ES202

Assignment-IV

C Programming Exercises

1. **Write a C program to print all-natural numbers between 1 to n using recursion.**

```
#include <stdio.h>
 int PrintNum(int n,int lim)
 {
  if(n<=lim)
   printf("%d ",n);
  PrintNum(++n,lim);

 }
 void main()
 {
   int l;
   printf("Enter limit: ");
   scanf("%d",&l);
   PrintNum(1,l);
 }
```

OUTPUT:

```
Enter limit: 100
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 3
2 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88
89 90 91 92 93 94 95 96 97 98 99 100
```

2. Write a C program to print all even or odd numbers in given range using recursion.

```
#include <stdio.h>
 void even(int n,int lim)
 {
  if(n<=lim&&n%2==0)
   printf("%d ",n);
  if(n%2==0)
   n+=2;
  else
    ++n;
  even(n,lim);

 }
 void odd(int n,int lim)
 {
  if(n<=lim&&n%2!=0)
   printf("%d ",n);
  if(n%2!=0)
   n+=2;
  else
    ++n;
  odd(n,lim);
 }

 void main()
 {
   int s,e,c;
   printf("Enter range: ");
   scanf("%d %d",&s,&e);
   printf("Enter 1 for odd and 2 for even: ");
   scanf("%d",&c);
   if(c==1)
    odd(s,e);
   else if(c==2)
     even(s,e);
 }
```

OUTPUT:

```
Enter range: 12 47
Enter 1 for odd and 2 for even: 1
13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
```

3. **Write a C program to find sum of all-natural numbers between 1 to n using recursion.**

```
#include <stdio.h>
 int Sum(int n)
 {if (n != 0)
       return n + Sum(n - 1);
    else
       return n;
}

 void main()
 {
   int l;
   printf("Enter number of terms: ");
   scanf("%d",&l);
   printf("Sum of first %d natural numbers: %d ",l,Sum(l));

 }
```

OUTPUT:

```
Enter number of terms: 100
Sum of first 100 natural numbers: 5050
```

4. **Write a C program to find sum of all even or odd numbers in given range using recursion.**

```
#include <stdio.h>
int sumOfEvenOdd(int s, int e)
{
  if(s > e)
      return 0;
   else
      return (s + sumOfEvenOdd(s + 2, e));
}
void main()
{
     int n1, n2;
   printf("Enter range: ");
   scanf("%d %d",&n1,&n2);
   printf("(Note: If the starting limit is odd the sum of odd numbers will be printed and same
applies for even.)\nSum of required numbers in the given range: %d",sumOfEvenOdd(n1,n2));
}
```

OUTPUT:

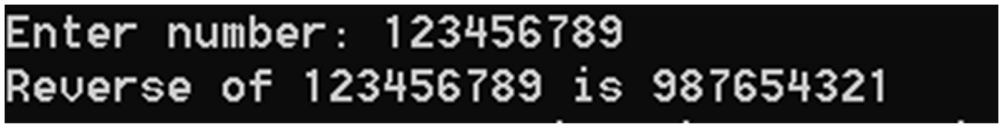
```
Enter range: 17 24
(Note: If the starting limit is odd the sum of odd numbers will be printed and same applies for even.)
Sum of required numbers in the given range: 80
```

5. Write a C program to find reverse of any number using recursion.

```
#include <stdio.h>
int sum=0,rem;
int reverse(int n)
{
 if(n!=0)
 {
     rem=n%10;
     sum=sum*10+rem;
     reverse(n/10);
   }
   else
     return sum;
 }

void main()
{
 int n;
 printf("Enter number: ");
   scanf("%d",&n);
   printf("Reverse of %d is %d",n,reverse(n));
}
```

OUTPUT:

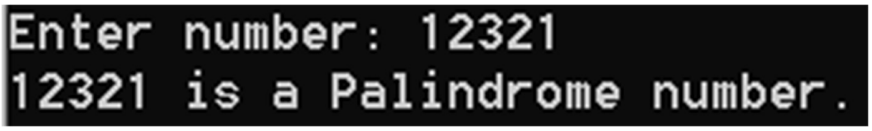


6. **Write a C program to check whether a number is palindrome or not using recursion.**

```
#include <stdio.h>
int sum=0,rem;
int reverse(int n)
{
 if(n!=0)
 {
     rem=n%10;
     sum=sum*10+rem;
     reverse(n/10);
  }
  else
     return sum;
 }

void main()
{
 int n;
 printf("Enter number: ");
   scanf("%d",&n);
   if(n==reverse(n))
    printf("%d is a Palindrome number.",n);
   else
    printf("%d is not a Palindrome number.",n);
}
```

OUTPUT:



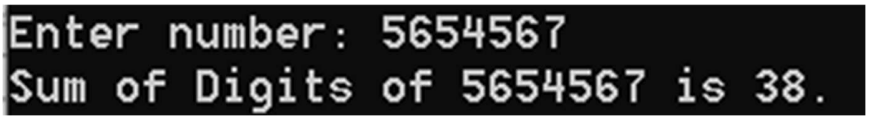
7. **Write a C program to find sum of digits of a given number using recursion.**

```
#include <stdio.h>
int sum=0;
int SoD(int n)
{
 if(n!=0)
 {
     sum+=n%10;
     SoD(n/10);
  }
  else
     return sum;
 }

void main()
{
  int n;
  printf("Enter number: ");
  scanf("%d",&n);
  printf("Sum of Digits of %d is %d. ",n,SoD(n));

}
```

OUTPUT:



8. Write a C program to generate nth Fibonacci term using recursion.

```
#include <stdio.h>
int fibo(int num)
{
   if (num == 0)
   {
      return 0;
   }
   else if (num == 1)
   {
      return 1;
   }
   else
   {
      return(fibo(num - 1) + fibo(num - 2));
   }
}
void main()
{
  int n;
  printf("Enter which term to print from the Fibonacci Series: ");
  scanf("%d",&n);
  if (n < 0)
   {
      printf("Fibonacci of negative number is not possible.\n");
   }
   else
   {

      printf("The %d number in fibonacci series is %d\n", n, fibo(n-1));
   }
}
```

OUTPUT:

9. Write a C program to find GCD (HCF) of two numbers using recursion.

```
#include <stdio.h>
int hcf(int a,int b)
{
   if (b != 0)
      return hcf(b, a % b);
   else
      return a;
}
void main()
{
     int n1, n2;

   printf("Enter two integers: ");
   scanf("%d %d",&n1,&n2);

   n1 = ( n1 > 0) ? n1 : -n1;
   n2 = ( n2 > 0) ? n2 : -n2;
   printf("HCF of %d and %d: %d",n1,n2,hcf(n1,n2));
}
```

OUTPUT:

10. Write a C program to find LCM of two numbers using recursion.

```
#include <stdio.h>
int lcm(int a, int b)
{
   static int c = 1;

   if (c % a == 0 && c % b == 0)
   {
      return c;
   }
   c++;
   lcm(a, b);
   return c;
}
void main()
{
     int n1, n2;

   printf("Enter two integers: ");
   scanf("%d %d",&n1,&n2);
   printf("LCM of %d and %d: %d",n1,n2,lcm(n1,n2));
}
```

OUTPUT: