

4CS001 – Introductory Programming & Problem Solving Workshop 2

Name: Nista Shrestha

Group: L4CG5

Student ID: NP03CS4S230123

Week: Two(2)

Tutor: Sujan Aryal

Workshop 2 Questions *(Please refer to guidelines)*

PART 1 *(Just write answers to below questions)*

1. What is the intuition behind assigning a value to a variable in python?

Answer: The intuition behind assigning a value to a variable in python is if you do not assign a value to a variable, either by an argument passed to the routine or by a LET statement, the variable has an undefined value, an undefined value is different from a NULL value. If you attempt to use a variable with an undefined value within the SPL routine, you receive an error.

2. What are some common data types in Python, and when would you use each one?

Ans: Some common data types in python are:

Numeric data types: **int**, **float**, **complex** which are used to define numeric variables holding whole numbers, to convert real numbers or integers into floating point numbers, returns a complex number by specifying a real number and an imaginary number.

string data types: **str** which is used to convert an object to a string version of the given object or number. etc

3. Discuss the differences between mutable and immutable data types and give an example of each

Ans: The difference between mutable and immutable data types is that mutable objects can be changed to any value or state without adding a new object. whereas immutable data cannot be changed after it is created. Examples of mutable data types are List, Set, Dictionary whereas the examples of immutable data types are tuples, int, float, bool, frozenset.

4. Python is a dynamically typed language. What does this statement mean?

Ans: Python is a dynamically typed language. This statement means that the python interpreter does type checking only as code runs, and the type of a variable is allowed to change over its lifetime. It is the type of variable that is determined only during runtime.

PART 2

Note: After writing code just take screenshot of code and output and paste below every questions.

1. Evaluate the following Boolean expressions in **IDLE**:

Note down the response to each. Do they differ from what you would expect?

A. *True and True*

Source Code:

```
Python 3.7.5 (tags/v3.7.5:5c02a39a0b, Oct 15 2019, 10:11:32) [AMD64] on win32
Type "help", "copyright", "credits" or "license()"
>>> true and true
Traceback (most recent call last):
  File "<pyshell#0>", line 1, in <module>
    true and true
NameError: name 'true' is not defined
>>> True and True
True
>>> |
```

Output:

B. *True and False or True*

C. *False or False and True*

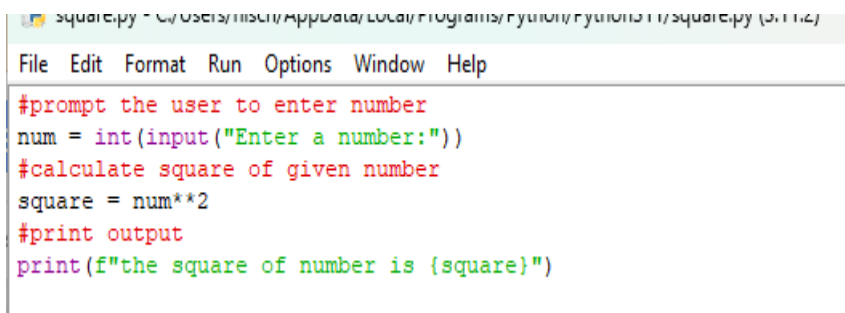
D. *False or 0*

E. *not (False) and True*

F. *not (True or not (False and False))*

2. Write a python program to prompt the user for input number and print square of that integer.

ANS:



```
square.py - C:\Users\mishr\AppData\Local\Programs\Python\Python37-1\square.py (3.7.1.2)
File Edit Format Run Options Window Help
#prompt the user to enter number
num = int(input("Enter a number:"))
#calculate square of given number
square = num**2
#print output
print(f"the square of number is {square}")
```

OUTPUT:

```
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>
=== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/square.py ==
Enter a number:9
the square of number is 81
>>
=== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/square.py ==
Enter a number:10
the square of number is 100
>>
```

3. Write a python program to calculate a simple interest rate.

ANS:

```
si.py - C:/Users/nisch/AppData/Local/Programs/Python/Python311/si.py...
File Edit Format Run Options Window Help
#Prompt the user to define the variables
print("Enter the value of principal amount: ")
p = int(input())
print("Enter the value of interest (%): ")
r = int(input())
print("Enter the value of time period: ")
t = float(input())
#calculate the given values
SI = (p*r*t)/100
#print the output
print(f"simple interest rate amount is {SI}")
```

output:

```
IDLE Shell 3.11.2
File Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/si.py =====
Enter the value of principal amount:
50000
Enter the value of interest (%):
16
Enter the value of time period:
3
simple interest rate amount is 24000.0
>>> |
```

4. Write a python program to input first name, last name, and address. Print them.

Ans:

```
names.py - C:/Users/nisch/AppData/Local/Programs/Python/Python311/names.py (3.11.2)
File Edit Format Run Options Window Help
#prompt the user to enter firstname, lastname and address
fname = input("Enter the first name:")
lname = input("Enter the last name:")
add = input("Enter the address:")
# print the output
print ("%s%d%d"%(fname,lname,add))
|
```

output:

```
*IDLE Shell 3.11.2*
File Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>
===== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/si.py =====
Enter the value of principal amount:
50000
Enter the value of interest (%):
16
Enter the value of time period:
3
simple interest rate amount is 24000.0
>
=== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/names.py ===
Enter the first name
=== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/names.py ===
Enter the first name:Nistha
Enter the last name:Shrestha
Enter the address:mhepi
```

5. Write a python program to ask in kilograms and convert into grams

Ans:

```
kg.py - C:/Users/nisch/AppData/Local/Programs/Python/Python311/kg.py (3.11.2)
File Edit Format Run Options Window Help
#prompt the user to enter the weight in kilogram
x = int(input("Enter the weight in kilogram:"))
#convert the kg into grams
grams = x*1000
#print the output
print("weight in grams is:",grams)
```

output:

```
IDLE Shell 3.11.2
File Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/kg.py =====
Enter the weight in kilogram:55
weight in grams is: 55000
>>>
```

6. Write a python program to display the area of the triangle, (take user input)

Ans:

```
area.py - C:/Users/nisch/AppData/Local/Programs/Python/Python311/area.py (3.11.2)
File Edit Format Run Options Window Help
#prompt the user to enter height and base
base = int(input("Enter the base:"))
height = int(input("Enter the height:"))
#using formula to calculate area of triangle
area = 1/2*base*height
#print output
print("Area of triangle is:",area)
```

Output:

```
Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

==== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/area.py ====
Enter the base:5
Enter the height:7
Area of triangle is: 17.5
|
```

7. Write a python program to prompt user to input their name and print like *"Hello <<NAME>>"*

Ans:

```
nnn.py - C:/Users/nisch/AppData/Local/Programs/Pytl
File Edit Format Run Options Window Help
#prompt user to enter name
name = input("Enter name:")
#print output
print("hello",name)
|
```

output:

```
File Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>
==== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/nnn.py ====
Enter name:nistha
hello nistha
>>
```

PART 3

1. Write a python program to find the remainder of a given number if divisor is 2.

Ans:

```
reminder.py - C:/Users/nisch/AppData/Local/Programs/Python/Python
File Edit Format Run Options Window Help
#prompt the user to divisor and dividend
divisor = 2
dividend = float(input("Enter the dividend:"))
#calculation
remainder = dividend%divisor
#print output
print("the remainder is:",remainder)
|
```

output:

```
IDLE Shell 3.11.2
File Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>
== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/reminder.py ==
Enter the dividend:69
the remainder is: 1.0
>>
|
```

2. Write a python program to calculate BMI of a person when all parameters are provided. **BMI= weight(kg)/height(m²)**

Simple Logic

- Asks to input the user's weight in kilograms.
- Asks to input the user's height in centimeters.
- Calculates the BMI (Body Mass Index).

[BMI=weight in kilograms / square of height in centimeters]

Prints the user's BMI.

Ans:

```
bmi.py - C:/Users/nisch/AppData/Local/Programs/Python/Python311/bmi.py
File Edit Format Run Options Window Help
#prompt the user to enter weight in kilogram
x = int(input("Enter the weight in kilogram:"))
#prompt the user to height in centimeter
h = int(input("Enter the height in centimeter:"))
#using formula
BMI = x*h/10000
#print output
print("the BMI of a person is:",BMI)
```

output:

```
File Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
==== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/bmi.py ====
Enter the weight in kilogram:56
Enter the height in centimeter:6
the BMI of a person is: 0.0336
>>>
```

3. A costumer walks in a flower shop and finds the following menu:

Particulars	White Roses	Lilies	Poppies	Marigold	Red Roses
Per piece	50	50	40	20	100
Per bouquet	300	300	250	200	1000

If the user bought a bouquet of lilies and four red roses, find the total money the user spent in the flower shop.

Ans:

```

File Edit Format Run Options Window Help
#user bought a banquet of lilies
lilies = 300
#user bought four roses
roses = 100
#calculation
totalprice = lilies+4*roses
#print output
print("the total price is ",totalprice)

```

output:

```

: Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>
=== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/flower.py ==
the total price is 700
>

```

4. Write a python program to display the total surface area of the hemisphere.

Ans:

```

TSA.py - C:/Users/nisch/AppData/Local/Programs/Python/Python311/TSA.py (3.11.2)
File Edit Format Run Options Window Help
#prompt the user to enter the value of radius of hemisphere
r = int(input("Enter the value of radius:"))
#using the formula
TSA = 2*3.14*r
#print output
print("Total surface area is",TSA)

```

Output:

```
IDLE Shell 3.11.2
Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

==== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/TSA.py ====
Enter the value of radius:8
Total surface area is 50.24
|
```

5. Write a program to find the cube root of a number. Prompt the user to input a number and print the cube root of the number.

Ans:

```
cube.py - C:/Users/nisch/AppData/Local/Programs/Python/Python3
File Edit Format Run Options Window Help
#prompt the user to enter any number
num = int(input("Enter any number:"))
#calculation
cube = num*num*num
#print the output
print("The cube root of this number is",cube)
```

output:

```
IDLE Shell 3.11.2
Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

==== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/cube.py ====
Enter any number:7
The cube root of this number is 343
```

6. Suppose you are a teacher, and you want to create a program that takes in grades from three exams and calculates the average grade for a student. (Print out the average.)

Ans:

output:

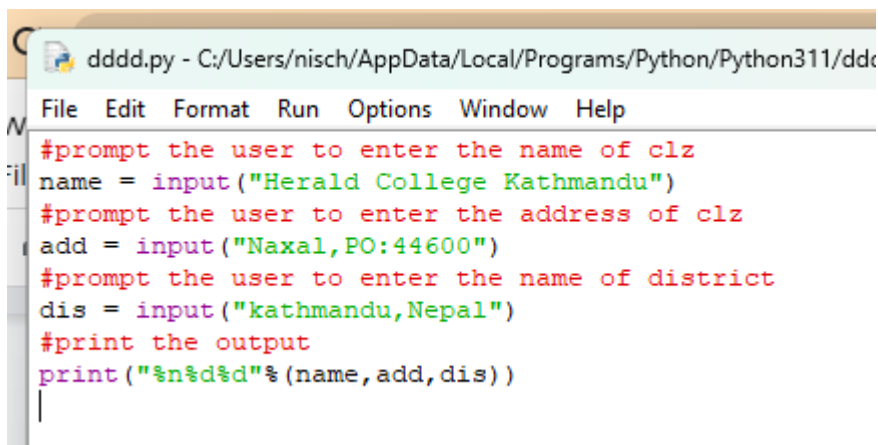
7. Suppose there are 20 students in a class and 8 of them are left-handed. What is the probability of randomly selecting a left-handed student from the class?
8. Write a python program to print this address as it is.

Herald College Kathmandu,

Naxal, PO:44600

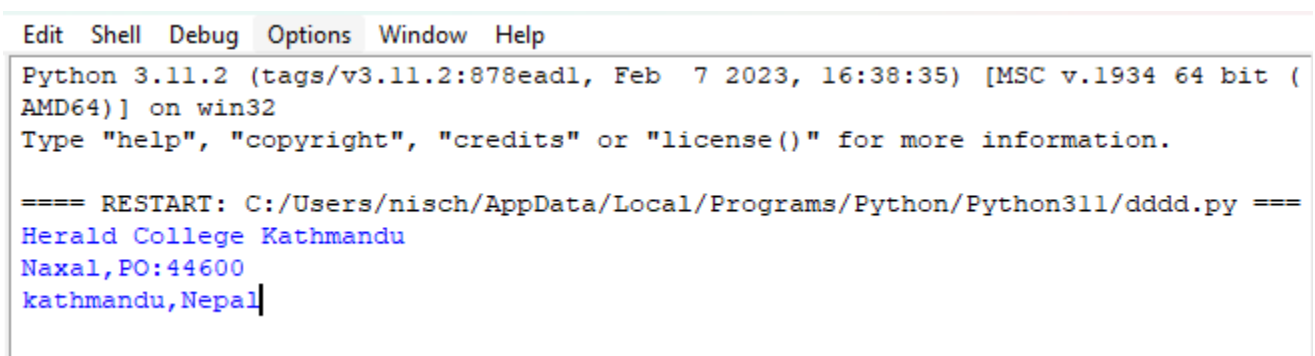
Kathmandu, Nepal

Ans:



```
dddd.py - C:/Users/nisch/AppData/Local/Programs/Python/Python311/ddd
File Edit Format Run Options Window Help
#prompt the user to enter the name of clz
name = input("Herald College Kathmandu")
#prompt the user to enter the address of clz
add = input("Naxal,PO:44600")
#prompt the user to enter the name of district
dis = input("kathmandu,Nepal")
#print the output
print ("%n%d%d"% (name, add, dis))
```

output:



```
Edit Shell Debug Options Window Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

==== RESTART: C:/Users/nisch/AppData/Local/Programs/Python/Python311/dddd.py ====
Herald College Kathmandu
Naxal,PO:44600
kathmandu,Nepal|
```

PART 4 (Home Task – Case Study Based)

1. You're waiting at a station and the announcer has just broadcast that your train is going to be 13445 seconds late. You need to work out in understandable terms what that means. You assume this is going to be quite a long time so you whip out your laptop to write a program to convert the seconds into hours, minutes, and seconds, aiming to maximize readability by giving priority to the largest units, i.e. the resulting seconds and minutes values must not be greater than 60.

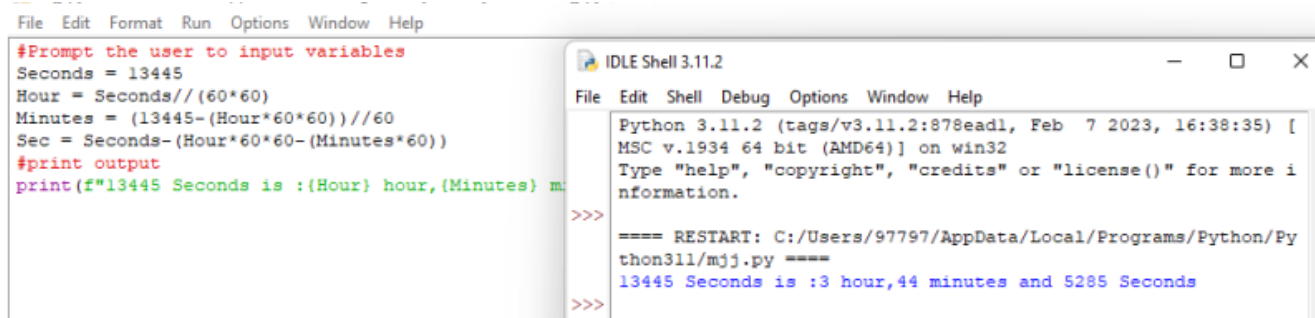
You will need four variables to hold:

- the total number of seconds.
- the number of hours; the number of minutes.
- and the number of remaining seconds.

The example output should look something like this:

13442 Seconds is: 3 Hours, 44 Minutes, and 5 Seconds

Ans:



The screenshot shows a Python IDE with two windows. The left window displays the source code for a program that converts 13445 seconds into hours, minutes, and seconds. The right window shows the output of the program, which is '13445 Seconds is :3 hour,44 minutes and 5285 Seconds'.

```
File Edit Format Run Options Window Help
#Prompt the user to input variables
Seconds = 13445
Hour = Seconds//(60*60)
Minutes = (13445-(Hour*60*60))//60
Sec = Seconds-(Hour*60*60-(Minutes*60))
#print output
print(f"13445 Seconds is :{Hour} hour,{Minutes} m
```

```
IDLE Shell 3.11.2
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [
MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more i
nformation.
>>>
==== RESTART: C:/Users/97797/AppData/Local/Programs/Python/Py
thon311/mjj.py ====
13445 Seconds is :3 hour,44 minutes and 5285 Seconds
>>>
```