



APSSDC

Andhra Pradesh State Skill Development Corporation



Data Science



Using Python



NumPy



Why python?

Why python

PYPL Popularity of Programming Language

Worldwide, May 2021 compared to a year ago:

Rank	Change	Language	Share	Trend
1		Python	29.9 %	-1.2 %
2		Java	17.72 %	-0.0 %
3		JavaScript	8.31 %	+0.4 %
4		C#	6.9 %	-0.1 %
5	↑	C/C++	6.62 %	+0.9 %
6	↓	PHP	6.15 %	+0.1 %
7		R	3.93 %	+0.0 %
8		Objective-C	2.52 %	+0.1 %
9		Swift	1.96 %	-0.2 %
10	↑	TypeScript	1.89 %	+0.0 %
11	↓	Matlab	1.71 %	-0.2 %
12		Kotlin	1.62 %	+0.1 %
13	↑	Go	1.42 %	+0.1 %
14	↓	VBA	1.33 %	-0.0 %
15	↑↑↑	Rust	1.13 %	+0.4 %
16	↓	Ruby	1.12 %	-0.1 %

The PYPL Popularity of Programming Language Index is created by analyzing how often language tutorials are searched on Google.

The more a language tutorial is searched, the more popular the language is assumed to be. It is a leading indicator. The raw data comes from Google Trends.

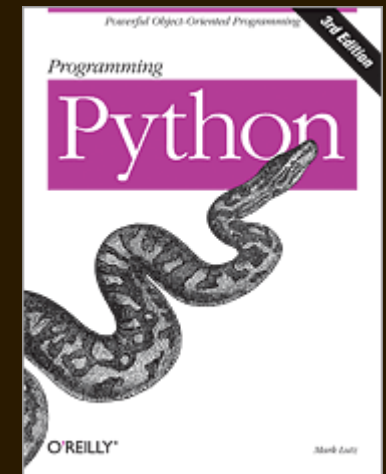
If you believe in collective wisdom, the PYPL Popularity of Programming Language index can help you decide which language to study, or which one to use in a new software project.





PYTHON AS A LANGUAGE

Python is the language of the Python Interpreter and those who can converse with it. An individual who can speak **Python** is known as a **Pythonista**. It is a very uncommon skill, and may be hereditary. Nearly all known **Pythonistas** use software initially developed by **Guido van Rossum**.



History

Python is an interpreted, high-level, general-purpose programming language.

- 1994 -----> v1.0
- 2000 -----> v2.0 – 2020 2.7
- 2008 -----> v3.0
- 2019 -----> v3.8 3.7+
- 2021 → 3.10 Stable → 3.11.0 Alpha0



Guido Van Rossum

Language properties

1. Everything is an object
2. Modules, classes, functions
3. Exception handling
4. Dynamic typing, polymorphism
5. Static scoping
6. Operator overloading
7. Indentation for block structure

High-level data types

1. Numbers: int, float, complex
2. Strings: immutable
3. Lists, Tuple, Sets, dictionaries: containers
4. Other types for e.g. binary data, regular expressions, introspection
5. Extension modules can define new “built-in” data types

Comparisons

Java

1. Typically 3-5 times shorter than equivalent Java programs
2. Run-time works harder than Java's
3. Components can be developed in Java and combined to form applications in Python
4. Python can be used to prototype components into Java implementation

Comparisons, cont'd

Perl

1. Come from similar backgrounds
2. Python is more applicable than Perl
3. Perl emphasizes support for common application-oriented tasks
4. Python emphasizes support for common programming methodologies

Comparisons, cont'd

C++

1. Differences are similar to Java's
2. Often 5-10 times shorter than equivalent C++ code
3. Python shines as a glue language; used to combine components written in C++

Features of Python

**Easy To Learn, Code
And Read**

**Free And Open-
source**

**High-level
Programming
Language**

**Portable And
Extensible**

Interpreted

Object-oriented

Embeddable

**Large Range Of
Library**

GUI Programming

Dynamically Typed

High Level → Human Understandable → Compiler, Interpreter
Assembly/Intermediate/Middle → half humans and half machine → Embedded
C

Assign A, #10

move 10, #10 → Assemble Programming → machine Code → Assembler
Low Level → Machine Understandable 0101010100

Python Programming Applications



Python had been developed to assimilate and work dynamically across various platforms. Here is a list of applications on its functional role:

1. Artificial Intelligence

2. Machine Learning

3. Data Analysis

4. Web Development

5. Game Development

6. Embedded Applications

7. Scripting Applications



Softwares

- Basic python IDLE
 - from <https://www.python.org/downloads/>
 - VS Code
 - PyCharm
 - Sublime Text
 - Atom
 - Spyder
- Jupyter Notebook by Anaconda Distributions
 - From <https://www.anaconda.com/products/individual>
- Google Colab by Google cloud service
 - From <https://colab.research.google.com/>
 - DataLab
- Different online editors
 - From <https://repl.it/languages/python3>
 - Kaggle
 - Azure Jupyter notebooks

Google Colab Resources:

Here I run some test.

https://colab.research.google.com/notebook#fileId=1dint4ly-7h8Trw0XRJ1uhC_VKe_wDJfY

In short:

n1-highmem-2 instance

2vCPU @ 2.2GHz

13GB RAM

100GB Free Space

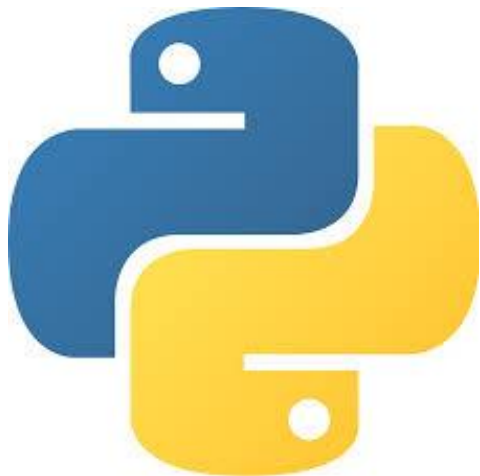
idle cut-off 90 minutes

maximum 12 hours

2020 Update:

GPU instance downgraded to 64GB disk space.

Anaconda for Python



Anaconda



It Is a platform/navigator to run python

Why should we use Anaconda for Python?

Many **scientific packages require a specific version of Python** to run. It's difficult to keep various Python installations on one computer from interacting and breaking, and harder to keep them up-to-date.

Anaconda Distribution makes management of multiple Python versions on one computer easier, and provides a large collection of highly optimized, commonly used data science libraries to get you started faster Link for installation of Anaconda Software: <https://www.anaconda.com/distribution/>

Jupyter



- Jupyter is a web - application
- Jupyter name is a reference to the three core programming languages supported by Jupyter, which are Julia, Python and R

Jupyter Notebook: The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text.

Uses include: data cleaning and transformation, numerical simulation, statistical modelling, data visualization, machine learning, and much more.

Advantages: Best for data exploration, data preparation, data validation,



Anaconda Installation

Installation

The screenshot shows the Anaconda website's product page for the Individual Edition. The browser's address bar displays 'anaconda.com/products/individual'. The navigation menu includes 'Products', 'Pricing', 'Solutions', 'Resources', 'Blog', and 'Company', with a 'Get Started' button on the right. A dropdown menu is open under 'Products', listing four options: 'Individual Edition (Open Source Distribution)', 'Team Edition (Package Manager)', 'Enterprise Edition (Full Data Science Platform)', and 'Professional Services (Data Experts Work Together)'. The main content area features the Anaconda logo and the text 'Individual Edition Your data toolkit'.

Individual Edition | Anaconda

anaconda.com/products/individual

ANACONDA

Products ▾ Pricing Solutions ▾ Resources ▾ Blog Company ▾

Get Started

Individual Edition
Open Source Distribution

Team Edition
Package Manager

Enterprise Edition
Full Data Science Platform

Professional Services
Data Experts Work Together

Individual Edition
Your data toolkit

With over 20 million users worldwide, the open-source Individual Edition (Distribution) is the easiest way to perform Python/R data science and machine learning on a single machine. Developed for

Downloading Anaconda Software

Windows

Python 3.7

64-Bit Graphical Installer (466 MB)

32-Bit Graphical Installer (423 MB)

Python 2.7

64-Bit Graphical Installer (413 MB)

32-Bit Graphical Installer (356 MB)

MacOS

Python 3.7

64-Bit Graphical Installer (442 MB)

64-Bit Command Line Installer (430 MB)

Python 2.7

64-Bit Graphical Installer (637 MB)

64-Bit Command Line Installer (409 MB)

Linux

Python 3.7

64-Bit (x86) Installer (522 MB)

64-Bit (Power8 and Power9) Installer (276 MB)

Python 2.7

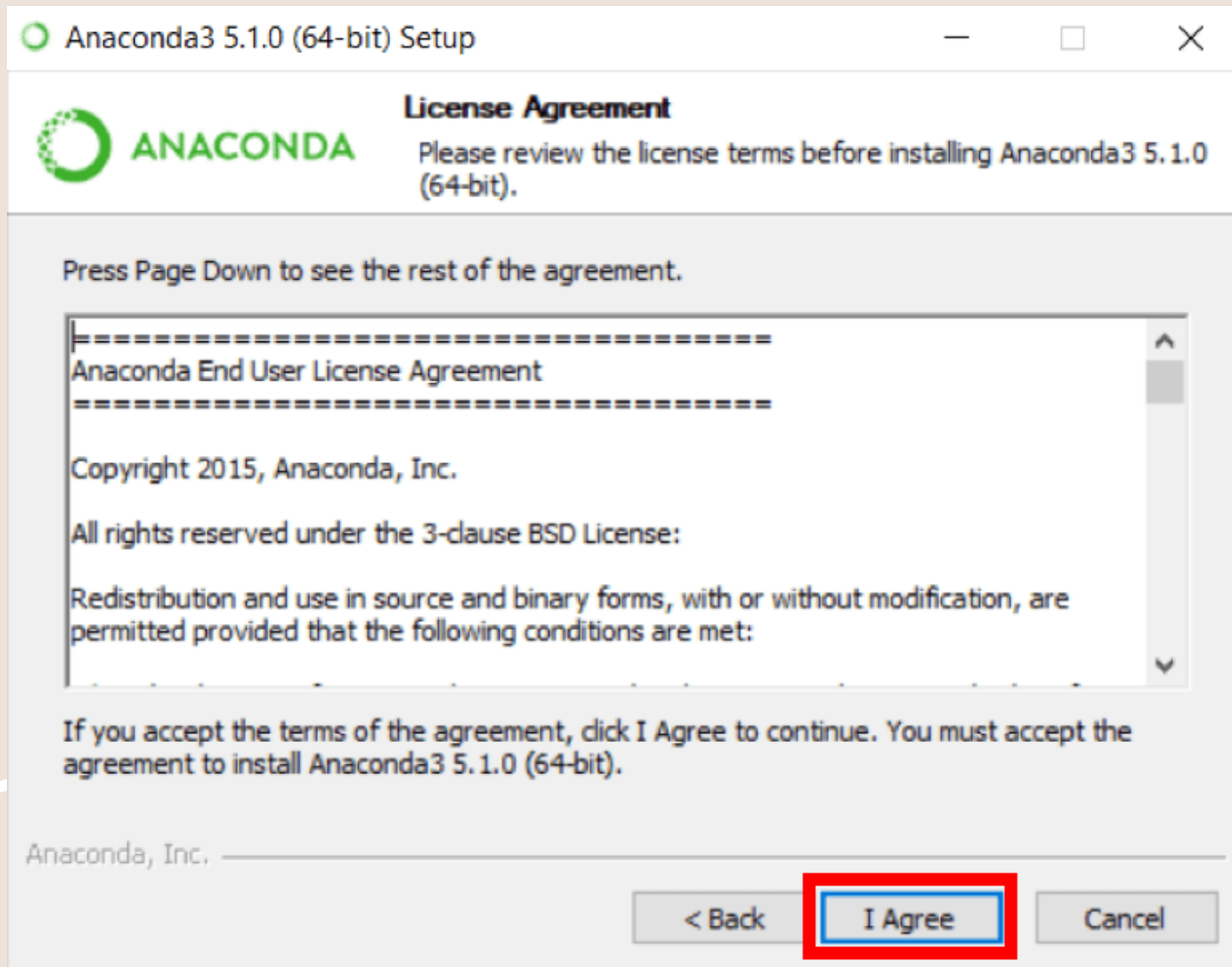
64-Bit (x86) Installer (477 MB)

64-Bit (Power8 and Power9) Installer (295 MB)

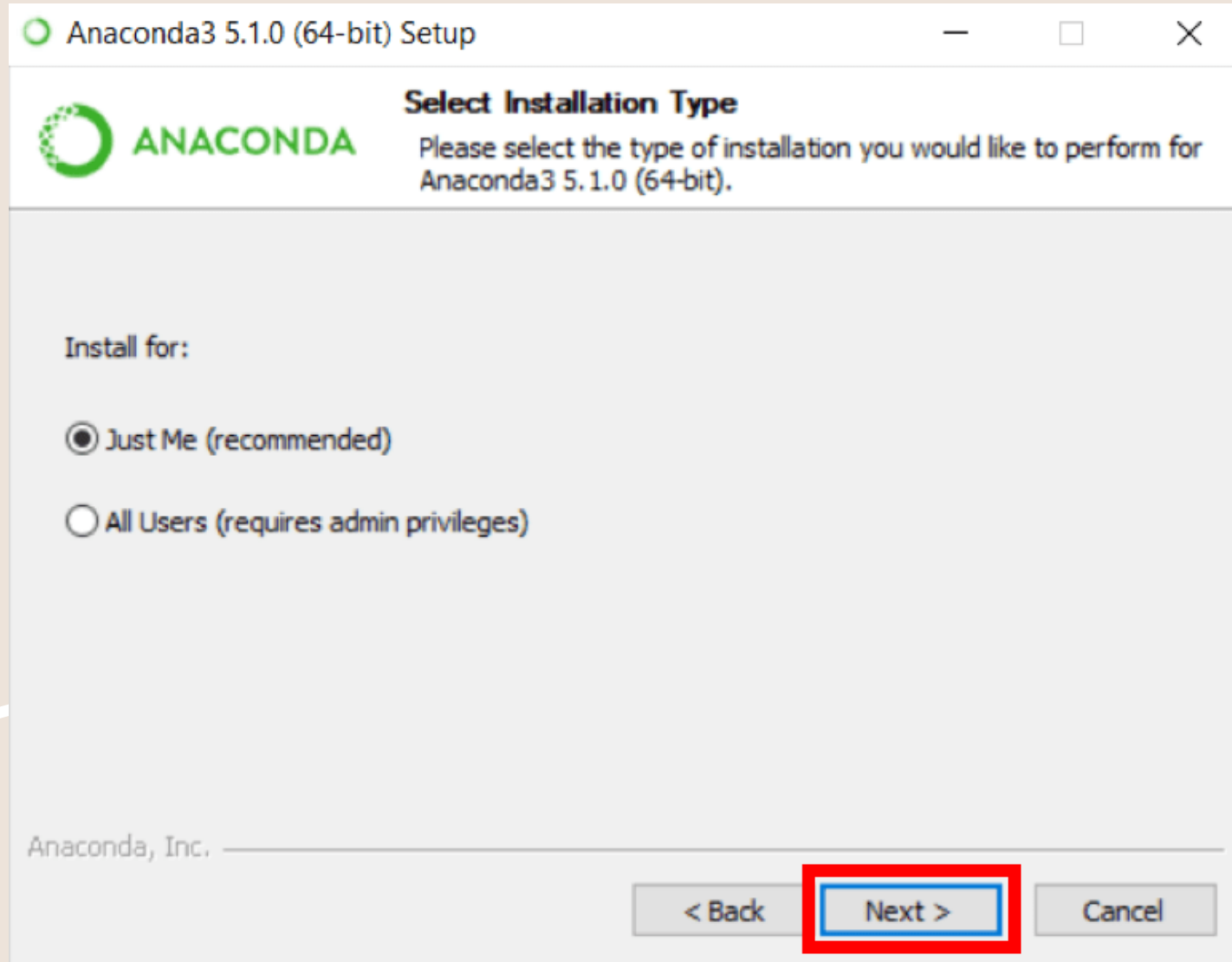
Installation



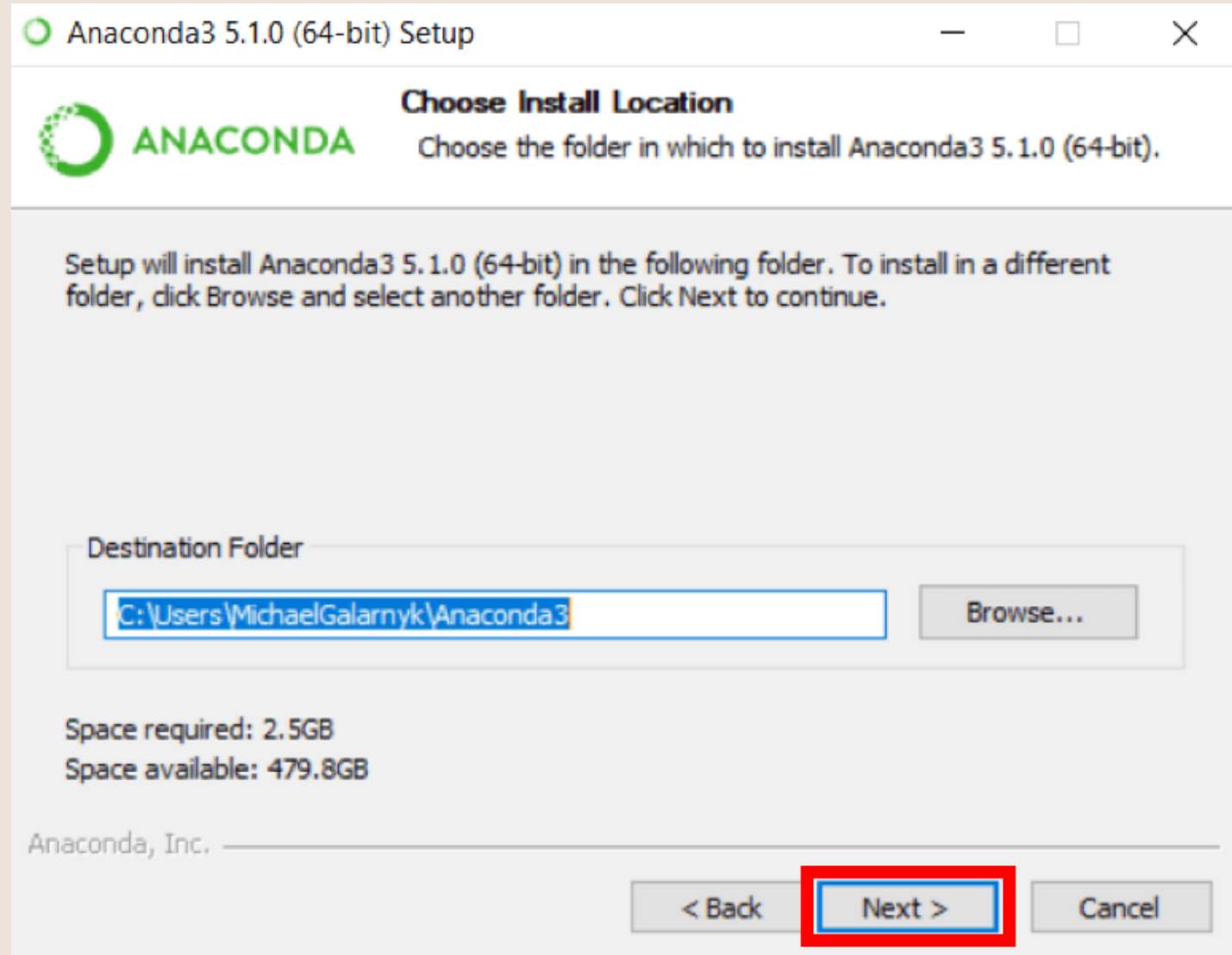
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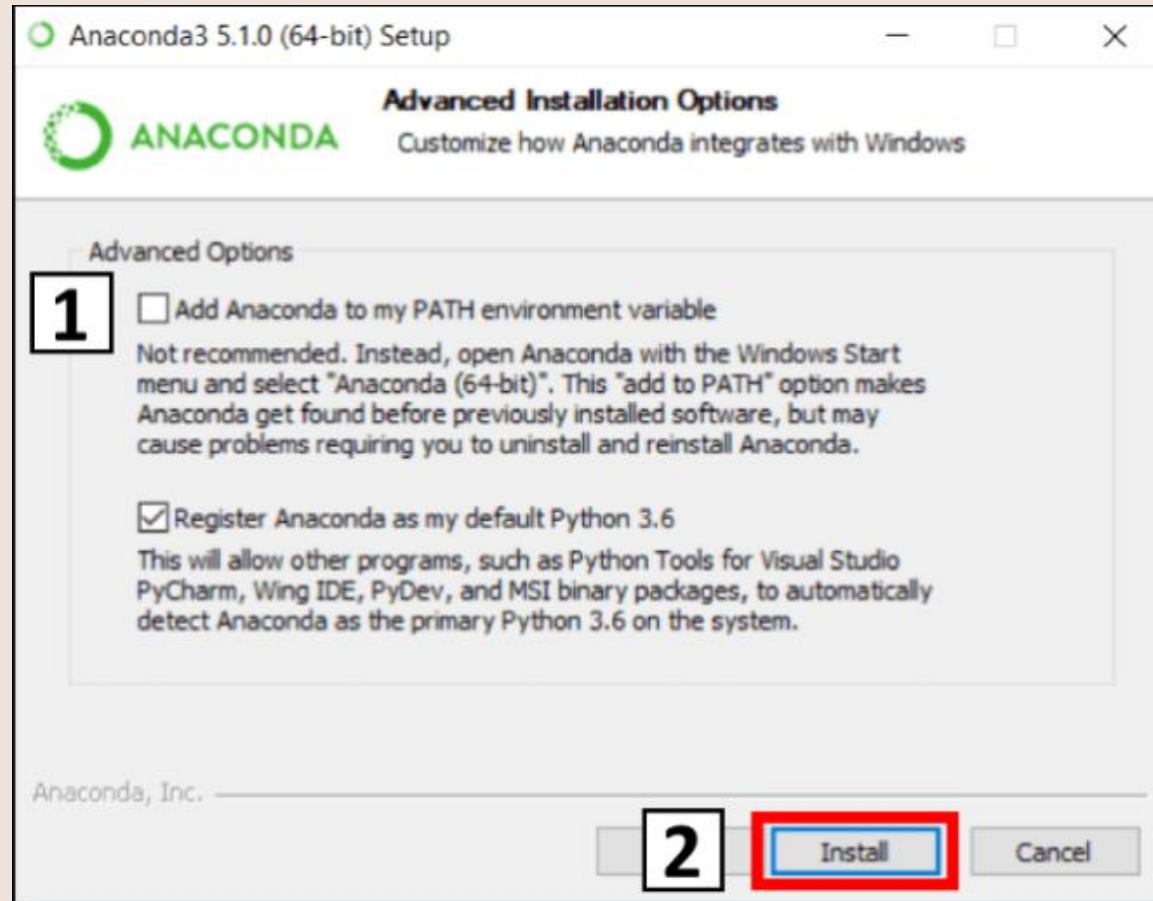
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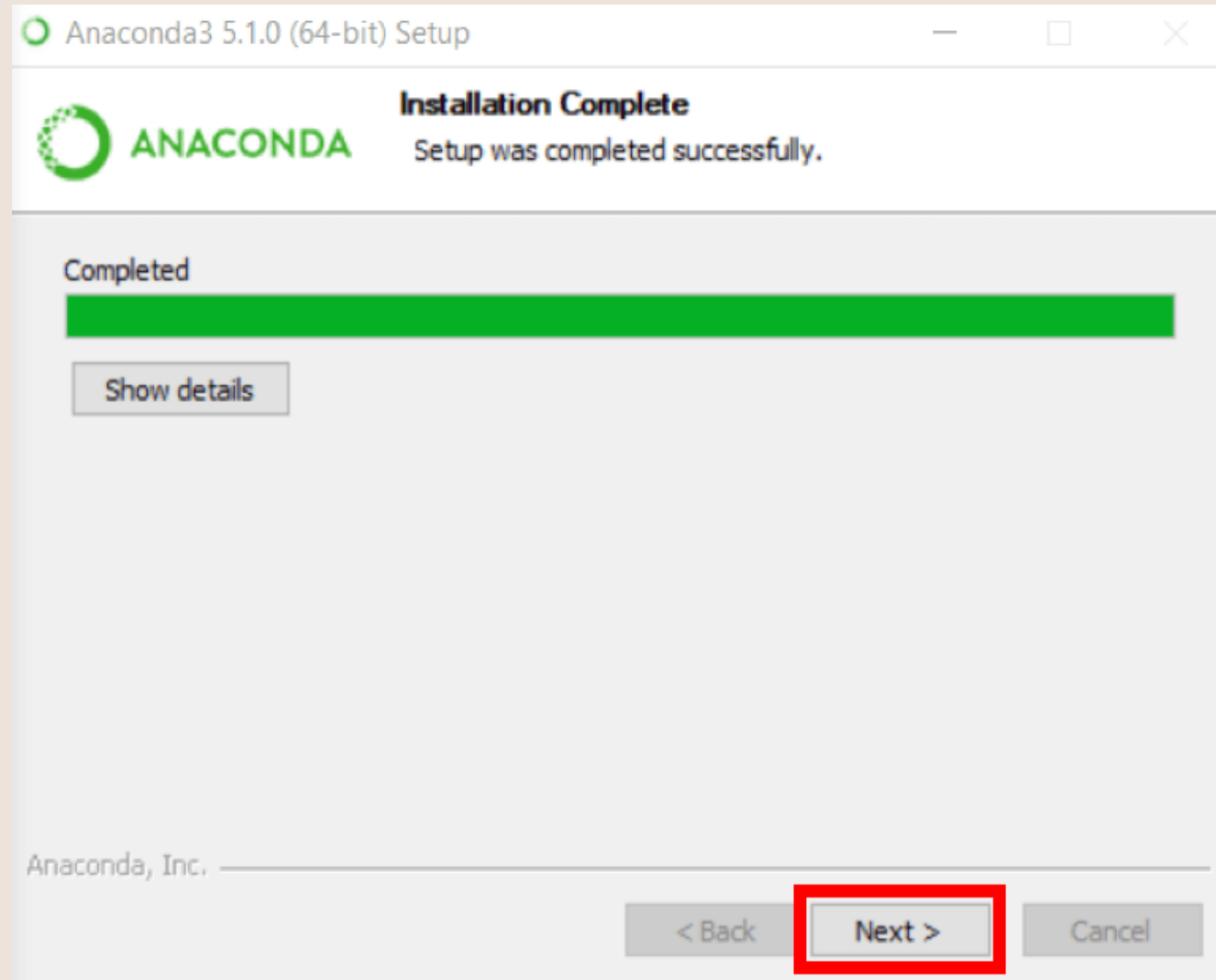
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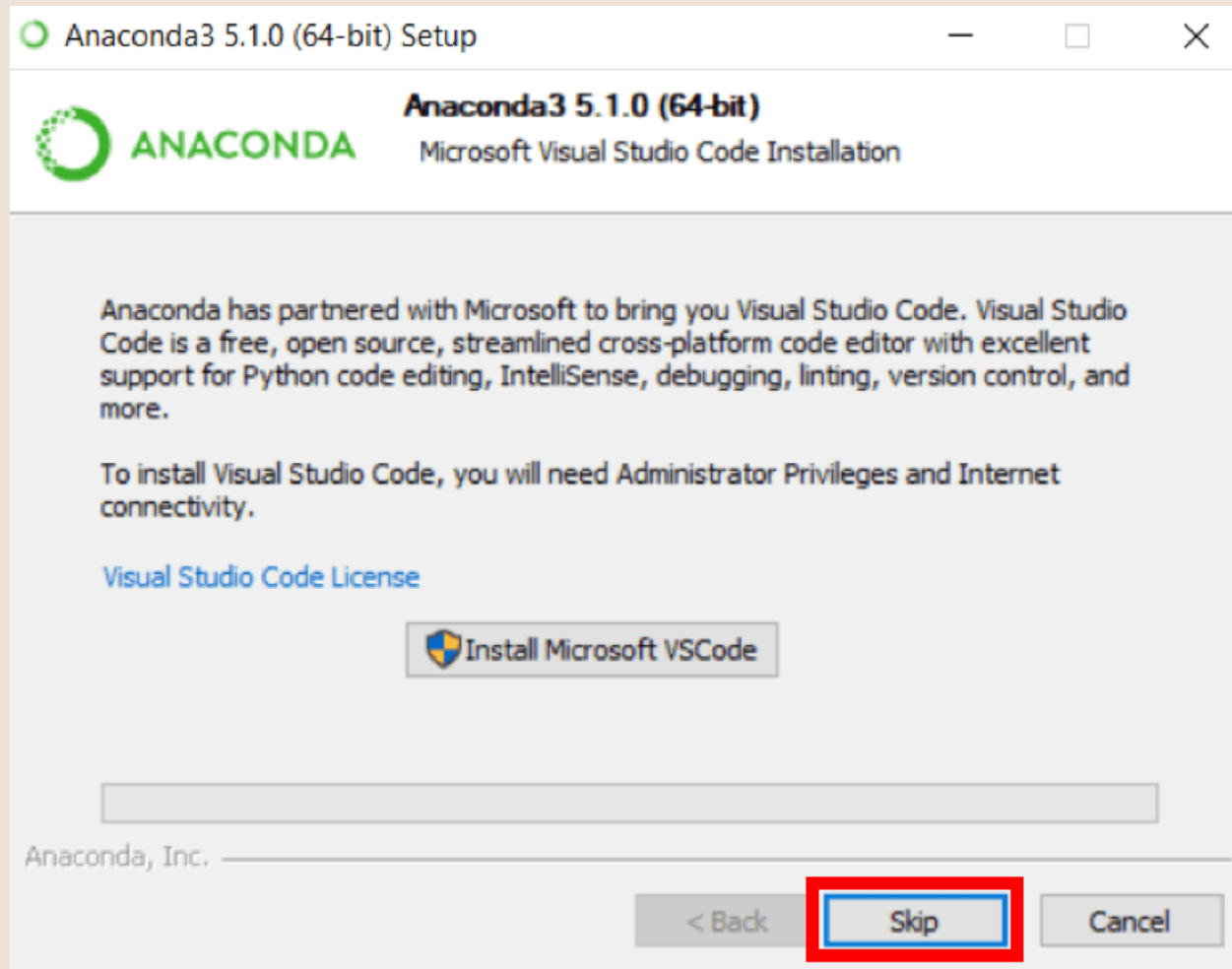
Installation



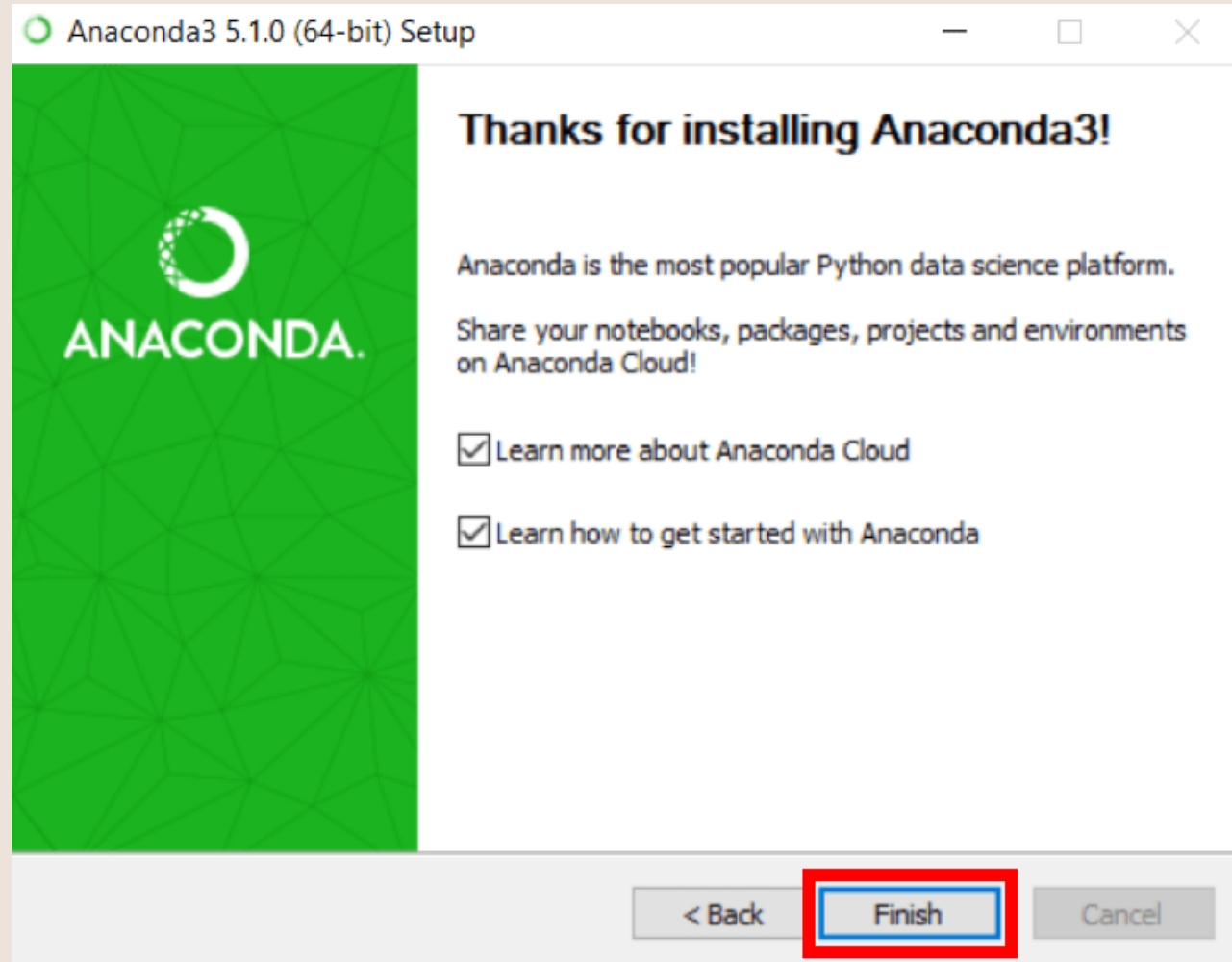
Installation



Installation



Installation





Let us start Jupyter Notebook

Launch Jupyter Notebook

