# Functions

*# A function is a block of code which only runs when it is called.*

*# You can pass data, known as parameters, into a function.*

*# A function can return data as a result.*

*#In Python a function is defined using the def keyword.*

```
def my_function():
  print("Hello from a function")
```

my_function() *#To call a function, use the function name followed by parenthesis.*

```
print()
```

```
def my_function1(fname):
  print("My name is :- " +fname)
```

```
my_function1("Ram")
my_function1("Rahul Gautam")
my_function1("Shyam")
```

```
def my_function(fname, lname):
  print(fname + " " + lname)
```

```
my_function("Rahul", "Gautam")
```

```
def my_function(food):
  for x in food:
    print(x)

fruits = ["apple", "banana", "cherry"]

my_function(fruits)
```

```
def my_function(x):
  return 5 * x

print(my_function(3))
print(my_function(5))
print(my_function(9))
```

*# Assignment 1: Simple Function*

*# Problem Statement:*

*# Create a function called greet_user that takes a user's name as input and prints a personalized greeting. For example, if the input is "Alice," the function should print "Hello, Alice!"*

```
def greet_user(name):
    print(f"Hello, {name}!")
```

```
# Test the function
user_name = input("Enter your name: ")
greet_user(user_name)


# Assignment 2: Mathematical Functions
# Problem Statement:
# Write functions for basic mathematical operations:

# Addition
# Subtraction
# Multiplication
# Division
# Each function should take two parameters and return the result.

def add(x, y):
    return x + y

def subtract(x, y):
    return x - y

def multiply(x, y):
    return x * y

def divide(x, y):
    if y != 0:
```

```
        return x / y
    else:
        return "Error: Division by zero is not allowed."

# Test the functions
result_add = add(5, 3)
result_subtract = subtract(8, 4)
result_multiply = multiply(2, 6)
result_divide = divide(10, 2)

print(f"Addition: {result_add}")
print(f"Subtraction: {result_subtract}")
print(f"Multiplication: {result_multiply}")
print(f"Division: {result_divide}")



# Assignment 3: Palindrome Checker
# Problem Statement:
# Write a function called is_palindrome that takes a string as input and returns True if the string is a palindrome (reads the same backward as forward), and False otherwise.

def is_palindrome(s):
    s = s.lower().replace(" ", "")  # Convert to lowercase and remove spaces
    #.replace(" ", "") : Replaces all space characters with an empty string. This is done to handle phrases or sentences that might have spaces between words. For example, "A man a plan a canal Panama" should be treated as a palindrome, and removing spaces helps in achieving that.
```

```
    return s == s[::-1]

# Test the function
input_str = input("Enter a string: ")
if is_palindrome(input_str):
    print("It's a palindrome!")
else:
    print("It's not a palindrome.")



# Assignment 4: Factorial Calculator
# Problem Statement:
# Write a function called calculate_factorial that takes a non-negative integer as input and returns its factorial.

def calculate_factorial(n):
    if n == 0 or n == 1:
        return 1
    else:
        return n * calculate_factorial(n - 1)
    #If n is greater than 1, the function recursively calls itself with n - 1 and multiplies the result by n.

    #For example, if you call calculate_factorial(5), it evaluates as follows:
    #5!=5×4!=5×4×3!=5×4×3×2!=5×4×3×2×1!=5×4×3×2×1×0!

# Test the function
```

```
num = int(input("Enter a non-negative integer: "))
result_factorial = calculate_factorial(num)
print(f"The factorial of {num} is: {result_factorial}")
```

*# Assignment 5*

Problem Statement: Python Function Operations

You are required to create a Python program that provides the user with various function operations. The program should implement functions for checking Leap Year, calculating Factorial, checking Prime, and checking Palindrome of a number. The user will interact with the program through a choice-based menu. The following functions are required:

is_leap_year(year): A function that checks whether a given year is a leap year or not.

factorial(n): A function that calculates the factorial of a given number.

is_prime(num): A function that checks whether a given number is a prime number or not.

is_palindrome(number): A function that checks whether a given number is a palindrome or not.

The program should provide a choice-based menu where the user can select the operation they want to perform. The program continues to execute until the user chooses to exit.

Requirements:

Implement a choice-based menu system.

Option 1: Check Leap Year.

Option 2: Calculate Factorial.

Option 3: Check Prime Number.

Option 4: Check Palindrome.

Option 5: Exit the program.

Implement the corresponding functions for each option.

Provide a clear and user-friendly interface with proper messages and prompts.

Sample Input:

# User selects option 1 (Check Leap Year)

Enter a year: 2024

# User selects option 2 (Calculate Factorial)

Enter a number to calculate factorial: 5

# User selects option 3 (Check Prime Number)

Enter a number to check for prime: 17

# User selects option 4 (Check Palindrome)

Enter a number to check for palindrome: 121

# User selects option 5 (Exit the program)

Sample Output:

Function Menu:

1. Check Leap Year

2. Calculate Factorial

3. Check Prime Number

4. Check Palindrome

5. Exit

Enter your choice (1-5): 1

Enter a year: 2024

2024 is a Leap Year.

Function Menu:

1. Check Leap Year

2. Calculate Factorial

3. Check Prime Number

4. Check Palindrome

5. Exit

Enter your choice (1-5): 2

Enter a number to calculate factorial: 5

The factorial of 5 is: 120

Function Menu:

1. Check Leap Year

2. Calculate Factorial

3. Check Prime Number

4. Check Palindrome

5. Exit

Enter your choice (1-5): 3

Enter a number to check for prime: 17

17 is a Prime Number.

Function Menu:

1. Check Leap Year

2. Calculate Factorial

3. Check Prime Number

4. Check Palindrome

5. Exit

Enter your choice (1-5): 4

Enter a number to check for palindrome: 121

121 is a Palindrome.

Function Menu:

1. Check Leap Year

2. Calculate Factorial

3. Check Prime Number

4. Check Palindrome

5. Exit

Enter your choice (1-5): 5

Exiting the program.

**Solution : -**

```
def is_leap_year(year):
    return (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0)

def factorial(n):
    if n == 0 or n == 1:
        return 1
    else:
        return n * factorial(n - 1)

def is_prime(num):
    if num < 2:
        return False
    for i in range(2, int(num**0.5) + 1):
        if num % i == 0:
            return False
    return True

def is_palindrome(number):
    return str(number) == str(number)[::-1]
```

```
while True:
    print("\nFunction Menu:")
    print("1. Check Leap Year")
    print("2. Calculate Factorial")
    print("3. Check Prime Number")
    print("4. Check Palindrome")
    print("5. Exit")

    choice = input("Enter your choice (1-5): ")

    if choice == '1':
        year = int(input("Enter a year: "))
        if is_leap_year(year):
            print(f"{year} is a Leap Year.")
        else:
            print(f"{year} is not a Leap Year.")

    elif choice == '2':
        num = int(input("Enter a number to calculate factorial: "))
        print(f"The factorial of {num} is: {factorial(num)}")

    elif choice == '3':
        num = int(input("Enter a number to check for prime: "))
        if is_prime(num):
            print(f"{num} is a Prime Number.")
        else:
```

```
        print(f"{num} is not a Prime Number.")

elif choice == '4':
    number = int(input("Enter a number to check for palindrome: "))
    if is_palindrome(number):
        print(f"{number} is a Palindrome.")
    else:
        print(f"{number} is not a Palindrome.")

elif choice == '5':
    print("Exiting the program.")
    break

else:
    print("Invalid choice. Please enter a number between 1 and 5.")
```