

## Muhammad Hammad Zafar (19-ee-328)

### Question 1:

#### Code:

```
#include <iostream>

#include <cmath>

using namespace std;

double S_A(double a,double d,double n);

double S_G(double a,double r, double d);

double S_I_G(double a,double r);

struct Z
{
    double X;
    double Y;
};

Z display(Z b)
{
    cout<<"{ "<<b.X<<","<<b.Y<<" }"<<endl;
    return b;
}

int main()
{
    int c;

    double ans1,ans2;

    double a=3,d=4,r=5,n=6;

    cout<<"Sum of Arithmetic series: "<<S_A(a,d,n)<<endl;

    cout<<"Sum of Geometric series: "<<S_G(a,r,n);
```

```

        cout<<"\nSum of Infinite Geometric series: "<<S_I_G(a,r)<<endl;
        ans1=S_G(a,r,n);
        ans2=S_I_G(a,r);
        struct Z p;
        p.X=ans1;
        p.Y=ans2;
        p=display(p);
    }

```

```

double S_A(double a,double d,double n)
{
    return (n/2)*(2*a+(n-1)*d);
}

```

```

double S_G(double a,double r,double n)
{
    double s,s1;
    if(r>1)
    {
        s=(a*(pow(r,n)-1 ))/(r-1);
        return s;
    }
    else if (r<1)
    {
        s1=(a*(1-pow(r,n)))/(1-r);
        return s1;
    }
}

```

```

double S_I_G(double a,double r)
{

```

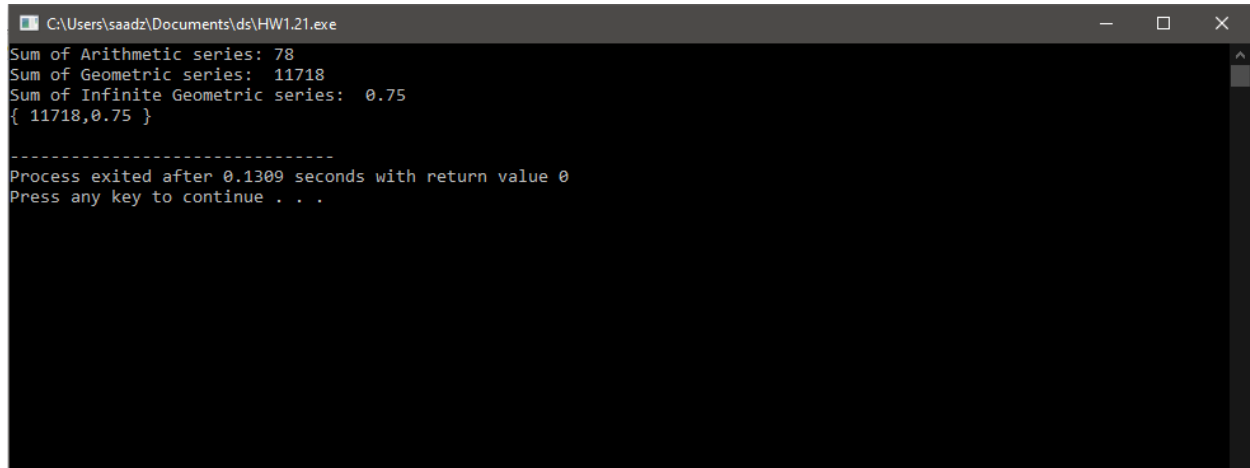
```

        if(r>1)
        {
            return a/(r-1);
        }

        else if (r<1)
        {
            return a/(1-r);
        }
    }
}

```

### Output:



```

C:\Users\saadz\Documents\ds\HW1.21.exe
Sum of Arithmetic series: 78
Sum of Geometric series: 11718
Sum of Infinite Geometric series: 0.75
{ 11718,0.75 }
-----
Process exited after 0.1309 seconds with return value 0
Press any key to continue . . .

```

### Question 2:

#### Code :

```

#include <iostream>

#include <cmath>

using namespace std;

double S_A(double a,double d,double n);

double S_G(double a,double r, double d);

double S_I_G(double a,double r);

```

```

struct Z
{
    double X;
    double Y;
};
Z display(Z b)
{
    cout<<"{ "<<b.X<<","<<b.Y<<" }"<<endl;
    return b;
}
int main()
{
    int c;
    double ans1,ans2;
    double a,d,r,n,a1,r1;
    char t='y';
    do
    {
        cout<<"Enter 1 for Arthimatic sum\n";
        cout<<"Enter 2 for Geometeric sum\n";
        cout<<"Enter 3 for Infinite Geometeric sum\n";
        cout<<"Enter 4 for function that returns struct \n";
        cin>>c;

        if(c==1)
        {
            cout<<"Enter the values of a,d,n respectively\n";
            cin>>a>>d>>n;

```

```

        cout<<"Sum of Arithmetic series: "<<S_A(a,d,n)<<endl;
    }
    else if (c==2)
    {
        cout<<"Enter the values of a,r,n \n";
        cout<<"r should be greater or less than 1\n";

        cin>>a>>r>>n;

        cout<<"sum of Geometric series: "<<S_G(a,r,n)<<endl;

    }
    else if (c==3)
    {
        cout<<"Enter the value a,r \n";
        cout<<"r should be greater or less than 1\n";

        cin>>a>>r;

        cout<<"Sum of infinite Geometric series: "<<S_I_G(a,r)<<endl;

    }
    else if (c==4)
    {
        cout<<"\nEnter the values of a,r,n,for geometric sum \n";

        cin>>a>>r>>n;

        cout<<"Enter the values of a,r for infinite geometric sum \n";

        cin>>a1>>r1;

        ans1=S_G(a,r,n);

        ans2=S_I_G(a1,r1);

        struct Z p;

        p.X=ans1;

        p.Y=ans2;

        p=display(p);
    }

```

```

    }
    else
    {
        cout<<"Invalid input.Enter 1,2,3 or 4 for respective functions";
    }
    cout<<"\nEnter y for another calculation"<<endl;
    cin>>t;
} while( t=='y');

```

```

}

```

```

double S_A(double a,double d,double n)

```

```

{
    return (n/2)*(2*a+(n-1)*d);
}

```

```

double S_G(double a,double r,double n)

```

```

{
    double s,s1;
    if(r>1)
    {
        s=(a*(pow(r,n)-1 ))/(r-1);
        return s;
    }
    else if (r<1)
    {
        s1=(a*(1-pow(r,n)))/(1-r);
        return s1;
    }
}

```

```

}

```

```

double S_I_G(double a,double r)
{
    if(r>1)
    {
        return a/(r-1);
    }
    else if (r<1)
    {
        return a/(1-r);
    }
}

```

## Output:

```

C:\Users\saadz\Documents\ds\HW 1..exe
Enter 1 for Arthimatic sum
Enter 2 for Geometeric sum
Enter 3 for Infinite Geometeric sum
Enter 4 for function that returns struct
1
Enter the values of a,d,n respectively
4
5
6
Sum of Arithmetic series: 99

Enter y for another calculation
y
Enter 1 for Arthimatic sum
Enter 2 for Geometeric sum
Enter 3 for Infinite Geometeric sum
Enter 4 for function that returns struct
2
Enter the values of a,r,n
r should be greater or less than 1
4
5
6
sum of Geometric series: 15624

Enter y for another calculation
y
Enter 1 for Arthimatic sum
Enter 2 for Geometeric sum
Enter 3 for Infinite Geometeric sum

```