CT60A0203
Introduction to Programming: Python
Week 1B

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Learning objectives: continued

- History of programming, programmable computers

- Python vs other computer programming languages

- To know the syntax of a Python program: The first Python program

- Installing Python IDLE code editor

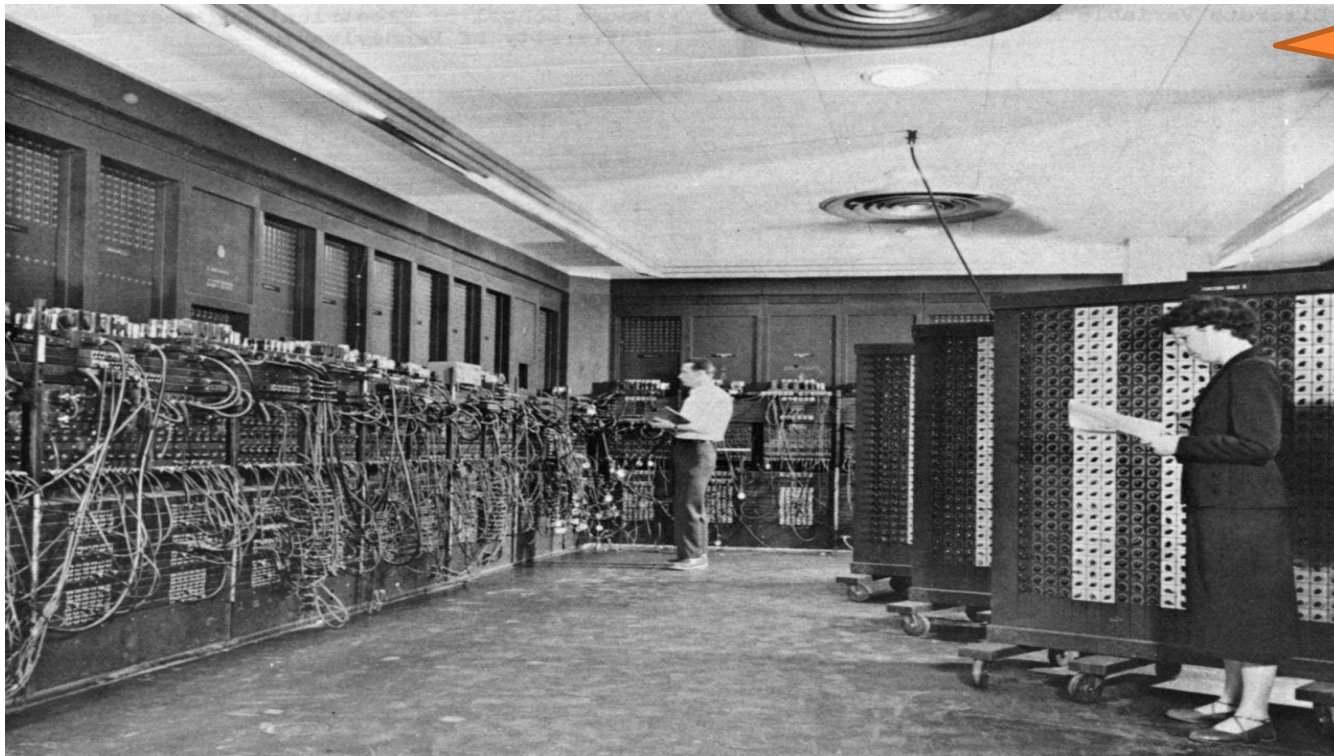- To become familiar with Python IDLE code editor

At the conclusion of this lecutre, students will be able to understand the how to start writing and running Python programs using Python IDLE code editor.

History of programming and programmable computers

- History of programming and programmable computers started in 1940's
- ENIAC, Zuse Z3 and Colossus, were the first programmable computers in those period (first generation of computers)
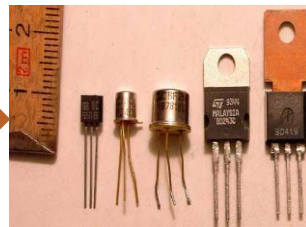- ENIAC was the first general purpose (electronic) computer

History of programming and programmable computers

- Hardware used to build these computers (ENIAC): Vacuum tubes (very costly and occupy more space and produces more heat when in use), then replaced by Transistors (1950-1960).

- Almost impossible to use it except by **very patient geniuses**

- Integrated circuits (1960-1970's) : **programmable by highly trained people only**

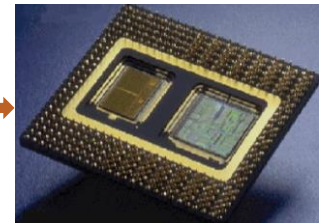- Silicon computer chips (1970's and on) – **Useable by just about anyone**

Vacuum tubes	Transistors	Circuit board	Silicon chips

History of computing YouTube Video:
https://www.youtube.com/watch?v=-M6lANfzFsM

Evolution of Programming languages

- 1950 – 1960 → Assembly language, FORTRAN, COBOL, LISP
- 1960 – 1970 → BASIC, PASCAL, Simula

- 1970 – 1980 → C*, SQL
- 1980 – 1990 → C++, FoxPro, Objective C

- 1990 – 2000 → Visual Basic, Java, **Python**, Ruby, PHP, JavaScript
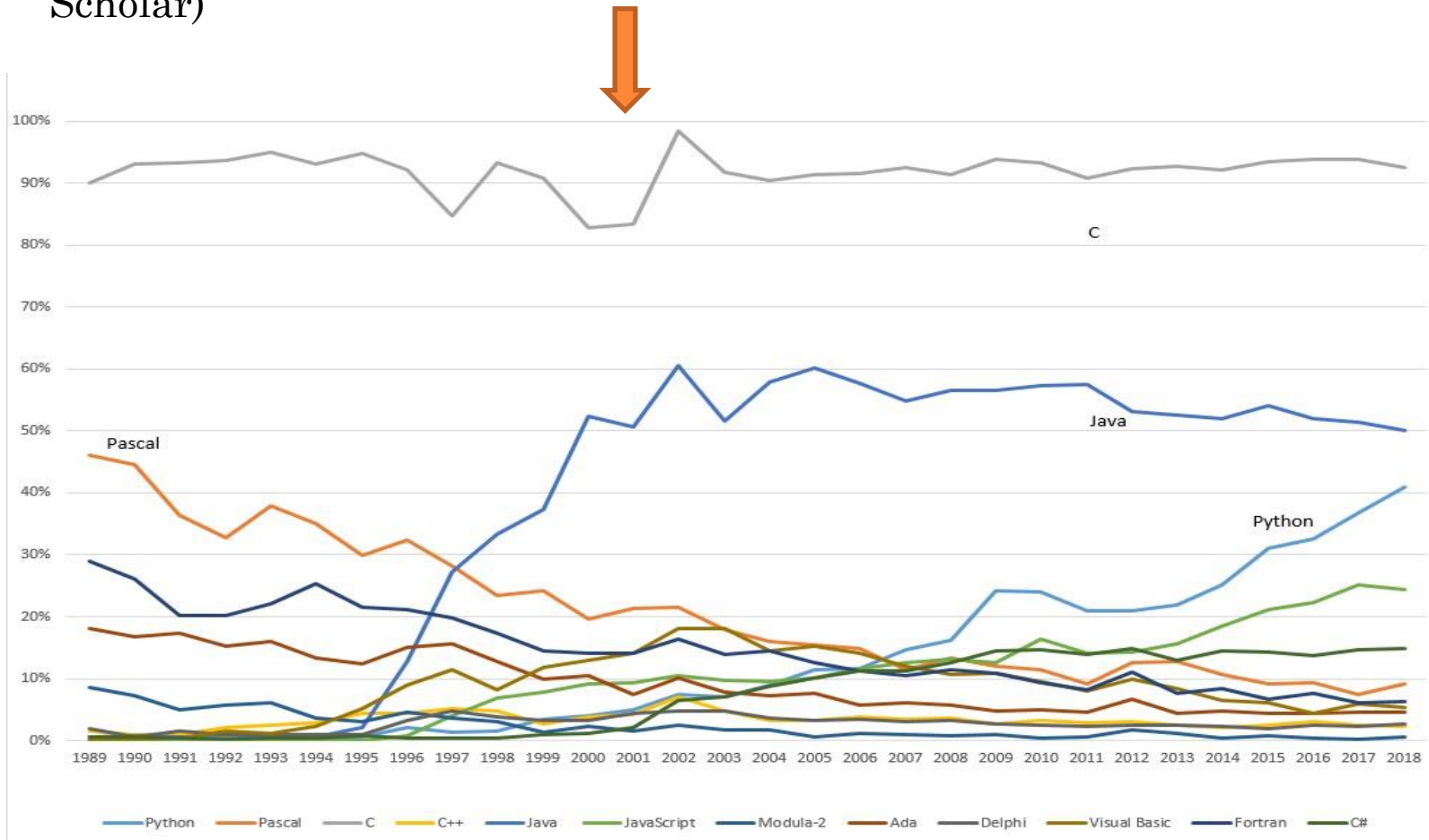- 2000- 2010 → C#, Scratch

- 2010 – till now → Rust, Dart, Swift and continuing

- *C language is widely used till today to develop program specific to hardware. It is one of the most popular languages used in industries till today.
- SQL is the first data manipulation specific language developed for database management.

Python Vs other programming languages

- ❑ It is a popular general purpose programming language
- ❑ Python works on different platforms such as (Windows, Mac, Linux and etc.,
- ❑ Social media sites such as <u>Instagram and Pinterest</u> are also built on Python.
- ❑ Programming languages used in the introduction to computing (Google Scholar)

- **TIOBE Index for August 2021* [*subject to change] :** https://www.tiobe.com/tiobe-index/

- Prerequisite top skills required from developers who wants to build a new software systems.

- Python is the most searched language and widely presented as "easy to learn due to its syntax, and a large library of standards and toolkits.

- In addition, Python is easier to integrate with other popular programming languages such as C and C++

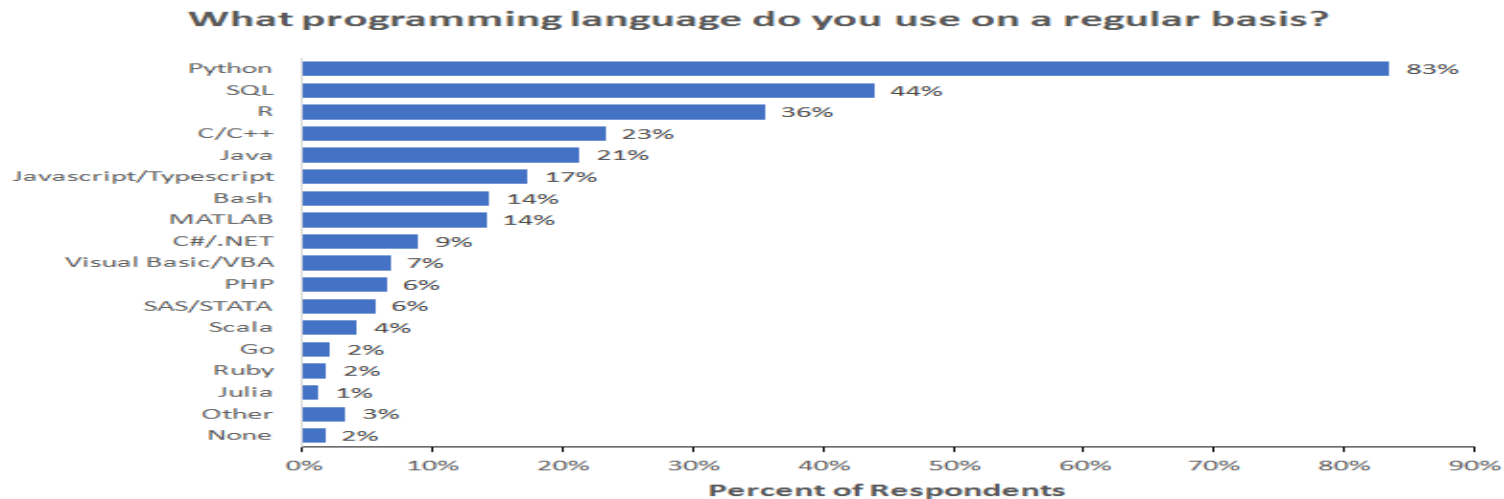- It is a popular programming language for novice programmers/learners

Top 5	Computer language [August 2021]
1	C
2	Python
3	Java
4	C++
5	C#

Applications of Python

❑ It has become lingua franca for many data science applications

❑ It has rich set of libraries for data loading, visualization, statistics, natural language processing, image processing and more.

❑ Python is mainly used for web development, software development, data analysis

❑ It has simple syntax that are like English words for developers to write code with fewer lines easily than some other programming languages

❑ Python programming can be written in procedural, object oriented or functional ways.

What programming language do you use on a regular basis?

Language	Percent of Respondents
Python	83%
SQL	44%
R	36%
C/C++	23%
Java	21%
Javascript/Typescript	17%
Bash	14%
MATLAB	14%
C#/.NET	9%
Visual Basic/VBA	7%
PHP	6%
SAS/STATA	6%
Scala	4%
Go	2%
Ruby	2%
Julia	1%
Other	3%
None	2%

Percent of Respondents

Note: Data are from the 2018 Kaggle Machine Learning and Data Science Survey. You can learn more about the study here: http://www.kaggle.com/kaggle/kaggle-survey-2018. A total of 18827 respondents answered the question.

What is computer programming?

❑ Writing set of instructions / commands that can be executed in the computer to perform certain tasks.

❑ The sequence of instructions are also called code or program

❑ The person who write code is called programmer

❑ Write code using high level programming language or low-level programming (machine code) language.

```
print ("Hello World!!!$")
```

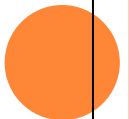Written using a high-level programming language **Python**

Written in assembly language
Written using C - mid level language

```c
#include <stdio.h>
int main() {
printf("hello world!!!$\n");
}
```

```asm
DATA SEGMENT
        MESSAGE DB "HELLO WORLD!!!$"
ENDS
CODE SEGMENT
        ASSUME DS:DATA CS:CODE
START:

        MOV AX,DATA
        MOV DS,AX
        LEA DX,MESSAGE
        MOV AH,9
        INT 21H
        MOV AH,4CH
        INT 21H
ENDS
END START
```

How does a Python program look like?

```python
1  # A simple Python program
2  from datetime import datetime
3
4  name = input ("What is your name: ")
5  city = input ("Where are you from: ")
6
7  print ("your name is:",name)
8  print (" City: ", city)
9
10 print("Present year is:", datetime.now().year)
11
```

Shell

```
Python 3.7.9 (bundled)
>>> %cd 'Z:\Python 2021_Fall\Fall 2021_CT60A0203\Week 1\Example programs'
>>> %Run 'Example 1_Week1.py'

 What is your name: Ashok Kumar
 Where are you from: Lahti
 your name is: Ashok Kumar
  City:  Lahti
 Present year is: 2021

>>>
```
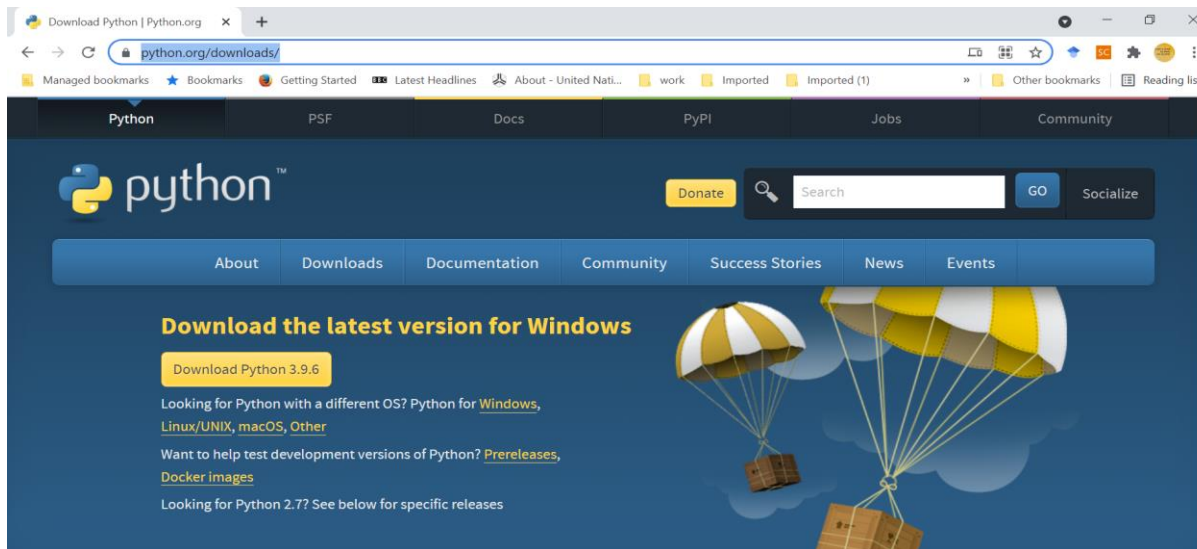
How to install Python?

- https://www.python.org/downloads/release/

- Python Release Python 3.9.1 or above (3.9.6 is available now*)
- The official home of the Python Programming Language :
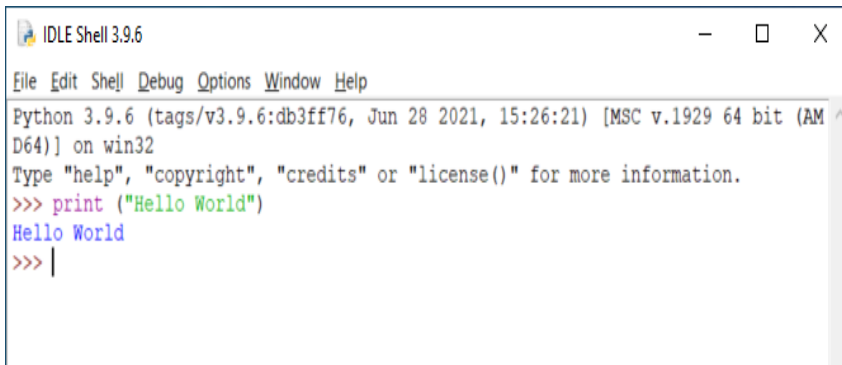- www.python.org

- **IDE (Integrated Development Environment) for writing, saving and running Python programs**
  - ❑ IDLE
  - ❑ Thonny
  - ❑ PyCharm
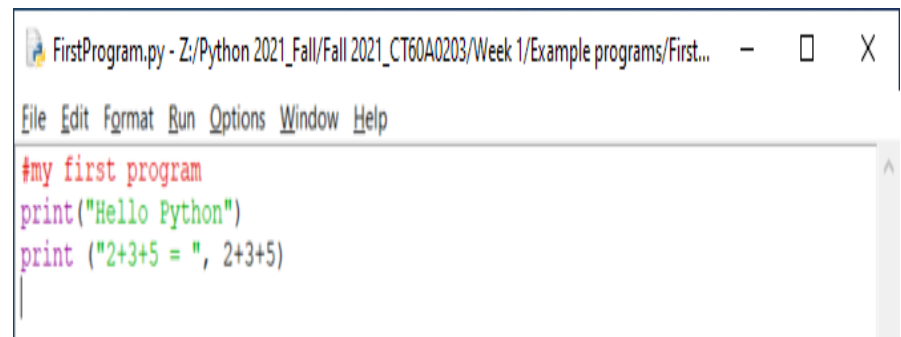 - ❑ Python tools for Visual Studio

Write and run your first Python program : Python IDLE

1. Open Python IDLE

2. File menu – New File

3. Type your code in the New window "untitled"

4. Save the file as "FirstProgram" [Python files extension must be .py]
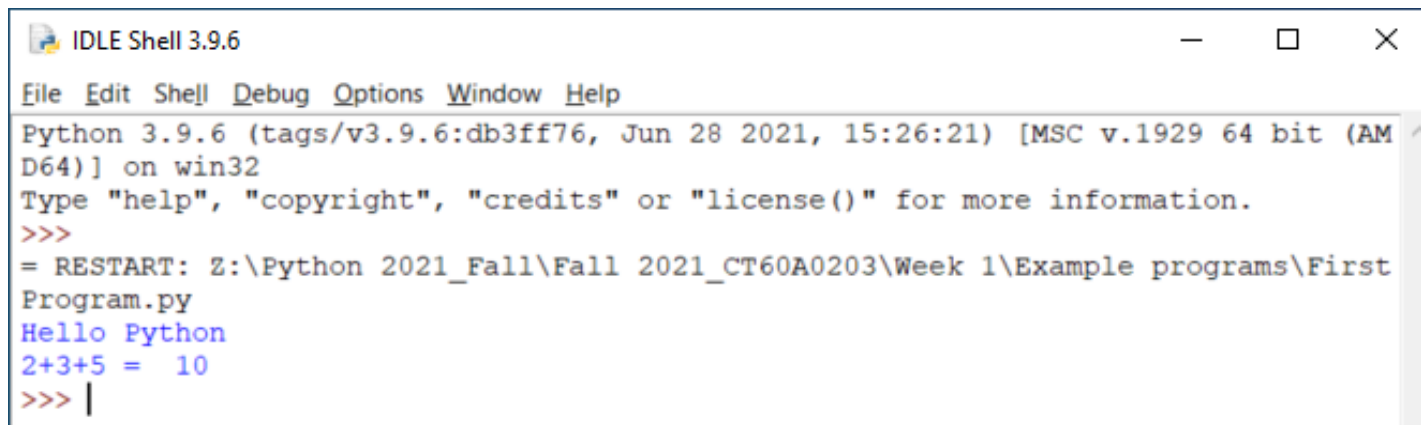
```
IDLE Shell 3.9.6                                    –  □  X
File  Edit  Shell  Debug  Options  Window  Help
Python 3.9.6 (tags/v3.9.6:db3ff76, Jun 28 2021, 15:26:21) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> print ("Hello World")
Hello World
>>>
```

```
FirstProgram.py - Z:/Python 2021_Fall/Fall 2021_CT60A0203/Week 1/Example programs/First...  –  □  X
File  Edit  Format  Run  Options  Window  Help
#my first program
print("Hello Python")
print ("2+3+5 = ", 2+3+5)
```

5. Run the file [Press F5 key or Fn + F5 key or click on run menu]

```
IDLE Shell 3.9.6                                    –  □  X
File  Edit  Shell  Debug  Options  Window  Help
Python 3.9.6 (tags/v3.9.6:db3ff76, Jun 28 2021, 15:26:21)  [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: Z:\Python 2021_Fall\Fall 2021_CT60A0203\Week 1\Example programs\First
Program.py
Hello Python
2+3+5 =  10
>>>
```

Write and run your first Python program : Python Shell

1. Select the folder where you want to create and save your Python file
2. Create a new text document and type your Python program
3. Save the file as "FirstProgram.py" [extension must be .py]
4. Check the screenshot How I did my first python code run on Python shell