

The logo is a circular emblem. The outer ring is yellow with a repeating pattern of small, stylized floral or geometric motifs. Inside this is a blue ring containing the text 'GURU BAHADUR INSTITUTE OF TECHNOLOGY' in white, uppercase letters. At the bottom of the blue ring, the word 'DELHI' is written in white, flanked by two small white stars. The center of the logo is white and features a faint, stylized illustration of a building or structure.

MACHINE LEARNING ASSIGNMENT

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Github link for code :

https://github.com/gurkiratsingh-1/ML_Assignment_Gurkirat

Question 1: 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

- Take number and age as input
- Take a variable of current year
- Add value of current year with difference of 100 and current age

Program Screenshot

```
In [1]: #Question 1

from datetime import date
name=input("Enter your name: ")
age=int(input("Enter your age: "))
num=int(input("Enter the Number of times you want to print Message: "))
age_hun=(date.today().year) + (100-age)
print("Hey! "+name+ ", you will be of 100 years in "+ str(age_hun) + "\n")
print("Printing Message for "+ str(num) +" times \n")
for i in range(num):
    print("Hey! "+name+ ", you will be of 100 years in "+ str(age_hun) + "\n")
```

Output:

```
Enter your name: Gurkirat Singh
Enter your age: 22
Enter the Number of times you want to print Message: 2
Hey! Gurkirat Singh, you will be of 100 years in 2099

Printing Message for 2 times

Hey! Gurkirat Singh, you will be of 100 years in 2099

Hey! Gurkirat Singh, you will be of 100 years in 2099
```

Question 2 : 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 that are smaller than that number given by the user.

Pseudocode

- Normal Code
 - Run a for loop
 - Compare each element with 5
 - If less than 5, print
 - Else iterate to next element
- Creating a new list
 - In an empty list run for loop on original list
 - If element is less than 5, add it to list
 - Else iterate to next element

Program Screenshot

```
In [2]: #Question 2

def small_list(list):
    # Printing Elements Less than 5
    new_list = []
    for i in list:
        if i<5:
            #Appending in List
            new_list.append(i)
    print("New List is: {}".format(new_list))

    #Appending in one line
    list_new = [x for x in list if x<5]
    print("New List in one line is: {}".format(list_new))

    #Asking user choice number
    num = int(input("Enter the number to find element smaller than the number: "))
    list_f = [x for x in list if x<num]
    print("Elements smaller than {} are: {}".format(num, list_f))

list = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]
small_list(list)
```

Output

```
New List is: [1, 1, 2, 3]
New List in one line is: [1, 1, 2, 3]
Enter the number to find element smaller than the number: 31
Elements smaller than 31 are: [1, 1, 2, 3, 5, 8, 13, 21]
```

Question 3: 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

- Take number as input
- Initialize two variables for first and second term
- Print Second term
- Run a for loop from 1 to number
- Take sum of first and second number
- Set first number = second
- Set second number = sum
- Print sum

Program Screenshot

```
In [4]: #Question 3
def recur_fibo(n):
    if n <= 1:
        return n
    else:
        return(recur_fibo(n-1) + recur_fibo(n-2))

nterms = int(input("Enter the number of Fibonacci Elements needed: "))

# check if the number of terms is valid
if nterms <= 0:
    print("Plese enter a positive integer")
else:
    print("Fibonacci sequence: ", end = " ")
    for i in range(nterms):
        print(recur_fibo(i), end = " ")
```

Output

```
Enter the number of Fibonacci Elements needed: 12
Fibonacci sequence: 0 1 1 2 3 5 8 13 21 34 55 89
```

Question 4 : 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

- Using Loops
 - Create a new list
 - Run a for loop for all elements
 - Add element to new list if it isn't present
 - Else don't add element and iterate to next

- Using sets
 - Typecast the list to set

Program Screenshot

```
In [8]: #Question 4
def list_for(lists):
    for_list = []
    for l in lists:
        if l not in for_list:
            for_list.append(l)
    for x in for_list:
        print(x, end=" ")
del list
def using_set(lists):
    test_list = list(set(lists))
    for x in test_list:
        print(x, end=" ")

lists = [1, 1, 2, 3, 5, 8, 36, 13, 21, 34, 55, 89, 21, 89, 27, 36]
print("List using for loop: ", end=" ")
list_for(lists)
print("\nList using Sets: ", end=" ")
using_set(lists)
```

Output

```
List using for loop:  1 2 3 5 8 36 13 21 34 55 89 27
List using Sets:  1 2 3 36 5 34 8 13 21 55 89 27
```

Question 5 : 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

- Input a number
- Set flag = 1
- Run a loop from 2 to square root of number
- If number is divisible in loop, set flag = 0 and exit the loop

- Else continue
- If flag is 1, number is prime
- Else number is not prime

Program Screenshot

```
In [11]: #Question 5
def check_prime():
    num = int(input("Enter Number of your choice: "))
    flag = 1
    for i in range(2, int(num/2)):
        if(num%i == 0):
            flag = 0
            break
    if(flag==0):
        print("Entered number is not Prime")
    else:
        print("Entered number is Prime")

print("Case 1:")
check_prime()
print("\n Case 2:")
check_prime()
```

Output

```
Case 1:
Enter Number of your choice: 23
Entered number is Prime
```

```
Case 2:
Enter Number of your choice: 57
Entered number is not Prime
```