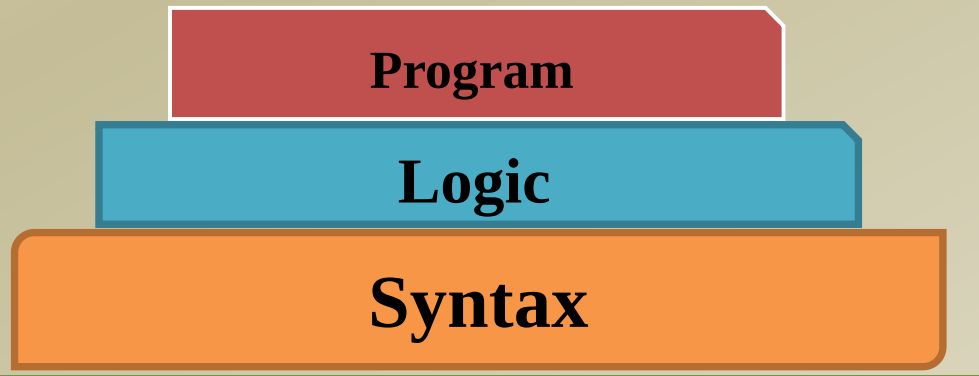
Code at Random (OPC) PVT. LTD.

Module 5: Previous Year Board Questions



Programs [2017 & 2016]

1. Write a program to accept a number and check and display whether it is a **Spy number** or not. (A number is spy if the sum of its digits equals the product of its digits).

   Example : Consider a number 1124

   Sum of digits: 1+1+2+4 =8 and

   *Product of digits: 1*1*2*4 =8.*

   Sum = Product

   Hence 1124 is a spy number.

2. Write a program to accept a number and check and display whether it is a Niven number or not. (Niven number is that number which is divisible by its sum of digits).

   Example: Consider the number 126

   Sum of its digits is 1 + 2 + 6 = 9 and 126 is divisible by 9.

Solution of Spy number

```
1. import java.util.Scanner;
   class spy {
    public static void main(String Args[]){
        int num, product=1, sum=0, lastdigit;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number to check: " );
        num=sc.nextInt();
        while(num>0)    {
            lastdigit=num%10;
            sum=sum+lastdigit;              //adds last digit to the variable sum
            product=product*lastdigit;
            num=num/10;  //removes the last digit from the given number
         }
        if(sum==product)   //compares the sum and product
        System.out.println("The given number is a spy number.");   //prints if the above condition returns true
        else
        System.out.println("The given number is not a spy number.");    //prints if the above condition returns false
    }
}
```

Solution of Niven number

```
2. import java.util.Scanner;
class niven{
    public static void main(String Args[]){
        int num, sum=0, lastdigit;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number to check: " );
        num=sc.nextInt();
        int t = num;
        while(num>0)  {
            lastdigit=num%10;
            sum=sum+lastdigit;  //adds last digit to the variable sum
            num=num/10;  //removes the last digit from the given number
         }
        if(t % sum ==0)
        System.out.println("The given number is a niven number."); //prints if the above condition returns true
        else
        System.out.println("The given number is not a niven number."); //prints if the above condition returns false
    }
}
```

Programs [18,06,07]

- Write a program to input a number and check and print whether it is a **Pronic** number or not.
  (**Pronic** number is the number which is the product of two consecutive integers)

  Examples:

  12 = 3 x 4

  20 = 4 x 5

  42 = 6 x 7

- Write a program to accept a number and check whether the number is Armstrong or not. A number is said to be Armstrong, if the sum of the cubes of its digits is equal to the original number.

  Example: *Input: 153*

  Output: Armstrong Number($1^3+5^3+3^3 = 153$) - *Already learned in lectures*

- Write a program to calculate and print the sum of odd numbers and the sum of even numbers for the first n natural numbers. The integer n is to be entered by the user. -Already done

Solution of Pronic Number

```
import java.util.*;
class pronic {
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        System.out.print("Input a number : ");
        int num = sc.nextInt();
        int ans = 0;
        for(int i=0; i<num; i++) {
            if(i*(i+1) == num) {
                ans = 1;
                break;
            }
        }
        if(ans == 1)
            System.out.println("Pronic Number.");
        else
            System.out.println("Not a Pronic Number.");
    }
}
```

Programs [08,15]

- Write a program to calculate and print the sum of each of the following series:

  a.) Sum (S) = 2 – 4 + 6 – 8 + ….. – 20

  b.) Sum (S) = $\frac{x}{2} + \frac{x}{5} + \frac{x}{8} + \frac{x}{11} + \ldots \frac{x}{20}$

- A special two-digit number is such that when the sum of its digits is added to the product of its digits, the result is equal to the original two-digit number

  Example : Consider the number 59.

  Sum of digits = 5 + 9 = 14

  *Product of its digits =5*9=45*

  Sum of sum of digits and product of digits = 14 + 45 = 59

Write a program to accept a two-digit number. Add the sum of its digit to the product of its digits. If the value is equal to the number input, output the message "Special 2-digit number" otherwise, out put the message "Not a special 2-digit number".

Solution of Series Program

```
import java.util.*;
class series {
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        System.out.print("Input a number : ");
        int x = sc.nextInt();
        int i,sum1=0, sign=1,sum2=0;
        for(i=1; i<=10; i++){
            sum1= sum1+(i*2);
            sign=sign*-1;
        }
        for(i=1;i<=7;i++){
            sum2= sum2+x/(3*i-1);
        }
        System.out.println("The sum of first series is"+sum1);
        System.out.println("The sum of second series is"+sum2);
    }
}
```

Solution of Special number

```
import java.util.*;
class special {
    public static void main(String Args[]){
        int num, product=1, sum=0, lastdigit;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number to check: " );
        num=sc.nextInt();
        int t= num;
        while(num>0)  {
            lastdigit=num%10;
            sum=sum+lastdigit;  //adds last digit to the variable sum
            product=product*lastdigit;
            num=num/10;  //removes the last digit from the given number
         }
        if(sum+product ==t)  //compares the sum + product with number
        System.out.println("The given number is a special number.");  //prints if the above condition returns true
        else
        System.out.println("The given number is not a special number."); //prints if the above condition returns false
    } }
```

Program [2013]

- The International Standard Book Number (ISBN) is a unique numeric book identifier which is printed on every book. The ISBN is based upon a 10-digit code. The ISBN is legal if:

  $1 * digit_1 + 2 * digit_2 + 3 * digit_3 + 4 * digit_4 + 5 * digit_5 + 6 * digit_6 + 7 * digit_7 + 8 * digit_8 + 9 * digit_9 + 10 * digit_{10}$ is divisible by 11.

Example : For an ISBN 1401601499

Sum = 1 * 1 + 2 * 4 + 3 * 0 + 4 * 1 + 5 * 6 + 6 * 0 + 7 * 1 + 8 * 4 + 9 * 9 + 10 * 9 = 253 which is divisible by 11.

Write a program to:

- Input the ISBN code as a 10-digit integer.
- If the ISBN is not a 10-digit integer, output the message, “Illegal ISBN” and terminate the program
- If the number is 10-digit, extract the digits of the number and compute the sum as explained above.
  - If the sum is divisible by 11, output the message, “Legal ISBN”. If the sum is not divisible by 11, output the message, “Illegal ISBN”.

Solution of ISBN Program

```
import java.util.*;
class isbn{
    public static void main(String Args[]){
        int isbn, sum=0, lastdigit,c=0;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the ISBN to check: " );
        isbn=sc.nextInt();
        int t = isbn;
        while(isbn>0)  {
            c++;
            isbn=isbn/10;
         }
        if(c==10){
            int a= 10;
            while(t>0){
                lastdigit = t%10;
                sum = sum+(lastdigit*a);
                t=t/10;
                a--;
            }
                System.out.println(sum);
                if(sum%11==0)
                    System.out.println("Legal ISBN");
                else
                  System.out.println("Illegal ISBN");
            }
            else
            System.out.println("Illegal ISBN");
        }
}
```

Program [2010, 11]

- WAP to print first n terms of Fibonacci series. The integer n is to be entered by the user.
  - The Fibonacci numbers are the numbers in the following integer sequence.

  0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, ……..

  The Fibonacci series is a series where the next term is the sum of the previous two terms. The first two terms of the Fibonacci sequence are 0 followed by 1.

  Enter the number of elements n : 10

  Output: 0 1 1 2 3 5 8 13 21 34

- WAP to input a number and check whether it is Automorphic or not. – [Already Covered]

Solution of Fibonacci Series

```
import java.util.*;
class fibonacci  {
    public static void main(String Args[])
     {
        int a,b,c,i,n;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the value of n");
        n=sc.nextInt();
        a=0;
        b=1;
        c=a+b;
        System.out.print(a);
        System.out.print(" "+b);
        System.out.print(" "+c);
for(i=1;i<=n-3;i++)
     {
          a=b;
          b=c;
          c=a+b;
          System.out.print(" "+c);
      }
   }
}
```