National University of Singapore
School of Computing
CS2109S: Introduction to AI and Machine Learning
Semester 2, 2024/2025

Environment Setup
Anaconda and IDE

A Required Files

- environment.yml
- requirements.txt

B Overview

We will go through step by step on how to install Anaconda, a framework that simplifies packages and dependencies management for Python, as well as how to use Jupyter Notebook using Anaconda.

We will also go through the steps to set up and debug using IDE, specially IDLE in the later section.

Note: You may skip these steps if you are familiar with setting up of Python, virtual environments, Jupyter Notebook and working with IDEs. However, if you choose to configure your own set up independently, you will be on your own in resolving any version-related issues or bugs.

C Setting up Anaconda for Windows and macOS

Note: If you're a macOS user with an M1 chip, please refer to Setting up Anaconda for Linux.

C.1 Step 1: Installing Anaconda

Note: You may skip this part if you have installed Anaconda previously.

Install anaconda via this link. Choose **(OS) (x-bit) Graphical Installer** (depends on your OS and whether you are on 32-bit or 64-bit)

Note: Most modern systems should be on 64-bit. To confirm your own system, you can follow this guide.

After done with the installation, open the exe file. Keep clicking next until until the *Install* button shows up. Click *Install* and wait until the installation is done.

C.2 Step 2: Create Environment for CS2109S

After you done with the installation, open the Anaconda Navigator app. You should see something similar with Figure1.

1. Click the *Environments* button at the left part of the app.

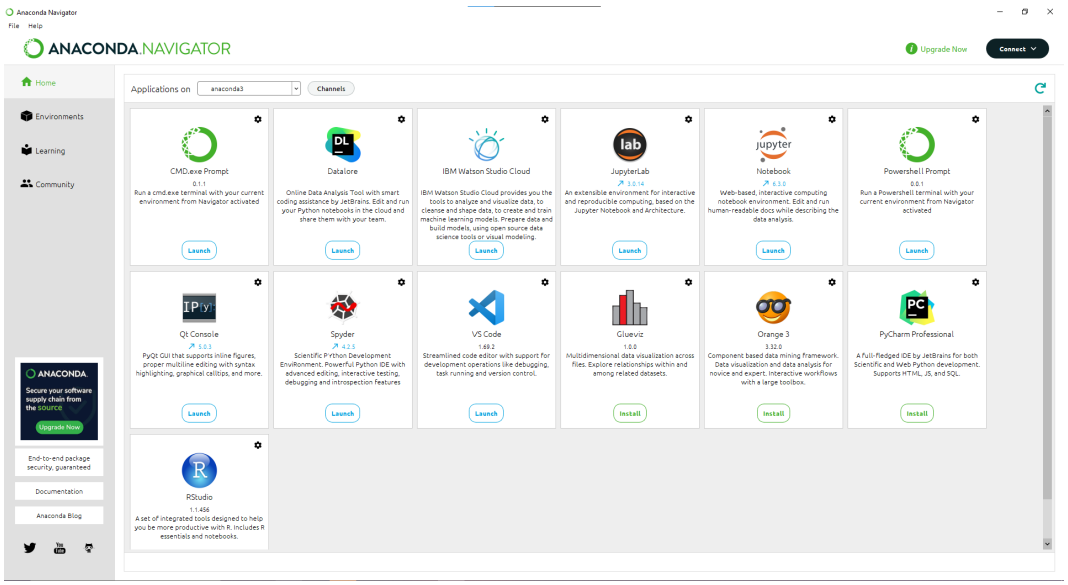


Figure 1: Anaconda Navigator

2. Click the *Import* button at the bottom part of the app.
3. Click the Folder Logo for Local Drive (refer to Figure2) and select *environment.yml*.
4. Rename the environment name into **CS2109S** and click *Import* button. Wait for around 10-15 minutes and your environment is ready.

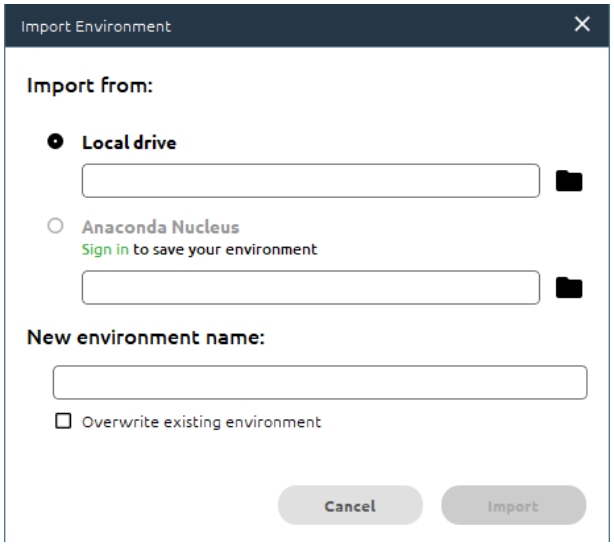


Figure 2: Select the Folder Logo for Local Drive

C.3 Step 3: Running Jupyter Notebook on Anaconda

1. Open the Anaconda Navigator App.
2. At the top part of the app, **ensure that we are using CS2109S instead of base(root) environment**.
3. Click the *Launch* button below Jupyter. A browser window will immediately pop up (or a localhost link should show up in the terminal which you should click) as

shown in Figure3.

4. Navigate through the directories to find *ps0.ipynb* and click it. You should see rectangles with code snippets OR text inside them as shown in Figure4.
5. To run the code within a **selected** cell (blue vertical line on the left), click the **Run** button on the top menu bar.

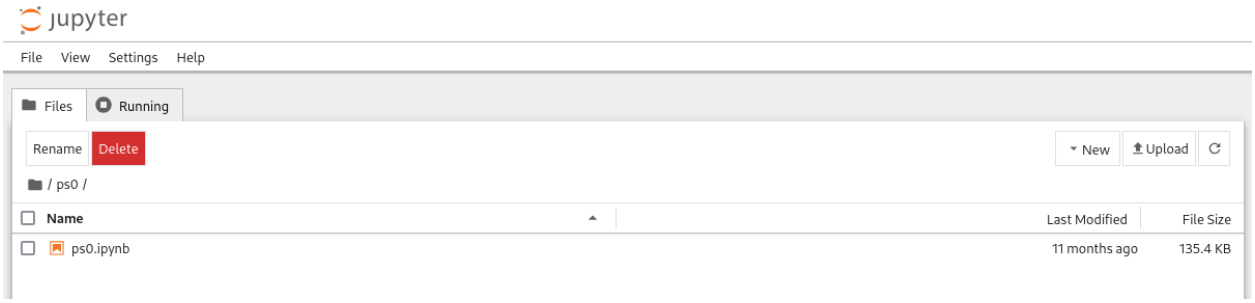


Figure 3: Notebook file explorer

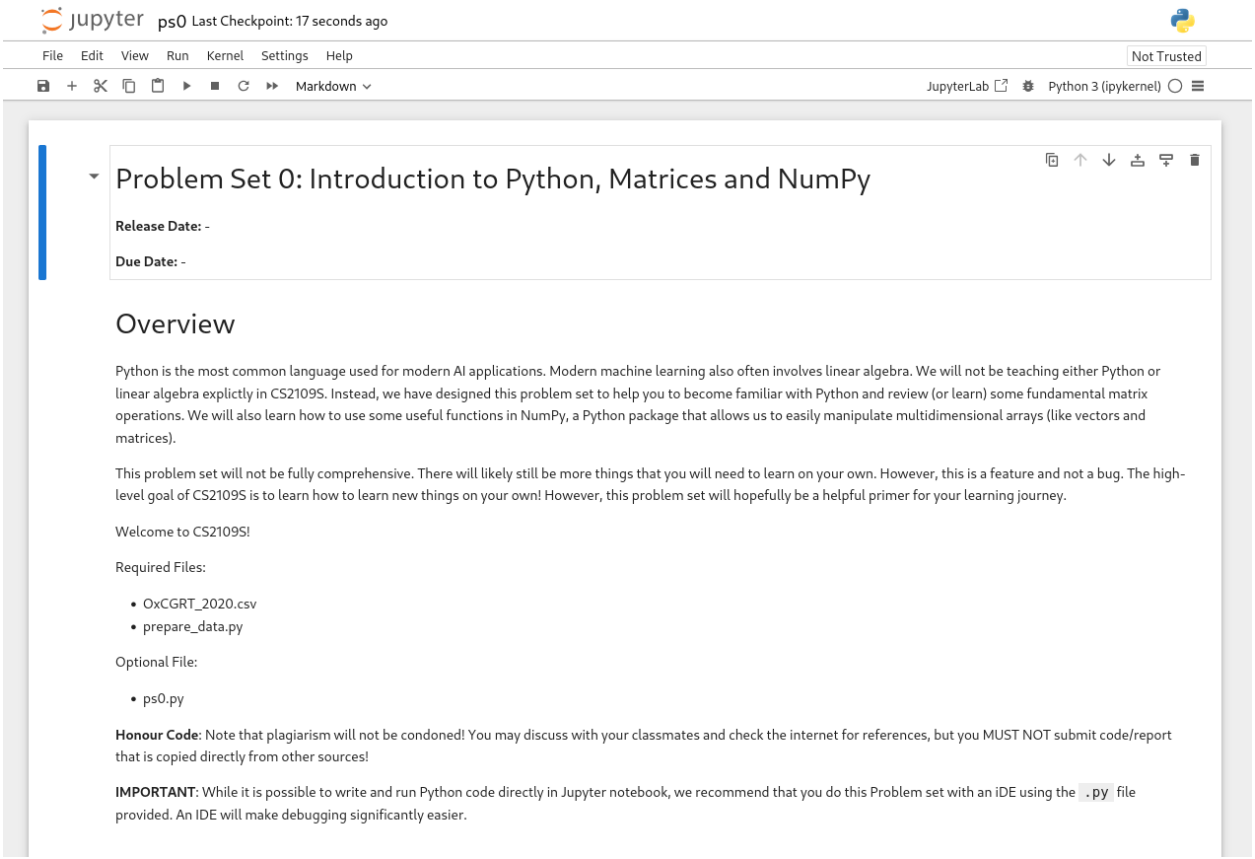


Figure 4: Opening up ps0.ipynb

D Setting up Anaconda for Linux

D.1 Step 1: Installing Anaconda

Note: You may skip this part if you have installed Anaconda previously.

Install anaconda via this link. Choose any version that supports Linux operating system.

After done with the installation, open the exe file. Keep clicking next until until the *Install* button shows up. Click *Install* and wait until the installation is done.

D.2 Step 2: Create Environment for CS2109S

1. Ensure your current working directory contains *environment.yml*.
2. Type in your terminal `conda env create -f environment.yml`. Wait for around 10-15 minutes and your environment is ready.
3. Type in your terminal `conda env list` and ensure that *cs2109s-ay2425s2* environment exists.

D.3 Step 3: Running Jupyter Notebook on Anaconda

1. Open your terminal.
2. Activate the environment by typing in your terminal `conda activate cs2109s-ay2425s2` .
3. Change your current working directory into the folder that contains *ps0.ipynb*.
4. Type in your terminal `jupyter notebook`. If installation was fine, a browser window will immediately pop up (or a localhost link should show up in the terminal which you should click) as shown in Figure3.
5. Navigate through the directories to find *ps0.ipynb* and click it. You should see rectangles with code snippets OR text inside them as shown in Figure4.
6. To run the code within a **selected** cell (blue vertical line on the left), click the **Run** button on the top menu bar.

E Debugging using IDE

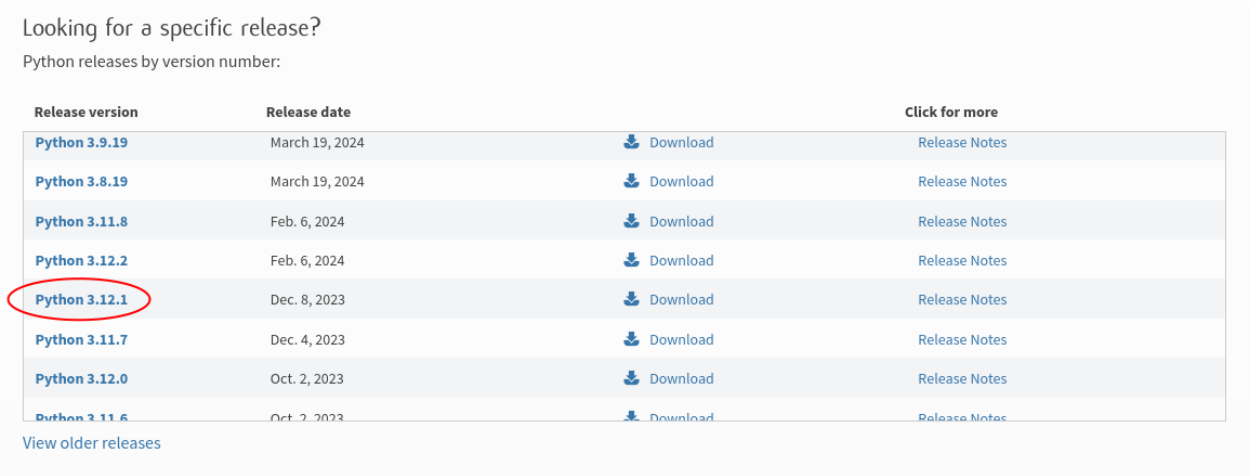
We encourage you to debug your code using an IDE. This section guides you in the installation and setting up of Python and your development environment, as well as debugging using IDLE.

F Setting up IDLE for Windows Users:

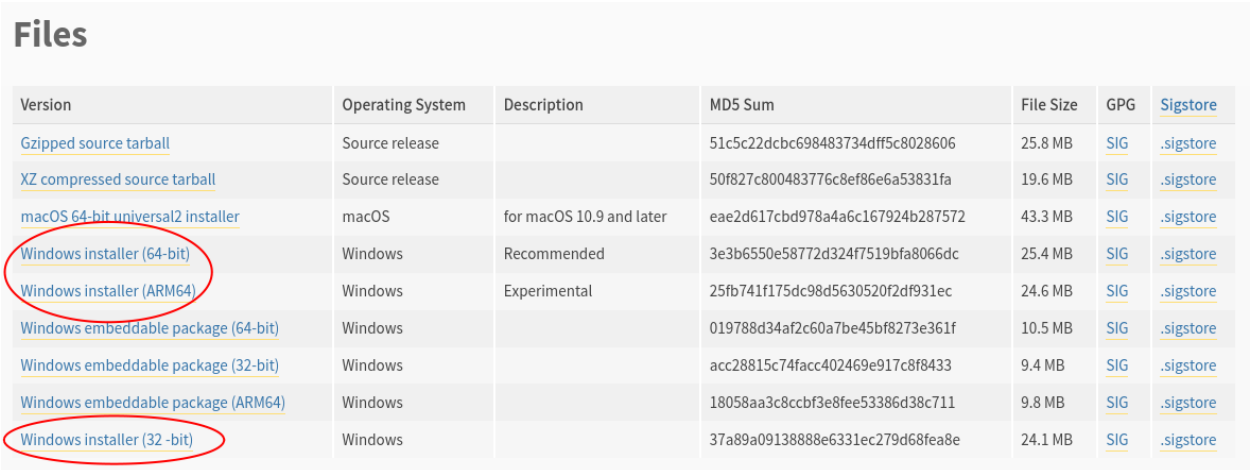
F.1 Step 1: Install Python for Windows

Note: If you are are familiar with Windows Subsystem for Linux (WSL or WSL2), you instead choose to install Python in WSL and follow the steps for Linux installation.

Head over to www.python.org/downloads and you should see something similar:



Choose **Python 3.12** and then choose **Windows installer (x-bit)** (depends whether you are on 32-bit or 64-bit).
Note: Most modern systems should be on 64-bit. To confirm your own system, you can go to Control Panel > System > About > System Type.



The **executable file** should now be inside your downloads folder now.
Run it and be sure to select add python 3.12 to path.

Important: Make sure to check the box that says **Add Python 3.12 to PATH** as shown to ensure that the interpreter will be placed in your execution path.

You do not need to install for all users if you have no admin access.

Click **Install Now** and it will complete in a few minutes. You should see a new program **IDLE** in your programs menu.

F.2 Step 2: Installing the packages

Note: If you are a poweruser, and know what you are doing, you are encouraged to set up a python virtual environment for the module. e.g. using `venv`, `pyenv` *or* `pipenv`.
You can also use conda environment if you have installed conda previously. Otherwise, you can install the following packages globally.

Enter the following command in your terminal and press enter:

```
pip3 install -r requirements.txt
```

Note: you may want to change the PyTorch index-url if you want to use CUDA.

You can access the **Command Prompt** terminal from your Start menu. If you need administrator rights, you should run **Command Prompt** as administrator.

F.3 Step 3: Debug using IDLE

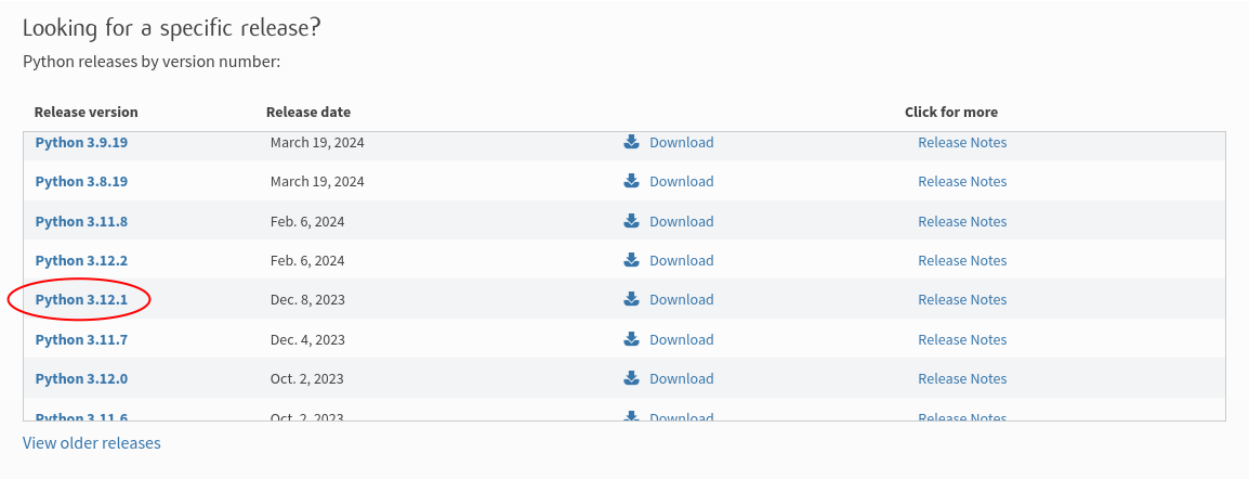
We recommend using **IDLE** as your development environment, as other IDEs might not be ready for use during practial exams. That said, you are free to use any other IDEs such as VSCode or PyCharm for your problem.

Run the ps0.py files in your **IDLE** directly if you install the dependencies locally. If you used virtual environments, activate your virtual environment and run your IDLE from your virtual environment. Use the built in IDLE debugger for stepping through a program and watching the variables change values.

G Setting up IDLE for Mac Users:

G.1 Step 1: Install Python for Mac

Download Python 3.12 **macOS 64-bit universal2 installer** from https://www.python.org/downloads and run the pkg installer.

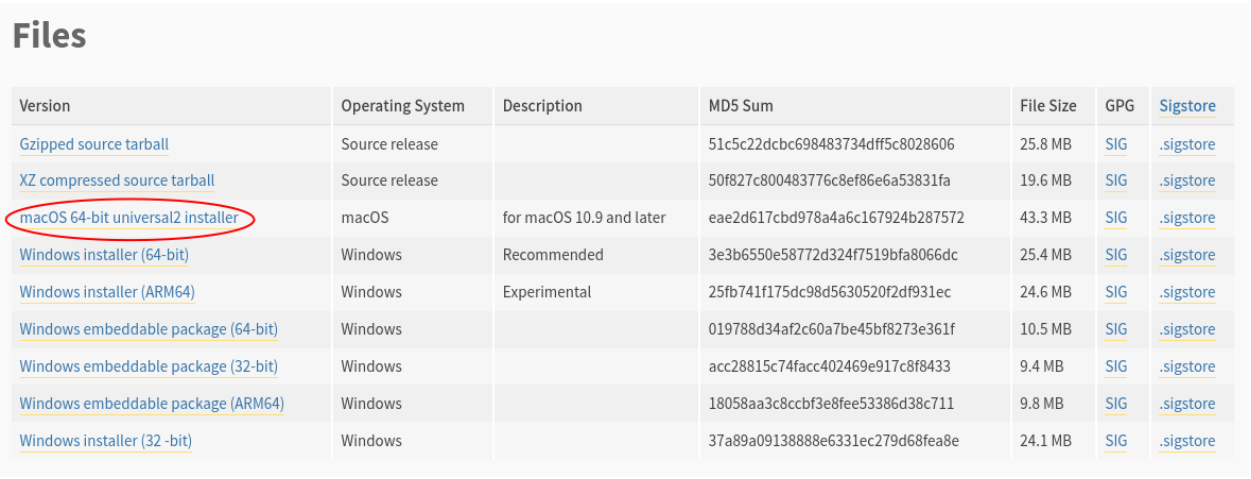


Looking for a specific release?

Python releases by version number:

Release version	Release date		Click for more
Python 3.9.19	March 19, 2024	Download	Release Notes
Python 3.8.19	March 19, 2024	Download	Release Notes
Python 3.11.8	Feb. 6, 2024	Download	Release Notes
Python 3.12.2	Feb. 6, 2024	Download	Release Notes
Python 3.12.1	Dec. 8, 2023	Download	Release Notes
Python 3.11.7	Dec. 4, 2023	Download	Release Notes
Python 3.12.0	Oct. 2, 2023	Download	Release Notes
Python 3.11.6	Oct. 2, 2023	Download	Release Notes

View older releases



Files

Version	Operating System	Description	MD5 Sum	File Size	GPG	Sigstore
Gzipped source tarball	Source release		51c5c22dcbc698483734dff5c8028606	25.8 MB	SIG	.sigstore
XZ compressed source tarball	Source release		50f827c800483776c8ef86e6a53831fa	19.6 MB	SIG	.sigstore
macOS 64-bit universal2 installer	macOS	for macOS 10.9 and later	eae2d617cbd978a4a6c167924b287572	43.3 MB	SIG	.sigstore
Windows installer (64-bit)	Windows	Recommended	3e3b6550e58772d324f7519bfa8066dc	25.4 MB	SIG	.sigstore
Windows installer (ARM64)	Windows	Experimental	25fb741f175dc98d5630520f2df931ec	24.6 MB	SIG	.sigstore
Windows embeddable package (64-bit)	Windows		019788d34af2c60a7be45bf8273e361f	10.5 MB	SIG	.sigstore
Windows embeddable package (32-bit)	Windows		acc28815c74facc402469e917c8f8433	9.4 MB	SIG	.sigstore
Windows embeddable package (ARM64)	Windows		18058aa3c8ccbf3e8fee53386d38c711	9.8 MB	SIG	.sigstore
Windows installer (32-bit)	Windows		37a89a09138888e6331ec279d68fea8e	24.1 MB	SIG	.sigstore

Once installation is completed, you should see that **IDLE** is available from your finder.

G.2 Step 2: Installing the packages

Note: If you are a poweruser, and know what you are doing, you are encouraged to set up a python virtual environment for the module. e.g. using `venv`, `pyenv` or `pipenv`. Otherwise, you can install the following packages globally.

Enter the following command in your terminal and press enter:

```
pip3 install -r requirements.txt
```

Note: you may want to change the PyTorch index-url if you want to use CUDA.

You can access the **Command Prompt** terminal from your Start menu. If you need administrator rights, you should run **Command Prompt** as administrator.

G.3 Step 3: Debug using IDLE

We recommend using **IDLE** as your development environment, as other IDEs might not be ready for use during practial exams. That said, you are free to use any other IDEs

such as VSCode or PyCharm for your problem.

Run the ps0.py files in your **IDLE** directly if you install the dependencies locally. If you used virtual environments, activate your virtual environment and run your IDLE from your virtual environment. Use the built in IDLE debugger for stepping through a program and watching the variables change values.

H Setting up IDLE for Linux Users:

If you are on Linux, you can follow any of the online guides to install Python for your particular distro. You are also recommended to create Python virtual environments to manage your different projects (e.g. `pyenv-virtualenv`, *pyenv*, `pipenv`, or `venv`), and to use **IDLE** as your development environment.

Ensure that you have installed the Python packages.

If you are still unsure how to install set up your system, then you can approach the TA for help or any tutor familiar with Linux.

I Troubleshooting

You can contact the teaching staff or check the Coursemology forum if you face any difficulty during the setup/installation process.

Please provide the following information to help us quickly identify your problem:

1. The operating system and version that you are using (e.g, macOS M1).
2. Which step in the instructions given did it fail or produce an error?
3. Take a screen shot of the failure or error.