

1. Write a program print following patterns:

a. Hollow square with star.

```
n=6
for i in range(n):
    for j in range(n):
        if i == 0 or i == n-1 or j == 0 or j ==n-1:
            print ("*", end=" ")
        else:
            print (" ", end=" ")
    print ()
```

b. Half number triangle.

```
num =1
for i in range (1,5):
    for j in range(i):
        print (num, end=" ")
        num +=1
    print ()
```

c. Number triangle.

```
def print_pascals_triangle(n):
    triangle = [[1] * (i + 1) for i in range(n)]

    for i in range (2, n):
        for j in range (1, i):
            triangle[i][j] = triangle [i - 1] [j - 1] + triangle [i - 1] [j]

    for i in range(n):
        spaces = " " * (n - i - 1)
        numbers = " ".join (map(str, triangle[i]))
        print (spaces + numbers)
print_pascals_triangle(4)
```

d. Half alphabet triangle.

```
for i in range (1,6):
    for j in range(i):
        print(chr(65+j), end=" ")
    print ()
```

e. Star pyramid.

```
for i in range (1,6):
    for j in range(1,6-i):
        print (' ', end=' ')

    for k in range (1, i+1):
        print ('*', end=' ')

    for k in range (1, i):
        print ('*', end=' ')
    print ()
```

f. Number pyramid.

```
n = 5
for i in range(n):
    spaces = " " * (n - i - 1)
    numbers = " ".join(str(j)
        for j in range (1, 2 * i + 2))
    print(spaces+numbers)
```

g. Alphabet triangle.

```
n = 5
for i in range(n):
    spaces = " " * (n - i - 1)
    chars = " ".join(chr(65 + j)
        for j in range (2 * i + 1))
    print (spaces + chars)
```

