Class IX **Tender Heart High School** Date-04.11.2024
Computer Application
Topic-Nested loops **Teacher- Prabhdeep Kaur**

Fill in the blanks

1 nested loops 2 break 3 Label 4 inner loop outer loop 5 Continue

Write whether the following statements are True/False

1 True 2 False 3 False 4 False 5 False

Differentiate between the following

Q 1 Nested if and nested loop

Nested if is used to do conditional checks at multiple levels whereas nested loops are used to execute one iterative set of statements inside another iterative set.

Q 2 Break and continue

1. break statement is used to unconditionally jump out of the loop whereas continue statement is used to unconditionally jump to the next iteration of the loop, skipping the remaining statements of the current iteration.
2. break statement is used in switch-case and loops whereas continue statement is only used in loops.

Q 3

Labelled break can be used to exit out of a deeply nested set of loops whereas Unlabelled break only exits from the loop within which it is enclosed.

<u>Answer the following questions</u>

Q 1 When a loop is contained inside another loop it is termed as nested loops

Q 2 When the repetition of two tasks depend on each other in such a way that for every repetition of first task, the second tasks needs to be repeated a number of times, then we use nested loops.

Q 3 By using Labelled break statement.

Q 4 Labelled break statement transfers program control out of the code block whose label is specified as its target. The target code block must enclose the break statement but it does not need to be the immediately enclosing block.
In the below code snippet:

```
first: for (int j = 1; j <= 5; j++) {
   for (int k = 1; k <= j; k++) {
      if (k > 4)
         break first;
      System.out.print(k);
   }
   System.out.println();
}
System.out.println("Outside code block labelled first");
```

the labelled break statement break first; **will transfer the program control outside the outer for loop to the statement** System.out.println("Outside code block labelled first");

Q 5 Write down the syntax of the nested loop.

```
for (<initial value>; <test condition>; <update value>) {

   for (<initial value>; <test condition>; <update value>) {

      executable statement(s)

   }

}
```

Give the output of the following snippets based on nested loops

Q 1

0
10
210
3210

Q 2

12
24
36

Q 3

ABCDEF
BCDEF

Q 4

1
12
1234

Q 5

5678910
56789
5678

Solutions to Unsolved Java Programs

Q 1

```
public class Tables
{
   public static void main(String args[]) {
      for (int i = 5; i <= 10; i++) {
         System.out.println("Table of " + i);
```

```
            for (int j = 1; j <= 10; j++) {
                System.out.println(i + "*" + j + " = " + (i*j));
            }
        }
    }
}
```

Q 2

```
import java.util.Scanner;

public class PrimeCheck
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.println("Enter 20 numbers");
        for (int i = 1; i <= 20; i++) {
            int n = in.nextInt();
            boolean isPrime = true;
            for (int j = 2; j <= n / 2; j++) {
                if (n % j == 0) {
                    isPrime = false;
                    break;
                }
            }
            if (isPrime)
                System.out.println(n + " is a Prime Number");
        }
    }
}
```

Q3

```
import java.util.Scanner;

public class Series
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter n: ");
        int n = in.nextInt();
        double sum = 0.0;
        for (int i = 2; i <= n; i++) {
            double num = 0.0, den = 1.0;
            for (int j = 1; j <= i; j++) {
                num += j;
                den *= j;
            }
            sum = sum + (num / den);
        }
        System.out.println("Sum=" + sum);
    }
}
```

Q4

(a)

```
*
* #
* # *
* # * #
* # * # *
```

```
public class Pattern
{
   public static void main(String args[]) {
      for (int i = 1; i <=5; i++) {
         for (int j = 1; j <= i; j++) {
            if (j % 2 == 0)
               System.out.print("# ");
            else
               System.out.print("* ");
         }
         System.out.println();
      }
   }
}
```

(b)

```
5 4 3 2 1
5 4 3 2
5 4 3
5 4
5
```

```
public class Pattern
{
   public static void main(String args[]) {
      for (int i = 1; i <=5; i++) {
         for (int j = 5; j >= i; j--) {
            System.out.print(j + " ");
         }
         System.out.println();
      }
   }
}
```

Q 5

```
import java.util.Scanner;

public class FactRange
{
   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++) {
                long fact = 1;
                for (int j = 1; j <= i; j++)
                    fact *= j;
                System.out.println("Factorial of " + i + " = " + fact);
            }
        }
        else {
            System.out.println("Invalid Input");
        }

    }
}
```

Q6

```
import java.util.Scanner;

public class MenuPrime
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.println("Enter 1: to display all prime numbers");
        System.out.println("Enter 2: to display all non-prime numbers");
        System.out.print("Enter your choice: ");
        int choice = in.nextInt();

        switch (choice) {
            case 1:
            for (int i = 2; i <= 100; i++) {
                boolean isPrime = true;
                for (int j = 2; j <= i / 2; j++) {
                    if (i % j == 0) {
                        isPrime = false;
                        break;
                    }
                }
                if (isPrime)
                    System.out.println(i);
            }
            break;

            case 2:
            System.out.println(1);
            for (int i = 2; i <= 100; i++) {
```

```
            boolean isPrime = true;
            for (int j = 2; j <= i / 2; j++) {
               if (i % j == 0) {
                  isPrime = false;
                  break;
               }
            }
            if (!isPrime)
               System.out.println(i);
         }
         break;

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

Q 7

```
import java.util.Scanner;

public class StudentMarks
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter number of students: ");
      int studentCount = in.nextInt();
      double totalMarks = 0.0;

      for (int i = 1; i <= studentCount; i++) {
         System.out.println("Enter details of student " + i);
         System.out.print("Name: ");
         in.nextLine();
         String name = in.nextLine();
         System.out.print("Marks in English: ");
         int engMarks = in.nextInt();
         System.out.print("Marks in Science: ");
         int sciMarks = in.nextInt();
         System.out.print("Marks in Maths: ");
         int mathsMarks = in.nextInt();
         double avgMarks = (engMarks + sciMarks + mathsMarks) / 3.0;
         totalMarks += avgMarks;
         System.out.println("Average marks of " + name + " = " + avgMarks);
      }

      double classAvg = totalMarks / studentCount;
      System.out.println("Class Average = " + classAvg);
   }
}
```

Q 8

```
import java.util.Scanner;

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

      if (num == 1) {
         System.out.println(num + " is not a twisted prime number");
      }
      else {
         boolean isPrime = true;
         for (int i = 2; i <= num / 2; i++) {
            if (num % i == 0) {
               isPrime = false;
               break;
            }
         }

         if (isPrime) {

            int t = num;
            int revNum = 0;

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

            for (int i = 2; i <= revNum / 2; i++) {
               if (revNum % i == 0) {
                  isPrime = false;
                  break;
               }
            }
         }

         if (isPrime)
               System.out.println(num + " is a twisted prime number");
            else
               System.out.println(num + " is not a twisted prime number");
         }

   }
}
```

Q 9 Write programs to find the sum of the given series:

(a) 1 + (1/2!) + (1/3!) + (1/4!) + ... + (1/n!)

```
import java.util.Scanner;

public class SeriesSum
{
   public static void main(String args[]) {
      Scanner in = new Scanner(System.in);
      System.out.print("Enter n: ");
      int n = in.nextInt();
      double sum = 0.0;
      for (int i = 1; i <= n; i++) {
         long f = 1;
         for (int j = 1; j <= i; j++) {
            f *= j;
         }
         sum += (1.0 / f);
      }
      System.out.println("Sum=" + sum);
   }
}
```

(b) 1 + (1+2) + (1+2+3) + ... + (1+2+3+ ..... + n)

```
import java.util.Scanner;

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

(c) 1 + (1*2) + (1*2*3) + ... + (1*2*3* ..... * n)

```
import java.util.Scanner;

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

```
            int p = 1;
            for (int j = 1; j <= i; j++) {
                p *= j;
            }
            sum += p;
        }
        System.out.println("Sum=" + sum);
    }
}
```

(d) 1 + 1 / (1+2) + 1 / (1+2+3) + ... + 1 / (1+2+3+.....+n)

```
import java.util.Scanner;

public class SeriesSum
{
    public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter n: ");
        int n = in.nextInt();
        double sum = 0.0;
        for (int i = 1; i <= n; i++) {
            long term = 0;
            for (int j = 1; j <= i; j++) {
                term += j;
            }
            sum += (1.0 / term);
        }
        System.out.println("Sum=" + sum);
    }
}
```

(e) (1/2) + (1/3) + (1/5) + (1/7) + (1/11) + ... + (1/29)

```
public class SeriesSum
{
    public static void main(String args[]) {
        double sum = 0.0;
        for (int i = 2; i < 30; i++) {
            boolean isPrime = true;
            for (int j = 2; j <= i / 2; j++) {
                if (i % j == 0) {
                    isPrime = false;
                    break;
                }
            }
            if (isPrime)
                sum += 1.0 / i;
        }
        System.out.println("Sum=" + sum);
    }
}
```

Q 10

Write the programs in Java to display the following patterns:

(a)

```
1
2 1
3 2 1
4 3 2 1
5 4 3 2 1
```

```
public class Pattern
{
    public static void main(String args[]) {
        for (int i = 1; i <= 5; i++) {
            for (int j = i; j >= 1; j--) {
                System.out.print(j + " ");
            }
            System.out.println();
        }
    }
}
```

(b)

```
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

```
public class Pattern
{
    public static void main(String args[]) {
        for (int i = 5; i >= 1; i--) {
            for (int j = 1; j <= i; j++) {
                System.out.print(j + " ");
            }
            System.out.println();
        }
    }
}
```

(c)

```
5 4 3 2 1
5 4 3 2
5 4 3
5 4
5
```

```
public class Pattern
```

```
{
   public static void main(String args[]) {
      for (int i = 1; i <= 5; i++) {
         for (int j = 5; j >= i; j--) {
            System.out.print(j + " ");
         }
         System.out.println();
      }
   }
}
```

(d)

```
1 3 5 7 9
1 3 5 7
1 3 5
1 3
1
```

```
public class Pattern
{
   public static void main(String args[]) {
      for (int i = 9; i >= 1; i -= 2) {
         for (int j = 1; j <= i; j += 2) {
            System.out.print(j + " ");
         }
         System.out.println();
      }
   }
}
```

(e)

```
5
5 4
5 4 3
5 4 3 2
5 4 3 2 1
```

```
public class Pattern
{
   public static void main(String args[]) {
      for (int i = 5; i >= 1; i--) {
         for (int j = 5; j >= i; j--) {
            System.out.print(j + " ");
         }
         System.out.println();
      }
   }
}
```

(f)

1 2 3 4 5
2 3 4 5
3 4 5
4 5
5

```
public class Pattern
{
   public static void main(String args[]) {
      for (int i = 1; i <= 5; i++) {
         for (int j = i; j <= 5; j++) {
            System.out.print(j + " ");
         }
         System.out.println();
      }
   }
}
```

(g)

9 9 9 9 9
7 7 7 7 7
5 5 5 5 5
3 3 3 3 3
1 1 1 1 1

```
public class Pattern
{
   public static void main(String args[]) {
      for (int i = 9; i >= 1; i -= 2) {
         for (int j = 1; j <= 5; j++) {
            System.out.print(i + " ");
         }
         System.out.println();
      }
   }
}
```

(h)

9
7 9
5 7 9
3 5 7 9
1 3 5 7 9

```
public class Pattern
{
   public static void main(String args[]) {
      for (int i = 9; i >= 1; i -= 2) {
         for (int j = i; j <= 9; j += 2) {
            System.out.print(j + " ");
         }
```

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

(i)

```
9
9 7
9 7 5
9 7 5 3
9 7 5 3 1
```

```
public class Pattern
{
    public static void main(String args[]) {
        for (int i = 9; i >= 1; i -= 2) {
            for (int j = 9; j >= i; j -= 2) {
                System.out.print(j + " ");
            }
            System.out.println();
        }
    }
}
```

(j)

```
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
```

```
public class Pattern
{
    public static void main(String args[]) {
        int term = 1;
        for (int i = 1; i <= 5; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.print(term++ + " ");
            }
            System.out.println();
        }
    }
}
```