KNS INSTITUTE OF TECHNOLOGY

HEGDE NAGAR, TIRUMENAHALLI, KOGILU ROAD, BENGALURU – 64

DEPARTMENT OF
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

PYTHON PROGRAMMING LABORATORY
LAB MANUAL

[21CSL46]

Academic Year 2022 - 2023

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Name of the Student: ______________________________

University Serial Number: ______________________________

Semester:____________________**Batch:** ____________________

CYCLE OF EXPERIMENTS

LAB CODE: 21CSL46

List of Experiments	Date	Remark
Cycle I		
1. Introduce the Python fundamentals, data types, operators, flow control and exception handling in Python 2. Demonstrating creation of functions, passing parameters and return values 3. Demonstration of manipulation of strings using string methods		
Cycle II		
4. Discuss different collections like list, tuple and dictionary 5. Demonstration of pattern recognition with and without using regular expressions 6. Demonstration of reading, writing and organizing files.		
Cycle III		
7. Demonstration of the concepts of classes, methods, objects and inheritance 8. Demonstration of classes and methods with polymorphism and overriding 9. Demonstration of working with excel spreadsheets and web scraping 10. Demonstration of working with PDF, word and JSON files		

NOTE:

a) SUB GROUP: Not more than 2 students/Group.

b) BATCH: Maximum of 16 students/Batch.

PYTHON PROGRAMMING LABORATORY

SUB CODE: 21CSL46

LABORATORY EXPERIMENTS

1. Introduce the Python fundamentals, data types, operators, flow control and exception handling in Python

   (a) Write a python program to find the best of two test average marks out of three test’s marks accepted from the user.

   (b) Develop a Python program to check whether a given number is palindrome or not and also count the number of occurrences of each digit in the input number.

2. Demonstrating creation of functions, passing parameters and return values

   (a) Defined as a function F as Fn = Fn-1 + Fn-2. Write a Python program which accepts a value for N (where N > 0) as input and pass this value to the function. Display suitable error message if the condition for input value is not followed.

   (b) Develop a python program to convert binary to decimal, octal to hexadecimal using functions.

3. Demonstration of manipulation of strings using string methods

   (a)Write a Python program that accepts a sentence and find the number of words, digits, uppercase letters and lowercase letters.

   (b)Write a Python program to find the string similarity between two given strings

```
Sample Output:                       Sample Output:
Original string:                     Original string:
Python Exercises                     Python Exercises
Python Exercises                     Python Exercise
Similarity between two said strings: Similarity between two said strings:
1.0                                  0.967741935483871
```

4. Discuss different collections like list, tuple and dictionary

   (a) Write a python program to implement insertion sort and merge sort using lists

   (b) Write a program to convert roman numbers in to integer values using dictionaries.

5. Demonstration of pattern recognition with and without using regular expressions

   (a) Write a function called isphonenumber () to recognize a pattern 415-555-4242 without using regular expression and also write the code to recognize the same pattern

   (b) Develop a python program that could search the text in a file for phone numbers (+919900889977) and email addresses (sample@gmail.com)

6. Demonstration of reading, writing and organizing files.

   (a) Write a python program to accept a file name from the user and perform the following operations

      1. Display the first N line of the file
      2. Find the frequency of occurrence of the word accepted from the user in the file

   (b) Write a python program to create a ZIP file of a particular folder which contains several files inside it.

7. Demonstration of the concepts of classes, methods, objects and inheritance

   (a) By using the concept of inheritance write a python program to find the area of triangle, circle and rectangle.

   (b) Write a python program by creating a class called Employee to store the details of Name, Employee_ID, Department and Salary, and implement a method to update salary of employees belonging to a given department.

8. Demonstration of classes and methods with polymorphism and overriding

   (a) Write a python program to find the whether the given input is palindrome or not (for both string and integer) using the concept of polymorphism and inheritance.

9. Demonstration of working with excel spreadsheets and web scraping

   (a) Write a python program to download the all XKCD comics

   (b) Demonstrate python program to read the data from the spreadsheet and write the data in to the spreadsheet

10. Demonstration of working with PDF, word and JSON files

   (a) Write a python program to combine select pages from many PDFs

   (b) Write a python program to fetch current weather data from the JSON file

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course. The student has to secure not less than 35% (18 Marks out of 50) in the semester-end examination (SEE). The student has to secure 40% of sum of the maximum marks of CIE and SEE to qualify in the course.

Continuous Internal Evaluation (CIE):

CIE marks for the practical course is 50 Marks.

The split-up of CIE marks for record/ journal and test are in the ratio 60:40.

- Each experiment to be evaluated for conduction with observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments designed by the faculty who is handling the laboratory session and is made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled downed to 30 marks (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct 02 tests for 100 marks, the first test shall be conducted after the 8th week of the semester and the second test shall be conducted after the 14th week of the semester.
- In each test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability. Rubrics suggested in Annexure-II of Regulation book
- The average of 02 tests is scaled down to 20 marks (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and average marks of two tests is the total CIE marks scored by the student.

Semester End Evaluation (SEE):

- SEE marks for the practical course is 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the University
- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. OR based on the course requirement evaluation rubrics shall be decided jointly by examiners.
- Students can pick one question (experiment) from the questions lot prepared by the internal/external examiners jointly.

- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.
- General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)
- Students can pick one experiment from the questions lot of PART A with equal choice to all the students in a batch. For PART B examiners should frame a question for each batch, student should develop an algorithm, program, execute and demonstrate the results with appropriate output for the given problem.
- Weightage of marks for PART A is 80% and for PART B is 20%. General rubrics suggested to be followed for part A and part B.
- Change of experiment is allowed only once and Marks allotted to the procedure part to be made zero (Not allowed for Part B).
- The duration of SEE is 03 hours Rubrics suggested in Annexure-II of Regulation book

Rubrics suggested in Annexure-II of Regulation book

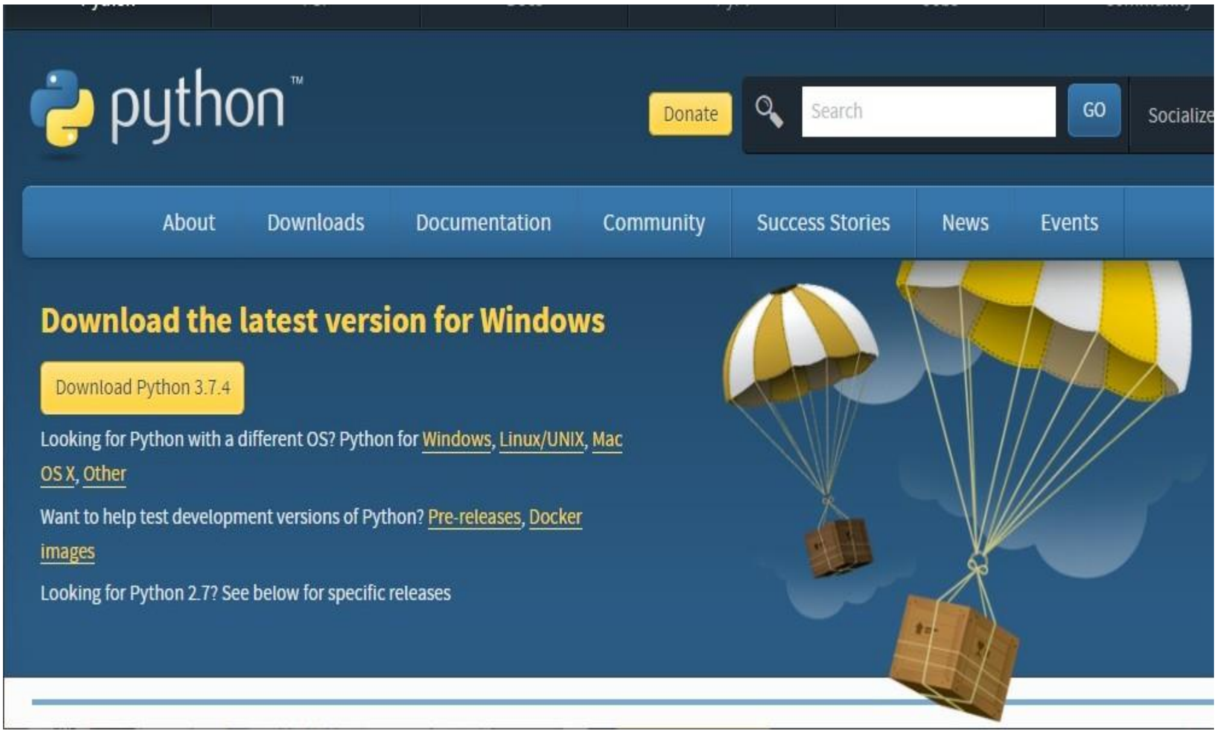
Introduction to Python

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting language to connect existing components together. Python is simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed.

Python Installation

Download Python Interpreter

Go to the Python downloads page and select the version foryour operating system (Windows, Mac, Linux)



Download the latest version for Windows

Download Python 3.7.4

Looking for Python with a different OS? Python for Windows, Linux/UNIX, Mac OS X, Other

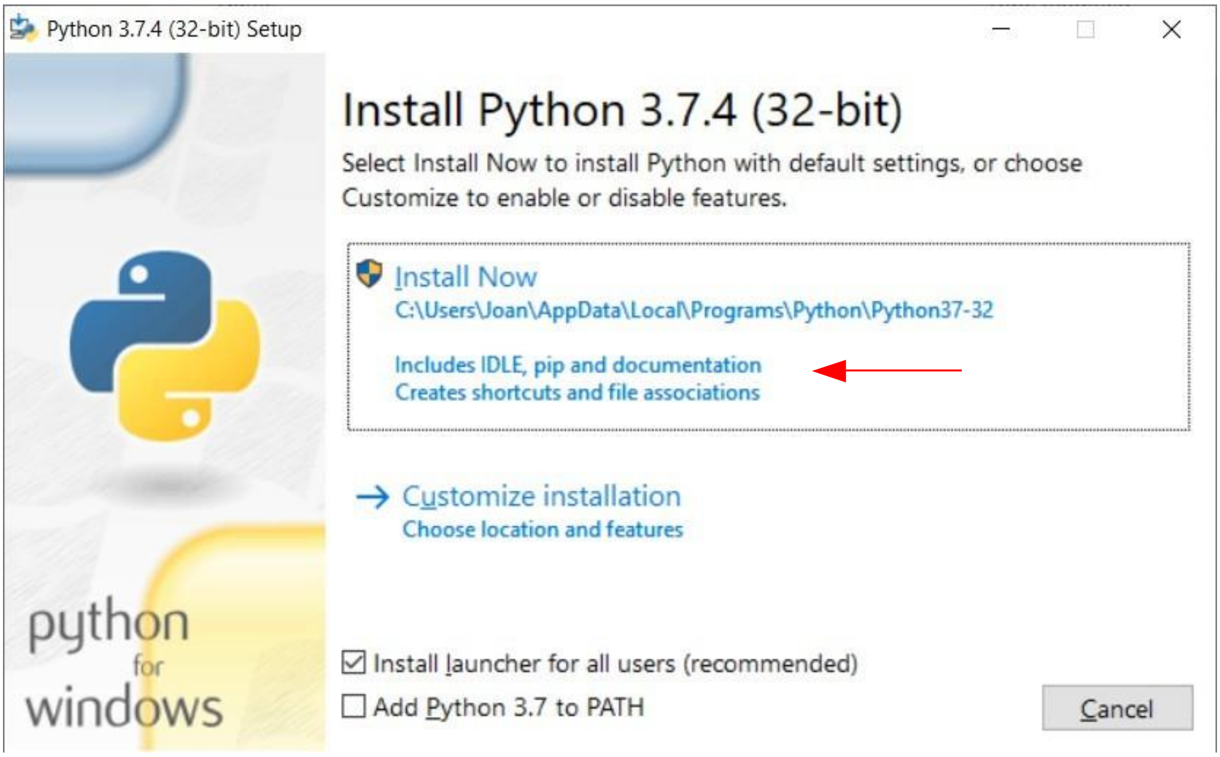
Want to help test development versions of Python? Pre-releases, Docker images

Looking for Python 2.7? See below for specific releases

Install Python Interpreter

- Select the downloaded file to start the installation.
- Important! Remember the directory where Python is installed

- 'Install Now' picks a default directory
- 'Customize installation' lets you specify the directory location



Python 3.7.4 (32-bit) Setup

Install Python 3.7.4 (32-bit)

Select Install Now to install Python with default settings, or choose Customize to enable or disable features.

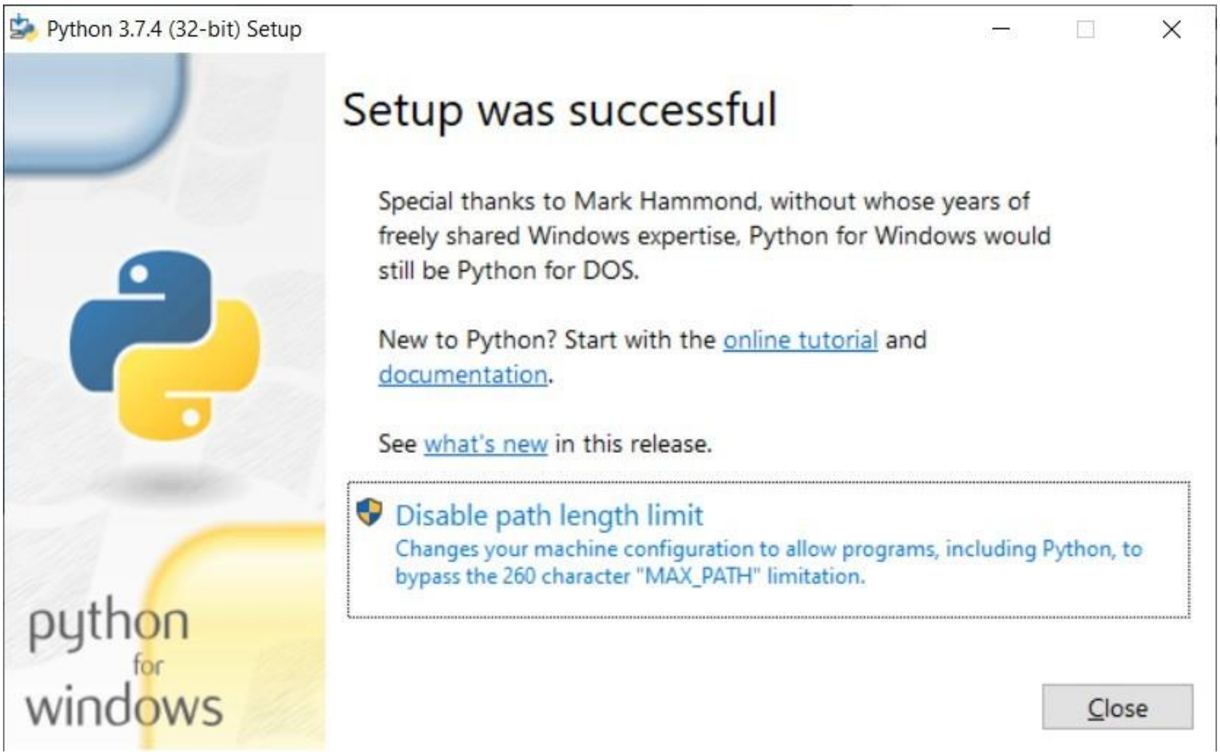
Install Now
C:\Users\Joan\AppData\Local\Programs\Python\Python37-32

Includes IDLE, pip and documentation
Creates shortcuts and file associations

→ Customize installation
Choose location and features

☑ Install launcher for all users (recommended)
□ Add Python 3.7 to PATH

If installation is successful, you should see this message



Python 3.7.4 (32-bit) Setup

Setup was successful

Special thanks to Mark Hammond, without whose years of freely shared Windows expertise, Python for Windows would still be Python for DOS.

New to Python? Start with the online tutorial and documentation.

See what's new in this release.

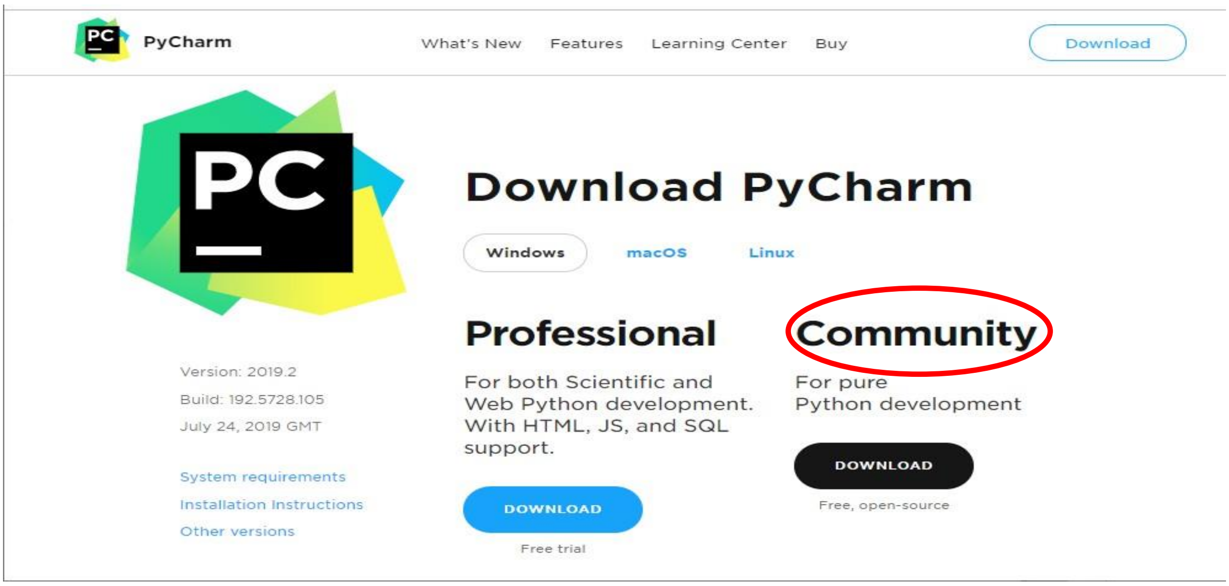
Disable path length limit
Changes your machine configuration to allow programs, including Python, to bypass the 260 character "MAX_PATH" limitation.

Introduction to PyCharm

PyCharm is an integrated development environment (IDE) used for programming in Python. It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems, and supports web development with Django. PyCharm is developed by the Czech company JetBrains.

PyCharm IDE Installation

Go to PyCharm download page and select the FREECommunity Edition



Download PyCharm

Professional

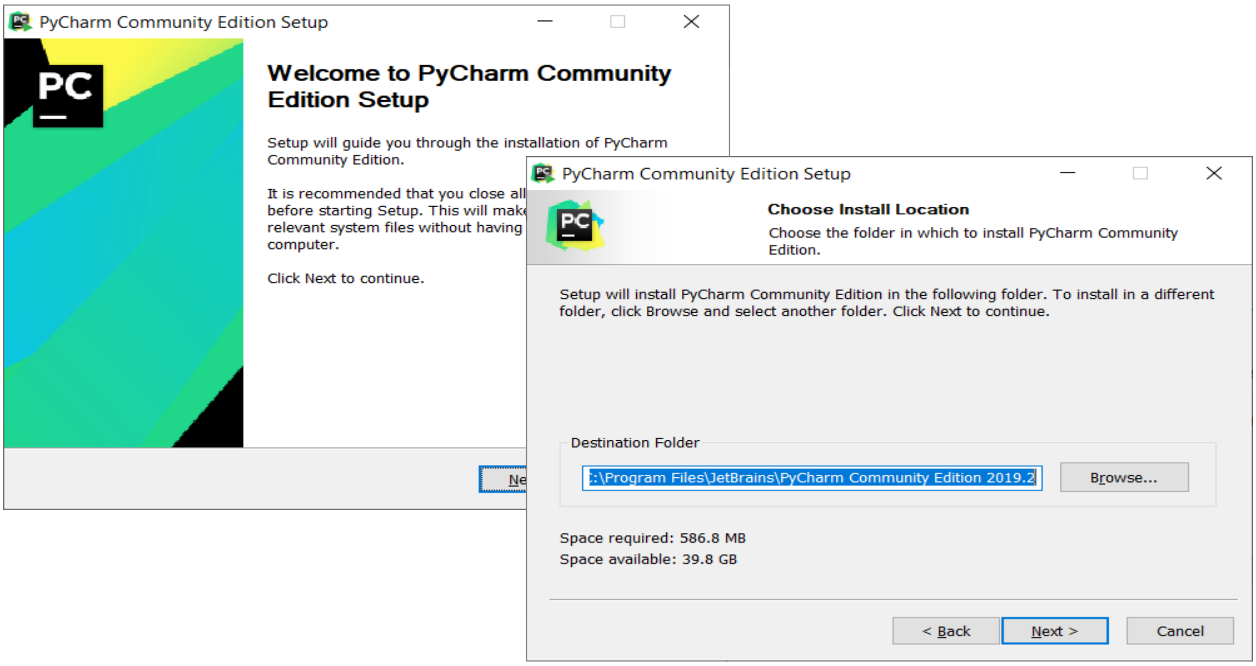
For both Scientific and Web Python development. With HTML, JS, and SQL support.

Community

For pure Python development

Version: 2019.2
Build: 192.5728.105
July 24, 2019 GMT

Run the installation program


PyCharm Community Edition Setup
PC
Ne

Welcome to PyCharm Community Edition Setup

Setup will guide you through the installation of PyCharm Community Edition.

It is recommended that you close all before starting Setup. This will make relevant system files without having computer.

Click Next to continue.

PyCharm Community Edition Setup

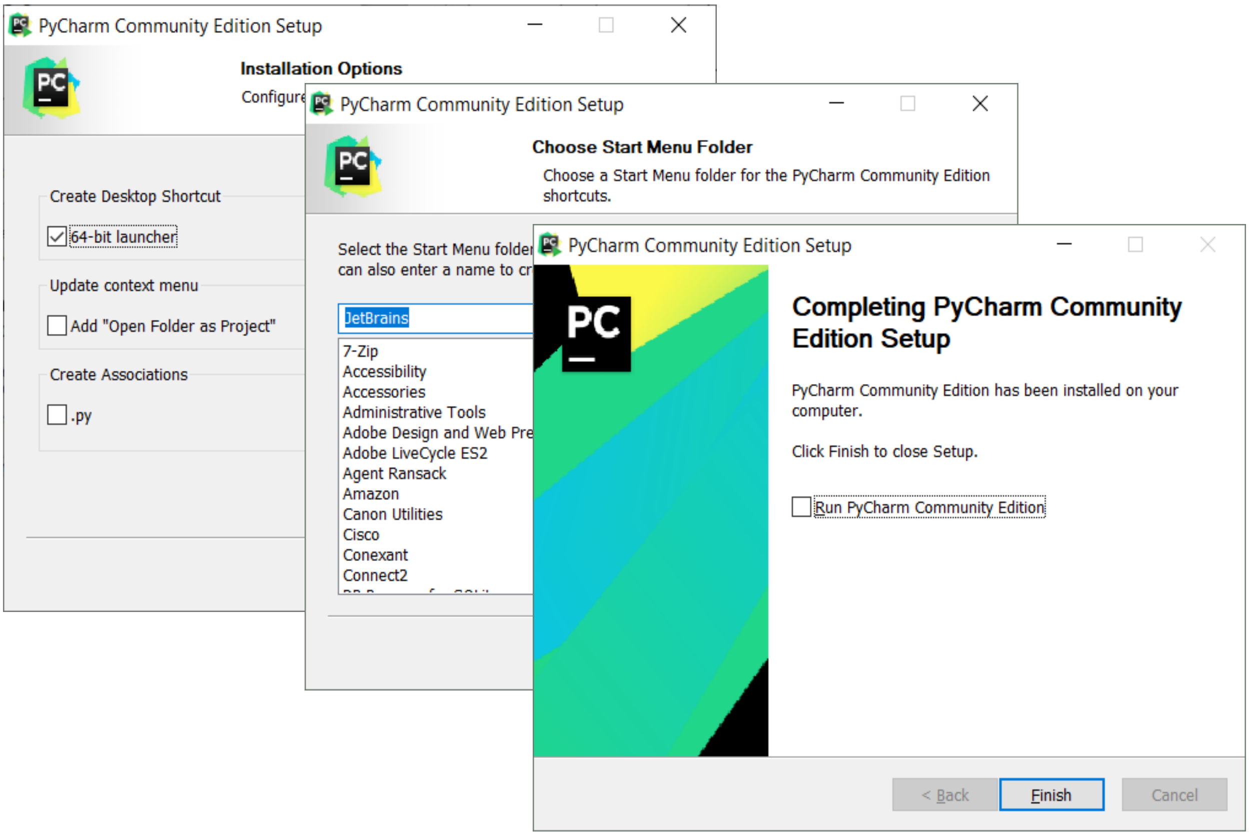
Choose Install Location

Choose the folder in which to install PyCharm Community Edition.

Setup will install PyCharm Community Edition in the following folder. To install in a different folder, click Browse and select another folder. Click Next to continue.

Destination Folder: :\Program Files\JetBrains\PyCharm Community Edition 2019.2

Space required: 586.8 MB
Space available: 39.8 GB



PyCharm Community Edition Setup

Installation Options

Configure

Create Desktop Shortcut

☑ 64-bit launcher

Update context menu

□ Add "Open Folder as Project"

Create Associations

□ .py

PyCharm Community Edition Setup

Choose Start Menu Folder

Choose a Start Menu folder for the PyCharm Community Edition shortcuts.

Select the Start Menu folder can also enter a name to cr

JetBrains

7-Zip
Accessibility
Accessories
Administrative Tools
Adobe Design and Web Pre
Adobe LiveCycle ES2
Agent Ransack
Amazon
Canon Utilities
Cisco
Conexant
Connect2

PyCharm Community Edition Setup

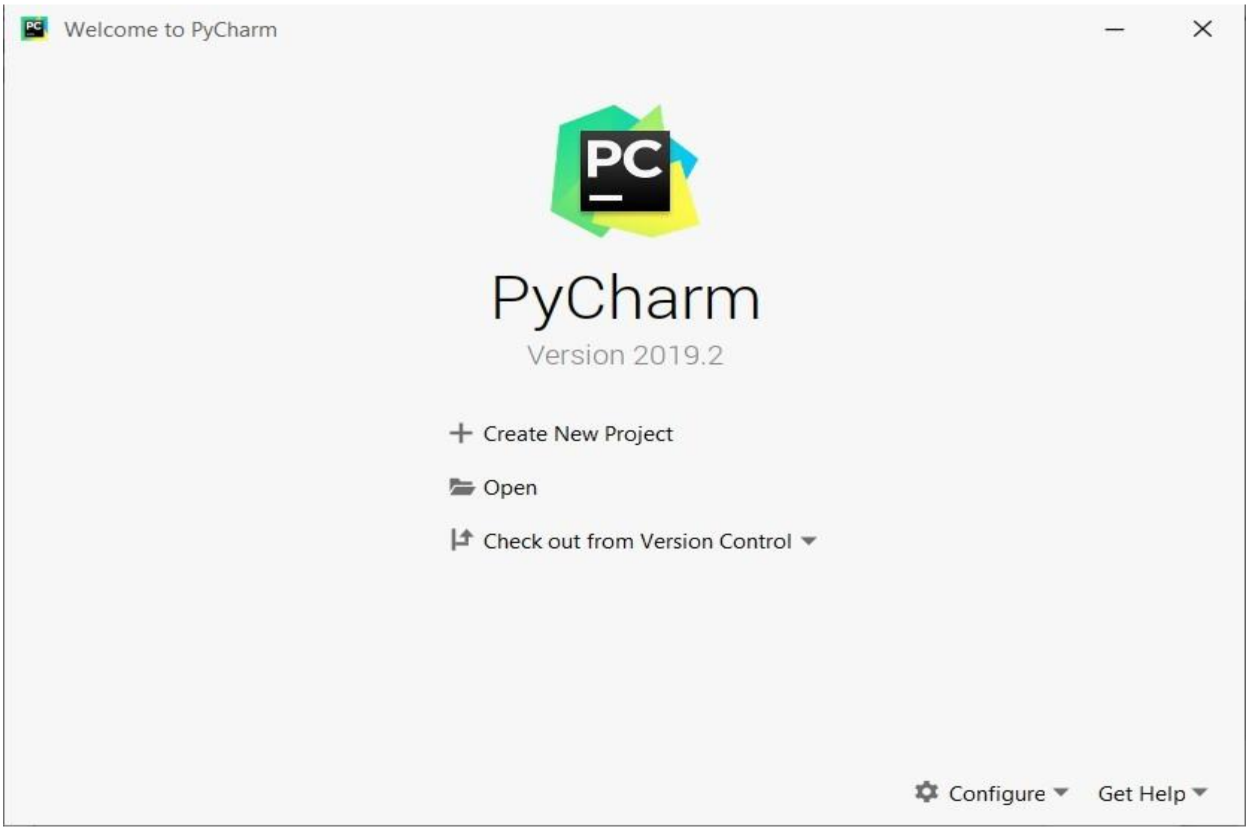
Completing PyCharm Community Edition Setup

PyCharm Community Edition has been installed on your computer.

Click Finish to close Setup.

□ Run PyCharm Community Edition

Using PyCharm: Create a project

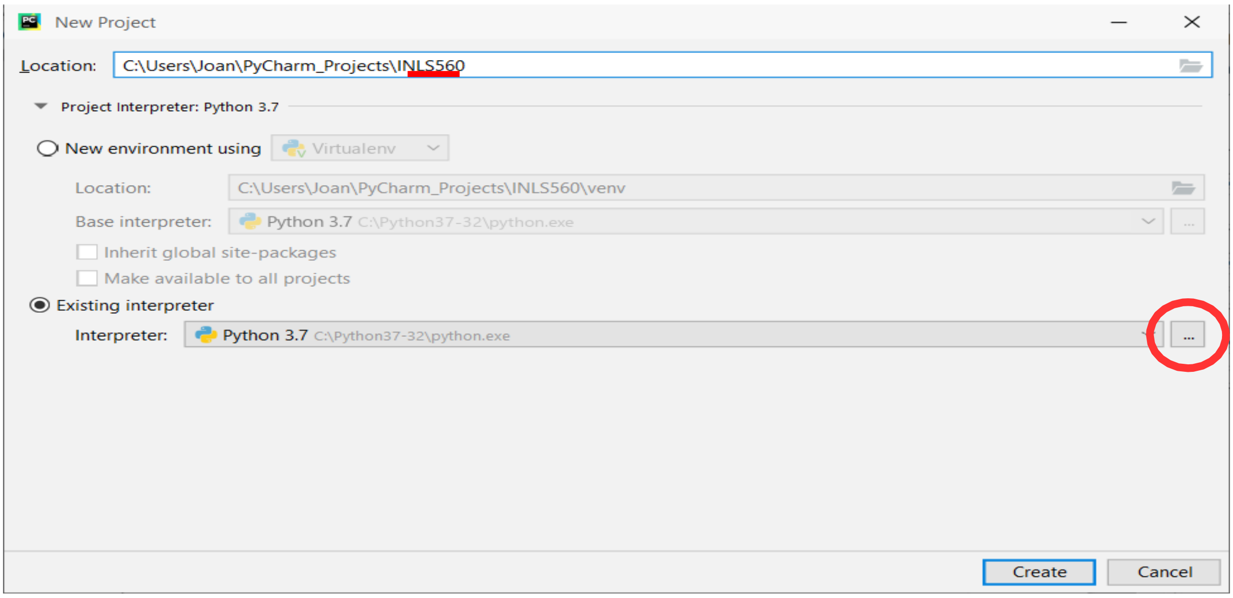


Welcome to PyCharm

PyCharm

Version 2019.2

- First, using File Explorer (Windows), or Finder (Mac), create a directory foryour projects, e.g., *PyCharm_Projects*
- Name your project, e.g., *INLS560*
- Specify the Python Interpreter you will use for your projects



New Project

Location: C:\Users\Joan\PyCharm_Projects\INLS560

Project Interpreter: Python 3.7

○ New environment using Virtualenv

Location: C:\Users\Joan\PyCharm_Projects\INLS560\venv

Base interpreter: Python 3.7 C:\Python37-32\python.exe

□ Inherit global site-packages

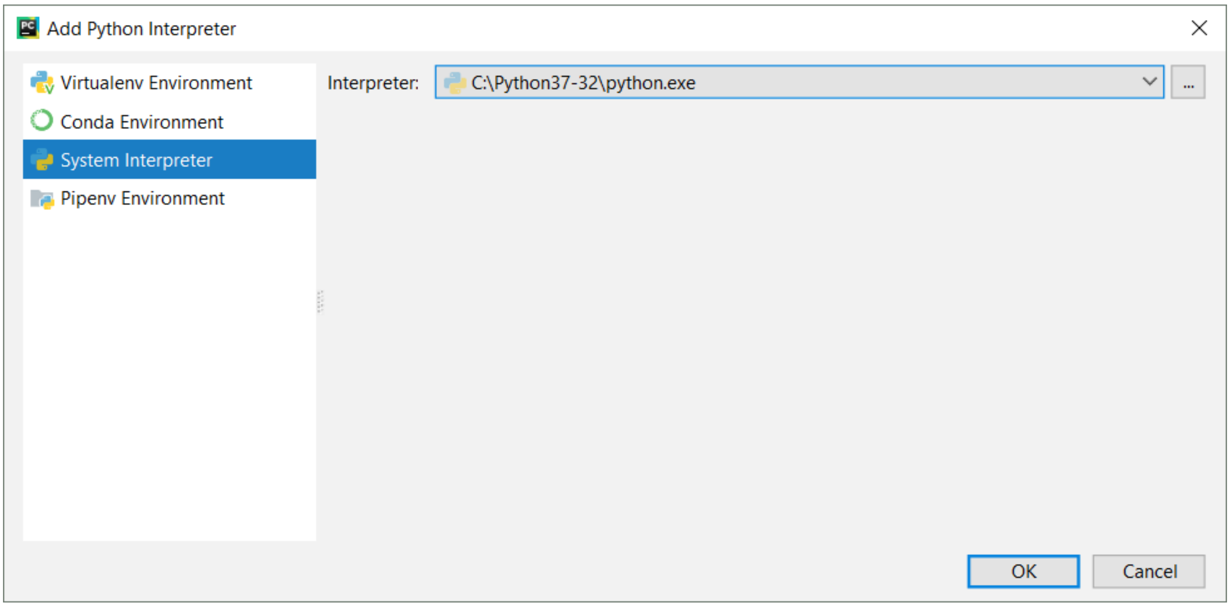
□ Make available to all projects

● Existing interpreter

Interpreter: Python 3.7 C:\Python37-32\python.exe

Specify the Python interpreter to use

- Select System Interpreter
- Ensure that the Interpreter field refers to the Python interpreterthat you just installed. Click OK.

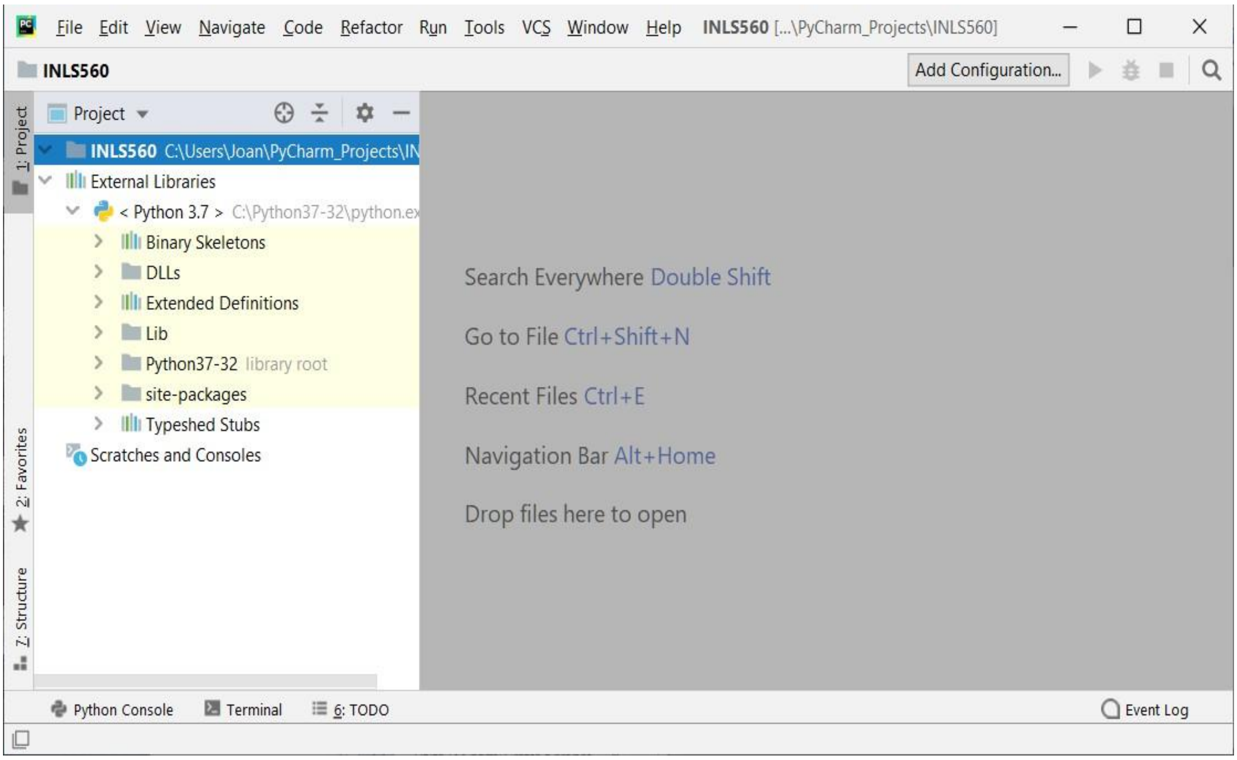


Add Python Interpreter

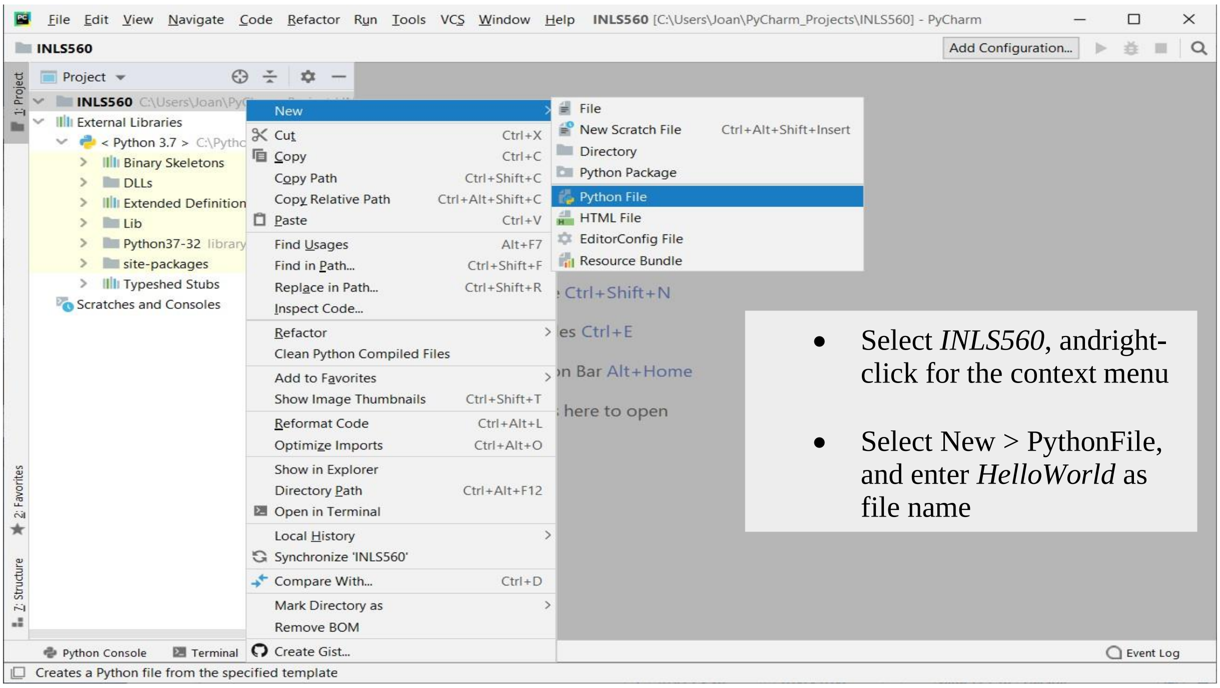
Interpreter: C:\Python37-32\python.exe

Initial project structure for *INLS560*

- Folder for your project
- Folder with External Libraries



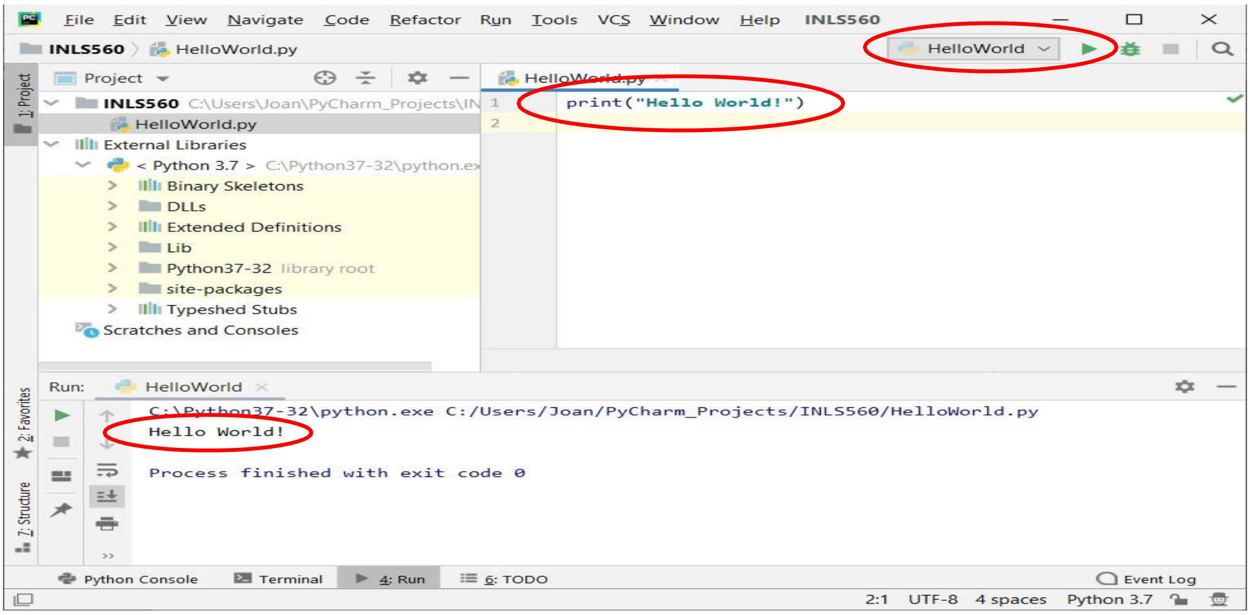
Create a Python Program



- Select *INLS560*, andright-click for the context menu
- Select New > PythonFile, and enter *HelloWorld* as file name

Create and run your program

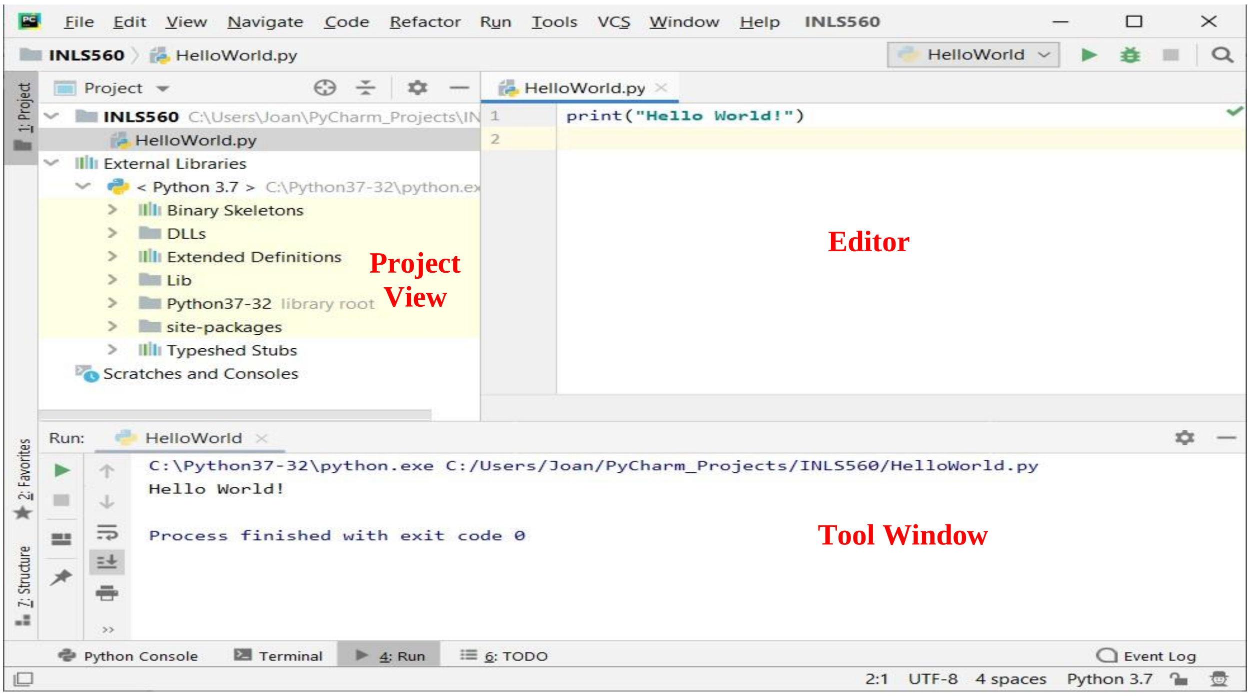
- Enter **print("Hello World!")**in the Editor
- Select **HelloWorld.py**and select Run from context menu; or, select Run icon ▶
- Output is displayed in the Run Window in the bottom pane



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

```
C:\Python37-32\python.exe C:/Users/Joan/PyCharm_Projects/INLS560/HelloWorld.py
Hello World!

Process finished with exit code 0
```

Default Window Layout



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

```
C:\Python37-32\python.exe C:/Users/Joan/PyCharm_Projects/INLS560/HelloWorld.py
Hello World!

Process finished with exit code 0
```

EXPERIMENT -1

Aim: Introduce the Python fundamentals, data types, operators, flow control and exception handling in Python

(a) Write a python program to find the best of two test average marks out of three test’s marks accepted from the user.

Calculation of Test Average

Python Code

```
m1 = int(input("Enter marks for test1 : "))
m2 = int(input("Enter marks for test2 : "))
m3 = int(input("Enter marks for test3 : "))

if m1 <= m2 and m1 <= m3:
    avgMarks = (m2+m3)/2
elif m2 <= m1 and m2 <= m3:
    avgMarks = (m1+m3)/2
elif m3 <= m1 and m2 <= m2:
    avgMarks = (m1+m2)/2

print("Average of best two test marks  out of three test’s marks is", avgMarks);
```

Output

```
Enter marks for test1 : 45
Enter marks for test2 : 39
Enter marks for test3 : 48
Average of best two test marks  out of three test’s marks is 46.5
```

(b) Develop a Python program to check whether a given number is palindrome or not and also count the number of occurrences of each digit in the input number.

Palindrome Check & Digit Occurrence Count

Python Code

```
val = int(input("Enter a value : "))
str_val = str(val)
if str_val == str_val[::-1]:
    print("Palindrome")
else:
    print("Not Palindrome")

for i in range(10):
    if str_val.count(str(i)) > 0:
        print(str(i),"appears", str_val.count(str(i)), "times");
```

Output

```
Enter a value : 1234234
Not Palindrome
1 appears 1 times
2 appears 2 times
3 appears 2 times
4 appears 2 times

Enter a value : 12321
Palindrome
1 appears 2 times
2 appears 2 times
3 appears 1 times
```

EXPERIMENT -2

Aim: Demonstrating creation of functions, passing parameters and return values

(a) Defined as a function F as Fn = Fn-1 + Fn-2. Write a Python program which accepts a value for N (where N > 0) as input and pass this value to the function. Display suitable error message if the condition for input value is not followed.

Fibonacci Sequence

Python Code

```
def fn(n):
    if n == 1:
        return 0
    elif n == 2:
        return 1
    else:
        return fn(n-1) + fn(n-2)


num = int(input("Enter a number : "))

if num > 0:
    print("fn(", num, ") = ",fn(num) , sep ="")
else:
    print("Error in input")
```

Output

```
Enter a number : 5
fn(5) = 3


Enter a number : -1
Error in input
```

(b) Develop a python program to convert binary to decimal, octal to hexadecimal using functions.

Binary to Decimal & Octal to Hexadecimal Conversion

Python Code

```
def bin2Dec(val):
    rev=val[::-1]
    dec = 0
    i = 0
    for dig in rev:
        dec += int(dig) * 2**i
        i += 1

    return dec

def oct2Hex(val):
    rev=val[::-1]
    dec = 0
    i = 0
    for dig in rev:
        dec += int(dig) * 8**i
        i += 1
    list=[]
    while dec != 0:
        list.append(dec%16)
        dec = dec // 16

    nl=[]
    for elem in list[::-1]:
        if elem <= 9:
            nl.append(str(elem))
        else:
            nl.append(chr(ord('A') + (elem -10)))
    hex = "".join(nl)

    return hex

num1 = input("Enter a binary number : ")
print(bin2Dec(num1))
```

```
num2 = input("Enter a octal number : ")
print(oct2Hex(num2))
```

Output

```
Enter a binary number : 10111001
185
Enter a octal number : 675
1BD
```

EXPERIMENT -3

Aim: Demonstration of manipulation of strings using string methods

(a) Write a Python program that accepts a sentence and find the number of words, digits, uppercase letters and lowercase letters.

Sentence Statistics

Python Code

```
sentence = input("Enter a sentence : ")

wordList = sentence.split(" ")
print("This sentence has", len(wordList), "words")

digCnt = upCnt = loCnt = 0

for ch in sentence:
    if '0' <= ch <= '9':
        digCnt += 1
    elif 'A' <= ch <= 'Z':
        upCnt += 1
    elif 'a' <= ch <= 'z':
        loCnt += 1

print("This sentence has", digCnt, "digits", upCnt, "upper case letters", loCnt, "lower case letters")
```

Output

```
Enter a sentence : Rama went to Devaraja market to pick 2 kgs of vegetable
This sentence has 11 words
This sentence has 1 digits 2 upper case letters 42 lower case letters
```

(b) Write a Python program to find the string similarity between two given strings

```
Sample Output:                          Sample Output:
Original string:                        Original string:
Python Exercises                        Python Exercises
Python Exercises                        Python Exercise
Similarity between two said strings:    Similarity between two said strings:
1.0                                     0.967741935483871
```

String Similarity

Python Code

```
str1 = input("Enter String 1 \n")
str2 = input("Enter String 2 \n")

if len(str2) < len(str1):
    short = len(str2)
    long = len(str1)
else:
    short = len(str1)
    long = len(str2)


matchCnt = 0
for i in range(short):
    if str1[i] == str2[i]:
        matchCnt += 1

print("Similarity between two said strings:")
print(matchCnt/long)
```

Output

```
Enter String 1
Python Exercises
Enter String 2
Python Exercises
Similarity between two said strings:
```

```
1.0

Enter String 1
Python Exercises
Enter String 2
Python Exercise
Similarity between two said strings:
0.9375
```

EXPERIMENT - 4

Aim: Discuss different collections like list, tuple and dictionary

(a) Write a python program to implement insertion sort and merge sort using lists

Insertion Sort & Merge Sort on lists

Python Code

```
import random

def merge_sort(lst):
    if len(lst) > 1:
        mid = len(lst) // 2
        left_half = lst[:mid]
        right_half = lst[mid:]

        merge_sort(left_half)
        merge_sort(right_half)

        i = j = k = 0

        while i < len(left_half) and j < len(right_half):
            if left_half[i] < right_half[j]:
                lst[k] = left_half[i]
                i += 1
            else:
                lst[k] = right_half[j]
                j += 1
            k += 1

        while i < len(left_half):
            lst[k] = left_half[i]
            i += 1
            k += 1

        while j < len(right_half):
            lst[k] = right_half[j]
            j += 1
            k += 1

    return lst


def insertion_sort(arr):
    for i in range(1, len(arr)):
        key = arr[i]
        j = i - 1
        while j >= 0 and key < arr[j]:
            arr[j + 1] = arr[j]
            j -= 1
        arr[j + 1] = key

my_list = []

for i in range(10):
    my_list.append(random.randint(0, 999))

print("\nUnsorted List")
print(my_list)
print("Sorting using Insertion Sort")
insertion_sort(my_list)
print(my_list)


my_list = []

for i in range(10):
    my_list.append(random.randint(0, 999))

print("\nUnsorted List")
print(my_list)
print("Sorting using Merge Sort")
merge_sort(my_list)
print(my_list)
```

Output

```
Unsorted List
[932, 111, 226, 685, 543, 589, 918, 539, 294, 717]
Sorting using Insertion Sort
[111, 226, 294, 539, 543, 589, 685, 717, 918, 932]

Unsorted List
[613, 176, 828, 265, 65, 326, 359, 919, 514, 868]
Sorting using Merge Sort
[65, 176, 265, 326, 359, 514, 613, 828, 868, 919]
```

(b) Write a program to convert roman numbers in to integer values using dictionaries.

Roman to Integer Conversion

Python Code

```
def roman2Dec(romStr):
    roman_dict ={'I': 1, 'V': 5, 'X': 10, 'L': 50, 'C': 100, 'D': 500, 'M': 1000}
    # Analyze string backwards
    romanBack = list(romStr)[::-1]
    value = 0
    # To keep track of order
    rightVal = roman_dict[romanBack[0]]
    for numeral in romanBack:
        leftVal = roman_dict[numeral]
        # Check for subtraction
        if leftVal < rightVal:
           value -= leftVal
        else:
            value += leftVal
        rightVal = leftVal
    return value


romanStr = input("Enter a Roman Number : ")
print(roman2Dec(romanStr))
```

Output

```
Enter a Roman Number : XVII
17
```

```
Enter a Roman Number : MLXVI
1066
```

EXPERIMENT -5

Aim: Demonstration of pattern recognition with and without using regular expressions

(a) Write a function called isphonenumber () to recognize a pattern 415-555-4242 without using regular expression and also write the code to recognize the same pattern

Check Phone Number

Python Code

```
import re


def isphonenumber(numStr):
    if len(numStr) != 12:
        return False
    for i in range(len(numStr)):
        if i==3 or i==7:
            if numStr[i] != "-":
                return False
        else:
            if numStr[i].isdigit() == False:
                return False
    return True


def chkphonenumber(numStr):
    ph_no_pattern = re.compile(r'^\d{3}-\d{3}-\d{4}$')
    if ph_no_pattern.match(numStr):
        return True
    else:
        return False

ph_num = input("Enter a phone number : ")
print("Without using Regular Expression")
if isphonenumber(ph_num):
    print("Valid phone number")
else:
    print("Invalid phone number")

print("Using Regular Expression")
if chkphonenumber(ph_num):
    print("Valid phone number")
else:
    print("Invalid phone number")
```

Output

```
Enter a phone number : 444-654-5656
Without using Regular Expression
Valid phone number
Using Regular Expression
Valid phone number

Enter a phone number : 45A4-444-878
Without using Regular Expression
Invalid phone number
Using Regular Expression
Invalid phone number
```

(b) Develop a python program that could search the text in a file for phone numbers (+919900889977) and email addresses (sample@gmail.com)

Search Phone Number & Email

Python Code

```
import re

# Define the regular expression for phone numbers
phone_regex = re.compile(r'\+\d{12}')
email_regex = re.compile(r'[A-Za-z0-9._]+@[A-Za-z0-9]+\.[A-Z|a-z]{2,}')
# Open the file for reading
with open('example.txt', 'r') as f:
    # Loop through each line in the file
    for line in f:
        # Search for phone numbers in the line
        matches = phone_regex.findall(line)
        # Print any matches found
        for match in matches:
            print(match)

        matches = email_regex.findall(line)
        # Print any matches found
        for match in matches:
            print(match)
```

Output

```
+918151894220
+829392938876
+918768456234
prakash81.82@gmail.in
```

EXPERIMENT - 6

Aim: Demonstration of reading, writing and organizing files.

(a) Write a python program to accept a file name from the user and perform the following operations

1. Display the first N line of the file
2. Find the frequency of occurrence of the word accepted from the user in the file

File Operations

Python Code

```
import os.path
import sys

fname = input("Enter the filename : ")

if not os.path.isfile(fname):
    print("File", fname, "doesn't exists")
    sys.exit(0)

infile = open(fname, "r")

lineList = infile.readlines()

for i in range(20):
    print(i+1, ":", lineList[i])

word = input("Enter a word : ")
cnt = 0
for line in lineList:
    cnt += line.count(word)

print("The word", word, "appears", cnt, "times in the file")
```

Output

```
Enter the filename : example.txt
1 : this is phone number +918151894220
2 : no phone number here
3 : here we have one +829392938876
```

```
4 : we have an email prakash81.82@gmail.in and a number +918768456234
5 : nothing of that sort here
6 : Better hope the life-inspector doesn't come around while you have your
7 : life in such a mess.
8 : You can create your own opportunities this week.  Blackmail a senior executive.
9 : Be different: conform.
10 : Be cheerful while you are alive.
11 :            -- Phathotep, 24th Century B.C.
12 : Q:         How many journalists does it take to screw in a light bulb?
13 : A:         Three.  One to report it as an inspired government program to bring
14 :     light to the people, one to report it as a diabolical government plot
15 :     to deprive the poor of darkness, and one to win a Pulitzer prize for
16 :     reporting that Electric Company hired a light bulb-assassin to break
17 :     the bulb in the first place.
18 : Q:         Why did the astrophysicist order three hamburgers?
19 : A:         Because he was hungry.
20 : Q:         Why haven't you graduated yet?
Enter a word : the
The word the appears 7 times in the file
```

(b) Write a python program to create a ZIP file of a particular folder which contains several files inside it.

Zip operation on a folder

Python Code

```
import os
import sys
import pathlib
import zipfile

dirName = input("Enter Directory name that you want to backup : ")

if not os.path.isdir(dirName):
    print("Directory", dirName, "doesn't exists")
    sys.exit(0)

curDirectory = pathlib.Path(dirName)

with zipfile.ZipFile("myZip.zip", mode="w") as archive:
    for file_path in curDirectory.rglob("*"):
        archive.write(file_path, arcname=file_path.relative_to(curDirectory))

if os.path.isfile("myZip.zip"):
    print("Archive", "myZip.zip", "created successfully")
else:
    print("Error in creating zip archive")
```

Output

```
Enter Directory name that you want to backup : zipDemo
Archive myZip.zip created successfully
```

EXPERIMENT -7

Aim: Demonstration of the concepts of classes, methods, objects and inheritance

(a) By using the concept of inheritance write a python program to find the area of triangle, circle and rectangle.

Inheritance

Python Code

```
import math

class Shape:
    def __init__(self):
        self.area = 0
        self.name = ""

    def showArea(self):
        print("The area of the", self.name, "is", self.area, "units")

class Circle(Shape):
    def __init__(self,radius):
        self.area = 0
        self.name = "Circle"
        self.radius = radius

    def calcArea(self):
        self.area = math.pi * self.radius * self.radius

class Rectangle(Shape):
    def __init__(self,length,breadth):
        self.area = 0
        self.name = "Rectangle"
        self.length = length
        self.breadth = breadth

    def calcArea(self):
        self.area = self.length * self.breadth
```

```
class Triangle(Shape):
    def __init__(self,base,height):
        self.area = 0
        self.name = "Triangle"
        self.base = base
        self.height = height

    def calcArea(self):
        self.area = self.base * self.height / 2



c1 = Circle(5)
c1.calcArea()
c1.showArea()


r1 = Rectangle(5, 4)
r1.calcArea()
r1.showArea()


t1 = Triangle(3, 4)
t1.calcArea()
t1.showArea()
```

Output

```
The area of the Circle is 78.53981633974483 units
The area of the Rectangle is 20 units
The area of the Triangle is 6.0 units
```

(b) Write a python program by creating a class called Employee to store the details of Name, Employee_ID, Department and Salary, and implement a method to update salary of employees belonging to a given department.

Employee Details

Python Code

```
class Employee:
    def __init__(self):
        self.name = ""
        self.empId = ""
        self.dept = ""
        self.salary = 0

    def getEmpDetails(self):
        self.name = input("Enter Employee name : ")
        self.empId = input("Enter Employee ID : ")
        self.dept = input("Enter Employee Dept : ")
        self.salary = int(input("Enter Employee Salary : "))

    def showEmpDetails(self):
        print("Employee Details")
        print("Name : ", self.name)
        print("ID : ", self.empId)
        print("Dept : ", self.dept)
        print("Salary : ", self.salary)

    def updtSalary(self):
        self.salary = int(input("Enter new Salary : "))
        print("Updated Salary", self.salary)


e1 = Employee()
e1.getEmpDetails()
e1.showEmpDetails()
e1.updtSalary()
```

Output

```
Enter Employee name : Sameer
Enter Employee ID : A123
Enter Employee Dept : CSE
Enter Employee Salary : 85750

Employee Details
Name :  Sameer
ID :  A123
Dept :  CSE
Salary :  85750

Enter new Salary : 88800
Updated Salary 88800
```

EXPERIMENT - 8

Aim: Demonstration of classes and methods with polymorphism and overriding

(a) Write a python program to find the whether the given input is palindrome or not (for both string and integer) using the concept of polymorphism and inheritance.

Polymorphism and Inheritance

Python Code

```
class PaliStr:
    def __init__(self):
        self.isPali = False

    def chkPalindrome(self, myStr):
        if myStr == myStr[::-1]:
            self.isPali = True
        else:
            self.isPali = False

        return self.isPali

class PaliInt(PaliStr):
    def __init__(self):
        self.isPali = False

    def chkPalindrome(self, val):
        temp = val
        rev = 0
        while temp != 0:
            dig = temp % 10
            rev = (rev*10) + dig
            temp = temp //10

        if val == rev:
            self.isPali = True
        else:
            self.isPali = False
        return self.isPali

st = input("Enter a string : ")

stObj = PaliStr()
if stObj.chkPalindrome(st):
    print("Given string is a Palindrome")
else:
    print("Given string is not a Palindrome")

val = int(input("Enter a integer : "))

intObj = PaliInt()
if intObj.chkPalindrome(val):
    print("Given integer is a Palindrome")
else:
        print("Given integer is not a Palindrome")
```

Output

```
Enter a string : madam
Given string is a Palindrome
Enter a integer : 567587
Given integer is not a Palindrome


Enter a string : INDIA
Given string is not a Palindrome
Enter a integer : 6789876
Given integer is a Palindrome
```

EXPERIMENT -9

Aim: Demonstration of working with excel spreadsheets and web scraping

(a) Write a python program to download the all XKCD comics

Download XKCD comics

Python Code

```
import requests
import os
from bs4 import BeautifulSoup

# Set the URL of the first XKCD comic
url = 'https://xkcd.com/1/'

# Create a folder to store the comics
if not os.path.exists('xkcd_comics'):
    os.makedirs('xkcd_comics')

# Loop through all the comics
while True:
    # Download the page content
    res = requests.get(url)
    res.raise_for_status()

    # Parse the page content using BeautifulSoup
    soup = BeautifulSoup(res.text, 'html.parser')

    # Find the URL of the comic image
    comic_elem = soup.select('#comic img')
    if comic_elem == []:
        print('Could not find comic image.')
    else:
        comic_url = 'https:' + comic_elem[0].get('src')

        # Download the comic image
        print(f'Downloading {comic_url}...')
        res = requests.get(comic_url)
        res.raise_for_status()

        # Save the comic image to the xkcd_comics folder
        image_file = open(os.path.join('xkcd_comics', os.path.basename(comic_url)), 'wb')
        for chunk in res.iter_content(100000):
            image_file.write(chunk)
        image_file.close()

    # Get the URL of the previous comic
    prev_link = soup.select('a[rel="prev"]')[0]
    if not prev_link:
        break
    url = 'https://xkcd.com' + prev_link.get('href')


print('All comics downloaded.')
```

Output

```
Downloading https://imgs.xkcd.com/comics/barrel_cropped_(1).jpg...
Downloading https://imgs.xkcd.com/comics/radians_are_cursed.png...
Downloading https://imgs.xkcd.com/comics/presents_for_biologists.png...
Downloading https://imgs.xkcd.com/comics/launch_window.png...
Downloading https://imgs.xkcd.com/comics/obituary_editor.png...
Downloading https://imgs.xkcd.com/comics/fanservice.png...
Downloading https://imgs.xkcd.com/comics/hand_dryers.png...
```

(b) Demonstrate python program to read the data from the spreadsheet and write the data in to the spreadsheet

Spreadsheet Operations

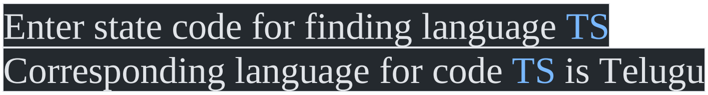
Python Code

```
from openpyxl import Workbook
from openpyxl.styles import Font

wb = Workbook()
sheet = wb.active
sheet.title = "Language"
wb.create_sheet(title = "Capital")

lang = ["Kannada", "Telugu", "Tamil"]
state = ["Karnataka", "Telangana", "Tamil Nadu"]
capital = ["Bengaluru", "Hyderabad", "Chennai"]
code =['KA', 'TS', 'TN']

sheet.cell(row = 1, column = 1).value = "State"
sheet.cell(row = 1, column = 2).value = "Language"
sheet.cell(row = 1, column = 3).value = "Code"


ft = Font(bold=True)
for row in sheet["A1:C1"]:
    for cell in row:
        cell.font = ft

for i in range(2,5):
    sheet.cell(row = i, column = 1).value = state[i-2]
    sheet.cell(row = i, column = 2).value = lang[i-2]
    sheet.cell(row = i, column = 3).value = code[i-2]

wb.save("demo.xlsx")
```

```
sheet = wb["Capital"]

sheet.cell(row = 1, column = 1).value = "State"
sheet.cell(row = 1, column = 2).value = "Capital"
sheet.cell(row = 1, column = 3).value = "Code"

ft = Font(bold=True)
for row in sheet["A1:C1"]:
    for cell in row:
        cell.font = ft

for i in range(2,5):
    sheet.cell(row = i, column = 1).value = state[i-2]
    sheet.cell(row = i, column = 2).value = capital[i-2]
    sheet.cell(row = i, column = 3).value = code[i-2]

wb.save("demo.xlsx")

srchCode = input("Enter state code for finding capital ")
for i in range(2,5):
    data = sheet.cell(row = i, column = 3).value
    if data == srchCode:
        print("Corresponding capital for code", srchCode, "is", sheet.cell(row = i, column = 2).value)


sheet = wb["Language"]

srchCode = input("Enter state code for finding language ")
for i in range(2,5):
    data = sheet.cell(row = i, column = 3).value
    if data == srchCode:
        print("Corresponding language for code", srchCode, "is", sheet.cell(row = i, column = 2).value)


wb.close()
```

Output

```
Enter state code for finding capital KA
Corresponding capital for code KA is Bengaluru
```



```
Enter state code for finding language TS
Corresponding language for code TS is Telugu
```

EXPERIMENT -10

Aim: Demonstration of working with PDF, word and JSON files

(a) Write a python program to combine select pages from many PDFs

Merge selected pages from Multiple PDFs to a new PDF

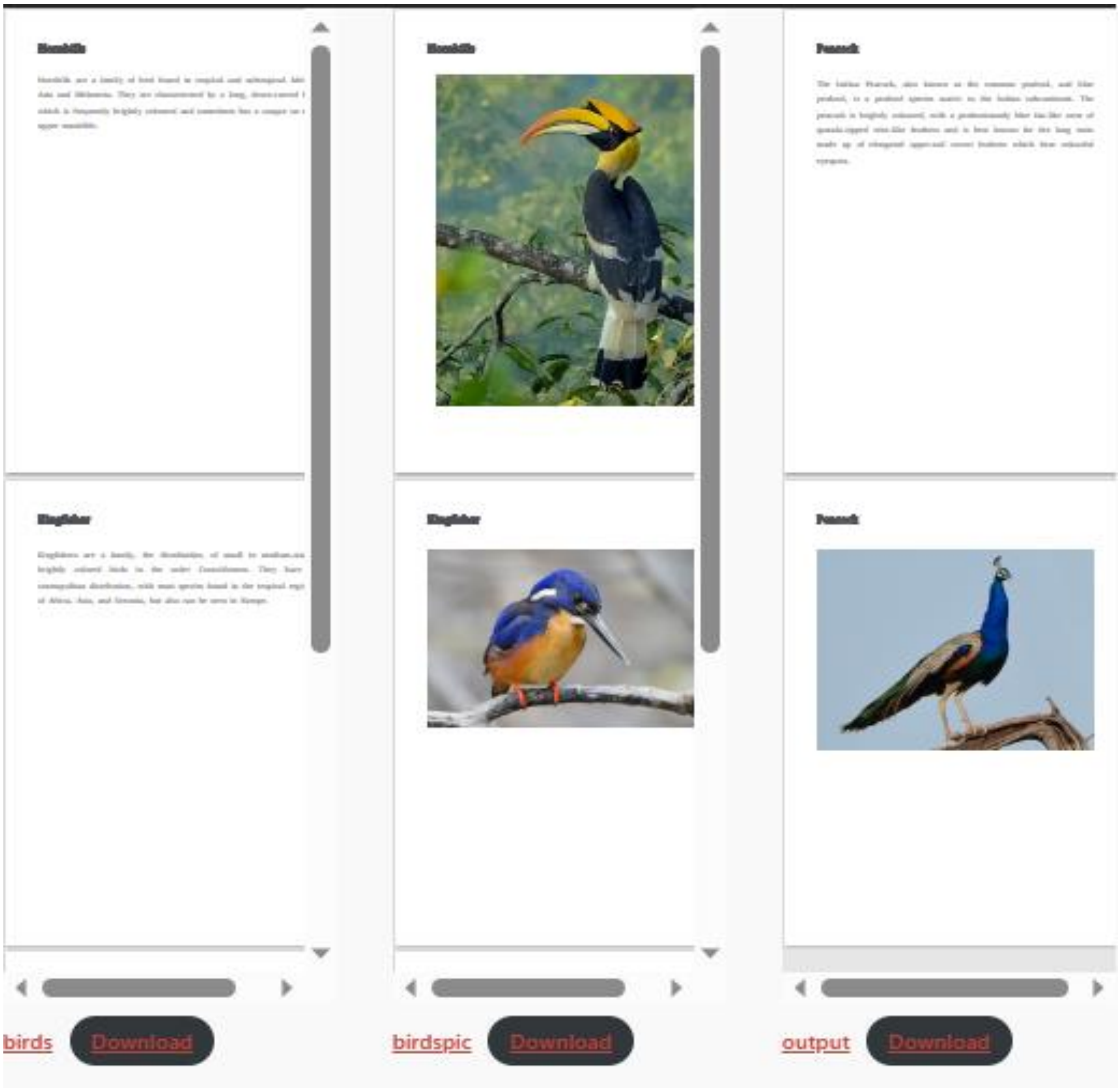
Python Code

```
from PyPDF2 import PdfWriter, PdfReader

num = int(input("Enter page number you want combine from multiple documents "))

pdf1 = open('birds.pdf', 'rb')
pdf2 = open('birdspic.pdf', 'rb')

pdf_writer = PdfWriter()

pdf1_reader = PdfReader(pdf1)
page = pdf1_reader.pages[num - 1]
pdf_writer.add_page(page)

pdf2_reader = PdfReader(pdf2)
page = pdf2_reader.pages[num - 1]
pdf_writer.add_page(page)

with open('output.pdf', 'wb') as output:
    pdf_writer.write(output)
```

Output

This program allows you to extract specific pages from two PDF files, “birds.pdf” and “birdspic.pdf,” by entering the page numbers as user input. Once you input the desired page numbers, the program fetches those pages from both PDF files and combines them into a new file called “output.pdf.” This way, you can easily compile the desired pages from multiple PDF files into one document for your convenience.

```
Enter page number you want combine from multiple documents 3
```



Hornbills

Hornbills are a family of bird found in tropical and subtropical Afri
Asia and Melanesia. They are characterized by a long, down-curved b
which is frequently brightly coloured and sometimes has a casque on t
upper mandible.

Kingfisher

Kingfishers are a family, the Alcedinidae, of small to medium-siz
brightly coloured birds in the order Coraciiformes. They have
cosmopolitan distribution, with most species found in the tropical regi
of Africa, Asia, and Oceania, but also can be seen in Europe.

Hornbills

Kingfisher

Peacock

The Indian Peacock, also known as the common peafowl, and blue peafowl, is a peafowl species native to the Indian subcontinent. The peacock is brightly coloured, with a predominantly blue fan-like crest of spatula-tipped wire-like feathers and is best known for the long train made up of elongated upper-tail covert feathers which bear colourful eyespots.

Peacock

(b) Write a python program to fetch current weather data from the JSON file

Fetch weather data from the JSON

Python Code

```
import json

# Load the JSON data from file
with open('weather_data.json') as f:
    data = json.load(f)

# Extract the required weather data
current_temp = data['main']['temp']
humidity = data['main']['humidity']
weather_desc = data['weather'][0]['description']

# Display the weather data
print(f"Current temperature: {current_temp}°C")
print(f"Humidity: {humidity}%")
print(f"Weather description: {weather_desc}")
```

JSON File

```
{
  "coord": {
    "lon": -73.99,
    "lat": 40.73
  },
  "weather": [
    {
      "id": 800,
      "main": "Clear",
      "description": "clear sky",
      "icon": "01d"
    }
  ],
  "base": "stations",
  "main": {
    "temp": 15.45,
    "feels_like": 12.74,
    "temp_min": 14.44,
    "temp_max": 16.11,
    "pressure": 1017,
    "humidity": 64
  },
  "visibility": 10000,
  "wind": {
    "speed": 4.63,
    "deg": 180
  },
  "clouds": {
    "all": 1
  },
  "dt": 1617979985,
  "sys": {
    "type": 1,
    "id": 5141,
    "country": "US",
    "sunrise": 1617951158,
    "sunset": 1618000213
  },
  "timezone": -14400,
  "id": 5128581,
  "name": "New York",
  "cod": 200
}
```

Output

```
Current temperature: 15.45°C
Humidity: 64%
Weather description: clear
```