

CSA0670-Design and Analysis of Algorithms for Tractability Problems.

9. Write a program to check a number is a prime number or not using recursion.

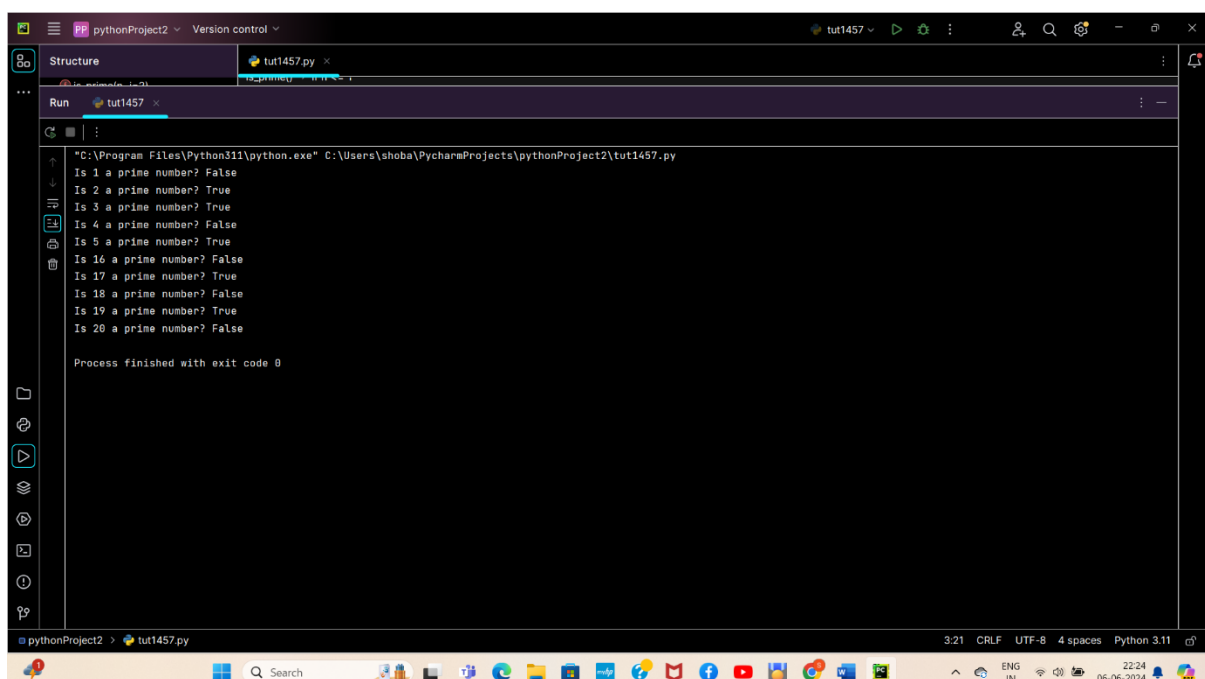
Program:

```
def is_prime(n, i=2):
    if n <= 1:
        return False
    if i * i > n:
        return True
    if n % i == 0:
        return False
    return is_prime(n, i + 1)

numbers = [1, 2, 3, 4, 5, 16, 17, 18, 19, 20]

for num in numbers:
    print("Is {} a prime number? {}".format(num, is_prime(num)))
```

Output:

A screenshot of a Python IDE window titled 'pythonProject2'. The 'Run' console shows the output of the program. The output consists of ten lines, each asking 'Is [number] a prime number? [True/False]'. The numbers are 1, 2, 3, 4, 5, 16, 17, 18, 19, and 20. The results are False, True, True, False, True, False, True, False, True, and False respectively. The console also shows the command prompt path and the message 'Process finished with exit code 0'. The status bar at the bottom indicates '3:21 CRLF UTF-8 4 spaces Python 3.11'.

Time Complexity: $O(\sqrt{n})$