Logic Building

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Day-4

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Decision

- The if statement evaluates the test expression inside the parenthesis ().
- If the test expression is evaluated to true, statements inside the body of if are executed.
- If the test expression is evaluated to false, statements inside the body of if are not executed.

- **How if...else statement works?**
- If the test expression is evaluated to true,
  - statements inside the body of if are executed.
  - statements inside the body of else are skipped from execution.
- If the test expression is evaluated to false,
  - statements inside the body of else are executed
  - statements inside the body of if are skipped from execution

If else ladder

- The if...else statement executes two different codes depending upon whether the test expression is true or false. Sometimes, a choice has to be made from more than 2 possibilities.
- The if...else ladder allows you to check between multiple test expressions and execute different statements.

Nested if else

- **Nested if...else**
- It is possible to include an if...else statement inside the body of another if...else statement.

Nested for

- for (init; condition; increment)

```
{
   for ( init; condition; increment )
    {
     statement(s);
    }
   statement(s);
}
```

Arithmetic Progression

- Nth term of an AP
- Tn=a+(n-1)d
- Sum of Nth term of AP
- Sn=n/2*[2a+(n-1)*d]

- **Approach we will be using to solve the given problem** –
- Take first term A, common difference D, and N the number of series.
- Then calculate nth term by (A + (N - 1) * D)
- Return the Output obtained from the above calculation.

Sum of N terms of AP

- A series with same common difference is known as **arithmetic series**. The first term of series is **a** and common difference is **d**. The series is looks like **a, a + d, a + 2d, a + 3d, . . .** Task is to find the sum of series.

- Input : a = 1 d = 2 n = 4 Output : 16 1 + 3 + 5 + 7 = 16 Input : a = 2.5 d = 1.5 n = 20 Output : 335

GP

- Given ‘a’ the First term, ‘r’ the common ratio and ‘n’ for the number of terms in a series. The task is to find the nth term of the series.
- So, before discussing how to write a program for the problem first we should know what is Geometric Progression.
- Geometric progression or Geometric sequence in mathematics are where each term after the first term is found by multiplying the previous one with the common ratio for a fixed number of terms.
- Like 2, 4, 8, 16, 32.. is a geometric progression with first term 2 and common ratio 2. If we have n = 4 then the output will be 16.
- So, we can say that Geometric Progression for nth term will be like −
- GP1 = a1 GP2 = a1 * r^(2-1) GP3 = a1 * r^(3-1) . . . GPn = a1 * r^(n-1)So the formula will be GP = a * r^(n-1).
- **Example**
- Input: A=1 R=2 N=5
- Output: The 5th term of the series is: 16

Explanation: The terms will be 1, 2, 4, 8, 16 so the output will be 16 Input: A=1 R=2 N=8 Output: The 8^{th} Term of the series is: 128

Algorithm for AP

- Start
- Step 1-> In function int nth_ap(int a, int d, int n)
  - Return (a + (n - 1) * d)
- Step 2 -> int main()
  - Declare and initialize the inputs a=2, d=1, n=5
  - Print The result obtained from calling the function nth_ap(a,d,n)
- Stop

Algorithm for GP

- Start Step 1 -> In function

  int Nth_of_GP(int a, int r, int n)

  Return(a * (int)(pow(r, n - 1))

Step 2 -> In function int main()

  Declare and set a = 1

  Declare and set r = 2

  Declare and set n = 8

 Print The output returned from calling the function Nth_of_GP(a, r, n)

Stop

Some special arrangements

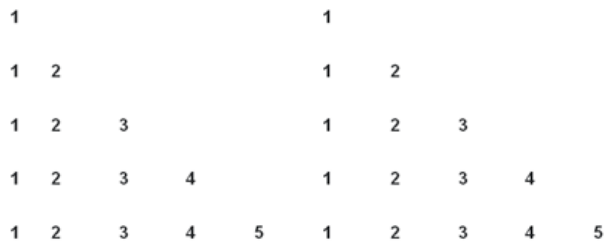
Print number 1 to 10, 5 times

- 1 2 3 4 5 6 7 8 9 10
- 1 2 3 4 5 6 7 8 9 10
- 1 2 3 4 5 6 7 8 9 10
- 1 2 3 4 5 6 7 8 9 10
- 1 2 3 4 5 6 7 8 9 10

Printing the following pattern

- 1
- 1 2
- 1 2 3
- 1 2 3 4
- 1 2 3 4 5

Printing the following pattern



- Thank You

Program for AP/Sum of AP

N Terms of AP

```
#include <stdio.h>
int nth_ap(int a, int d, int n)
{
t(n) = a(1) + (n-1)*d
return (a + (n - 1) * d);
 }
int main()
{
int a = 2;
int d = 1;
int n = 5;
printf("The %dth term of AP :%d\n", n,
      nth_ap(a,d,n));
return 0;
}
```

SUM OF N TERMS OF AP

```
#include<bits/stdc++.h>
using namespace std;

// Function to find sum of series.
float sumOfAP(float a, float d, int n)
{
   float sum = 0;
   for (int i=0;i<n;i++)
   {
      sum = sum + a;
      a = a + d;
   }
   return sum;
}

int main()
{
   int n = 20;
   float a = 2.5, d = 1.5;
   cout<<sumOfAP(a, d, n);
   return 0;
}
```

Program for GP

```
#include <stdio.h>
#include <math.h>
int Nth_of_GP(int a, int r, int n)
 {
 return( a * (int)(pow(r, n - 1)) );
}

 int main()
 {
int a = 1;
 int r = 2;
 int n = 8;
printf("The %dth term of the series is:
      %d\n",n, Nth_of_GP(a, r, n) );
return 0;
 }
```

Pattern1

```
#include <stdio.h>
int main()
{
	int i;
	int j;
	i=1;
do
	{
	j=1;
	do
		{
		printf("%d ",j);
		j++;
		}
	while( j<=10 );
	printf("\n");
	i++;
	}
while( i<=5 );
return 0
;
}
```

- 1 2 3 4 5 6 7 8 9 10
- 1 2 3 4 5 6 7 8 9 10
- 1 2 3 4 5 6 7 8 9 10
- 1 2 3 4 5 6 7 8 9 10
- 1 2 3 4 5 6 7 8 9 10

Pattern2

```
#include <stdio.h>
int main()
{
        int i;
        int j;
         i=1;
do
    {
    j=1;
    do
        {
        printf("%d ",j);
        j++;
        }
    while( j<=i );
    printf("\n");
    i++;
    }
while( i<=5 );
return 0;
}
```

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

Pattern3

```
#include<stdio.h>
#include<conio.h>

void main()
{
      int i, j, k;
      clrscr();
      for(i=0; i<=5; i++)
      {
                for(j=0; j<=i;j++)//column
                printf("%d", j+1);
                for(k=0; k<=5-(i+1); k++)//spaces
                printf(" ");
      for(j=0; j<=i; j++)
      printf("%d", j+1);
      printf("\n");
      }
      getch();
}
```

```
1          1
1 2        1 2
1 2 3      1 2 3
1 2 3 4    1 2 3 4
1 2 3 4 5  1 2 3 4 5
```

Pattern4

```
# include <iostream.h>
# include <conio.h>
# include <string.h>
void main()
{
   char ch[10];
   int a,b,c,d;
   clrscr();
   cout <<"Enter any string :";
   cin >>ch;
   a=strlen(ch)-1;
   for(d=0;d<=a;d++)
      {
         for(b=0;b<=a-d;b++)
         cout <<ch[b]<<" ";
            for(b=0;b<d*2;b++)
            cout <<"  ";
               for(c=a-d;c>=0;c--)
               cout <<ch[c]<<" ";
         cout <<"\n";
      }
   getch();
}
```

```
Enter any string : saradhi
s a r a d h i i h d a r a s
s a r a d h     h d a r a s
s a r a d         d a r a s
s a r a             a r a s
s a r                 r a s
s a                     a s
s                         s
```

Pattern5

```
# include <iostream.h>
# include <conio.h>
# include <string.h>
void main()
{
    int i,j,k,l;
    char ch[20];
    clrscr();
    cout << "enter any string : ";
    cin >> ch;
    k=strlen(ch);
    l=k-1;
    for(i=0;i<(k*2);i++)
    {
        if(i<k)
        {
            for(j=0;j<=i;j++)
            cout <<ch[j];
            cout <<"\n";
        }
        else
        {
            for(j=0;j<l;j++)
            cout <<ch[j];
            l--;
            cout <<"\n";
        }
    }
getch();
}
```

REDMI NOTE 5 PRO

```
Enter any string : kensys
k
ke
ken
kens
kensy
kensys
kensy
kens
ken
ke
k
```

Counting Different characters

```
# include <iostream.h>
# include <conio.h>
# include <stdio.h>
void main()
{
   int i,nc,nv,nb,nw,nn,ns;
   char ch[100];
   clrscr();
   cout<<"enter any multi word string : ";
   gets(ch);
   i=nc=nv=nb=nn=ns=0;
   nw=1;
   while(ch[i]!='\0')
   {
      if((ch[i]>64&&ch[i]<91)||(ch[i]>96&&ch[i]<123))
        {
        if(ch[i]=='a'||ch[i]=='e'||ch[i]=='i'||ch[i]=='o'||ch[i]=='u')
          nv++;
        else
          nc++;
        }
      else if(ch[i]==' ')
        {
          nb++;
          nw++;
        }
      else if(ch[i]>46 && ch[i]<57)
        nn++;
      else
        ns++;
      i++;
   }
   cout <<"\nlength of string          : "<<i;
   cout <<"\nno.of vowels              : "<<nv;
   cout <<"\nno.of characters          : "<<nc;
   cout <<"\nno.of numerics            : "<<nn;
   cout <<"\nno.of special characters  : "<<ns;
   cout <<"\nno.of blank spaces        : "<<nb;
   cout <<"\nno.of words               : "<<nw;
   getch();
}
```



```
enter any multi word string : s.p.balasubramanyam is given
                              PADMASRI 10 years lately
length of string            : 53
no.of vowels                : 16
no.of characters            : 27
no.of numerics              : 2
no.of special characters    : 2
no.of blank spaces          : 6
no.of words                 : 7
```

Swapping of two strings

```
# include <iostream.h>
# include <conio.h>
# include <string.h>
void main()
{
   char  ch[20],st[20],temp[20];
   clrscr();
   cout <<"enter any two strings : ";
   cin  >>ch>>st;
   cout <<"\nentered strings are : ";
   cout  <<ch<<"\t"<<st;
   strcpy(temp,ch);
   strcpy(ch,st);
   strcpy(st,temp);
   cout <<"\nafter swapping : \n";
   cout  <<ch<<"\t"<<st;
   getch();
}
```

```
enter any two strings : pardha
saradhi
entered strings are : pardha saradhi
after swapping :
saradhi pardha
```

THANK YOU