Problem 7. By listing the first six prime numbers: 2, 3, 5, 7, 11, and 13, we can see that the 6th prime is 13. What is the 10,001st prime number?

Knowledge Required: How to check if a number is prime

Solution Outline: This problem asks us to print 10,001st prime number. We start by implementing a function `is_prime` which checks if a number is prime in $O(\sqrt{n})$ time. Then we initialize three variables `_10001st_prime` to None, `cnt` to 0 and `num` to 2. Then we run a while loop, until `cnt` becomes equal 10001, and check if `num` is prime, if it is we increment the `cnt` by one and set `_10001st_prime` to `num`. Finally `_10001st_prime` contains the final answer.

Python Solution

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

_10001st_prime = None
cnt = 0
num = 2

while cnt < 10001:
    if is_prime(num):
        cnt += 1
        _10001st_prime = num

    num += 1

print(_10001st_prime)
```