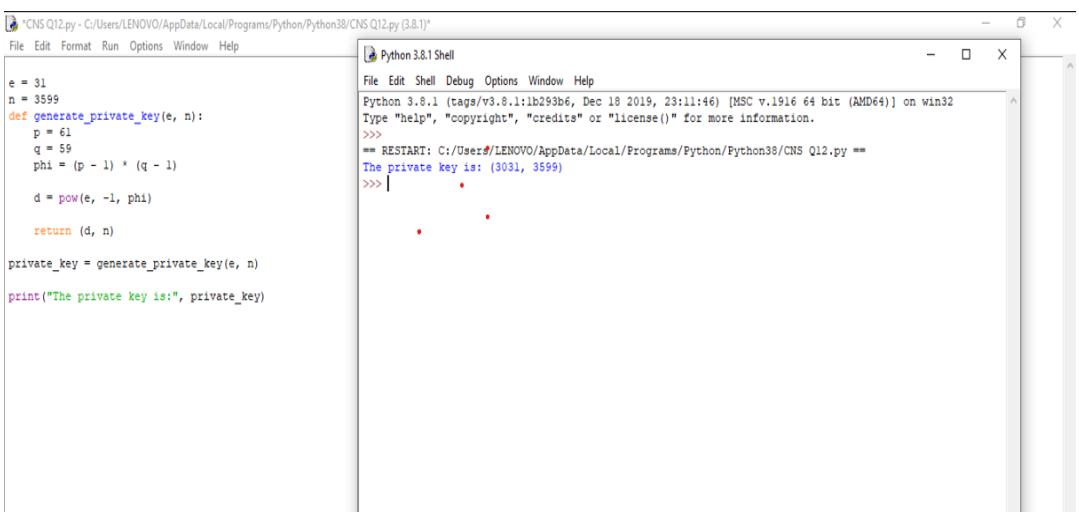
DAY 3

Q12. Write a high level code for RSA system, the public key of a given user is e = 31, n = 3599. What is the private key of this user?

PROGRAM:

```
e = 31

n = 3599

def generate_private_key(e, n):

    p = 61

    q = 59

    phi = (p - 1) * (q - 1)

    d = pow(e, -1, phi)

    return (d, n)

private_key = generate_private_key(e, n)

print("The private key is:", private_key)
```

RESULT:



Q13. Write a high level code for set of blocks encoded with the RSA algorithm and we don't have the private key. Assume n = pq, e is the public key. Suppose also someone tells us they know one of the plaintext blocks has a common factor with n. Does this help us in any way?

PROGRAM:

```
# Define the public key values

n = 3599 # Assuming n is a composite number

e = 31

# Define a list of encoded blocks

encoded_blocks = [1221, 1335, 1765, 1963, 2345]

# Define a function to check for common factors

def check_common_factor(block):

    # Check if block has a common factor with n

    if n % block == 0:

        # If yes, return True and the common factor

        return True, n // block

    else:

        # If no, return False and None

        return False, None

# Loop through each encoded block

for block in encoded_blocks:

    # Check for common factors

    has_common_factor, factor = check_common_factor(block)

    # If a common factor is found, print the result and exit the loop

    if has_common_factor:

        print("Block {} has a common factor with n: {}".format(block, factor))

        break
```

else:

If no common factors are found, print a message

print("No plaintext block has a common factor with n.")

RESULT: