National University of Computer and Emerging Sciences

Artificial Intelligence CS461

Laboratory Manual

Course Instructor

Lab Instructor(s)

Section

Semester Spring 2021

FAST School of Computing
Department of Software Engineering
FAST-NU, Lahore, Pakistan.

FAST NUCES, Lahore Campus
Faculty of Computer Sciences
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Course:	Artificial Intelligence	Date: 15-03-2021
Course Code:	CS 461	Max Marks: 100
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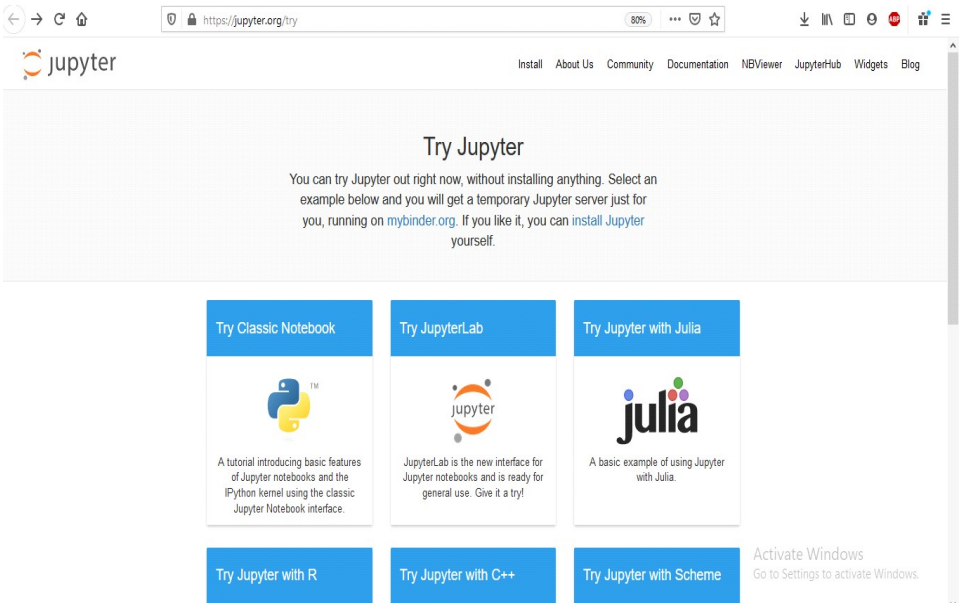
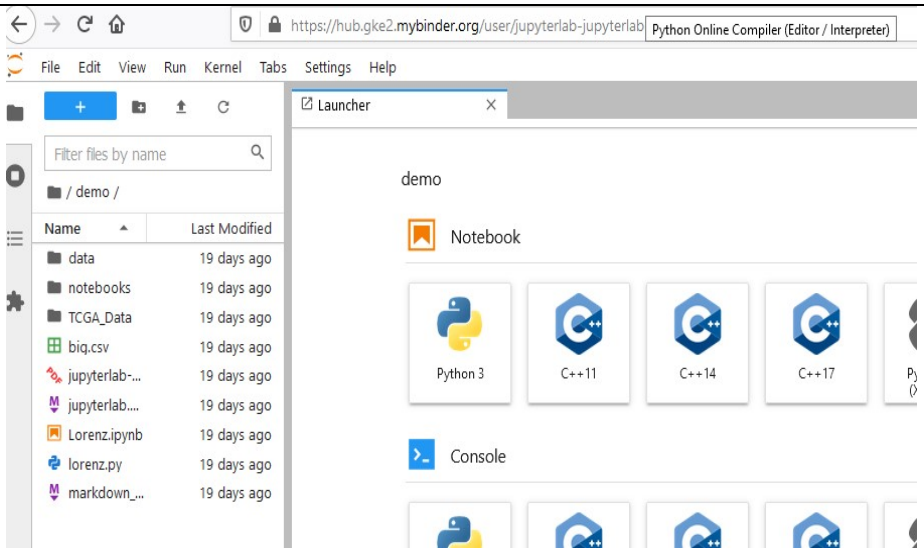
Objective(s) :

The Objectives of this lab are to understand the basics of Python , Core components variables, control statements, loops, and functions.

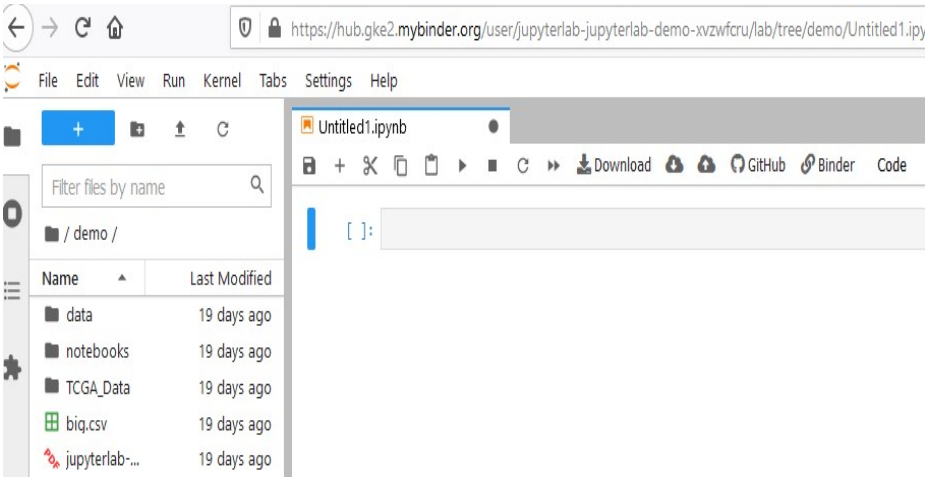
APPETIZERS: [GETTING STARTED]

In this task you are required to use the online Jupyter notebook to learn the basic building blocks of Python by creating and executing simple Python scripts.

A 1.1	Open the URL **https://jupyter.org/try** in your web browsers. You must reach the following webpage 
A 1.2:	Click on the **Try JupyterLab** link: and an environment will be created for you on an online system. You will see the following page.



In the **Notebook** section select the Python 3 option and you will reach the notebook editor page.



Use Save As option in the File Menu to save it using your Registration no as the file name (Name Format: LXXYYYY.ipynb

A ipython notebook consists of multiple cells each having a python script/code that can be executed

A 1.3	Python has four primitive datatypes int, float, Boolean and string. We can use the print function to display messages on the output window.

Variables and OUTPUT

Following script creates four variables of the primitive types.
Enter the code in your notebooks as shown below and then run the code in each cell in order.

```
[ ]: print('Hello World')
```

```
[ ]: print('Python premitive data types')
     i = 4
     f = 4.25
     b = True
     s = 'This\' "is" a string!'
     type(i)
     print()
     type(f)
```

```
[ ]: print(i)
     print(f)
     print(b)
     print(s)
```

```
[ ]: if i == 1 and f > 4:
         print ("The value of i is 1 and f is greater than 4.")
     elif i > 4 and f > 4:
         print ("i or f are both greater than 4.")
     else:
         print ("both i and f are less than or equal to 4")
```

Note

Python uses Tab/Space to indicate a block of statements and unlike C++ {} are not used. Read more about it online. You must be able to see how important the proper indentation is in this language.

A 1.4	Finally copy the following Python script and paste it in the last cell of your script. Try using different values of the variable **how_many_snakes** how_many_snakes = 2 snake_string = """ Welcome to Python3! ____ / . .\\ \ ---< \ / __________/ / -=:___________/ <3, Python """ print(snake_string * how_many_snakes) **WHAT OUTPUT IS PRODUCED By THE SCRIPT IN EACH CELL** **Save your notebook and download it. Submit the script along with the output on the classroom.**

Raw Inputs

A 2.1	Create the following scripts in your notebook run these scripts and submit the script along with the output on google classroom

.

[ ]:
```
Name = input("Enter your name")
Greatings = 'Stay Home Stay Safe ' + ' ' + Name
print(Greatings)
```

[ ]:
```
T_F_str = input('Enter Fahrenheit Temperature:')
T_F = float(T_F_str)
T_C = (T_F - 32.0) * 5.0 / 9.0
print (T_C)
```

[ ]:
```
try:
    T_F_str = input('Enter Fahrenheit Temperature:')
    T_F = float(T_F_str)
    T_C = (T_F - 32.0) * 5.0 / 9.0
    print (T_C)
except:
    print ('Only numeric input please')
```

[ ]:
```
import math
degrees = float(input('Enter Angle in Degrees:'))
radians = degrees / 360.0 * 2 * math.pi
print(radians)
print(math.sin(radians))
```

Python provides the following operators

Arithmetic operators:	
Operator	**Meaning**
+, -, *, /	**Adding, subtracting, multiplying, and dividing two numeric values**
**	**Exponentiation/power**
//, %	**Integer Division and remainder**
More Operators	
Comparison	==, !=, <, <=, >, >=
Logical	**and , or, not**
Bitwise	&, |, ^, ~, <<, >>

Basic Loops in Python

A 3.1	Create the following scripts in your notebook run these scripts and submit the script along with the output on google classroom
for loop and while loop	

```
[ ]: for Counter in range(5):
         print(Counter)
```

```
[ ]: for Counter in range(5, 10):
         print(Counter)
```

```
[ ]: for Counter in range(5, 20, 3):
         print(Counter)
```

```
[ ]: for Counter in range(10, 0, -2):
         print(Counter)
```

```
[ ]: counter = 7
     while counter >= 0:
         print(counter)
         counter-= 2
     print('Got it?')
```

Creating Function: Create the following function and call it using the script given in the second cell. Submit the notebook along with the output on Google Classroom

A 3.1

```
[ ]: def IP(N):
         if (N < 2) or (N > 2 and N % 2 == 0):
             return False

         for D in range(3,N - 1):
             if N % D == 0:
                 return False
         return True
```

```
[ ]: for n in range(2, 50):
         if IP(n) == True:
             print(n)
```

Program Writing

P 1.1 [30]

Exercise 1: Write a function that returns **True** if the numeric parameter is a palindrome and **False** otherwise

Input: x = 121 Output: true

Exercise 2: Print the following pattern using for loop

- *5 4 3 2 1*
- *4 3 2 1*
- *3 2 1*
- *2 1*
- *1*

Exercise 3: Write a loop to find the factorial of any number

- *Input : 5*
- *5 x 4 x 3 x 2 x 1 = 120*
- *Output: 120*

P 1.2 [70]

Exercise 1: Print First 10 natural numbers using while loop

Expected output:
0 1 2 3 4 5 6 7 8 9 10

Exercise 2: Given a list, iterate it, and display numbers divisible by five, and if you find a number greater than 150, stop the loop iteration

list1 = [12, 15, 32, 42, 55, 75, 122, 132, 150, 180, 200]

Expected output:
15
55
75
150

Exercise 3: Reverse the following list using for loop

- *list1 = [10, 20, 30, 40, 50]*
- *Expected Output = [50, 40, 30, 20, 10]*

Exercise 4: Write a program to display all prime numbers within a range

start = 25 end = 50

Expected Output:
- *29*
- *31*
- *37*
- *41*
- *43*
- *47*

Exercise 5: Reverse a given integer number

- *Input : 53469*
- *Output : 96435*

Exercise 6: Use a loop to display elements from a given list that are present at even index positions

- *my_list = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100]*
- *Output: 20, 40, 60, 80, 100*

Submit your notebook along with the output on google classroom

Use one cell per Exercise