Setup Manual

Read the instruction/text carefully and follow each and every step!!!

These are the steps to perform after you login to the newly installed Ubuntu system. If you are performing these steps in the workshop class avoid the step 2 and step 3 as it might take some time and we will have limited time. Do perform it later at your own time as it helps keep your system up to date.

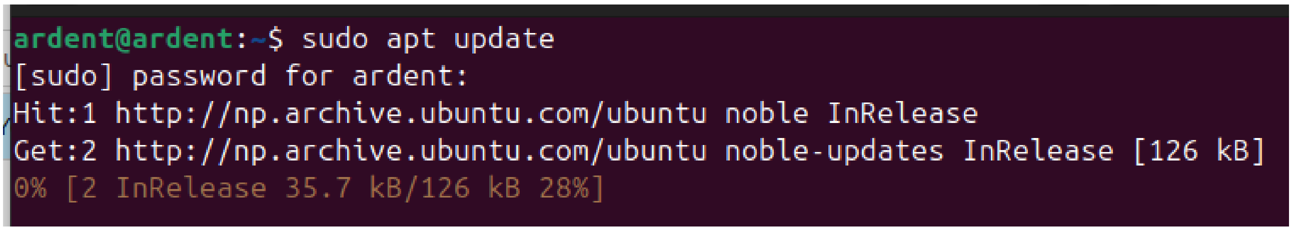
1. Press CTRL+ALT+T to open terminal. You can also press the window key and search for it

2. In the terminal run the following command: sudo apt update

sudo keyword is used to provider root access...this will ask you for a password enter your system password

apt is a command line utility that will be used to install any new software in your system from here onwards

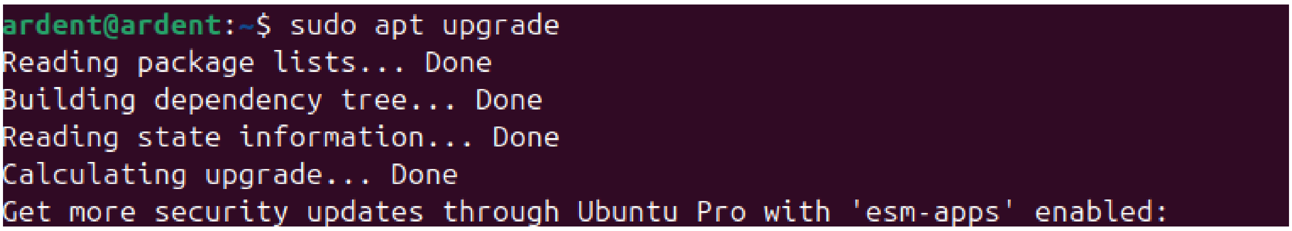
update will get any updates regarding the software repository from remote



```
ardent@ardent:~$ sudo apt update
[sudo] password for ardent:
Hit:1 http://np.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://np.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
0% [2 InRelease 35.7 kB/126 kB 28%]
```

3. Run sudo apt upgrade

this will upgrade all the software that have updates available

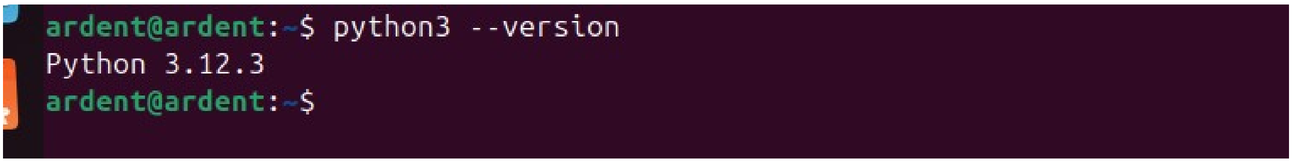


```
ardent@ardent:~$ sudo apt upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
Get more security updates through Ubuntu Pro with 'esm-apps' enabled:
```

Enter y when/if prompted

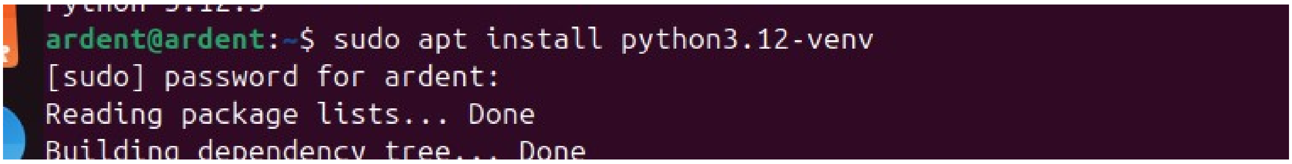
After this our system is up-to-date with any pending being applied. Now we will install other software that we will require throughout the course

Initially, let us figure out the python version using below command



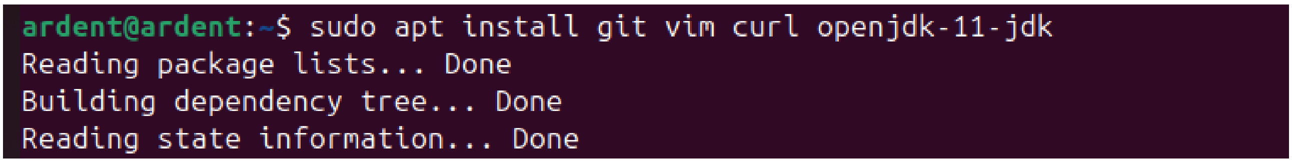
```
ardent@ardent:~$ python3 --version
Python 3.12.3
ardent@ardent:~$
```

Now install the virtual environment relevant to the python version



```
Python 3.12.3
ardent@ardent:~$ sudo apt install python3.12-venv
[sudo] password for ardent:
Reading package lists... Done
Building dependency tree... Done
```

Install git and other useful libraries using the below command. Notice how multiple tools can be downloaded at once separated by space. Vim is optional but is a good command line text editor if anyone wants to learn.

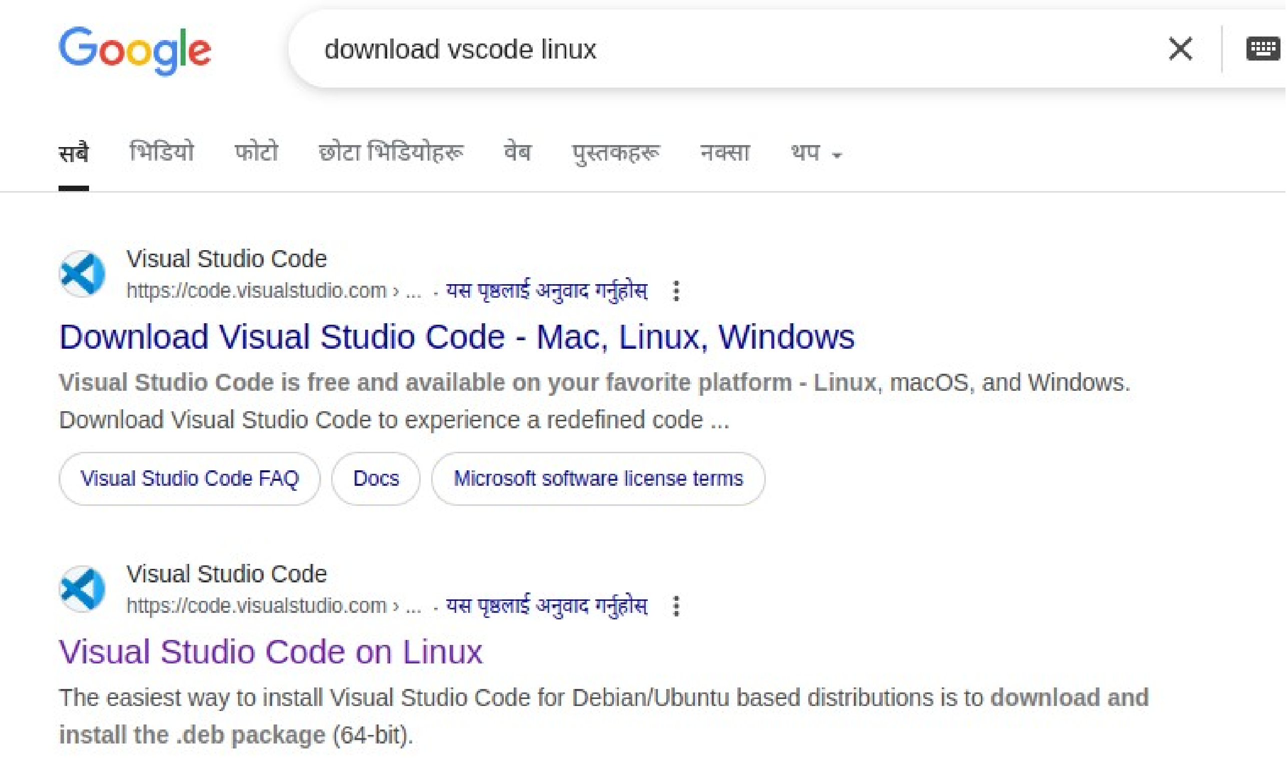


```
ardent@ardent:~$ sudo apt install git vim curl openjdk-11-jdk
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

VSCode Installation

Now, it is time to install vscode. Since the ubuntu repository does not have location of vscode prebuilt to it. We will have to do this manually.

1: Go to your browser search bar and type download vscode linux



download vscode linux

Visual Studio Code
https://code.visualstudio.com › ... · यस पृष्ठलाई अनुवाद गर्नुहोस्

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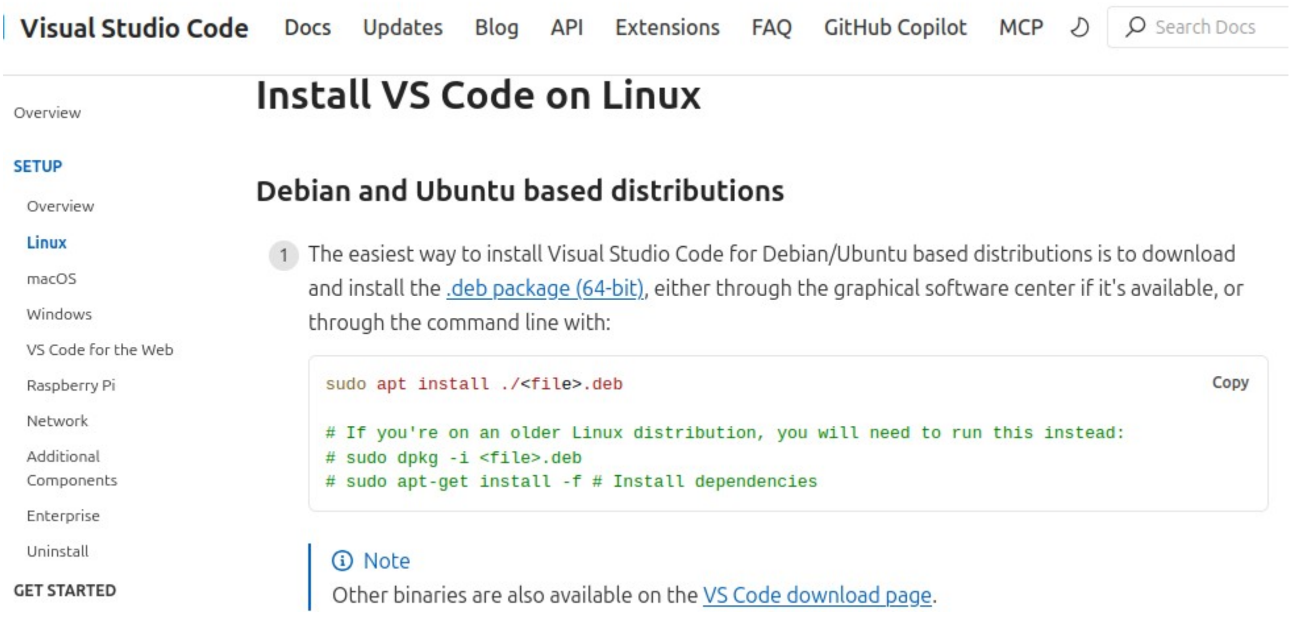
Visual Studio Code on Linux

The easiest way to install Visual Studio Code for Debian/Ubuntu based distributions is to download and install the .deb package (64-bit).

2. Open the link that has “visual studio code on linux” written on it and scroll down until you see link for code written as “.deb package (64-bit),”



Install VS Code on Linux

Debian and Ubuntu based distributions

1 The easiest way to install Visual Studio Code for Debian/Ubuntu based distributions is to download and install the .deb package (64-bit), either through the graphical software center if it's available, or through the command line with:

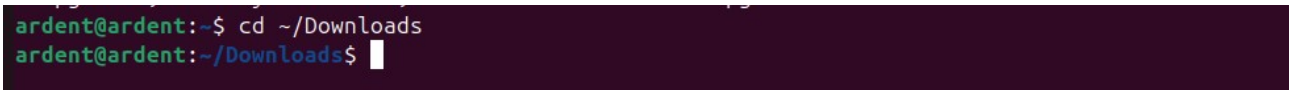
```
sudo apt install ./<file>.deb

# If you're on an older Linux distribution, you will need to run this instead:
# sudo dpkg -i <file>.deb
# sudo apt-get install -f # Install dependencies
```

ⓘ Note
Other binaries are also available on the VS Code download page.

This will automatically download .deb file to your system

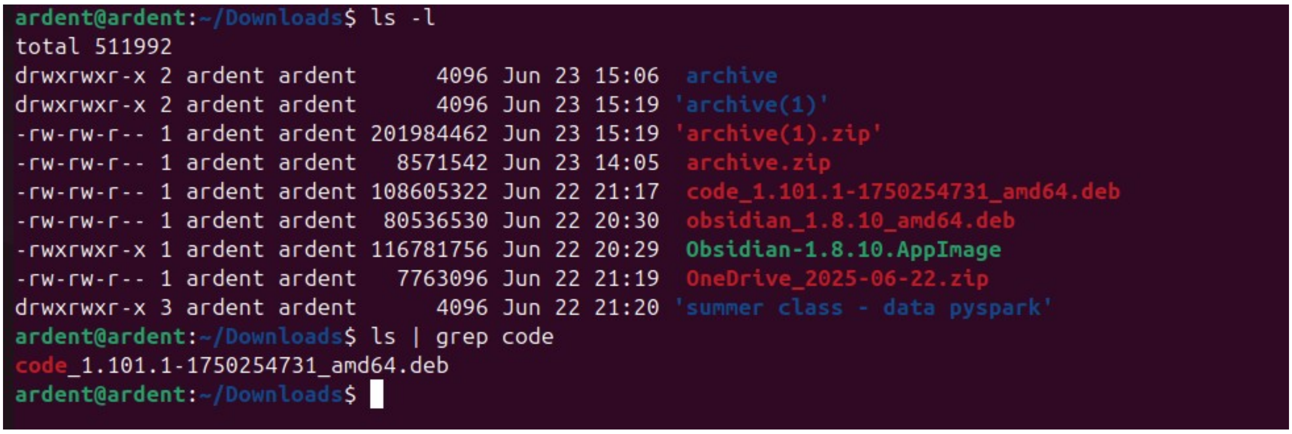
3. Change directory to Downloads as below:



```
ardent@ardent:~$ cd ~/Downloads
ardent@ardent:~/Downloads$ 
```

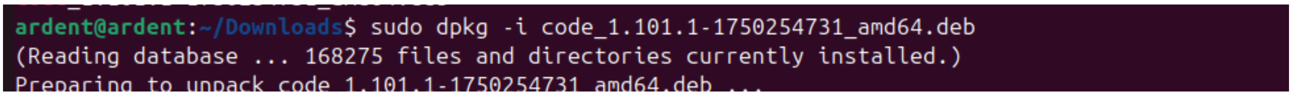
Notice the ~ after the cd command this means start from the user home directory

4. You can either run ls command and view all the files or use grep to quickly figure out if code has been downloaded successfully. If the code is not available there, it has either not downloaded properly or is in some other directory



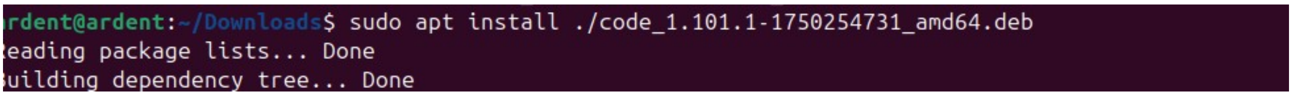
```
ardent@ardent:~/Downloads$ ls -l
total 511992
drwxrwxr-x 2 ardent ardent      4096 Jun 23 15:06  archive
drwxrwxr-x 2 ardent ardent      4096 Jun 23 15:19 'archive(1)'
-rw-rw-r-- 1 ardent ardent 201984462 Jun 23 15:19 'archive(1).zip'
-rw-rw-r-- 1 ardent ardent   8571542 Jun 23 14:05  archive.zip
-rw-rw-r-- 1 ardent ardent 108605322 Jun 22 21:17  code_1.101.1-1750254731_amd64.deb
-rw-rw-r-- 1 ardent ardent  80536530 Jun 22 20:30  obsidian_1.8.10_amd64.deb
-rwxrwxr-x 1 ardent ardent 116781756 Jun 22 20:29  Obsidian-1.8.10.AppImage
-rw-rw-r-- 1 ardent ardent   7763096 Jun 22 21:19  OneDrive_2025-06-22.zip
drwxrwxr-x 3 ardent ardent      4096 Jun 22 21:20 'summer class - data pyspark'
ardent@ardent:~/Downloads$ ls | grep code
code_1.101.1-1750254731_amd64.deb
ardent@ardent:~/Downloads$ 
```

5. Run the following command to install vscode in your system



```
ardent@ardent:~/Downloads$ sudo dpkg -i code_1.101.1-1750254731_amd64.deb
(Reading database ... 168275 files and directories currently installed.)
Preparing to unpack code_1.101.1-1750254731_amd64.deb ...
```

You can also use apt to install as apt internally uses dpkg



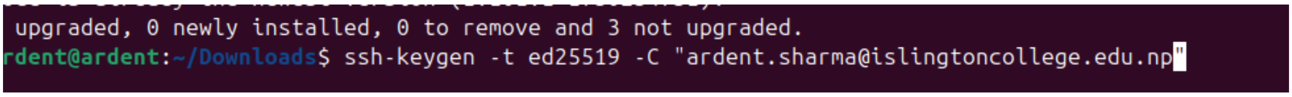
```
rdent@ardent:~/Downloads$ sudo apt install ./code_1.101.1-1750254731_amd64.deb
eading package lists... Done
uilding dependency tree... Done
```

Git and GitHub SSH Setup

Now, we have most of the tools we will need throughout the course. Let us configure git and GitHub to work with ssh key

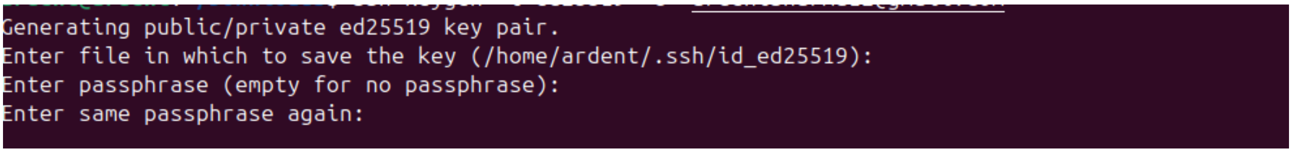
1. Let us first create an ssh key using below command: Make sure to set the email you have a github account for

ssh-keygen -t ed25519 -C "your_email@gmail.com"



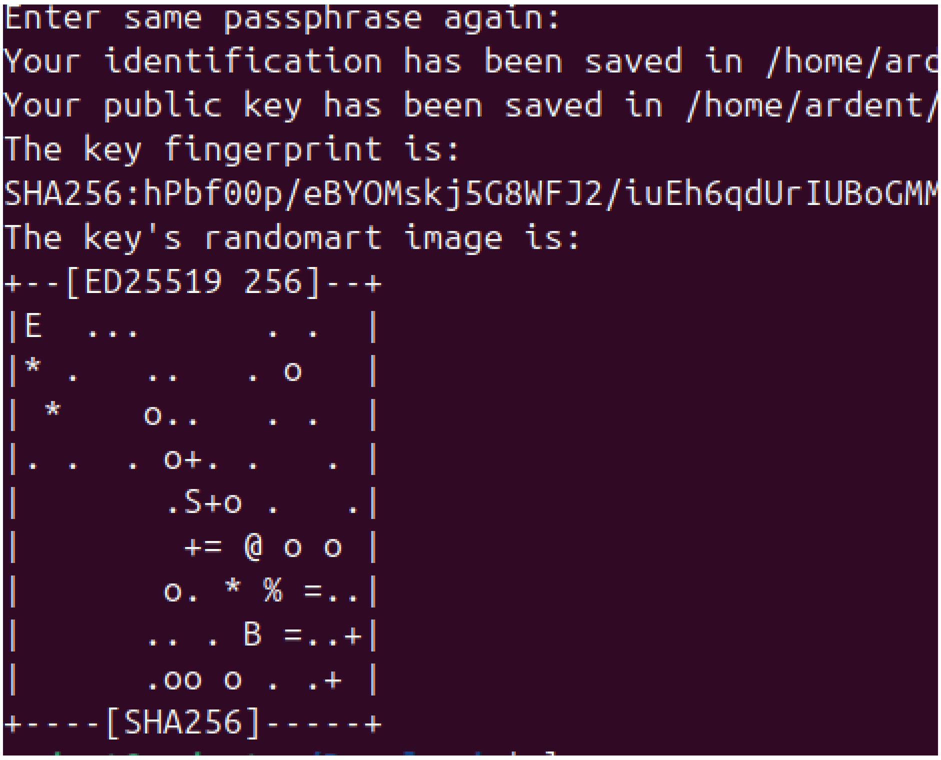
```
 upgraded, 0 newly installed, 0 to remove and 3 not upgraded.
rdent@ardent:~/Downloads$ ssh-keygen -t ed25519 -C "ardent.sharma@islingtoncollege.edu.np"
```

2. You can set the filename and passphrase to use but for now leave it **empty** press enter 3 times



```
Generating public/private ed25519 key pair.
Enter file in which to save the key (/home/ardent/.ssh/id_ed25519):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
```

You should output similar to below:

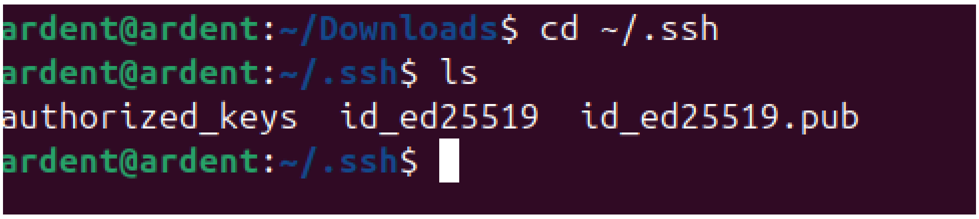


```
Enter same passphrase again:
Your identification has been saved in /home/ar
Your public key has been saved in /home/ardent/
The key fingerprint is:
SHA256:hPbf00p/eBYOMskj5G8WFJ2/iuEh6qdUrIUBoGM
The key's randomart image is:
+--[ED25519 256]--+
|E  ...      . .  |
|* .   ..   . o   |
| *    o..   . .  |
|. .  . o+. .   . |
|       .S+o .   .|
|        += @ o o |
|       o. * % =..|
|      .. . B =..+|
|      .oo o . .+ |
+----[SHA256]-----+
```

3. Change directory to where the key were saved using below command. Use ls command to view the files in that directory. If you left blank space above and did not provide any file name the names

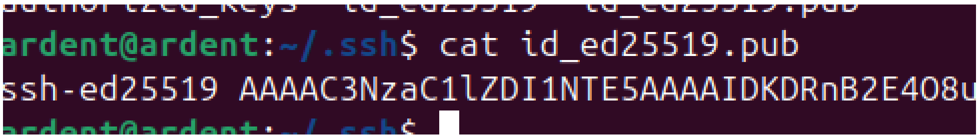
will be same as below: id_ed25519 and id_ed25519.pub

id_ed25519.pub is the public key and will be used in GitHub to setup ssh. Do not share these key with anyone else especially the private key



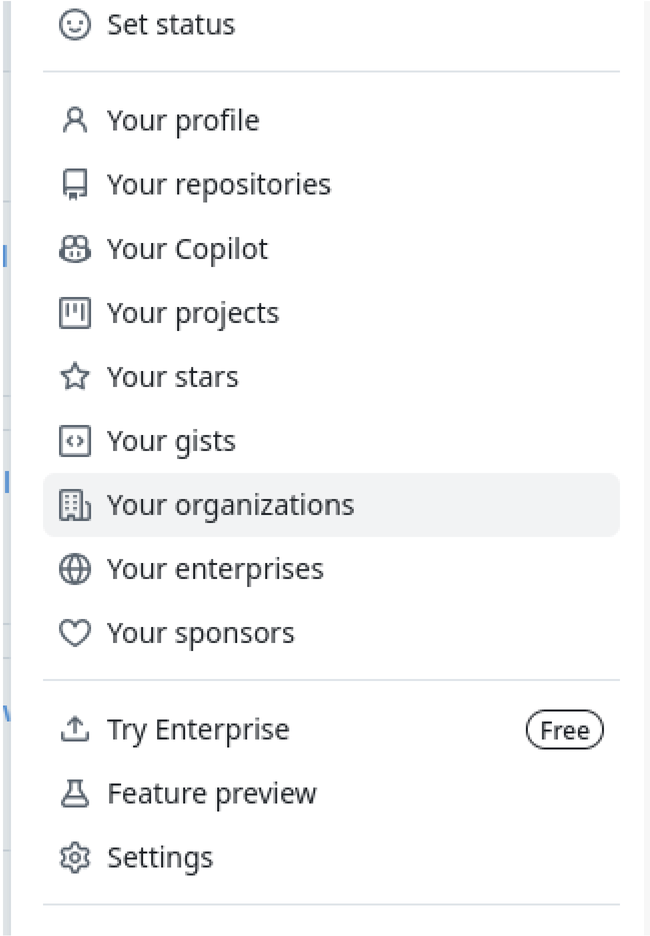
```
ardent@ardent:~/Downloads$ cd ~/.ssh
ardent@ardent:~/.ssh$ ls
authorized_keys  id_ed25519  id_ed25519.pub
ardent@ardent:~/.ssh$ 
```

4. View the content of the pub file using cat and copy the text as it is using CTRL+SHIFT+C

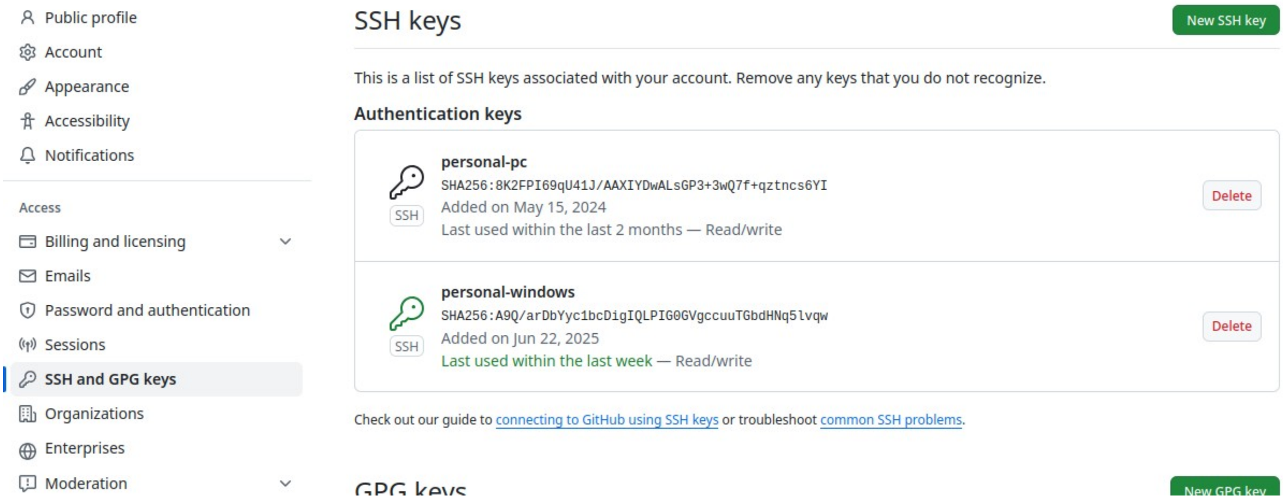


```
authorized_keys  id_ed25519  id_ed25519.pub
ardent@ardent:~/.ssh$ cat id_ed25519.pub
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIDKDRnB2E408u
ardent@ardent:~/.ssh$ 
```

5. Log in to GitHub and goto settings, from the profile icon



6. In the left hand side you should see Access section. Click on SSH and GPG keys then New SSH Key on the right side



SSH keys

This is a list of SSH keys associated with your account. Remove any keys that you do not recognize.

Authentication keys

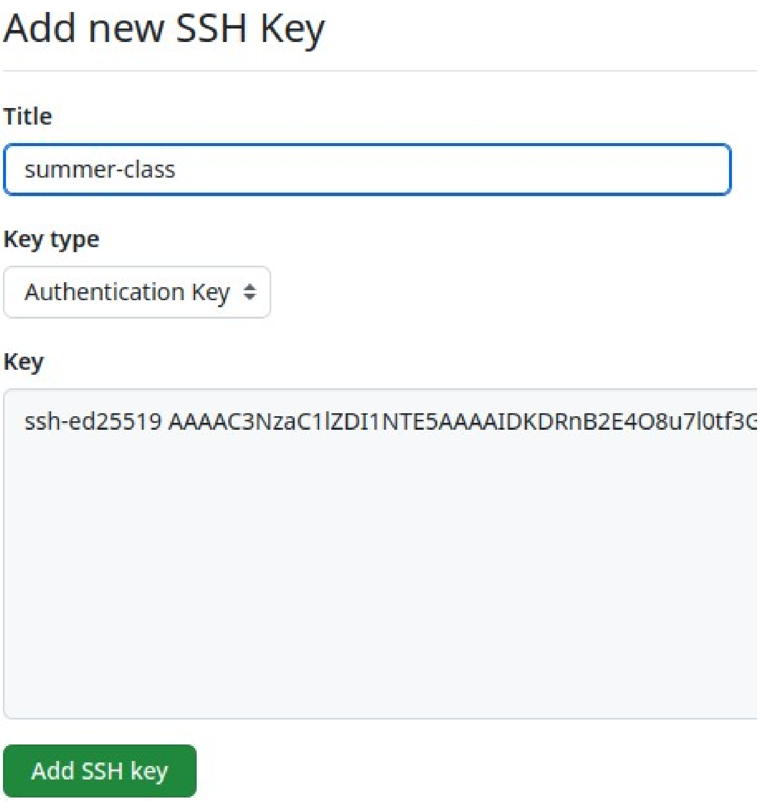
personal-pc
SHA256:8K2FPI69qU41J/AAXIYDwALsGP3+3wQ7f+qztncs6YI
Added on May 15, 2024
Last used within the last 2 months — Read/write

personal-windows
SHA256:A9Q/arDbYyc1bcDigIQLPIG0GVgccuuTGbdHNq5lvqw
Added on Jun 22, 2025
Last used within the last week — Read/write

Check out our guide to connecting to GitHub using SSH keys or troubleshoot common SSH problems.

GPG keys

7. Give a title and paste the content you copied from the terminal to Key section. Note that the start of key must be ssh-ed25519 and end must be your email. Finally, click on Add SSH Key button



Add new SSH Key

Title

summer-class

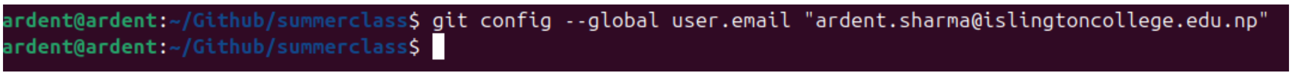
Key type

Authentication Key

Key

ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIDKDRnB2E4O8u7l0tf3G

8. Finally, to let git know who you are use the following command. User your own email address

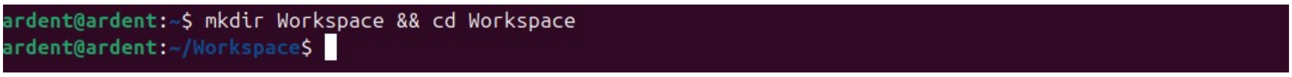


```
ardent@ardent:~/Github/summerclass$ git config --global user.email "ardent.sharma@islingtoncollege.edu.np"
ardent@ardent:~/Github/summerclass$ 
```

Pyspark Setup

Let us now install pyspark in our system in a virtual environment

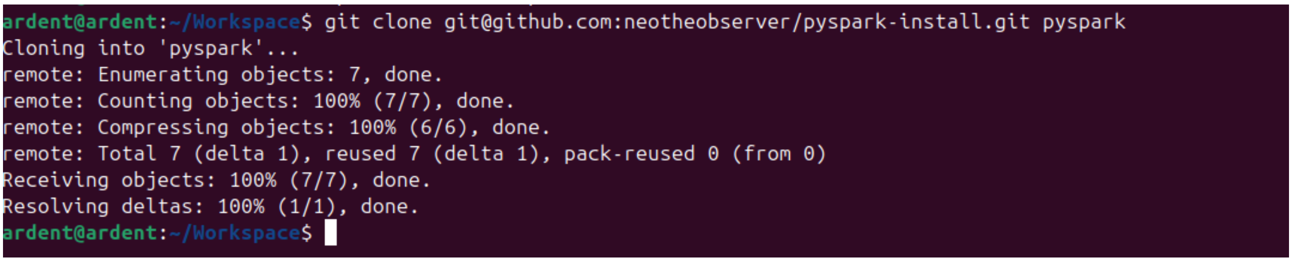
1. Create a new directory Workspace and cd into that directory. Create this directory in your home



```
ardent@ardent:~$ mkdir Workspace && cd Workspace
ardent@ardent:~/Workspace$ 
```

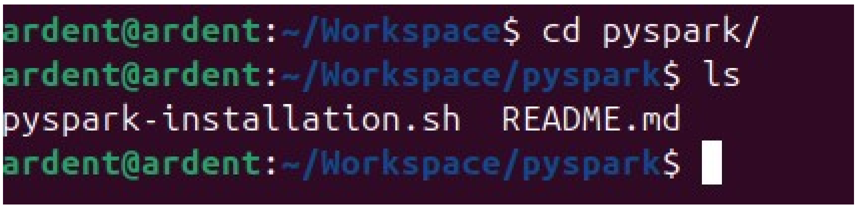
2. Clone the following git repo inside the Workspace directory: it contains script to install pyspark

git clone git@github.com:neotheobserver/pyspark-install.git pyspark



```
ardent@ardent:~/Workspace$ git clone git@github.com:neotheobserver/pyspark-install.git pyspark
Cloning into 'pyspark'...
remote: Enumerating objects: 7, done.
remote: Counting objects: 100% (7/7), done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 7 (delta 1), reused 7 (delta 1), pack-reused 0 (from 0)
Receiving objects: 100% (7/7), done.
Resolving deltas: 100% (1/1), done.
ardent@ardent:~/Workspace$ 
```

3. Now cd into the newly created pyspark directory and ls to verify if the files have been downloaded

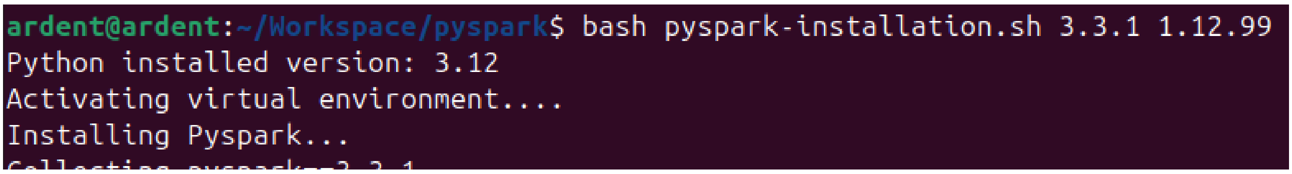


```
ardent@ardent:~/Workspace$ cd pyspark/
ardent@ardent:~/Workspace/pyspark$ ls
pyspark-installation.sh  README.md
ardent@ardent:~/Workspace/pyspark$ 
```

4. Run the installation script using below command

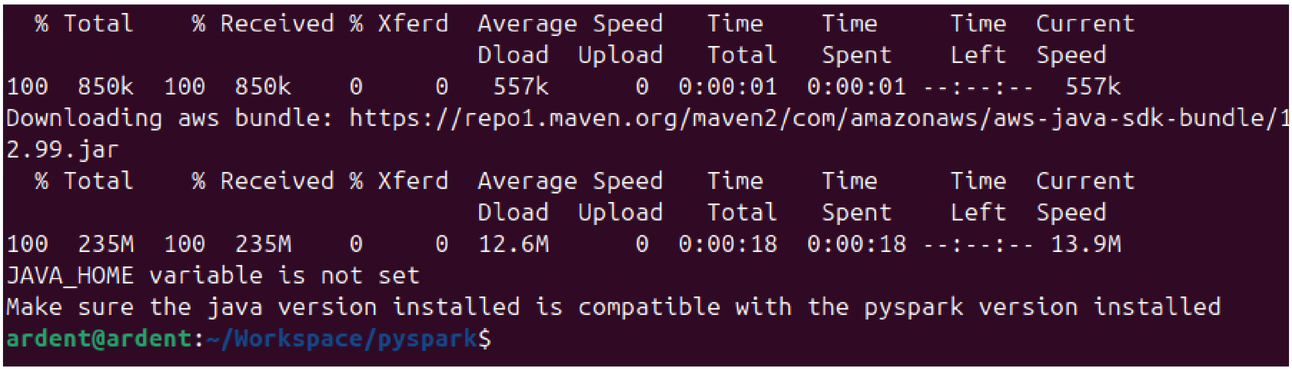
bash pyspark-installation.sh 3.3.1 1.12.99

Here, 3.3.1 is the pyspark verison and 1.12.99 is the aws bundle. Make sure the same version is installed or else there might be dependency issues



```
ardent@ardent:~/Workspace/pyspark$ bash pyspark-installation.sh 3.3.1 1.12.99
Python installed version: 3.12
Activating virtual environment....
Installing Pyspark...
Collecting pyspark==3.3.1
```

If there is any error during installation make sure the internet is working fine. If the issue persists some tool might be missing: install them using apt

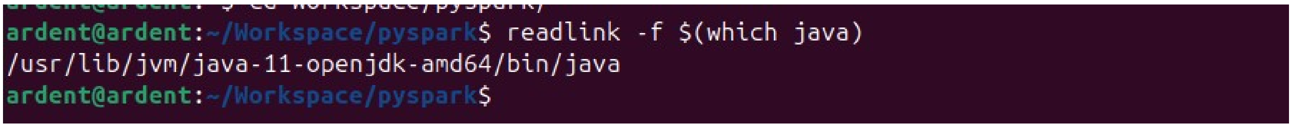


```
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  850k  100  850k    0     0   557k      0  0:00:01  0:00:01 --:--:--  557k
Downloading aws bundle: https://repo1.maven.org/maven2/com/amazonaws/aws-java-sdk-bundle/1
2.99.jar
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  235M  100  235M    0     0  12.6M      0  0:00:18  0:00:18 --:--:-- 13.9M
JAVA_HOME variable is not set
Make sure the java version installed is compatible with the pyspark version installed
ardent@ardent:~/Workspace/pyspark$
```

Most of us will get the above output. Notice JAVA_HOME variable is not set issue shown here. We have already installed openjdk-11-jdk before, we need to configure it in our .bashrc file. .bashrc is located in the home directory and it is the file that is run by the system everytime we open a terminal. So making the changes there will be reflected in every terminal. Let us first figure out the java installation directory

5. Use the below command to find the installed directory. We will take the path before the bin

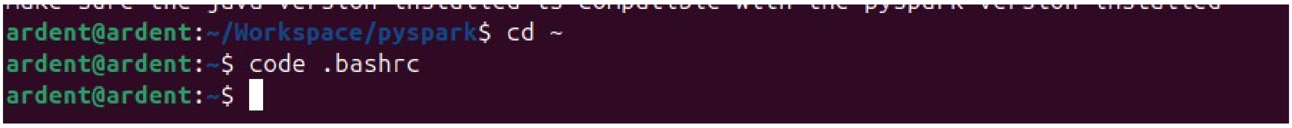
readlink -f $(which java)



```
ardent@ardent:~$ cd Workspace/pyspark/
ardent@ardent:~/Workspace/pyspark$ readlink -f $(which java)
/usr/lib/jvm/java-11-openjdk-amd64/bin/java
ardent@ardent:~/Workspace/pyspark$
```

Copy the path before bin using CTRL+SHIFT+C

6. Change directory to home and open the .bashrc file in a text editor of your choice. It could either be vim, nano, or vscode
 The file should be opened in the text editor

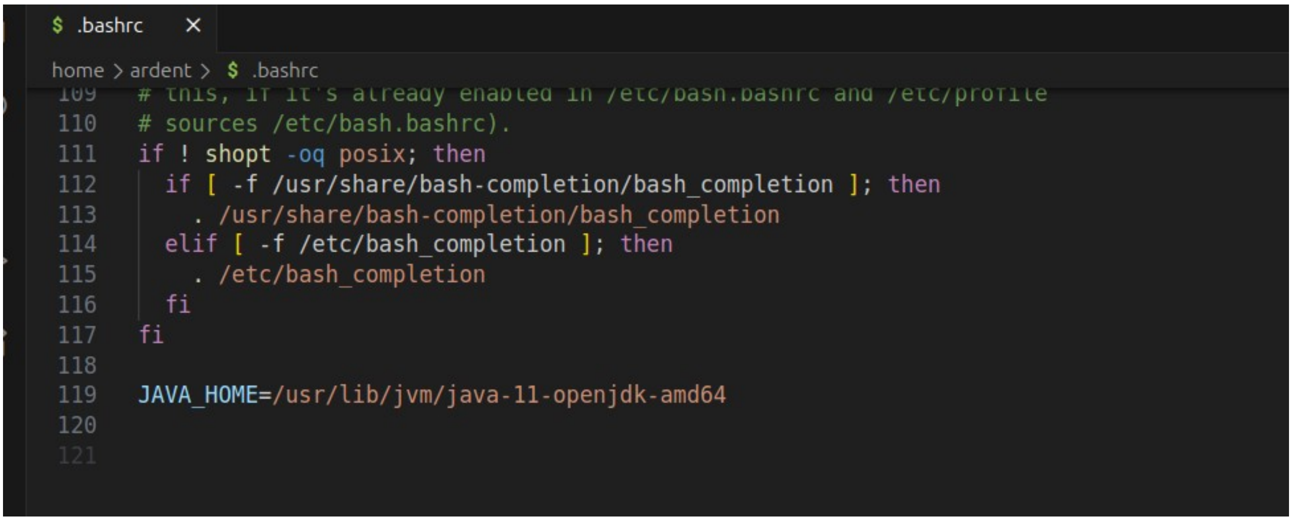


```
Make sure the java version installed is compatible with the pyspark version installed
ardent@ardent:~/Workspace/pyspark$ cd ~
ardent@ardent:~$ code .bashrc
ardent@ardent:~$ 
```

7. Go to the end of the file and add the following line

```
JAVA_HOME=/usr/lib/jvm/java-11-openjdk-amd64
```

Make sure there is no spaces in either the path or the assignment variables and operators

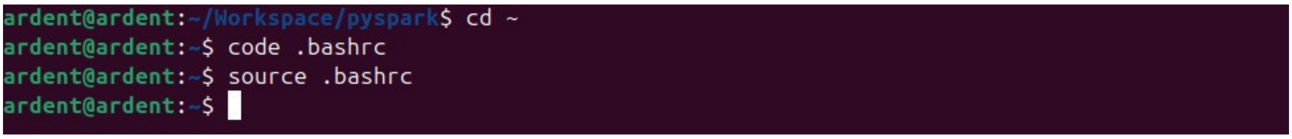


```
# this, if it's already enabled in /etc/bash.bashrc and /etc/profile
# sources /etc/bash.bashrc).
if ! shopt -oq posix; then
  if [ -f /usr/share/bash-completion/bash_completion ]; then
    . /usr/share/bash-completion/bash_completion
  elif [ -f /etc/bash_completion ]; then
    . /etc/bash_completion
  fi
fi

JAVA_HOME=/usr/lib/jvm/java-11-openjdk-amd64

```

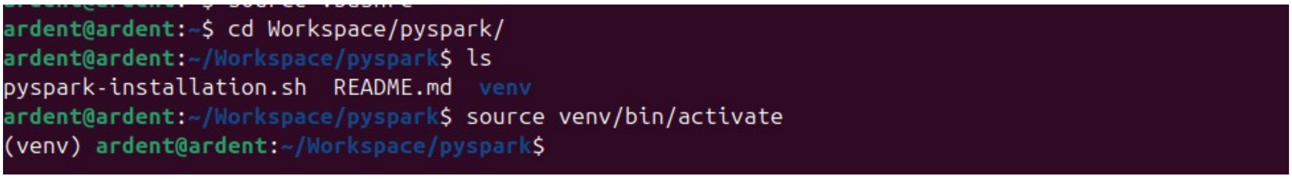
Save the file and close the text editor. The changes will be applied after we restart the terminal. Alternatively, we can tell the bash to reload the file using the source command as below



```
ardent@ardent:~/Workspace/pyspark$ cd ~
ardent@ardent:~$ code .bashrc
ardent@ardent:~$ source .bashrc
ardent@ardent:~$ 
```

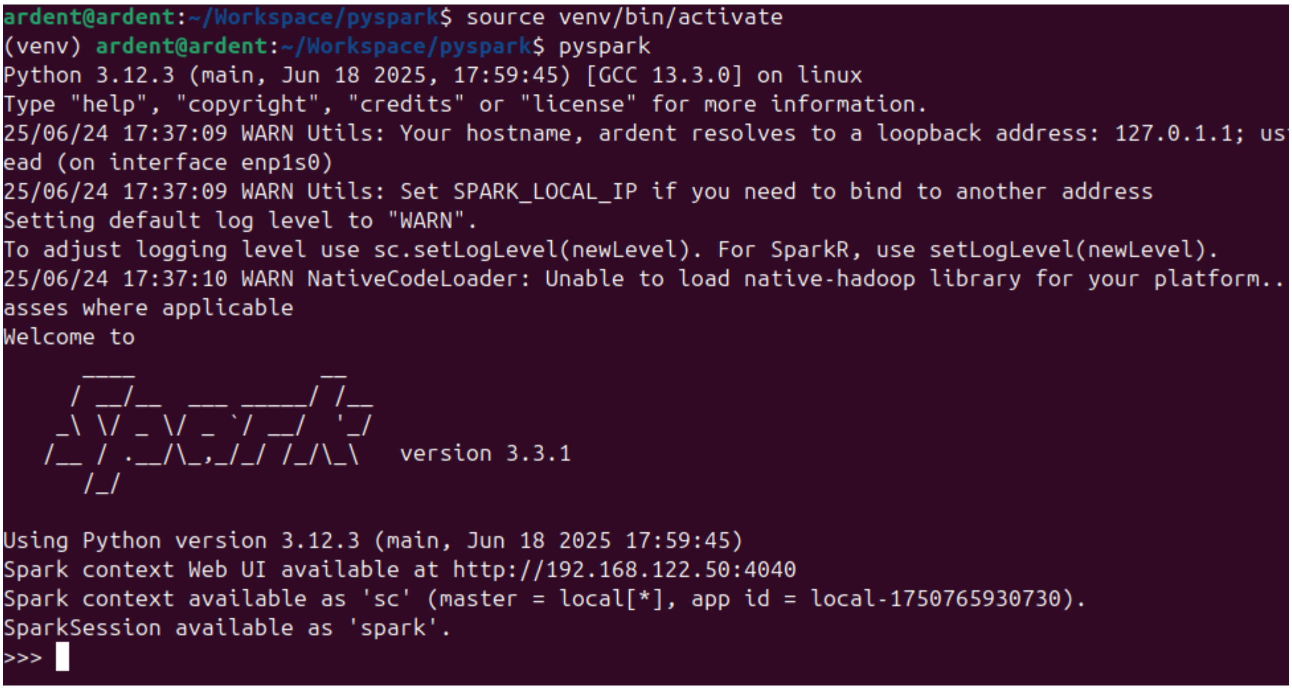
8. Let us move back to the directory we setup pyspark virtual environment and activate the virtual environment.
cd ~/Workspace/pyspark/
source venv/bin/activate

Since we have installed pyspark in a virtual environment we need to activate it everytime before running any pyspark code



```
ardent@ardent:~$ source .bashrc
ardent@ardent:~$ cd Workspace/pyspark/
ardent@ardent:~/Workspace/pyspark$ ls
pyspark-installation.sh  README.md  venv
ardent@ardent:~/Workspace/pyspark$ source venv/bin/activate
(venv) ardent@ardent:~/Workspace/pyspark$
```

9. Enter pyspark in the terminal. You should get the below output which verifies that pyspark has been installed properly



```
ardent@ardent:~/Workspace/pyspark$ source venv/bin/activate
(venv) ardent@ardent:~/Workspace/pyspark$ pyspark
Python 3.12.3 (main, Jun 18 2025, 17:59:45) [GCC 13.3.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
25/06/24 17:37:09 WARN Utils: Your hostname, ardent resolves to a loopback address: 127.0.1.1; us
ead (on interface enp1s0)
25/06/24 17:37:09 WARN Utils: Set SPARK_LOCAL_IP if you need to bind to another address
Setting default log level to "WARN".
To adjust logging level use sc.setLogLevel(newLevel). For SparkR, use setLogLevel(newLevel).
25/06/24 17:37:10 WARN NativeCodeLoader: Unable to load native-hadoop library for your platform..
asses where applicable
Welcome to
      ____              __
     / __/__  ___ _____/ /__
    _\ \/ _ \/ _ `/ __/  '_/
   /__ / .__/\_,_/_/ /_/\_\   version 3.3.1
      /_/

Using Python version 3.12.3 (main, Jun 18 2025 17:59:45)
Spark context Web UI available at http://192.168.122.50:4040
Spark context available as 'sc' (master = local[*], app id = local-1750765930730).
SparkSession available as 'spark'.
>>> 
```

Congratulations! Your system is ready to run pyspark jobs and you can now perform git operations from your local system using ssh authentication.