Institute's Vision

To be an organization with potential for excellence in engineering and management for the advancement of society and human kind

Institute's Mission

To excel in academics, practical engineering, management and to commence research endeavors.

To prepare students for future opportunities.

To nurture students with social and ethical responsibilities.

Department's Vision

To create IT graduates with ethical and employable skills.

Department's Mission

To imbibe problem solving and analytical skills through teaching learning process.

To impart technical and managerial skills to meet the industry requirement.

To encourage ethical and value based education.

SYLLABUS

Sr. No.	Module	Detailed Content	Hours	LO Mapping
0	Prerequisite	Knowledge of Linux Operating system, installation and configuration of services and command line basics, Basics of Computer Networks and Software Development Life cycle.	**00**	LO1
I	Introduction to Devops	Understanding of the process to be followed during the development of an application, from the inception of an idea to its final deployment. Learn about the concept of DevOps and the practices and principles followed to implement it in any company's software development life cycle. Learn about the phases of Software Lifecycle. Get familiar with the concept of Minimum Viable Product (MVP) & Cross-functional Teams. Understand why DevOps evolved as a prominent culture in most of the modern-day startups to achieve agility in the software development process **Self-Learning Topics: Scrum, Kanban, Agile**	**04**	LO1
II	Version Control	In this module you will learn: • GIT Installation, Version Control, Working with remote repository • GIT Cheat sheet • Create and fork repositories in GitHub • Apply branching, merging and rebasing concepts. • Implement different Git workflow strategies in real-time scenarios • Understand Git operations in IDE **Self-Learning Topics: AWS Codecommit, Mercurial, Subversion, Bitbucket, CVS**	**04**	LO1 & LO2
III	Continuous Integration using Jenkins	In this module, you will know how to perform Continuous Integration using Jenkins by building and automating test cases using Maven / Gradle / Ant. • Introduction to Jenkins (With Architecture) • Introduction to Maven / Gradle / Ant.	**04**	LO1 & LO3

		• Jenkins Management Adding a slave node to Jenkins • Build the pipeline of jobs using Maven / Gradle / Ant in Jenkins, create a pipeline script to deploy an application over the tomcat server **Self-Learning Topics: Travis CI, Bamboo, GitLab, AWS CodePipeline**		
IV	Continuous Testing with Selenium	In this module, you will learn about selenium and how to automate your test cases for testing web elements. You will also get introduced to X-Path, TestNG and integrate Selenium with Jenkins and Maven. • Introduction to Selenium • Installing Selenium • Creating Test Cases in Selenium WebDriver • Run Selenium Tests in Jenkins Using Maven **Self-Learning Topics: Junit, Cucumber**	**04**	LO1 , LO3 & LO4
V	Continuous Deployment: Containerization with Docker	In this module, you will be introduced to the core concepts and technology behind Docker. Learn in detail about container and various operations performed on it. • Introduction to Docker Architecture and Container Life Cycle • Understanding images and containers • Create and Implement docker images using Dockerfile. • Container Lifecycle and working with containers. • To Build, deploy and manage web or software application on Docker Engine. • Publishing image on Docker Hub. **Self-Learning Topics: Docker Compose, Docker Swarm.**	**05**	LO1 & LO5
VI	Continuous Deployment: Configuration Management with Puppet	In this module, you will learn to Build and operate a scalable automation system. • Puppet Architecture • Puppet Master Slave Communication • Puppet Blocks • Installation and Configuring Puppet Master and Agent on Linux machines • Use exported resources and forge modules to set up Puppet modules • Create efficient manifests to streamline your deployments **Self-Learning Topics: Ansible, Saltstack**	**05**	LO1 & LO6

Program Outcomes

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineeringproblems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Department of Information

Technology Course : DevOps LAB

Semester: VII

Class :TEIT

Course Outcomes / Lab Outcomes

Course Code	Course Outcomes
	On successful completion, of course, learner/student will be able to:
ITL503.1	To understand the fundamentals of DevOps engineering and be fully proficient with DevOps terminologies, concepts, benefits, and deployment options to meet your business requirements
ITL503.2	To obtain complete knowledge of the “version control system” to effectively track changes augmented with Git and GitHub
ITL503.3	To understand the importance of Jenkins to Build and deploy Software Applications on server environment.
ITL503.4	Understand the importance of Selenium and Jenkins to test Software Applications
ITL503.5	To understand concept of containerization and Analyze the Containerization of OS images and deployment of applications over Docker
ITL503.6	To Synthesize software configuration and provisioning using Ansible.

Rubrics for Practical

Rubrics Description	Maximum Marks Weight	15-12	12-9	9-6	6-0
Implementation (R1)	5	Successful completion with accurate output (5-4)	Output correct but not precise (4-3)	Few errors in the output (3-2)	Incorrect Output (2-0)
Understanding (R2)	5	Understanding Experiment and drawn correct conclusion (5-4)	Understand Experiment but conclusion less accurate (4-3)	Improper Conclusion (3-2)	No Conclusion (2-0)
Punctuality and Discipline (R3)	5	Submission within a week (5-4)	Submission after week (4-3)	Submission after two weeks (3-2)	Submission after three weeks and more (2-0)

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EXPERIMENT NO. – 01

Aim of the Experiment: -

Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

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Practical Incharge

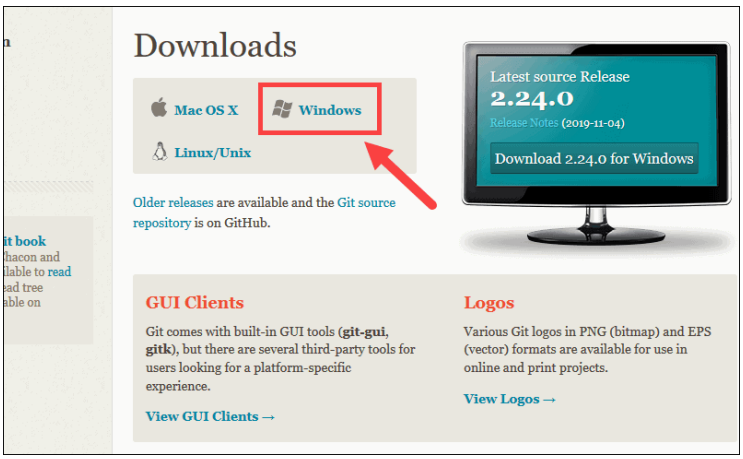
PRACTICAL NO. 1

Problem Definition: To perform installation of Git and work on local and remote git repositories.

Compiler / Tool: Git-2.35.1.2-64-bit

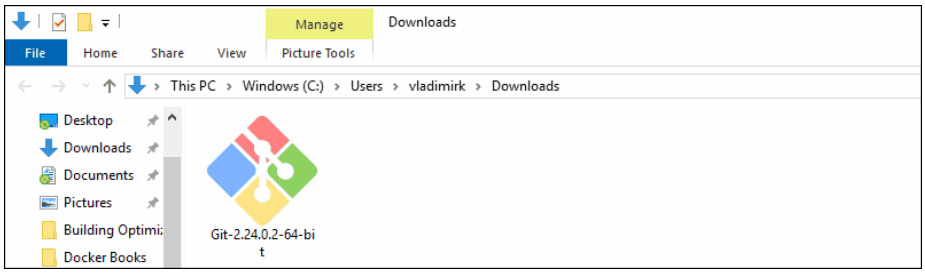
Installation:

1. Browse to the official Git website: https://git-scm.com/downloads
2. Click the download link for Windows and allow the download to complete.

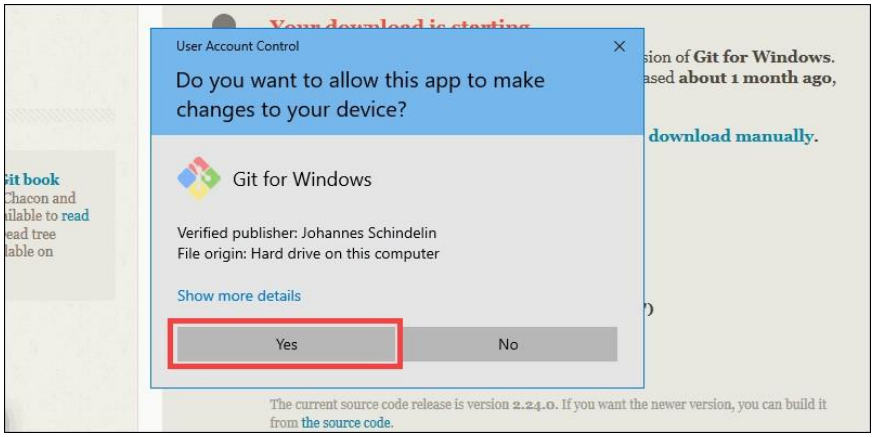


Extract and Launch Git Installer

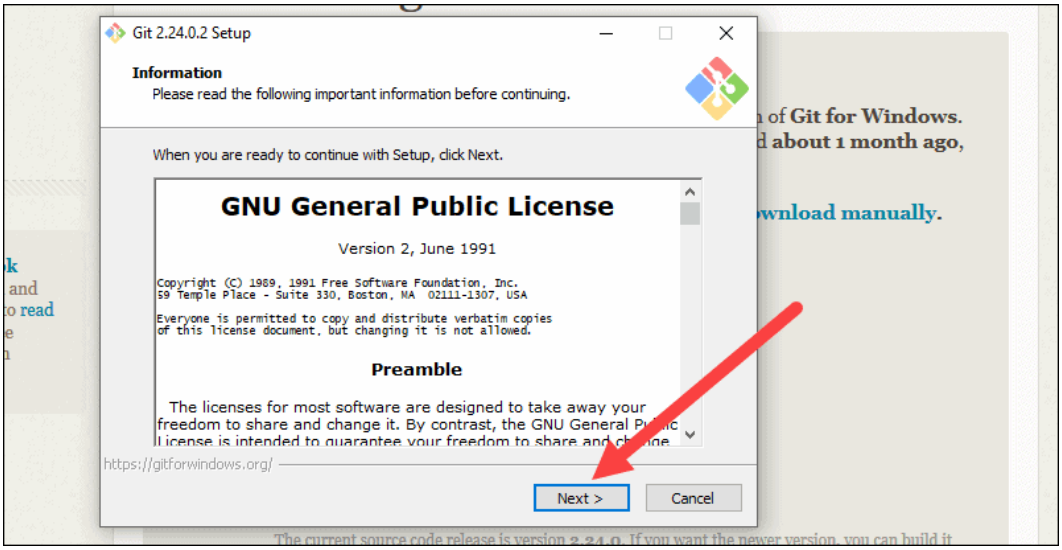
3. Browse to the download location (or use the download shortcut in your browser). Double-click the file to extract and launch the installer.



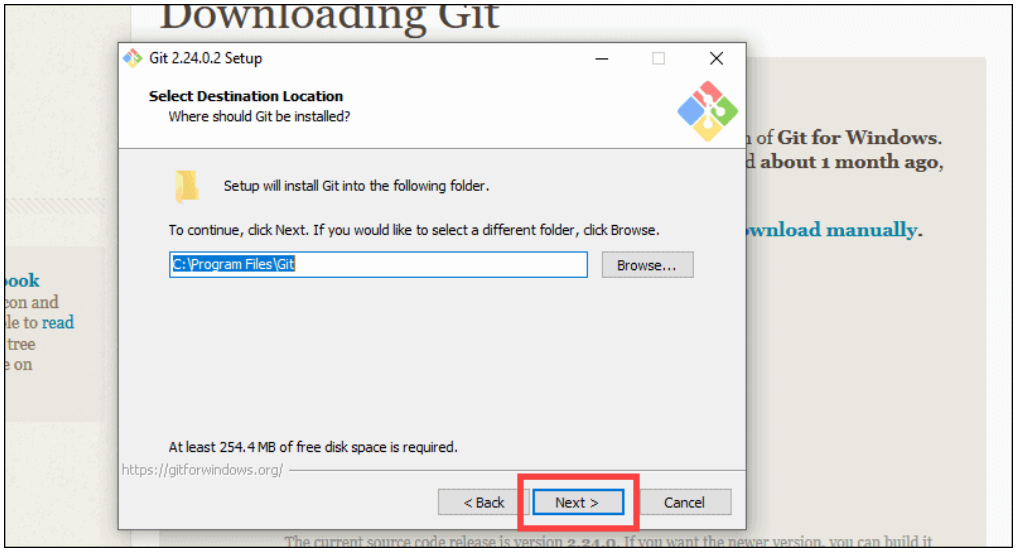
4. Allow the app to make changes to your device by clicking **Yes** on the User Account Control dialog that opens.


User Account Control
Do you want to allow this app to make changes to your device?
Git for Windows
Verified publisher: Johannes Schindelin
File origin: Hard drive on this computer
Show more details
Yes
No
download manually.
The current source code release is version 2.24.0. If you want the newer version, you can build it from the source code.

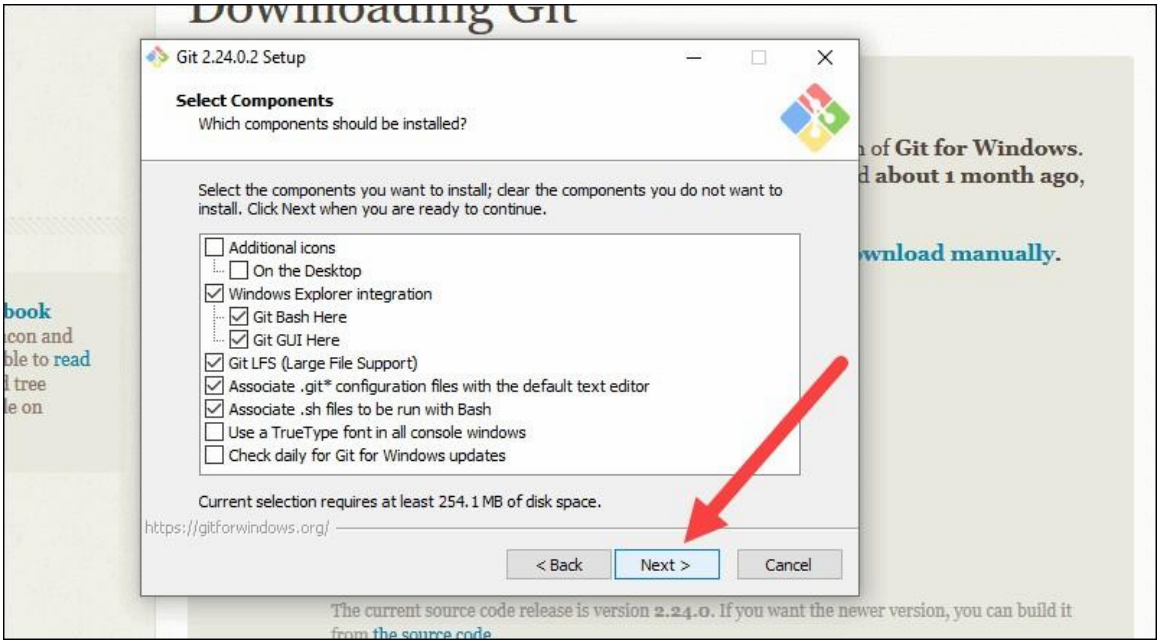
5. Review the GNU General Public License, and when you're ready to install, click **Next**.



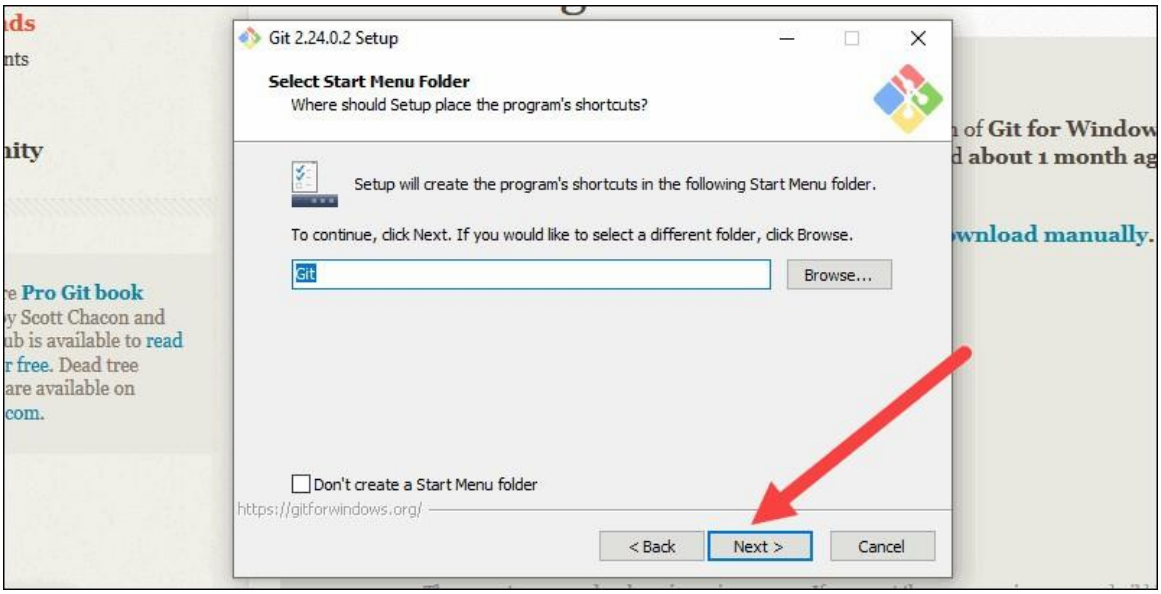
6. The installer will ask you for an installation location. Leave the default, unless you have reason to change it, and click **Next**.



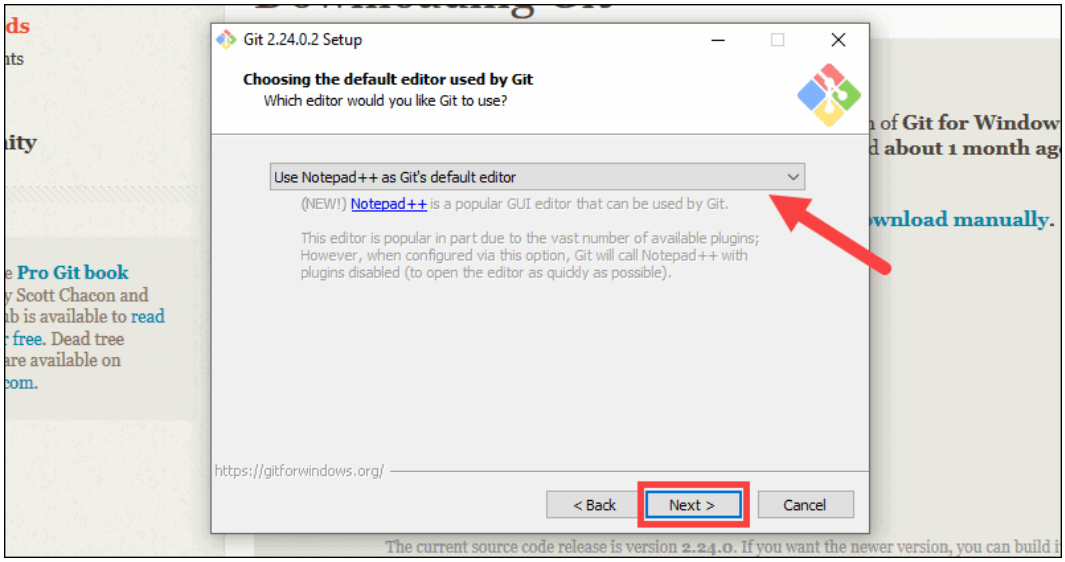
7. A component selection screen will appear. Leave the defaults unless you have a specific need to change them and click **Next**.



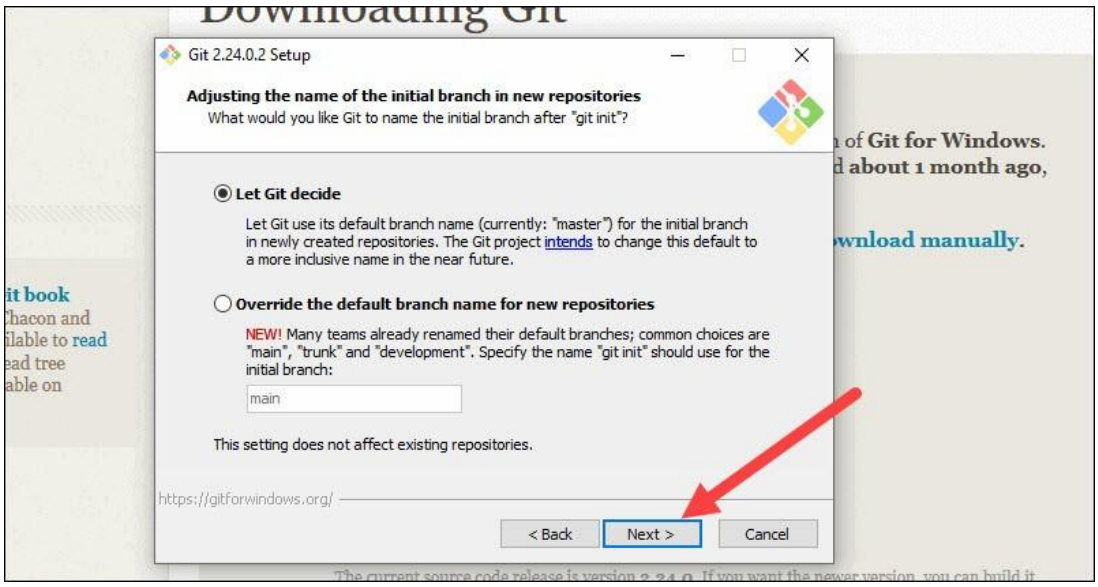
8. The installer will offer to create a start menu folder. Simply click **Next**.



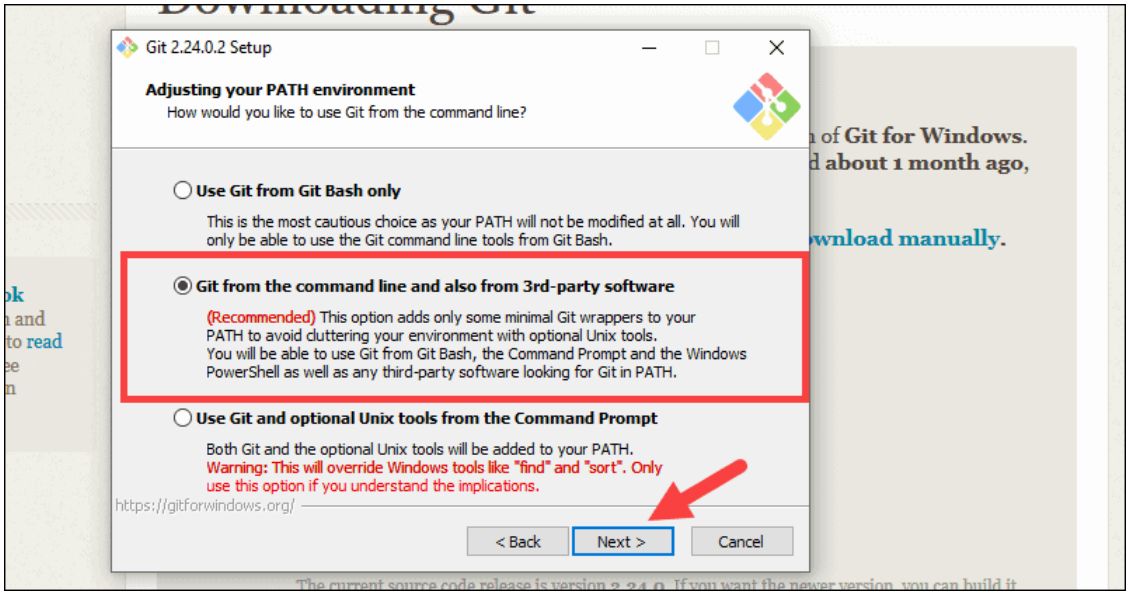
9. Select a text editor you'd like to use with Git. Use the drop-down menu to select Notepad++ (or whichever text editor you prefer) and click **Next**.



10. The next step allows you to choose a different name for your initial branch. The default is 'master.' Unless you're working in a team that requires a different name, leave the default option and click **Next.**



11. This installation step allows you to change the **PATH environment**. The **PATH** is the default set of directories included when you run a command from the command line. Leave this on the middle (recommended) selection and click **Next**.



Server Certificates, Line Endings and Terminal Emulators

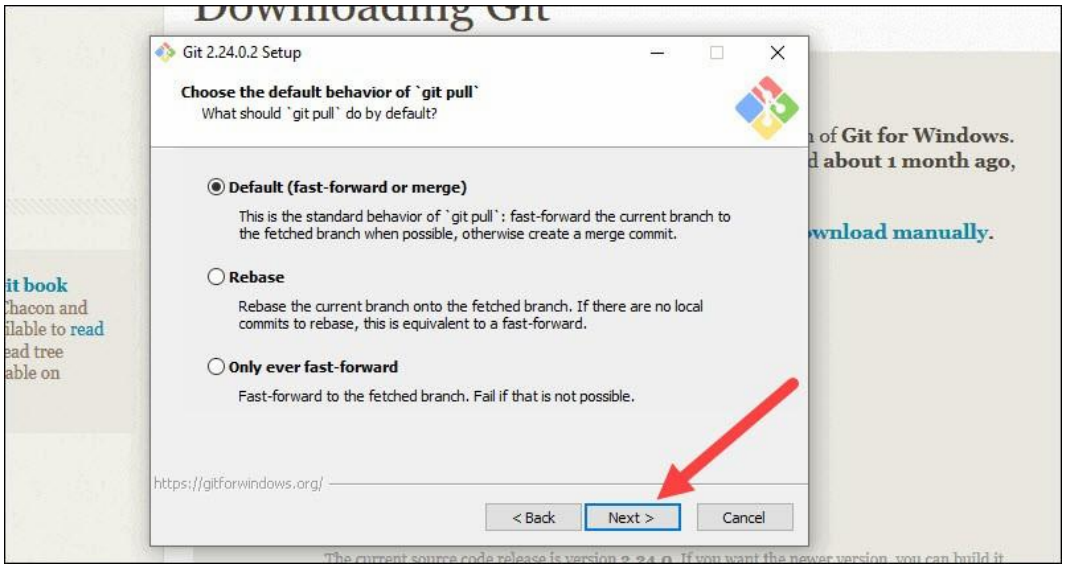
12. The installer now asks which SSH client you want Git to use. Git already comes with its own SSH client, so if you don't need a specific one, leave the default option and click **Next.**

13. The next option relates to server certificates. Most users should use the default. If you're working in an Active Directory environment, you may need to switch to Windows Store certificates. Click **Next**.

14. The next selection converts line endings. It is recommended that you leave the default selection. This relates to the way data is formatted and changing this option may cause problems. Click **Next**.

15. Choose the terminal emulator you want to use. The default MinTTY is recommended, for its features. Click **Next**.

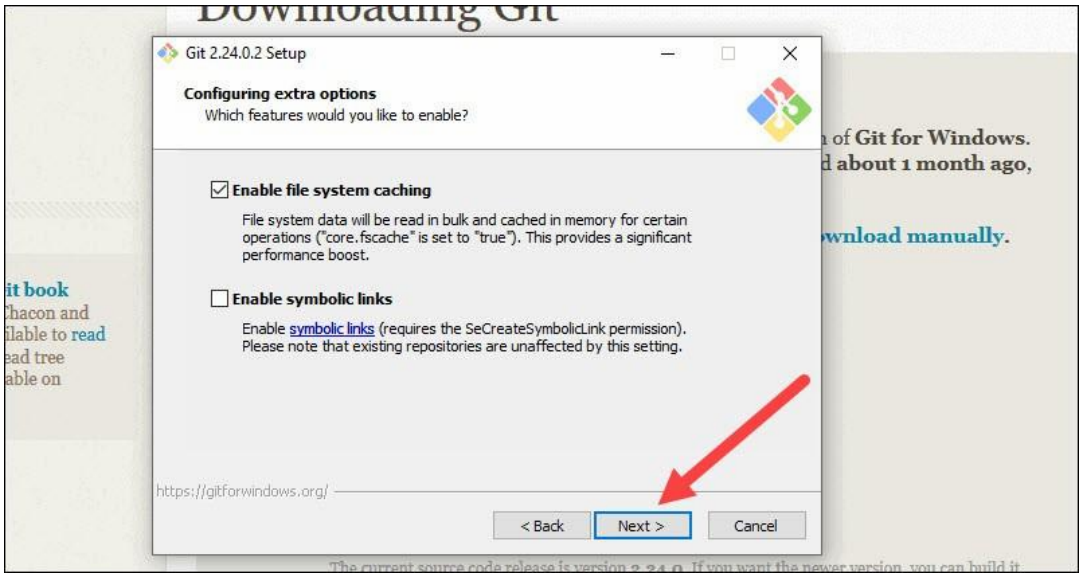
16. The installer now asks what the `git pull` command should do. The default option is recommended unless you specifically need to change its behavior. Click **Next** to continue with the installation.



17. Next you should choose which credential helper to use. Git uses credential helpers to fetch or save credentials. Leave the default option as it is the most stable one, and click **Next**.

Additional Customization Options

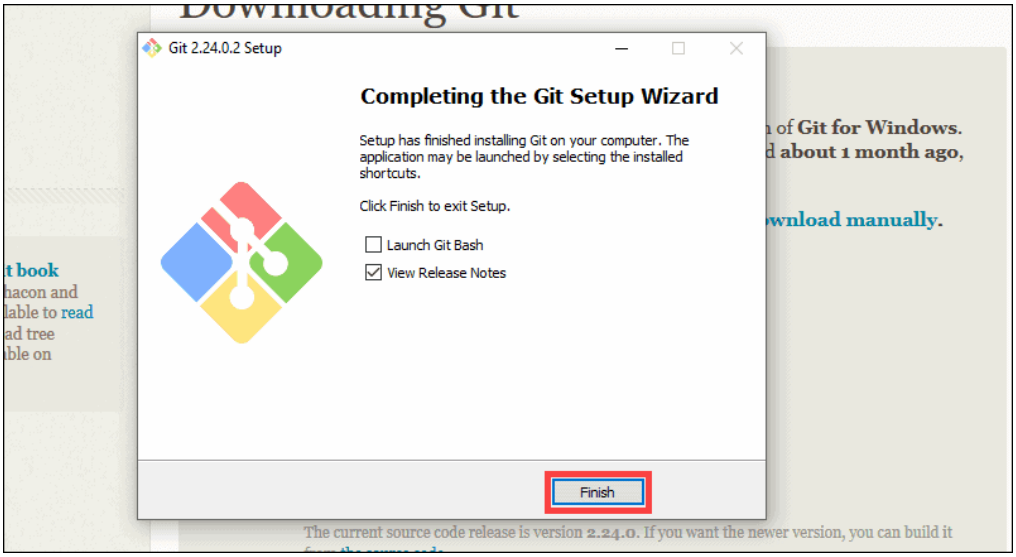
18. The default options are recommended, however this step allows you to decide which extra option you would like to enable. If you use symbolic links, which are like shortcuts for the command line, tick the box. Click **Next**.



19. Depending on the version of Git you're installing, it may offer to install experimental features. At the time this article was written, the options to include support for pseudo controls and a built-in file system monitor were offered. Unless you are feeling adventurous, leave them unchecked and click **Install**.

Complete Git Installation Process

20. Once the installation is complete, tick the boxes to view the Release Notes or Launch Git Bash, then click **Finish**.

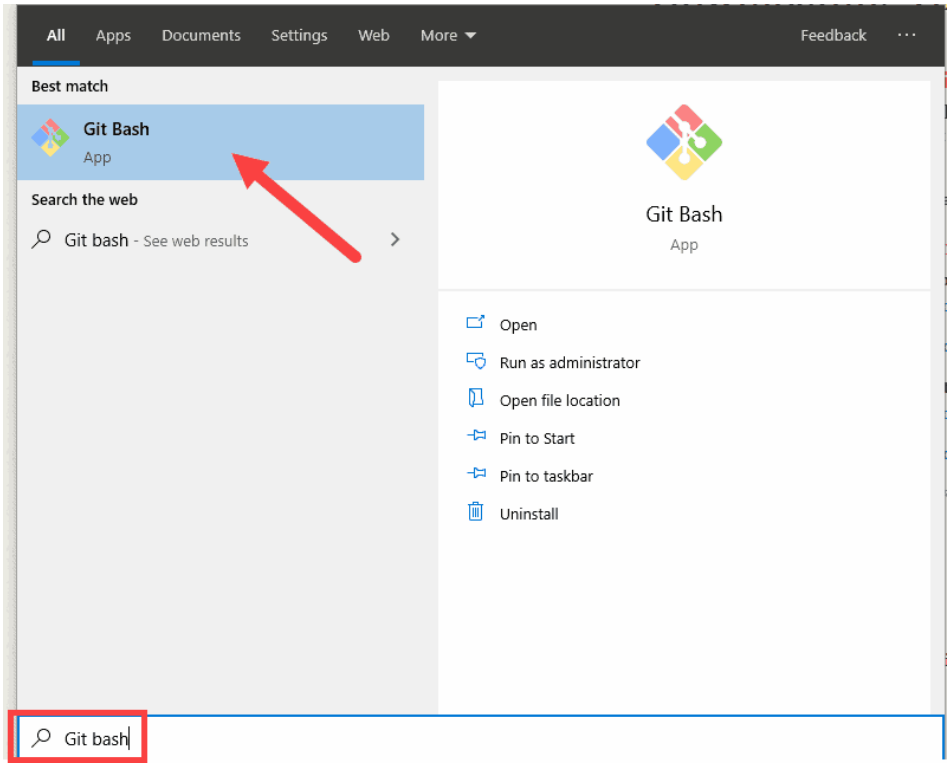


How to Launch Git in Windows

Git has two modes of use – a **bash scripting shell** (or command line) and a **graphical user interface** (GUI).

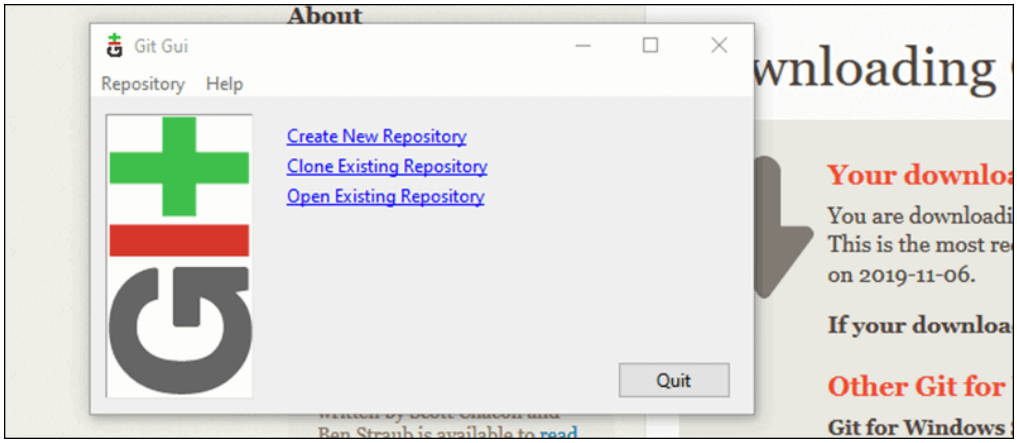
Launch Git Bash Shell

To launch **Git Bash** open the **Windows Start** menu, type ***git bash*** and press **Enter** (or click the application icon).



Launch Git GUI

To launch **Git GUI** open the **Windows Start** menu, type ***git gui*** and press **Enter** (or click the application icon).



Commands:

Git Commands: Working With Local Repositories

git init

- The command git init is used to create an empty Git repository.
- After the git init command is used, a .git folder is created in the directory with some subdirectories. Once the repository is initialized, the process of creating other files begins.

git init

git add

- Add command is used after checking the status of the files, to add those files to the staging area.

- Before running the commit command, "git add" is used to add any new or modified files.

```
git add .
```

git commit

- The commit command makes sure that the changes are saved to the local repository.
- The command "git commit –m <message>" allows you to describe everyone and help them understand what has happened.

```
git commit -m “commit message”
```

git status

- The git status command tells the current state of the repository.
- The command provides the current working branch. If the files are in the staging area, but not committed, it will be shown by the git status. Also, if there are no changes, it will show the message no changes to commit, working directory clean.

git config

- The git config command is used initially to configure the user.name and user.email. This specifies what email id and username will be used from a local repository.
- When git config is used with --global flag, it writes the settings to all repositories on the computer.

```
git config --global user.name “any user name”

git config --global user.email <email id>
```

git branch

- The git branch command is used to determine what branch the local repository is on.
- The command enables adding and deleting a branch.

```
# Create a new branch
  git branch <branch_name>
# List all remote or local branches
  git branch -a
# Delete a branch
  git branch -d <branch_name>
```

git checkout

- The git checkout command is used to switch branches, whenever the work is to be started on a different branch.
- The command works on three separate entities: files, commits, and branches.

```
# Checkout an existing branch
  git checkout <branch_name>
# Checkout and create a new branch with that name
  git checkout -b <new_branch>
```

git merge

- The git merge command is used to integrate the branches together. The command combines the changes from one branch to another branch.
- It is used to merge the changes in the staging branch to the stable branch.

git merge <branch_name>

Git Commands: Working With Remote Repositories

git remote

- The git remote command is used to create, view, and delete connections to other repositories.
- The connections here are not like direct links into other repositories, but as bookmarks that serve as convenient names to be used as a reference.

```
git remote add origin <address>
```

git clone

- The git clone command is used to create a local working copy of an existing remote repository.
- The command downloads the remote repository to the computer. It is equivalent to the Git init command when working with a remote repository.

```
git clone <remote_URL>
```

git pull

- The git pull command is used to fetch and merge changes from the remote repository to the local repository.
- The command "git pull origin master" copies all the files from the master branch of the remote repository to the local repository.

```
git pull <branch_name> <remote URL>
```

git push

- The command git push is used to transfer the commits or pushing the content from the local repository to the remote repository.
- The command is used after a local repository has been modified, and the modifications are to be shared with the remote team members.

```
git push -u origin master
```

git stash

- The git stash command takes your modified tracked files and saves it on a pile of incomplete changes that you can reapply at any time. To go back to work, you can use the stash pop.
- The git stash command will help a developer switch branches to work on something else without committing to incomplete work.

```
# Store current work with untracked files
  git stash -u
# Bring stashed work back to the working directory
  git stash pop
```

git log

- The git log command shows the order of the commit history for a repository.

- The command helps in understanding the state of the current branch by showing the commits that lead to this state.

```
git log
```

Output Screenshots:

Conclusion:

Successfully performed all basic commands.

EXPERIMENT NO. – 02

Aim of the Experiment: -

Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

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Practical Incharge

PRACTICAL NO. 2

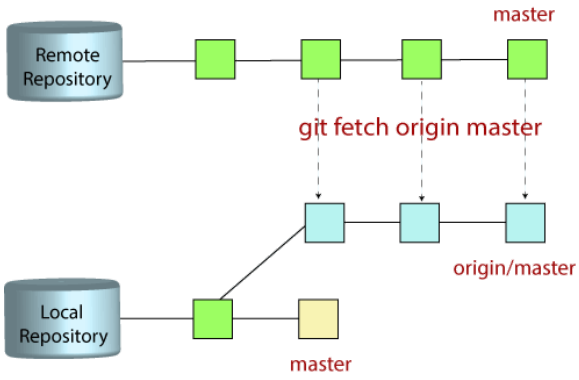
Problem Definition: To fetch and synchronize Git repository.

Compiler / Tool : Git-2.35.1.2-64-bit

Implementation:

Git Fetch

Git "fetch" Downloads commits, objects and refs from another repository. It fetches branches and tags from one or more repositories. It holds repositories along with the objects that are necessary to complete their histories to keep updated remote-tracking branches.



The "git fetch"command

The "**git fetch**" **command** is used to pull the updates from remote-tracking branches. Additionally, we can get the updates that have been pushed to our remote branches to our local machines. As we know, a branch is a variation of our repositories main code, so the remote-tracking branches are branches that have been set up to pull and push from remote repository.

How to fetch Git Repository

We can use fetch command with many arguments for a particular data fetch. See the below scenarios to understand the uses of fetch command.

Scenario 1: To fetch the remote repository:

We can fetch the complete repository with the help of fetch command from a repository URL like a pull command does.

Syntax:

$ git fetch< repository Url>

Scenario 2: To fetch a specific branch:

We can fetch a specific branch from a repository. It will only access the element from a specific branch.

Syntax:

$ git fetch <branch URL><branch name>

Scenario 3: To fetch all the branches simultaneously:

The git fetch command allows to fetch all branches simultaneously from a remote repository

Syntax:

$ git fetch -all

Scenario 4: To synchronize the local repository:

Suppose, your team member has added some new features to your remote repository. So, to add these updates to your local repository, use the git fetch command. It is used as follows.

Syntax:

$ git fetch origin

The git fetch can fetch from either a single named repository or URL or from several repositories at once. It can be considered as the safe version of the git pull commands.

The git fetch downloads the remote content but not update your local repo's working state. When no remote server is specified, by default, it will fetch the origin remote.

Differences between git fetch and git pull

To understand the differences between fetch and pull, let's know the similarities between both of these commands. Both commands are used to download the data from a remote repository. But both of these commands work differently. Like when you do a git pull, it gets all the changes from the remote or central repository and makes it available to your corresponding branch in your local repository. When you do a git fetch, it fetches all the changes from the remote repository and stores it in a separate branch in your local repository. You can reflect those changes in your corresponding branches by merging.

So basically,

git pull = git fetch + git merge

Git Fetch vs. Pull

git fetch	git pull
Fetch downloads only new data from a remote repository.	Pull is used to update your current HEAD branch with the latest changes from the remote server.
Fetch is used to get a new view of all the things that happened in a remote repository.	Pull downloads new data and directly integrates it into your current working copy files.
Fetch never manipulates or spoils data.	Pull downloads the data and integrates it with the current working file.
It protects your code from merge conflict.	In git pull, there are more chances to create the **merge conflict**.
It is better to use git fetch command with git merge command on a pulled repository.	It is not an excellent choice to use git pull if you already pulled any repository.

Output Screenshot:

Add origin

Git status

Git merge origin/master

Conclusion:

Successfully fetch and synchronize Git repository.

EXPERIMENT NO. – 03

Aim of the Experiment: -

Lab Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

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Practical Incharge

PRACTICAL NO. 3

Problem Definition: To perform basic branching and merging in Git.

Compiler / Tool: Git-2.35.1.2-64-bit

Implementation:

Basic Branching and Merging

Let's go through a simple example of branching and merging with a workflow that you might use in the real world. You'll follow these steps:

1. Do some work on a website.
2. Create a branch for a new user story you're working on.
3. Do some work in that branch.

At this stage, you'll receive a call that another issue is critical and you need a hotfix. You'll do the following:

1. Switch to your production branch.
2. Create a branch to add the hotfix.
3. After it's tested, merge the hotfix branch, and push to production.
4. Switch back to your original user story and continue working.

Basic Branching

First, let's say you're working on your project and have a couple of commits already on the `master` branch.

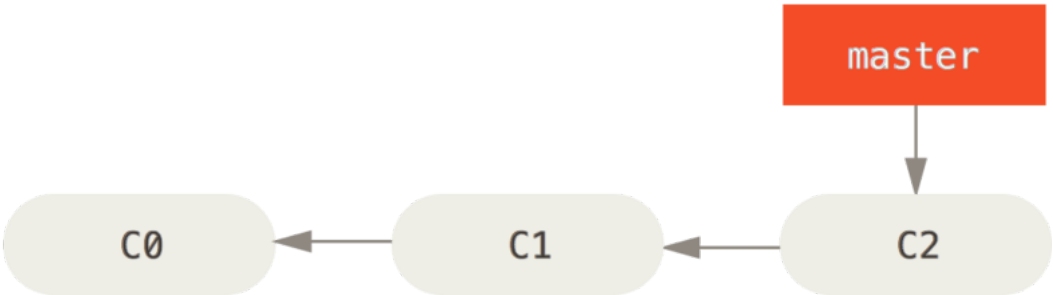


Figure 3.1. A simple commit history

You've decided that you're going to work on issue #53 in whatever issue-tracking system your company uses. To create a new branch and switch to it at the same time, you can run the `git checkout` command with the `-b` switch:

```
$ git checkout -b iss53
Switched to a new branch "iss53"
```

This is shorthand for:

```
$ git branch iss53
$ git checkout iss53
```

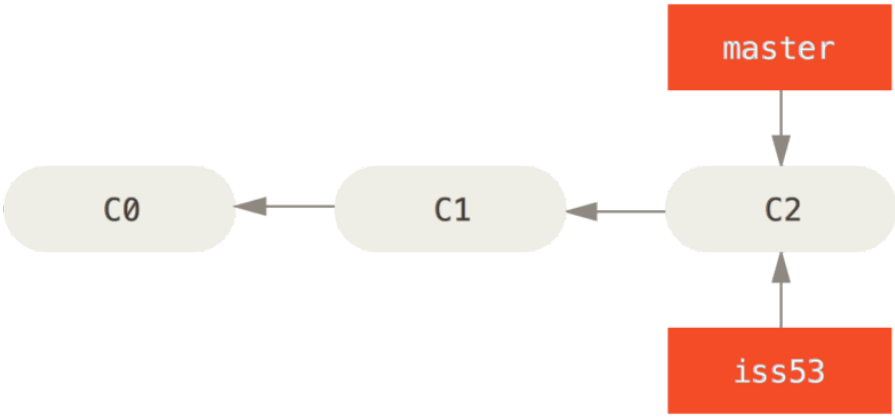


Figure 3.2. Creating a new branch pointer

You work on your website and do some commits. Doing so moves the `iss53` branch forward, because you have it checked out (that is, your `HEAD` is pointing to it):

```
$ vim index.html
$ git commit -a -m 'Create new footer [issue 53]'
```

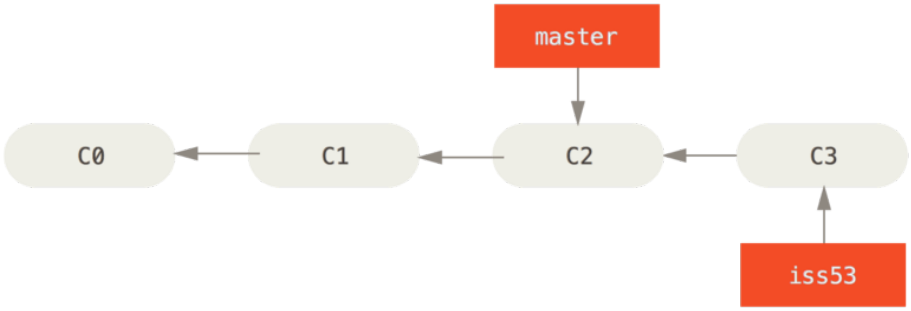


Figure 3.3. The `iss53` branch has moved forward with your work

Now you get the call that there is an issue with the website, and you need to fix it immediately. With Git, you don't have to deploy your fix along with the `iss53` changes you've made, and you don't have to put a lot of effort into reverting those changes before you can work on applying your fix to what is in production. All you have to do is switch back to your `master` branch.

However, before you do that, note that if your working directory or staging area has uncommitted changes that conflict with the branch you're checking out, Git won't let you switch branches. It's best to have a clean working state when you switch branches. There are ways to get around this (namely, stashing and commit amending) that we'll cover later on, in Stashing and Cleaning. For now, let's assume you've committed all your changes, so you can switch back to your `master` branch:

```
$ git checkout master
Switched to branch 'master'
```

At this point, your project working directory is exactly the way it was before you started working on issue #53, and you can concentrate on your hotfix. This is an important point to remember:

when you switch branches, Git resets your working directory to look like it did the last time you committed on that branch. It adds, removes, and modifies files automatically to make sure your working copy is what the branch looked like on your last commit to it.

Next, you have a hotfix to make. Let's create a `hotfix` branch on which to work until it's completed:

```
$ git checkout -b hotfix
Switched to a new branch 'hotfix'
$ vim index.html
$ git commit -a -m 'Fix broken email address'
[hotfix 1fb7853] Fix broken email address
 1 file changed, 2 insertions(+)
```

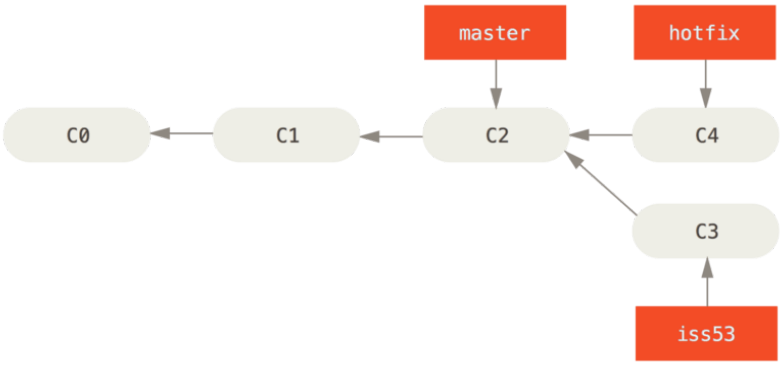


Figure 3.4. Hotfix branch based on `master`

You can run your tests, make sure the hotfix is what you want, and finally merge the `hotfix` branch back into your `master` branch to deploy to production. You do this with the `git merge` command:

```
$ git checkout master
$ git merge hotfix
Updating f42c576..3a0874c
Fast-forward
 index.html | 2 ++
 1 file changed, 2 insertions(+)
```

You'll notice the phrase "fast-forward" in that merge. Because the commit `C4` pointed to by the branch `hotfix` you merged in was directly ahead of the commit `C2` you're on, Git simply moves the pointer forward. To phrase that another way, when you try to merge one commit with a commit that can be reached by following the first commit's history, Git simplifies things by moving the pointer forward because there is no divergent work to merge together — this is called a "fast-forward."

Your change is now in the snapshot of the commit pointed to by the `master` branch, and you can deploy the fix.

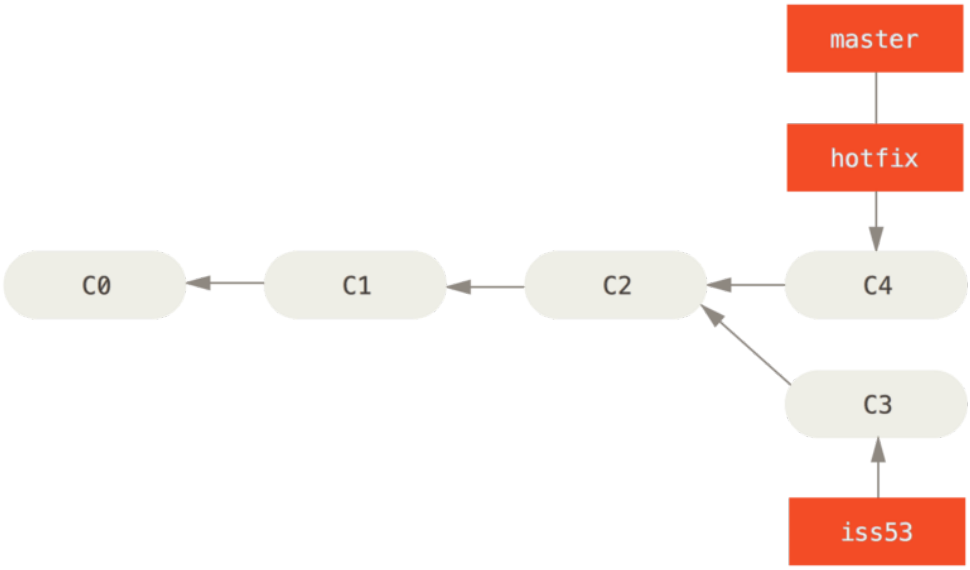


Figure 3.5. `master` is fast-forwarded to `hotfix`

After your super-important fix is deployed, you're ready to switch back to the work you were doing before you were interrupted. However, first you'll delete the `hotfix` branch, because you no longer need it — the `master` branch points at the same place. You can delete it with the `-d` option to `git branch`:

```
$ git branch -d hotfix
Deleted branch hotfix (3a0874c).
```

Now you can switch back to your work-in-progress branch on issue #53 and continue working on it.

```
$ git checkout iss53
Switched to branch "iss53"
$ vim index.html
$ git commit -a -m 'Finish the new footer [issue 53]'
[iss53 ad82d7a] Finish the new footer [issue 53]
1 file changed, 1 insertion(+)
```

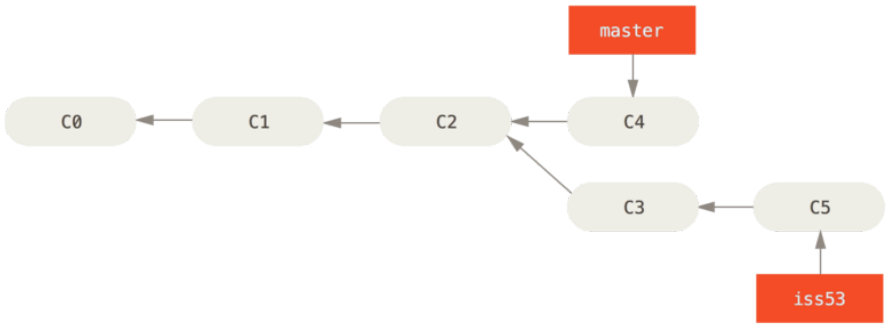


Figure 3.6. Work continues on `iss53`

It's worth noting here that the work you did in your `hotfix` branch is not contained in the files in your `iss53` branch. If you need to pull it in, you can merge your `master` branch into your `iss53` branch by running `git merge master`, or you can wait to integrate those changes until you decide to pull the `iss53` branch back into `master` later.

Basic Merging

Suppose you've decided that your issue #53 work is complete and ready to be merged into your `master` branch. In order to do that, you'll merge your `iss53` branch into `master`, much like you merged your `hotfix` branch earlier. All you have to do is check out the branch you wish to merge into and then run the `git merge` command:

```
$ git checkout master
Switched to branch 'master'
$ git merge iss53
Merge made by the 'recursive' strategy.
index.html |    1 +
1 file changed, 1 insertion(+)
```

This looks a bit different than the `hotfix` merge you did earlier. In this case, your development history has diverged from some older point. Because the commit on the branch you're on isn't a direct ancestor of the branch you're merging in, Git has to do some work. In this case, Git does a simple three-way merge, using the two snapshots pointed to by the branch tips and the common ancestor of the two.

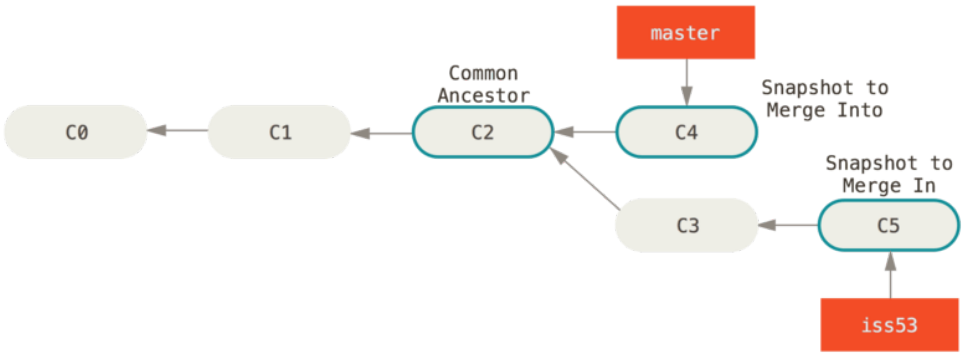


Figure 3.7. Three snapshots used in a typical merge

Instead of just moving the branch pointer forward, Git creates a new snapshot that results from this three-way merge and automatically creates a new commit that points to it. This is referred to as a merge commit, and is special in that it has more than one parent.

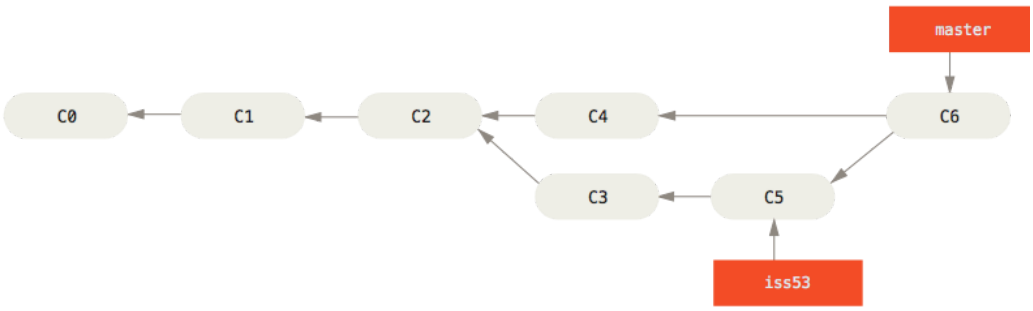


Figure 3.8. A merge commit

Now that your work is merged in, you have no further need for the `iss53` branch. You can close the issue in your issue-tracking system, and delete the branch:

```
$ git branch -d iss53
```

Basic Merge Conflicts

Occasionally, this process doesn't go smoothly. If you changed the same part of the same file differently in the two branches you're merging, Git won't be able to merge them cleanly. If your fix for issue #53 modified the same part of a file as the `hotfix` branch, you'll get a merge conflict that looks something like this:

```
$ git merge iss53
Auto-merging index.html
CONFLICT (content): Merge conflict in index.html
Automatic merge failed; fix conflicts and then commit the result.
```

Git hasn't automatically created a new merge commit. It has paused the process while you resolve the conflict. If you want to see which files are unmerged at any point after a merge conflict, you can run `git status`:

```
$ git status
On branch master
You have unmerged paths.
  (fix conflicts and run "git commit")

Unmerged paths:
  (use "git add <file>..." to mark resolution)

    both modified:      index.html

no changes added to commit (use "git add" and/or "git commit -a")
```

Anything that has merge conflicts and hasn't been resolved is listed as unmerged. Git adds standard conflict-resolution markers to the files that have conflicts, so you can open them manually and resolve those conflicts. Your file contains a section that looks something like this:

```
<<<<<<< HEAD:index.html
<div id="footer">contact : email.support@github.com</div>
=======
```

```
<div id="footer">
 please contact us at support@github.com
</div>
>>>>>>> iss53:index.html
```

This means the version in `HEAD` (your `master` branch, because that was what you had checked out when you ran your merge command) is the top part of that block (everything above the `=======`), while the version in your `iss53` branch looks like everything in the bottom part. In order to resolve the conflict, you have to either choose one side or the other or merge the contents yourself. For instance, you might resolve this conflict by replacing the entire block with this:

```
<div id="footer">
please contact us at email.support@github.com
</div>
```

This resolution has a little of each section, and the `<<<<<<<`, `=======`, and `>>>>>>>` lines have been completely removed. After you've resolved each of these sections in each conflicted file, run `git add` on each file to mark it as resolved. Staging the file marks it as resolved in Git.

If you want to use a graphical tool to resolve these issues, you can run `git mergetool`, which fires up an appropriate visual merge tool and walks you through the conflicts:

```
$ git mergetool

This message is displayed because 'merge.tool' is not configured.
See 'git mergetool --tool-help' or 'git help config' for more details.
'git mergetool' will now attempt to use one of the following tools:
opendiff kdiff3 tkdiff xxdiff meld tortoisemerge gvimdiff diffuse diffmerge
ecmerge p4merge araxis bc3 codecompare vimdiff emerge
Merging:
index.html

Normal merge conflict for 'index.html':
  {local}: modified file
  {remote}: modified file
Hit return to start merge resolution tool (opendiff):
```

If you want to use a merge tool other than the default (Git chose `opendiff` in this case because the command was run on a Mac), you can see all the supported tools listed at the top after "one of the following tools." Just type the name of the tool you'd rather use.

Output Screenshots:

Conclusion:

Successfully perform basic branching and merging in Git.

EXPERIMENT NO. – 04

Aim of the Experiment: -

Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

_____

Practical Incharge

PRACTICAL NO. 4

Problem Definition: To install and Jenkins and build a job in jenkins.

Compiler / Tool : Jenkins ,Java 8 or Java 11, Modern web browsers - Google Chrome, Mozilla Firefox, Microsoft Internet Explorer, Apple Safari.

Installation:

Steps to Install Jenkins on Windows

1. Install Java Development Kit (JDK)

Download JDK 8 and choose windows 32-bit or 64-bit according to your system configuration.
Click on "accept the license agreement."

2. Set the Path for the Environmental Variable for JDK

Go to System Properties. Under the "Advanced" tab, select "Environment Variables."
Under system variables, select "new." Then copy the path of the JDK folder and paste it in the corresponding value field. Similarly, do this for JRE.
Under system variables, set up a bin folder for JDK in PATH variables.
Go to command prompt and type the following to check if Java has been successfully installed:

```
C:\Users\lab3>java -version
```

3. Download and Install Jenkins

Download Jenkins. Under LTS, click on windows.
After the file is downloaded, unzip it. Click on the folder and install it. Select "finish" once done.

4. Run Jenkins on Localhost 8080

Once Jenkins is installed, explore it. Open the web browser and type "localhost:8080".
Enter the credentials and log in. If you install Jenkins for the first time, the dashboard will ask you to install the recommended plugins. Install all the recommended plugins.

5. Jenkins Server Interface

New Item allows you to create a new project.
Build History shows the status of your builds.
Manage System deals with the various configurations of the system.

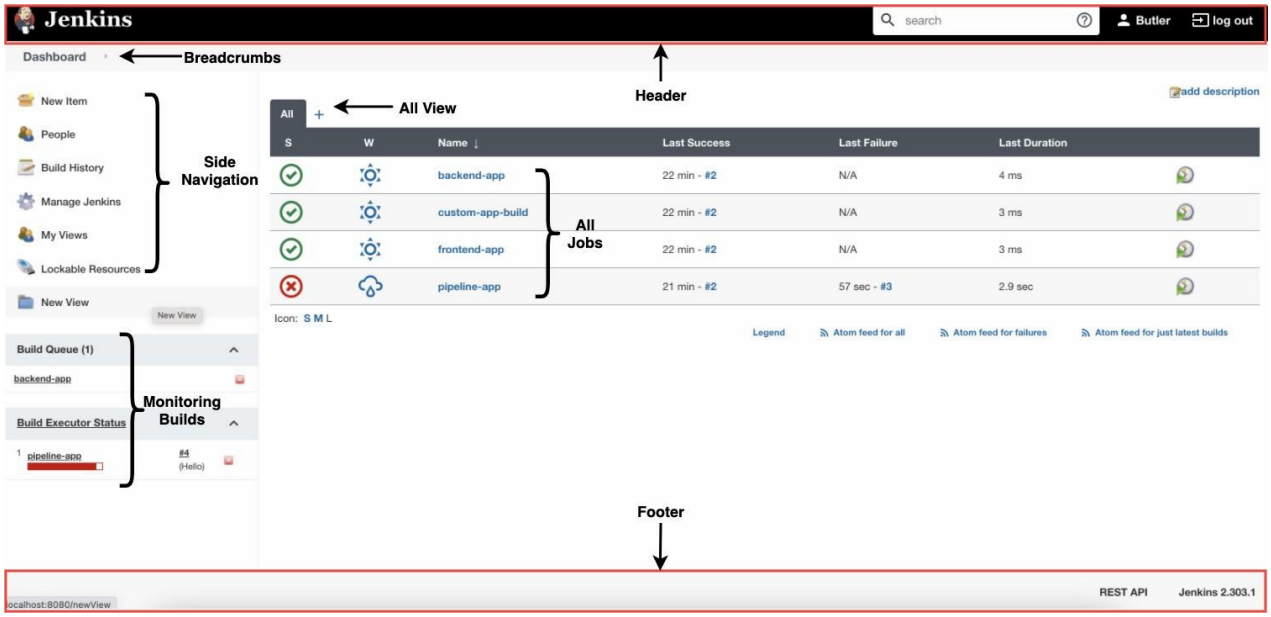
6. Build and Run a Job on Jenkins

Select a new item (Name - Jenkins_demo). Choose a freestyle project and click Ok.
Under the General tab, give a description like "This is my first Jenkins job." Under the "Build Triggers" tab, select add built step and then click on the "Execute Windows" batch command.
In the command box, type the following: echo "Hello... This is my first Jenkins Demo: %date%: %time% ". Click on apply and then save.

Select build now. You can see a building history has been created. Click on that. In the console output, you can see the output of the first Jenkins job with time and date.

Post Installation Setup Wizard: Accessing the Jenkins Home Page

You are now ready to access Jenkins home page at http:<YOUR IP ADDRESS>:<PORT>.

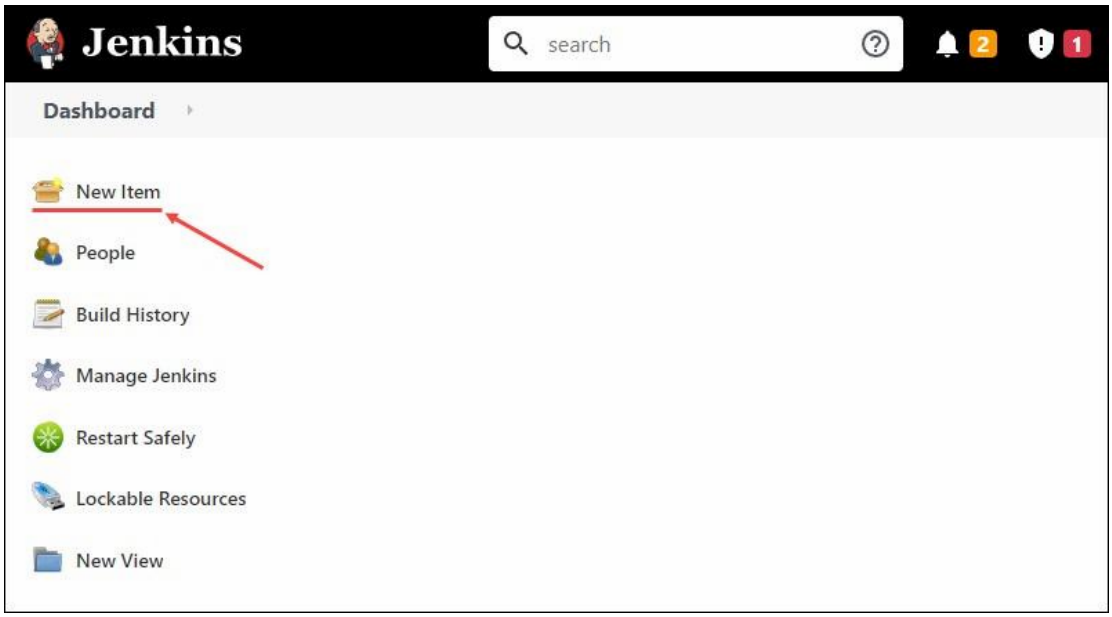


How to Set up a Build Job in Jenkins

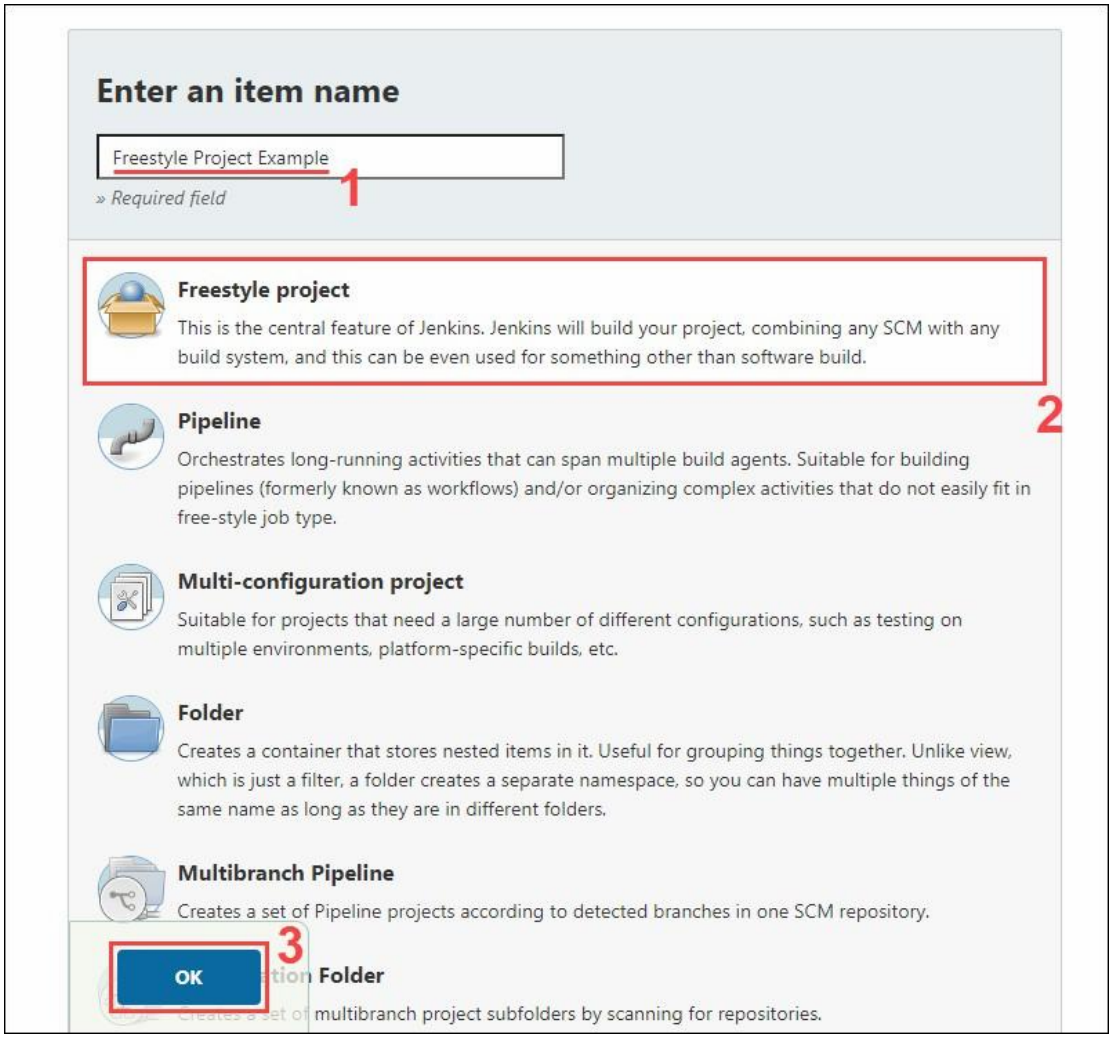
Follow the steps outlined below to set up and run a new Jenkins freestyle project.

Step 1: Create a New Freestyle Project

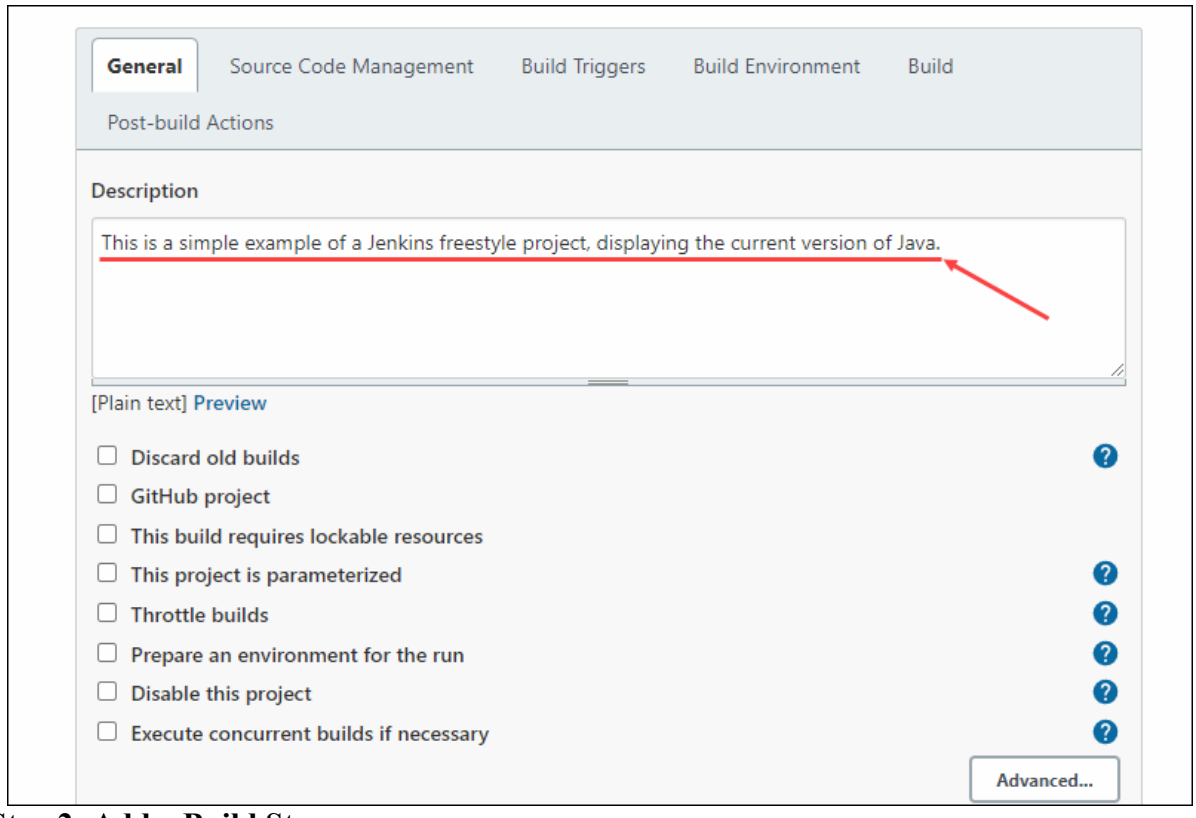
1. Click the **New Item** link on the left-hand side of the Jenkins dashboard.



2. Enter the new project's name in the **Enter an item name** field and select the **Freestyle project** type. Click **OK** to continue.



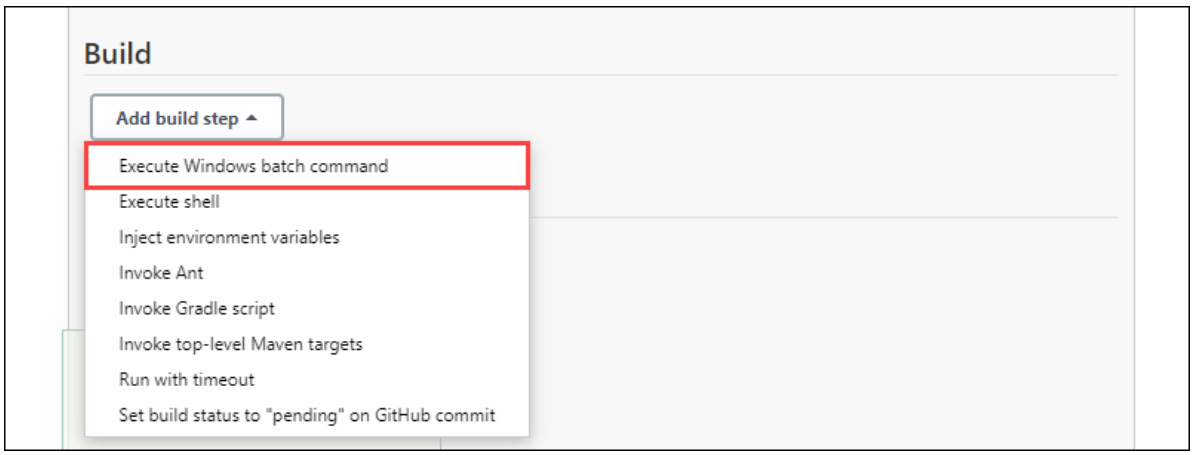
3. Under the *General* tab, add a project description in the **Description** field.



Step 2: Add a Build Step

1. Scroll down to the *Build* section.

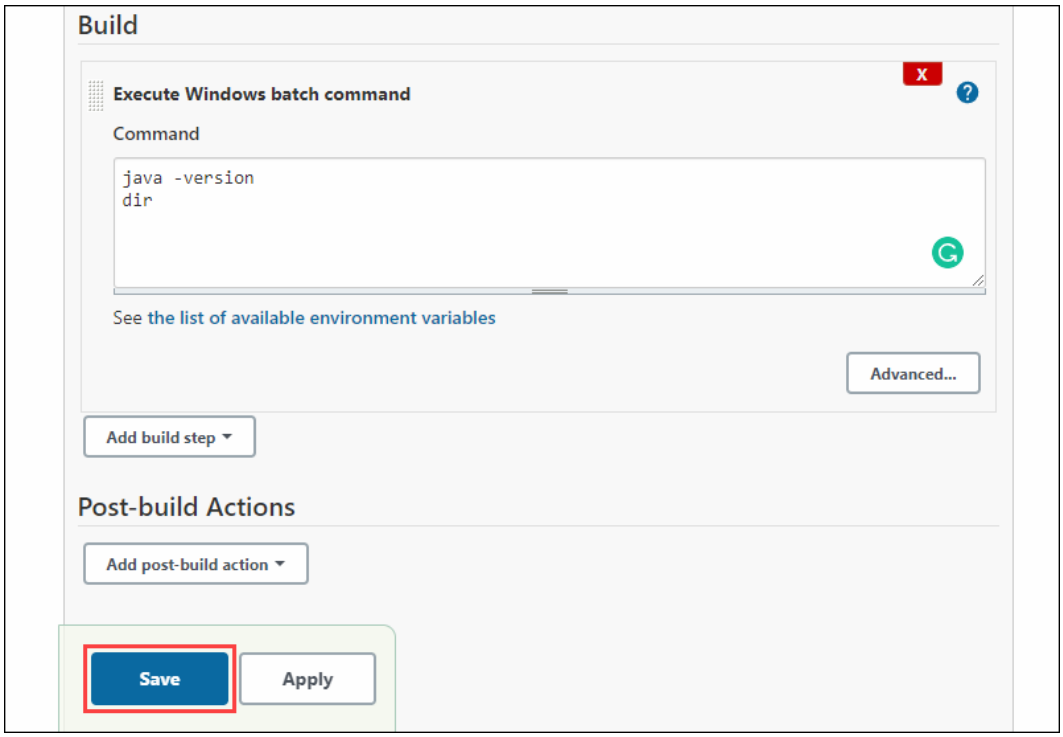
2. Open the **Add build step** drop-down menu and select **Execute Windows batch command**.



3. Enter the commands you want to execute in the **Command** field. For this tutorial, we are using a simple set of commands that display the current version of Java and Jenkins working directory:

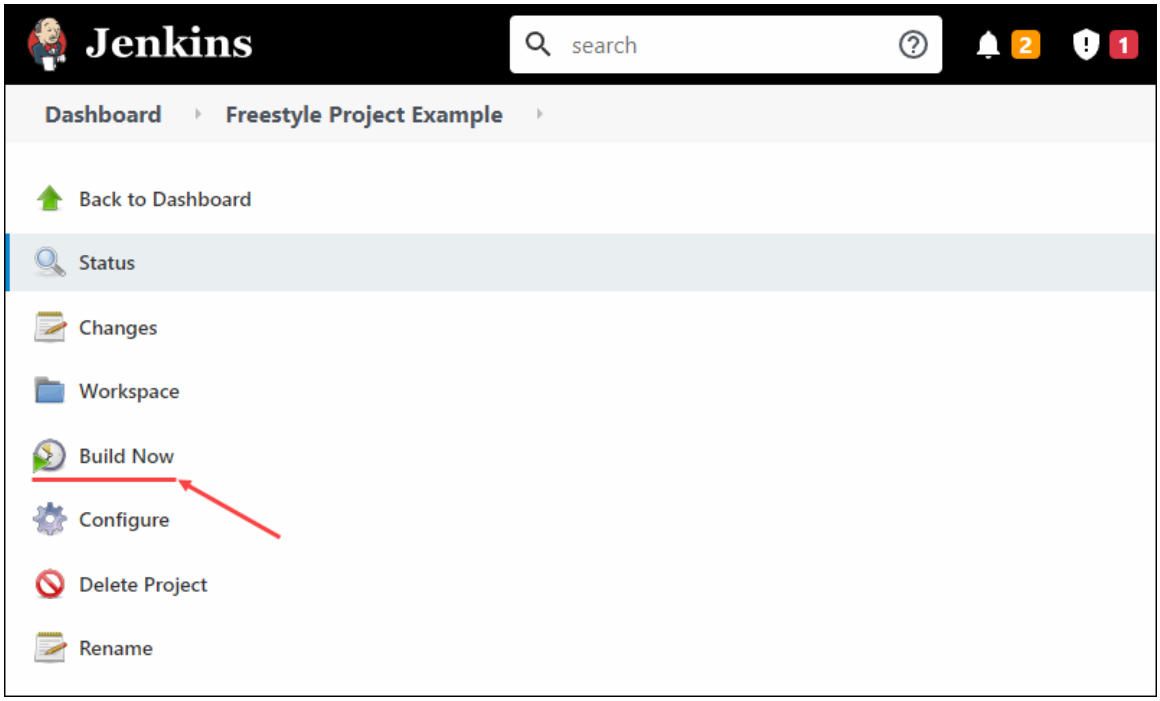
```
java -version
dir
```

4. Click the **Save** button to save changes to the project.

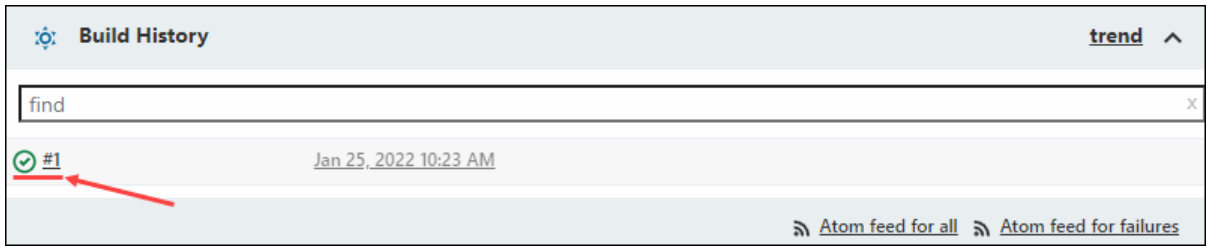


Step 3: Build the Project

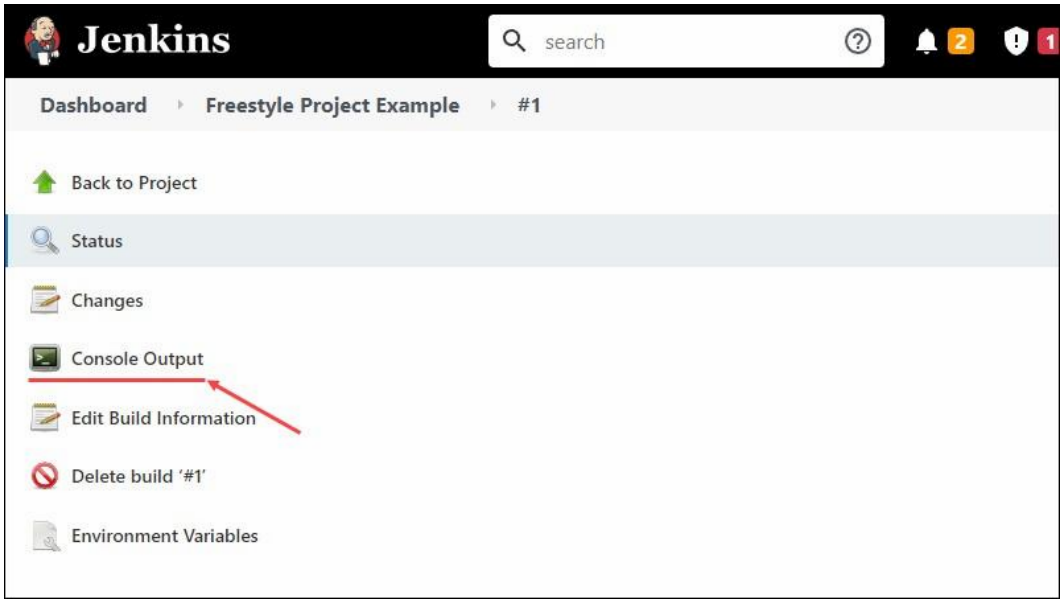
1. Click the **Build Now** link on the left-hand side of the new project page.



2. Click the link to the latest project build in the *Build History* section.



3. Click the **Console Output** link on the left-hand side to display the output for the commands you entered.



4. The console output indicates that Jenkins is successfully executing the commands, displaying the current version of Java and Jenkins working directory.

Output Screenshots:

Conclusion:
install and Jenkins and build a job in Jenkins successfully.

EXPERIMENT NO. – 05

Aim of the Experiment: -

Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

Practical Incharge

PRACTICAL NO. 5

Problem Definition: To create a CI/CD pipeline in Jenkins

Compiler / Tool : Jenkins ,Java 8 or Java 11, Modern web browsers - Google Chrome, Mozilla Firefox, Microsoft Internet Explorer, Apple Safari.

Theory:

What is a CI/CD pipeline?

A CI/CD pipeline automates the process of software delivery. It builds code, runs tests, and helps you to safely deploy a new version of the software. CI/CD pipeline reduces manual errors, provides feedback to developers, and allows fast product iterations.

CI/CD pipeline introduces automation and continuous monitoring throughout the lifecycle of a software product. It involves from the integration and testing phase to delivery and deployment. These connected practices are referred as CI/CD pipeline.

What is Continuous Integration, Continuous Delivery, and Continuous Deployment?

Continuous integration is a software development method where members of the team can integrate their work at least once a day. In this method, every integration is checked by an automated build to search the error.

Continuous delivery is a software engineering method in which a team develops software products in a short cycle. It ensures that software can be easily released at any time.

Continuous deployment is a software engineering process in which product functionalities are delivered using automatic deployment. It helps testers to validate whether the codebase changes are correct, and it is stable or not.

Implementation:

To Build a CI/CD Pipeline With Jenkins

Go to your Jenkins Portal:

Click on ‘Create a job’.
In the item name dialog box, you may enter the ‘pipeline’.
Select the pipeline job type in the list below.
Click on OK.

A configuration related to the pipeline opens on the screen.

Scroll down on that page.
There in the dialog box, choose GitHub+Maven.

The next step is to integrate the Jenkins file into the Version Control

system. So, to do that, you must:

Select ‘Pipeline script from SCM’.

Then in the SCM dialog box, select Git.
‘Jenkins file’ is the name of the Script.
Add the Git repository URL.
You can add the credentials if any.

The credentials can be added with the help of the ‘Add’ option.

Then save the configuration

A page now appears on the screen that gives you various options like ‘Build Now’, ‘Delete Pipeline’, ‘Configure’, etc.

Click on the Build Now option.

The pipeline will start downloading. The checkout will be visible on the screen and you can see the build being complete on the screen.

You can go to the console output option to check the log that is taking place.

Output Screenshots:

Step 1: Download Jenkins

Step 2: Execute Jenkins as a Java binary

```
java -jar ./jenkins.war
```

Step 3: Create a new Jenkins job

Step 4: Create a pipeline job

Step 5: Configure and execute a pipeline job through a direct script

Conclusion:

Successfully created pipeline in jenkins

EXPERIMENT NO. – 06

Aim of the Experiment: -

Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

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Practical Incharge

PRACTICAL NO. 6

Problem Definition: To install Docker and execute basic command in Docker.

Compiler / Tool : Docker

Installation:

Step-By-Step Docker Installation on Windows

1. Go to the website https://docs.docker.com/docker-for-windows/install/ and download the docker file.

Note: A 64-bit processor and 4GB system RAM are the hardware prerequisites required to successfully run Docker on Windows 10.

2. Then, double-click on the Docker Desktop Installer.exe to run the installer.

Note: Suppose the installer (Docker Desktop Installer.exe) is not downloaded; you can get it from Docker Hub and run it whenever required.

3. Once you start the installation process, always enable Hyper-V Windows Feature on the Configuration page.

4. Then, follow the installation process to allow the installer and wait till the process is done.

5. After completion of the installation process, click Close and restart.

Implementation:

Run/Start Docker Application on Windows

Once you have successfully installed the docker desktop application, you will have to start the application as it will not start automatically after installation.

Go to the **start menu**, and **search for Docker**, **click on the Docker Desktop**.

You will see a **moving whale icon** appear in your taskbar, which means the docker desktop application is getting started. Wait for this whale icon to stop moving and become steady, which means docker has started.

Once the docker desktop application starts, you can use the **windows command prompt to run docker commands**.

To verify the installation, run the following command to check the version of the docker installed:

```
docker --version
```

Output Screenshots:

Conclusion:
Bascis docker commands are executed.

EXPERIMENT NO. – 07

Aim of the Experiment: -

Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

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Practical Incharge

PRACTICAL NO. 7

Problem Definition: To build image from docker file.

Compiler / Tool : Java Compile , Eclipse IDE

Theory:

The Docker engine includes tools that automate container image creation. While you can create container images manually by running the `docker commit` command, adopting an automated image creation process has many benefits, including:

Storing container images as code.
Rapid and precise recreation of container images for maintenance and upgrade purposes.
Continuous integration between container images and the development cycle.

The Docker components that drive this automation are the Dockerfile, and the `docker build` command.

The Dockerfile is a text file that contains the instructions needed to create a new container image. These instructions include identification of an existing image to be used as a base, commands to be run during the image creation process, and a command that will run when new instances of the container image are deployed.

Docker build is the Docker engine command that consumes a Dockerfile and triggers the image creation process.

Implementation:

Basic Syntax

In its most basic form, a Dockerfile can be very simple. The following example creates a new image, which includes IIS, and a ‘hello world’ site.

A Dockerfile must be created with no extension. To do this in Windows, create the file with your editor of

choice, then save it with the notation "Dockerfile" (including the quotes).

```
# Sample Dockerfile

# Indicates that the windowsservercore image will be used as the base image.
FROM mcr.microsoft.com/windows/servercore:ltsc2019
```

```
LABEL maintainer="jshelton@contoso.com"

# Uses dism.exe to install the IIS role.

RUN dism.exe /online /enable-feature /all /featurename:iis-webserver /NoRestart

# Creates an HTML file and adds content to this file.

RUN echo "Hello World - Dockerfile" > c:\inetpub\wwwroot\index.html

# Sets a command or process that will run each time a container is run from the new image.

CMD [ "cmd" ]
```

Instructions

Dockerfile instructions provide the Docker Engine the instructions it needs to create a container image. These instructions are performed one-by-one and in order. The following examples are the most commonly used instructions in Dockerfiles.

FROM

The `FROM` instruction sets the container image that will be used during the new image creation process. For instance, when using the instruction `FROM mcr.microsoft.com/windows/servercore`, the resulting image is derived from, and has a dependency on, the Windows Server Core base OS image. If the specified image is not present on the system where the Docker build process is being run, the Docker engine will attempt to download the image from a public or private image registry.

The FROM instruction's format goes like this:

```
FROM <image>
```

To download the ltsc2019 version windows server core from the Microsoft Container Registry (MCR):

```
FROM mcr.microsoft.com/windows/servercore:ltsc2019
```

RUN

The `RUN` instruction specifies commands to be run, and captured into the new container image. These commands can include items such as installing software, creating files and directories, and creating environment configuration.

The RUN instruction goes like this:

```
# exec form
```

```
RUN ["<executable>", "<param 1>", "<param

2>"] # shell form

RUN <command>
```

The difference between the exec and shell form is in how the `RUN` instruction is executed. When using the exec form, the specified program is run explicitly.

Here's an example of the exec form:

```
FROM
mcr.microsoft.com/windows/servercore:ltsc2019
RUN ["powershell", "New-Item", "c:/test"]
```

The resulting image runs the `powershell New-Item c:/test` command:

```
docker history doc-exe-method

IMAGE               CREATED             CREATED BY                      SIZE
COMMENT
b3452b13e472        2 minutes ago       powershell New-Item c:/test     30.76 MB
```

Output Screenshots:

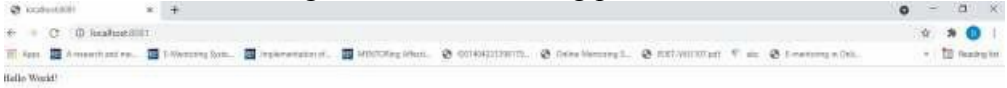
Step 1. Create a docker Hub account

```
C:\python-docker>docker run --name python-app -p 5000:5000 my-python-app
 * Running on http://0.0.0.0:5000/ (Press CTRL+C to quit)
 * Restarting with stat
 * Serving Flask app "index" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Debugger is active!
 * Debugger PIN: 281-336-181
172.17.0.1 - - [10/May/2021 18:10:37] "GET / HTTP/1.1" 200 -
172.17.0.1 - - [10/May/2021 18:10:38] "GET /favicon.ico HTTP/1.1" 404 -
```

Step2: Build a demo application my-python-app by running the following commands in command prompt

Till now we have create the my-python-app file

See if the file is working in the browser using port number



Step3: See all the images present in the docker. Here you will see that my-python-app is also present.

```
C:\>docker images
REPOSITORY                                  TAG       IMAGE ID       CREATED          SIZE
my-python-app                               latest    00150bea5a3a   2 minutes ago    91.6MB
demo-spring-example                         latest    5f7f949046b6   3 days ago       531MB
shwetashakapnor1999/demo-spring-example     latest    5f7f949046b6   3 days ago       531MB
alpine/git                                  latest    c99c7d810bc1   2 weeks ago      25.1MB
hello-world                                 latest    d1165f221234   2 months ago     13.3kB
```

Step4: Login to the docker hub account

```
C:\>docker login
Authenticating with existing credentials...
Login Succeeded
```

Step5: To push the image with your repository name

```
C:\>docker tag my-python-app:latest shwetashakapnor1999/my-python-app
```

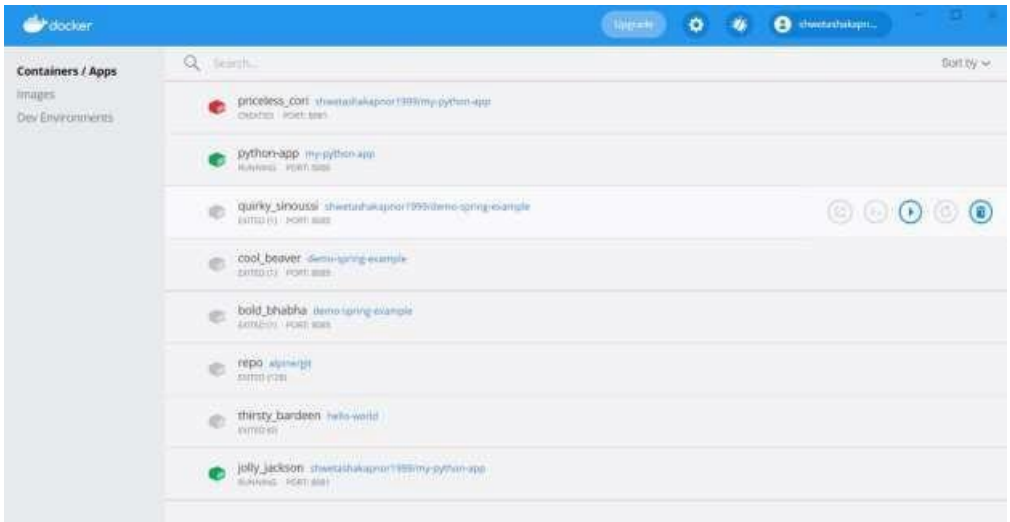
Step6: Check the images present, this should include the image name with repository

```
C:\>docker images
REPOSITORY                                TAG       IMAGE ID       CREATED          SIZE
my-python-app                             latest    00150bea5a3a   5 minutes ago    91.6MB
shwetashakapnor1999/my-python-app         latest    00150bea5a3a   5 minutes ago    91.6MB
demo-spring-example                       latest    5f7f949046b6   3 days ago       531MB
shwetashakapnor1999/demo-spring-example   latest    5f7f949046b6   3 days ago       531MB
alpine/git                                latest    c99c7d810bc1   2 weeks ago      25.1MB
hello-world                               latest    d1165f221234   2 months ago     13.3kB
```

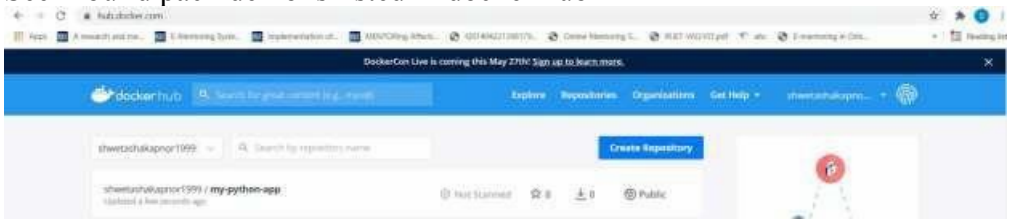
Step7: Push the image into docker hub account

```
C:\>docker push shwetashakapnor1999/my-python-app
Using default tag: latest
The push refers to repository [docker.io/shwetashakapnor1999/my-python-app]
19593e83d549: Pushed
5f70bf18a086: Pushed
608fd516c32b: Pushed
5fa31f02caa8: Mounted from library/python
88e61e328a3c: Mounted from library/python
9b77965e1d3f: Mounted from library/python
50f8b07e9421: Mounted from library/python
629164d914fc: Mounted from library/python
latest: digest: sha256:06394790b114211f71b2b8b8eec142c4a1e30663cdc5547baf6b0288ea445b54 size: 1992
```

You will see the application generated with the repository name in the docker container



See if build pack demo is listed in docker hub



Step8: Check that the images with the repository is now present in the list

```
C:\>docker run -p 8081:5000 shwetashakapnor1999/my-python-app
 * Serving Flask app "index" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://0.0.0.0:5000/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 303-727-519
```

Step9: Pull the image


```
C:\>docker run -p 8081:5000 shwetashakapnor1999/my-python-app
 * Serving Flask app "index" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://0.0.0.0:5000/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 303-727-519
```


Check it in the browser using the port number assigned.

Conclusion:

We have learn how to use Dockerfiles with Windows containers

References:

EXPERIMENT NO. – 08

Aim of the Experiment: -

Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

_____

Practical Incharge

PRACTICAL NO. 8

Problem Definition: To deploy java application into docker.

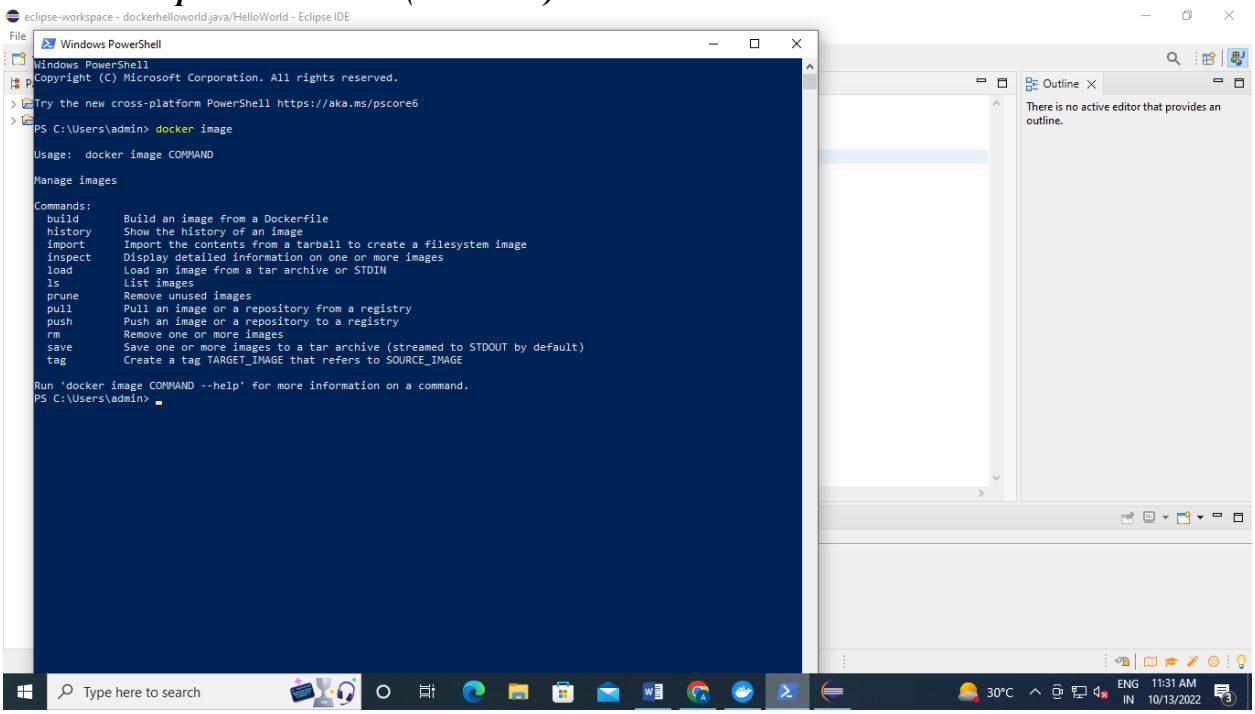
Compiler / Tool: Docker, Jdk

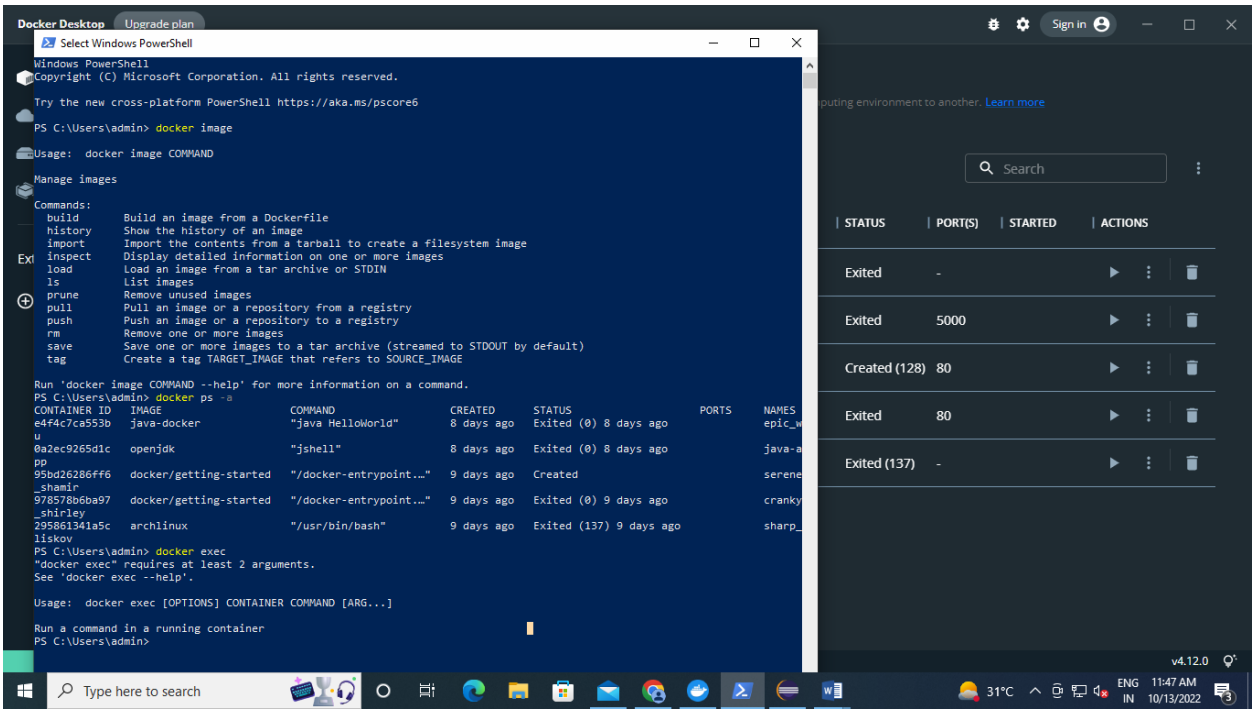
Implementation:

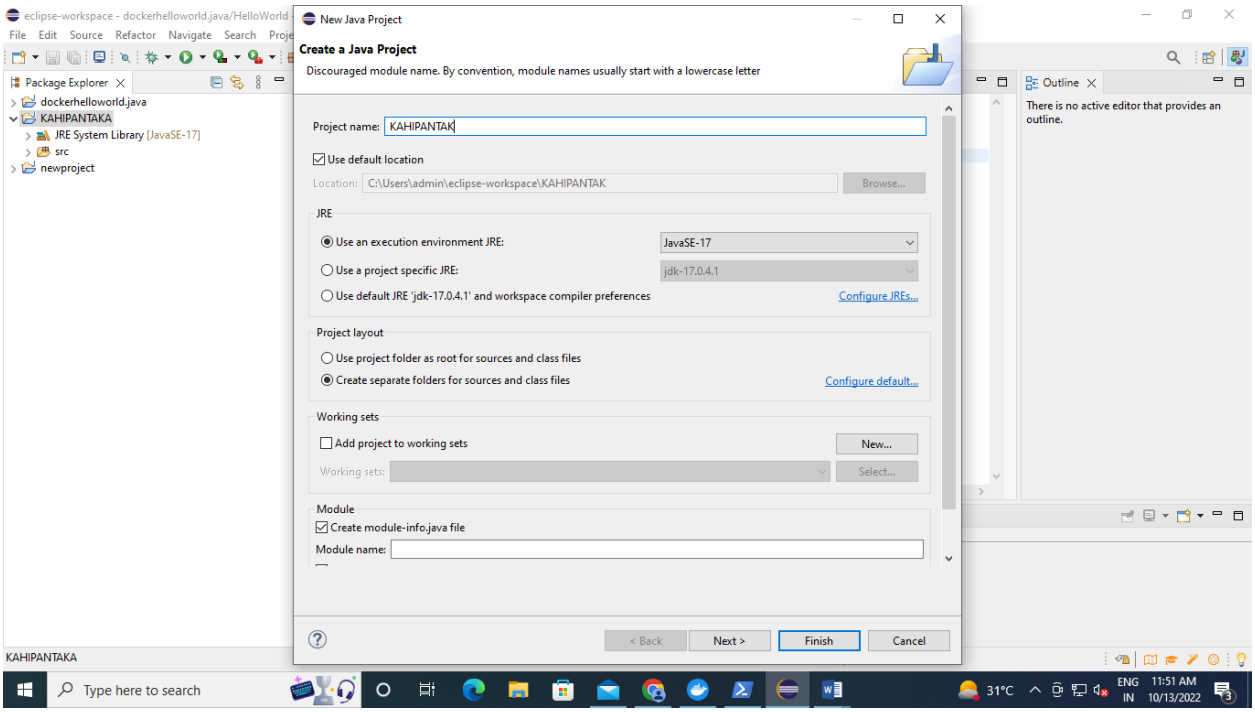
Step 1: install Java inside Docker

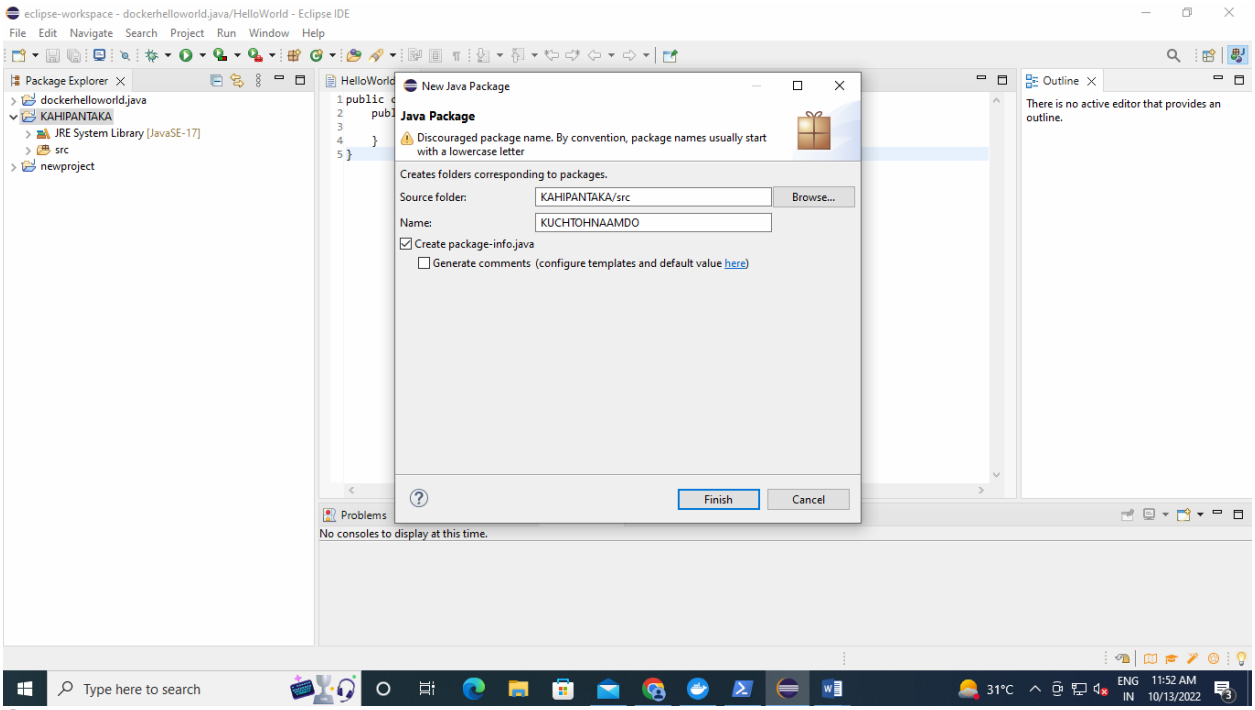
Step 2: install the app in your Docker container

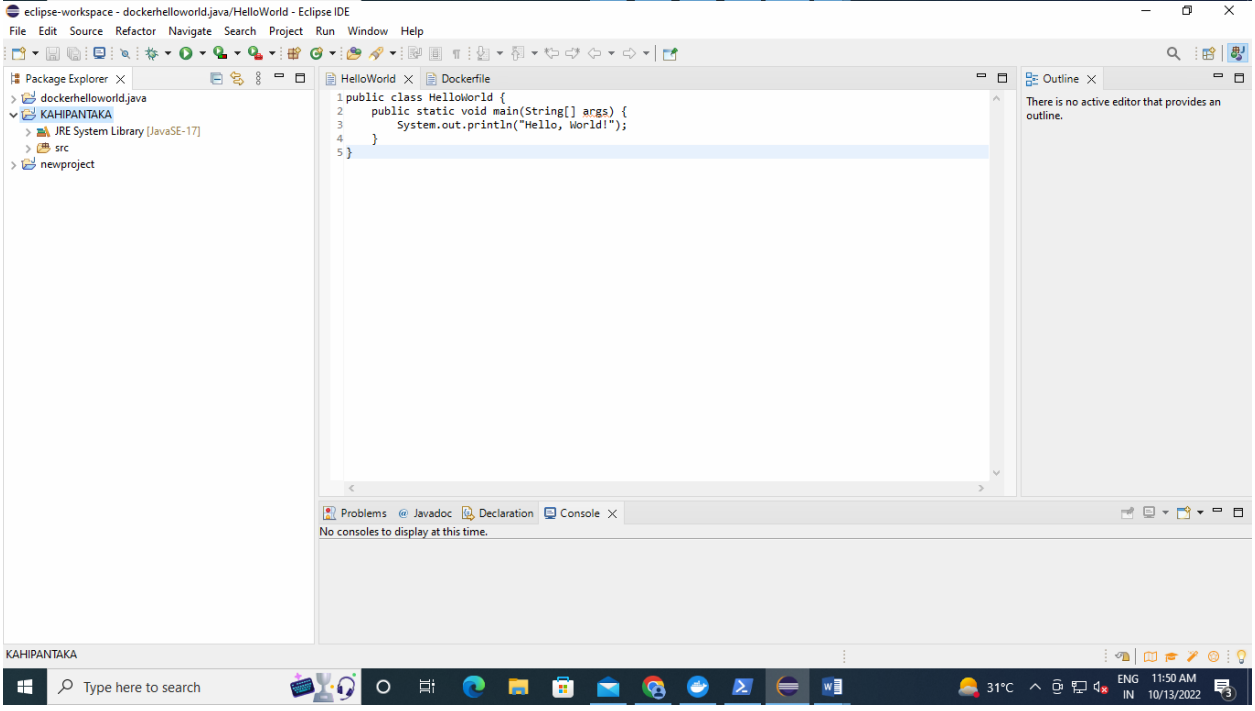
Output Screenshots: (command)




Docker Desktop
Upgrade plan
Sign in
Select Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.
Try the new cross-platform PowerShell https://aka.ms/pscore6
PS C:\Users\admin> docker image
Usage: docker image COMMAND
Manage images
Commands:
build Build an image from a Dockerfile
history Show the history of an image
import Import the contents from a tarball to create a filesystem image
inspect Display detailed information on one or more images
load Load an image from a tar archive or STDIN
ls List images
prune Remove unused images
pull Pull an image or a repository from a registry
push Push an image or a repository to a registry
rm Remove one or more images
save Save one or more images to a tar archive (streamed to STDOUT by default)
tag Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
Run 'docker image COMMAND --help' for more information on a command.
PS C:\Users\admin> docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
e4f4c7ca553b java-docker "java HelloWorld" 8 days ago Exited (0) 8 days ago epic_w
u
0a2ec9265d1c openjdk "jshell" 8 days ago Exited (0) 8 days ago java-a
pp
95bd26286ff6 docker/getting-started "/docker-entrypoint.…" 9 days ago Created serene
_shamir
978578b6ba97 docker/getting-started "/docker-entrypoint.…" 9 days ago Exited (0) 9 days ago cranky
_shirley
295861341a5c archlinux "/usr/bin/bash" 9 days ago Exited (137) 9 days ago sharp_
liskov
PS C:\Users\admin> docker exec
"docker exec" requires at least 2 arguments.
See 'docker exec --help'.
Usage: docker exec [OPTIONS] CONTAINER COMMAND [ARG...]
Run a command in a running container
PS C:\Users\admin>
Search
STATUS
PORT(S)
STARTED
ACTIONS
Exited -
Exited 5000
Created (128) 80
Exited 80
Exited (137) -
v4.12.0
Type here to search
31°C
ENG IN
11:47 AM
10/13/2022


eclipse-workspace - dockerhelloworld.java/HelloWorld
File Edit Source Refactor Navigate Search
Package Explorer
dockerhelloworld.java
KAHIPANTAKA
JRE System Library [JavaSE-17]
src
newproject
New Java Project
Create a Java Project
Discouraged module name. By convention, module names usually start with a lowercase letter
Project name: KAHIPANTAK
Use default location
Location: C:\Users\admin\eclipse-workspace\KAHIPANTAK
Browse...
JRE
Use an execution environment JRE: JavaSE-17
Use a project specific JRE: jdk-17.0.4.1
Use default JRE 'jdk-17.0.4.1' and workspace compiler preferences
Configure JREs...
Project layout
Use project folder as root for sources and class files
Create separate folders for sources and class files
Configure default...
Working sets
Add project to working sets
New...
Working sets:
Select...
Module
Create module-info.java file
Module name:
< Back
Next >
Finish
Cancel
Outline
There is no active editor that provides an outline.
KAHIPANTAKA
Type here to search
31°C
ENG IN
11:51 AM
10/13/2022


eclipse-workspace - dockerhelloworld.java/HelloWorld - Eclipse IDE
File Edit Navigate Search Project Run Window Help
Package Explorer
dockerhelloworld.java
KAHIPANTAKA
JRE System Library [JavaSE-17]
src
newproject
HelloWorld
New Java Package
Java Package
Discouraged package name. By convention, package names usually start with a lowercase letter
Creates folders corresponding to packages.
Source folder:
KAHIPANTAKA/src
Browse...
Name:
KUCHTOHNAAMDO
Create package-info.java
Generate comments (configure templates and default value here)
Finish
Cancel
Outline
There is no active editor that provides an outline.
Problems
No consoles to display at this time.
Type here to search
31°C
ENG IN
11:52 AM
10/13/2022


eclipse-workspace - dockerhelloworld.java/HelloWorld - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
dockerhelloworld.java
KAHIPANTAKA
JRE System Library [JavaSE-17]
src
newproject
HelloWorld
Dockerfile
public class HelloWorld {
public static void main(String[] args) {
System.out.println("Hello, World!");
}
}
Outline
There is no active editor that provides an outline.
Problems
Javadoc
Declaration
Console
No consoles to display at this time.
KAHIPANTAKA
Type here to search
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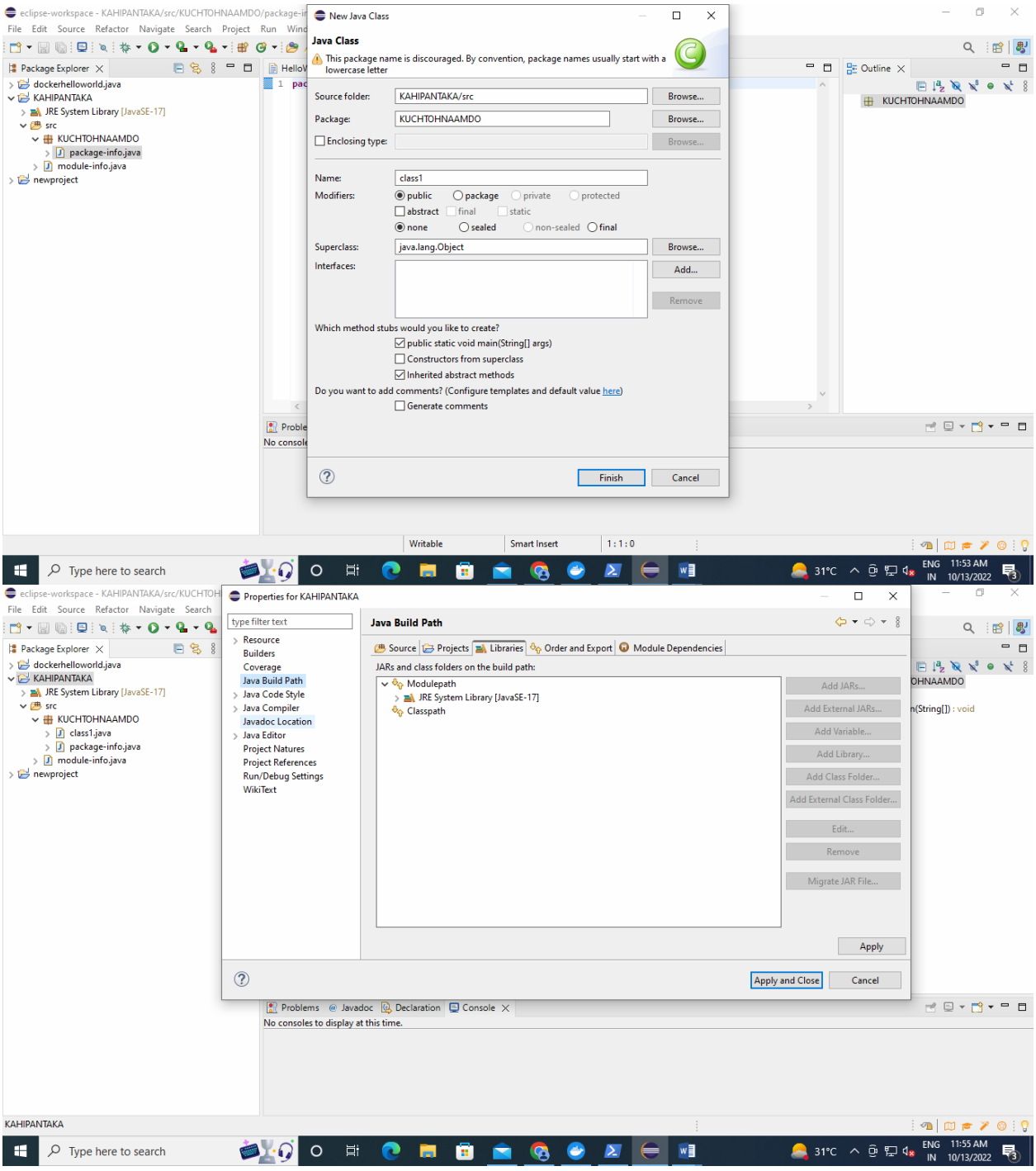
ENG IN
11:50 AM
10/13/2022


New Java Class
Java Class
This package name is discouraged. By convention, package names usually start with a lowercase letter
Source folder: KAHIPANTAKA/src
Package: KUCHTOHNAAMDO
Enclosing type:
Name: class1
Modifiers: public package private protected
abstract final static
none sealed non-sealed final
Superclass: java.lang.Object
Interfaces:
Which method stubs would you like to create?
public static void main(String[] args)
Constructors from superclass
Inherited abstract methods
Do you want to add comments? (Configure templates and default value here)
Generate comments
Finish
Cancel
Package Explorer
dockerhelloworld.java
KAHIPANTAKA
JRE System Library [JavaSE-17]
src
KUCHTOHNAAMDO
package-info.java
module-info.java
newproject
Outline
Writable
Smart Insert
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Type here to search
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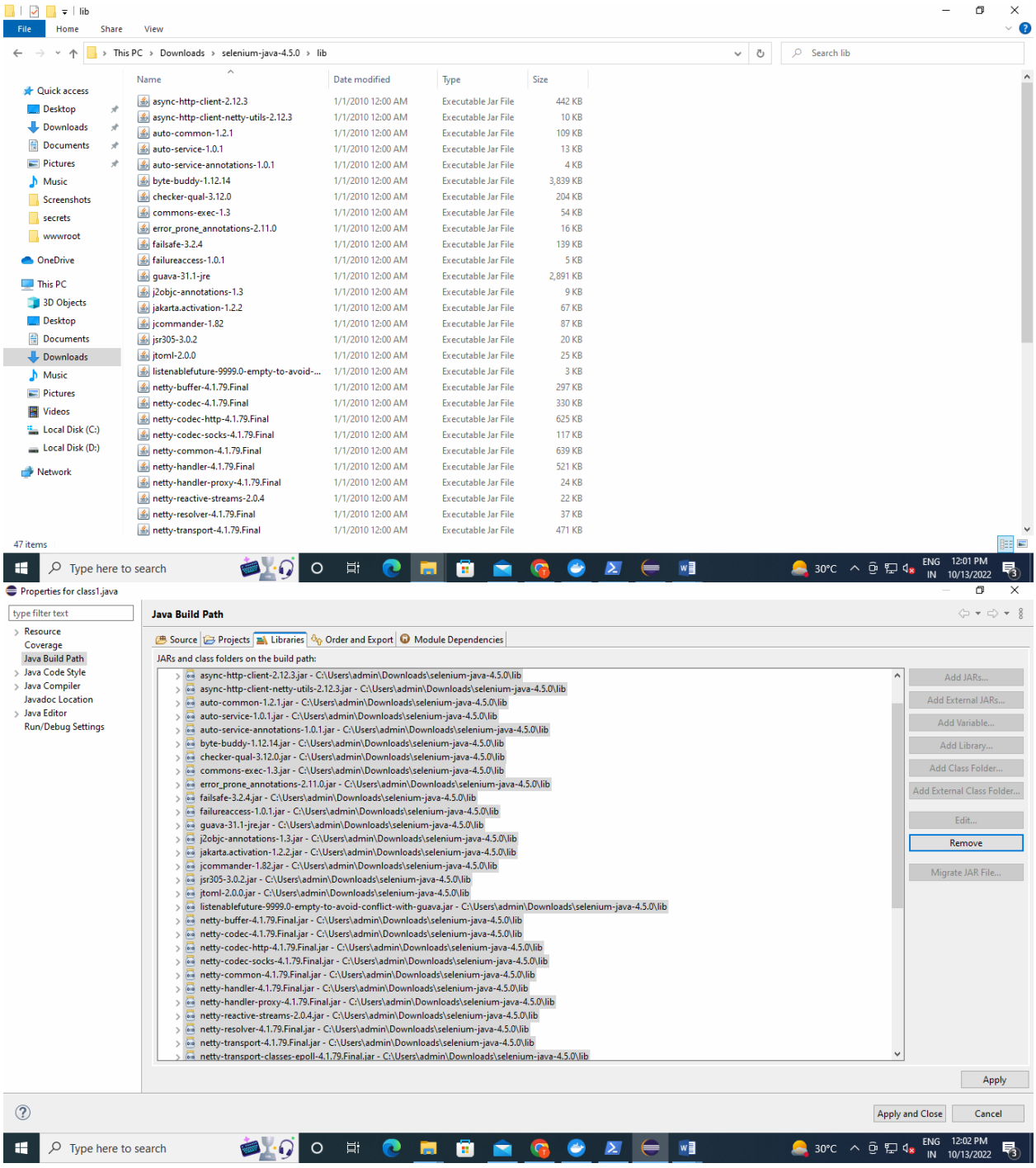
11:53 AM
10/13/2022

Properties for KAHIPANTAKA
type filter text
Resource
Builders
Coverage
Java Build Path
Java Code Style
Java Compiler
Javadoc Location
Java Editor
Project Natures
Project References
Run/Debug Settings
WikiText
Java Build Path
Source
Projects
Libraries
Order and Export
Module Dependencies
JARs and class folders on the build path:
Modulepath
JRE System Library [JavaSE-17]
Classpath
Add JARs...
Add External JARs...
Add Variable...
Add Library...
Add Class Folder...
Add External Class Folder...
Edit...
Remove
Migrate JAR File...
Apply
Apply and Close
Cancel
Problems
Javadoc
Declaration
Console
No consoles to display at this time.
KAHIPANTAKA
Type here to search
31°C
ENG IN
11:55 AM
10/13/2022


lib
File
Home
Share
View
This PC › Downloads › selenium-java-4.5.0 › lib
Search lib
Quick access
Desktop
Downloads
Documents
Pictures
Music
Screenshots
secrets
wwwroot
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Local Disk (C:)
Local Disk (D:)
Network
Name
Date modified
Type
Size
async-http-client-2.12.3 1/1/2010 12:00 AM Executable Jar File 442 KB
async-http-client-netty-utils-2.12.3 1/1/2010 12:00 AM Executable Jar File 10 KB
auto-common-1.2.1 1/1/2010 12:00 AM Executable Jar File 109 KB
auto-service-1.0.1 1/1/2010 12:00 AM Executable Jar File 13 KB
auto-service-annotations-1.0.1 1/1/2010 12:00 AM Executable Jar File 4 KB
byte-buddy-1.12.14 1/1/2010 12:00 AM Executable Jar File 3,839 KB
checker-qual-3.12.0 1/1/2010 12:00 AM Executable Jar File 204 KB
commons-exec-1.3 1/1/2010 12:00 AM Executable Jar File 54 KB
error_prone_annotations-2.11.0 1/1/2010 12:00 AM Executable Jar File 16 KB
failsafe-3.2.4 1/1/2010 12:00 AM Executable Jar File 139 KB
failureaccess-1.0.1 1/1/2010 12:00 AM Executable Jar File 5 KB
guava-31.1-jre 1/1/2010 12:00 AM Executable Jar File 2,891 KB
j2objc-annotations-1.3 1/1/2010 12:00 AM Executable Jar File 9 KB
jakarta.activation-1.2.2 1/1/2010 12:00 AM Executable Jar File 67 KB
jcommander-1.82 1/1/2010 12:00 AM Executable Jar File 87 KB
jsr305-3.0.2 1/1/2010 12:00 AM Executable Jar File 20 KB
jtoml-2.0.0 1/1/2010 12:00 AM Executable Jar File 25 KB
listenablefuture-9999.0-empty-to-avoid-... 1/1/2010 12:00 AM Executable Jar File 3 KB
netty-buffer-4.1.79.Final 1/1/2010 12:00 AM Executable Jar File 297 KB
netty-codec-4.1.79.Final 1/1/2010 12:00 AM Executable Jar File 330 KB
netty-codec-http-4.1.79.Final 1/1/2010 12:00 AM Executable Jar File 625 KB
netty-codec-socks-4.1.79.Final 1/1/2010 12:00 AM Executable Jar File 117 KB
netty-common-4.1.79.Final 1/1/2010 12:00 AM Executable Jar File 639 KB
netty-handler-4.1.79.Final 1/1/2010 12:00 AM Executable Jar File 521 KB
netty-handler-proxy-4.1.79.Final 1/1/2010 12:00 AM Executable Jar File 24 KB
netty-reactive-streams-2.0.4 1/1/2010 12:00 AM Executable Jar File 22 KB
netty-resolver-4.1.79.Final 1/1/2010 12:00 AM Executable Jar File 37 KB
netty-transport-4.1.79.Final 1/1/2010 12:00 AM Executable Jar File 471 KB
47 items
Type here to search
30°C
ENG IN
12:01 PM 10/13/2022

Properties for class1.java
type filter text
Resource
Coverage
Java Build Path
Java Code Style
Java Compiler
Javadoc Location
Java Editor
Run/Debug Settings
Java Build Path
Source
Projects
Libraries
Order and Export
Module Dependencies
JARs and class folders on the build path:
async-http-client-2.12.3.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
async-http-client-netty-utils-2.12.3.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
auto-common-1.2.1.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
auto-service-1.0.1.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
auto-service-annotations-1.0.1.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
byte-buddy-1.12.14.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
checker-qual-3.12.0.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
commons-exec-1.3.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
error_prone_annotations-2.11.0.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
failsafe-3.2.4.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
failureaccess-1.0.1.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
guava-31.1-jre.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
j2objc-annotations-1.3.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
jakarta.activation-1.2.2.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
jcommander-1.82.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
jsr305-3.0.2.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
jtoml-2.0.0.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
listenablefuture-9999.0-empty-to-avoid-conflict-with-guava.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-buffer-4.1.79.Final.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-codec-4.1.79.Final.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-codec-http-4.1.79.Final.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-codec-socks-4.1.79.Final.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-common-4.1.79.Final.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-handler-4.1.79.Final.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-handler-proxy-4.1.79.Final.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-reactive-streams-2.0.4.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-resolver-4.1.79.Final.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-transport-4.1.79.Final.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
netty-transport-classes-epoll-4.1.79.Final.jar - C:\Users\admin\Downloads\selenium-java-4.5.0\lib
Add JARs...
Add External JARs...
Add Variable...
Add Library...
Add Class Folder...
Add External Class Folder...
Edit...
Remove
Migrate JAR File...
Apply
Apply and Close
Cancel
Type here to search
30°C
ENG IN
12:02 PM 10/13/2022

Conclusion:
It’s an easy way to deploy, run, and manage applications using containers that are independent of elements like hardware and language, which makes these containers highly portable.

EXPERIMENT NO. – 09

Aim of the Experiment: -

Lab Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

_____

Practical Incharge

PRACTICAL NO. 9

Problem Definition: To perform continuous testing of web applications using Selenium.

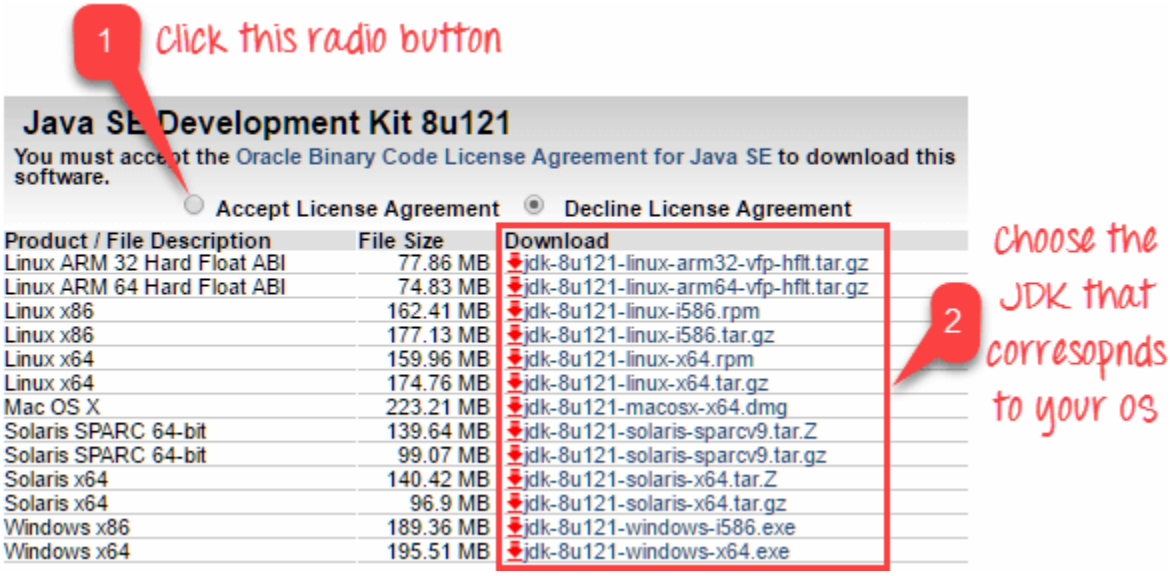
Compiler / Tool: Eclipse IDE, Selenium

Implementation:

Step 1 – Install Java on your computer

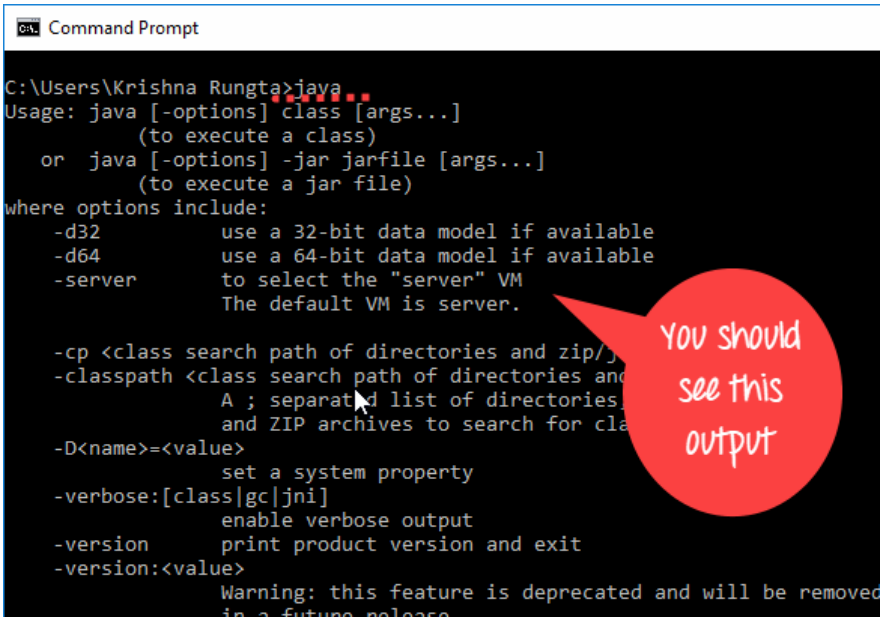
Download and install the **Java Software Development Kit (JDK)** here.

Next –



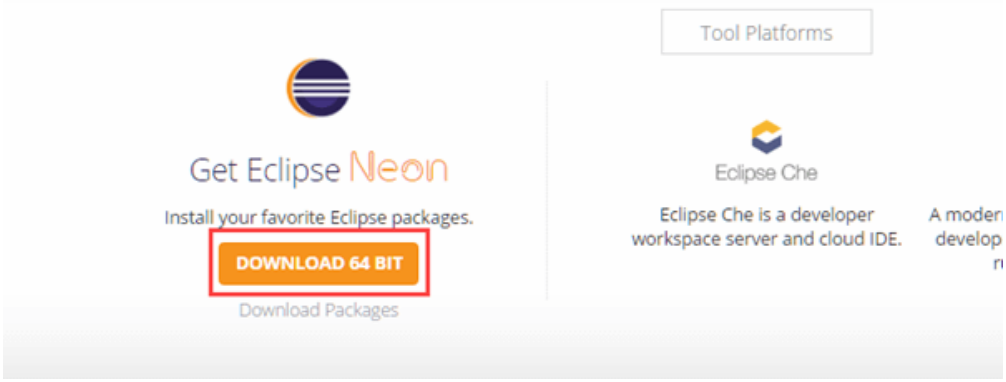
This JDK version comes bundled with Java Runtime Environment (JRE), so you do not need to download and install the JRE separately.

Once installation is complete, open command prompt and type ―java‖. If you see the following screen you are good to move to the next step

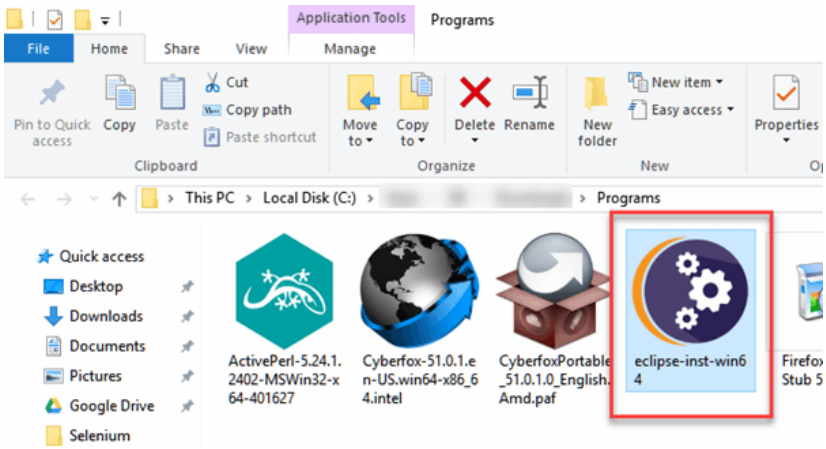


Step 2 – Install Eclipse IDE

Download latest version of **"Eclipse IDE for Java Developers"** hzere. Be sure to choose correctly between Windows 32 Bit and 64 Bit versions.

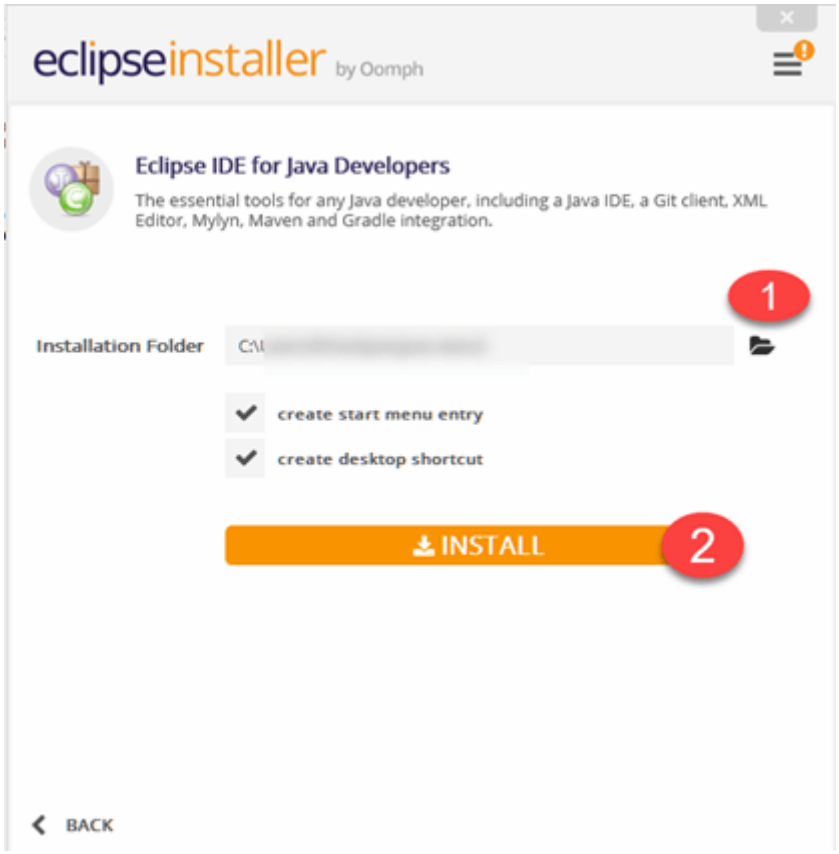


You should be able to download an exe file named ―eclipse-inst-win64‖ for Setup.

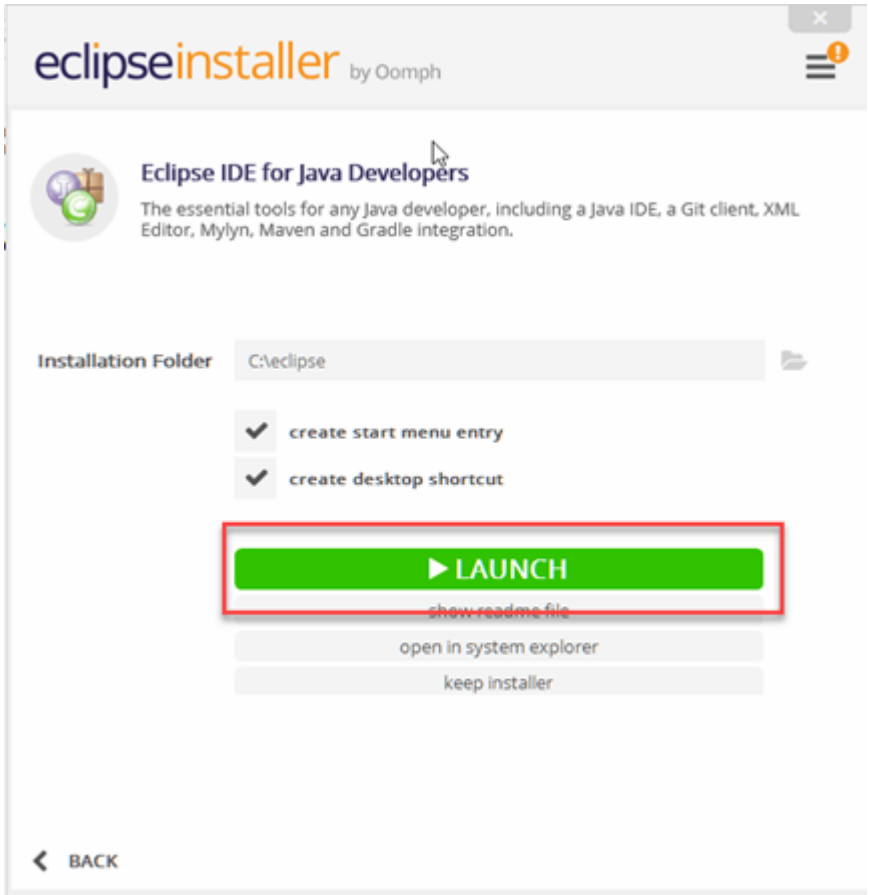


Double-click on file to Install the Eclipse. A new window will open. Click Eclipse IDE for Java Developers.

After that, a new window will open which click button marked 1 and change path to ―C:\eclipse‖. Post that Click on Install button marked 2



After successful completion of the installation procedure, a window will appear. On that window click on Launch



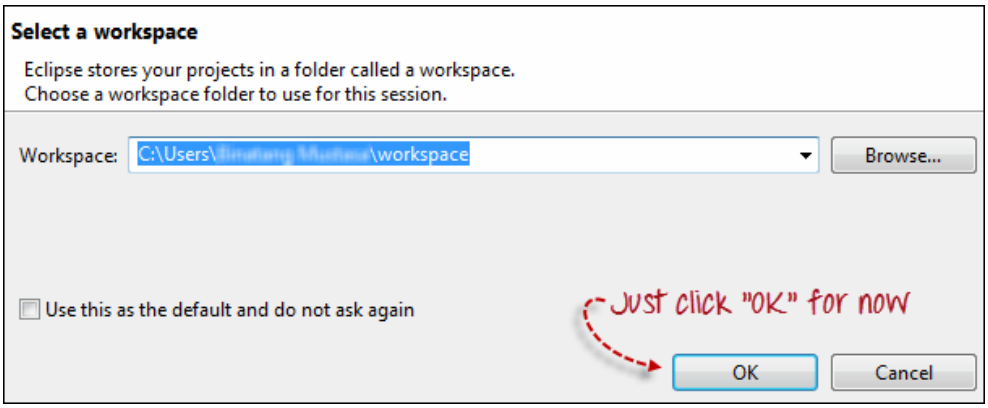
This will start eclipse neon IDE for you.

Step 3 – Download the Selenium Java Client Driver

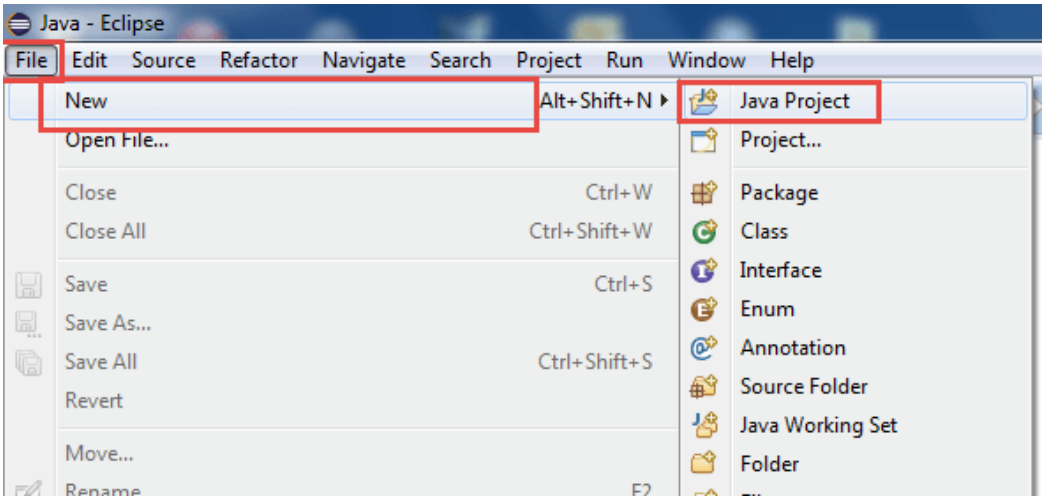
You can download **Selenium Webdriver for Java Client Driver** here. You will find client drivers for other languages there, but only choose the one for Java.

Step 4 – Configure Eclipse IDE with WebDriver

1. Launch the ―eclipse.exe‖ file inside the ―eclipse‖ folder that we extracted in step 2. If you followed step 2 correctly, the executable should be located on C:\eclipse\eclipse.exe.
2. When asked to select for a workspace, just accept the default location.

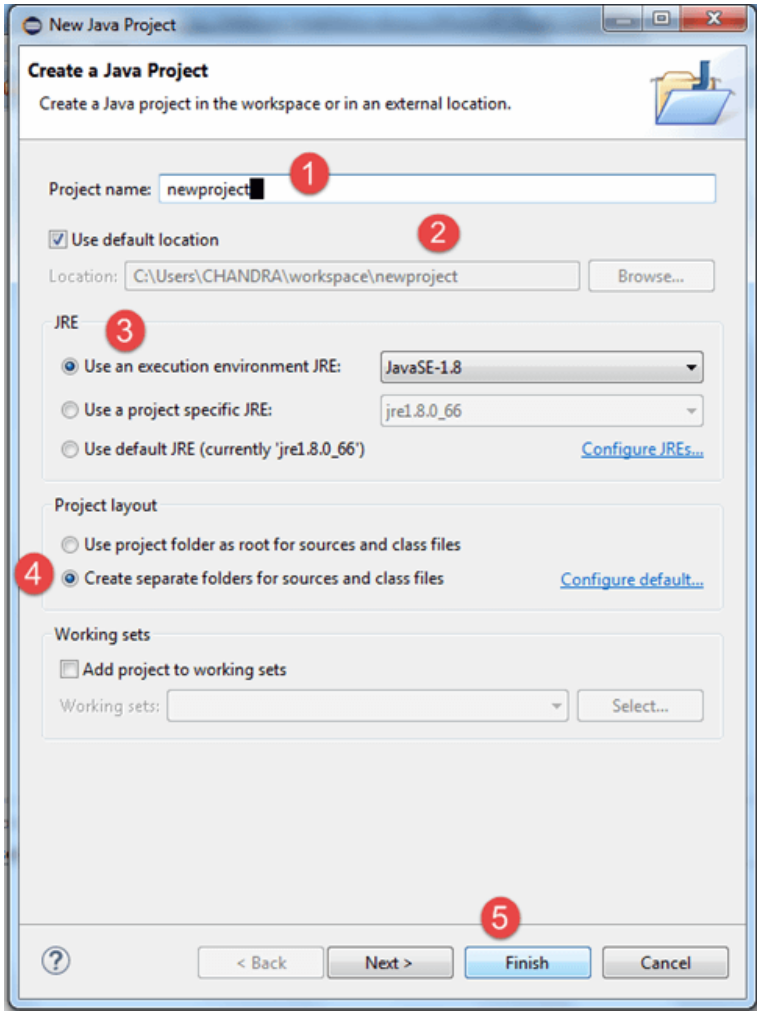


3. Create a new project through File > New > Java Project. Name the project as ―newproject‖.



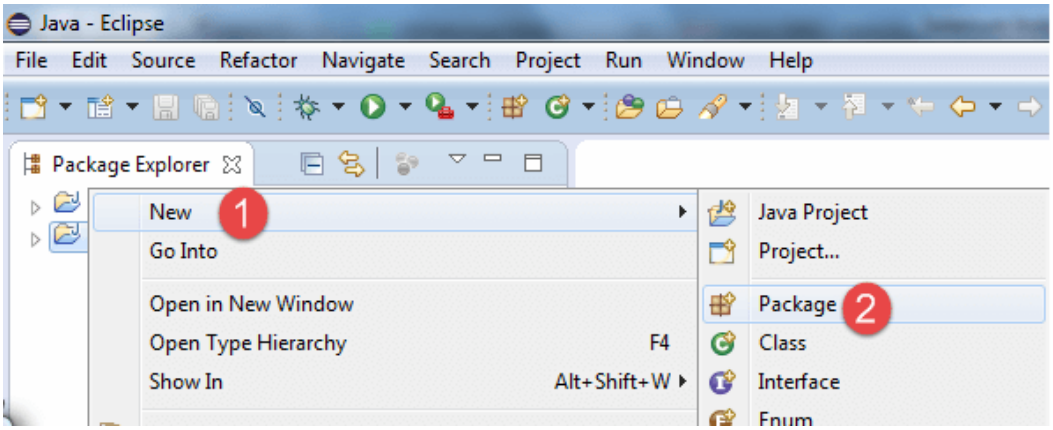
A new pop-up window will open enter details as follow

1. Project Name
2. Location to save project
3. Select an execution JRE
4. Select layout project option
5. Click on Finish button



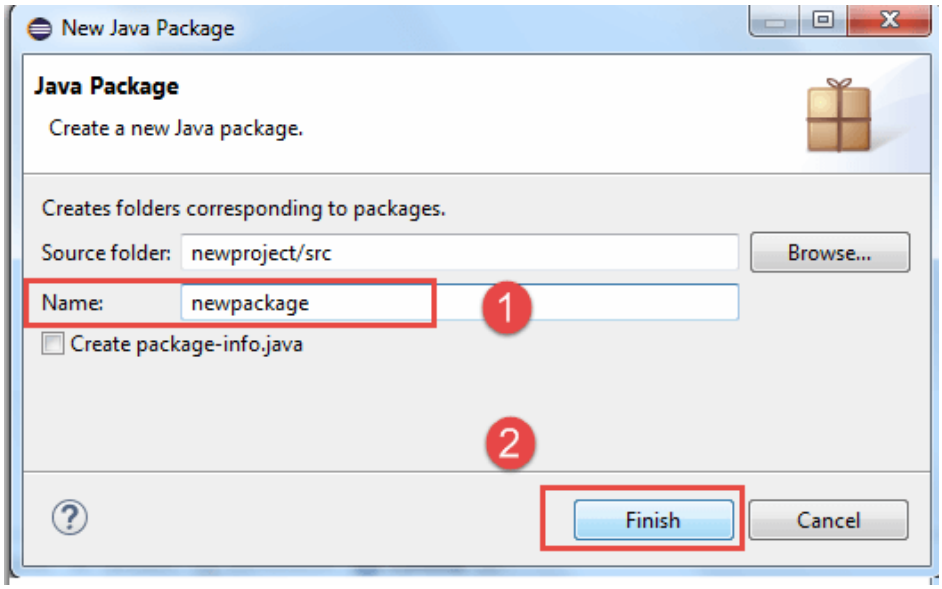
4. In this step,

1. Right-click on the newly created project and
2. Select New > Package, and name that package as ―newpackage‖.

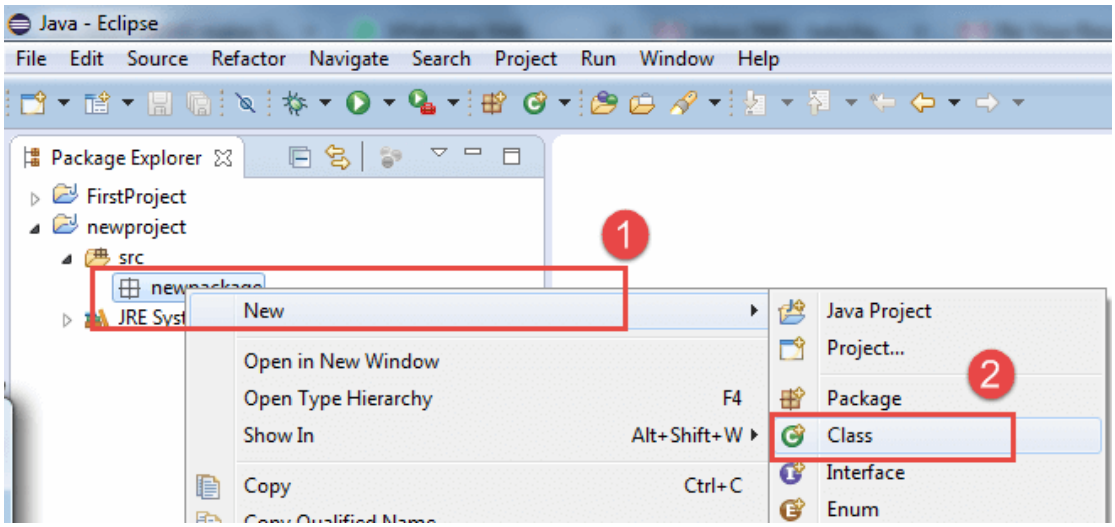


A pop-up window will open to name the package,

1. Enter the name of the package
2. Click on Finish button

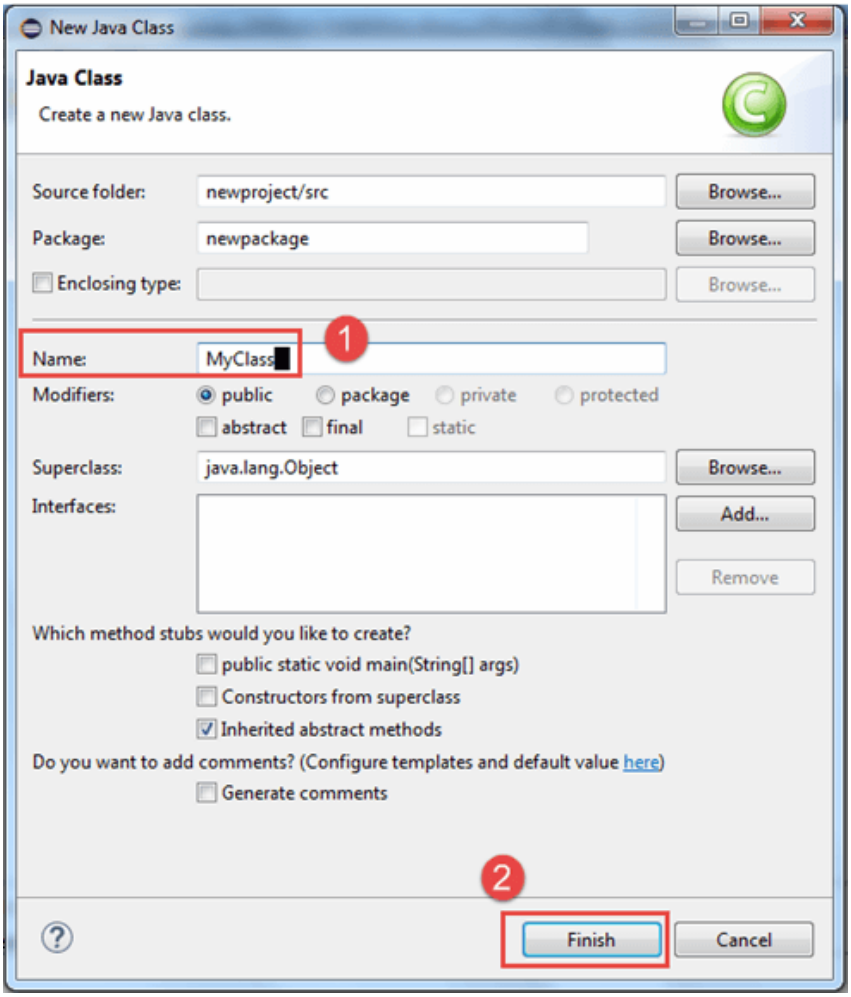


5. Create a new Java class under newpackage by right-clicking on it and then selecting- New > Class, and then name it as ―MyClass‖. Your Eclipse IDE should look like the image below.

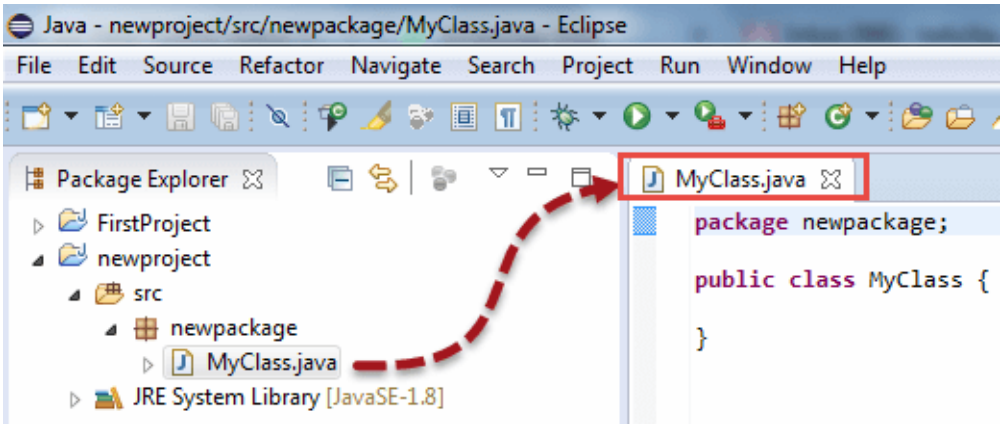


When you click on Class, a pop-up window will open, enter details as

1. Name of the class
2. Click on Finish button



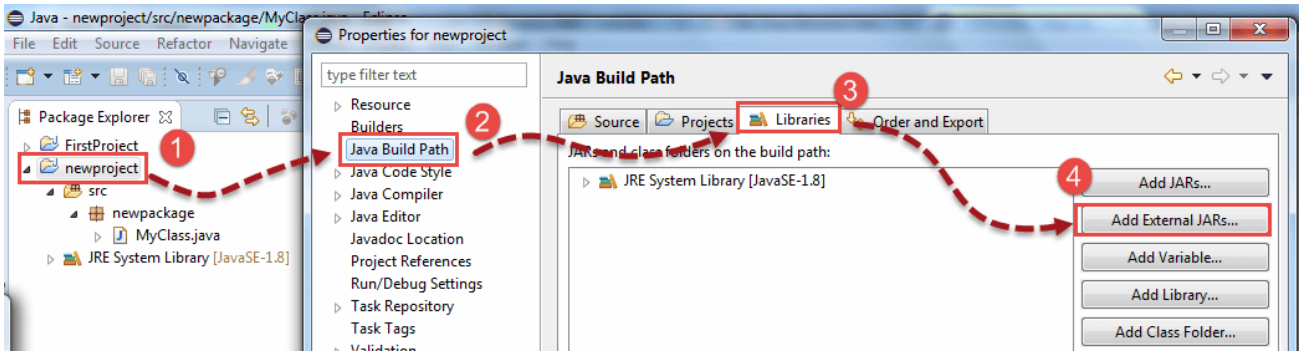
This is how it looks like after creating class.



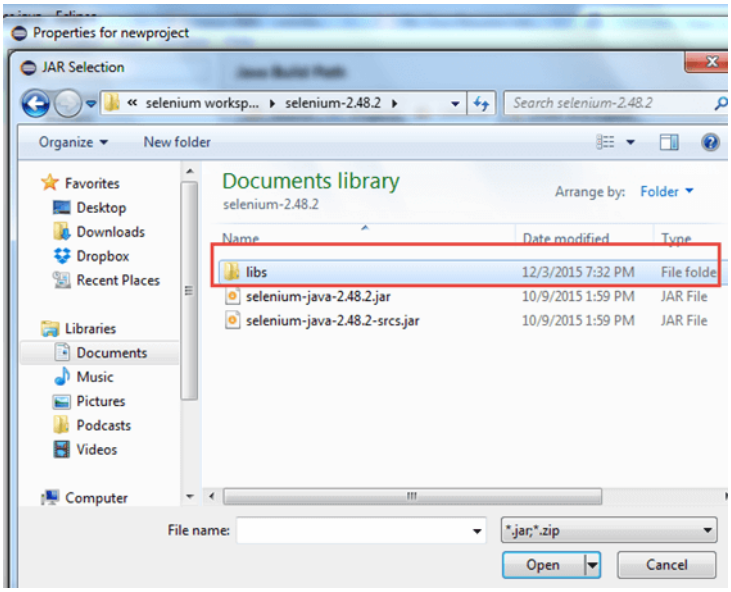
Now selenium WebDriver‘s into Java Build Path

In this step,

1. Right-click on ―newproject‖ and select **Properties**.
2. On the Properties dialog, click on ―Java Build Path‖.
3. Click on the **Libraries** tab, and then
4. Click on ―Add External JARs..‖

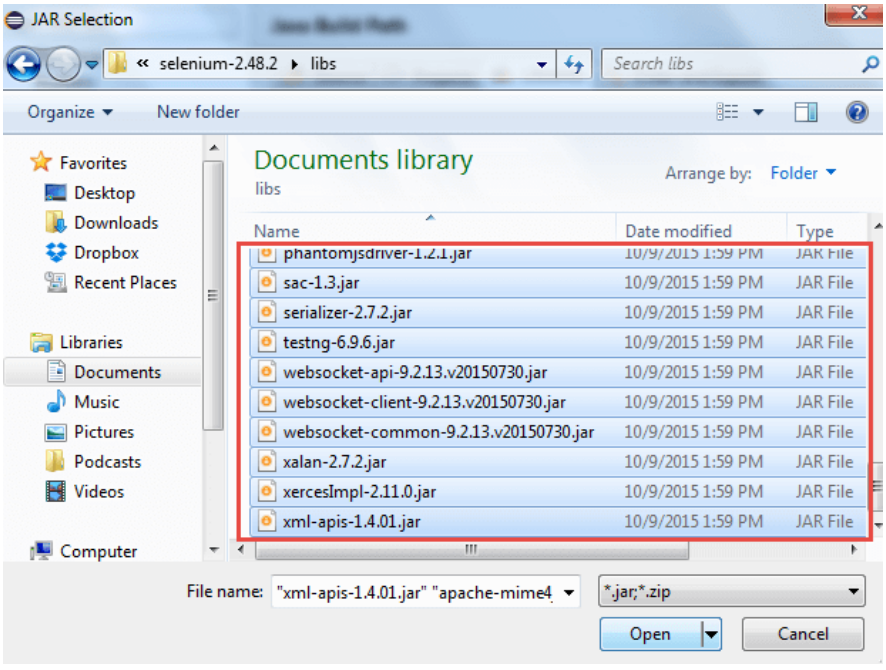


When you click on ―Add External JARs..‖ It will open a pop-up window. Select the JAR files you want to add.

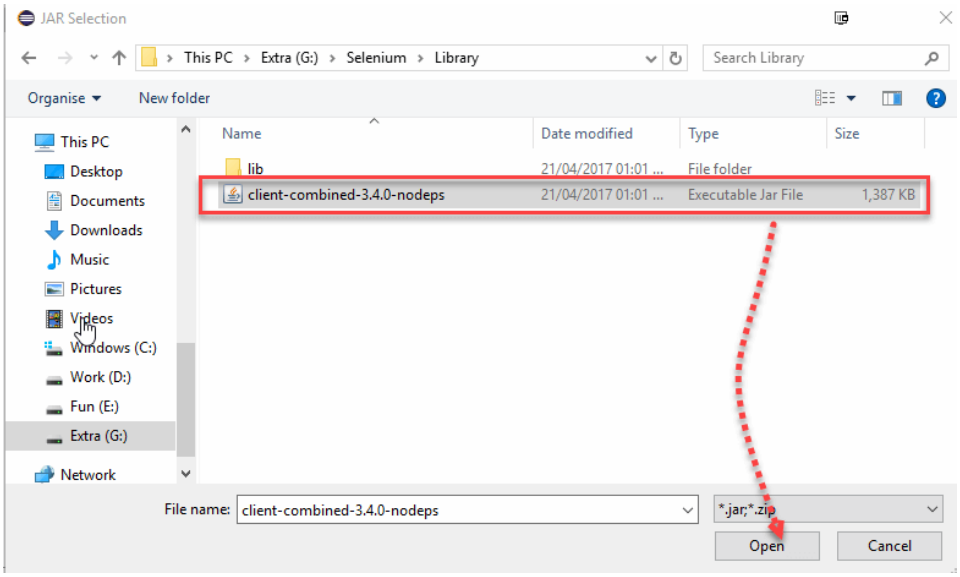


After selecting jar files, click on OK button.

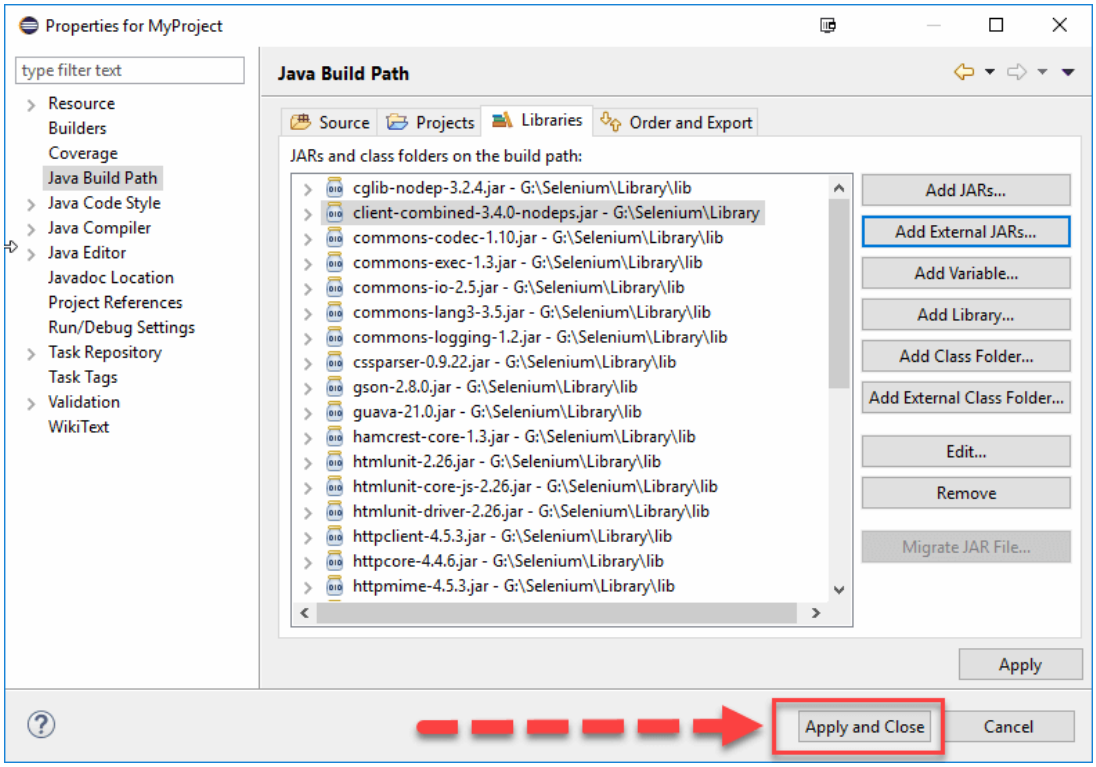
Select all files inside the lib folder.



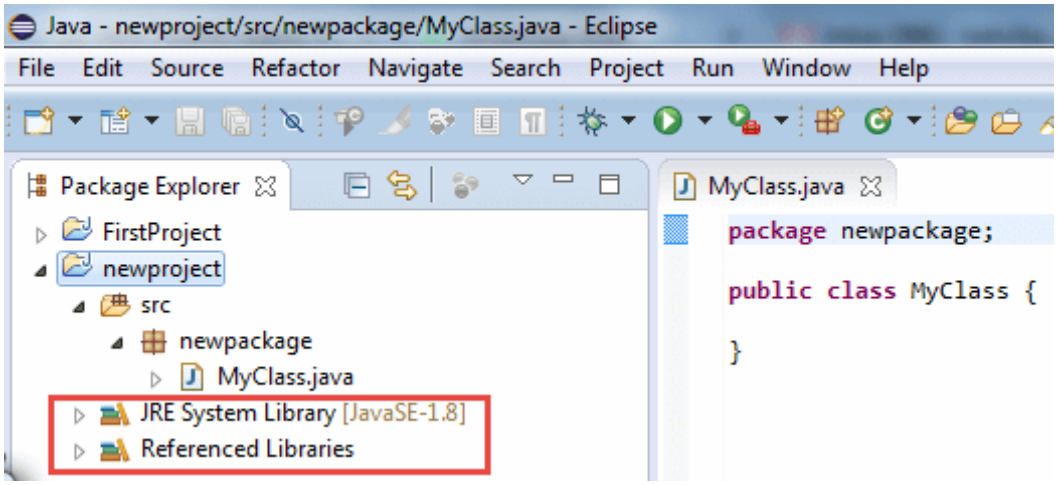
Select files outside lib folder



Once done, click ―Apply and Close‖ button

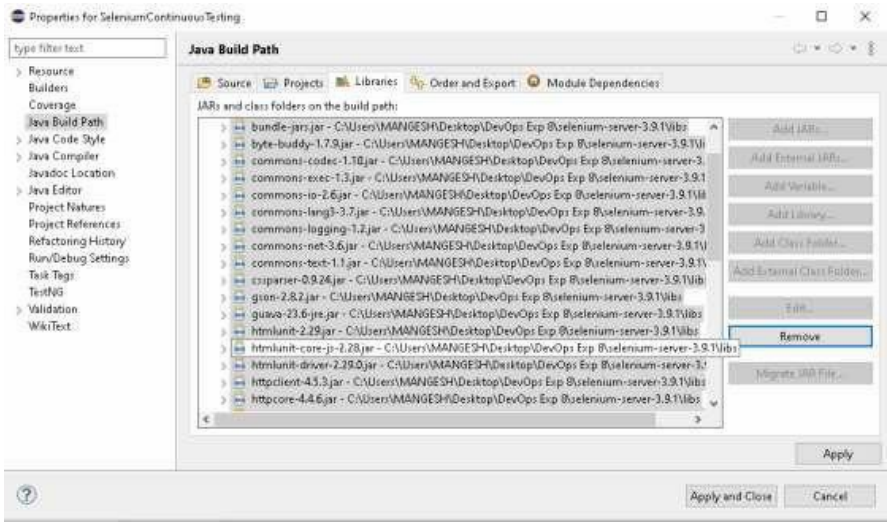


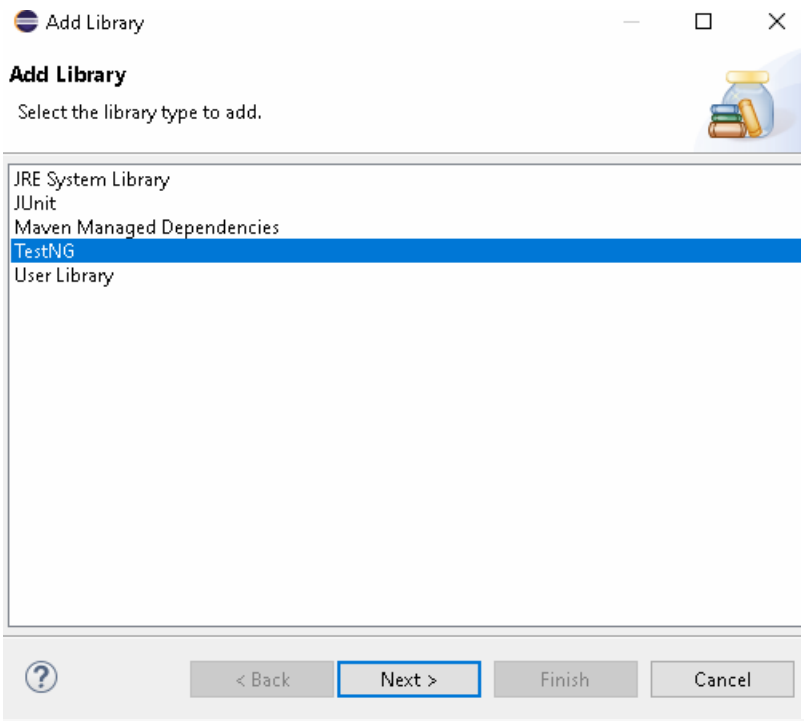
6. Add all the JAR files inside and outside the ―libs‖ folder. Your Properties dialog should now look similar to the image below.

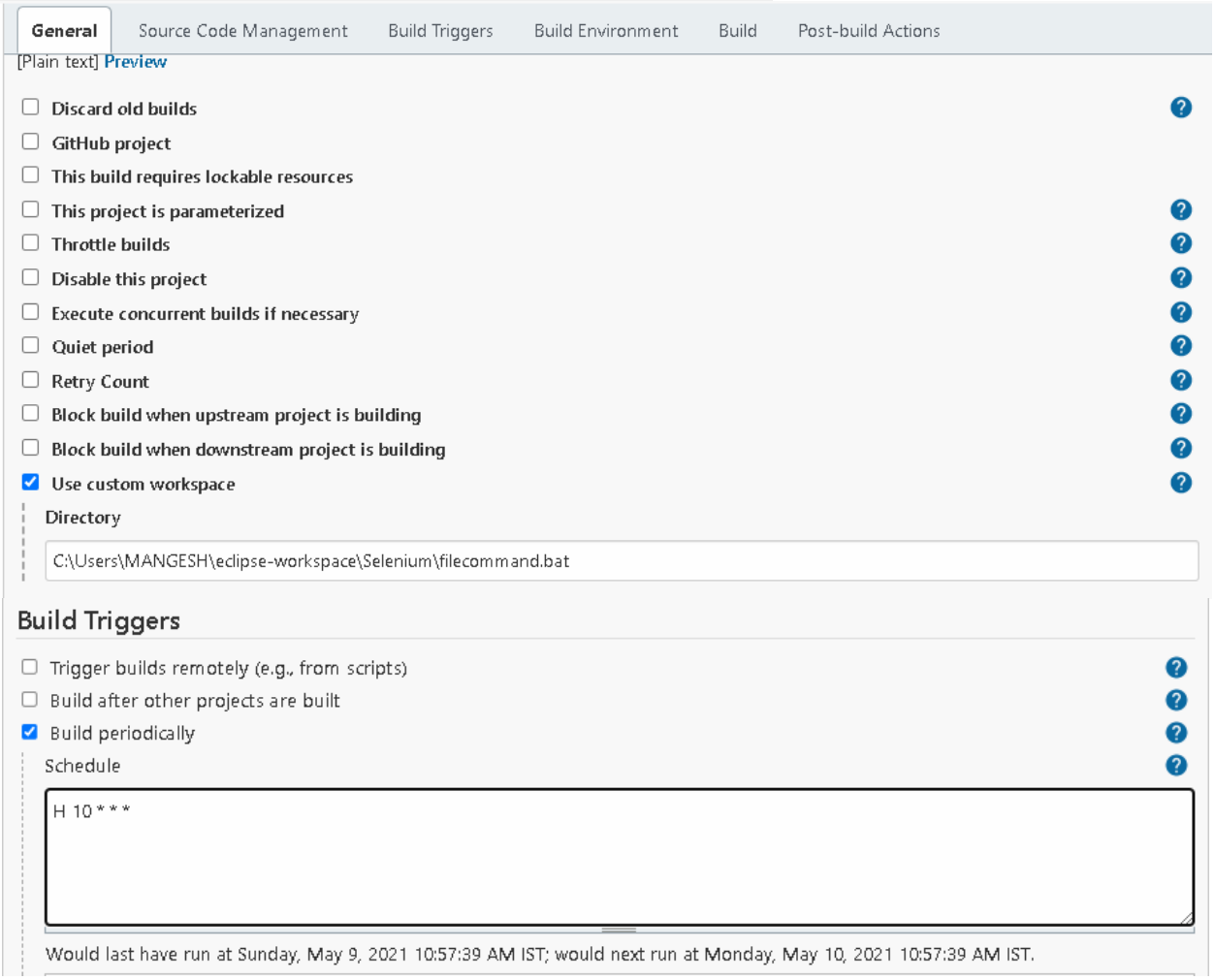


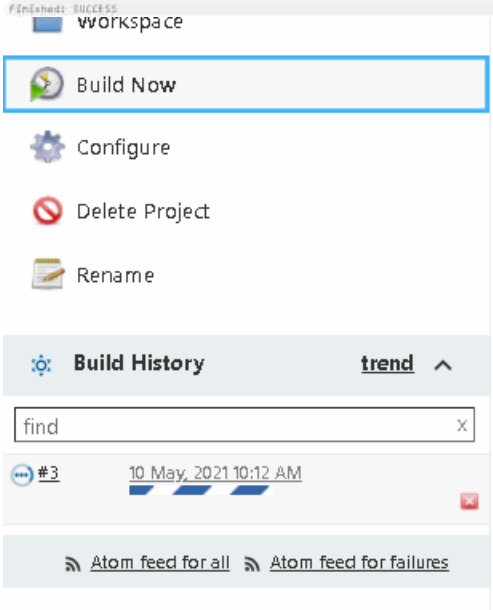
7. Finally, click OK and we are done importing Selenium libraries into our project.

Output Screenshots:




Add Library
Add Library
Select the library type to add.
JRE System Library
JUnit
Maven Managed Dependencies
TestNG
User Library
< Back
Next >
Finish
Cancel


General
Source Code Management
Build Triggers
Build Environment
Build
Post-build Actions
[Plain text] Preview
Discard old builds
GitHub project
This build requires lockable resources
This project is parameterized
Throttle builds
Disable this project
Execute concurrent builds if necessary
Quiet period
Retry Count
Block build when upstream project is building
Block build when downstream project is building
Use custom workspace
Directory
C:\Users\MANGESH\eclipse-workspace\Selenium\filecommand.bat
Build Triggers
Trigger builds remotely (e.g., from scripts)
Build after other projects are built
Build periodically
Schedule
H 10 * * *
Would last have run at Sunday, May 9, 2021 10:57:39 AM IST; would next run at Monday, May 10, 2021 10:57:39 AM IST.




```
public void JenkinsTest()
{
    //System.setProperty("webdriver.chrome.driver","file_location");
```

to me

See <http://localhost:8080/job/ContinuousTestingwithSelenium/3/display/redirect>

Changes:

Started by user Rishabh Shah
Running as SYSTEM
Building in workspace <http://localhost:8080/job/ContinuousTestingwithSelenium/ws/>
[Selenium] $ cmd /c call C:\WINDOWS\TEMP\jenkins565127751367542246.bat

<http://localhost:8080/job/ContinuousTestingwithSelenium/ws/>filecommand.bat>

<http://localhost:8080/job/ContinuousTestingwithSelenium/ws/>java> -cp bin;lib/* org.testng.TestNG testing.xml
Error: Could not find or load main class org.testng.TestNG
Caused by: java.lang.ClassNotFoundException: org.testng.TestNG
Build step 'Execute Windows batch command' marked build as failure

Conclusion:

Testing of web app has been done using selenium

EXPERIMENT NO. – 10

Aim of the Experiment: -

Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

Practical Incharge

PRACTICAL NO. 10

Problem Definition: Install puppet agent and puppet master on two separate virtual machines and establish connection between them.

Compiler / Tool: Puppet, Oracle Virtual Box,Ubuntu

Theory:

Puppet is a configuration management tool that simplifies system administration. Puppet uses a client/server model in which your managed nodes, running a process called the Puppet *agent*, talk to and pull down configuration profiles from a Puppet *master*.

Puppet deployments can range from small groups of servers up to enterprise-level operations. This guide will demonstrate how to install Puppet 6.1 on three servers:

A Puppet master running Ubuntu 18.04

A managed Puppet Agent node running Ubuntu 18.04

What is puppet?

Puppet is a configuration management tool developed by Puppet Labs in order to automate infrastructure management and configuration. Puppet is a very powerful tool which helps in the concept of Infrastructure as code. Puppet follows the client-server model, where one machine in any cluster acts as the server, known as puppet master and the other acts as a client known as a slave on nodes. Puppet has the capability to manage any system from scratch, starting from initial configuration till the end-of-life of any particular machine.

Features of puppet

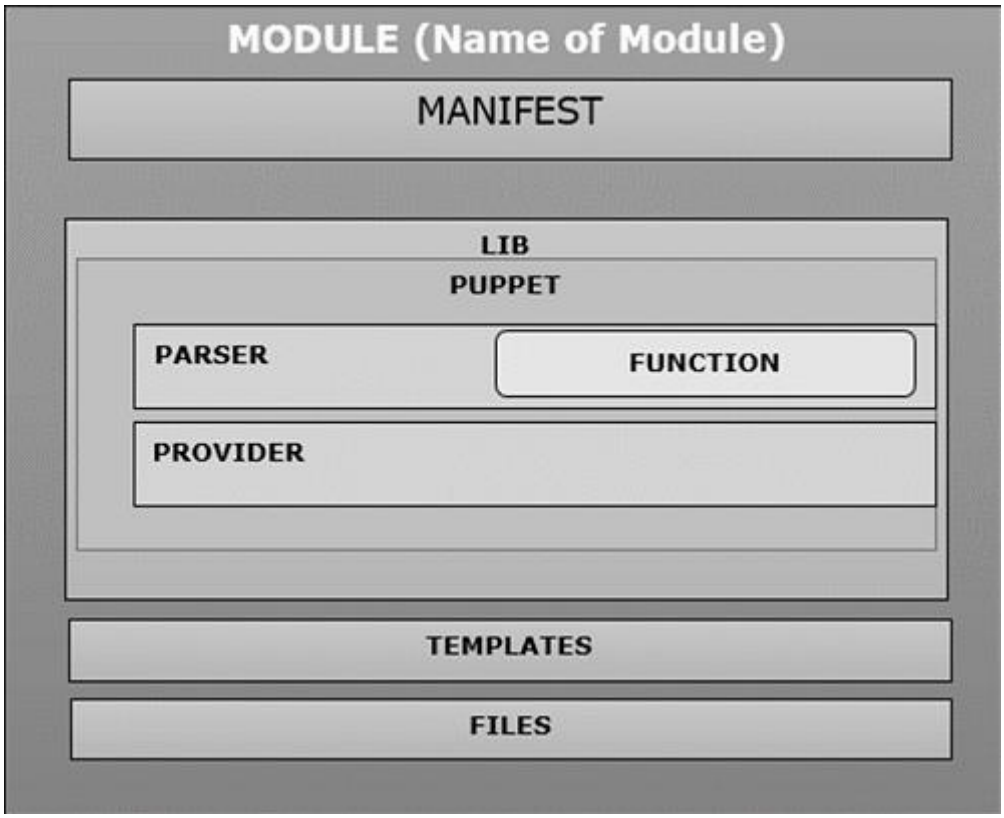
Following are the most important features of Puppet:

Idempotency: Puppet supports Idempotency which makes it unique. Idempotency helps in managing any particular machine throughout its lifecycle starting from the creation of machine, configurational changes in the machine, till the end-of-life. Puppet Idempotency feature is very helpful in keeping the machine updated for years rather than rebuilding the same machine multiple times, when there is any configurationally change.

Cross-platform: In Puppet, with the help of Resource Abstraction Layer (RAL) which uses

Puppet resources, one can target the specified configuration of system without worrying about the implementation details and how the configuration command will work inside the system, which are defined in the underlying configuration file.

Key Components of puppet



Puppet Resources

Puppet resources are the key components for modelling any particular machine. These resources have their own implementation model. Puppet uses the same model to get any particular resource in the desired state.

Providers

Providers are basically fulfillers of any particular resource used in Puppet. For example, the package type 'apt-get' and 'yum' both are valid for package management. Sometimes, more than one provider would be available on a particular platform. Though each platform always have a default provider.

Manifest

Manifest is a collection of resources which are coupled inside the function or classes to configure any target system. They contain a set of Ruby code in order to configure a system.

Modules

Module is the key building block of Puppet, which can be defined as a collection of resources, files, templates, etc. They can be easily distributed among different kinds of OS being defined that they are of the same flavour. As they can be easily distributed, one module can be used multiple times with the same configuration.

Templates

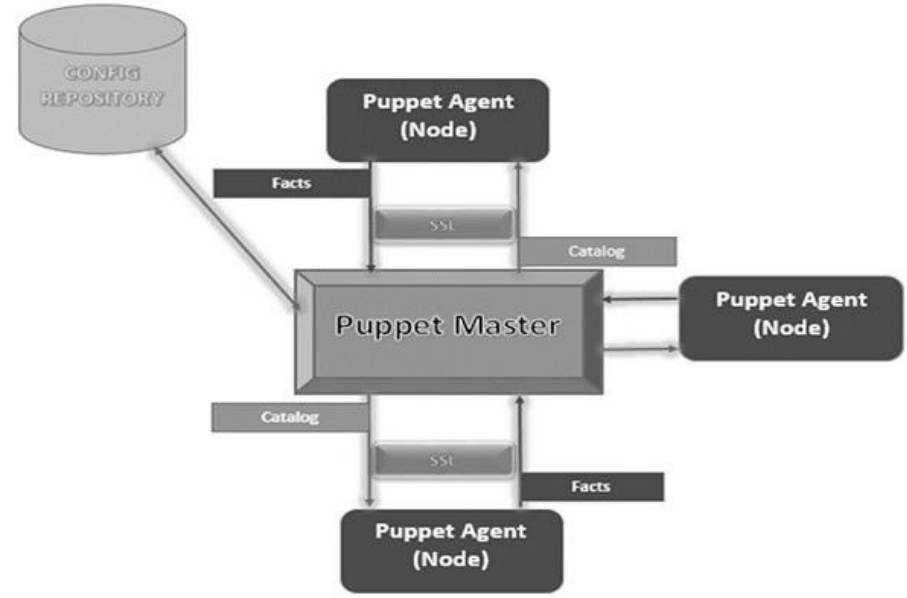
Templates use Ruby expressions to define the customized content and variable input.

Static Files

Static files can be defined as a general file which are sometimes required to perform specific tasks. They can be simply copied from one location to another using Puppet. All static files are located

inside the files directory of any module. Any manipulation of the file in a manifest is done using the file resource.

Architecture of puppet



Puppet Master

Puppet Master is the key mechanism which handles all the configuration related stuff. It applies the configuration to nodes using the Puppet agent.

Puppet Agent

Puppet Agents are the actual working machines which are managed by the Puppet master. They have the Puppet agent daemon service running inside them.

Config Repository

This is the repo where all nodes and server-related configurations are saved and pulled when required.

Facts

Facts are the details related to the node or the master machine, which are basically used for analysing the current status of any node. On the basis of facts, changes are done on any target machine. There are pre-defined and custom facts in Puppet.

Catalog

All the manifest files or configuration which are written in Puppet are first converted to a compiled format called catalog and later those catalogs are applied on the target machine

How puppet master and puppet agent communicates?

Master-agent communication follows this pattern:

1. An agent node sends facts to the master and requests a catalog.

2. The master compiles and returns the node's catalog using the sources of information the master has access to.

3. The agent applies the catalog to the node by checking each resource the catalog describes. If it finds resources that are not in their desired state, it makes the changes necessary to correct them. Or, in no-op mode, it assesses what changes would be needed to reconcile the catalog.

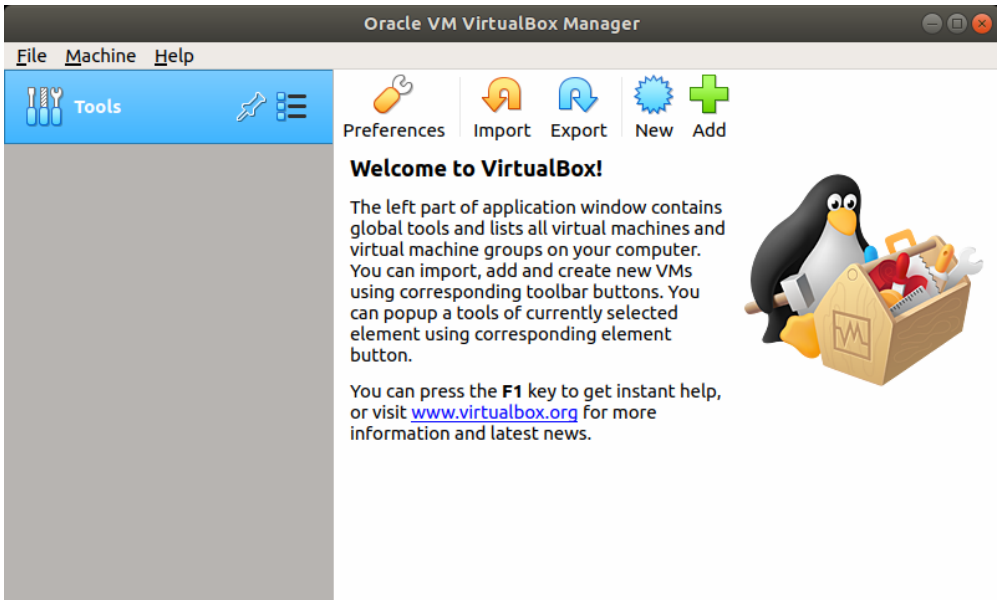
4. The agent sends a report back to the master.

Implementation:

Download Oracle virtualbox Debian Package from its official site and Install Oracle VirtualBox Manager using following command :

ubuntu@ubuntu$ dpkg -i virtualbox.deb

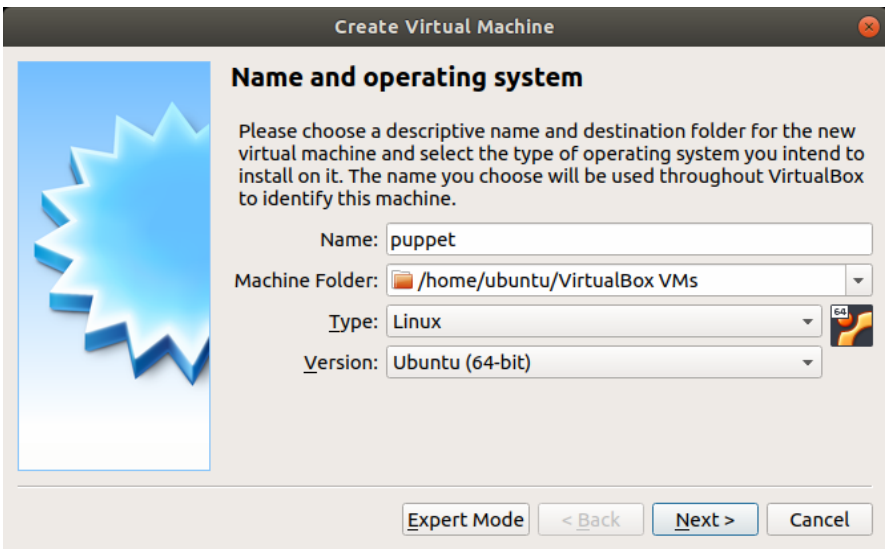
Following figure shows the initial appearance of the Oracle virtualbox.



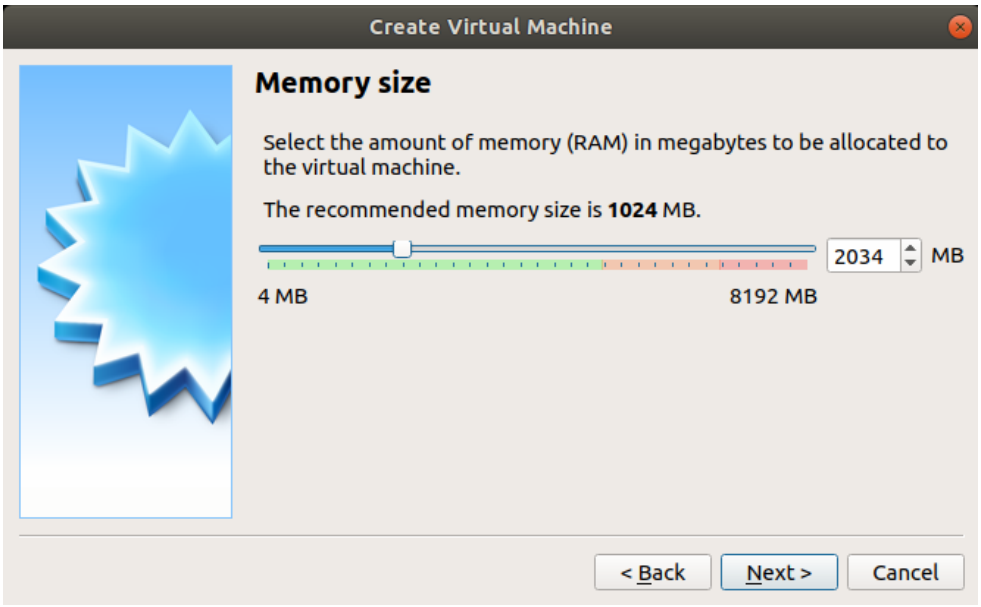
Now your task is to install and configure puppet-master and puppet-agent. Let's proceed with the installation of puppet mater virtual vm on oracle virtualbox.

Step 1: Click on the new option available on the screen.

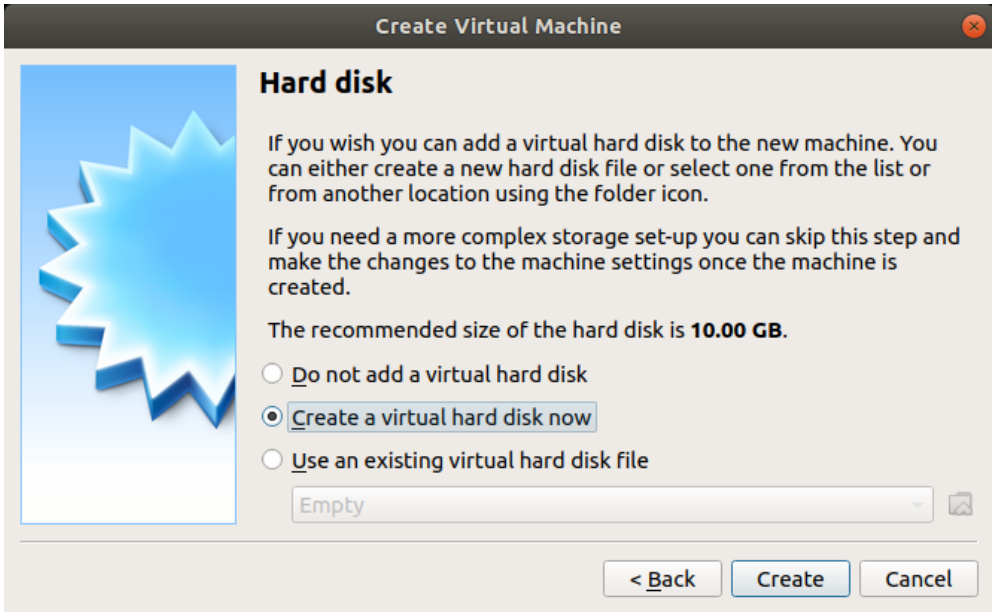
Step 2: Selecting Ubuntu 64 bit as operating system



Step 3: Allocating memory of 2GB to the virtual os

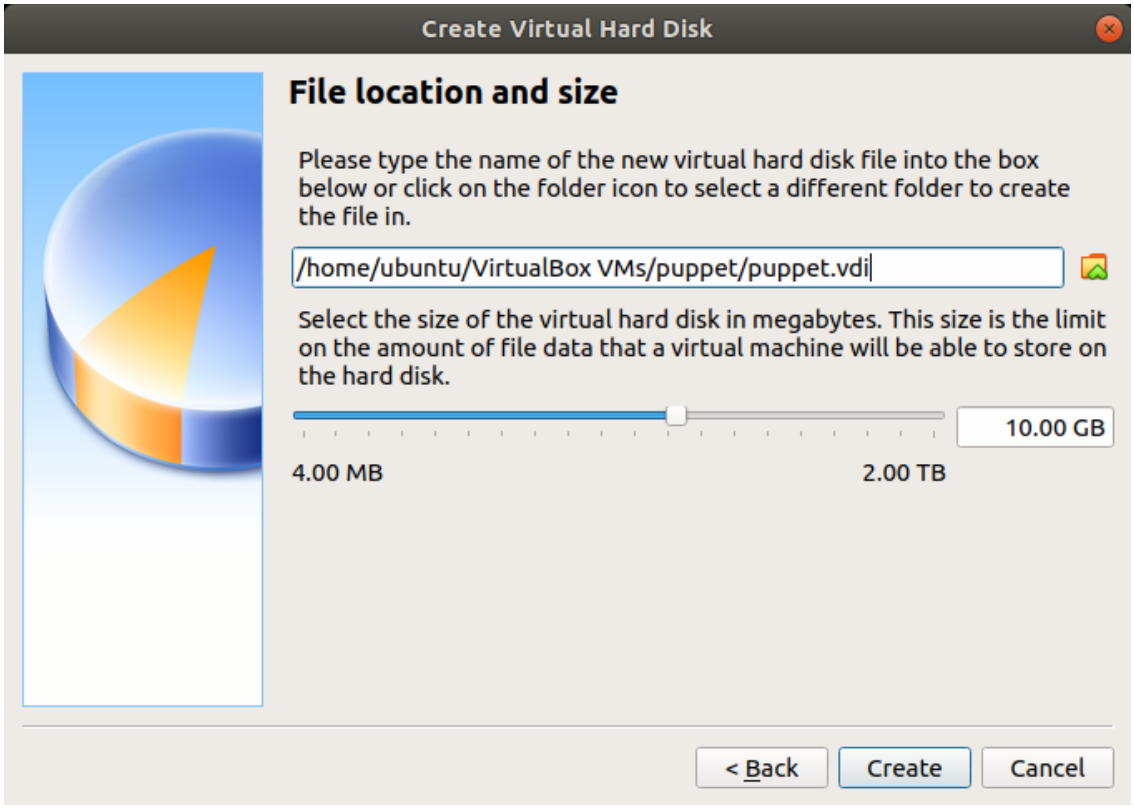


Step 4: select option virtual hard disk

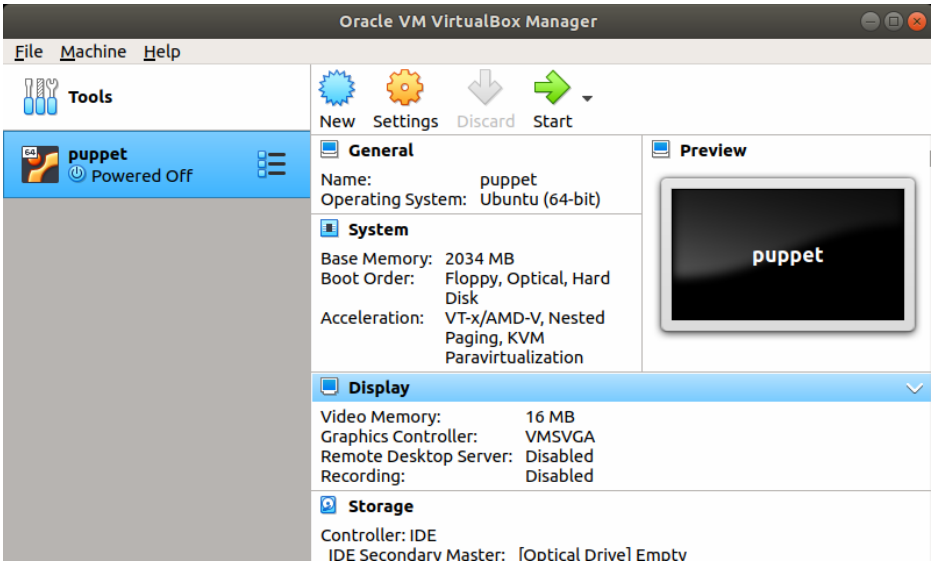


Step 5: Selecting virtual disk image

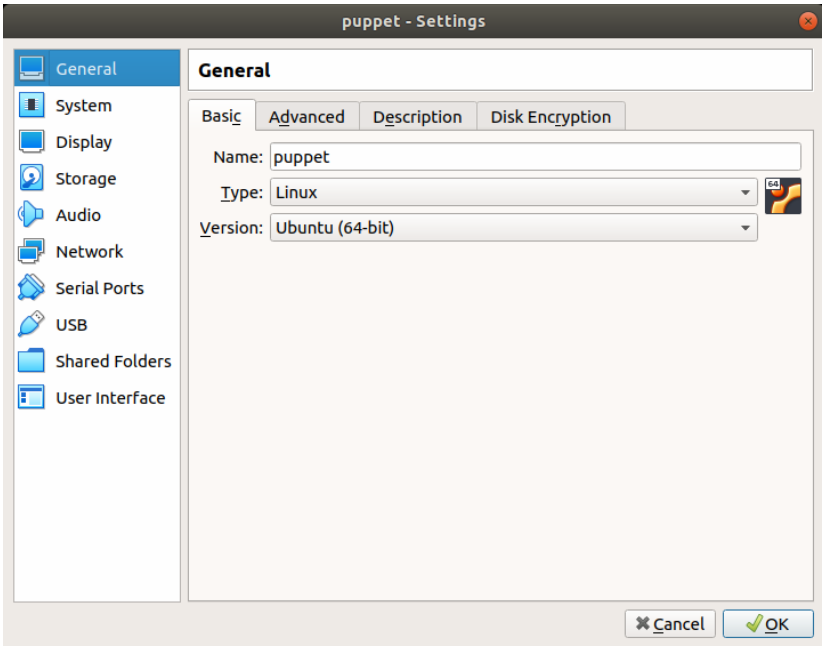
Step 6: Allocate file and specify the maximum size vm can take.



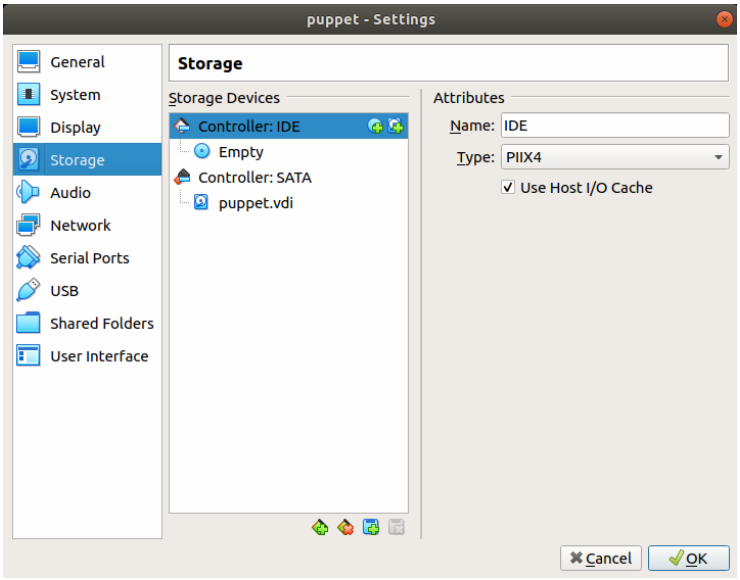
Step 7 : Allocate file and specify the maximum size vm can take.



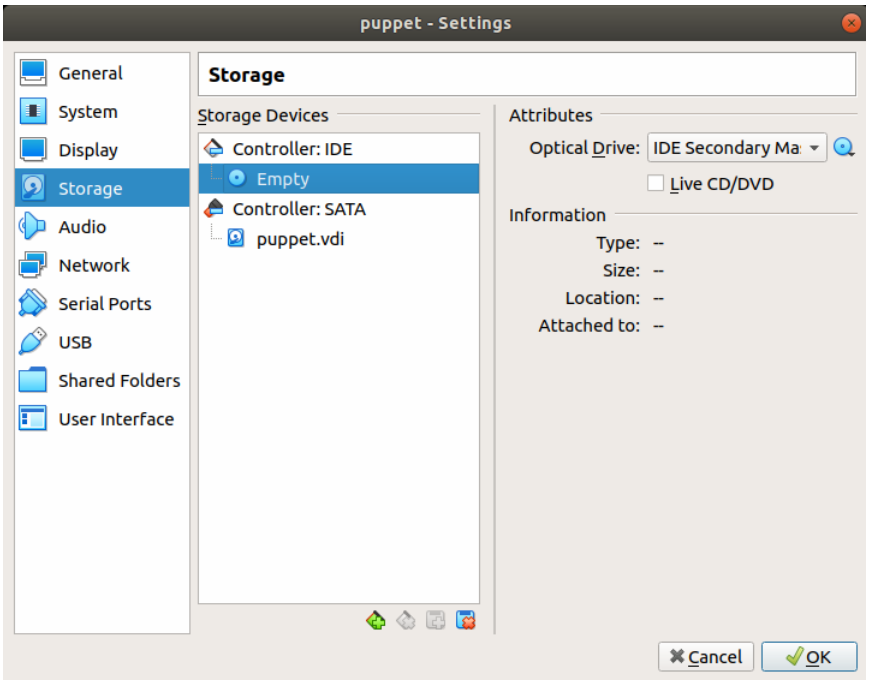
Step 8: Verify the general settings in the general setting tab.



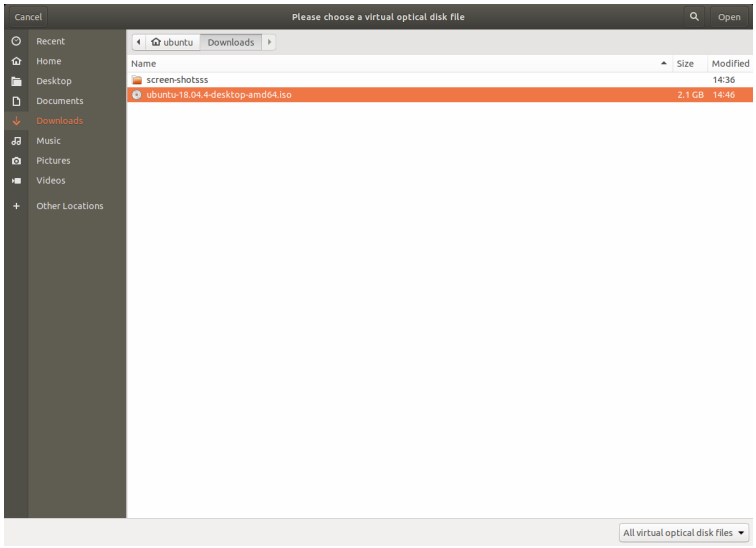
Step 9: Now go to storage option and click on controller

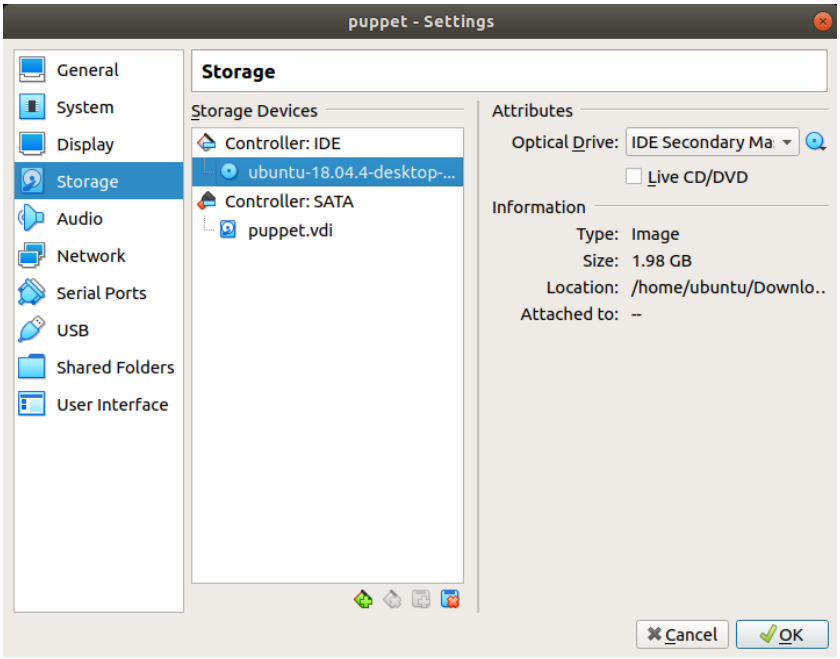


Step 10: Click on empty option and select disk option at the top right

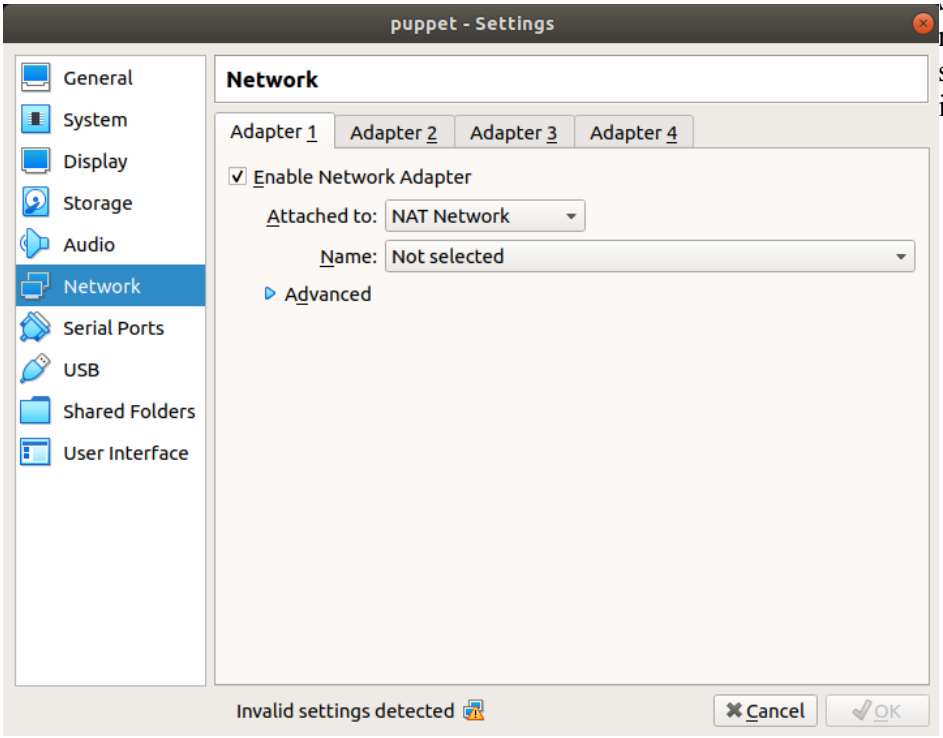


Step 11: Select ubuntu-18.04 iso file

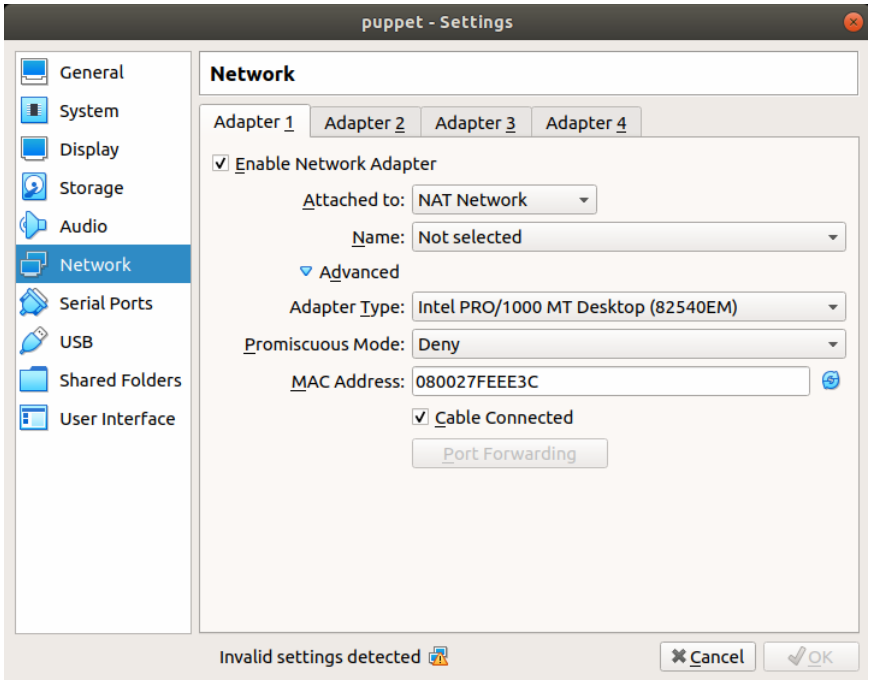


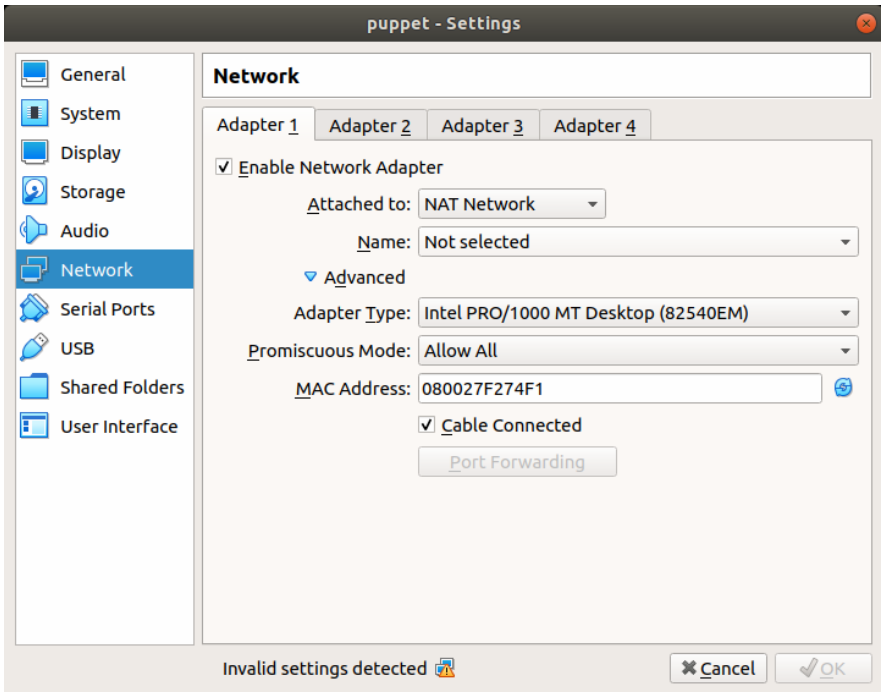


Step 12: Select the network tab and enable network adapter
Change attached to “Nat Network” from “Nat”

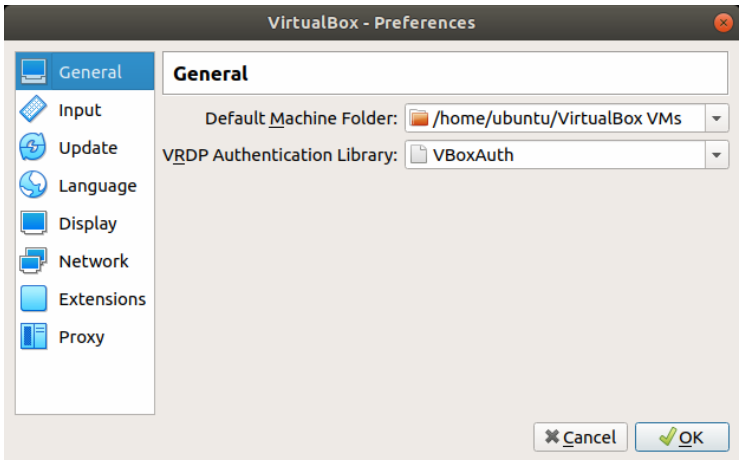


Step 13: Change network options as shown in below image



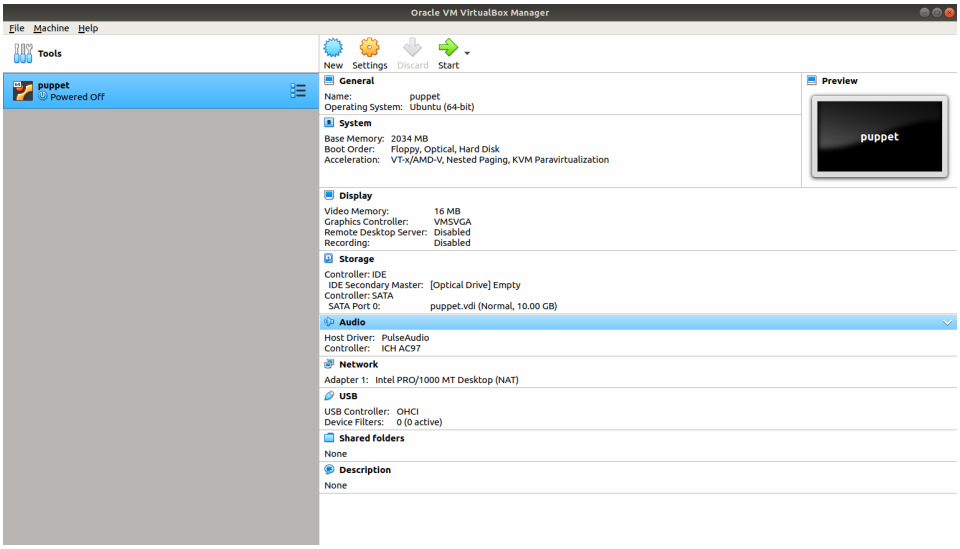


Step 14: In order to create new nat network click on file -> preferences



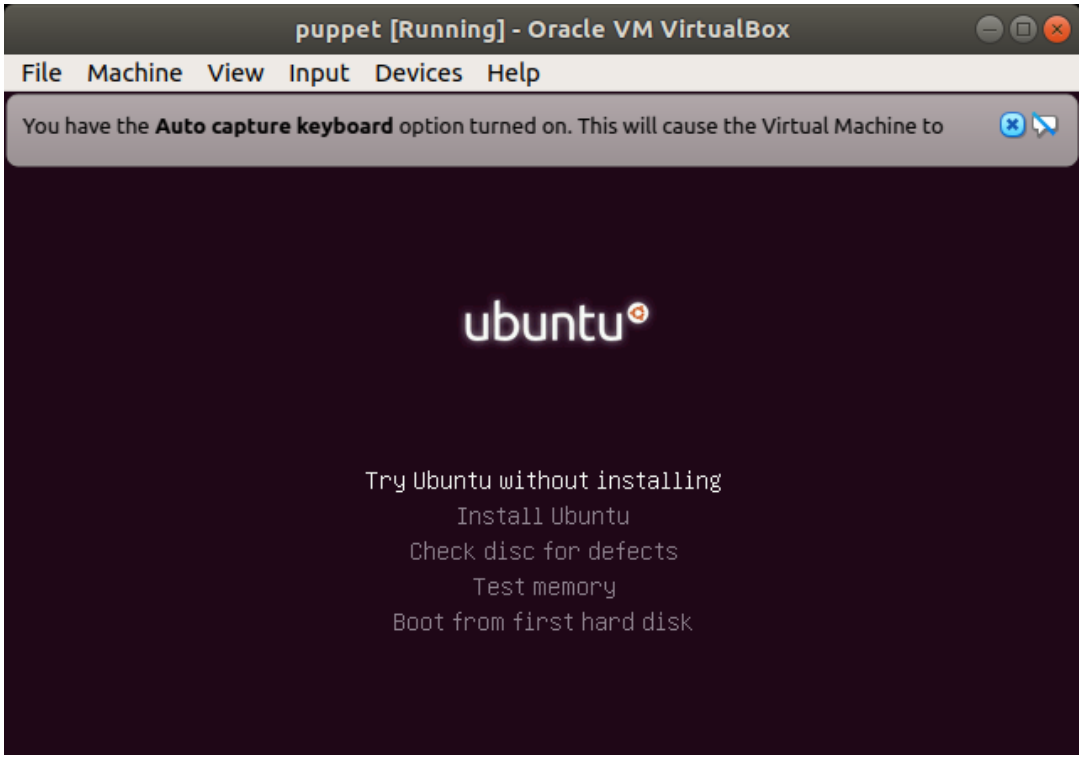
Step 15: Click on network tab and enter new nat network details

Step 16: Now again go to puppet server and set network configuration

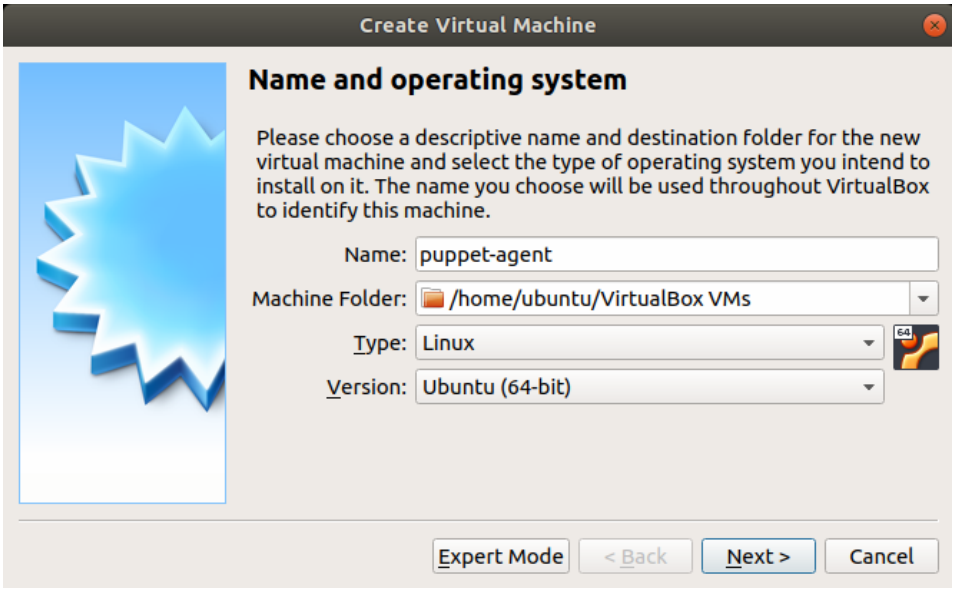


Step 17: Selecting NAT network and choosing created network.

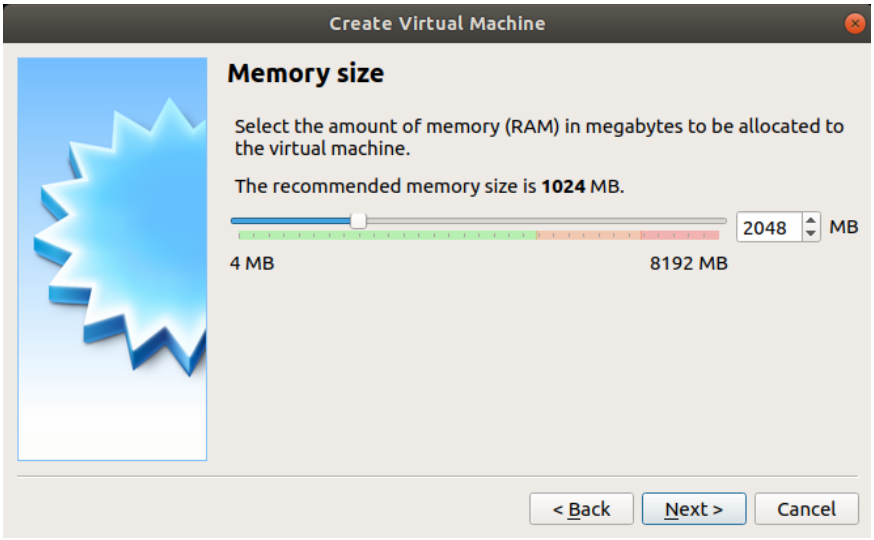
Step 18: Start the created virtual machine i.e. puppet



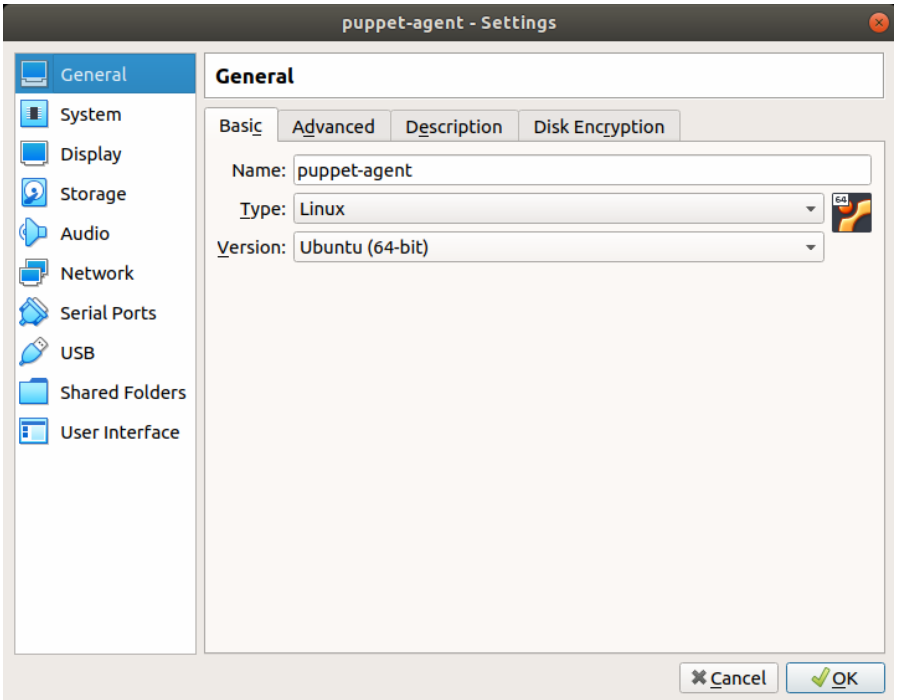
Step 19: Create another virtual machine as puppet-agent



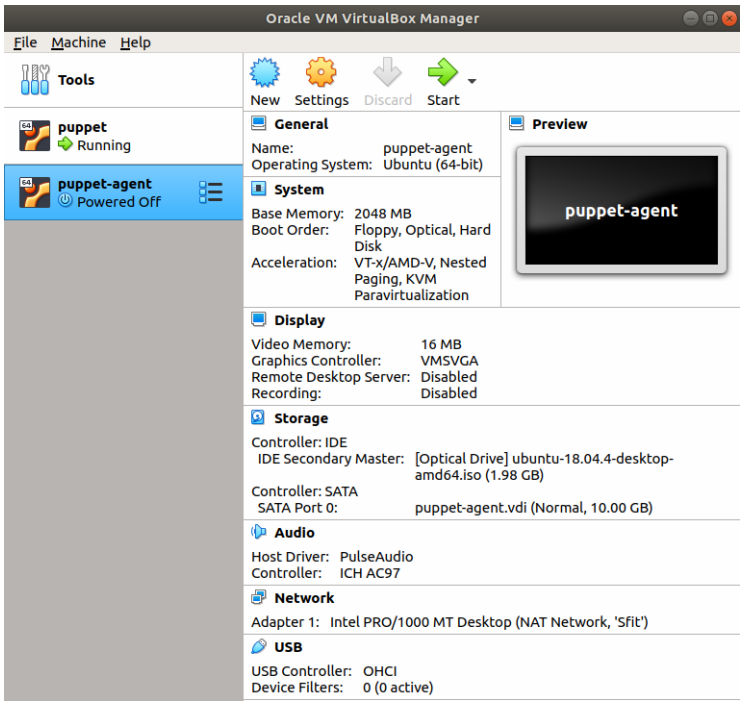
Step 20: Allocate 2gb of memory



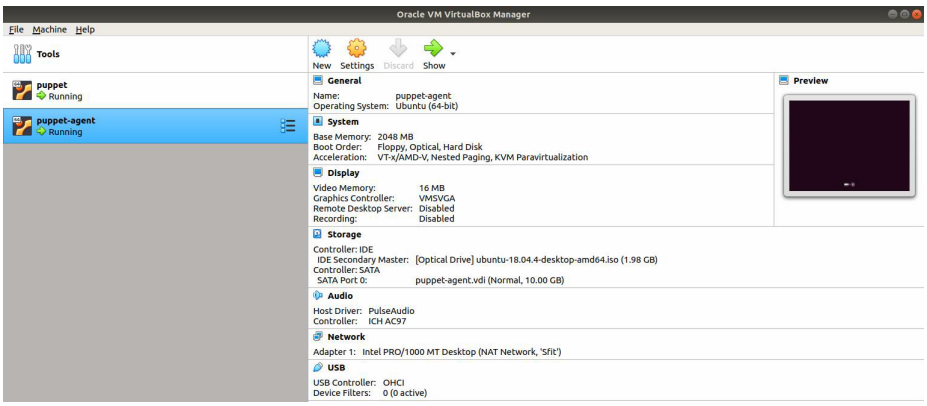
Step 21: Now click on settings to configure the puppet-agent



Step 22: Select newly created vm and hit enter key from your keyboard to start puppet-agent.



Step 23:Virtual Box will ask you to set up the start up boot select ubuntu iso file.



Conclusion

In this experiment we have learn about puppet which is a configuration management tool. It follows the client-server model, where one machine in any cluster acts as the server, known as

puppet master and the other acts as a client known as a puppet agents. We have successfully installed puppet master and puppet agent and have established connection between them.

EXPERIMENT NO. – 11

Aim of the Experiment: -

Outcome: -

Date of Conduction: Date of Submission:

Implementation (5)	Understanding (5)	Punctuality & Discipline (5)	Total (15)

Practical Incharge

PRACTICAL NO. 11

Problem Definition:.To install Ansible on ubantu 20.4

Compiler / Tool: Puppet, Oracle Virtual Box,Ubuntu

Theory:

Step 1: Configure Ansible Control Node, Host, and SSH Key Pair

Before you install Ansible on Ubuntu, make sure you have a couple of things set up. The configuration requires an Ansible control node and one or more Ansible hosts.

Configuring the Ansible Control Node

To set up the Ansible control node, log in as root user. Create another (non-root) user with administrative privileges, and then add an SSH key pair for the new user.

1. As root, add an administrator-level user for the control node. Use the `adduser` command:

2. Define a strong account password and, optionally, answer a list of questions.

3. Press **Enter** to skip any of the fields you don't want to fill out at the moment.
   4. The new account is ready. Now, assign administrative access to the account. The following command assigns superuser privileges, allowing the account to use the `sudo` command:

   # usermod -aG sudo [username]

Setting up an SSH Key pair

1. Enter the following command in the Ansible control node terminal:

adduser [username]

```
test@test-machine:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/test/.ssh/id_rsa):
```

```
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
```

```
Your identification has been saved in /home/test/.ssh/id_rsa
Your public key has been saved in /home/test/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:GKUPN9UmR4WDrabMe3fi9AmCfyNFqjq5vXne1aBZoiw test@test-machine
The key's randomart image is:
+---[RSA 3072]----+
|         . .=.o.  |
|       o .o B     |
|      + o  = .    |
|       * .o .     |
|      .oSo o. o   |
|        +o...= o  |
|       .Eo+.= . .|
|      o.o+++=+..  |
|      o++=o=o+o   |
+----[SHA256]-----+
```

Configuring an Ansible Host

Ansible hosts are remote servers that are monitored and controlled by the Ansible control node. Each host needs to have the control node's SSH key in the system user's authorized keys directory.

1. The easiest method of setting up an SSH public key is to copy it using the `ssh-copy-id` command:

```
test@test-machine:~$ ssh-copy-id test@10.0.2.15
The authenticity of host '10.0.2.15 (10.0.2.15)' can't be established.
ECDSA key fingerprint is SHA256:ecAnmW4+i+Bei5bdFM2ekWPsjC5//L+DDYj9o6Q7MOc.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
```

```
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter
 out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are promp
ted now it is to install the new keys
test@10.0.2.15's password:
```

```
Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'test@10.0.2.15'"
and check to make sure that only the key(s) you wanted were added.
```

Step 2: Install Ansible

```
$ ssh-copy-id username@remote_host
```

1. Make sure your system’s package index is up to date. Refresh the package index with the command:

2. Next, install Ansible on Ubuntu with the command:

3. The installation will prompt you to press `Y` to confirm, with the rest of the installation process being automated.

```
$ sudo apt update
```

```
$ sudo apt install ansible
```

Conclusion :

In this experiment,we have learn how to install Ansible on ubuntu 20.4