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Tender Heart High School

Class IX **Computer**

Topic-Iterative construct in java **Teacher-Prabhdeep Kaur**

1. Multiple Choice Questions

1. iteration 2 do-while **3**. while for 4. for(i=3;i<=30;i=i+3)

5 switch 6 while loop for 7 eleven times 8 infinite 9. switch 10 never

Answer the Following Questions

Question 1

Iterative process means repeating a set of actions a certain number of times to perform some task. Loops in programming languages like Java enable us to repeat a single statement or a set of statements as long as the desired condition remains true.

Question 2

This for loop prints the table of 2 till 12. int i = 1 is the initialization part of the for loop, it is executed only once when the loop gets executed for the first time. i <= 12 is the condition part of the for loop, it is executed before the start of each iteration. Loop iterates as long as this condition remains true. Once it becomes false, execution of the loop is stopped. i++ is the update part of the for loop. It is executed at the end of each iteration.

Question 3

Name the different types of loop statements.

1. for
2. while
3. do-while

Question 4

What are the parameters needed to create a for loop?
The following parameters are commonly used in a for loop:

1. An initial value for the loop control variable.
2. A condition—loop will iterate as long as this condition remains true.

3. An update expression to modify the loop control variable after every iteration.
4. Body of the loop which consists of the statements that needs to be repeatedly executed.

Question 5

(a) Entry controlled loop
An entry-controlled loop checks the condition at the time of entry. Only if the condition is true, the program control enters the body of the loop. for and while loops are entry-controlled loops.
(b) Exit controlled loop
An exit-controlled loop checks the condition after executing its body. If the condition is true, loop will perform the next iteration otherwise program control will move out of the loop. do-while loop is an exit-controlled loop.

Question 6

Write down the general format of:
(a) for loop

```
for (initialization; condition; update) {
   //loop-body
}
```

(b) do - while

```
do {
   //loop-body
} while (condition);
```

(c) while loop

```
while (condition) {
   //loop-body
}
```

Question 7

What is the purpose of using:
(a) break statement
break statement is used to unconditionally jump out of the loop
(b) continue statement
continue statement is used to unconditionally jump to the next iteration of the loop, skipping the remaining statements of the current iteration.

Question 8

We can convert the repetitive logic written using one type of loop into any of the other 2 types. For example, if some repetitive logic is coded using a for loop, we can convert that for loop into while or do-while loop. This is termed inter-conversion of loops.

Question 9

1. for loop to while loop
2. for loop to do-while loop
3. do-while loop to while loop
4. do-while loop to for loop
5. while loop to do-while loop
6. while loop to for loop

Question 10 Define the following:
(a) Finite loop
A loop which iterates for a finite number of iterations is termed as a finite loop.

(b) Delay loop
A loop which is used to pause the execution of the program for some finite amount of time is termed as Delay loop. Delay loops have an empty loop body.

(c) Infinite loop
A loop which continues iterating indefinitely and never stops is termed as infinite loop.

(d) Null loop
A loop which has an empty loop body is termed as a null loop.

Question 11 Distinguish between:

(a) for and while loop

1. for loop is a suitable choice when we know the number of iterations beforehand. while loop is helpful in situations where numbers of iterations is not known.
2. Omitting the condition in for loop will lead to an infinite loop whereas if condition is not provided in while loop, it will cause a compilation error.

(b) while and do-while loop

1. while is an entry-controlled loop whereas do-while is an exit-controlled loop
2. while loop is helpful in situations where numbers of iterations is not known. do-while is suitable when we need to display a menu to the user.

Question 12

State one difference and one similarity between while and do-while loop
Similarity — Both while and do-while are suitable in situations where numbers of iterations is not known.
Difference — while is an entry-controlled loop whereas do-while is an exit-controlled loop

Question 13

State one similarity and one difference between while and for loop.
Similarity — Both for and while are entry-controlled loops
Difference — for loop is a suitable choice when we know the number of iterations beforehand. while loop is helpful in situations where numbers of iterations is not known.

Question 14

Give two differences between Step loop and Continuous loop.
In Continuous loop, loop control variable is incremented or decremented by 1 in each iteration whereas in Step loop the loop control variable is incremented or decremented by more than 1 in each iteration.

Predict the Output of the following Programs

Question 1

0

2

4

6

8

10

Question 2

60

Question 3

m=3

n=14

m=4

n=13

m=5

n=12

m=6

n=11

m=7

n=10

Question 4

10

2

The loop will execute 2 times

After 2 iterations y becomes less than x so condition of while loop becomes false and it stops executing.

Rewrite the following Programs

Question 1

```
class Test
{
public static void main(String args[])
{
int x=10, c=20;
do {
x++;
System.out.println(x);
c=c-2;
} while (c>=10);
}
}
```

Question 2

```
class Pattern
{
public static void main(String args[])
```

```
{
int i=5,j;
do {
System.out.print(i);
i--;
} while (i>=1);
System.out.println();
}
}
```

Question 3

```
class Number
{
public static void main(String args[])
{
int i=1,n=191,c=0;
do {
if(n%i==0)
c=c+1;
i++;
} while (i<=n);
if(c==2)
System.out.println("Prime");
else
System.out.println("Not Prime");
}
}
```

Question 4

```
import java.io.*;
class Sample
{
public static void main(String args[]) throws IOException
{
int n,r;
InputStreamReader read = new InputStreamReader(System.in);
BufferedReader in = new BufferedReader(read);
System.out.println("Enter a number");
n=Integer.parseInt(in.readLine());
while(n!=0)
{
r=n%10;
n=n/10;
```

```
System.out.println(r);
}
}
}
```

Solutions to Unsolved Java Programs

Question 1

Write the programs in Java to display the first ten terms of the following series:

(a) 1, 4, 9, 16,

```
public class Series
{
   public static void main(String args[]) {
      for (int i = 1; i <= 10; i++) {
         System.out.print(i * i + " ");
      }
   }
}
```

(b) 1, 2, 4, 7, 11,

```
public class Series
{
   public static void main(String args[]) {
      for (int i = 0; i < 10; i++) {
         int term = 1 + ((i * (i + 1)) / 2);
         System.out.print(term + " ");
      }
   }
}
```

(c) 3, 6, 9, 12,

```
public class Series
{
   public static void main(String args[]) {
      for (int i = 3; i <= 30; i = i + 3) {
         System.out.print(i + " ");
      }
   }
}
```

(d) 4, 8, 16, 32,

```
public class Series
{
   public static void main(String args[]) {
      for (int i = 2; i <= 11; i++) {
         System.out.print((int)(Math.pow(2, i)) + " ");
      }
   }
}
```

(e) 1.5, 3.0, 4.5, 6.0,

```
public class Series
{
   public static void main(String args[]) {
      float term = 1.5f;
      for (int i = 1; i <= 10; i++) {
         System.out.print(term + " ");
         term += 1.5f;
      }
   }
}
```

(f) 0, 7, 26,

```
public class Series
{
   public static void main(String args[]) {
      for (int i = 1; i <= 10; i++) {
         int term = (int)(Math.pow(i, 3) - 1);
         System.out.print(term + " ");
      }
   }
}
```

(g) 1, 9, 25, 49,

```
public class Series
{
   public static void main(String args[]) {
      for (int i = 1; i <= 19; i = i + 2) {
         System.out.print((i * i) + " ");
```

```
        }
    }
}
```

(h) 4, 16, 36, 64,

```
public class Series
{
    public static void main(String args[]) {
        for (int i = 2; i <= 20; i = i + 2) {
            System.out.print((i * i) + " ");
        }
    }
}
```

Output

(i) 0, 3, 8, 15,

```
public class Series
{
    public static void main(String args[]) {
        for (int i = 1; i <= 10; i++) {
            System.out.print((i * i - 1) + " ");
        }
    }
}
```

(j) 24, 99, 224, 399,

```
public class Series
{
    public static void main(String args[]) {
        for (int i = 5; i <= 50; i = i + 5) {
            int term = (int)(Math.pow(i, 2) - 1);
            System.out.print(term + " ");
        }
    }
}
```

(k) 2, 5, 10, 17,

```
public class Series
{
```

```
    public static void main(String args[]) {
        for (int i = 1; i <= 10; i++) {
            System.out.print((i * i + 1) + " ");
        }
    }
}
```

Question 2

```
import java.util.Scanner;

public class Integers
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        int pSum = 0, pCount = 0, nSum = 0, nCount = 0;
        System.out.println("Enter 50 numbers");

        for (int i = 1; i <= 50; i++) {
            int n = in.nextInt();
            if (n >= 0) {
                pSum += n;
                pCount++;
            }
            else {
                nSum += n;
                nCount++;
            }
        }

        System.out.println("Positive Count = " + pCount);
        System.out.println("Positive Sum = " + pSum);
        System.out.println("Negative Count = " + nCount);
        System.out.println("Negative Sum = " + nSum);
    }
}
```

Question 3

```
import java.util.Scanner;

public class OddEvenSum
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
```

```
        System.out.print("Enter m: ");
        int m = in.nextInt();
        System.out.print("Enter n: ");
        int n = in.nextInt();
        long sumOdd = 0, sumEven = 0;

        if (m > n) {
            System.out.println("m should be less than n");
        }
        else {
            for (int i = m; i <=n; i++) {
                if (i % 2 == 0)
                    sumEven += i;
                else
                    sumOdd += i;
            }

            System.out.println("Even Sum: " + sumEven);
            System.out.println("Odd Sum: " + sumOdd);
        }
    }
}
```

Question 4

```
import java.util.Scanner;

public class DivisibleBy5
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        int n, c = 0;
        System.out.println("Enter 50 numbers");
        for (int i = 1; i <= 50; i++) {
            n = in.nextInt();
            if (n % 5 == 0) {
                if (n % 10 == 5)
                    System.out.println("Number end with the digit 5");
                if (n % 10 == 0)
                    c++;
            }
        }
        System.out.println("Count of numbers ending with 0: " + c);
```

```
    }
}
```

Question 5

```
import java.util.Scanner;

public class PerfectSquare
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter m: ");
        int m = in.nextInt();
        System.out.print("Enter n: ");
        int n = in.nextInt();

        if (m < n && m > 0 && n > 0) {
            for (int i = m; i <= n; i++) {
                System.out.println("Number = " + i);
                double sroot = Math.sqrt(i);
                if (sroot == Math.floor(sroot))
                    System.out.println(i + " is a perfect square");
            }
        }
        else {
            System.out.println("Invalid input");
        }
    }
}
```

Question 6

```
import java.util.Scanner;

public class BuzzNumber
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter p: ");
        int p = in.nextInt();
        System.out.print("Enter q: ");
```

```
        int q = in.nextInt();
        if (p < q) {
            System.out.println("Buzz Numbers between "
                + p + " and " + q);
            for (int i = p; i <= q; i++) {
                if (i % 10 == 7 || i % 7 == 0)
                    System.out.println(i);
            }
        }
        else {
            System.out.println("Invalid Inputs!!!");
            System.out.println("p should be less than q");
        }

    }
}
```

Question 7

```
import java.util.Scanner;

public class ExamResult
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        int ta = 0, te = 0, tm = 0, ts = 0;
        for (int i = 1; i <= 40; i++) {
            System.out.println("Enter marks of student " + i);
            System.out.print("English: ");
            int eng = in.nextInt();
            System.out.print("Maths: ");
            int maths = in.nextInt();
            System.out.print("Science: ");
            int sci = in.nextInt();

            if (eng >= 95 && maths >= 95 && sci >= 95)
                ta++;

            if (eng >= 90)
                te++;

            if (maths >= 90)
                tm++;
```

```
            if (sci >= 90)
                ts++;
        }
        System.out.println("No. of students >= 95% in all subjects: " + ta);
        System.out.println("No. of students >= 90% in English: " + te);
        System.out.println("No. of students >= 90% in Maths: " + tm);
        System.out.println("No. of students >= 90% in Science: " + ts);
    }
}
```

Question 8

Write a program in Java to find the sum of the given series :
(a) 1 + 4 + 9 + ... + 400

```
public class Series
{
    public static void main(String args[]) {
        int sum = 0;
        for (int i = 1; i <= 20; i++)
            sum += (i*i);
        System.out.println("Sum = " + sum);
    }
}
```

(b) 1 + (1/2) + (1/3) + ... + (1/20)

```
public class Series
{
    public static void main(String args[]) {
        double sum = 0.0;
        for (int i = 1; i <= 20; i++)
            sum += (1.0 / i);
        System.out.println("Sum = " + sum);
    }
}
```

(c) 1 + (1/3) + (1/5) + ... + (1/19)

```
public class Series
{
```

```
    public static void main(String args[]) {
        double sum = 0.0;
        for (int i = 1; i <= 19; i = i + 2)
            sum += (1.0 / i);
        System.out.println("Sum = " + sum);
    }
}
```

(d) (1/2) + (2/3) + (3/4) + ... + (19/20)

```
public class Series
{
    public static void main(String args[]) {
        double sum = 0.0;
        for (int i = 1; i <= 19; i++)
            sum += (i / (double)(i + 1));
        System.out.println("Sum = " + sum);
    }
}
```

(e) 2 - 4 + 6 - 8 + ... - 20

```
public class Series
{
    public static void main(String args[]) {
        double sum = 0.0;
        for (int i = 1; i <= 10; i++) {
            if (i % 2 == 0)
                sum -= i * 2;
            else
                sum += i * 2;
        }
        System.out.println("Sum = " + sum);
    }
}
```

(f) (1*2) + (2*3) + ... + (19*20)

```
public class Series
{
    public static void main(String args[]) {
        int sum = 0;
        for (int i = 1; i <= 19; i++)
```

```
            sum += i * (i + 1);
        System.out.println("Sum = " + sum);
    }
}
```

Question 9

```
import java.util.Scanner;

public class DigitCount
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter number: ");
        int n = in.nextInt();
        int dc = 0;

        while (n != 0) {
            dc++;
            n /= 10;
        }

        System.out.println("Number of digits = " + dc);

        if (dc % 2 == 0)
            System.out.println("The number contains even number of digits");
        else
            System.out.println("The number contains odd number of digits");
    }
}
```

Question 10

```
import java.util.Scanner;

public class DigitReverse
{
    public static void main(String args[]) {

        Scanner in = new Scanner(System.in);
        System.out.print("Enter Number: ");
        int orgNum = in.nextInt();
```

```
        int copyNum = orgNum;
        int revNum = 0;

        while(copyNum != 0) {
            int digit = copyNum % 10;
            copyNum /= 10;
            revNum = revNum * 10 + digit;
        }

        int diff = revNum - orgNum;
        System.out.println("Reversed Number = " + revNum);
        System.out.println("Absolute Difference = " + Math.abs(diff));
    }
}
```

Question 11

```
import java.util.Scanner;

public class GCD
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter first number: ");
        int a = in.nextInt();
        System.out.print("Enter second number: ");
        int b = in.nextInt();
        while (b != 0) {
            int t = b;
            b = a % b;
            a = t;
        }
        System.out.println("GCD=" + a);
    }
}
```

Question 12

Write a program in Java to find the sum of the given series :

(a) $S = a^2 + a^2 / 2 + a^2 / 3 + ... + a^2 / 10$

```
import java.util.Scanner;

public class Series
```

```
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter a: ");
      int a = in.nextInt();
      double sum = 0.0;
      for (int i = 1; i <= 10; i++)
         sum += Math.pow(a, 2) / i;
      System.out.println("Sum = " + sum);
   }
}
```

(b) $S = a + a^2 / 2 + a^3 / 3 + ... + a^{10} / 10$

```
import java.util.Scanner;

public class Series
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter a: ");
      int a = in.nextInt();
      double sum = 0.0;
      for (int i = 1; i <= 10; i++)
         sum += Math.pow(a, i) / i;
      System.out.println("Sum = " + sum);
   }
}
```

(c) S = (a*2) + (a*3) + ... + (a*20)

```
import java.util.Scanner;

public class Series
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter a: ");
      int a = in.nextInt();
      long sum = 0;
      for (int i = 2; i <= 20; i++)
         sum += a * i;
      System.out.println("Sum = " + sum);
   }
```

```
}
```

(d) $S = a + a^2 + a^3 + ... + a^n$

```
import java.util.Scanner;

public class Series
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter a: ");
      int a = in.nextInt();
      System.out.print("Enter n: ");
      int n = in.nextInt();
      long sum = 0;
      for (int i = 1; i <= n; i++)
         sum += Math.pow(a, i);
      System.out.println("Sum = " + sum);
   }
}
```

(e) $S = 1 + 2^2 / a + 3^3 / a^2 + ... $ to n terms

```
import java.util.Scanner;

public class Series
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter a: ");
      int a = in.nextInt();
      System.out.print("Enter n: ");
      int n = in.nextInt();
      double sum = 1.0;
      for (int i = 2; i <= n; i++)
         sum += Math.pow(i, i) / Math.pow(a, i - 1);
      System.out.println("Sum = " + sum);
   }
}
```

(f) $S = 1^2/a + 3^2 / a^2 + 5^2 / a^3 + ... $ to n terms

```
import java.util.Scanner;
```

```
public class Series
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter a: ");
      int a = in.nextInt();
      System.out.print("Enter n: ");
      int n = in.nextInt();
      double sum = 0.0;
      for (int i = 1, j = 1; i <= n; i++, j=j+2)
         sum += Math.pow(j, 2) / Math.pow(a, i);
      System.out.println("Sum = " + sum);
   }
}
```

Output

(g) $S = 1/a + 1/a^2 + 1/a^3 + ... + 1/a^n$

```
import java.util.Scanner;

public class Series
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter a: ");
      int a = in.nextInt();
      System.out.print("Enter n: ");
      int n = in.nextInt();
      double sum = 0.0;
      for (int i = 1; i <= n; i++)
         sum += 1 / Math.pow(a, i);
      System.out.println("Sum = " + sum);
   }
}
```

(h) $S = x/2 + x/5 + x/8 + x/11 + ... + x/20$

```
import java.util.Scanner;

public class Series
{
   public static void main(String args[]) {
```

```
        Scanner in = new Scanner(System.in);
        System.out.print("Enter x: ");
        int x = in.nextInt();
        double sum = 0.0;
        for (int i = 2; i <= 20; i = i+3)
           sum += (double)x / i;
        System.out.println("Sum = " + sum);
    }
}
```

Question 13

```
import java.util.Scanner;

public class MonkeyPole
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter height of the pole: ");
        double poleHt = in.nextDouble();
        double jumpHt = 5.0;
        int numAttempts = 1;
        while (jumpHt < poleHt) {
           jumpHt += 5.0;
           jumpHt -= 2 * jumpHt / 100.0;
           numAttempts++;
        }
        System.out.println("Number of Attempts = " + numAttempts);
    }
}
```

Question 14

```
import java.util.Scanner;

public class CompoundInterest
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter Principal: ");
        double p = in.nextDouble();
        System.out.print("Enter Rate: ");
        double r = in.nextDouble();
        System.out.print("Enter Time: ");
        int t = in.nextInt();
```

```
        double amt = p;
        for (int i = 1; i <= t; i++) {
            double interest = (amt * r * 1) / 100.0;
            amt += interest;
            System.out.println("Amount after " + i
                               + " year = " + amt);
        }
    }
}
```

Question 15

```
import java.util.Scanner;

public class NumberOperations
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.println("1. Sum without '+' operator");
        System.out.println("2. Product without '*' operator");
        System.out.println("3. Quotient and Remainder without '/' & '%' operators");
        System.out.print("Enter your choice: ");
        int choice = in.nextInt();
        System.out.print("Enter m: ");
        int m = in.nextInt();
        System.out.print("Enter n: ");
        int n = in.nextInt();

        if (m > n) {
            switch (choice) {
                case 1:
                    while (n > 0) {
                        m++;
                        n--;
                    }
                    System.out.println("Sum = " + m);
                    break;

                case 2:
                    int p = 0;
                    while (n > 0) {
                        p += m;
                        n--;
                    }
                    System.out.println("Product = " + p);
```

```
            break;

        case 3:
            int q = 0;
            while (m >= n) {
                m = m - n;
                q++;
            }
            System.out.println("Quotient = " + q);
            System.out.println("Remainder = " + m);
            break;

        default:
            System.out.println("Incorrect Choice");
            break;
      }
    }
    else {
      System.out.println("Invalid Inputs");
    }
  }
}
```

Question 16

```
import java.util.Scanner;

public class PalinOrPerfect
{
  public static void main(String args[]) {
    Scanner in = new Scanner(System.in);
    System.out.println("1. Palindrome number");
    System.out.println("2. Perfect number");
    System.out.print("Enter your choice: ");
    int choice = in.nextInt();
    System.out.print("Enter number: ");
    int num = in.nextInt();

    switch (choice) {
      case 1:
      int copyNum = num;
      int revNum = 0;
```

```
        while(copyNum != 0) {
            int digit = copyNum % 10;
            copyNum /= 10;
            revNum = revNum * 10 + digit;
        }

        if (revNum == num)
            System.out.println(num + " is palindrome");
        else
            System.out.println(num + " is not palindrome");
        break;

        case 2:
        int sum = 0;

        for (int i = 1; i <= num / 2; i++) {
            if (num % i == 0) {
                sum += i;
            }
        }

        if (num == sum)
            System.out.println(num + " is a perfect number");
        else
            System.out.println(num + " is not a perfect number");
        break;

        default:
        System.out.println("Incorrect Choice");
        break;
    }
  }
}
```

Question 17

```
import java.util.Scanner;

public class PrimeAutomorphic
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.println("1. Prime number");
      System.out.println("2. Automorphic number");
      System.out.print("Enter your choice: ");
```

```
int choice = in.nextInt();
System.out.print("Enter number: ");
int num = in.nextInt();

switch (choice) {
    case 1:
    int c = 0;
    for (int i = 1; i <= num; i++) {
        if (num % i == 0) {
            c++;
        }
    }
    if (c == 2)
        System.out.println(num + " is Prime");
    else
        System.out.println(num + " is not Prime");
    break;

    case 2:
    int numCopy = num;
    int sq = num * num;
    int d = 0;

    /*
     * Count the number of
     * digits in num
     */
    while(num > 0) {
        d++;
        num /= 10;
    }

    /*
     * Extract the last d digits
     * from square of num
     */
    int ld = (int)(sq % Math.pow(10, d));

    if (ld == numCopy)
        System.out.println(numCopy + " is automorphic");
    else
        System.out.println(numCopy + " is not automorphic");
    break;

    default:
```

```
            System.out.println("Incorrect Choice");
            break;
        }
    }
}
```

Question 18

```
import java.util.Scanner;

public class SeriesMenu
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.println("Type 1 to print series");
        System.out.println("0, 3, 8, 15, 24,....to n terms");
        System.out.println();
        System.out.println("Type 2 to find sum of series");
        System.out.println("(1/2) + (3/4) + (5/6) + (7/8) +....+ (19/20)");
        System.out.println();
        System.out.print("Enter your choice: ");
        int choice = in.nextInt();

        switch (choice) {
            case 1:
                System.out.print("Enter n: ");
                int n = in.nextInt();
                for (int i = 1; i <= n; i++)
                    System.out.print(((i * i) - 1) + " ");
                System.out.println();
                break;

            case 2:
                double sum = 0;
                for (int i = 1; i <= 19; i = i + 2)
                    sum += i / (double)(i + 1);
                System.out.println("Sum = " + sum);
                break;

            default:
                System.out.println("Incorrect Choice");
                break;
        }
    }
}
```

Question 19

```
import java.util.Scanner;

public class FibonacciNDigitSum
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.println("1. Fibonacci Series");
      System.out.println("2. Sum of digits");
      System.out.print("Enter your choice: ");
      int ch = in.nextInt();

      switch (ch) {
         case 1:
         int a = 0, b = 1;
         System.out.print(a + " " + b);
         for (int i = 3; i <= 10; i++) {
            int term = a + b;
            System.out.print(" " + term);
            a = b;
            b = term;
         }
         break;

         case 2:
         System.out.print("Enter number: ");
         int num = in.nextInt();
         int sum = 0;
         while (num != 0) {
            sum += num % 10;
            num /= 10;
         }
         System.out.println("Sum of Digits " + " = " + sum);
         break;

         default:
         System.out.println("Incorrect choice");
         break;
      }
   }
}
```

Question 20

```
import java.util.Scanner;

public class SpecialNumber
{
   public static void main(String args[]) {

      Scanner in = new Scanner(System.in);

      System.out.print("Enter a 2 digit number: ");
      int orgNum = in.nextInt();

      int num = orgNum;
      int count = 0, digitSum = 0, digitProduct = 1;

      while (num != 0) {
         int digit = num % 10;
         num /= 10;
         digitSum += digit;
         digitProduct *= digit;
         count++;
      }

      if (count != 2)
         System.out.println("Invalid input, please enter a 2-digit number");
      else if ((digitSum + digitProduct) == orgNum)
         System.out.println("Special 2-digit number");
      else
         System.out.println("Not a special 2-digit number");

   }
}
```

Question 21

```
import java.util.Scanner;

public class Menu
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.println("1. Factors of number");
      System.out.println("2. Factorial of number");
      System.out.print("Enter your choice: ");
      int choice = in.nextInt();
      int num;
```

```
        switch (choice) {
            case 1:
            System.out.print("Enter number: ");
            num = in.nextInt();
            for (int i = 1; i < num; i++) {
                if (num % i == 0) {
                    System.out.print(i + " ");
                }
            }
            System.out.println();
            break;

            case 2:
            System.out.print("Enter number: ");
            num = in.nextInt();
            int f = 1;
            for (int i = 1; i <= num; i++)
                f *= i;
            System.out.println("Factorial = " + f);
            break;

            default:
            System.out.println("Incorrect Choice");
            break;
        }
    }
}
```

Question 22

```
import java.util.Scanner;

public class NivenNumber
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter number: ");
        int num = in.nextInt();
        int orgNum = num;

        int digitSum = 0;

        while (num != 0) {
            int digit = num % 10;
```

```
            num /= 10;
            digitSum += digit;
        }

        /*
         * digitSum != 0 check prevents
         * division by zero error for the
         * case when users gives the number
         * 0 as input
         */
        if (digitSum != 0 && orgNum % digitSum == 0)
            System.out.println(orgNum + " is a Niven number");
        else
            System.out.println(orgNum + " is not a Niven number");
    }
}
```

Question 23

```
import java.util.Scanner;

public class SpyNumber
{
    public static void main(String args[]) {

        Scanner in = new Scanner(System.in);

        System.out.print("Enter Number: ");
        int num = in.nextInt();

        int digit, sum = 0;
        int orgNum = num;
        int prod = 1;

        while (num > 0) {
            digit = num % 10;

            sum += digit;
            prod *= digit;
            num /= 10;
        }

        if (sum == prod)
            System.out.println(orgNum + " is Spy Number");
        else
```

```
        System.out.println(orgNum + " is not Spy Number");

    }
}
```

Question 24

```
import java.util.Scanner;

public class SeriesMenu
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.println("1. Sum of the series");
        System.out.println("2. Display series");
        System.out.print("Enter your choice: ");
        int choice = in.nextInt();

        switch (choice) {
            case 1:
            int sum = 0;
            for (int i = 1; i <= 20; i++) {
                int term = (int)Math.pow(2, i);
                if (i % 2 == 0)
                    sum -= term;
                else
                    sum += term;
            }
            System.out.println("Sum=" + sum);
            break;

            case 2:
            int term = 1;
            for (int i = 1; i <= 5; i++) {
                System.out.print(term + " ");
                term = term * 10 + 1;
            }
            break;

            default:
            System.out.println("Incorrect Choice");
            break;
        }
    }
}
```