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Section: E
Roll No.: 51
Stream: B. Tech. ML+AI
Sem: 1st

Assignment-2

Q1: Write a program to calculate a factorial of a number using recursion.

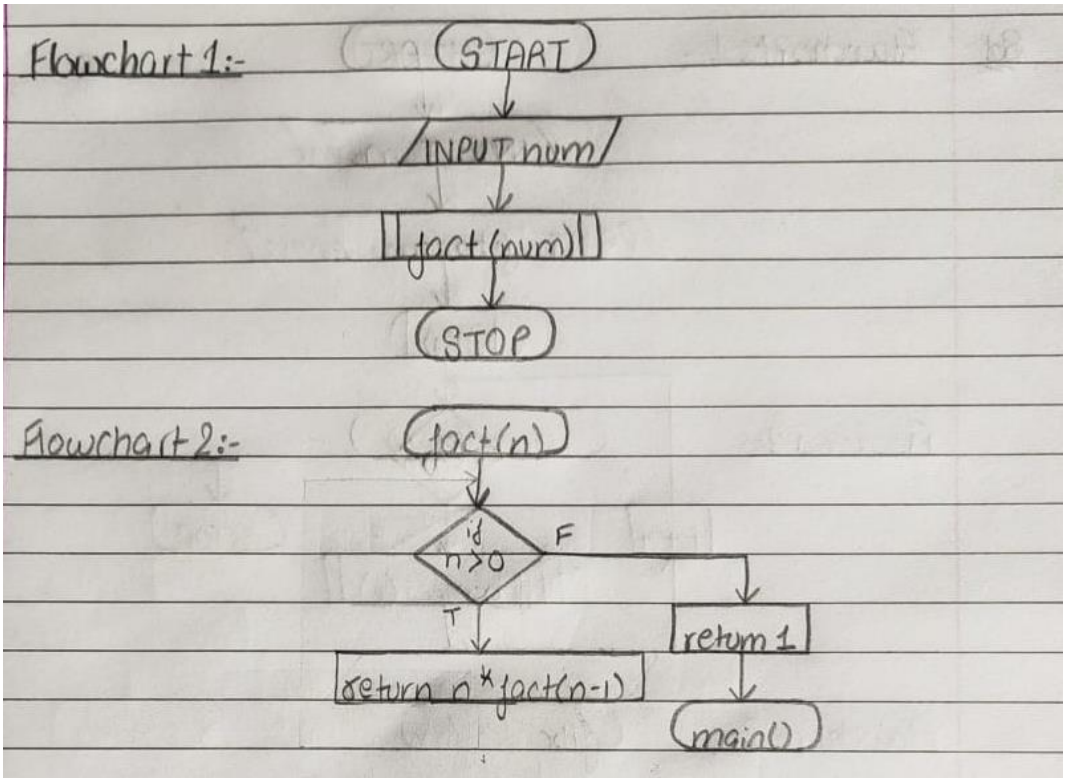
SOURCE CODE

```c
#include<stdio.h>
int fact(int n);
int main() {
  printf("------------DETAILS------------\n");
  printf("Name: Deepanshu Gupta\nRoll No.: 51\n");
  printf("------------OUTPUT-------------\n");
  int num;
  printf("Enter a number: ");
  scanf("%d", &num);
  printf("Factorial of %d = %d\n", num, fact(num));
  return 0;
}
int fact(int n) {
  if (n>0)
    return n*fact(n-1);
  else
    return 1;
}
```

OUTPUT

```
PS C:\Users\Deepanshu\Desktop\WarIsOn> ./a.exe
------------DETAILS------------
Name: Deepanshu Gupta
Roll No.: 51
------------OUTPUT-------------
Enter a number: 5
Factorial of 5 = 120
PS C:\Users\Deepanshu\Desktop\WarIsOn>
```

FLOWCHART



Q2: Write a program to print a Fibonacci series using recursion.

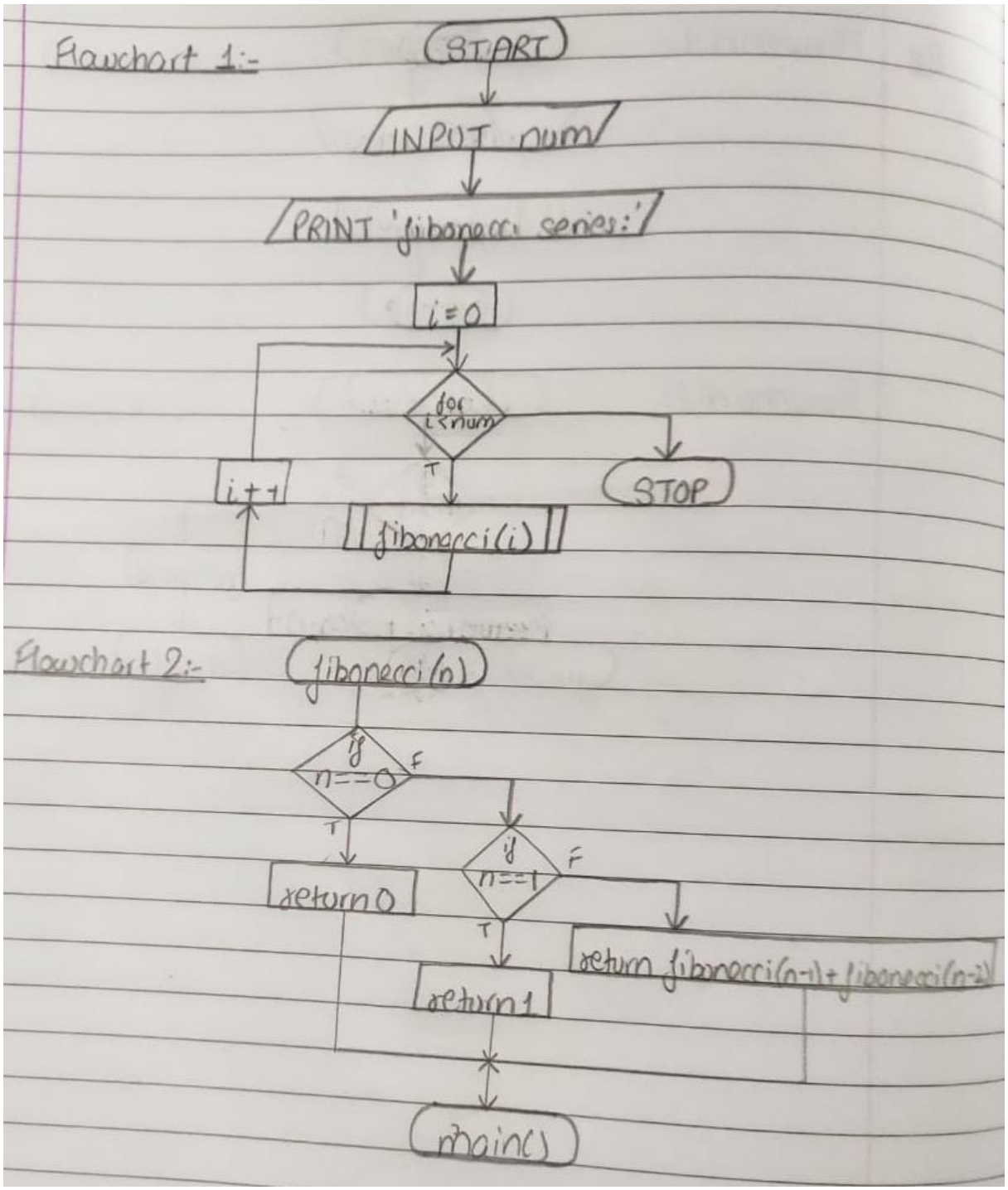
SOURCE CODE

```c
#include<stdio.h>
int fibonacci(int n);
int main() {
  printf("------------DETAILS------------\n");
  printf("Name: Deepanshu Gupta\nRoll No.: 51\n");
  printf("------------OUTPUT-------------\n");
  int num, i;
  printf("Enter a number: ");
  scanf("%d", &num);
  printf("Fibonacci Series:\t");
  for (i=0; i<num; i++)
    printf("%d\t", fibonacci(i));
  printf("\n");
  return 0;
}
int fibonacci(int n) {
  if (n==0)   return 0;
  else if (n==1)    return 1;
  else     return (fibonacci(n-1)+fibonacci(n-2));
}
```

OUTPUT

```
PS C:\Users\Deepanshu\Desktop\WarIsOn> ./a.exe
------------DETAILS------------
Name: Deepanshu Gupta
Roll No.: 51
------------OUTPUT-------------
Enter a number: 7
Fibonacci Series:       0       1       1       2       3       5       8
PS C:\Users\Deepanshu\Desktop\WarIsOn>
```

FLOWCHART



Q3: Write a program to calculate the sum of first 'n' natural numbers using recursion.

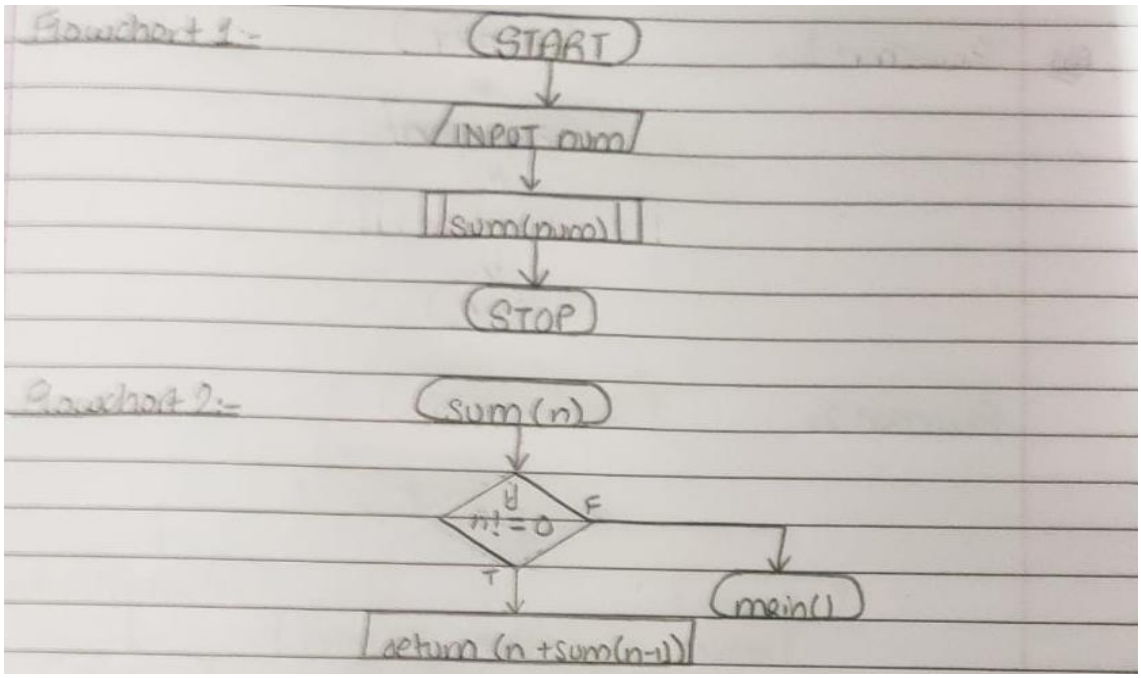
SOURCE CODE

```c
#include<stdio.h>
int sum(int n);
int main() {
  printf("------------DETAILS------------\n");
  printf("Name: Deepanshu Gupta\nRoll No.: 51\n");
  printf("------------OUTPUT-------------\n");
  int num;
  printf("Enter the number of terms: ");
  scanf("%d", &num);
  printf("Sum = %d", sum(num));
  return 0;
}
int sum(int n) {
  if (n!=0)
    return (n+sum(n-1));
}
```

OUTPUT

```
PS C:\Users\Deepanshu\Desktop\WarIsOn> ./a.exe
------------DETAILS------------
Name: Deepanshu Gupta
Roll No.: 51
------------OUTPUT-------------
Enter the number of terms: 12
Sum = 78
PS C:\Users\Deepanshu\Desktop\WarIsOn>
```

FLOWCHART



Q4: Write a program to find the sum of digits of a number using recursion.

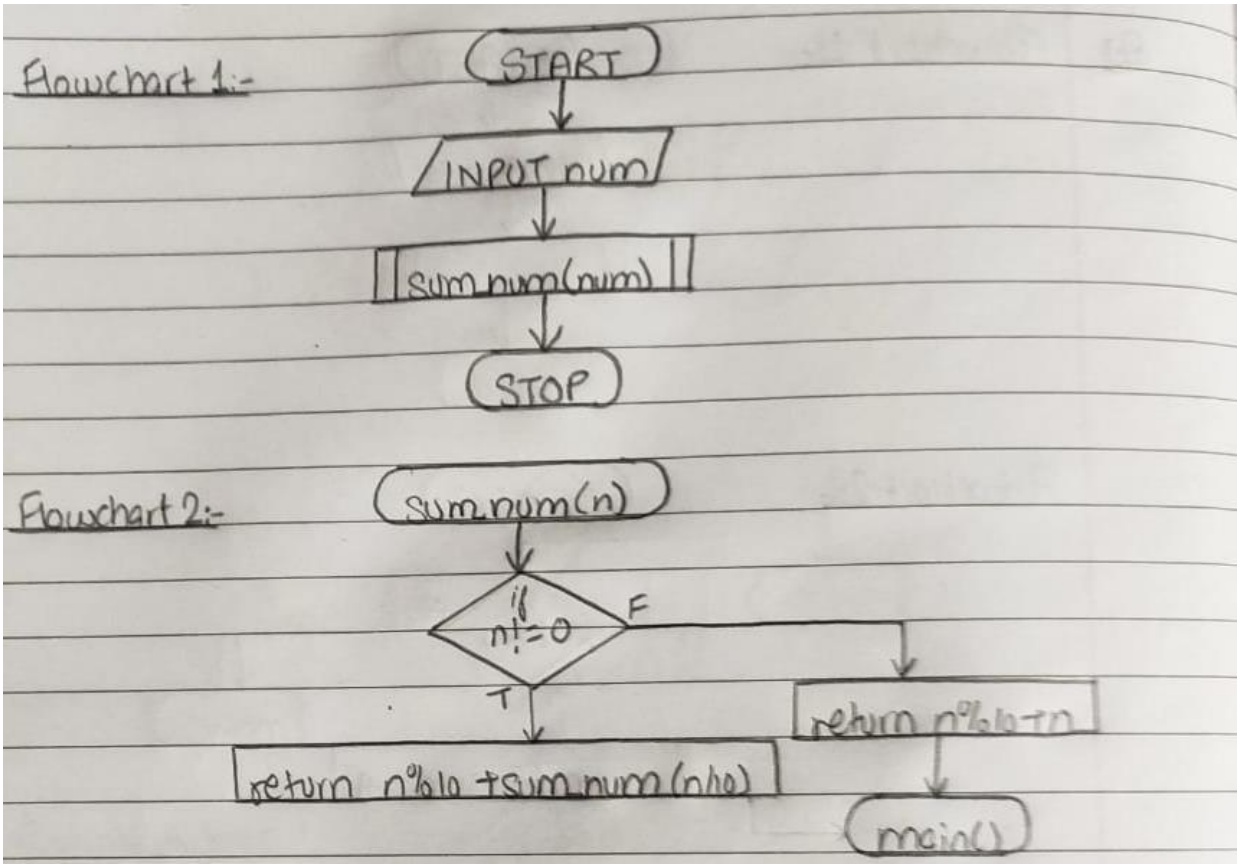
SOURCE CODE

```c
#include<stdio.h>
int sum_num(int n);
int main() {
  printf("------------DETAILS------------\n");
  printf("Name: Deepanshu Gupta\nRoll No.: 51\n");
  printf("------------OUTPUT-------------\n");
  int num;
  printf("Enter a number: ");
  scanf("%d", &num);
  printf("Sum = %d\n", sum_num(num));
  return 0;
}
int sum_num(int n) {
  if (n!=0)
    return n%10+sum_num(n/10);
  else
    return n%10+n;
}
```

OUTPUT

```
PS C:\Users\Deepanshu\Desktop\WarIsOn> ./a.exe
------------DETAILS------------
Name: Deepanshu Gupta
Roll No.: 51
------------OUTPUT-------------
Enter a number: 1234
Sum = 10
PS C:\Users\Deepanshu\Desktop\WarIsOn>
```

FLOWCHART



Q5: Write a program to reverse a number using recursion.

SOURCE CODE

```
#include<stdio.h>
#include<math.h>
int rev(int n);
int main() {
  printf("------------DETAILS------------\n");
  printf("Name: Deepanshu Gupta\nRoll No.: 51\n");
  printf("------------OUTPUT-------------\n");
  int num;
  printf("Enter a number: ");
  scanf("%d", &num);
  printf("Reverse Number = %d\n", rev(num));
  return 0;
}
int rev(int n) {
  if (n!=0) {
    int x=log10(n);
    return (n%10)*pow(10,x)+rev(n/10);
  } else    return n%10+n;
}
```

OUTPUT

```
PS C:\Users\Deepanshu\Desktop\WarIsOn> ./a.exe
------------DETAILS------------
Name: Deepanshu Gupta
Roll No.: 51
------------OUTPUT-------------
Enter a number: 1234
Reverse Number = 4321
PS C:\Users\Deepanshu\Desktop\WarIsOn>
```

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