**Assignment-1**

**Code :**

#include<bits/stdc++.h>

using namespace std;

long long a[] = { 1, 10, 100, 1000, 10000, 100000, 1000000, 10000000, 100000000 };

int middleSquareNumber(int numb, int dig)

{

long long int sqn = numb \* numb, next\_num = 0;

int trim = (dig / 2);

sqn = sqn / a[trim];

for (int i = 0; i < dig; i++)

{

next\_num += (sqn % (a[trim])) \* (a[i]);

sqn = sqn / 10;

}

return next\_num;

}

void midsq()

{

cout<<"Enter the seed value :";

int seed;

cin>>seed;

int dig;

cout<<"Enter the number of digits :";

cin>>dig;

int n;

cout<<"Enter the number of random numbers you want to generate: ";

cin>>n;

cout<<"The random numbers are: ";

cout<<seed<<", ";

int ni=seed;

for(int i=1; i<n; ++i)

{

ni = middleSquareNumber(ni,dig);

cout<<ni<<", ";

}

cout<<"\n";

}

void residue()

{

int a,c,M,r;

cout<<"Enter the value of 'a', 'c' and 'M': ";

cin>>a>>c>>M;

cout<<"Enter the number of random numbers you want :";

int n;

cin>>n;

cout<<"Enter the first random number: ";

cin>>r;

cout<<"The random numbers are: ";

cout<<r<<", ";

int rd=r;

for(int i=1; i<n; ++i)

{

r= (a\*rd+ c)%M;

rd=r;

cout<<r<<", ";

}

cout<<"\n";

}

void arithmeticCong()

{

int n,a,b,m;

cout<<"Enter the number of random numbers you want to generate :";

cin>>n;

cout<<"Enter the seed values: ";

cin>>a>>b;

cout<<"Enter the value of M";

cin>>m;

int r;

cout<<"The random numbers generated are :";

for(int i=0; i<n; ++i)

{

r=(a+b)%m;

b=a;

a=r;

cout<<r<<", ";

}

cout<<"\n";

}

int main()

{

int choice;

do{

cout<<"Enter the choice of Algorithm for generating random numbers\n1.Mid square method\n2.Residue Method\n3.Arithmetic Congruential Method\n4.Exit\n";

cin>>choice;

switch(choice)

{

case 1: midsq();

break;

case 2: residue();

break;

case 3: arithmeticCong();

break;

case 4:

break;

default:

cout<<"Wrong choice\n";

break;

}

}while(choice<4);

}

**Output:**

