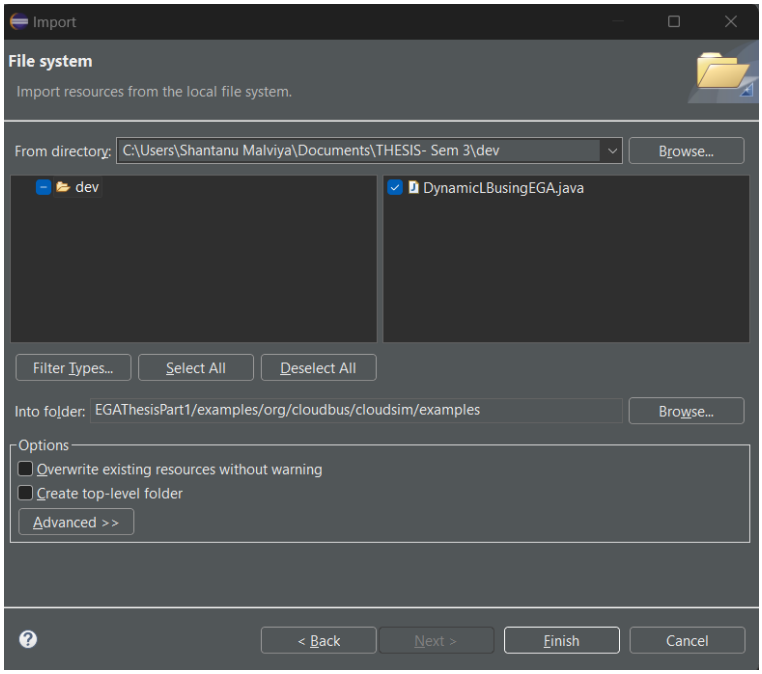


The “Location” of the project should be same as the one where CloudSim has been installed in the system.

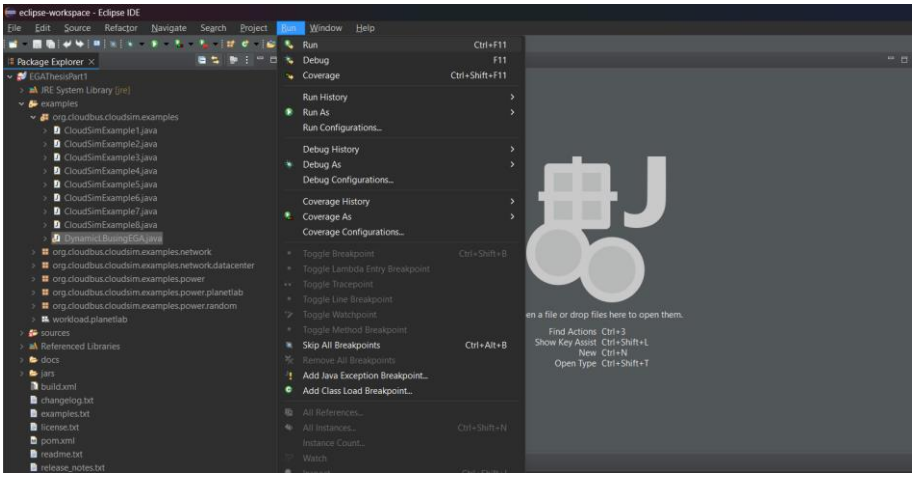
Step 2: Navigate through Project Name > Examples > org.cloudbus.cloudsim.examples and select the option “import”




Step 3: Import the file “DynamicLBUsingEGA.java” as a File System and browse through the path where the .java file is stored on the Local System



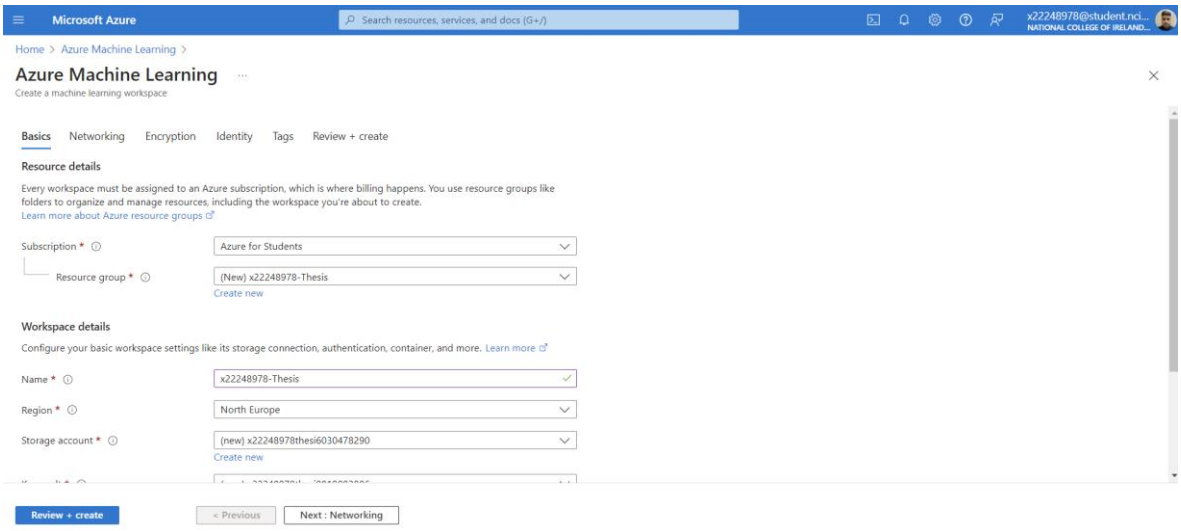
Step 4: Click Run > Run to execute the Algorithm



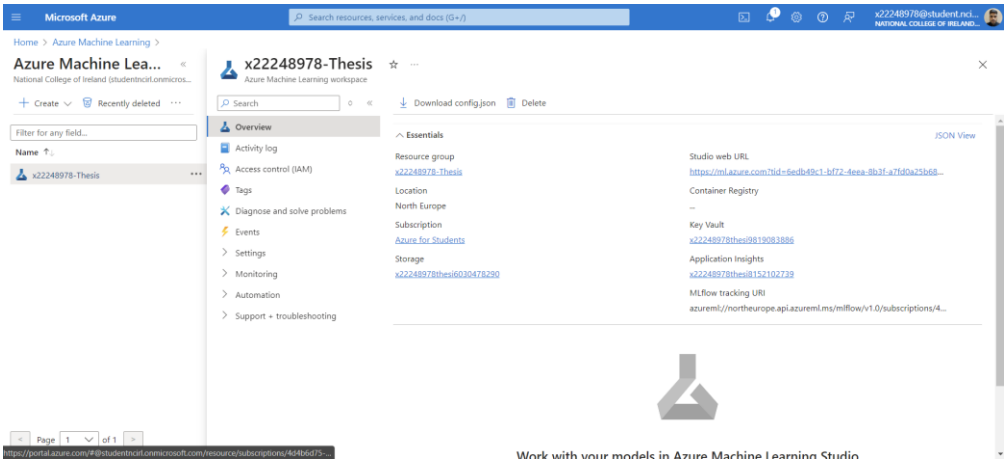

## 4.2 Azure ML Studio

Step 1: Access the Azure Cloud Portal via the URL: https://portal.azure.com/ and Access the Azure ML Studio service

-> Create an Azure Machine Learning Workspace by defining the necessary parameters



Step 2: Access the created workspace and launch the “Studio Web URL” to access the Azure ML Studio




Step 3: Create a .ipynb notebook and upload the dataset .csv file to the same folder

-> Select the “Serverless Spark Compute” to configure and initialize sessions computing resources

-> Execute each cell individually or all at once to obtain the results