

# *“SESSION – 3”*

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# Q] WACP to calculate the sum of following progressions:-

## A] ARITHMETIC PROGRESSION

### ALGORITHM

**STEP 1:** Start

**STEP 2:** Take  $a, d, n, i, tn$  as input and declare  $sum=0$ .

**STEP 3:** Calculate  $sum = (n * (2 * a + (n - 1) * d)) / 2$  and  $tn = a + (n - 1) * d$ .

**STEP 4:** Print Sum of The Arithmetic Progression series.

**STEP 5:** Run a For loop from  $i=a$  to  $i \leq tn$  and iterate it by  $i+=d$ .

**STEP 6:** If  $i$  not equals to  $tn$  then print  $i$

**STEP 7:** Else print  $i$  as well as  $sum$ .

**STEP 8:** Stop

main.cpp	Run	Output
<pre>1 #include &lt;stdio.h&gt; 2 #include &lt;math.h&gt; 3 4 int main() 5 { 6     int a, d, n, i, tn; 7     int sum = 0; 8 9     printf("Enter the first term value of the A.P. series: "); 10    scanf("%d", &amp;a); 11    printf("Enter the total numbers in the A.P. series: "); 12    scanf("%d", &amp;n); 13    printf("Enter the common difference of A.P. series: "); 14    scanf("%d", &amp;d); 15    sum = (n * (2 * a + (n - 1) * d)) / 2; 16    tn = a + (n - 1) * d; 17    printf("Sum of the A.P series is: "); 18    for (i = a; i &lt;= tn; i = i + d) 19    { 20        if (i != tn) 21            printf("%d + ", i); 22        else 23            printf("%d = %d ", i, sum); 24    } 25    return 0;</pre>		<pre>/tmp/fJpIhzQG9c.o Enter the first term value of the A.P. series: 1 Enter the total numbers in the A.P. series: 5 Enter the common difference of A.P. series: 2 Sum of the A.P series is: 1 + 3 + 5 + 7 + 9 = 25</pre>

## **B] GEOMETRIC PROGRESSION**

### **ALGORITHM**

**STEP 1:** *Start*

**STEP 2:** *Take int a,n,r & float tn as input and declare sum=0*

**STEP 3:** *Calculate  $sum = (a * (1 - \text{pow}(r, n))) / (1 - r)$  and  $tn = a * (\text{pow}(r, n - 1))$ .*

**STEP 4:** *Print Sum of The Geometric Progression series.*

**STEP 5:** *Stop.*

```
1 #include <stdio.h>
2 #include <math.h>
3
4 int main() {
5
6     int a, n, r;
7     float tn, sum = 0;
8
9     printf(" Please Enter First Number of an G.P Series: ");
10    scanf("%d", &a);
11    printf(" Please Enter the Total Numbers in this G.P Series: ");
12    scanf("%d", &n);
13    printf(" Please Enter the Common Ratio: ");
14    scanf("%d", &r);
15
16    sum = (a * (1 - pow(r, n))) / (1 - r);
17    tn = a * (pow(r, n - 1));
18
19    printf("\n The Sum of Geometric Progression Series = %.2f", sum);
20    printf("\n The tn Term of Geometric Progression Series = %.2f \n", tn);
21    return 0;
22 }
```

/tmp/Da0Sb7TRS0.o

Please Enter First Number of an G.P Series: 1

Please Enter the Total Numbers in this G.P Series: 5

Please Enter the Common Ratio: 2

The Sum of Geometric Progression Series = 31.00

The tn Term of Geometric Progression Series = 16.00

# Q] Write C Programs to generate the following patterns:

1]

## ALGORITHM

**STEP 1:** Start

**STEP 2:** Input integer values ie i,j,rows.

**STEP 3:** Iterate through rows using a For loop for i.

**STEP 4:** Print leading Spaces using a For loop for j.


**STEP 5:** Print Star using For loop ( $j=1; j \leq (2*i-1); j++$ ).

**STEP 6:** Move to the next Line

**STEP 7:** Stop

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main.c	Run	Output
<pre>1 #include&lt;stdio.h&gt; 2 int main() 3 { int i, j, rows; 4   /* Input number of rows to print */ 5   printf("Enter number of rows : "); 6   scanf("%d", &amp;rows); 7   /* Iterate through rows */ 8   for(i=1; i&lt;=rows; i++) 9   { 10      /* Print leading spaces */ 11      for(j=i; j&lt;rows; j++) 12      { 13         printf(" "); 14      } 15      /* Print star */ 16      for(j=1; j&lt;=(2*i-1); j++) 17      { 18         printf("*"); 19      } 20      /* Move to next line */ 21      printf("\n"); 22   } 23 24   return 0; 25 }</pre>		<pre>/tmp/VYYv47IMbx.o Enter number of rows : 5 * *** ***** ***** *****</pre>

2]

## ALGORITHM

**STEP 1:** *Start*

**STEP 2:** *Input integer values ie i,j,n.*

**STEP 3:** *Iterate through rows using a For loop for i.*

**STEP 4:** *Iterate through Spaces using a For loop for j.*

**STEP 5:** *Print j & Move to the next Line.*

**STEP 6:** *Stop.*

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main.c



Run

Output

Clear

```
1 #include<stdio.h>
2 int main()
3 {
4     int i,j,n;
5     printf("\n Enter the number of lines to be printed\n");
6     scanf("%d",&n);
7
8     for(i=1; i<=n ; i++)
9     {
10         for(j=1; j<=i;j++)
11         {
12             printf("%d",j);
13         }
14
15         printf("\n");
16
17
18     }
19
20 return 0;
21 }
22
```

```
/tmp/k0mT9WkebR.o
Enter the number of lines to be printed
5
1
12
123
1234
12345
```

3]

## ALGORITHM

**STEP 1:** Start

**STEP 2:** Input integer values ie rows, space, i, j and declare coef=1.

**STEP 3:** Iterate through rows using a For loop for i.

**STEP 4:** Print leading Spaces using a For loop for space.

**STEP 5:** Iterate using a For loop for j.

**STEP 6:** If  $j = 0$  ||  $i = 0$  then declare coef = 1.

**STEP 7:** Else  $\text{coef} = \text{coef} * (i - j + 1) / j$ .

**STEP 8:** Print coef and move on the next line.

**STEP 9:** Stop.

main.c



Run

Output

Clear

```
1 #include<stdio.h>
2 int main() {
3     int rows, coef = 1, space, i, j;
4     printf("Enter the number of rows: ");
5     scanf("%d", &rows);
6
7     for (i = 0; i < rows; i++) {
8         for (space = 1; space <= rows - i; space++)
9             printf(" ");
10        for (j = 0; j <= i; j++) {
11            if (j == 0 || i == 0)
12                coef = 1;
13            else
14                coef = coef * (i - j + 1) / j;
15            printf("%4d", coef);
16        }
17
18        printf("\n");
19    }
20    return 0;
21 }
```

/tmp/32ordHfYUp.o

Enter the number of rows: 5

```

    1
  1 1
1 2 1
1 3 3 1
1 4 6 4 1
```

4]

## ALGORITHM

**STEP 1:** *Start*

**STEP 2:** *Input integer values ie i,j,n,s.*

**STEP 3:** *Iterate through rows using a For loop for i.*

**STEP 4:** *Print leading Spaces using a For loop for s.*


**STEP 5:** *Iterate and print Star using a For loop for j.*

**STEP 6:** *Run again a For loop for(i=n-1;i>=1;i--).*

**STEP 7:** *Print again a For loop for Space increment.*

**STEP 8:** *Print again a For loop for Star for(j=1;j<=i;j++)*

**STEP 9:** *Stop.*

main.c	Run	Output
<pre>2 int main() 3 { int i,j,n,s; 4   printf("\n Enter the no. of lines\n"); 5   scanf("%d",&amp;n); 6   for( i=1;i&lt;=n;i++) 7   { for( s= 1 ; s&lt;=n-i; s++) 8     { 9       printf(" "); 10    } 11    for( j=1;j&lt;=i;j++) 12    { printf("* "); 13    } 14    printf("\n"); 15  } for( i=n-1;i&gt;=1;i--) 16  {for( s= 1 ; s&lt;=n-i; s++) 17  { 18    printf(" "); 19  } 20  for( j=1;j&lt;=i;j++) 21  { printf("* "); 22  } 23  printf("\n"); 24  } 25  return 0; 26 }</pre>		<pre>/tmp/32ordHfYUp.o Enter the no. of lines 3 * * * * * * * * * </pre>

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## ALGORITHM

**STEP 1:** *Start*

**STEP 2:** *Input integer values ie i,j,n.*

**STEP 3:** *Iterate through rows using a For loop for i.*

**STEP 4:** *Iterate and Print leading Star using a For loop for j.*

**STEP 5:** *Move to New Line.*

**STEP 6:** *Stop.*

main.c



Run

Output

Clear

```
1 #include<stdio.h>
2 int main()
3 {
4     int i,j,n;
5     printf("\n Enter the number of lines to be printed\n");
6     scanf("%d",&n);
7
8     for(i=1; i<=n ; i++)
9     {
10         for(j=1; j<=i;j++)
11         {
12             printf("*");
13         }
14
15         printf("\n");
16     }
17
18     return 0;
19 }
```

```
/tmp/32ordHfYUp.o
Enter the number of lines to be printed
4
*
**
***
****
```



6]

## ALGORITHM

**STEP 1:** Start.

**STEP 2:** Input integer values ie space, star.

**STEP 3:** Run Two While Loops to print space and star and Move to New Line.

**STEP 4:** Take void main and input integer values ie star,space,i,j.

**STEP 5:** Enter Number so  $j = \text{star}/2$  &  $i = \text{star}$  as well as declare  $\text{space} = 0$ .

**STEP 6:** Again run a while loop with  $\text{space} < j$  //  $\text{star} > 0$  as condition.

**STEP 7:** Then Print space , star and increment space by 1 and decrement start by 2.

**STEP 8:** Again run a while loop with  $\text{space} > 0$  //  $\text{star} \leq i$  as condition and print space and star.

**STEP 9:** Iterate  $\text{space} = \text{space} - 1$  &  $\text{star} = \text{star} + 2$ .

**STEP 10:** Stop.

main.c



Run

Output

Clear

```
1 #include<stdio.h>
2 void print(int space, int star)
3 { while (space-->0) {
4     printf(" ");
5 }
6 while (star-->0) {
7     printf("*");
8 }
9 printf("\n");
10 }
11 void main()
12 { int star,space,i,j;
13     printf("Enter number:");
14     scanf("%d",&star);
15     j=star/2;
16     i=star;space=0;
17     while (space<j || star>0) {
18         print(space,star);
19         space=space+1;star=star-2;
20     }
21     space=j-1;star=3;
22     while(space>0 || star>=i) {
23         print(space,star);
24         space=space-1;star=star+2;
25     }
```

```
/tmp/32ordHfYUp.o
Enter number:5
*****
***
*
***
*****
```

7]

## ALGORITHM

**STEP 1:** *Start.*

**STEP 2:** *Input integer values ie i, j, k, n.*

**STEP 3:** *Print the Statement Enter the no of rows .*

**STEP 4:** *Iterate through rows using a For loop for i.*

**STEP 5:** *Iterate and Print leading Space using a For loop for j.*

**STEP 6:** *Iterate and Print leading Star using a For loop for k.*

**STEP 7:** *Move to New Line.*

**STEP 8:** *Stop.*

main.c



Run

Output

Clear

```
1 #include <stdio.h>
2 int main() {
3     int i,j,k,n;
4     printf("\n Enter the no. of rows:\n");
5     scanf("%d",&n);
6
7     for (i=1; i<=n; i++) {
8         for (j=n; j>=i; j--) {
9             printf(" ");
10        }
11        for (k=1; k<=i; k++) {
12            printf("*");
13        }
14
15        printf("\n");
16    }
17    return 0 ;
18 }
```

```
/tmp/32ordHfYUp.o
Enter the no. of rows:
4
 *
**
***
****
```

8]

## ALGORITHM

**STEP 1:** Start.

**STEP 2:** Input integer values ie i, j, n.

**STEP 3:** Print the Statement Enter the no of lines .

**STEP 4:** Iterate through rows using a For loop for i.

**STEP 5:** Iterate and Print leading Space using a For loop for j ie for(j=n;j<=i-1;j++)

**STEP 6:** Iterate and Print leading Star using a For loop for(j=n;j>=i;j--).

**STEP 7:** Move to New Line.

**STEP 8:** Stop.

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main.c



Run

Output

Clear

```
1 #include<stdio.h>
2 int main()
3 {
4     int i, j, n;
5     printf("\nEnter the no. of lines:");
6     scanf("%d",&n);
7     for(i = 1;i<=n;i++)
8     {
9         for(j=1;j<=i-1;j++)
10        {
11            printf(" ");
12        }
13        for( j= n; j>=i ;j--)
14        {
15            printf("*");
16        }
17        printf("\n");
18    }
19    return 0;
20 }
```

```
/tmp/kOmT9wKebR.o
Enter the no. of lines:4
****
***
**
*
```

9]

## ALGORITHM

**STEP 1:** Start.

**STEP 2:** Input integer values ie i, j, n.

**STEP 3:** Print the Statement Enter the no of lines .

**STEP 4:** Iterate through rows using a For loop for i.

**STEP 5:** Iterate and Print leading Star using a For loop for j ie for(j=1;j<=i;j++)

**STEP 6:** Move to New Line.

**STEP 7:** Stop.

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main.c



Run

Output

Clear

```
1 #include<stdio.h>
2 int main()
3 {
4     int i, j, n;
5     printf("\nEnter the no. of lines:");
6     scanf("%d",&n);
7
8     for(i = n;i>=1;i--)
9     {
10         for( j= 1; j<=i ;j++)
11         {
12             printf("*");
13         }
14
15         printf("\n");
16     }
17     return 0;
18 }
```

```
/tmp/32ordHfYUp.o
Enter the no. of lines:4
****
***
**
*
|
```

**10]**

## ALGORITHM

**STEP 1:** *Start.*

**STEP 2:** *Input integer values ie i, j, rows.*

**STEP 3:** *Print the Statement Enter the no of rows .*

**STEP 4:** *Iterate through rows using a For loop for i.*

**STEP 5:** *Iterate and Print leading Space using a For loop for j ie for(j=i;j<=rows;j++)*

**STEP 6:** *If (j= = i || j= = rows || i= = 1) then Print Star.*

**STEP 7:** *Else Print Space.*

**STEP 8:** *Move to New Line.*

**STEP 9:** *Stop.*

main.c	Run	Output	Clear
<pre>1 #include &lt;stdio.h&gt; 2 int main() 3 { 4     int i, j, rows; 5     printf("Enter number of rows : "); 6     scanf("%d", &amp;rows); 7     for(i=1; i&lt;=rows; i++) 8     { 9         for(j=1; j&lt;i; j++) 10        { 11            printf(" "); 12        } 13 14        for(j=i; j&lt;=rows; j++) 15        { 16            if(j==i    j==rows    i==1) 17            { 18                printf("*"); 19            } 20            else 21            { 22                printf(" "); 23            } 24        } 25 26        printf("\n"); 27    } 28 29    return 0; 30 }</pre>		<pre>/tmp/32ordHfYUp.o Enter number of rows : 5 ***** * * * * ** *</pre>	

**11]**

## ALGORITHM

**STEP 1:** Start.

**STEP 2:** Input integer values ie i, j, rows.

**STEP 3:** Print the Statement Enter the number of rows .

**STEP 4:** Iterate through rows using a For loop for i ie  
***for(i=rows;i>=1;--i)***

**STEP 5:** Iterate and Print j using a For loop ie  
***for(j=1;j<=i;j++)***

**STEP 6:** Move to New Line.

**STEP 7:** Stop.

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main.c



Run

Output

Clear

```
1 #include <stdio.h>
2 int main() {
3     int i, j, rows;
4     printf("Enter the number of rows: ");
5     scanf("%d", &rows);
6     for (i = rows; i >= 1; --i) {
7         for (j = 1; j <= i; ++j) {
8             printf("%d ", j);
9         }
10        printf("\n");
11    }
12    return 0;
13 }
14
15
```

```
/tmp/kOmT9wKebR.o
Enter the number of rows: 5
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

**12]**

## ALGORITHM

**STEP 1:** Start.

**STEP 2:** Input integer values ie  $i, j, N$ .

**STEP 3:** Print the Statement Enter the number of rows .

**STEP 4:** Iterate through rows using a For loop for  $i$  ie  
 $for(i=1; i \leq N; i++)$

**STEP 5:** Iterate and Print Star using a For loop ie  
 $for(j=1; j \leq N; j++)$

**STEP 6:** Move To New Line.

**STEP 7:** Stop.

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main.c



Run

Output

Clear

```
1 #include <stdio.h>
2
3 int main()
4 {
5     int i, j, N;
6
7     /* Input number of rows from user */
8     printf("Enter number of rows: ");
9     scanf("%d", &N);
10
11    /* Iterate through N rows */
12    for(i=1; i<=N; i++)
13    {
14        /* Iterate over columns */
15        for(j=1; j<=N; j++)
16        {
17            /* Print star for each column */
18            printf("*");
19        }
20
21        /* Move to the next line/row */
22        printf("\n");
23    }
24
25    return 0;
26 }
```

```
/tmp/VYYv47IMbx.o
Enter number of rows: 5
*****
*****
*****
*****
*****
```

*THANK YOU*

