

A  
PRACTICAL ASSIGNMENT  
OF  
“MCA 206 - Programming in Python”

Submitted in partial fulfillment of the requirements for the

**Master of Computer Applications  
MCA - IIInd semester**

From

**PT. RAVISHANKAR SHUKLA UNIVERSITY SCHOOL OF  
STUDIES, RAIPUR(C.G)**

Year: 2022-23



**Guided By:-**

**Mr. Rahul Singh  
(Ass. Professor ,C.S.&IT,PRSU)**

**Submitted by :-**

**Saumya Ranjan Nayak**

Submitted to

**( S. O. S. IN COMPUTER SCIENCE & IT, RAIPUR )  
Pt.Ravishankar Shukla University Raipur (C.G.)**

# INDEX

S.No.	List of programs	Signature
1	Program to perform arithmetic operations on integers	
2	Program to check and print the types of at least 5 different in-built objects	
3	Program to check if a number is EVEN or ODD	
4	Program to check if a number is Positive, Negative or Zero	
5	Program to check if a number is PRIME or NOT	
6	Program to check whether a string is a valid decimal number or not	
7	Program to check leap year	
8	Program to check string is palindrome or not	
9	Program to convert into different number systems	
10	Program to find the sum of natural number upto N	
11	Program to get marks and calculate average marks	
12	Program to find sum and product of digits of number	
13	Program to find GCD and LCM	
14	Program to find factorial using while loop	
15	Program to print fibonacci series	
16	Program to print multiplication table	
17	Program to access each element of a string using while loop	
18	Program to access each element of string using for loop	
19	Program to find substring in the main string	
20	Program to find the first occurrence of a substring in the main string	
21	Program to count the number of times a substring appears in the main string	
22	Program to demonstrate the use of all casting methods and display a string in different cases	
23	Program to demonstrate all string testing methods	
24	Program to take int list input and return average	

S.No.	List of programs	Signature
25	Function to print prime numbers between I/O	
26	Function to take two integers and return sum & product	
27	Program to demonstrate positional arguments	
28	Program for keyword arguments of a function	
29	Program to demonstrate default arguments of function	
30	Program for variable length arguments	
31	Program to demonstrate keyword variable length	
32	Program to demonstrate global and local variables	
33	Program to find factorial using recursion	
34	Program to demonstrate lamda functions	
35	Program to demonstrate use of lambda functions and map	
36	Program to demonstrate the use of lambda function and reduce	
37	Program to demonstrate the various list procession methods	
38	Program to find biggest and smallest numbers in list	
39	Program to find common elements in two list	
40	Program to demonstrate the various tuple procession methods	
41	Program to demonstrate the use of dictionaries	
42	Program to find the number of occurrences of each letter in string using dictionaries	
43	Program to print the CWD and change the CWD	
44	Program that takes a list of words from the user and writes them into a file.	
45	Program that reads a file in text mode and counts the number of words that contain	
46	Programs to demonstrate the creation and use of “modules”	
47	Exception Handling Program that uses try and except	
48	Exception Handling Program that handles multiple types of exceptions	



## Practical No. 1

**Program :** Write a Python program to perform arithmetic operations on integers.

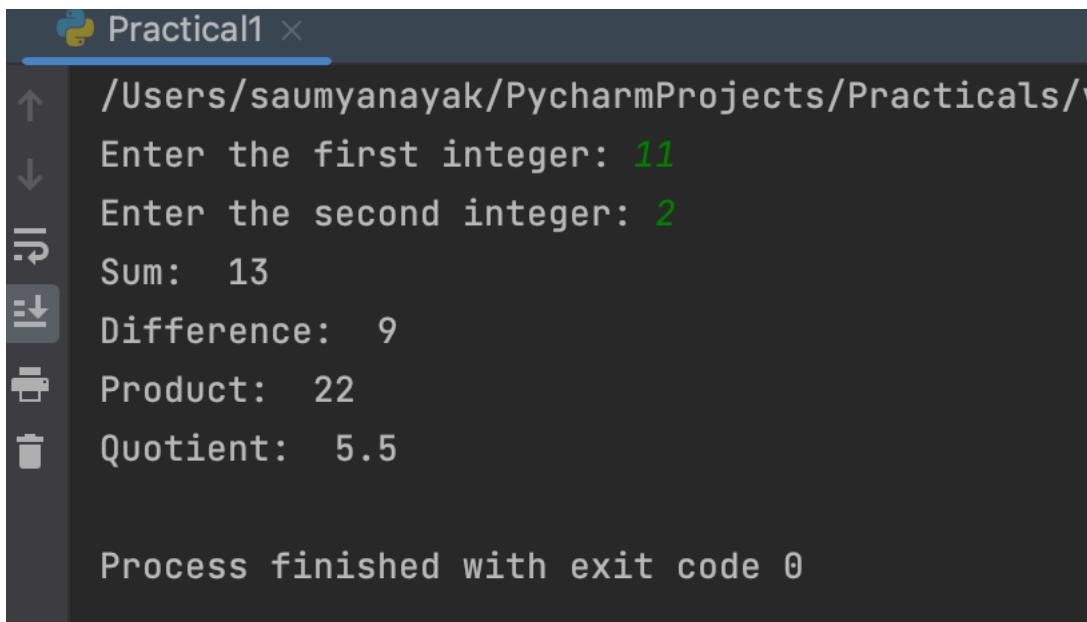
**Code Section :**

```
# Ask the user to input two integers
num1 = int(input("Enter the first integer: "))
num2 = int(input("Enter the second integer: "))

# Perform arithmetic operations
sum = num1 + num2
difference = num1 - num2
product = num1 * num2
quotient = num1 / num2

# Print the results
print("Sum: ", sum)
print("Difference: ", difference)
print("Product: ", product)
print("Quotient: ", quotient)
```

**Output Section :**



The screenshot shows the PyCharm terminal window titled 'Practical1'. The terminal displays the following output:

```
/Users/saumyanayak/PycharmProjects/Practicals/
Enter the first integer: 11
Enter the second integer: 2
Sum: 13
Difference: 9
Product: 22
Quotient: 5.5

Process finished with exit code 0
```

## Practical No. 2

**Program :** Write a Python program to check and print the types of at least 5 different in-built objects.

**Code Section :**

```
# Check and print the types of different built-in objects
```

```
# Integer
```

```
num = 123
```

```
print("Type of", num, "is", type(num))
```

```
# Floating-point number
```

```
float_num = 3.14
```

```
print("Type of", float_num, "is", type(float_num))
```

```
# Boolean
```

```
is_true = True
```

```
print("Type of", is_true, "is", type(is_true))
```

```
# String
```

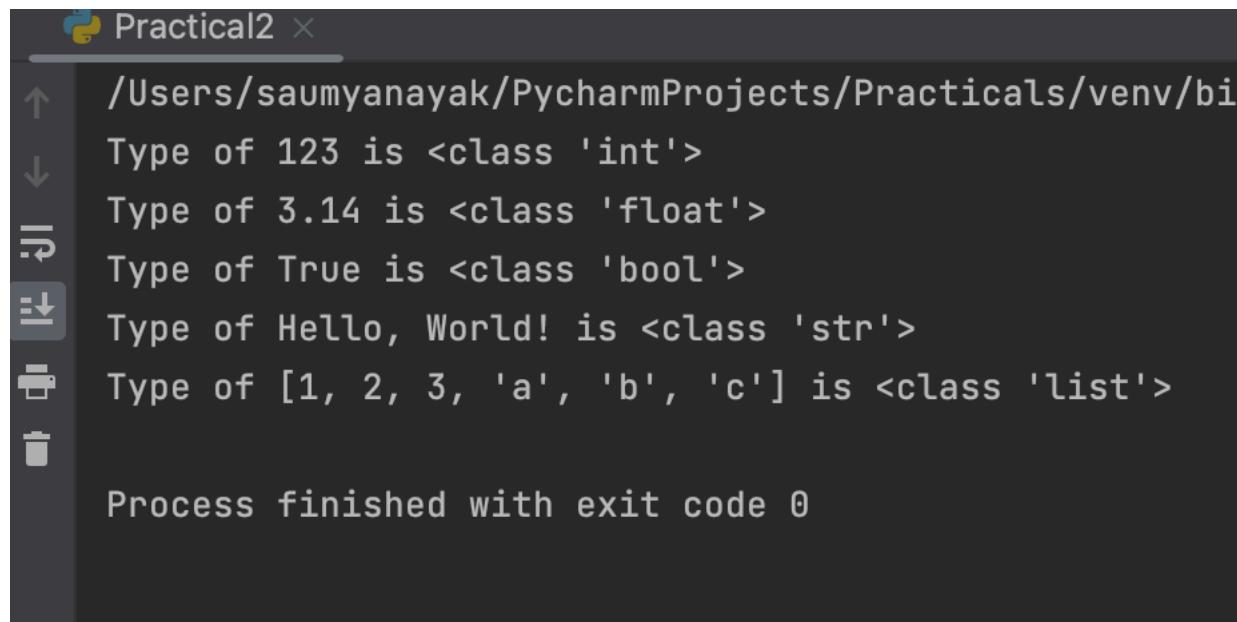
```
text = "Hello, World!"
```

```
print("Type of", text, "is", type(text))
```

```
# List
```

```
my_list = [1, 2, 3, "a", "b", "c"]
```

```
print("Type of", my_list, "is", type(my_list))
```

**Output Section :**

```
Practical2 ×
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python3.8 main.py
Type of 123 is <class 'int'>
Type of 3.14 is <class 'float'>
Type of True is <class 'bool'>
Type of Hello, World! is <class 'str'>
Type of [1, 2, 3, 'a', 'b', 'c'] is <class 'list'>
Process finished with exit code 0
```

## Practical No. 3

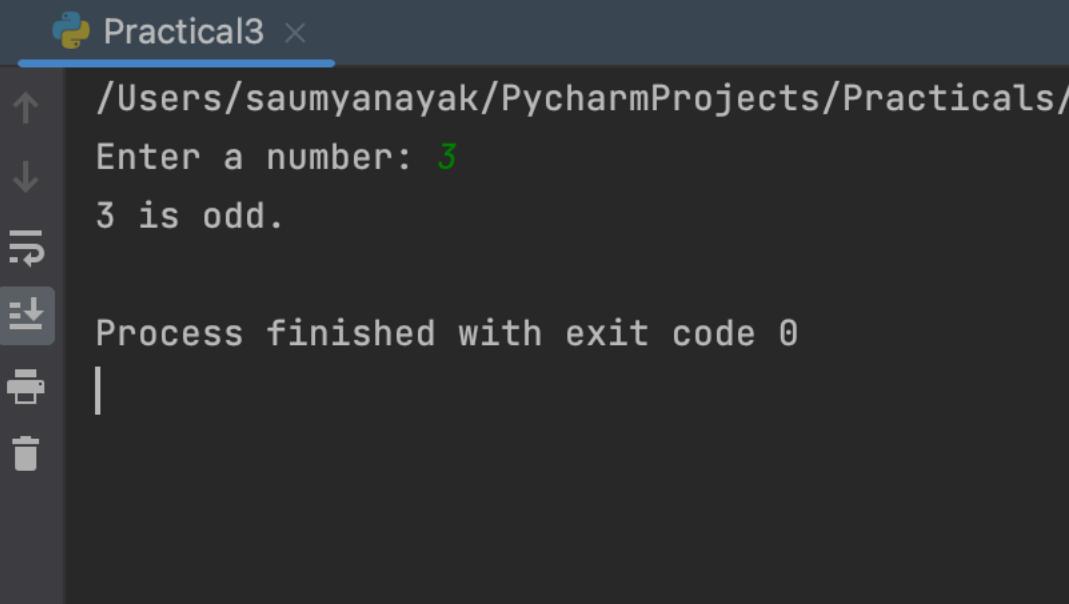
**Program :** Write a Python program to check if a number is EVEN or ODD.

**Code Section :**

```
# Ask the user to input a number
num = int(input("Enter a number: "))

# Check if the number is even or odd
if num % 2 == 0:
    print(num, "is even.")
else:
    print(num, "is odd.")
```

**Output Section :**



The screenshot shows a terminal window in PyCharm with the title bar 'Practical3'. The terminal displays the following text:  
/Users/saumyanayak/PycharmProjects/Practicals/  
Enter a number: 3  
3 is odd.  
Process finished with exit code 0

## Practical No. 4

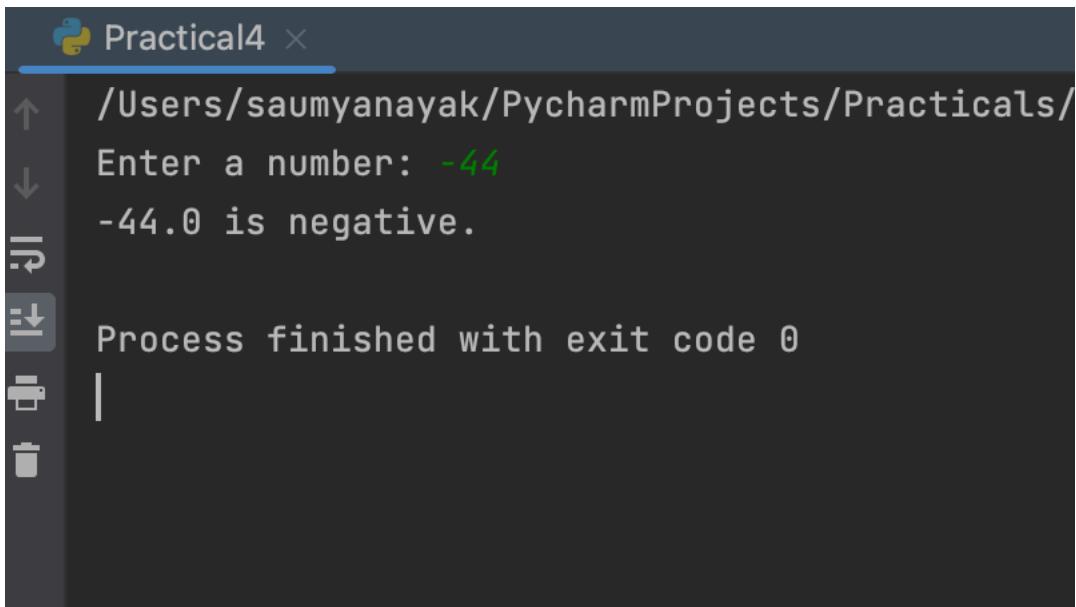
**Program :** Write a Python program to check if a number is Positive, Negative or Zero.

**Code Section :**

```
# Ask the user to input a number
num = float(input("Enter a number: "))

# Check if the number is positive, negative, or zero
if num > 0:
    print(num, "is positive.")
elif num < 0:
    print(num, "is negative.")
else:
    print(num, "is zero.")
```

**Output Section :**



The screenshot shows a terminal window in PyCharm with the title 'Practical4'. The terminal path is '/Users/saumyanayak/PycharmProjects/Practicals/'. The user has entered the number '-44' and the program has output '-44.0 is negative.' followed by 'Process finished with exit code 0'.

```
Practical4
/Users/saumyanayak/PycharmProjects/Practicals/
Enter a number: -44
-44.0 is negative.

Process finished with exit code 0
```

## Practical No. 5

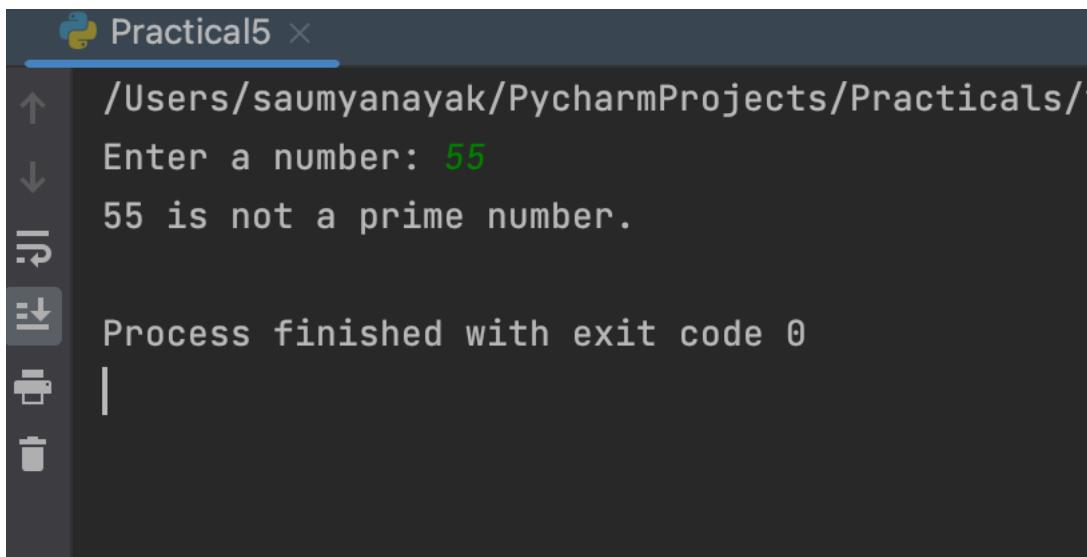
**Program :** Write a Python program to check if a number is PRIME or NOT.

**Code Section :**

```
# Ask the user to input a number
num = int(input("Enter a number: "))

# Check if the number is prime
if num > 1:
    # check for factors
    for i in range(2, num):
        if num % i == 0:
            print(num, "is not a prime number.")
            break
    else:
        print(num, "is a prime number.")
else:
    print(num, "is not a prime number.")
```

**Output Section :**



The screenshot shows the PyCharm terminal window titled 'Practical5'. The terminal output is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/
Enter a number: 55
55 is not a prime number.

Process finished with exit code 0
```

The terminal interface includes standard PyCharm navigation and file-related icons on the left.

## Practical No. 6

**Program :** Write a Python program to check whether a string entered by the user is a valid decimal number or not.

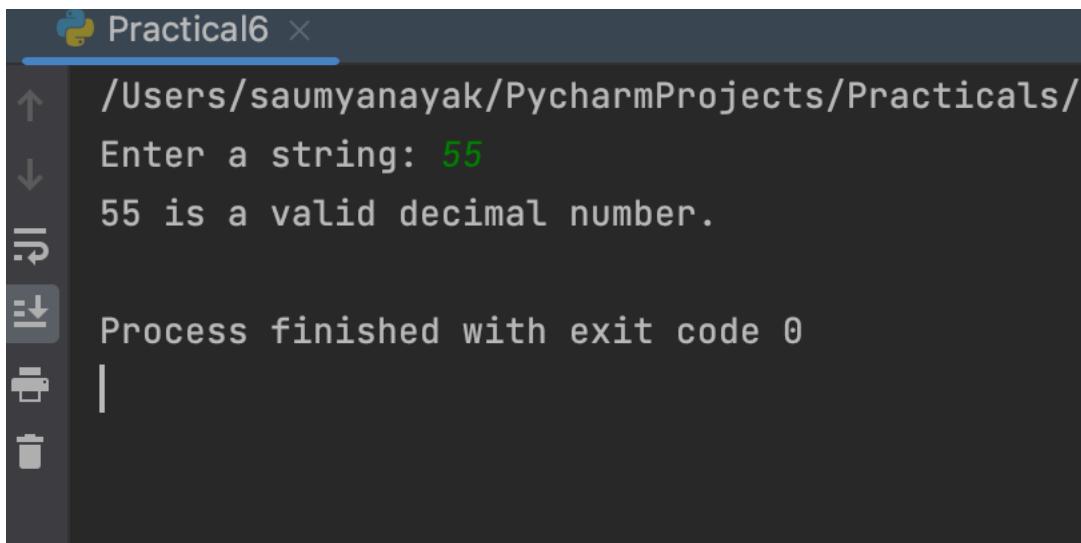
**Code Section :**

```
# Ask the user to input a string
str = input("Enter a string: ")

# Try to convert the string to a float
try:
    num = float(str)
    print(str, "is a valid decimal number.")

except ValueError:
    print(str, "is not a valid decimal number.")
```

**Output Section :**



The screenshot shows the PyCharm terminal window titled 'Practical6'. The terminal output is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/
Enter a string: 55
55 is a valid decimal number.
Process finished with exit code 0
```

## Practical No. 7

**Program :** Write a Python program to check if a year entered by the user is a Leap Year or NOT.

**Code Section :**

```
# Ask the user to input a year
```

```
year = int(input("Enter a year: "))
```

```
# Check if the year is a leap year
```

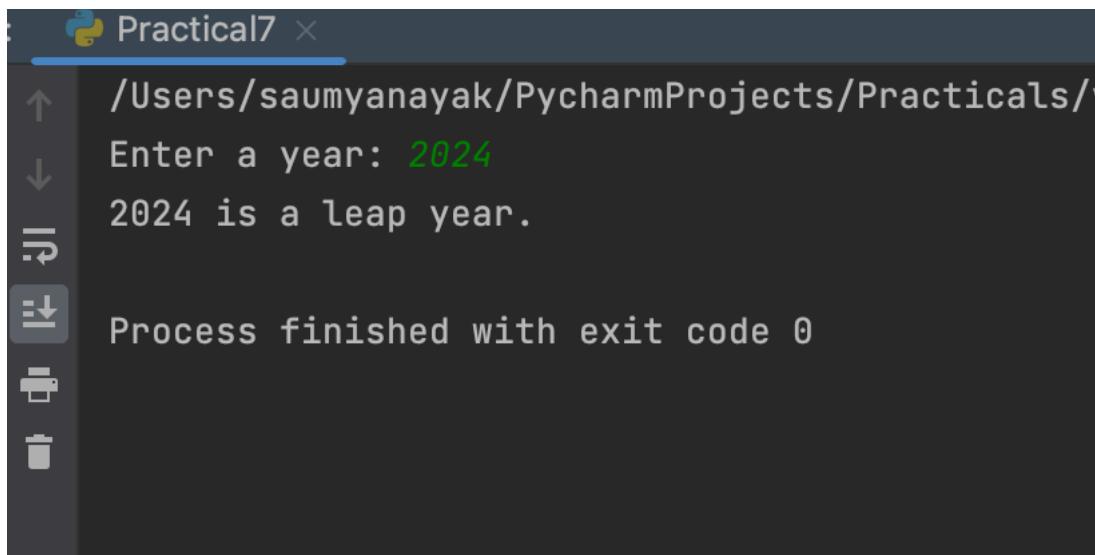
```
if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0):
```

```
    print(year, "is a leap year.")
```

```
else:
```

```
    print(year, "is not a leap year.")
```

**Output Section :**



The screenshot shows the PyCharm terminal window titled 'Practical7'. The terminal path is '/Users/saumyanayak/PycharmProjects/Practicals/'. The user has entered 'Enter a year: 2024' and the program has responded with '2024 is a leap year.' The terminal concludes with 'Process finished with exit code 0'.

```
Practical7
/usr/bin/python3.8
/Users/saumyanayak/PycharmProjects/Practicals/
Enter a year: 2024
2024 is a leap year.

Process finished with exit code 0
```

## Practical No. 8

**Program :** Write a Python program to check whether a string entered by the user is a palindrome or not.

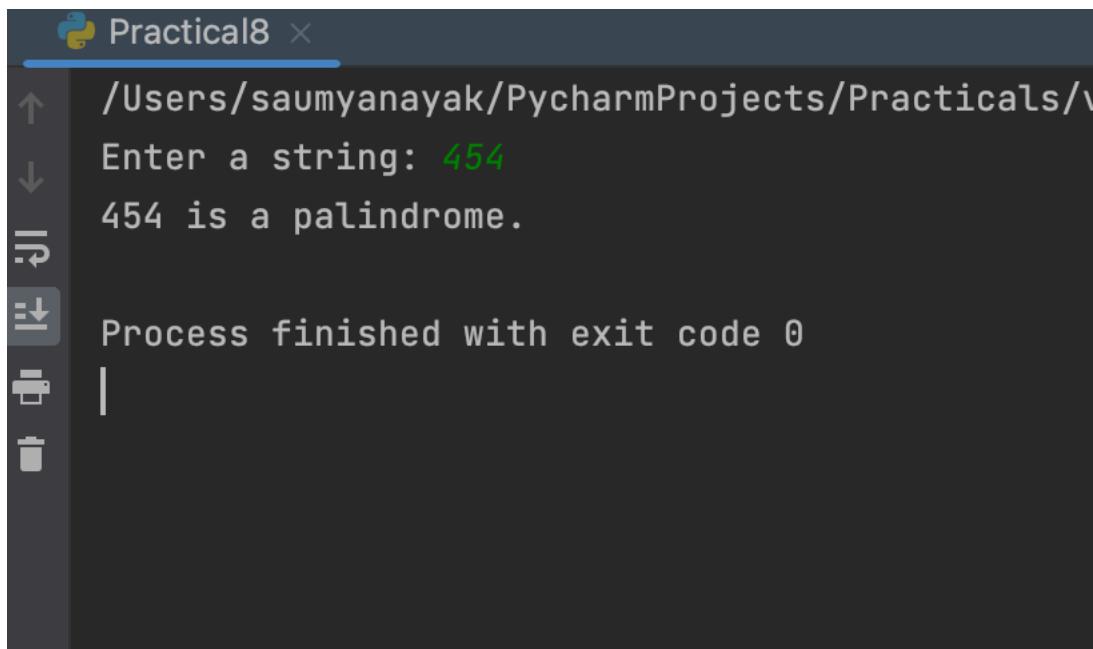
**Code Section :**

```
# Ask the user to input a string
str = input("Enter a string: ")

# Reverse the string
rev_str = str[::-1]

# Check if the string is a palindrome
if str == rev_str:
    print(str, "is a palindrome.")
else:
    print(str, "is not a palindrome.")
```

**Output Section :**



The screenshot shows a terminal window titled "Practical8" in PyCharm. The terminal displays the following text:  
/Users/saumyanayak/PycharmProjects/Practicals/\n Enter a string: 454\n 454 is a palindrome.\n\nProcess finished with exit code 0

## Practical No. 9

**Program :** Write a Python program to get a Decimal number from user and convert it into Binary, Octal and Hexadecimal.

### Code Section :

```
# Ask the user to input a decimal number
decimal = int(input("Enter a decimal number: "))

# Convert the decimal number to binary, octal, and hexadecimal
binary = bin(decimal)
octal = oct(decimal)
hexadecimal = hex(decimal)

# Print the result
print("Decimal:", decimal)
print("Binary:", binary)
print("Octal:", octal)
print("Hexadecimal:", hexadecimal)
```

**Output Section :**

```
Practical9 ✘
↑ /Users/saumyanayak/PycharmProjects/Practicals/
↓ Enter a decimal number: 5
Binary: 0b101
Octal: 0o5
Hexadecimal: 0x5
Process finished with exit code 0
|
```

## Practical No. 10

**Program :** Write a Python program to find sum of natural numbers, up to N.

**Code Section :**

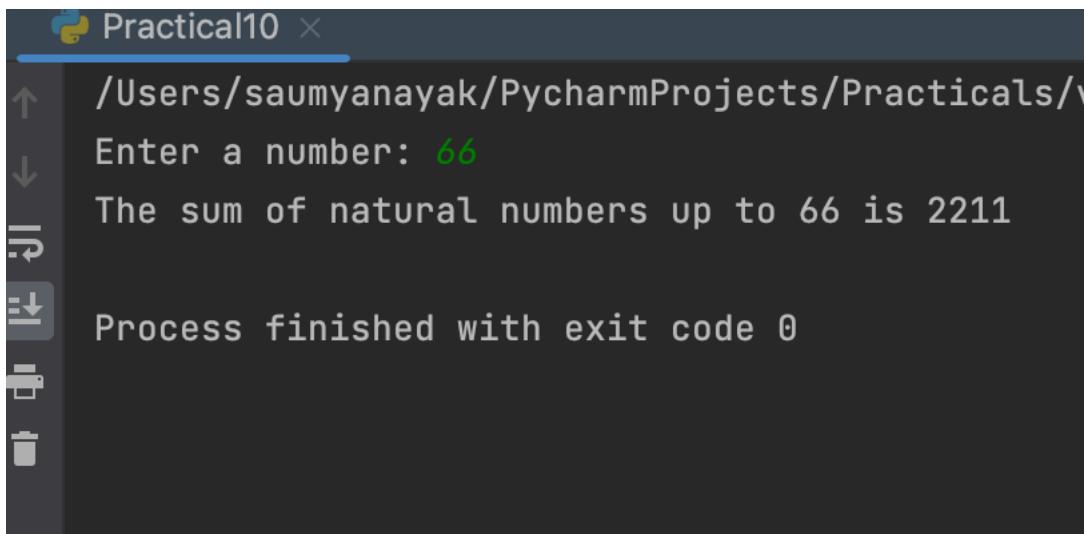
```
# Ask the user to input a number  
N = int(input("Enter a number: "))
```

```
# Initialize the sum to 0  
sum = 0
```

```
# Use a loop to iterate from 1 to N and add each number to the sum  
for i in range(1, N+1):  
    sum += i
```

```
# Print the result  
print("The sum of natural numbers up to", N, "is", sum)
```

**Output Section :**



The screenshot shows a terminal window in PyCharm with the title bar 'Practical10'. The terminal output is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/
Enter a number: 66
The sum of natural numbers up to 66 is 2211
Process finished with exit code 0
```

## Practical No. 11

**Program :** Write a Python program to get marks in five subjects from user and calculate average marks, percentage and grade of a student.

### Code Section :

```
# Ask the user to input marks in five subjects
subject1 = int(input("Enter marks in subject 1: "))
subject2 = int(input("Enter marks in subject 2: "))
subject3 = int(input("Enter marks in subject 3: "))
subject4 = int(input("Enter marks in subject 4: "))
subject5 = int(input("Enter marks in subject 5: "))

# Calculate the total marks and average marks
total_marks = subject1 + subject2 + subject3 + subject4 + subject5
average_marks = total_marks / 5

# Calculate the percentage
percentage = (total_marks / 500) * 100

# Determine the grade based on percentage
if percentage >= 90:
    grade = 'A+'
elif percentage >= 80:
    grade = 'A'
elif percentage >= 70:
    grade = 'B'
elif percentage >= 60:
```

```
grade = 'C'  
elif percentage >= 50:  
    grade = 'D'  
else:  
    grade = 'Fail'  
  
# Print the result  
print("Total marks:", total_marks)  
print("Average marks:", average_marks)  
print("Percentage:", percentage, "%")  
print("Grade:", grade)
```

**Output Section :**

```
Practical11 ×
/Users/saumyanayak/PycharmProjects/Practicals/
Enter marks in subject 1: 55
Enter marks in subject 2: 77
Enter marks in subject 3: 45
Enter marks in subject 4: 90
Enter marks in subject 5: 88
Total marks: 355
Average marks: 71.0
Percentage: 71.0 %
Grade: B

Process finished with exit code 0
```

## Practical No. 12

**Program :** Write a Python program to get a number and find the sum and product of its digits.

**Code Section :**

```
# Ask the user to input a number
number = int(input("Enter a number: "))

# Initialize the sum and product to 0 and 1 respectively
sum = 0
product = 1

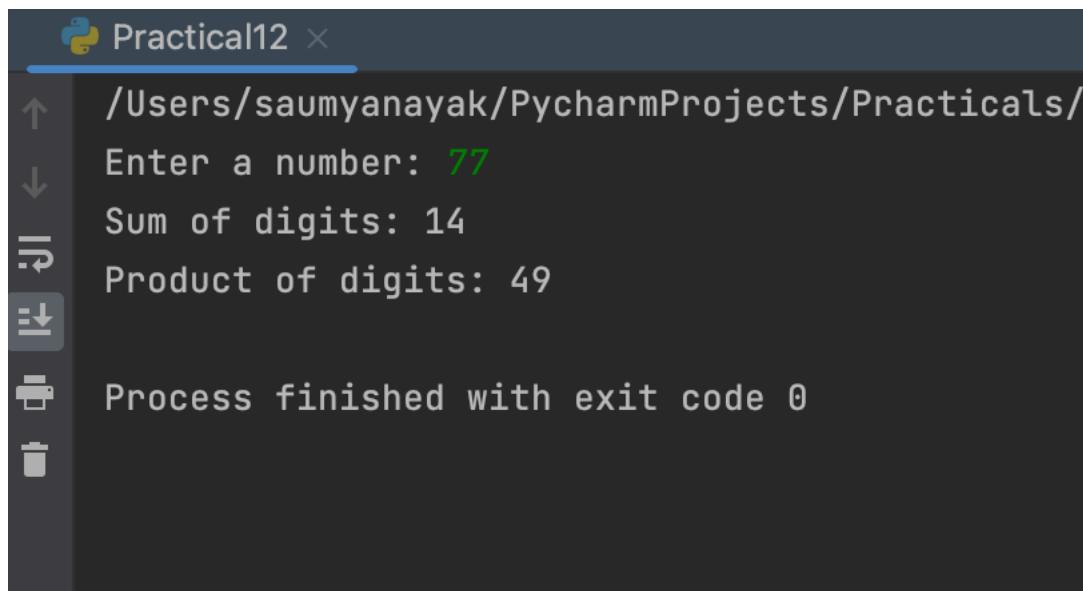
# Use a loop to iterate over each digit of the number
while number > 0:
    # Get the last digit of the number
    digit = number % 10

    # Add the digit to the sum and multiply it to the product
    sum += digit
    product *= digit

    # Remove the last digit from the number
    number //= 10

# Print the result
print("Sum of digits:", sum)
print("Product of digits:", product)
```

**Output Section :**



The screenshot shows the PyCharm terminal window titled 'Practical12'. The terminal displays the following output:

```
/Users/saumyanayak/PycharmProjects/Practicals/
Enter a number: 77
Sum of digits: 14
Product of digits: 49
Process finished with exit code 0
```

## Practical No. 13

**Program :** Write a Python program to get two integers and find their GCD and LCM.

**Code Section :**

```
# Function to find GCD of two numbers
```

```
def gcd(a, b):
```

```
    if b == 0:
```

```
        return a
```

```
    else:
```

```
        return gcd(b, a % b)
```

```
# Function to find LCM of two numbers
```

```
def lcm(a, b):
```

```
    return (a * b) // gcd(a, b)
```

```
# Get two integers from the user
```

```
num1 = int(input("Enter the first number: "))
```

```
num2 = int(input("Enter the second number: "))
```

```
# Calculate the GCD and LCM
```

```
gcd_value = gcd(num1, num2)
```

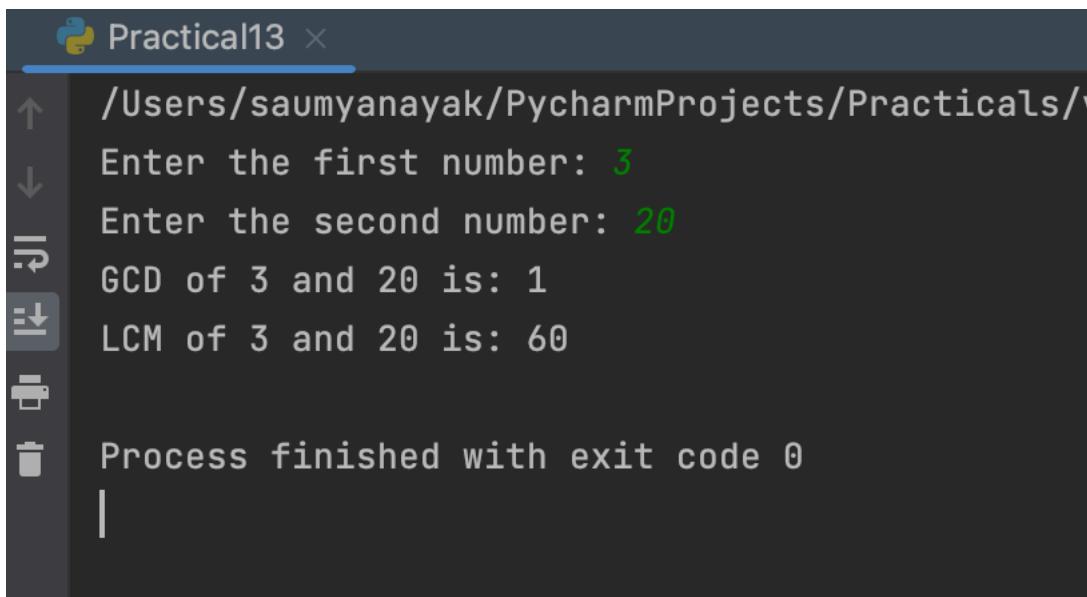
```
lcm_value = lcm(num1, num2)
```

```
# Print the results
```

```
print("GCD of", num1, "and", num2, "is:", gcd_value)
```

```
print("LCM of", num1, "and", num2, "is:", lcm_value)
```

**Output Section :**



The screenshot shows a PyCharm terminal window titled 'Practical13'. The terminal displays the following text:

```
/Users/saumyanayak/PycharmProjects/Practicals/
Enter the first number: 3
Enter the second number: 20
GCD of 3 and 20 is: 1
LCM of 3 and 20 is: 60
Process finished with exit code 0
```

## Practical No. 14

**Program :** Write a Python program to find factorial of a number using while loop.

**Code Section :**

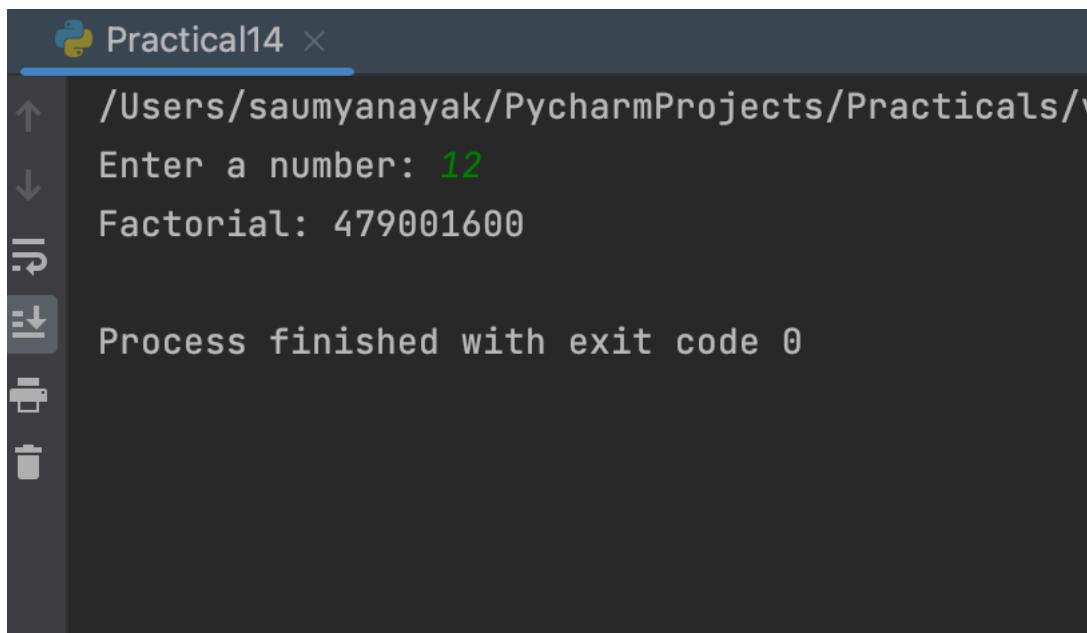
```
# Get the input from the user
num = int(input("Enter a number: "))

# Initialize the factorial to 1
factorial = 1

# Use a while loop to calculate the factorial
while num > 0:
    factorial *= num
    num -= 1

# Print the result
print("Factorial:", factorial)
```

**Output Section :**



A screenshot of the PyCharm terminal window titled 'Practical14'. The terminal shows the following output:

```
/Users/saumyanayak/PycharmProjects/Practicals/
Enter a number: 12
Factorial: 479001600
Process finished with exit code 0
```

The terminal interface includes a vertical toolbar on the left with icons for file operations like open, save, and delete, and a scroll bar on the right.

## Practical No. 15

**Program :** Write a Python program to print Fibonacci series up to N terms.

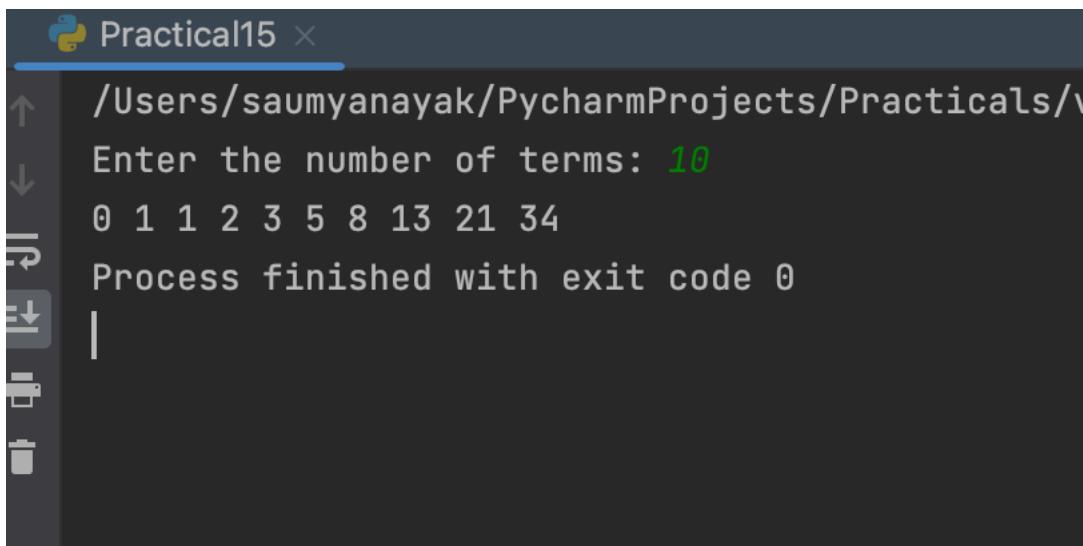
### Code Section :

```
# Get the input from the user
num_terms = int(input("Enter the number of terms: "))

# Initialize the first two terms of the series
a = 0
b = 1

# Use a loop to generate the series
for i in range(num_terms):
    print(a, end=" ")
    c = a + b
    a = b
    b = c
```

**Output Section :**



The screenshot shows the PyCharm terminal window titled 'Practical15'. The terminal path is '/Users/saumyanayak/PycharmProjects/Practicals/'. The user has entered 'Enter the number of terms: 10' and the program has output the first 10 terms of the Fibonacci sequence: '0 1 1 2 3 5 8 13 21 34'. The terminal concludes with 'Process finished with exit code 0'.

```
Practical15
/Users/saumyanayak/PycharmProjects/Practicals/
Enter the number of terms: 10
0 1 1 2 3 5 8 13 21 34
Process finished with exit code 0
```

## Practical No. 16

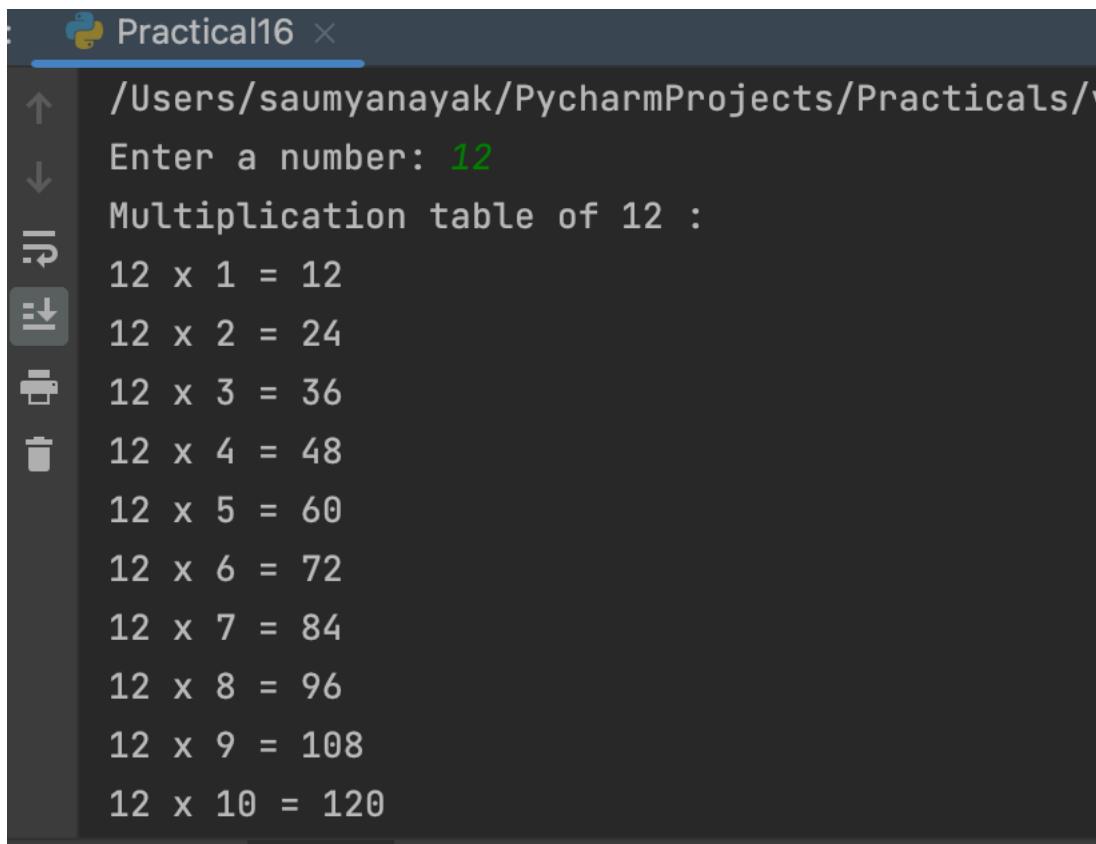
**Program :** Write a Python program to print multiplication table.

**Code Section :**

```
# Get the input from the user
num = int(input("Enter a number: "))

# Print the multiplication table
print("Multiplication table of", num, ":")

for i in range(1, 11):
    print(num, "x", i, "=", num * i)
```

**Output Section :**

The screenshot shows a PyCharm terminal window titled 'Practical16'. The terminal displays the following text:

```
/Users/saumyanayak/PycharmProjects/Practicals/
Enter a number: 12
Multiplication table of 12 :
12 x 1 = 12
12 x 2 = 24
12 x 3 = 36
12 x 4 = 48
12 x 5 = 60
12 x 6 = 72
12 x 7 = 84
12 x 8 = 96
12 x 9 = 108
12 x 10 = 120
```

## Practical No. 17

**Program :** Write a Python program to access each element of a string in forward and backward orders using the ‘while’ loop.

**Code Section :**

```
# Get the input from the user
```

```
string = input("Enter a string: ")
```

```
# Access each element of the string in forward order
```

```
print("Forward order:")
```

```
i = 0
```

```
while i < len(string):
```

```
    print(string[i])
```

```
    i += 1
```

```
# Access each element of the string in backward order
```

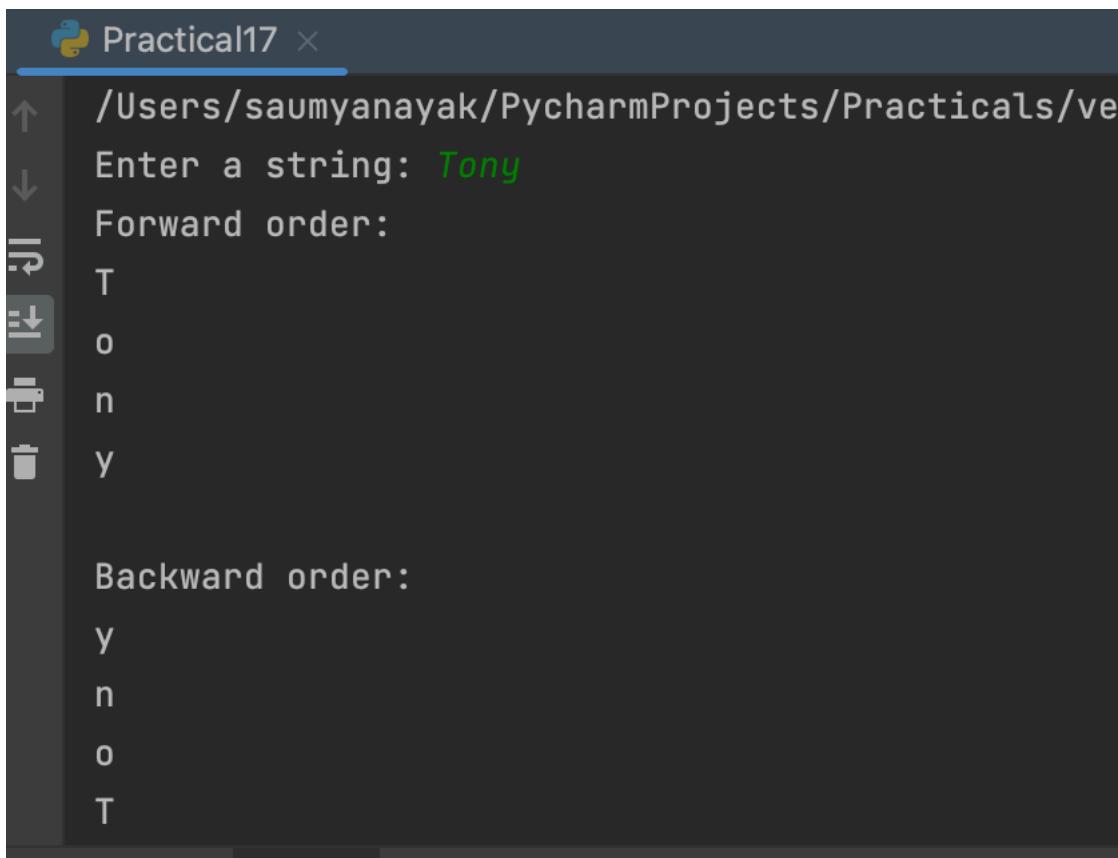
```
print("\nBackward order:")
```

```
i = len(string) - 1
```

```
while i >= 0:
```

```
    print(string[i])
```

```
    i -= 1
```

**Output Section :**

The screenshot shows a PyCharm terminal window titled "Practical17". The terminal displays the following text:

```
/Users/saumyanayak/PycharmProjects/Practicals/ve
Enter a string: Tony
Forward order:
T
o
n
y

Backward order:
y
n
o
T
```

The terminal interface includes standard PyCharm navigation icons on the left: back, forward, search, and file operations.

## Practical No. 18

**Program :** Write a Python program to access each element of a string in forward and backward orders using the ‘for’ loop.

**Code Section :**

```
# Get the input from the user
```

```
string = input("Enter a string: ")
```

```
# Access each element of the string in forward order
```

```
print("Forward order:")
```

```
for char in string:
```

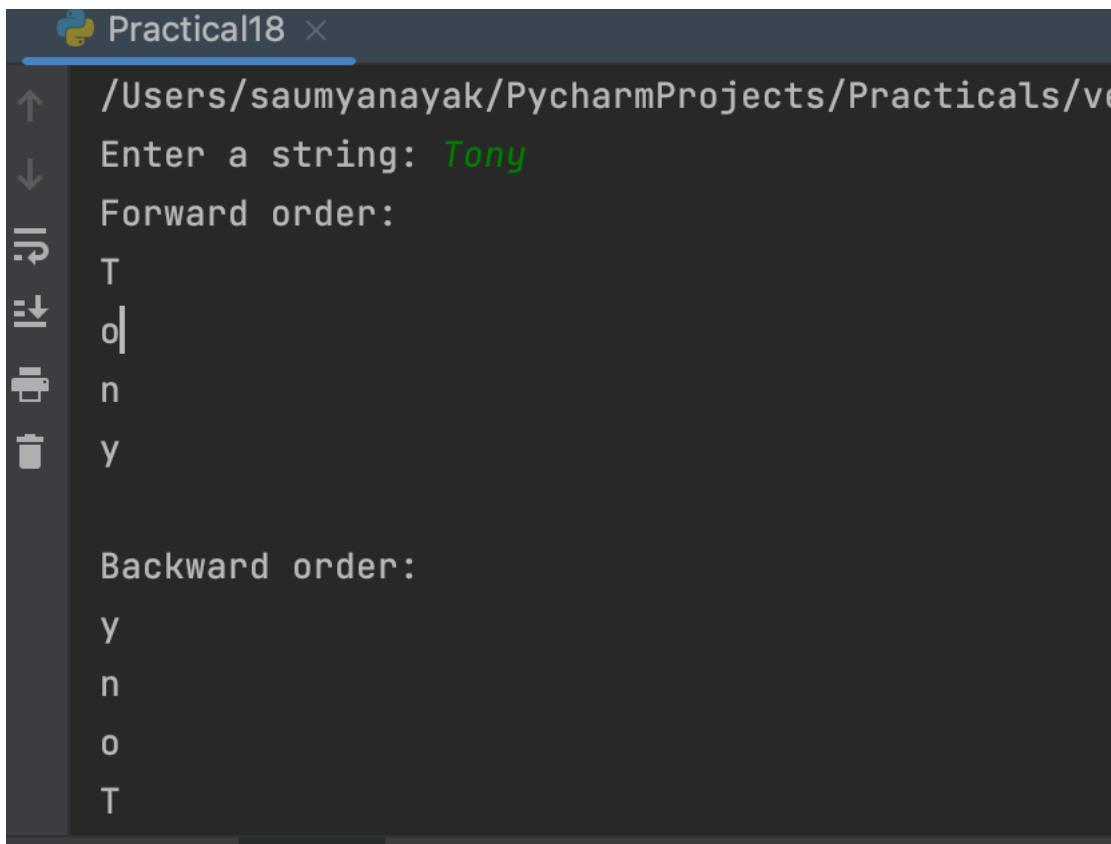
```
    print(char)
```

```
# Access each element of the string in backward order
```

```
print("\nBackward order:")
```

```
for char in reversed(string):
```

```
    print(char)
```

**Output Section :**

The screenshot shows a PyCharm terminal window titled "Practical18". The terminal displays the following text:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv
Enter a string: Tony
Forward order:
T
o
n
y

Backward order:
y
n
o
T
```

The terminal interface includes standard PyCharm navigation and search icons on the left.

## Practical No. 19

**Program :** Write a Python program to find whether a substring exists in main string or not.

**Code Section :**

```
# Get the input from the user

main_string = input("Enter the main string: ")

sub_string = input("Enter the sub string: ")

# Check if the sub string exists in the main string

if sub_string in main_string:

    print(f"The sub string '{sub_string}' exists in the main string '{main_string}'")

else:

    print(f"The sub string '{sub_string}' does not exist in the main string
'{main_string}'")
```

## **Output Section :**

```
Practical19 x
/usr/local/bin/python3.8
Enter the main string: Tony
Enter the sub string: on
The sub string 'on' exists in the main string 'Tony'
Process finished with exit code 0
```

## Practical No. 20

**Program :** Write a Python program to find the first occurrence of a substring in the main string.

**Code Section :**

```
# Get the input from the user
```

```
main_string = input("Enter the main string: ")
```

```
sub_string = input("Enter the sub string: ")
```

```
# Find the first occurrence of the sub string in the main string
```

```
index = main_string.find(sub_string)
```

```
# Check if the sub string was found in the main string
```

```
if index != -1:
```

```
    print(f"The sub string '{sub_string}' was found in the main string '{main_string}' at  
index {index}")
```

```
else:
```

```
    print(f"The sub string '{sub_string}' was not found in the main string  
'{main_string}'")
```

## **Output Section :**

```
Practical20 x
/usr/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python
Enter the main string: Tony
Enter the sub string: on
The sub string 'on' was found in the main string 'Tony' at index 1
Process finished with exit code 0
```

## Practical No. 21

**Program :** Write a Python program to count the number of times a substring appears in the main string.

**Code Section :**

```
# Get the input from the user
main_string = input("Enter the main string: ")
sub_string = input("Enter the sub string: ")

# Count the number of occurrences of the sub string in the main string
count = main_string.count(sub_string)

# Print the result
print(f"The sub string '{sub_string}' appears {count} times in the main string
'{main_string}'")
```

## **Output Section :**

```
Practical21 x
/usr/local/bin/python /Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /u
Enter the main string: Tony
Enter the sub string: on
The sub string 'on' appears 1 times in the main string 'Tony'
Process finished with exit code 0
```

## Practical No. 22

**Program :** Write a Python program to demonstrate the use of all “casing” methods and display a string in different cases.

**Code Section :**

```
# Get the input from the user
input_string = input("Enter a string: ")

# Convert the string to different cases using casing methods
uppercase_string = input_string.upper()
lowercase_string = input_string.lower()
titlecase_string = input_string.title()
capitalized_string = input_string.capitalize()
swapcase_string = input_string.swapcase()

# Print the string in different cases
print(f"The original string is: {input_string}")
print(f"The string in uppercase is: {uppercase_string}")
print(f"The string in lowercase is: {lowercase_string}")
print(f"The string in titlecase is: {titlecase_string}")
print(f"The string in capitalized form is: {capitalized_string}")
print(f"The string with swapped cases is: {swapcase_string}")
```

**Output Section :**

```
Practical22 ×
/usr/local/bin/python3.8
Enter a string: Tony
The original string is: Tony
The string in uppercase is: TONY
The string in lowercase is: tony
The string in titlecase is: Tony
The string in capitalized form is: Tony
The string with swapped cases is: tONY

Process finished with exit code 0
```

## Practical No. 23

**Program :** Write a Python program to demonstrate the use of all string testing {isXXX()} methods.

**Code Section :**

```
# Get the input from the user
input_string = input("Enter a string: ")

# Use string testing methods to check different properties of the string
print(f"Is the string alphanumeric? {input_string.isalnum()}")
print(f"Is the string alphabetic? {input_string.isalpha()}")
print(f"Is the string decimal? {input_string.isdecimal()}")
print(f"Is the string a digit? {input_string.isdigit()}")
print(f"Is the string an identifier? {input_string.isidentifier()}")
print(f"Is the string lowercase? {input_string.islower()}")
print(f"Is the string numeric? {input_string.isnumeric()}")
print(f"Is the string printable? {input_string.isprintable()}")
print(f"Is the string whitespace? {input_string.isspace()}")
print(f"Is the string titlecased? {input_string.istitle()}")
print(f"Is the string uppercase? {input_string.isupper()}"
```

**Output Section :**

```
Practical23 ×
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Use
Enter a string: Tony
Is the string alphanumeric? True
Is the string alphabetic? True
Is the string decimal? False
Is the string a digit? False
Is the string an identifier? True
Is the string lowercase? False
Is the string numeric? False
Is the string printable? True
Is the string whitespace? False
Is the string titlecased? True
Is the string uppercase? False
```

## Practical No. 24

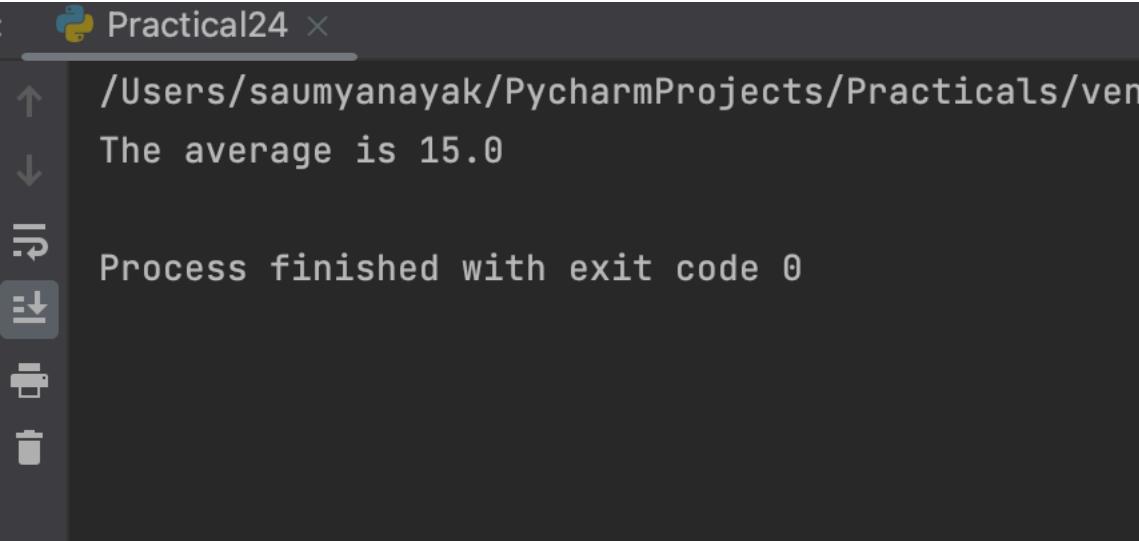
**Program :** Write a Python function to take a list of integers as input and return the average.

**Code Section :**

```
def find_average(lst):  
    if len(lst) == 0:  
        return 0  
    else:  
        return sum(lst) / len(lst)
```

```
lst = [5, 10, 15, 20, 25]  
average = find_average(lst)  
print(f"The average is {average}")
```

**Output Section :**



The screenshot shows the PyCharm IDE's Output window. The window title is 'Practical24'. The output text is:

```
/Users/saumyanayak/PycharmProjects/Practicals/ven
The average is 15.0

Process finished with exit code 0
```

The window has a dark theme and includes standard file operations icons (Up, Down, Copy, Paste, Print, Delete) on the left side.

## Practical No. 25

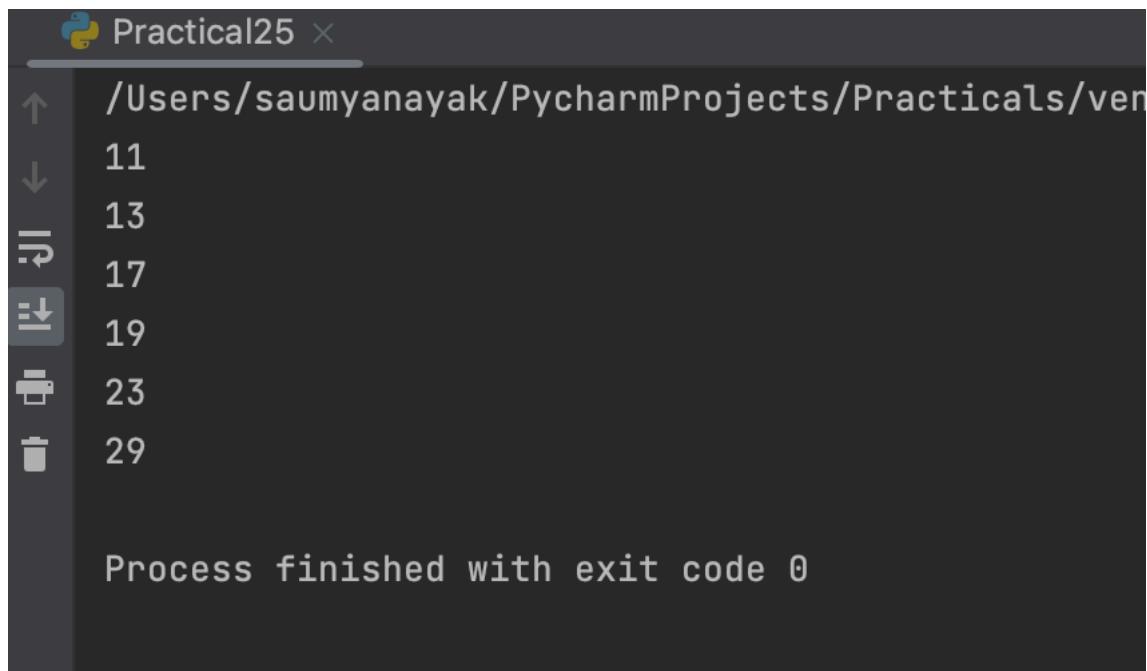
**Program :** Write a Python function to take two distinct integers as input and print all prime numbers between them.

**Code Section :**

```
def print_primes_between(num1, num2):  
    for num in range(num1, num2 + 1):  
        if num > 1:  
            for i in range(2, num):  
                if (num % i) == 0:  
                    break  
            else:  
                print(num)
```

```
print_primes_between(10, 30)
```

**Output Section :**



The screenshot shows the PyCharm IDE's Output window for a project named 'Practical25'. The window displays a list of odd numbers from 11 to 29, each on a new line. Below this list, the message 'Process finished with exit code 0' is shown, indicating the successful execution of the program.

```
11
13
17
19
23
29

Process finished with exit code 0
```

## Practical No. 26

**Program :** Write a Python function to take two integers as input and return both their sum and product.

**Code Section :**

```
def sum_and_product(num1, num2):
```

```
    sum = num1 + num2
```

```
    product = num1 * num2
```

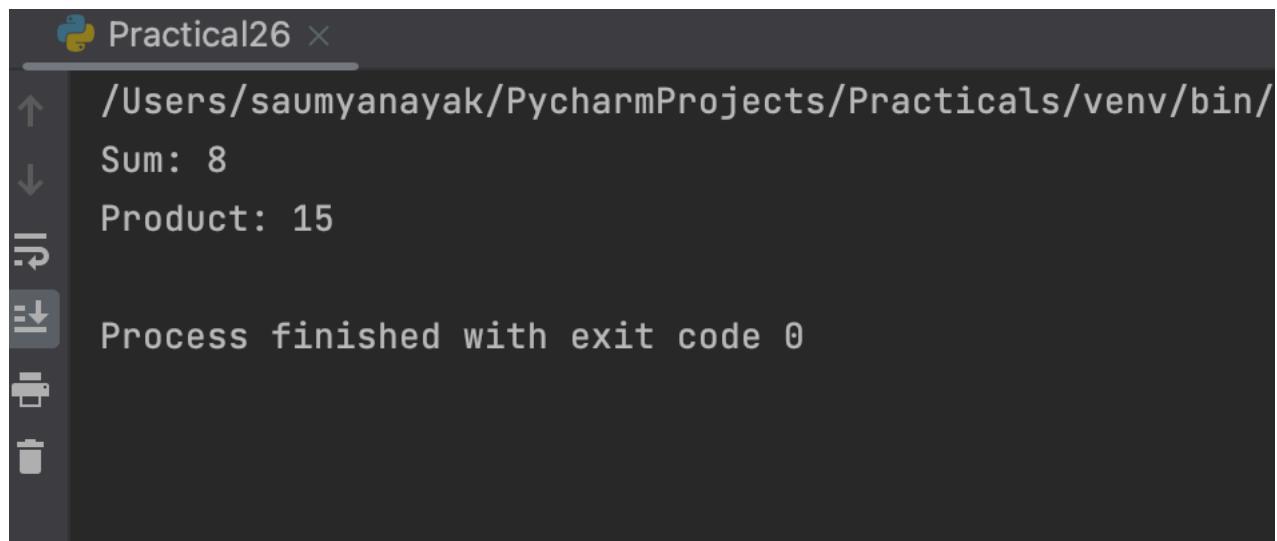
```
    return sum, product
```

```
result = sum_and_product(3, 5)
```

```
print("Sum:", result[0])
```

```
print("Product:", result[1])
```

**Output Section :**



A screenshot of the PyCharm terminal window titled "Practical26". The terminal displays the following output:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/
Sum: 8
Product: 15
Process finished with exit code 0
```

The terminal interface includes standard file operations icons (New, Open, Save, Print, Delete) on the left.

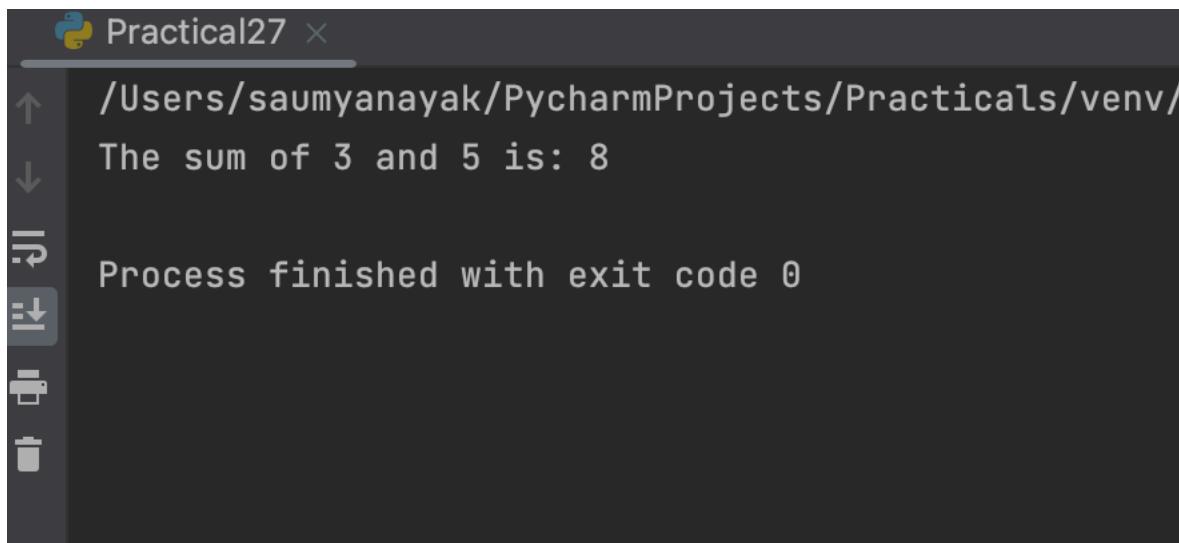
## Practical No. 27

**Program :** Write a Python program to demonstrate the positional arguments of a function.

**Code Section :**

```
def add_numbers(a, b):  
    sum = a + b  
    return sum  
  
result = add_numbers(3, 5)  
print("The sum of 3 and 5 is:", result)
```

**Output Section :**



The screenshot shows the PyCharm terminal window titled "Practical27". The terminal output is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/
The sum of 3 and 5 is: 8
Process finished with exit code 0
```

The terminal interface includes a vertical toolbar on the left with icons for file operations like up, down, copy, paste, and delete.

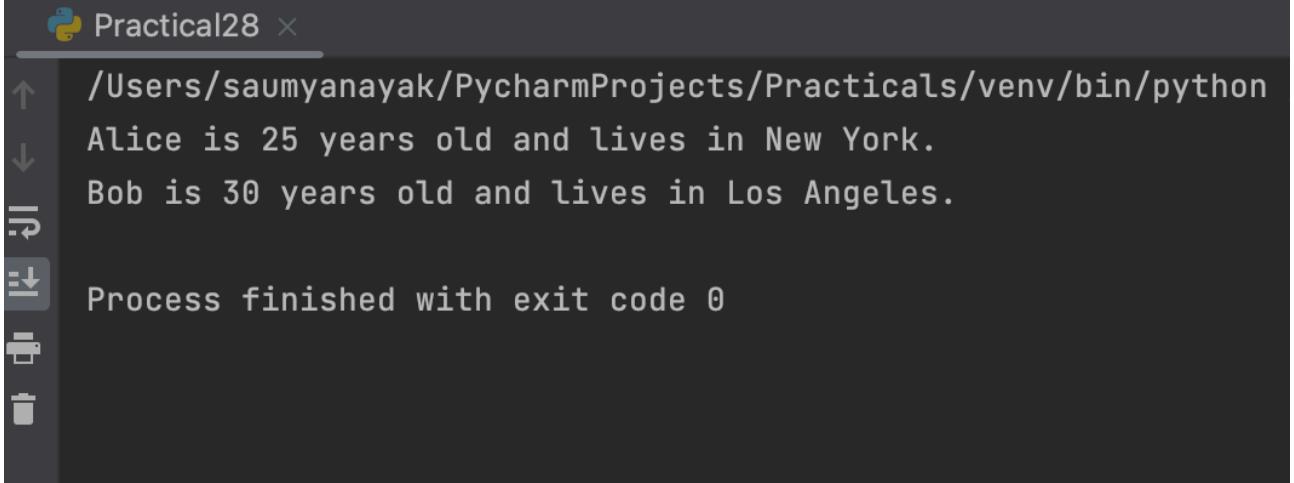
## Practical No. 28

**Program :** Write a Python program to demonstrate the keyword arguments of a function.

**Code Section :**

```
def describe_person(name, age, city):  
    print(f"{name} is {age} years old and lives in {city}.")  
  
# calling the function using positional arguments  
describe_person("Alice", 25, "New York")  
  
# calling the function using keyword arguments  
describe_person(name="Bob", age=30, city="Los Angeles")
```

**Output Section :**



```
Practical28 ×
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python
Alice is 25 years old and lives in New York.
Bob is 30 years old and lives in Los Angeles.

Process finished with exit code 0
```

## Practical No. 29

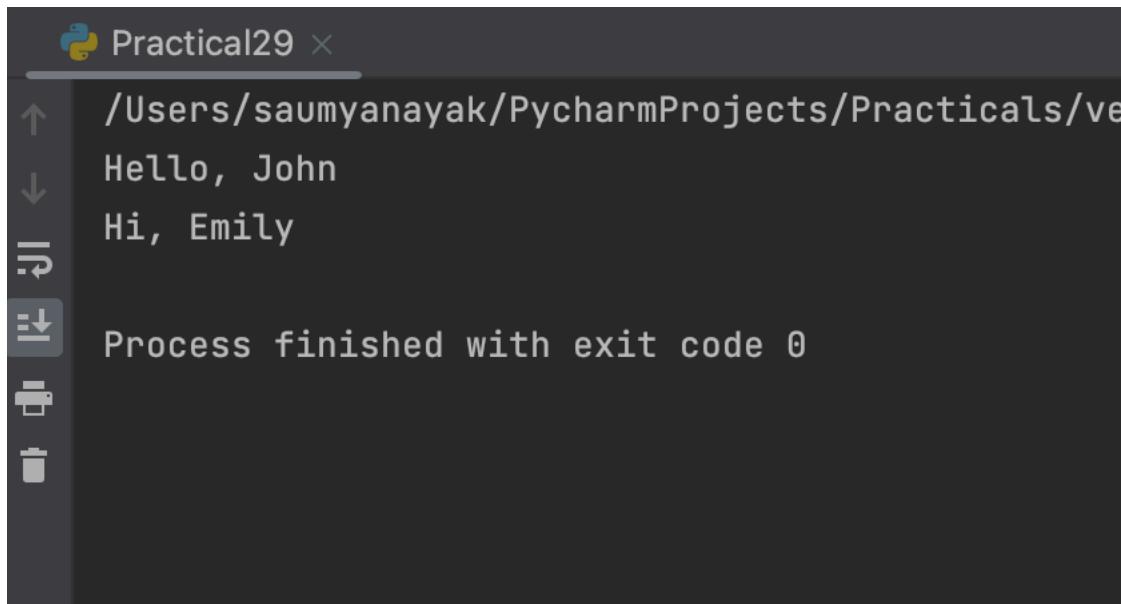
**Program :** Write a Python program to demonstrate the default arguments of a function.

**Code Section :**

```
def greet(name, greeting="Hello"):  
    print(greeting + ", " + name)  
  
# Call the function with one argument  
greet("John") # Output: Hello, John
```

```
# Call the function with two arguments  
greet("Emily", "Hi") # Output: Hi, Emily
```

**Output Section :**



The screenshot shows the PyCharm IDE's Output window. The window title is "Practical29". The output content is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/ve
Hello, John
Hi, Emily
Process finished with exit code 0
```

The window has a dark theme and includes standard file operations icons (New, Open, Save, Print, Delete) on the left side.

## Practical No. 30

**Program :** Write a Python function to demonstrate variable length arguments.

**Code Section :**

```
def add_numbers(*args):
```

```
    total = 0
```

```
    for num in args:
```

```
        total += num
```

```
    return total
```

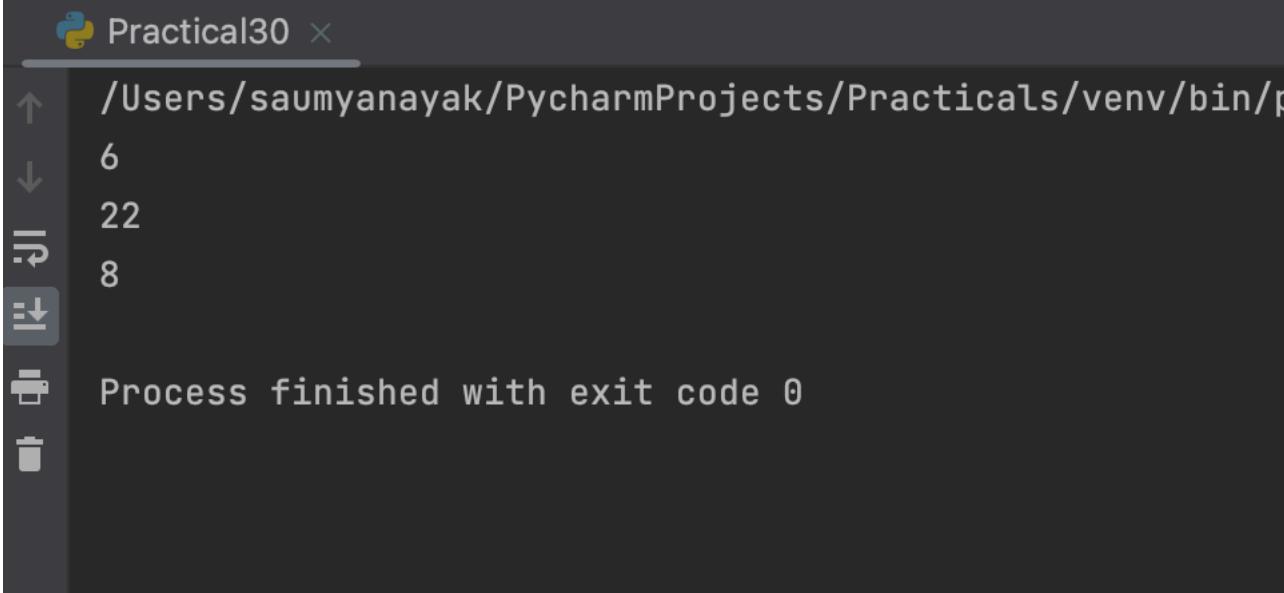
```
# Call the function with different number of arguments
```

```
print(add_numbers(1, 2, 3)) # Output: 6
```

```
print(add_numbers(4, 5, 6, 7)) # Output: 22
```

```
print(add_numbers(8)) # Output: 8
```

**Output Section :**



The screenshot shows the PyCharm IDE's Output window for a project named 'Practical30'. The window displays the following text output:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python
6
22
8
Process finished with exit code 0
```

The output consists of three lines of integers (6, 22, 8) followed by a message indicating the process finished successfully with an exit code of 0. The window has a dark theme and includes standard file operations like 'Open', 'Save', and 'Close' in the toolbar.

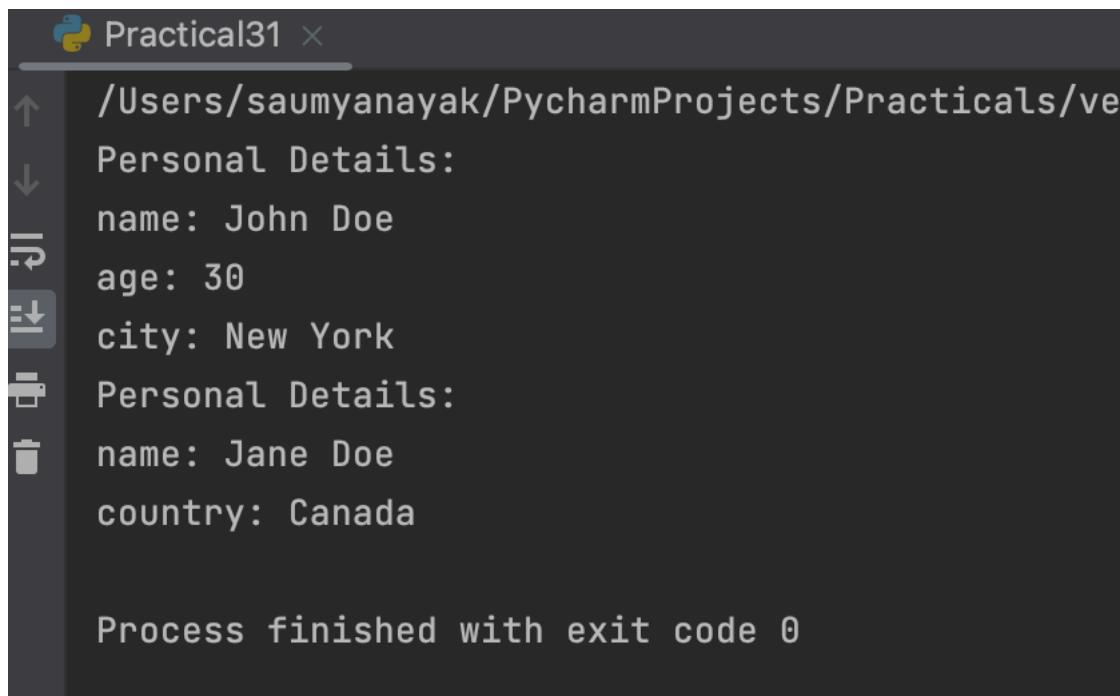
## Practical No. 31

**Program :** Write a Python function to demonstrate keyword variable length arguments.

**Code Section :**

```
def person_details(**kwargs):  
    print("Personal Details:")  
    for key, value in kwargs.items():  
        print(f'{key}: {value}')  
  
# Call the function with different keyword arguments  
person_details(name="John Doe", age=30, city="New York")  
person_details(name="Jane Doe", country="Canada")
```

**Output Section :**



A screenshot of the PyCharm terminal window titled "Practical31". The terminal displays the following output:

```
/Users/saumyanayak/PycharmProjects/Practicals/ve
Personal Details:
name: John Doe
age: 30
city: New York
Personal Details:
name: Jane Doe
country: Canada

Process finished with exit code 0
```

## Practical No. 32

**Program :** Write a Python program to demonstrate global and local variables.

**Code Section :**

```
# Global variable
```

```
global_var = 10
```

```
def func():
```

```
    # Local variable
```

```
    local_var = 5
```

```
    # Accessing the global variable within the function
```

```
    print("Inside the function - global_var:", global_var)
```

```
    # Accessing the local variable within the function
```

```
    print("Inside the function - local_var:", local_var)
```

```
# Call the function
```

```
func()
```

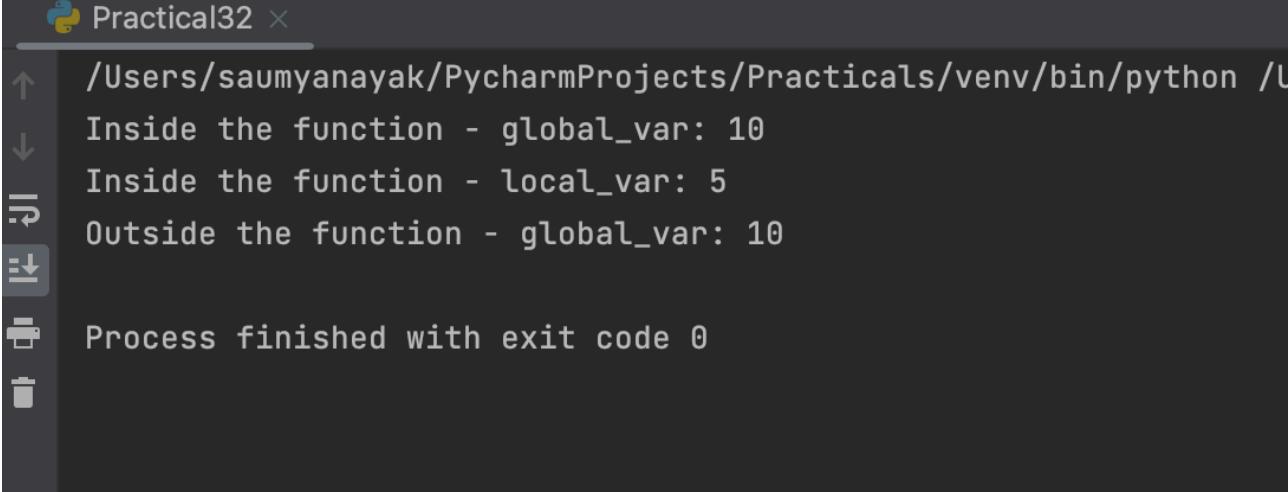
```
# Accessing the global variable outside the function
```

```
print("Outside the function - global_var:", global_var)
```

```
# Trying to access the local variable outside the function raises an error
```

```
#print("Outside the function - local_var:", local_var)
```

### Output Section :



```
Practical32 ×
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/PycharmProjects/Practicals/Practical32.py
Inside the function - global_var: 10
Inside the function - local_var: 5
Outside the function - global_var: 10
Process finished with exit code 0
```

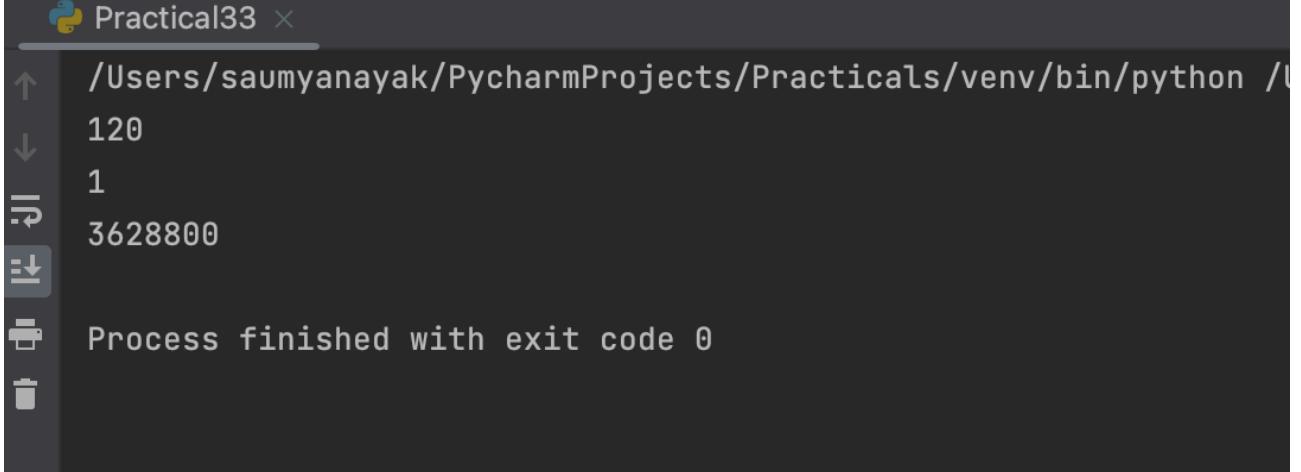
## Practical No. 33

**Program :** Write a Python function that takes an integer as input and calculates its factorial using recursion.

**Code Section :**

```
def factorial(n):  
    if n == 0:  
        return 1  
    else:  
        return n * factorial(n-1)  
  
print(factorial(5)) # Output: 120  
print(factorial(0)) # Output: 1  
print(factorial(10)) # Output: 3628800
```

**Output Section :**



The screenshot shows the PyCharm terminal window with the title 'Practical33'. The terminal output is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/PycharmProjects/Practicals/Practical33.py
120
1
3628800
Process finished with exit code 0
```

The terminal interface includes standard navigation keys (up, down, left, right, home, end) and a toolbar with icons for copy, paste, and other operations.

## Practical No. 34

**Program :** Write a Python program to demonstrate the use of lambda functions.

### **Code Section :**

```
# Example 1: Lambda function to add two numbers
```

```
add = lambda x, y: x + y
```

```
print(add(3, 5)) # Output: 8
```

```
# Example 2: Lambda function to check if a number is even
```

```
is_even = lambda x: x % 2 == 0
```

```
print(is_even(4)) # Output: True
```

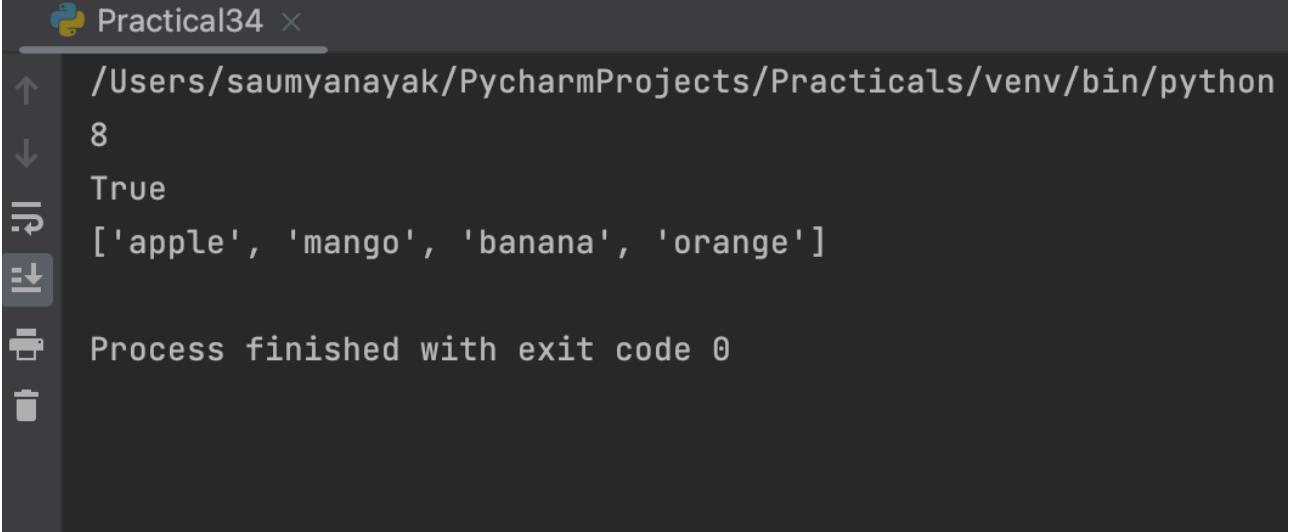
```
# Example 3: Sorting a list of strings by their length using lambda function
```

```
fruits = ['apple', 'banana', 'orange', 'mango']
```

```
sorted_fruits = sorted(fruits, key=lambda x: len(x))
```

```
print(sorted_fruits) # Output: ['mango', 'apple', 'banana', 'orange']
```

**Output Section :**



```
Practical34 ×
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python
8
True
['apple', 'mango', 'banana', 'orange']
Process finished with exit code 0
```

## Practical No. 35

**Program :** Write a Python program to demonstrate the use of lambda functions and map.

**Code Section :**

```
# Define a list of numbers
```

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

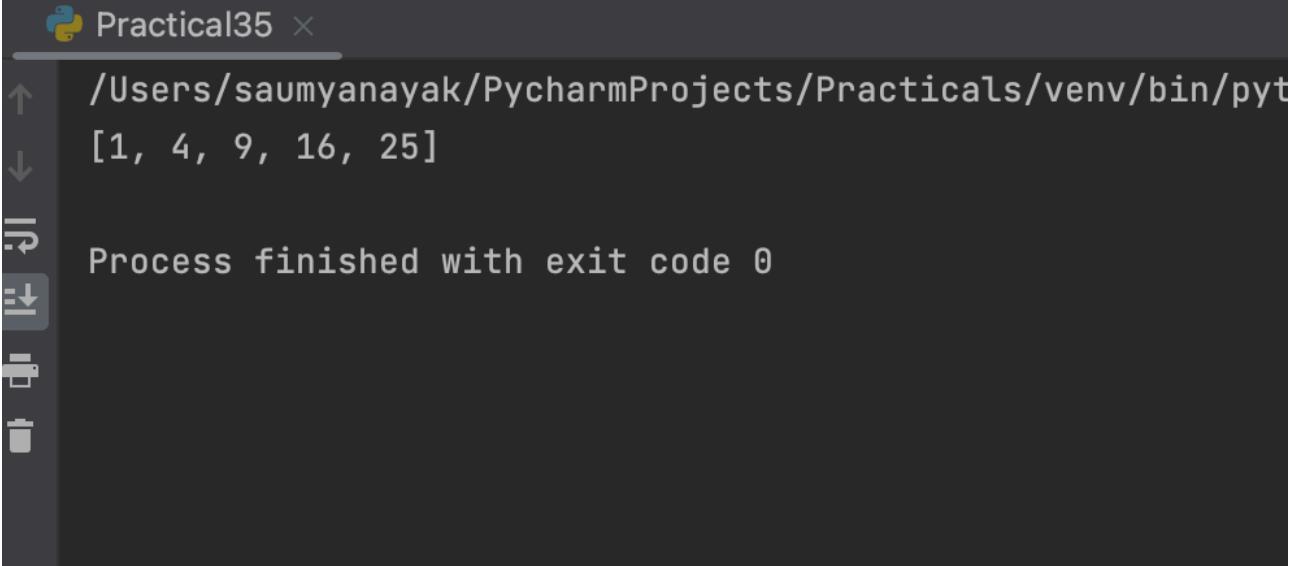
```
# Use lambda function and map to square each number in the list
```

```
squared_numbers = list(map(lambda x: x**2, numbers))
```

```
# Print the squared numbers
```

```
print(squared_numbers)
```

**Output Section :**



The screenshot shows the PyCharm IDE's Output window. The window title is 'Practical35'. The output text is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python
[1, 4, 9, 16, 25]

Process finished with exit code 0
```

The window has a dark theme and includes standard file operations icons (New, Open, Save, etc.) on the left side.

## Practical No. 36

**Program :** Write a Python program to demonstrate the use of lambda functions and reduce.

**Code Section :**

```
from functools import reduce
```

```
# using lambda functions with reduce to calculate the product of a list of numbers
```

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

```
product = reduce(lambda x, y: x * y, nums)
```

```
print(f"Product of {nums} = {product}")
```

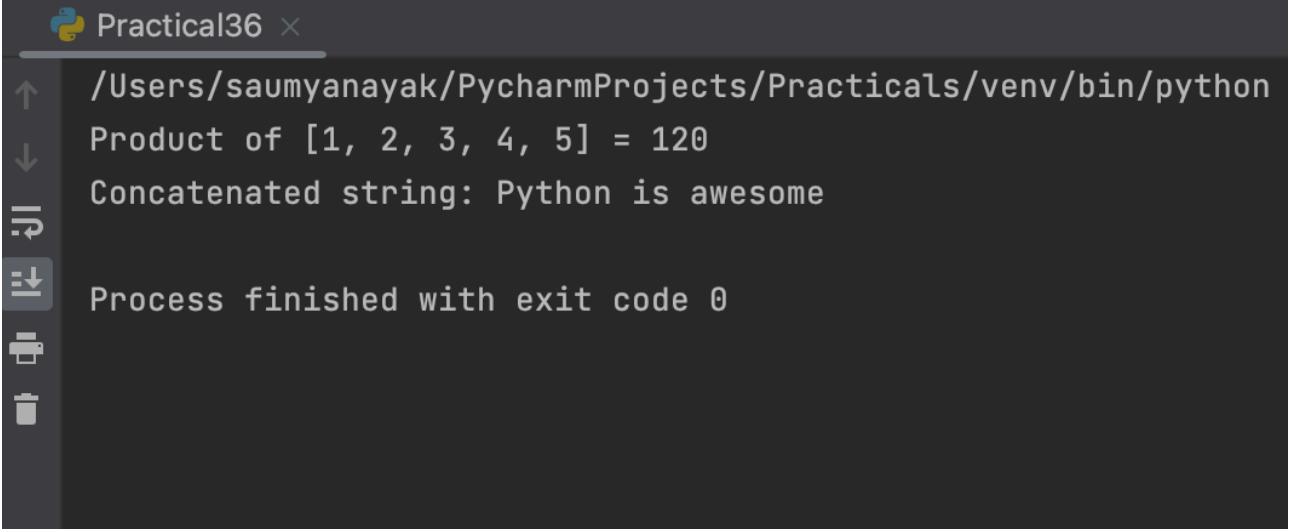
```
# using lambda functions with reduce to concatenate a list of strings
```

```
strings = ["Python", "is", "awesome"]
```

```
result = reduce(lambda x, y: x + " " + y, strings)
```

```
print(f"Concatenated string: {result}")
```

**Output Section :**



The screenshot shows the PyCharm terminal window titled 'Practical36'. The terminal output is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python
Product of [1, 2, 3, 4, 5] = 120
Concatenated string: Python is awesome

Process finished with exit code 0
```

The terminal interface includes a vertical toolbar on the left with icons for file operations like up, down, and search, and a bottom toolbar with icons for copy, paste, and delete.

## Practical No. 37

**Program :** Write a Python program to demonstrate the various list processing methods.

**Code Section :**

```
# create a list of integers
```

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

```
# print the length of the list
```

```
print("Length of the list:", len(nums))
```

```
# print the sum of the list
```

```
print("Sum of the list:", sum(nums))
```

```
# print the maximum value in the list
```

```
print("Maximum value in the list:", max(nums))
```

```
# print the minimum value in the list
```

```
print("Minimum value in the list:", min(nums))
```

```
# add a new element to the end of the list
```

```
nums.append(6)
```

```
print("List after appending a new element:", nums)
```

```
# insert a new element at a specific position in the list
```

```
nums.insert(2, 10)
```

```
print("List after inserting a new element:", nums)
```

```
# remove the first occurrence of an element in the list  
nums.remove(2)  
print("List after removing an element:", nums)
```

```
# sort the list in ascending order  
nums.sort()  
print("List in ascending order:", nums)
```

```
# sort the list in descending order  
nums.sort(reverse=True)  
print("List in descending order:", nums)
```

```
# reverse the order of the list  
nums.reverse()  
print("List in reverse order:", nums)
```

```
# create a copy of the list  
new_nums = nums.copy()  
print("New list:", new_nums)
```

```
# clear all elements from the list  
nums.clear()  
print("List after clearing all elements:", nums)
```

**Output Section :**

```
Practical37 ✘
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/PycharmProjects/Practicals/Practical37.py
Length of the list: 5
Sum of the list: 15
Maximum value in the list: 5
Minimum value in the list: 1
List after appending a new element: [1, 2, 3, 4, 5, 6]
List after inserting a new element: [1, 2, 10, 3, 4, 5, 6]
List after removing an element: [1, 10, 3, 4, 5, 6]
List in ascending order: [1, 3, 4, 5, 6, 10]
List in descending order: [10, 6, 5, 4, 3, 1]
List in reverse order: [1, 3, 4, 5, 6, 10]
New list: [1, 3, 4, 5, 6, 10]
List after clearing all elements: []
```

## Practical No. 38

**Program :** Write a Python program to find the biggest and smallest numbers in a list of integers.

**Code Section :**

```
def find_largest_smallest(numbers):
```

```
    largest = max(numbers)
```

```
    smallest = min(numbers)
```

```
    return largest, smallest
```

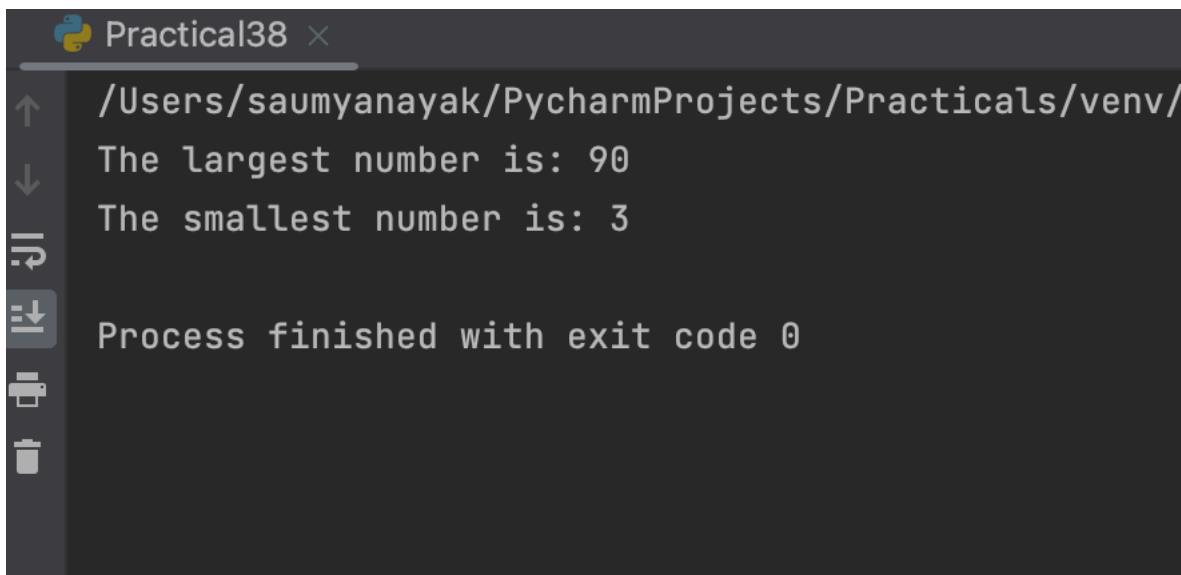
```
numbers = [12, 3, 45, 6, 78, 90, 23]
```

```
largest, smallest = find_largest_smallest(numbers)
```

```
print("The largest number is:", largest)
```

```
print("The smallest number is:", smallest)
```

**Output Section :**



```
Practical38
/Users/saumyanayak/PycharmProjects/Practicals/venv/
The largest number is: 90
The smallest number is: 3
Process finished with exit code 0
```

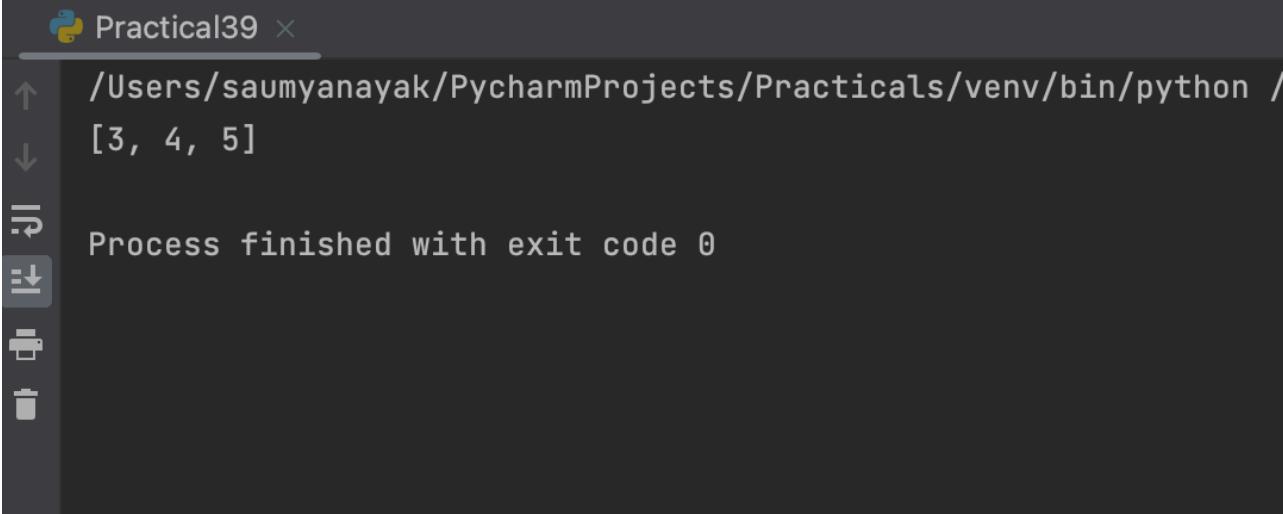
## Practical No. 39

**Program :** Write a Python program to find common elements in two lists.

**Code Section :**

```
def common_elements(list1, list2):  
    set1 = set(list1)  
    set2 = set(list2)  
    common = list(set1.intersection(set2))  
    return common  
  
# Example usage  
list1 = [1, 2, 3, 4, 5]  
list2 = [3, 4, 5, 6, 7]  
print(common_elements(list1, list2)) # Output: [3, 4, 5]
```

**Output Section :**



```
Practical39 <...>
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /
[3, 4, 5]

Process finished with exit code 0
```

## Practical No. 40

**Program :** Write a Python program to demonstrate the various tuple processing methods.

**Code Section :**

```
# create a tuple
```

```
my_tuple = (1, 3, 5, 7, 9)
```

```
# access elements of tuple using indexing
```

```
print(my_tuple[0]) # 1
```

```
print(my_tuple[2]) # 5
```

```
# slicing
```

```
print(my_tuple[1:4]) # (3, 5, 7)
```

```
# length of tuple
```

```
print(len(my_tuple)) # 5
```

```
# convert tuple to list
```

```
my_list = list(my_tuple)
```

```
print(my_list) # [1, 3, 5, 7, 9]
```

```
# count number of occurrences of an element
```

```
print(my_tuple.count(5)) # 1
```

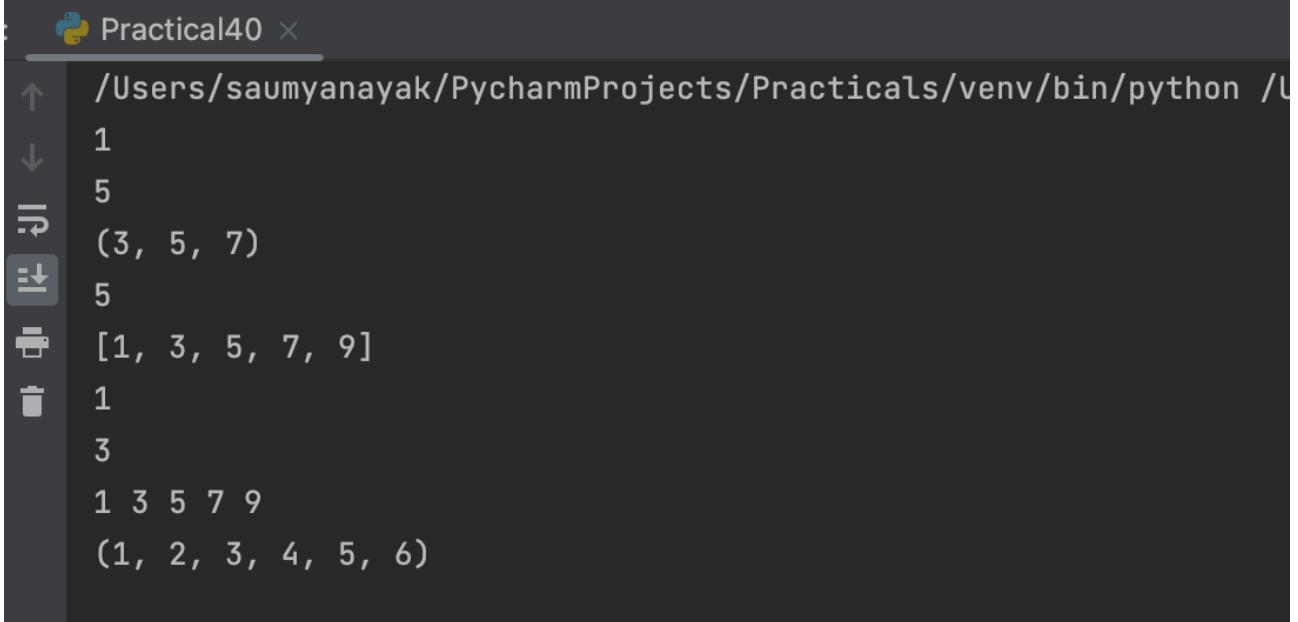
```
# index of the first occurrence of an element
```

```
print(my_tuple.index(7)) # 3
```

```
# unpacking a tuple
a, b, c, d, e = my_tuple
print(a, b, c, d, e) # 1 3 5 7 9
```

```
# combining tuples
tuple1 = (1, 2, 3)
tuple2 = (4, 5, 6)
combined_tuple = tuple1 + tuple2
print(combined_tuple) # (1, 2, 3, 4, 5, 6)
```

**Output Section :**



The screenshot shows the PyCharm interface with a dark theme. On the left, there is a vertical toolbar with icons for navigating between files, switching between tabs, and managing project structure. The main window displays the output of a Python script. The script's title is 'Practical40'. The output text is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/PycharmProjects/Practicals/Practical40.py
1
5
(3, 5, 7)
5
[1, 3, 5, 7, 9]
1
3
1 3 5 7 9
(1, 2, 3, 4, 5, 6)
```

## Practical No. 41

**Program :** Write a Python program to demonstrate the use of dictionaries.

**Code Section :**

```
# Define a dictionary with some key-value pairs
person = {'name': 'John', 'age': 30, 'city': 'New York'}

# Accessing dictionary values using keys
print(person['name']) # Output: John
print(person['age']) # Output: 30
print(person['city']) # Output: New York

# Adding a new key-value pair to the dictionary
person['occupation'] = 'Software Engineer'

print(person) # Output: {'name': 'John', 'age': 30, 'city': 'New York', 'occupation': 'Software Engineer'}

# Modifying an existing value in the dictionary
person['age'] = 35

print(person) # Output: {'name': 'John', 'age': 35, 'city': 'New York', 'occupation': 'Software Engineer'}

# Removing a key-value pair from the dictionary
del person['occupation']

print(person) # Output: {'name': 'John', 'age': 35, 'city': 'New York'}

# Looping through all the keys in a dictionary
for key in person:
    print(key, person[key])
```

## Output Section :

```
Practical41 ×
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/PycharmPr
↑
↓
John
30
New York
{'name': 'John', 'age': 30, 'city': 'New York', 'occupation': 'Software Engineer'}
{'name': 'John', 'age': 35, 'city': 'New York', 'occupation': 'Software Engineer'}
{'name': 'John', 'age': 35, 'city': 'New York'}
name John
age 35
city New York

Process finished with exit code 0
```

## Practical No. 42

**Program :** Write a Python program to find the number of occurrences of each letter in a string using dictionaries.

**Code Section :**

```
string = input("Enter a string: ")
```

```
count = {}
```

```
for letter in string:
```

```
    if letter in count:
```

```
        count[letter] += 1
```

```
    else:
```

```
        count[letter] = 1
```

```
print("The number of occurrences of each letter in the string:")
```

```
for letter, num in count.items():
```

```
    print(letter, ":", num)
```

## **Output Section :**

```
Practical42 x
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/Pycharm
Enter a string: Saumya Nayak
The number of occurrences of each letter in the string:
S : 1
a : 4
u : 1
m : 1
y : 2
: 1
N : 1
k : 1

Process finished with exit code 0
```

## Practical No. 43

**Program :** Write a Python program to print the CWD and change the CWD.

**Code Section :**

```
import os
```

```
# Print the current working directory
print("Current working directory:", os.getcwd())
```

```
# Change the current working directory
new_dir = input("Enter new directory path: ")
os.chdir(new_dir)
```

```
# Print the updated current working directory
print("Updated working directory:", os.getcwd())
```

### Output Section :

```
Practical43 ×
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanay
Current working directory: /Users/saumyanayak/PycharmProjects/Practicals
Enter new directory path: /Users/saumyanayak/Downloads
Updated working directory: /Users/saumyanayak/Downloads

Process finished with exit code 0
```

## Practical No. 44

**Program :** Write a Python program that takes a list of words from the user and writes them into a file. The program should stop when the user enters the word 'quit'.

**Code Section :**

```
filename = 'words.txt'

# Open the file in write mode
with open(filename, 'w') as file:

    # Loop until the user enters 'quit'
    while True:
        word = input("Enter a word: ")

        # Write the word to the file
        file.write(word + '\n')

        # If the user enters 'quit', break out of the loop
        if word == 'quit':
            break

    print(f"The words have been written to the file '{filename}'.")
```

**Output Section :**

```
Practical44 ×
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/Pychar
↑
↓
Enter a word: Fractional
Enter a word: reserve
Enter a word: banking
Enter a word: creates
Enter a word: money
Enter a word: quit
The words have been written to the file 'words.txt'.

Process finished with exit code 0
|
```

## Practical No. 45

**Program :** Write a Python program that reads a file in text mode and counts the number of words that contain anyone of the letters ['w', 'o', 'r', 'd', 's'].

### **Code Section :**

with open('words.txt', 'r') as file:

    word\_count = 0

    for line in file:

        words = line.strip().split()

        for word in words:

            for letter in ['w', 'o', 'r', 'd', 's']:

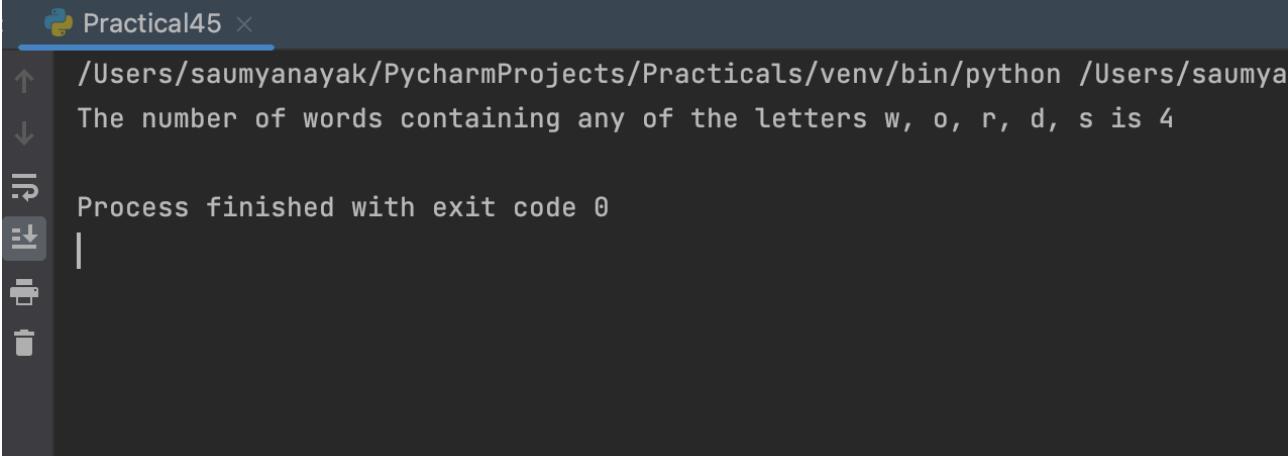
                if letter in word:

                    word\_count += 1

                break

```
print(fThe number of words containing any of the letters w, o, r, d, s is  
{word_count}')
```

### Output Section :



The screenshot shows the PyCharm terminal window for a project named 'Practical45'. The terminal output is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumya
The number of words containing any of the letters w, o, r, d, s is 4

Process finished with exit code 0
```

## Practical No. 46

**Program :** Python programs to demonstrate the creation and use of “modules”.

**Code Section :**

```
//mymodule

def say_hello():
    print("Hello from mymodule!")
```

```
//importing module
```

```
import mymodule
```

```
mymodule.say_hello()
```

## **Output Section :**

## Practical No. 47

**Program :** Exception Handling Program that uses try and except.

**Code Section :**

while True:

try:

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

y = int(input("Enter another number: "))

result = x / y

print("Result:", result)

break
```

except ValueError:

```
print("Invalid input, please enter a number.")
```

except ZeroDivisionError:

```
print("Cannot divide by zero, please enter a non-zero value for the second
number.")
```

**Output Section :**

```
Practical47 ×
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python Practical47.py
Enter a number: 55
Enter another number: five
Invalid input, please enter a number.
Enter a number: 4
Enter another number: 44
Result: 0.09090909090909091

Process finished with exit code 0
```

## Practical No. 48

**Program :** Exception Handling Program that handles multiple types of exceptions.

**Code Section :**

try:

```
# Code that may raise an exception
```

```
num1 = int(input("Enter a number: "))
```

```
num2 = int(input("Enter another number: "))
```

```
result = num1 / num2
```

```
print("The result is:", result)
```

except ValueError:

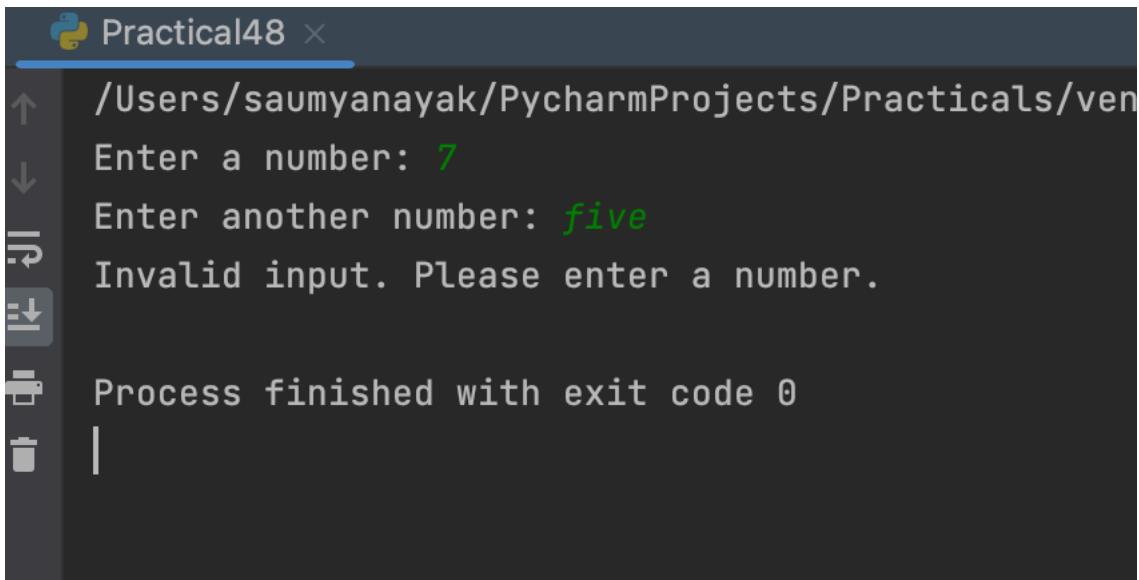
```
print("Invalid input. Please enter a number.")
```

except ZeroDivisionError:

```
print("Cannot divide by zero.")
```

except Exception as e:

```
print("An error occurred:", e)
```

**Output Section :**

Practical48

```
/Users/saumyanayak/PycharmProjects/Practicals/ven
Enter a number: 7
Enter another number: five
Invalid input. Please enter a number.

Process finished with exit code 0
```

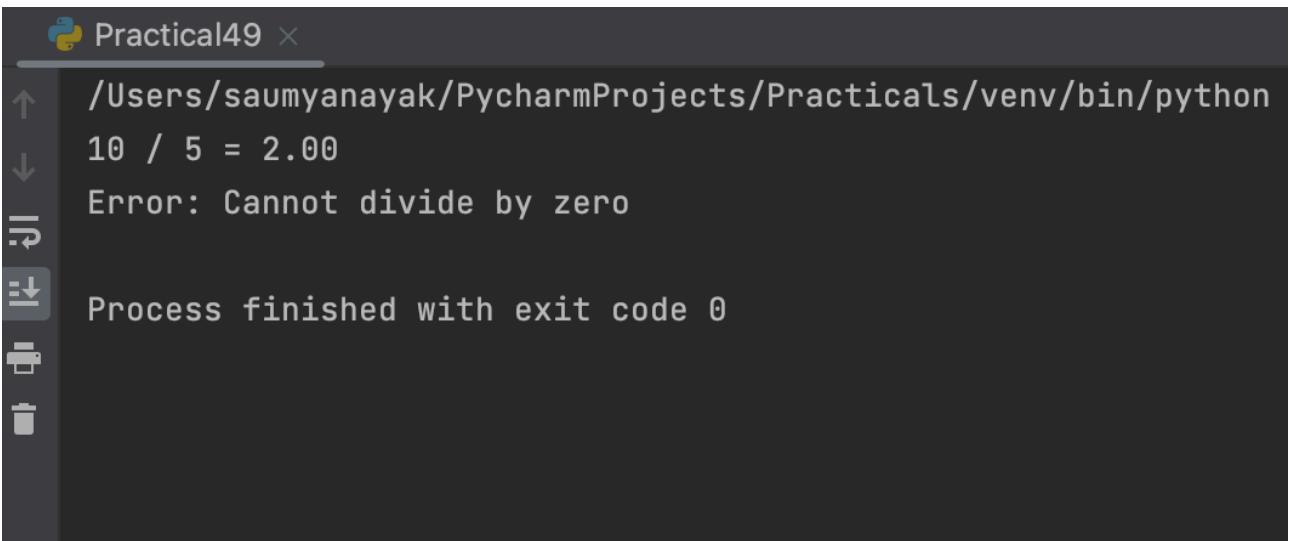
## Practical No. 49

**Program :** Exception Handling Program that uses try, except and else.

**Code Section :**

```
def divide_numbers(a, b):  
    try:  
        result = a / b  
    except ZeroDivisionError:  
        print("Error: Cannot divide by zero")  
    else:  
        print(f"\{a} / \{b} = \{result:.2f}\")  
  
# Example usage:  
divide_numbers(10, 5) # Output: 10 / 5 = 2.00  
divide_numbers(10, 0) # Output: Error: Cannot divide by zero
```

**Output Section :**



```
Practical49 ×
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python
10 / 5 = 2.00
Error: Cannot divide by zero
Process finished with exit code 0
```

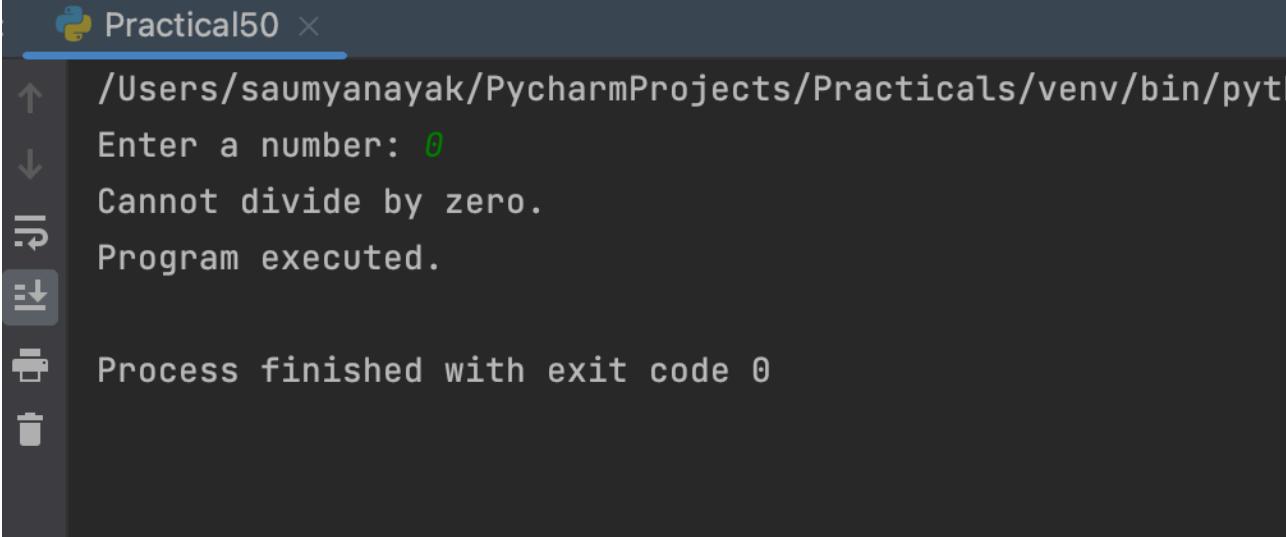
## Practical No. 50

**Program :** Exception Handling Program that uses finally with try.

**Code Section :**

```
try:  
    num = int(input("Enter a number: "))  
    result = 10 / num  
    print("Result:", result)  
  
except ValueError:  
    print("Invalid input. Please enter a number.")  
  
except ZeroDivisionError:  
    print("Cannot divide by zero.")  
  
else:  
    print("No exception occurred.")  
  
finally:  
    print("Program executed.")
```

**Output Section :**



The screenshot shows a terminal window in PyCharm with the title 'Practical50'. The terminal output is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python
Enter a number: 0
Cannot divide by zero.
Program executed.

Process finished with exit code 0
```

The terminal interface includes standard file operations (New, Open, Save, Print, Delete) on the left side of the window.

## Practical No. 51

**Program :** Write a Python program that creates a class “Person”, with attributes [aadhar, name, DoB]

**Code Section :**

```
class Person:
```

```
    def __init__(self, aadhar, name, DoB):
```

```
        self.aadhar = aadhar
```

```
        self.name = name
```

```
        self.DoB = DoB
```

```
    def display(self):
```

```
        print("Aadhar:", self.aadhar)
```

```
        print("Name:", self.name)
```

```
        print("Date of Birth:", self.DoB)
```

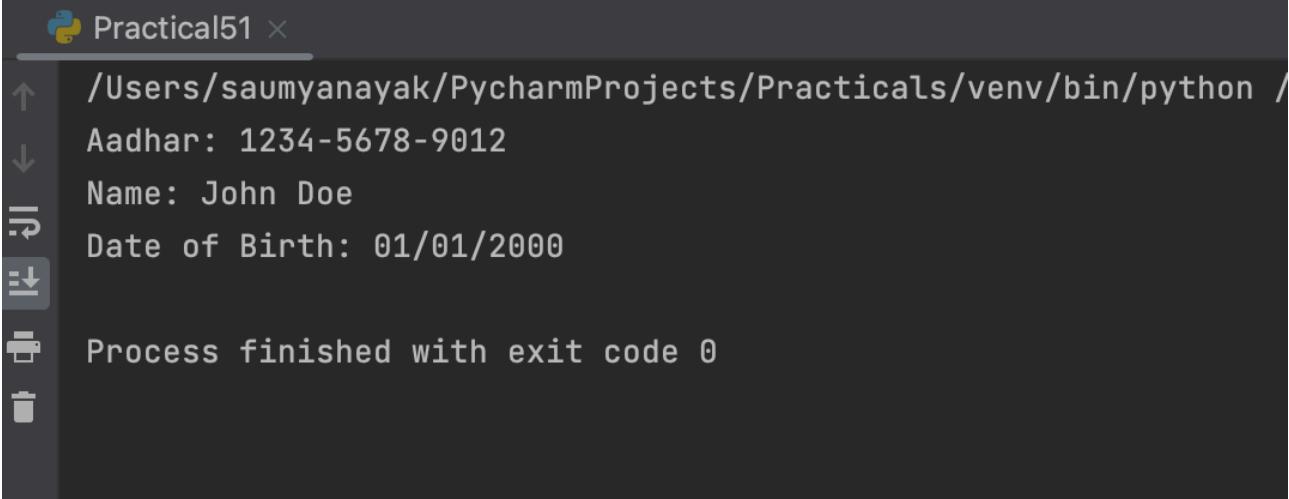
```
# Create an instance of the Person class
```

```
p = Person("1234-5678-9012", "John Doe", "01/01/2000")
```

```
# Display the details of the person
```

```
p.display()
```

**Output Section :**



The screenshot shows the PyCharm IDE's Output window for a project named 'Practical51'. The window displays the following text output:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /  
Aadhar: 1234-5678-9012  
Name: John Doe  
Date of Birth: 01/01/2000  
  
Process finished with exit code 0
```

The window has a dark theme and includes standard file and edit icons on the left side.

## Practical No. 52

**Program :** Write a Python program that creates classes “Point” and “Rectangle” where the Rectangle class has a Point object as its attribute.

### Code Section :

```
class Point:
```

```
    def __init__(self, x, y):  
        self.x = x  
        self.y = y
```

```
class Rectangle:
```

```
    def __init__(self, p1, p2):  
        self.p1 = p1  
        self.p2 = p2
```

```
    def area(self):
```

```
        width = abs(self.p2.x - self.p1.x)  
        height = abs(self.p2.y - self.p1.y)  
        return width * height
```

```
# example usage
```

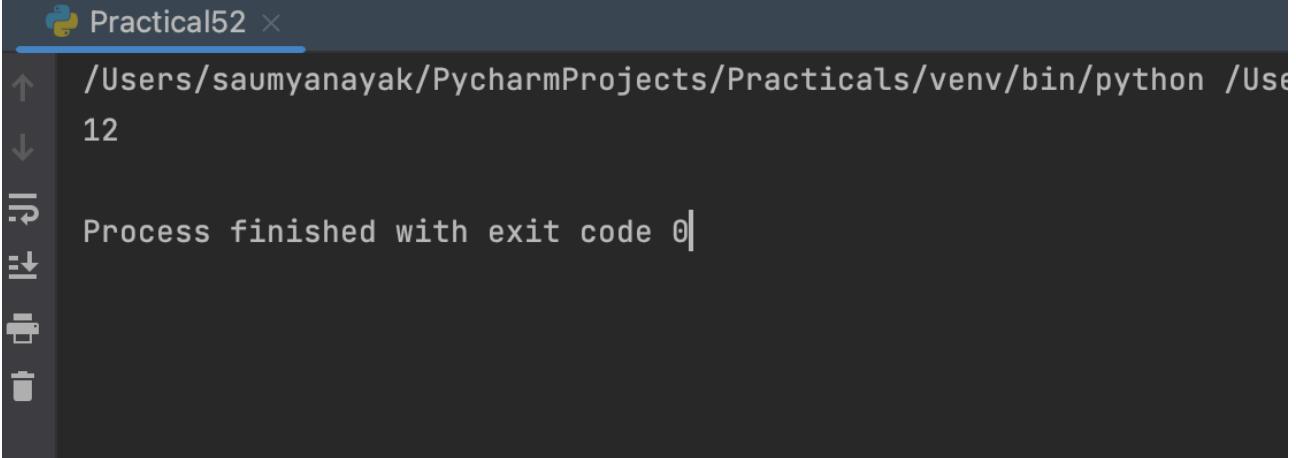
```
p1 = Point(2, 3)
```

```
p2 = Point(5, 7)
```

```
rect = Rectangle(p1, p2)
```

```
print(rect.area()) # prints 12
```

### Output Section :



The screenshot shows the PyCharm IDE's Output terminal. The terminal window is titled 'Practical52'. The output text is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/PycharmProjects/Practicals/Practical52.py
12

Process finished with exit code 0
```

The terminal interface includes standard file operations like Open, Save, and Delete on the left side.

## Practical No. 53

**Program :** Write a Python program that creates a class Students which inherits the properties of the “Person” class; add attributes [roll\_no, class].

### **Code Section :**

```
class Person:
```

```
    def __init__(self, aadhar, name, dob):  
        self.aadhar = aadhar  
        self.name = name  
        self.dob = dob
```

```
class Students(Person):
```

```
    def __init__(self, aadhar, name, dob, roll_no, class_name):  
        super().__init__(aadhar, name, dob)  
        self.roll_no = roll_no  
        self.class_name = class_name
```

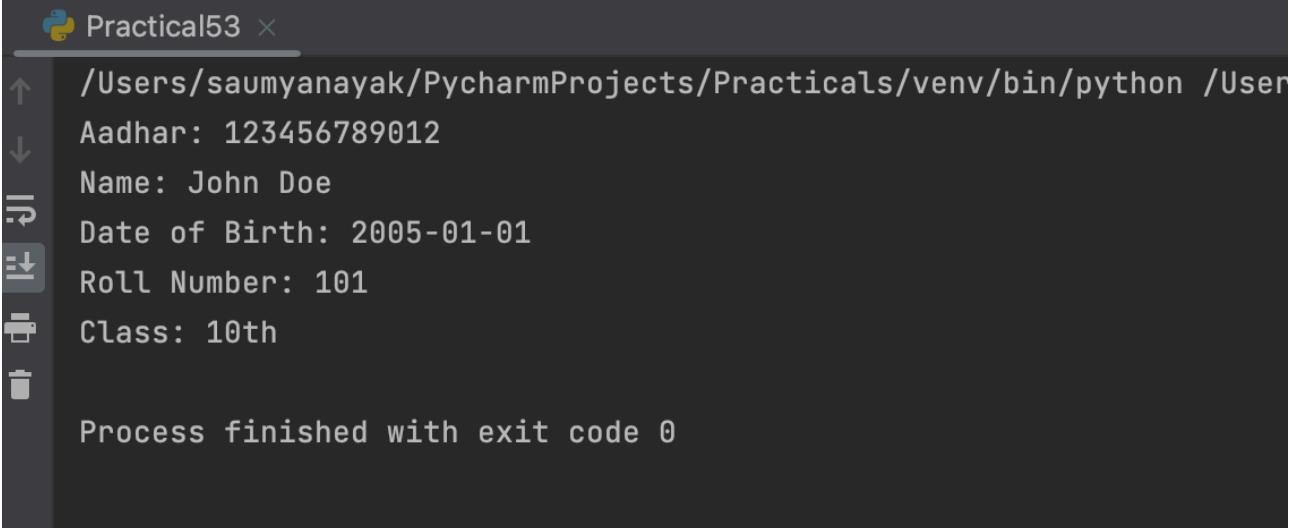
```
    def display(self):
```

```
        print("Aadhar:", self.aadhar)  
        print("Name:", self.name)  
        print("Date of Birth:", self.dob)  
        print("Roll Number:", self.roll_no)  
        print("Class:", self.class_name)
```

```
# creating object of Students class and displaying its details
```

```
s = Students("123456789012", "John Doe", "2005-01-01", "101", "10th")  
s.display()
```

### Output Section :



The screenshot shows the PyCharm terminal window titled 'Practical53'. The terminal displays the following output:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/PycharmProjects/Practicals/Practical53.py
Aadhar: 123456789012
Name: John Doe
Date of Birth: 2005-01-01
Roll Number: 101
Class: 10th

Process finished with exit code 0
```

## Practical No. 54

**Program :** Write a Python program to demonstrate “Multiple Inheritance”.

**Code Section :**

```
# Defining the parent classes
```

```
class A:
```

```
    def method_a(self):  
        print("This is method A")
```

```
class B:
```

```
    def method_b(self):  
        print("This is method B")
```

```
# Defining the child class which inherits from both A and B
```

```
class C(A, B):
```

```
    def method_c(self):  
        print("This is method C")
```

```
# Creating an object of class C
```

```
obj = C()
```

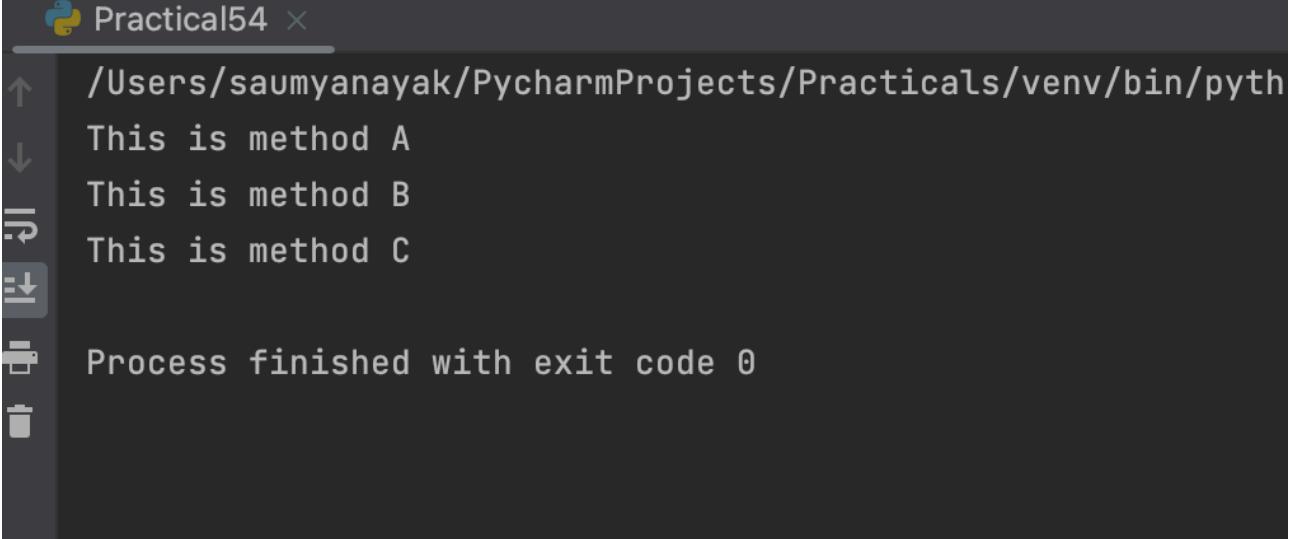
```
# Calling the methods of A, B, and C using the object of C
```

```
obj.method_a()
```

```
obj.method_b()
```

```
obj.method_c()
```

**Output Section :**



The screenshot shows the PyCharm IDE's terminal output window. The window title is 'Practical54'. The output text is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python
This is method A
This is method B
This is method C

Process finished with exit code 0
```

## Practical No. 55

**Program :** Write a Python program to demonstrate “Method Overriding”.

**Code Section :**

```
class Animal:
```

```
    def move(self):  
        print("I can move.")
```

```
class Dog(Animal):
```

```
    def move(self):  
        print("I can run and walk.")
```

```
class Fish(Animal):
```

```
    def move(self):  
        print("I can swim.")
```

```
# create objects of the classes
```

```
animal = Animal()
```

```
dog = Dog()
```

```
fish = Fish()
```

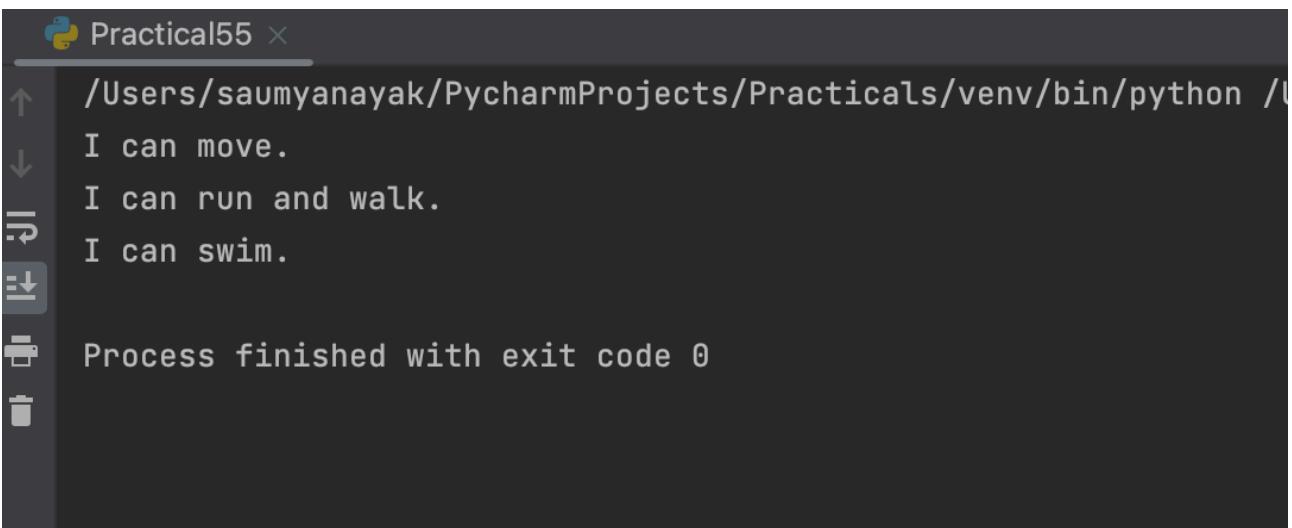
```
# call the move() method on each object
```

```
animal.move() # prints "I can move."
```

```
dog.move() # prints "I can run and walk."
```

```
fish.move() # prints "I can swim."
```

**Output Section :**



The screenshot shows the PyCharm IDE's terminal window. The title bar says "Practical55". The terminal output is as follows:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/PycharmProjects/Practicals/Practical55.py
I can move.
I can run and walk.
I can swim.

Process finished with exit code 0
```

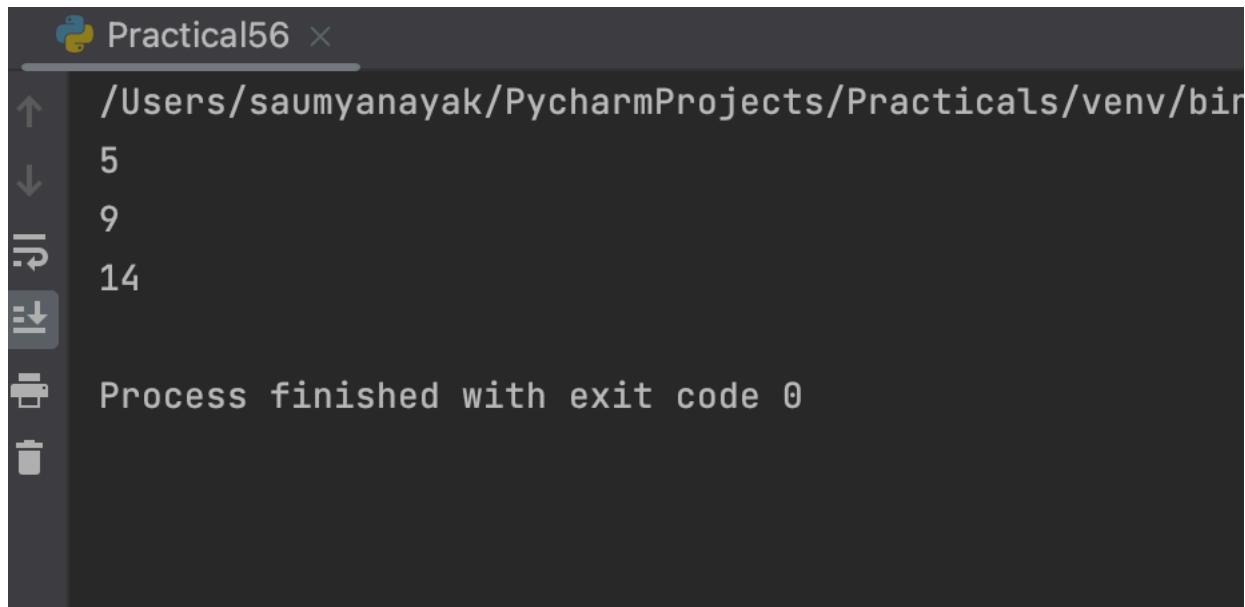
## Practical No. 56

**Program :** Write a Python program to demonstrate “Method Overloading”.

**Code Section :**

```
class Calculator:  
    def add(self, a, b, c=0, d=0):  
        return a + b + c + d  
  
calc = Calculator()  
  
print(calc.add(2, 3))  
print(calc.add(2, 3, 4))  
print(calc.add(2, 3, 4, 5))
```

**Output Section :**



The screenshot shows the PyCharm terminal window titled 'Practical56'. The terminal displays the following output:

```
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/PycharmProjects/Practicals/Practical56.py
5
9
14
Process finished with exit code 0
```

The terminal interface includes standard file navigation icons (up, down, back, forward, search) on the left and a trash bin icon at the bottom.

## Practical No. 57

**Program :** Write a Python program to demonstrate “Operator Overloading” [+ and -] using a class “Book”.

**Code Section :**

class Book:

```
def __init__(self, title, author, pages):
```

```
    self.title = title
```

```
    self.author = author
```

```
    self.pages = pages
```

```
def __str__:
```

```
    return f'{self.title} by {self.author}'
```

```
def __add__:
```

```
    new_title = f'{self.title} and {other.title}'
```

```
    new_author = f'{self.author} and {other.author}'
```

```
    new_pages = self.pages + other.pages
```

```
    return Book(new_title, new_author, new_pages)
```

```
def __sub__:
```

```
    new_title = f'{self.title} without {other.title}'
```

```
    new_author = self.author
```

```
    new_pages = self.pages - other.pages
```

```
    return Book(new_title, new_author, new_pages)
```

```
book1 = Book("The Alchemist", "Paulo Coelho", 197)
```

```
book2 = Book("The Catcher in the Rye", "J.D. Salinger", 224)
```

```
book3 = Book("To Kill a Mockingbird", "Harper Lee", 281)
```

```
# adding two books
```

```
new_book = book1 + book2
```

```
print(new_book)
```

```
print(f"Total pages: {new_book.pages}")
```

```
# subtracting one book from another
```

```
new_book = book3 - book2
```

```
print(new_book)
```

```
print(f"Total pages: {new_book.pages}")
```

## Output Section :

```
Practical57 x
/Users/saumyanayak/PycharmProjects/Practicals/venv/bin/python /Users/saumyanayak/
The Alchemist and The Catcher in the Rye by Paulo Coelho and J.D. Salinger
Total pages: 421
To Kill a Mockingbird without The Catcher in the Rye by Harper Lee
Total pages: 57
Process finished with exit code 0
```

## Practical No. 58

**Program :** Use the “turtle” module to draw concentric circles with different colours.

**Code Section :**

```
import turtle
```

```
colors = ["red", "green", "blue", "purple", "yellow"]
```

```
turtle.speed(0)
```

```
for i in range(5):
```

```
    turtle.color(colors[i])
```

```
    turtle.penup()
```

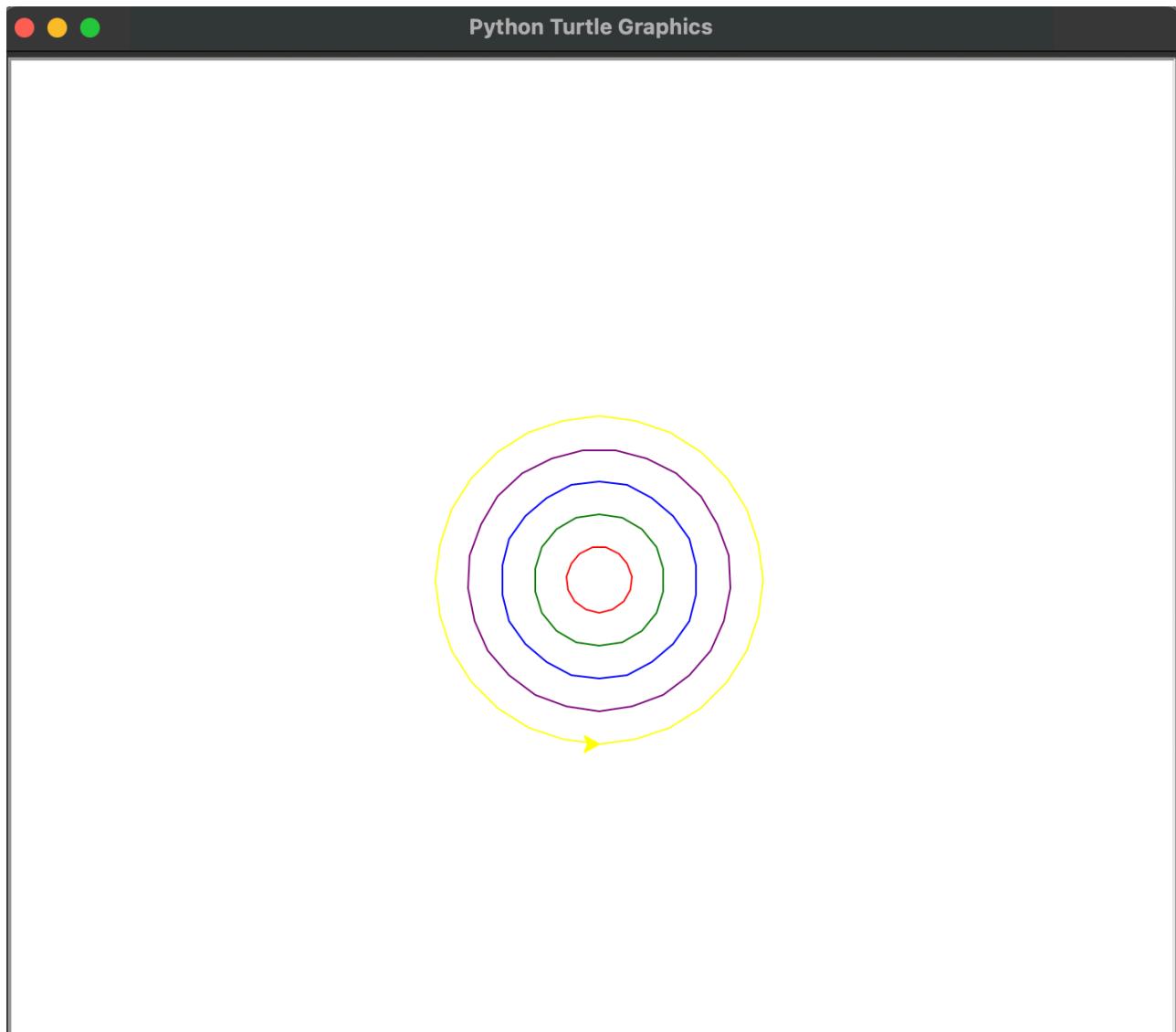
```
    turtle.goto(0, -i * 20)
```

```
    turtle.pendown()
```

```
    turtle.circle(20 * (i + 1))
```

```
turtle.done()
```

**Output Section :**



## Practical No. 59

**Program :** Use the “turtle” module to print the multiplication table.

**Code Section :**

```
import turtle
```

```
# Set up the turtle
```

```
t = turtle.Turtle()
```

```
t.speed(0)
```

```
# Define a function to draw a single multiplication table
```

```
def draw_table(num, x, y):
```

```
    t.penup()
```

```
    t.goto(x, y)
```

```
    t.pendown()
```

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

```
        t.write("{} x {} = {}".format(num, i, num * i))
```

```
        t.penup()
```

```
        t.goto(x, y - i * 20)
```

```
        t.pendown()
```

```
# Draw the multiplication tables
```

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

```
    draw_table(i, i * 50, 0)
```

```
# Keep the turtle window open
```

```
turtle.done()
```

**Output Section :**

$1 \times 1 = 1$	$2 \times 1 = 2$	$3 \times 1 = 3$	$4 \times 1 = 4$	$5 \times 1 = 5$	$6 \times 1 = 6$	$7 \times 1 = 7$	$8 \times 1 = 8$	$9 \times 1 = 9$	$10 \times 1 = 10$
$1 \times 2 = 2$	$2 \times 2 = 4$	$3 \times 2 = 6$	$4 \times 2 = 8$	$5 \times 2 = 10$	$6 \times 2 = 12$	$7 \times 2 = 14$	$8 \times 2 = 16$	$9 \times 2 = 18$	$10 \times 2 = 20$
$1 \times 3 = 3$	$2 \times 3 = 6$	$3 \times 3 = 9$	$4 \times 3 = 12$	$5 \times 3 = 15$	$6 \times 3 = 18$	$7 \times 3 = 21$	$8 \times 3 = 24$	$9 \times 3 = 27$	$10 \times 3 = 30$
$1 \times 4 = 4$	$2 \times 4 = 8$	$3 \times 4 = 12$	$4 \times 4 = 16$	$5 \times 4 = 20$	$6 \times 4 = 24$	$7 \times 4 = 28$	$8 \times 4 = 32$	$9 \times 4 = 36$	$10 \times 4 = 40$
$1 \times 5 = 5$	$2 \times 5 = 10$	$3 \times 5 = 15$	$4 \times 5 = 20$	$5 \times 5 = 25$	$6 \times 5 = 30$	$7 \times 5 = 35$	$8 \times 5 = 40$	$9 \times 5 = 45$	$10 \times 5 = 50$
$1 \times 6 = 6$	$2 \times 6 = 12$	$3 \times 6 = 18$	$4 \times 6 = 24$	$5 \times 6 = 30$	$6 \times 6 = 36$	$7 \times 6 = 42$	$8 \times 6 = 48$	$9 \times 6 = 54$	$10 \times 6 = 60$
$1 \times 7 = 7$	$2 \times 7 = 14$	$3 \times 7 = 21$	$4 \times 7 = 28$	$5 \times 7 = 35$	$6 \times 7 = 42$	$7 \times 7 = 49$	$8 \times 7 = 56$	$9 \times 7 = 63$	$10 \times 7 = 70$
$1 \times 8 = 8$	$2 \times 8 = 16$	$3 \times 8 = 24$	$4 \times 8 = 32$	$5 \times 8 = 40$	$6 \times 8 = 48$	$7 \times 8 = 56$	$8 \times 8 = 64$	$9 \times 8 = 72$	$10 \times 8 = 80$
$1 \times 9 = 9$	$2 \times 9 = 18$	$3 \times 9 = 27$	$4 \times 9 = 36$	$5 \times 9 = 45$	$6 \times 9 = 54$	$7 \times 9 = 63$	$8 \times 9 = 72$	$9 \times 9 = 81$	$10 \times 9 = 90$
$1 \times 10 = 10$	$2 \times 10 = 20$	$3 \times 10 = 30$	$4 \times 10 = 40$	$5 \times 10 = 50$	$6 \times 10 = 60$	$7 \times 10 = 70$	$8 \times 10 = 80$	$9 \times 10 = 90$	$10 \times 10 = 100$



## Practical No. 60

**Program :** Use the “turtle” module to draw (not write) your name.

**Code Section :**

```
import turtle as t
```

```
t.pen
```

```
t.backward(200)
```

```
t.undo()
```

```
t.penup()
```

```
t.backward(250)
```

```
t.pendown()
```

```
#S
```

```
t.forward(50)
```

```
t.left(90)
```

```
t.forward(25)
```

```
t.left(90)
```

```
t.forward(50)
```

```
t.right(90)
```

```
t.forward(25)
```

```
t.right(90)
```

```
t.forward(50)
```

```
t.penup()
```

```
t.goto(150,0)
```

```
t.undo()
```

```
#A
```

```
t.goto(-150,0)
```

```
t.left(90)
```

```
t.pendown()  
t.forward(50)  
t.right(90)  
t.forward(40)  
t.right(90)  
t.forward(50)  
t.backward(50)  
t.forward(25)  
t.right(90)  
t.forward(50)  
t.undo()  
t.forward(40)  
t.penup()  
#U  
t.goto(-70,0)  
t.right(90)  
t.forward(50)  
t.pendown()  
t.backward(50)  
t.right(90)  
t.forward(40)  
t.left(90)  
t.forward(50)  
#M  
t.goto(20,0)  
t.undo()
```

```
t.penup()  
t.goto(20,0)  
t.pendown()  
t.forward(50)  
t.right(90)  
t.forward(20)  
t.right(45)  
t.forward(25)  
t.left(90)  
t.forward(25)  
t.right(45)  
t.forward(20)  
t.right(90)  
t.forward(50)  
t.penup()  
#Y  
t.goto(120,0)  
t.goto(140,0)  
t.left(180)  
t.pendown()  
t.forward(25)  
t.left(45)  
t.forward(25)  
t.backward(25)  
t.right(90)  
t.forward(25)
```

```
t.penup()  
#A  
t.goto(190,0)  
t.left(45)  
t.pendown()  
t.forward(50)  
t.right(90)  
t.forward(40)  
t.right(90)  
t.forward(25)  
t.right(90)  
t.forward(40)  
t.backward(40)  
t.left(90)  
t.forward(25)
```

**Output Section :**

