Print the following Pattern:

1.
```
*
# *
# * #
* # * #
* # * # *
```

C code for the program:

```
#include<stdio.h>
void main(){
    int i,j,c=0;
    for (i = 1; i <= 5; i++){
        for (j = 1; j <= i; j++){
            c++;
            if (c%2==0){
                printf("#");}
            else{
                printf("*");}}
        printf("\n");
    }}
```

PYTHON code for the program:

```
c=0
for i in range(0,5):
    for j in range(0,i+1):
        c=c+1
        if(c%2==0):
            print("#", end="")
        else:
            print("*", end= "")

    print("\n")
```

2.
```
A
B B
C C C
D D D D
```

C code for the program:

```
#include<stdio.h>
void main(){
    for (int i = 1; i <= 4; i++){
        for (int j = 1; j <= 4-i; j++){
            printf(" ");}
        for (int k = 1; k <= i; k++){
            printf("%c ", i+64);}
        printf("\n");}}
```

PYTHON code for the program:

```
for i in range(1,5):
    for j in range(1,5-i):
        print(" ",end="")
    for k in range(0,i):
        a=chr(64+i)
```

```
        print(a, end=" ")
    print("\n")
```

3. 1

  2 3

 4 5 6

7 8 9 10

C code for the program:

```
#include<stdio.h>
void main(){
    int c=0;
    for (int i = 1; i <= 4; i++){
        for (int j = 1; j <= 4-i; j++){
            printf(" ");}
        for (int k = 1; k <= i; k++){
            c++;
            printf("%d ", c);}
        printf("\n");
    }}
```

PYTHON code for the program:

```
c=0
for i in range(1,5):
    for j in range(1,5-i):
        print(" ",end="")
    for k in range(0,i):
        c=c+1
        print(c, end=" ")
    print("\n")
```

4. Consider the given series and calculate the summation up-to 'N' number. 1+1+4+9+25+64+……..+N.

C code for the program:

```
#include<stdio.h>
void main(){
    int n,sum=0;
    printf("Enter limit of series: ");
    scanf("%d",&n);
    for (int i = 1; i <= n; i++){
        sum=sum+ (i*i);}
    printf("\nsum of the given series is: %d",sum+1);
    }
```

PYTHON code for the program:

```
n= input("Enter the limit of the series: ")
sum=0
for i in range(1,int(n)+1):
    sum=sum+(i*i)
print("The sum of the series is: ", sum+1)
```

5. Write a program to insert a new element in array at given location k.

C code for the program:

#include<stdio.h>

void main(){

```
int pos,x;
int arr[20]={2,3,1,4,7,8};
printf("Enter position: ");
scanf("%d",&pos);
printf("\nEnter value to be inserted: ");
scanf("%d", &x);
for (int i = 6; i >= pos; i--)
{
    arr[i]=arr[i-1];
}
arr[pos-1]=x;
for (int i = 0; i < 7; i++)
{
    printf("%d  ", arr[i]);
}
```

PYTHON code for the program:

```
list1=[2,1,3,4,7,8]
pos=input("Enter position: ")
x=input("\nEnter value: ")
list1.insert(int(pos)-1, int(x))
print(list1)
```

6. Write a program to delete an element from array.

C code for the program:

```
#include <stdio.h>
int main (){
    int arr[50];
    int pos, i, num;
    printf (" \n Enter the number of elements in an array: \n ");
    scanf (" %d", &num);

    printf (" \n Enter %d elements in array: \n ", num);
    for (i = 0; i < num; i++ ){
        printf (" arr[%d] = ", i);
        scanf (" %d", &arr[i]);
    }
    printf( " Define the position of the array element where you want to delete: \n ");
    scanf (" %d", &pos);
        for (i = pos - 1; i < num -1; i++)
        {
            arr[i] = arr[i+1];
        }
        printf (" \n The resultant array is: \n");
        for (i = 0; i< num - 1; i++)
        {
            printf (" %d  ", arr[i]);
        }
    return 0;
}
```

PYTHON code for the program:

```
list1=[2,1,3,4,7,8]
pos=input("Enter position: ")
list1.remove(int(pos))
print(list1)
```

7. Write a program to remove duplicate elements from array.

C code for the program:

```
#include <stdio.h>
#include <conio.h>
void main (){
    int arr[20], i, j, k, size;

    printf (" Define the number of elements in an array: ");
    scanf (" %d", &size);

    printf (" \n Enter %d elements of an array: \n ", size);
    for ( i = 0; i < size; i++){
        scanf (" %d", &arr[i]);
    }
    for ( i = 0; i < size; i ++){
        for ( j = i + 1; j < size; j++){
            if ( arr[i] == arr[j]){
                for ( k = j; k < size - 1; k++){
                    arr[k] = arr [k + 1];
                }
                size--;
                j--;
            }}}
    printf (" \n Array elements after deletion of the duplicate elements: ");
    for ( i = 0; i < size; i++)
    {
        printf (" %d \t", arr[i]);
    }}
```

PYTHON code for the program:

```
test_list = [1, 3, 5, 6, 3, 5, 6, 1]
print ("The original list is :" + str(test_list))
res = []
[res.append(x) for x in test_list if x not in res]
print ("The list after removing duplicates :"+ str(res))
```

8. Write a program to find second highest from an array. (Do not use sorting)

C code for the program:

```
#include <stdio.h>

void main(){
    int x[10];
    int i, n, first, second;
    printf("Input the size of array :");
    if (scanf("%d", &n) != 1 || n < 0 || n > 10){
        printf("invalid input\n");
        return 1;}

    if (n <= 0){
        first = second = 0;}
    else{
        printf("Input %d elements in the array:\n", n);
```

```
        for (i = 0; i < n; i++){
            printf("x[%d]: ", i);
            if (scanf("%d", &x[i]) != 1){
                printf("invalid input\n");
                return 1;}}
        first = second = x[0];
        for (i = 1; i < n; ++i){
            if (first < x[i]){
                second = first;
                first = x[i];}
            else if (x[i] > second && x[i] != first){
                second = x[i];}}}
    if (second == first)
        printf("There is no second largest element\n");
    else
        printf("\nThe Second largest element in the array is: %d\n", second);
return 0;
}
```

PYTHON code for the program:

```
test_list = [2,1,3,4,56,64,123]
print ("The original list is :" + str(test_list))
test_list.remove(max(test_list))
print("The second maximum element is: " +str(max(test_list)))
```

9. Write a program to find frequency of a given number ‘k’.

C code for the program:

```
#include <stdio.h>

void main(){
    int x[10]={1,2,3,2,3,2,12,34,2};
    int i, count=0, elem;
    printf("Enter element to find frequency of: ");
    scanf("%d",&elem);
    for (i = 0; i < 9; i++)
    {
        if (x[i]==elem)
        {
            count++;
        }

    }
    printf("The frequncy of the given element is: %d", count);
}
```

PYTHON code for the program:

```
def frequency(a, x):
    count = 0

    for i in a:
        if i == x: count += 1
    return count

a = [0, 5, 5, 5, 4]
x = 5
print(frequency(a, x))
```

10. Write a program to merge two sorted array of length M & N. [M & N may not be equal]

C code for the program:

```
#include <stdio.h>
#include <stdlib.h>
void swap(int *xp, int *yp){
    int temp = *xp;
    *xp = *yp;
    *yp = temp;}
void bubbleSort(int *arr, int n){
    int i, j;
    for (i = 0; i < n - 1; i++)
        for (j = 0; j < n - i - 1; j++)
            if (arr[j] > arr[j + 1])
                swap(&arr[j], &arr[j + 1]);}
int main(){
    int m,n,n3;
    printf("\nEnter the size of first array: ");
    scanf("%d",&m);
    printf("\nEnter the size of second array: ");
    scanf("%d",&n);
    n3=m+n;
    printf("\nEnter the 1st array elements: ");
    int a[m],b[n],c[n3];
    for(int i=0;i<m;i++)
    {
       scanf("%d",&a[i]);
       c[i]=a[i];
    }
    int k=m;
    printf("\nEnter the 2nd array elements: ");
    for(int i=0;i<n;i++){
        scanf("%d",&b[i]);
        c[k]=b[i];
        k++;
    }
    printf("\nThe merged array..\n");
    for(int i=0;i<n3;i++)
    printf("%d ",c[i]);

    printf("\nAfter sorting...\n");
    bubbleSort(c, n3);
    for(int i=0 ; i<n3 ; i++)
    {
        printf(" %d ",c[i]);
    }
    return 0;
}
```

PYTHON code for the program:

```
m=input("Enter element number for first array: ")
n=input("Enter element number for second array: ")
list1=list(map(int, input("Enter "+m+ " first list elements: ").split(" ")))
list2=list(map(int, input("Enter " +n+ " second list elements: ").split(" ")))
list1.sort()
list2.sort()
list3=list1+list2
list3.sort()
print(list3)
```