

Ex.No:11B

Date:24.10.24

ARITHMETIC OPERATIONS USING RPC

AIM:

To Develop a simple calculator using XMLRPC

ALGORITHM:

Server.py

1. Import XMLRPCServer package
2. Define functions for addition, subtraction, multiplication, division and modulus
3. Initialize simple XMLRPCServer with IP address (or localhost) and port number
4. Register the functions add, sub, mul, div and mod with the server
5. Handle the request
6. Close the connection

Client.py

1. Import XMLRPC Client package
2. Define functions for addition, subtraction, multiplication, division and modulus
3. Initialize simple XMLRPC Client with Server IP address (or localhost) and port number
4. Get two numbers a and b for arithmetic operations
5. Call add() function and print the result
6. Call sub() function and print the result
7. Call mul() function and print the result
8. Call div() function and print the result
9. Call mod() function and print the result
10. Close the connection

CODE:

Server.py

XML RPC PROGRAM- SERVER SIDE:

```
from xmlrpc.server import SimpleXMLRPCServer
# Define a function
def is_even(n):
    return n % 2 == 0
def add(a,b):
    return a+b
def sub(a,b):
    return a-b
def factorial(n):
```

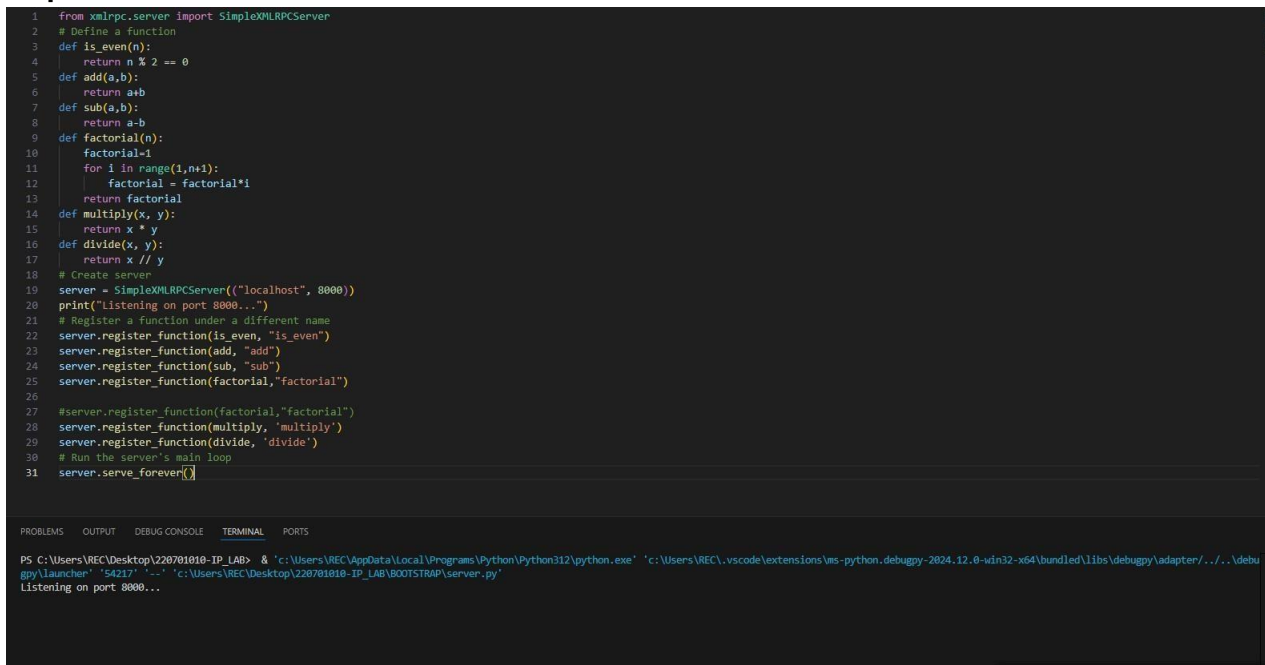
```

factorial=1
for i in range(1,n+1):
    factorial = factorial*i
return factorial
def multiply(x, y):
    return x * y
def divide(x, y):
    return x // y
# Create server
server = SimpleXMLRPCServer(("localhost", 8000))
print("Listening on port 8000...")
# Register a function under a different name
server.register_function(is_even, "is_even")
server.register_function(add, "add")
server.register_function(sub, "sub")
server.register_function(factorial, "factorial")

#server.register_function(factorial, "factorial")
server.register_function(multiply, 'multiply')
server.register_function(divide, 'divide')
# Run the server's main loop server.serve_forever()

```

Output:



```

1 from xmlrpc.server import SimpleXMLRPCServer
2 # Define a function
3 def is_even(n):
4     return n % 2 == 0
5 def add(a,b):
6     return a+b
7 def sub(a,b):
8     return a-b
9 def factorial(n):
10     factorial=1
11     for i in range(1,n+1):
12         factorial = factorial*i
13     return factorial
14 def multiply(x, y):
15     return x * y
16 def divide(x, y):
17     return x // y
18 # Create server
19 server = SimpleXMLRPCServer(("localhost", 8000))
20 print("Listening on port 8000...")
21 # Register a function under a different name
22 server.register_function(is_even, "is_even")
23 server.register_function(add, "add")
24 server.register_function(sub, "sub")
25 server.register_function(factorial, "factorial")
26
27 #server.register_function(factorial, "factorial")
28 server.register_function(multiply, 'multiply')
29 server.register_function(divide, 'divide')
30 # Run the server's main loop
31 server.serve_forever()

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\REC\Desktop\220701010-IP_LAB> & 'c:\Users\REC\AppData\Local\Programs\Python\Python312\python.exe' 'c:\Users\REC\.vscode\extensions\ms-python.debugpy-2024.12.0-x64\bundled\libs\debugpy\adapter\..\..\debugpy\launcher' '54217' '-.' 'c:\Users\REC\Desktop\220701010-IP_LAB\BOOTSTRAP\server.py'
Listening on port 8000...

Client.py

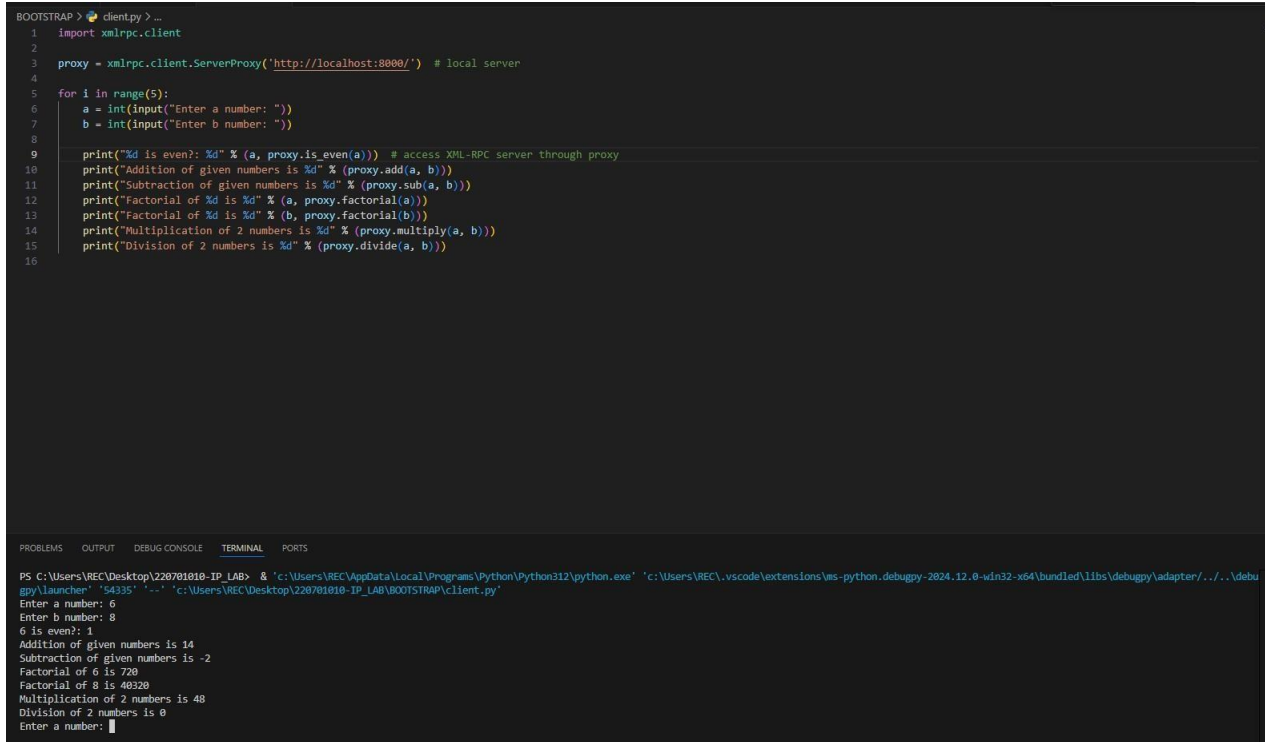
XML RPC PROGRAM- CLIENT SIDE:

```

import xmlrpc.client proxy=
xmlrpc.client.ServerProxy('http://localhost:8000/') # local server for i in
range(5):
a=int(input("Enter a number:")) b=int(input("Enter
b number:"))
print("%d is even?: %d" % (a, (proxy.is_even(a)))) #access XML-RPC server through proxy
print("addition of given number is %d "%((proxy.add(a,b)))) print("sub of given number is
%d "%((proxy.sub(a,b))))
print("factorial: %d" %((proxy.factorial(a)))) print("factorial: %d"
%((proxy.factorial(b)))) print("Multiplication of 2 numbers is
%d" %(proxy.multiply(a,b)) print("Division of 2 numbers is %d"
%(proxy.divide(a,b))

```

Output:



The screenshot shows a VS Code editor with a Python script in a file named `client.py`. The script uses `xmlrpc.client` to connect to a local XML-RPC server at `http://localhost:8000/`. It performs several operations: checking if a number is even, adding and subtracting numbers, calculating factorials, multiplying, and dividing two numbers. The terminal output shows the execution of the script, where the user enters the number 6 for 'a' and 8 for 'b'. The output displays the results of these operations: 6 is even (True), addition of 6 and 8 is 14, subtraction of 6 and 8 is -2, factorial of 6 is 720, factorial of 8 is 40320, multiplication of 6 and 8 is 48, and division of 6 and 8 is 0.75. The terminal also shows the command prompt and the file path of the script.

```

BOOTSTRAP > client.py > ...
1 import xmlrpc.client
2
3 proxy = xmlrpc.client.ServerProxy('http://localhost:8000/') # local server
4
5 for i in range(5):
6     a = int(input("Enter a number: "))
7     b = int(input("Enter b number: "))
8
9     print("%d is even?: %d" % (a, proxy.is_even(a))) # access XML-RPC server through proxy
10    print("Addition of given numbers is %d" % (proxy.add(a, b)))
11    print("Subtraction of given numbers is %d" % (proxy.sub(a, b)))
12    print("Factorial of %d is %d" % (a, proxy.factorial(a)))
13    print("Factorial of %d is %d" % (b, proxy.factorial(b)))
14    print("Multiplication of 2 numbers is %d" % (proxy.multiply(a, b)))
15    print("Division of 2 numbers is %d" % (proxy.divide(a, b)))
16

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```

PS C:\Users\REC\Desktop\220701010-IP_LAB> & 'c:\Users\REC\AppData\Local\Programs\Python\Python312\python.exe' 'c:\Users\REC\.vscode\extensions\ms-python.debugpy-2024.12.0-win32-x64\bundled\libs\debugpy\adapter\...\debu
gpy\launcher' '54335' '-.' 'c:\Users\REC\Desktop\220701010-IP_LAB\BOOTSTRAP\client.py'
Enter a number: 6
Enter b number: 8
6 is even?: 1
Addition of given numbers is 14
Subtraction of given numbers is -2
Factorial of 6 is 720
Factorial of 8 is 40320
Multiplication of 2 numbers is 48
Division of 2 numbers is 0.75
Enter a number:

```

Result:

A simple calculator was designed using XMLRPC.