

CBSE - XI Computer Science (083)

Computer Science with Python by sumita arora



A FOSS Scripting Language

python™

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Getting Started with Python

python

► Installation of Python Interpreter

► <https://www.python.org/>

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```
TT:
S n s
>>> 'Fruits = ['Banana', 'Apple', 'Lime']
I
>>> loud_fruits = [fruit.upper() for fruit
in fruits]
>>> print(loud_fruits)
['BANANA', 'APPLE', 'LIME']

# List and the enumerate
function >>>
list(enumerate(fruits))
[(0, 'Banana'), (1, 'Apple'), (2, 'Lime')]
```

Compound Data Types

Lists (known as arrays in other languages) are one of the compound data types that Python understands. Lists can be indexed, sliced and manipulated with other built-in functions.

[More about lists in Python 3](#)

Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)

Getting Started with Python



- ▶ **Python 3.8.2** Released on **February 24, 2020**
- ▶ One can download Python Versions as per his/her Machine's Configuration & OS

A screenshot of the Python.org website's download page. The browser's address bar shows "python.org/downloads/". The website has a dark blue header with the Python logo and the word "python". Below the header is a navigation bar with links: "About", "Downloads", "Documentation", "Community", "Success Stories", "News", and "Events". The main content area features a large yellow button labeled "Download Python 3.8.2". To the right of this button is a search bar with a "GO" button and a "Socialize" button. Below the button, there is text linking to other operating systems: "Looking for Python with a different OS? Python for [Windows](#), [Linux/UNIX](#), [Mac OS X](#), [Other](#)". Further down, it says "Want to help test development versions of Python? [Prereleases](#), [Docker images](#)". At the bottom, it says "Looking for Python 2.7? See below for specific releases". The background of the page features an illustration of two parachutes with cargo boxes hanging from them, set against a blue sky with clouds.

Getting Started with Python

- ▶ **IDLE** (**I**ntegrated **D**evelopment & **L**earning **E**nvironment)
the most popular and standard Python development environment.
- ▶ Python can be used in two ways: **Interactive(shell)** & **Script mode**
 - ▶ **Interactive mode** allows to interact with operating system
 - ▶ **Script mode** allows to create and edit python source file

Python - Interactive Mode (Offline)

- ▶ Launch Python IDLE installed on your Computer System
- ▶ Note the welcome message
- ▶ Python Primary prompt '>>>'
- ▶ Try the following - credits(), copyright(), license(), help(), exit()

T*- "Python Shel *

File Edit Shell Debug Options Windows Help

Python 3.0.1 (r301:69561, Feb 13 2009, 20:04:18) (MSC v.1500 32 bit (Intel))

Type "copyright", "credits" or "license()" for more information.

>>> license ()

A. HISTORY OF THE SOFTWARE

Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for
Hit Return for more, or q (and Return) to quit: I



Python - Interactive Mode

- ▶ Interactive mode allows users to interact with Operating System

```
>>> a = 3 >>> b = 4 >>> a * b
```

- ▶ 12

```
>>> 20 * a #For Multiplication *
```

- ▶ 60

```
>>> b ** 3 #For raise to the Power **
```

- ▶ 64

```
>>> width = 10 #Variables can be any string >>> height = 4 >>> width * height
```

- ▶ 40

Python - Interactive Mode (Offline)

- Write your **Python Program** in **IDLE** installed



```
Python Shell
File Edit Shell Debug Options Windows Help
Python 3.0.1 (r301:69561, Feb 13 2009, 20:04:18) [MSC v.1500 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> a=3
>>> b=4
>>> a*b
12
>>> 20*a
60
>>> b**3
64
>>> width = 10    #Variables can be any string
>>> height = 4
>>> width * height
40
>>> |
```


Python - Interactive Mode (Online)

► <https://www.pythonanywhere.com/>



Host, run, and code Python in the cloud!

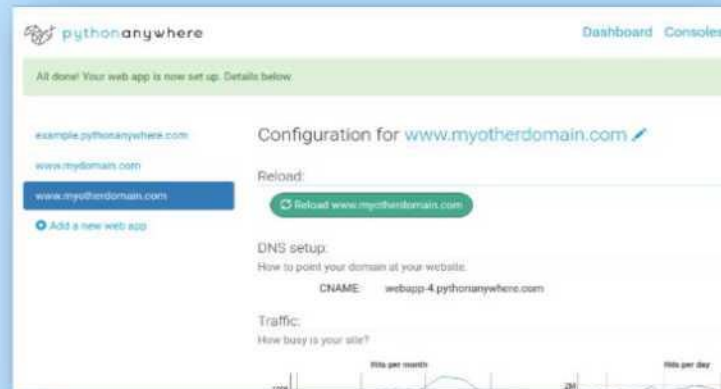
Get started for free. Our basic plan gives you access to machines with a [full Python environment](#) already installed. You can develop and host your website or any other code directly from your browser without having to install software or manage your own server.

Need more power? Upgraded plans start at \$5/month.

Start running Python online in less than a minute! »

Watch our one-minute video »

Not convinced? [Read what our users are saying!](#)



Python - Interactive Mode (Online)



► Create a Beginner Account

Browser address bar: <https://www.pythonanywhere.com/pricing/>

Navigation links: Send feedback Forums Help Blog Pricing & signup Log in

pythonanywhere

Plans and pricing

Beginner: Free!

A limited account with one web app at your-username.pythonanywhere.com, restricted outbound internet access from your apps, low CPU/bandwidth, no IPython/Jupyter notebook support.

It works and it's a great way to get started

[Create a Beginner account](#)

Education accounts

Are you a teacher looking for a place your students can code Python? You're not alone. Click through to find out more about our [Education beta](#).

All of our paid plans come with a no-quibble 30-day money-back guarantee. You're billed monthly and you can cancel at any time. The minimum contract length is just one month. You get unrestricted Internet access from your applications, unlimited in-browser Python, Bash and database consoles, and full SSH access to your account. All accounts (including free ones) have screen-sharing with other PythonAnywhere accounts, and free SSL support (though you'll need to get a certificate for your own domains).

Hacker	\$5/month	Web dev	\$12/month Standard	\$99/month	Custom \$5 to \$500/month
Run your Python code in the cloud from one web app and the console		If you want to host small Python-based websites for you or for your clients		Start a business and don't worry about having to scale to handle traffic spikes	Want a combination that's not on the list? Create your own! All custom plans have:

Python - Interactive Mode (Online)



► Create a Beginner Account

https://www.pythonanywhere.com/registration/register/beginner/



Create your account

Username:

Email:

Password:

Password (again):

☐ I agree to the [Terms and Conditions](#) and the [Privacy and Cookies Policy](#), and confirm that I am at least 13 years old.

Register

We promise not to spam or pass your details on to anyone else.

Python - Interactive Mode (Online)



Write your Python Code Online

0 A <https://www.pythonanywhere.com/Lser/abcuser/consoles/12976506/>



Python3.7 console 12976506

```
Python 3.7.0 (default, Aug 22 2018, 20:50:05)
```

```
[GCC 5.4.0 20160609] on linux
```

```
Type "help", "copyright", "credits" or "license" for more information.
```

```
>>> a=5
```

```
>>> b=6 >>>
```

```
a*b 30
```

Python - Libraries

- ▶ **NUMPY - Numerical Python**
 - ▶ Complex Matrices & Multi-dimensional array based problems
- ▶ **SCIPY - Scientific Python**
 - ▶ Optimization, Linear Algebra, Integration, Interpolation, Special functions, FFT, Signal and Image Processing
- ▶ **MATPLOTLIB - Visualization**
 - ▶ Graphical representation of data
- ▶ **PANDAS - Data Manipulation and Analysis**
 - ▶ Offers data structures and operations for manipulating numerical tables and time series

Python - Libraries

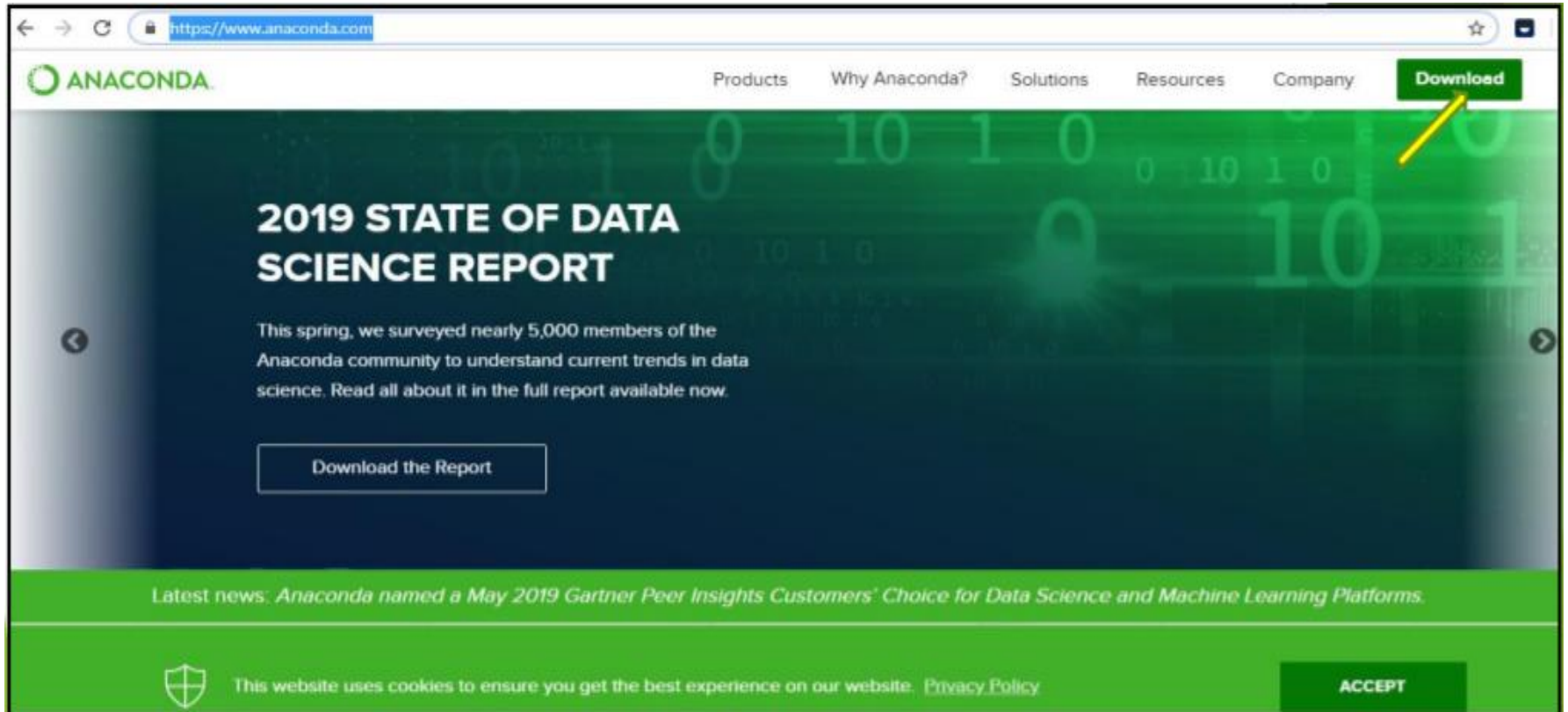
- ▶ We need to install all the libraries one by one using **PIP Installer** and then **Import** the **Library** to use its functions
- ▶ The Installation and Import procedure for each Library may be avoided

if we download and install - **ANACONDA**

- ▶ Anaconda is the entire suite containing **Basic Python**, **Numpy**, **Scipy**, **Matplotlib** and **Pandas**

Python - Anaconda

► <https://www.anaconda.com/>



The screenshot shows the Anaconda website homepage. The browser's address bar displays <https://www.anaconda.com/>. The navigation bar includes links for Products, Why Anaconda?, Solutions, Resources, Company, and a prominent green Download button. A yellow arrow points to this button. The main content area has a dark green background with binary code (0s and 1s) and features the title "2019 STATE OF DATA SCIENCE REPORT". Below the title, a paragraph states: "This spring, we surveyed nearly 5,000 members of the Anaconda community to understand current trends in data science. Read all about it in the full report available now." A button labeled "Download the Report" is positioned below the text. At the bottom of the page, a green banner contains the text: "Latest news: Anaconda named a May 2019 Gartner Peer Insights Customers' Choice for Data Science and Machine Learning Platforms." The footer includes a cookie consent message: "This website uses cookies to ensure you get the best experience on our website. Privacy Policy" and an ACCEPT button.

ANAconda

Products Why Anaconda? Solutions Resources Company **Download**

2019 STATE OF DATA SCIENCE REPORT

This spring, we surveyed nearly 5,000 members of the Anaconda community to understand current trends in data science. Read all about it in the full report available now.

Download the Report

Latest news: Anaconda named a May 2019 Gartner Peer Insights Customers' Choice for Data Science and Machine Learning Platforms.

This website uses cookies to ensure you get the best experience on our website. [Privacy Policy](#) **ACCEPT**

Python - Anaconda

► <https://www.anaconda.com/>

The screenshot shows the Anaconda Distribution website. The header features the Anaconda logo on the left and navigation links for Products, Why Anaconda?, Solutions, Resources, Company, and a prominent Download button on the right. The main section has a green background with the title 'Anaconda Distribution' and the tagline 'The World's Most Popular Python/R Data Science Platform', followed by another Download button. Below this, a paragraph describes the platform's ease of use and its popularity. A list of capabilities follows, with a yellow arrow pointing from the text 'scikit-learn, TensorFlow, and Theano' to the 'pandas' icon in the grid. The grid itself contains 15 icons for various data science tools: jupyter, spyder, NumPy, SciPy, Numba, pandas, DASK, Bokeh, HoloViews, Databricks, matplotlib, sklearn, H2O.ai, TensorFlow, and CONDA.

ANACONDA

Products Why Anaconda? Solutions Resources Company **Download**

Anaconda Distribution

The World's Most Popular Python/R Data Science Platform **Download**

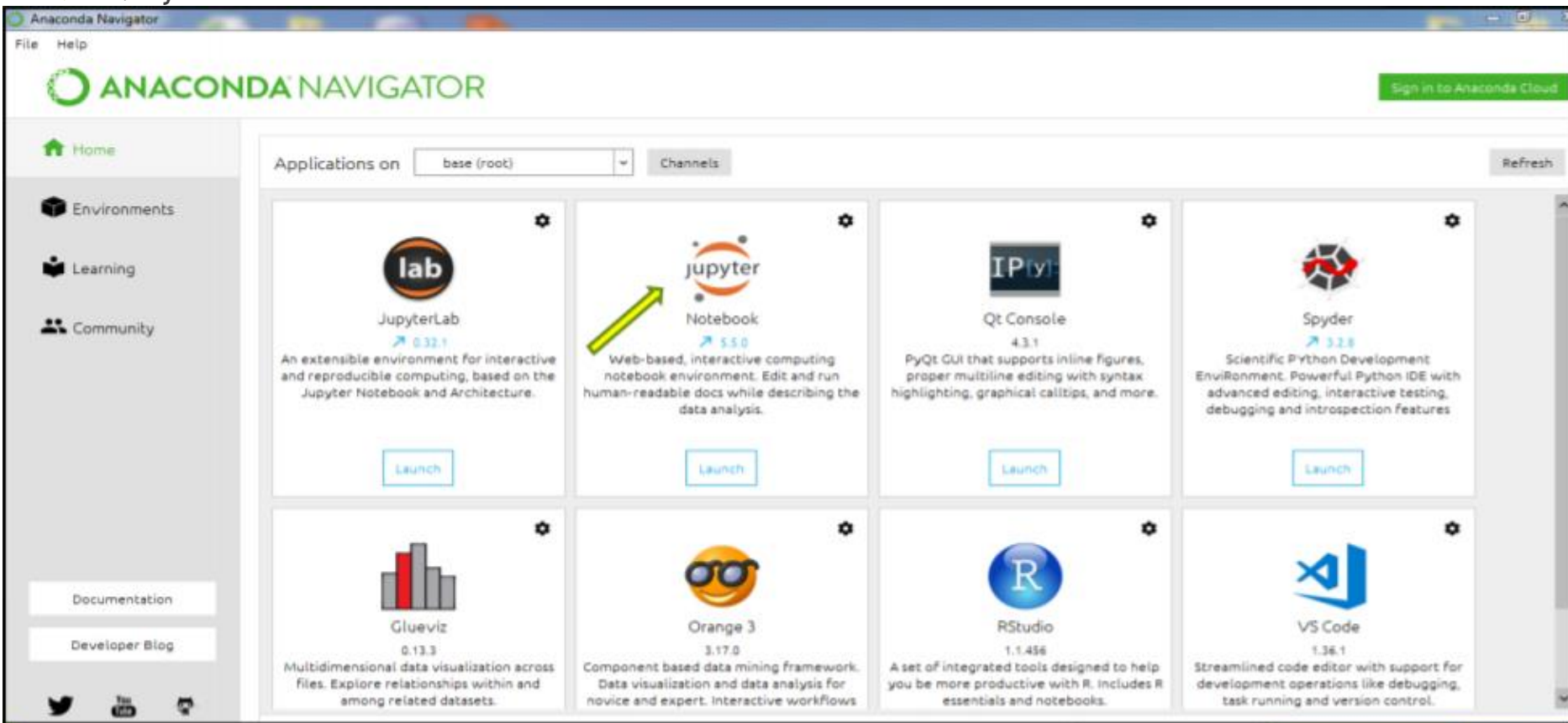
The open-source Anaconda Distribution is the easiest way to perform Python/R data science and machine learning on Linux, Windows, and Mac OS X. With over 15 million users worldwide, it is the industry standard for developing, testing, and training on a single machine, enabling *individual data scientists* to:

- Quickly download 1,500+ Python/R data science packages
- Manage libraries, dependencies, and environments with Conda
- Develop and train machine learning and deep learning models with scikit-learn, TensorFlow, and Theano
- Analyze data with scalability and performance with Dask, NumPy, pandas, and Numba

jupyter	spyder	NumPy	SciPy	Numba
pandas	DASK	Bokeh	HoloViews	Databricks
matplotlib	sklearn	H2O.ai	TensorFlow	CONDA

Python - Anaconda

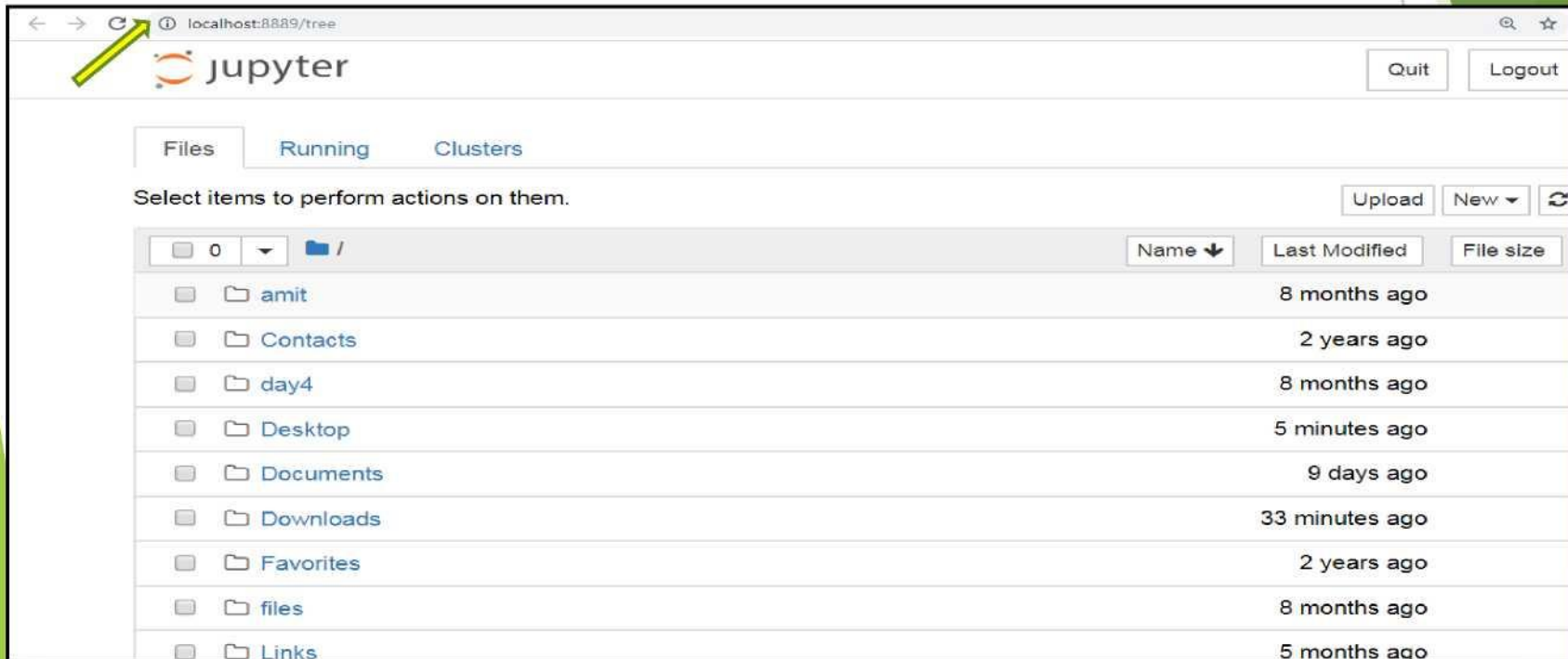
- ▶ Launch **Anaconda Navigator**
- ▶ Many **IDEs** visible



Python - Anaconda



- ▶ Launch Zupyter Notebook 5.5.0
- ▶ It will Open in default Browser & shows root directory/path(localhost:8889/tree)



Python - Anaconda

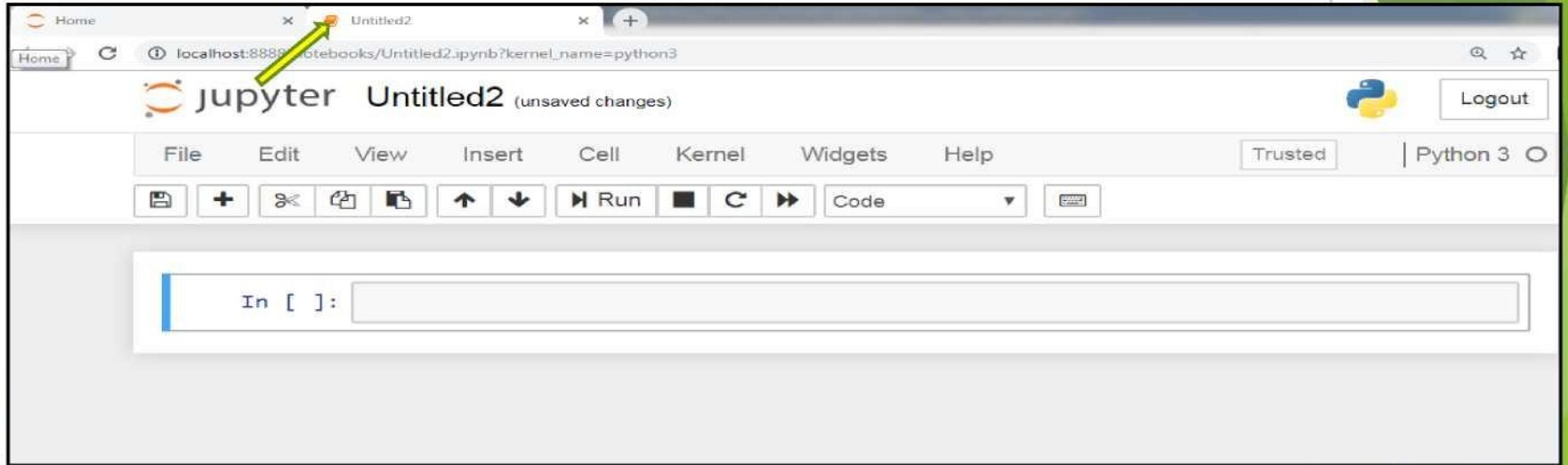
- Click **New** -> **Python 3** to open a new **Zupyter Notebook**

A screenshot of the JupyterLab web interface. The top bar shows the "jupyter" logo on the left and "Quit" and "Logout" buttons on the right. Below the top bar, there are tabs for "Files" and "Running Clusters". The "Files" tab is active, showing a file browser with a list of files and folders. A yellow arrow points to the "Python 3" option in the "Upload New" dropdown menu. The "Upload New" menu is open, showing options: "Notebook", "Python 3", "Other...", "Text File", "Folder", and "Terminal". A tooltip next to the "Python 3" option reads "Create a new notebook with Python 3". The file browser shows a list of files and folders, including "CD amit", "CD Contacts", "CD day4", "CD Desktop", "CD Documents", "CD Downloads", "CD Favorites", and "CD files". The "CD Documents" folder is highlighted, and its contents are shown in a table with columns for the file name and the time it was last modified.

Name	Modified
CD amit	
CD Contacts	
CD day4	
CD Desktop	
CD Documents	11 days ago
CD Downloads	5 hours ago
CD Favorites	2 years ago
CD files	8 months ago

Python - Anaconda

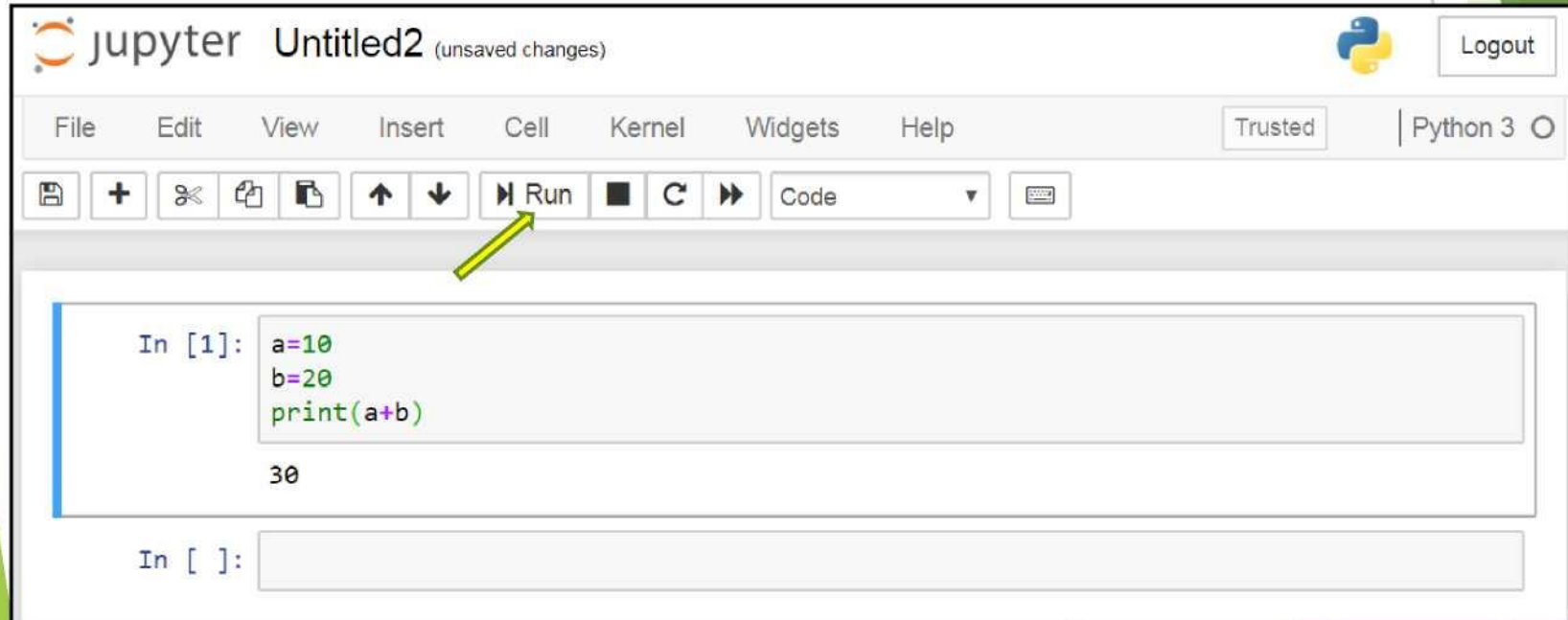
- The new **Zupyter Notebook** will open in the new Browser Window



Python - Anaconda



- Type the code in the Input Block of the **Zupyter Notebook** (Interactive Mode) and get the Output in separate block by pressing **Run Button** or **SHIFT+ENTER** Key

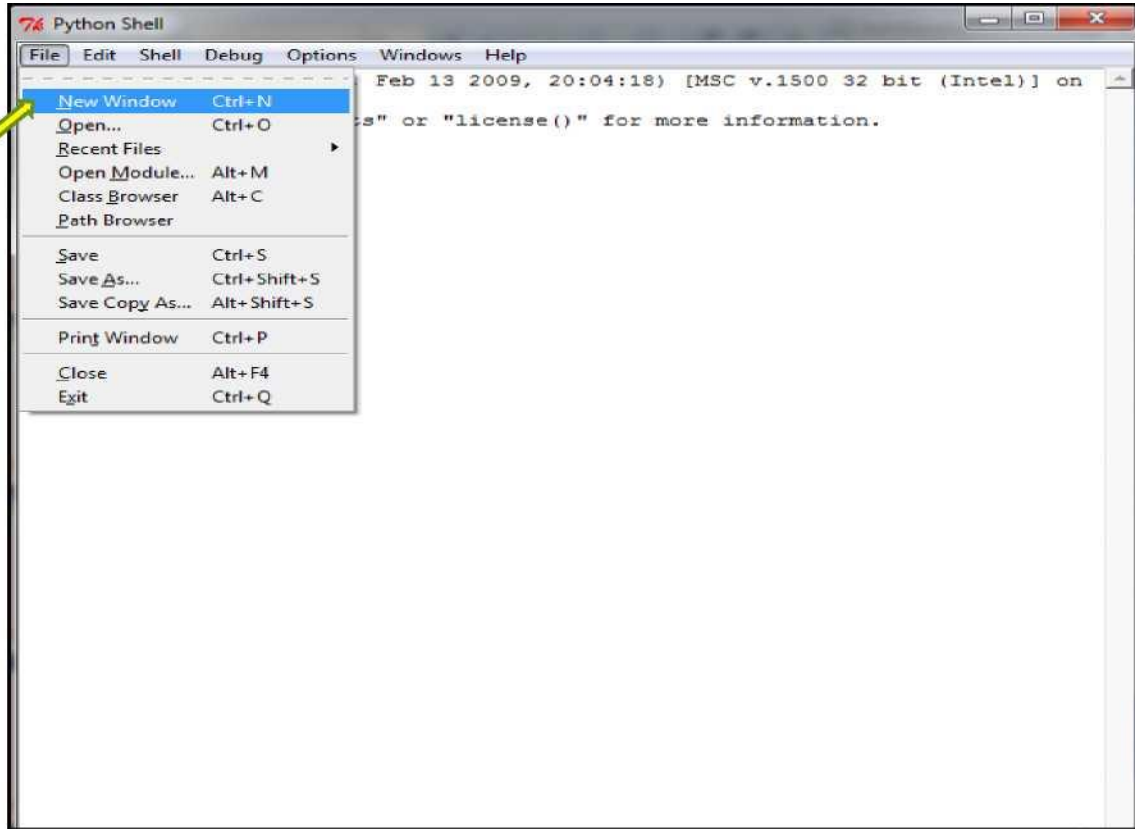


Python - Script Mode

- ▶ **Script Mode** allows the user to type Python program in a file and use interpreter to execute content of file.
- ▶ Start comments with **#**
 - ▶ the rest of line is ignored.

Python - Script Mode

- Open **New Window** from **File Menu**



Python - Script Mode

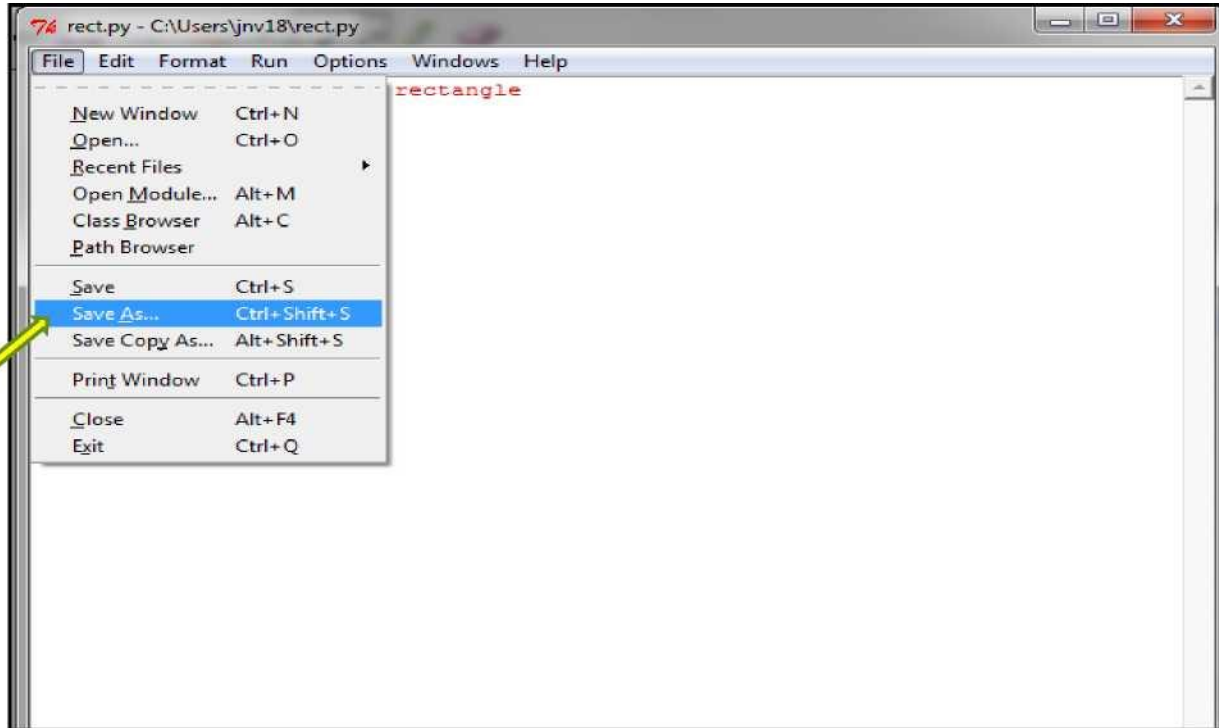
- Type your Python Code in the **New Window**

A screenshot of a Python IDE window titled "*Untitled*". The window has a menu bar with "File", "Edit", "Format", "Run", "Options", "Windows", and "Help". The main text area contains the following Python code:

```
#Program to find area of rectangle
length=20
breadth=30
print(length*breadth)
```


Python - Script Mode

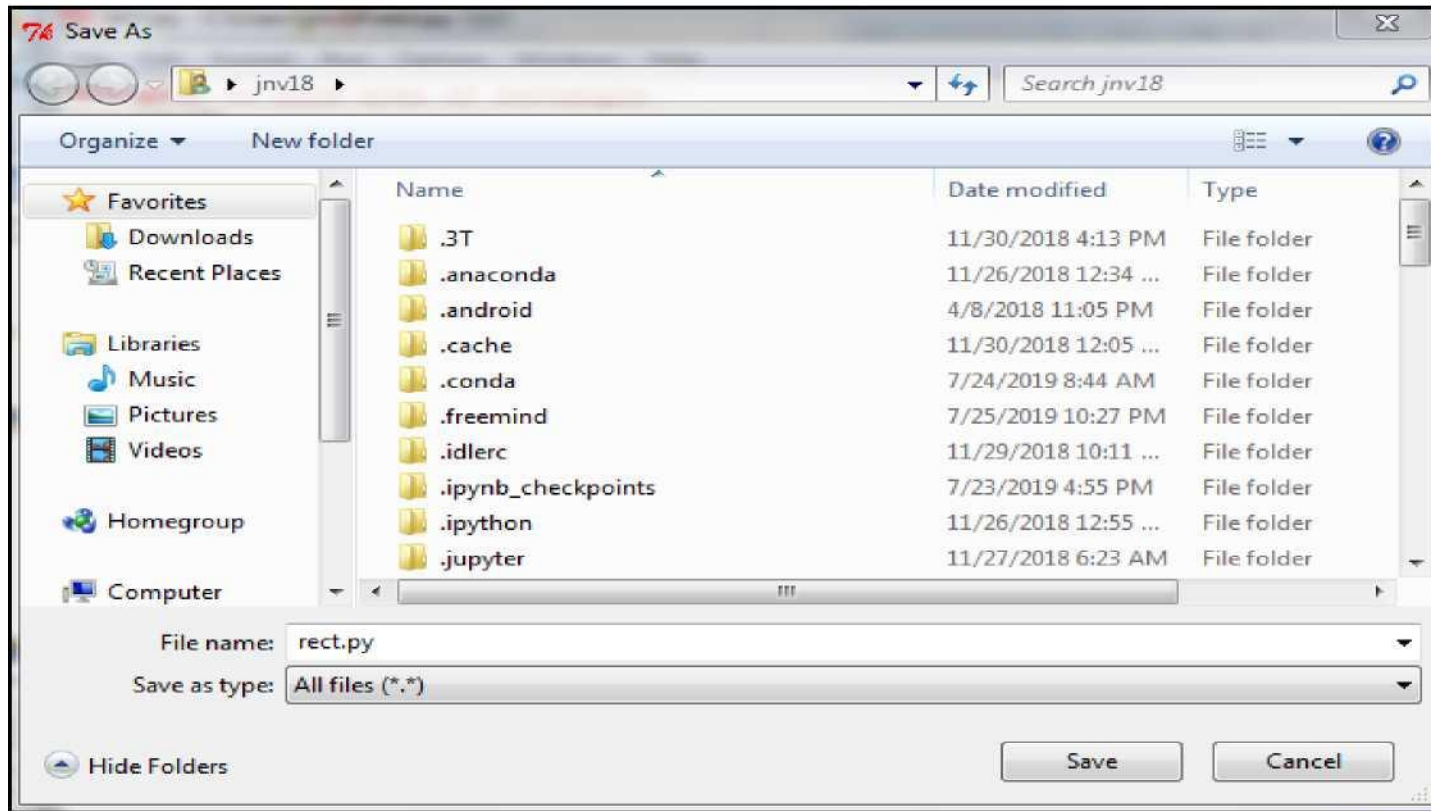
- Save the Python code file: **File -> Save As...**



Python - Script Mode

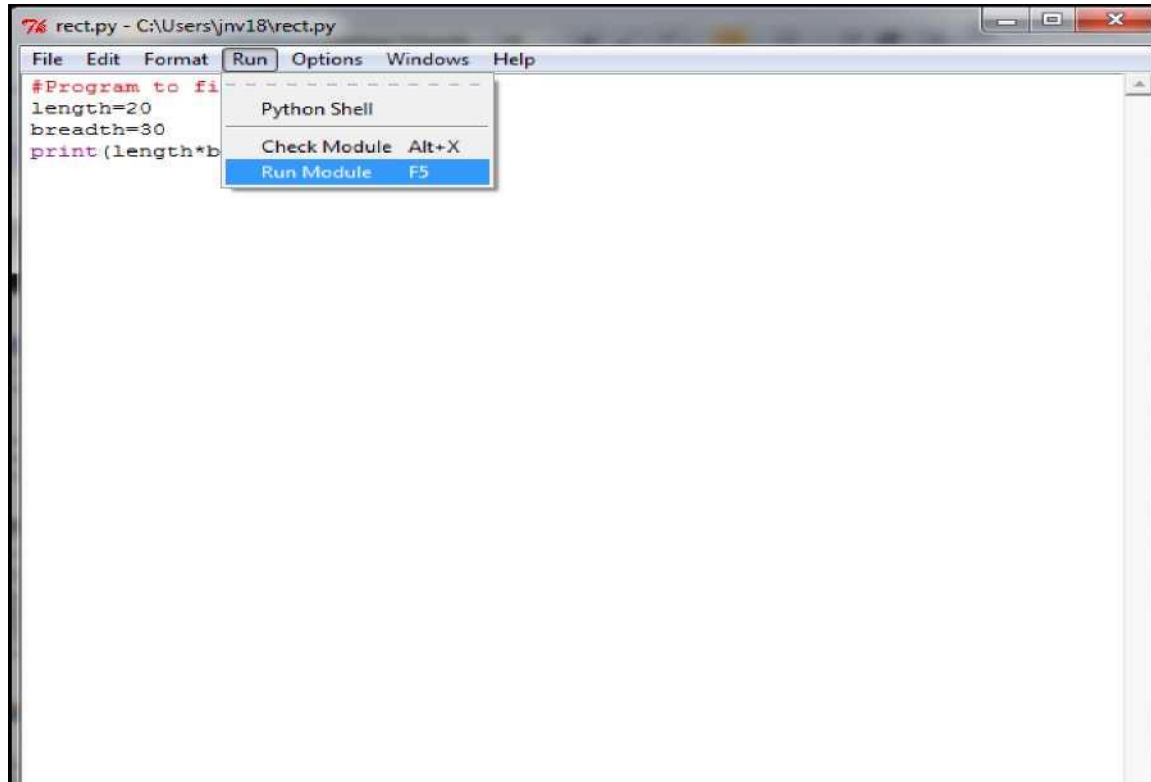


- Save the **Python code file** with an extension **.py**



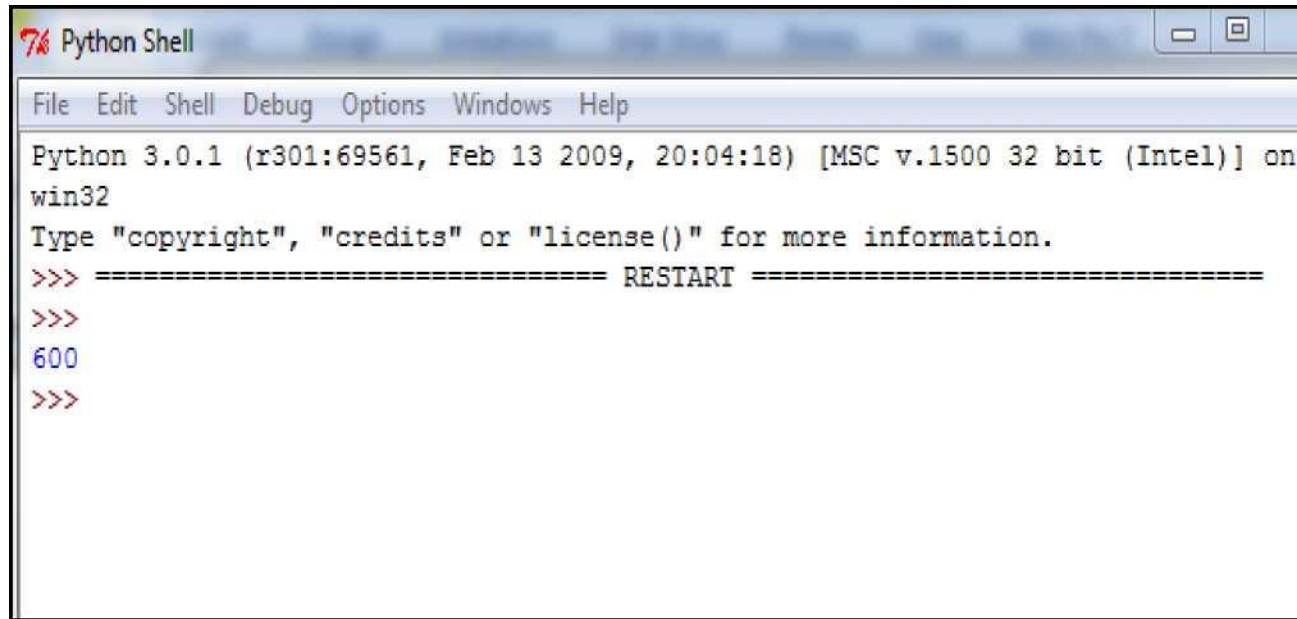
Python - Script Mode

- o Run the Python code by pressing **F5** or **Run -> Run Module**



Python - Script Mode

- The **Output** of the Python Code will be displayed in the **Interactive Code Window**

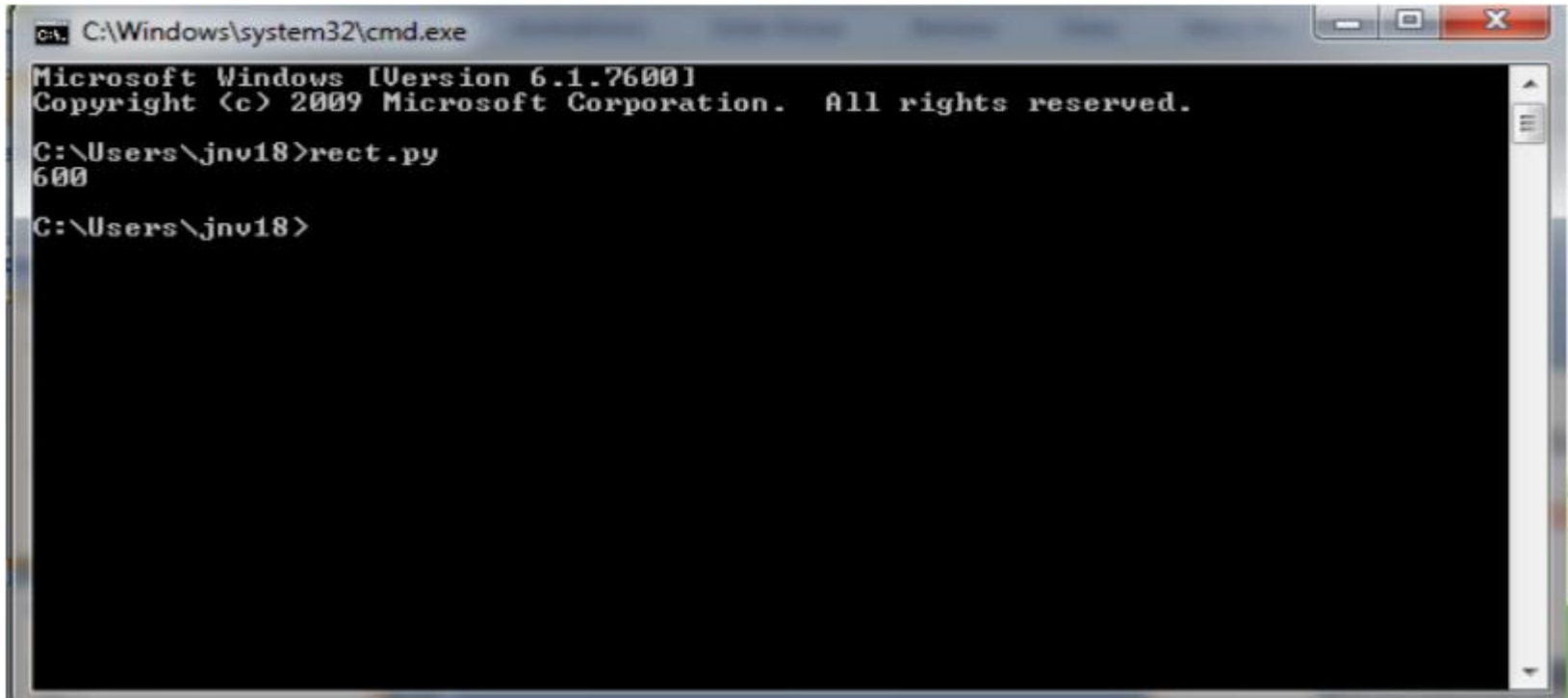


```
Python Shell
File Edit Shell Debug Options Windows Help
Python 3.0.1 (r301:69561, Feb 13 2009, 20:04:18) [MSC v.1500 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
>>>
600
>>>
```



Python - Script Mode (Alternate)

- Go to Command Prompt in Windows (**cmd.exe**) and just type your python file name e.g. **rect.py** and press enter to run it



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\jnv18>rect.py
600

C:\Users\jnv18>
```

The image shows a Windows Command Prompt window with a black background and white text. The title bar at the top reads 'C:\Windows\system32\cmd.exe'. The window contains the following text: 'Microsoft Windows [Version 6.1.7600]', 'Copyright (c) 2009 Microsoft Corporation. All rights reserved.', 'C:\Users\jnv18>rect.py', '600', and 'C:\Users\jnv18>'. The text is displayed in a monospaced font. The window has standard Windows window controls (minimize, maximize, close) in the top right corner.