1) WAP to convert all lowercase letters to uppercase letters and vice versa.(without using swapcase method)

In [12]:
```
def changeCase(word):
    new_word = ""
    for i in word:
        if i.islower():
            new_word += i.upper()
        elif i.isupper():
            new_word += i.lower()
        else:
            new_word += i
    return new_word
changeCase("Python1st 2")
```

Out[12]:
```
'pYTHON1ST 2'
```

2) WAP to print Pascal's Triangle

Method 1

Dynamic Programming

In [95]:
```
n = 7
list1 = []
for i in range(n):
    print("  "*((n-i)), end="")

    for j in range(i+1):
        if j == 0 or j == i:
            print(f"{1:4d}", end = "")
            list1.append(1)
        else:
            x = list1[j] + list1[j-1]
            print(f"{x:4d}", end = "")
            list1.append(x)
    list1 = list1[i:]
    print()
```

```
                1
              1   1
            1   2   1
          1   3   3   1
        1   4   6   4   1
      1   5  10  10   5   1
    1   6  15  20  15   6   1
```

Method 2

Math

In [74]:
```
n = 8
for i in range(n):
    print("  "*((n-i)), end="")

    x=1
    for j in range(1, i+1):
      print(f'{x:4d}', end='')
      x = x * (i - j) // j
    print()
```

```
                1
              1   1
            1   2   1
          1   3   3   1
        1   4   6   4   1
      1   5  10  10   5   1
    1   6  15  20  15   6   1
```

Method 3

using combination nCr

In [151]:
```
def fact(n):
    fact = 1
    for i in range(1,n+1):
        fact *= i
    return fact

def nCr(n,r):
    # nCr = n!/((n-r)!*r!)
    return (fact(n)//(fact(r)*fact(n-r)))

n = 9
for i in range(n):
    print("  "*((n-i)), end="")

    for j in range(i+1):
        print(f"{nCr(i,j):4d}", end="")
    print()
```

```
                  1
                1   1
              1   2   1
            1   3   3   1
          1   4   6   4   1
        1   5  10  10   5   1
      1   6  15  20  15   6   1
    1   7  21  35  35  21   7   1
  1   8  28  56  70  56  28   8   1
```

Method 4

as power of 11

In [152]:
```
def createArr(n):
    if n == 0:
        return [1]
    else :
        z = [1]
        for i in range(len(x) -1):
            z.append(x[i] + x[i+1])
        z.append(1)
        return z

n = 9
for i in range(n):

    print("  "*((n-i)), end="")

    x = createArr(i)
    for i in x:
        print(f"{i:4d}",end ="")
    print()
```

```
                    1
                  1   1
                1   2   1
              1   3   3   1
            1   4   6   4   1
          1   5  10  10   5   1
        1   6  15  20  15   6   1
      1   7  21  35  35  21   7   1
    1   8  28  56  70  56  28   8   1
```

3) WAP to print the following pattern

Method 1

In [13]:
```
def printPattern(n):
    for i in range(n):
      for j in range(i):
        print("  ", end="")
      for j in range(2*(n - i) -1):
        print("* ", end="")
      for j in range(2*i):
        print("  ", end="")
      for j in range(n-i-1):
        print("* ", end="")
      print()
      for j in range(n-i):
        print("* ", end="")
      print()
    # n= n-1
    for i in range(n-1):
      print("  "*n, end="  ")
      for j in range(i):
        print("  ", end="")
      for j in range(2*(n-1 - i) -1):
        print("* ", end="")

      print()
    return
```

In [14]:
```
printPattern(5)
```

```
* * * * * * * * * * * * * * * * * *
* * * * *                   * * * * *
  * * * * * * *         * * *
* * * *                       * * * *
    * * * * *               * *
* * *                           * * *
      * * *                   *
* *                               * *
        *                       *
*                                   *
            * * * * * * *
              * * * * *
                * * *
                  *
```

In [10]:
```
printPattern(4)
```

```
* * * * * * * * * *
* * * *
  * * * * *     * *
* * *
    * * *         *
* *
      *
*
          * * * * *
            * * *
              *
```

Method 2

In [76]:
```
n=5
for i in range(1,2*n+1):
  if i %2 != 0 :
    i=i//2
    for i in range(1,i+1):
      print("  ",end="")
    for j in range(2*(n-i)-1):
      print("* ",end="")
    for j in range(2*i):
      print("  ",end="")
    for j in range(n-i-1):
      print("* ",end="")
    print()
  else:
    for j in range(n-i//2+1):
      print("* ",end="")
    print()

for i in range(n-1):
  print("  "*n, end="  ")
  for j in range(i):
    print("  ", end="")
  for j in range(2*(n-1 - i) -1):
    print("* ", end="")

  print()
```

```
* * * * * * * * * * * * * * *
* * * * *
  * * * * * * *     * * *
* * * *
    * * * * *         * *
* * *
      * * *             *
* *
        *
*
            * * * * * * *
              * * * * *
                * * *
                  *
```

4) WAP to print the number of times that the substring occurs in the given string.(case-sensitive)

In [89]:
```
stri = "ABCDCDCDC"
subStr = "CDC"
subStrCount = 0
for i in range(len(stri) - len(subStr) + 1):
    if stri[i] == subStr[0]:
        for j in range(1,len(subStr)):
            if stri[i+j] != subStr[j]:
                break
        else:
            subStrCount += 1
print(subStrCount)
```

```
3
```