Python Introduction Lab
Assignment 1

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CSE-3

Q1. Create a program that asks the user to enter their name and their age. Print out a

message addressed to them that tells them the year that they will turn 100 years old.

Extras:

1. Add on to the previous program by asking the user for another number and printing out that many copies of the previous message.

2. Print out that many copies of the previous message on separate lines. (Hint:

the string "\n is the same as pressing the ENTER button)

Pseudocode:

1. Read input name, age.
2. year100 = 2021 + age
3. Print name and year100

Program:

```
In [1]: name = input("Enter your name: ")
        age = int( input("Enter your age: ") )

        bday100 =  2021 - age + 100

        print(f"Hi {name}, you will turn 100 years old in the year {bday100}.")
```

Extra 1:

In [2]:
```
#EXTRA 1
n = int(input("How many times do you want the output to be displayed? "))

name = input("Enter your name: ")
age = int( input("Enter your age: ") )
bday100 =  2021 - age + 100

for i in range(n):
    print(f"Hi {name}, you will turn 100 years old in the year {bday100}.")
```

Extra 2: (extra 1 was already getting printed in new line)

In [3]:
```
#EXTRA 2
n = int(input("How many times do you want the output to be displayed? "))

name = input("Enter your name: ")
age = int( input("Enter your age: ") )
bday100 =  2021 - age + 100

for i in range(n):
    print(f"Hi {name}, you will turn 100 years old in the year {bday100}." + "\n
```

Output:

```
Enter your name: Harpreet Singh
Enter your age: 22
Hi Harpreet Singh, you will turn 100 years old in the year 2099.
```

Extra 1:

```
How many times do you want the output to be displayed? 6
Enter your name: Harpreet Singh
Enter your age: 22
Hi Harpreet Singh, you will turn 100 years old in the year 2099.
Hi Harpreet Singh, you will turn 100 years old in the year 2099.
Hi Harpreet Singh, you will turn 100 years old in the year 2099.
Hi Harpreet Singh, you will turn 100 years old in the year 2099.
Hi Harpreet Singh, you will turn 100 years old in the year 2099.
Hi Harpreet Singh, you will turn 100 years old in the year 2099.
```

Extra 2: (extra 1 was already getting printed in new line)

```
How many times do you want the output to be displayed? 3
Enter your name: Harpreet Singh
Enter your age: 22
Hi Harpreet Singh, you will turn 100 years old in the year 2099.

Hi Harpreet Singh, you will turn 100 years old in the year 2099.

Hi Harpreet Singh, you will turn 100 years old in the year 2099.
```

GITHUB LINK:

https://github.com/harpreeths/ML-Assignment/blob/main/ML%20Assignment.ipynb

Q2. Take a list, say for example this one:

a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]

and write a program that prints out all the elements of the list that are less than 5.

Extras:

1. Instead of printing the elements one by one, make a new list that has all the

elements less than 5 from this list in it and print out this new list.

2. Write this in one line of Python.
3. Ask the user for a number and return a list that contains only elements from the original list a that are smaller than that number given by the user.

Pseudocode:

1. a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]
2. for loop on a
   2.1 if i < 5 #i is an element of a for a particular iteration
   2.2 then print i

Program:

In [4]:
```
a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]

for i in a:
    if i < 5:
        print(i)
```

Extra 1:

In [5]:
```
a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]
new = []
for i in a:
    if i < 5:
        new.append(i)
print(new)
```

Extra 2:

In [6]:
```
#EXTRA 2
print( [x for x in a if x < 5] )  # One liner
```

Extra 3:

```
In [7]: # EXTRA 3
a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]
n = int(input("Enter number: "))
new = []
for i in a:
    if i < n:
        new.append(i)
print(new)
```

Outputs:

```
1
1
2
3
```

Extra 1:

```
[1, 1, 2, 3]
```

Extra 2:

```
[1, 1, 2, 3]
```

Extra 3:

```
Enter number: 21
[1, 1, 2, 3, 5, 8, 13]
```

GITHUB LINK:

https://github.com/harpreeths/ML-Assignment/blob/main/ML%20Assignment.ipynb

Q3. Write a program that asks the user how many Fibonacci numbers to generate and

then generates them. Take this opportunity to think about how you can use functions.

Make sure to ask the user to enter the number of numbers in the sequence to

generate. {Hint: The Fibonacci sequence is a sequence of numbers where the next number in the sequence is the sum of the previous two numbers in the sequence. The sequence

looks like this: 1, 1, 2, 3, 5, 8, 13, ...}

Pseudocode:

1. function Fibonacci(n):
   1.1 if n <= 1
   1.2 then return n
   1.3 else return (Fibonacci(n-1) + Fibonacci(n-2)) 2. read input n
3. for 0 to n:
   3.1 print Fibonacci(i) #i is any number from 0 to n

Program:

In [8]:
```
def fibonacci(n):
    if n <= 1:
        return n
    else:
        return(fibonacci(n-1) + fibonacci(n-2))

n = int(input("Enter nth term till which you want the fibonacci series: "))

print("Fibonacci sequence:")
for i in range(n):
    print(fibonacci(i))
```

Output:

```
Enter nth term till which you want the fibonacci series: 11
Fibonacci sequence:
0
1
1
2
3
5
8
13
21
34
55
```

GITHUB LINK:

https://github.com/harpreeths/ML-Assignment/blob/main/ML%20Assignment.ipynb

Q4. Write a program (function!) that takes a list and returns a new list that contains all the elements of the first list minus all the duplicates.

Extras:

● Write two different functions to do this - one using a loop and constructing a list, and another using sets.

Pseudocode:

1. function no duplicates(li):
1.1 new = []
1.2 for loop on the li:
1.2.1 if i not in new # i is any element in li
1.2.2 add i to new
1.3 return new

2. a = no duplicates(li)
3. print a

Program:

In [9]:
```
def no_duplicates(li):
    new = []

    for i in li:
        if i not in new:
            new.append(i)
    return new

a = no_duplicates( [1,1,2,3, 4, 4, 5, 5,5] )
print(a)
```

Extra:

```
In [10]: #EXTRA
         def no_duplicates(li):
             return list(set(li))

         print( no_duplicates([1,1,2,3, 4, 4, 5, 5,5]) )
```

Output:

```
[1, 2, 3, 4, 5]
```

Extra:

```
[1, 2, 3, 4, 5]
```

GITHUB LINK:

https://github.com/harpreeths/ML-Assignment/blob/main/ML%20Assignment.ipynb

Q5. Ask the user for a number and determine whether the number is prime or not. (For those who have forgotten, a prime number is a number that has no divisors.). Use functions Pseudocode:

1. function prime_num(n):
   - 1.1 if n <= 1
   - 1.2 then return “not prime”
   - 1.3 else
     - 1.3.1 for 2 to n/2 :
       - 1.3.1.1 if n % i == 0
       - 1.3.1.2 then return “not prime”
     - 1.3.2 else return “prime”

Program:

```
In [11]: def prime_num(n):
             if n <= 1:
                 return "Not prime"
             else:

                 for i in range(2, n//2):
                     if n % i == 0:
                         return "Not prime"
                 else:
                     return "Prime"

         n = int( input("Enter a number: ") )
         print( prime_num(n) )
```

Output:

```
Enter a number: 47
Prime
```

GITHUB LINK:

https://github.com/harpreeths/ML-Assignment/blob/main/ML%20Assignment.ipynb