Programming in Python (CSE 3142)

MINOR ASSIGNMENT-3: CONTROL STRUCTURES

1. Write an assignment statement using a single conditional expression for the following if-else code:

```
if marks >= 70:
        remarks = 'good'
else:
        remarks = 'average'
```

2. Study the program segments given below. In each case, give the output produced, if any.

a.
```
total = 0
count = 20
  while count > 5:
  total += count
count -= 1
print(total)
```

b.
```
total = 0
N = 5
for i in range(1, N+1):
  for j in range(1, i+1):
    total += 1
print(total)
```

c.
```
total = 0
N = 10
for i in range(1, N+1):
  for j in range(1, i+1):
    total += 1
print(total)
```

d.
```
total = 0
N = 5
for i in range(1, N+1):
  for j in range(1, i+1):
    total += 1
  total -= 1
print(total)
```

e.
```
total = 0
N = 5
for i in range(1, N+1):
  for j in range(1, N+1):
    total += i
print(total)
```

f.
```
total = 0
N = 5
for i in range(1, N+1):
  for j in range(1, i+1):
    total += j
print(total)
```

g.
```
total = 0
N = 5
for i in range(1, N+1):
```

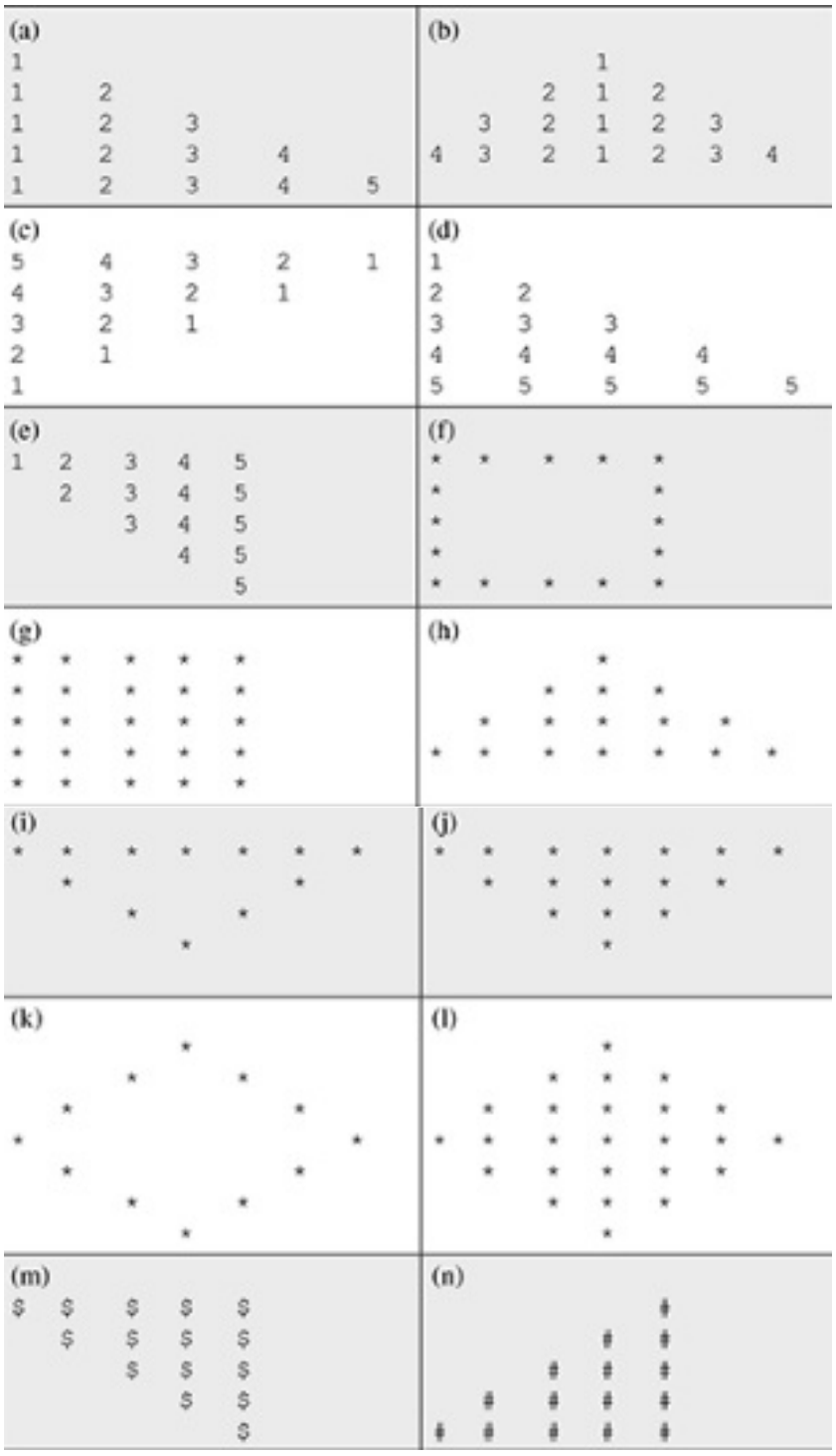
```
        for j in range(1, N+1):
            total += i+j
    print(total)
h. total = 0
    N = 5
    for i in range(1, N+1):
        for j in range(1, i+1):
          for k in range(1, j+1):
            total += 1
    print(total)
i. number = 72958476
    a, b = 0, 0
    while (number > 0):
    digit = number % 10
        if(digit % 2 != 0):
            a += digit
        else:
            b += digit
        number /= 10
    print(a,b)
```

3. Write a function to determine whether a given natural number is a perfect number. A natural number is said to be a perfect number if it is the sum of its divisors. For Example, 6 is a perfect number because 6 = 1+2+3, but 15 is not a perfect number because 15 != 1+3+5.

4. Write a function that takes two numbers as input parameters and returns their least common multiple.

5. Write a function that takes two numbers as input parameters and returns their greatest common divisor.

6. Write a function that accepts as an input parameter the number of rows to be printed and prints a figure like:



7. Write a function that finds the sum of the n terms of the following series:
   a.

$$1 - x^2/2! + x^4/4! - x^6/6! + ...x^n/n!$$

   b.

$$e^x = 1 + x/1! + x^2/2! + x^3/3! + ...$$

8. Write a function that returns True or False depending on whether the given number is a palindrome.
9. Write a function that returns the sum of digits of a number, passed to it as an argument.

10. Write a program that prints Armstrong numbers in the range 1 to 1000. An Armstrong number is a number whose sum of the cubes of the cubes of the digits is equal to the number itself. For Example,

$$370 = 3^3 + 7^3 + 0^3$$

11. Write a function that takes two numbers as input parameters and returns True or False depending on whether they are co-primes. Two numbers are said to be co-prime if they do not have any common divisor other than one.

12. Write a function to multiply two non-negative numbers by repeated addition, for example, 7*5 = 7+7+7+7+7.