Task List for Basic Python Programs

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Github Link: https://github.com/aamir-786/AI_Practical_Lab.git

1. Input/Output and Variables

2. Conditional Statements

5. Write a program to check whether a number is **even or odd**.
6. Write a program to find the **largest of three numbers**.
7. Write a program to check whether a year is a **leap year**.
8. Write a program to classify a person's age:
    - Age < 13 → Child
    - 13 <= Age < 20 → Teenager
    - Age >= 20 → Adult

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3. Loops

9. Write a program to print the first **10 natural numbers**.
10. Write a program to calculate the **sum of numbers from 1 to n**, where `n` is entered by the user.
11. Write a program to display the **multiplication table** of a number entered by the user.
12. Write a program to count the number of **vowels** in a string.
13. Write a program to print all **prime numbers between 1 and 50**.
14. Write a program to calculate the **factorial** of a given number.

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4. Lists

15. Write a program to take 5 numbers as input from the user, store them in a list, and display the list.
16. Write a program to calculate the **sum** and **average** of elements in a list.
17. Write a program to find the **largest** and **smallest** elements in a list.
18. Write a program to **reverse** a list.
19. Write a program to count how many times a specific number appears in a list.
20. Write a program to sort a list in **ascending order**.

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5. Strings

21. Write a program to input a string and print its **length**.
22. Write a program to reverse a string without using slicing.
23. Write a program to check if a string is a **palindrome**.

24. Write a program to count the number of **words, vowels, and consonants** in a string.
25. Write a program to replace all spaces in a string with an underscore (_).

Functions in Python

A function in Python is a block of reusable code that performs a specific task. Functions help to make code more modular, readable, and maintainable.

Types of Functions in Python
Built-in Functions – Predefined functions like print(), len(), max(), sum(), etc.
User-defined Functions – Functions created by users to perform specific tasks.
Defining a Function
In Python, we define a function using the def keyword.

Syntax:

```
def function_name(parameters):
    """Docstring (optional)"""
    # Function body
    return value  # (optional)
```

Examples of Functions in Python
1. Function Without Parameters

```
def greet():
    print("Hello, welcome to Python!")

greet()  # Calling the function
```

2. Function With Parameters

```
def add(a, b):
    return a + b

result = add(5, 3)
print("Sum:", result)  # Output: Sum: 8
```

3. Function With Default Parameters

```
def greet(name="User"):
    print(f"Hello, {name}!")

greet()        # Output: Hello, User!
greet("Alice")  # Output: Hello, Alice!
```

4. Function With Return Value

```
def square(num):
return num * num
result = square(4)

print("Square:", result) # Output: Square: 16
```

6. Functions

26. Write a function to calculate the **square** of a number.
27. Write a function to check if a number is **even or odd**.
28. Write a function to calculate the **factorial** of a number.
29. Write a function to check if a string is a palindrome.
30. Write a function to find the maximum of three numbers.

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7. Dictionaries

31. Write a program to create a dictionary of 5 students with their marks and display it.
32. Write a program to update the marks of a specific student in the dictionary.
33. Write a program to find the student with the **highest marks**.
34. Write a program to count the number of occurrences of each word in a given string.

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9. Miscellaneous

38. Write a program to generate the **Fibonacci sequence** up to `n` terms.
39. Write a program to create a **guess the number game**, where the user has to guess a randomly generated number.
40. Write a program to simulate a simple **calculator** with options for addition, subtraction, multiplication, and division.
41. Write a program to count the occurrences of each character in a string.

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10. Advanced (Optional for Lab)

43. Write a program to find the **GCD** (Greatest Common Divisor) of two numbers.
44. Write a program to generate a list of the first `n` prime numbers.
45. Write a program to calculate the **sum of digits** of a given number.
46. Write a program to find the **second largest number** in a list.
47. Write a program to merge two dictionaries and sort the resulting dictionary by key

Solutions:

1. Input/Output and Variables

5. Write a program to input your name and age, and print them.

```
name = input("Enter your name: ")

age = int(input("Enter your age: "))

print("Name: " name ) print("Age: "  age)
```

6. Write a program to calculate the **area of a circle**, where the radius is input by the user.

```
import math

radius = float(input("Enter the radius of the circle: "))

area = math.pi * radius**2

print(f"Area of the circle: {area:.2f}")
```

7. Write a program to swap two numbers using a temporary variable.

```
a = int(input("Enter the first number: "))

b = int(input("Enter the second number: "))

print("Before swap: a = ” , a , “b = “, b)


temp = a

a = b

b = temp


print(f"After swap: a = {a}, b = {b}")
```

8. Write a program to convert **Celsius to Fahrenheit**.

```
celsius = float(input("Enter temperature in Celsius: "))

fahrenheit = (celsius * 9/5) + 32 print(f"Temperature in Fahrenheit: {fahrenheit:.2f}")
```

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2. Conditional Statements

9. Write a program to check whether a number is **even or odd**.

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

if num % 2 == 0:

print(f"{num} is Even")

else: print(f"{num} is Odd")
```

10. Write a program to find the **largest of three numbers**.
11. Write a program to check whether a year is a **leap year**.
12. Write a program to classify a person's age:
    - Age < 13 → Child
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3. Loops

15. Write a program to print the first **10 natural numbers**.

```
for i in range(1, 11):

   print(i, end=" ")
```

16. Write a program to calculate the **sum of numbers from 1 to n**, where `n` is entered by the user.

```
n = int(input("Enter n: "))

 sum_n = sum(range(1, n + 1))

 print(f"Sum of numbers from 1 to {n}: {sum_n}")
```