```python
# 11-1
def f(n):  new *
    if n == 0:
        return 0
    else:
        return f(n - 1) + n

# 11-2
def Fib(n):  3 usages  new *
    if n == 0 or n == 1:
        return n
    return Fib(n - 1) + Fib(n - 2)

# 11-3
def Catalen(n):  3 usages  new *
    if n == 0:
        return 1
    else:
        sum = 0
        for k in range (0, n):
            sum += Catalen(k) * Catalen(n - k - 1)
        return sum

# 11-4
def Cnk(n, k):  6 usages  new *
```

```python

# 11-4
def Cnk(n, k):  6 usages  new *
    if n == 0 or n == k:
        return 1
    return Cnk(n - 1, k) + Cnk(n - 1, k - 1)

# 11-6
def gcd(a, b):  2 usages  new *
    if b == 0:
        return a;
    return gcd(b, a % b)


if __name__ == '__main__':
    print(f(100))
    for i in range(10):
        print("Fib(%d) = %d" % (i, Fib(i)))
    for n in range(10):
        print("Catalen(%d) = %d" % (n, Catalen(n)))
    print("C(5, 3) = ", Cnk( n: 5,  k: 3))
    print("C(4, 2) = ", Cnk( n: 4,  k: 2))
    print("C(4, 3) = ", Cnk( n: 4,  k: 3))
    # 11-5
    for n in range(10):
```

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


if __name__ == '__main__':
    print(f(100))
    for i in range(10):
        print("Fib(%d) = %d" % (i, Fib(i)))
    for n in range(10):
        print("Catalen(%d) = %d" % (n, Catalen(n)))
    print("C(5, 3) = ", Cnk( n: 5,  k: 3))
    print("C(4, 2) = ", Cnk( n: 4,  k: 2))
    print("C(4, 3) = ", Cnk( n: 4,  k: 3))
    # 11-5
    for n in range(10):
        for k in range(n + 1):
            print(Cnk(n, k), end = " ")
        print()
    a, b = eval(input("Please enter two numbers: "))
    ans = gcd(a, b)
    print("GCD(%d, %d) = %d" % (a, b, ans))
```

```
/usr/local/bin/python3.12 /Users/pengyenjia/Desktop/運算思維與程式設計/makeUp_Submission_py/5_6/課堂練習/11227130_資訊二甲_11227130_彭妍嘉 5_6.py
5050
Fib(0) = 0
Fib(1) = 1
Fib(2) = 1
Fib(3) = 2
Fib(4) = 3
Fib(5) = 5
Fib(6) = 8
Fib(7) = 13
Fib(8) = 21
Fib(9) = 34
Catalen(0) = 1
Catalen(1) = 1
Catalen(2) = 2
Catalen(3) = 5
Catalen(4) = 14
Catalen(5) = 42
Catalen(6) = 132
Catalen(7) = 429
Catalen(8) = 1430
Catalen(9) = 4862
C(5, 3) =  16
C(4, 2) =  11
C(4, 3) =  5
1
2 1
4 3 1
8 7 4 1
16 15 11 5 1
32 31 26 16 6 1
64 63 57 42 22 7 1
128 127 120 99 64 29 8 1
```

```
1
2 1
4 3 1
8 7 4 1
16 15 11 5 1
32 31 26 16 6 1
64 63 57 42 22 7 1
128 127 120 99 64 29 8 1
256 255 247 219 163 93 37 9 1
512 511 502 466 382 256 130 46 10 1
Please enter two numbers: 2, 3
GCD(2, 3) = 1

Process finished with exit code 0
```