**Question 1**

Write a program to print numbers from 1 to 10.

Show the answer.

public class OneToTen {

    public static void main(String[] *args*) {

        for (int i = 1; i <= 10; i++) {

            System.out.println(i);

        }

    }

}

**Question 2**

Write a program to calculate the sum of first 10 natural number.

Show the answer.

public class SumOfNaturalNum {

    public static void main(String[] *args*) {

        int sum = 0;

        for (int i = 1; i <= 11; i++) {

            sum += i;

        }

        System.out.print(sum);

    }

}

**Question 3**

Write a program that prompts the user to input a positive integer. It should then print the multiplication table of that number.

Show the answer.

import java.util.Scanner;

public class MultTable {

    public static void main(String[] *main*) {

        Scanner console = new Scanner(System.in);

        int choice;

        do {

            System.out.print("Input a positive Integer: ");

            choice = console.nextInt();

        } while (choice < 0);

        console.close();

*// print multiplication table. I'm going for the grid view*

        for (int i = 0; i <= choice; i++) {

            for (int j = 0; j <= choice; j++) {

                System.out.print(i \* j + " ");

            }

            System.out.println();

        }

    }

}

**Question 4**

Write a program to find the factorial value of any number entered through the keyboard.

Show the answer.

import java.util.Scanner;

public class Factorial {

    public static void main(String[] *args*) {

        Scanner console = new Scanner(System.in);

        int choice;

        do {

            System.out.print("Input a positive Integer: ");

            choice = console.nextInt();

        } while (choice < -1 && choice > 9);

        int factorial = choice;

*// count backwards from factorial but skip the original number*

*// 0! and 1! are edge cases so skip them.*

        if (choice > 1) {

            for (int i = factorial - 1; i > 0; i--) {

                factorial \*= i;

            }

            System.out.printf("%d! = %d", choice, factorial);

        } else {

            System.out.printf("%d! = 1", choice);

        }

    }

}

**Question 5**

Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another. (Do not use Java built-in method)

Show the answer.

import java.util.Scanner;

public class PowerOfAnother {

    public static void main(String[] *args*) {

        Scanner console = new Scanner(System.in);

        System.out.print("Enter the first integer: ");

        int num1 = console.nextInt();

        System.out.print("Enter the second integer: ");

        int num2 = console.nextInt();

        int initialNum = num1;

        if (num2 == 0) {

            num1 = 1;

        } else {

            for (int i = 0; i < num2 - 1; i++) {

                num1 \*= initialNum;

            }

        }

        console.close();

        System.out.printf("%d raised to the power of %d is %d", initialNum, num2, num1);

    }

}

**Question 6**

Write a program that prompts the user to input an integer and then outputs the number with the digits reversed. For example, if the input is 12345, the output should be 54321.

Show the answer.

import java.util.Scanner;

public class DigitReverse {

    public static void main(String[] *args*) {

        Scanner console = new Scanner(System.in);

        System.out.print("Enter an Integer: ");

        int userNum = console.nextInt();

        console.close();

*// to iterate, split into string array*

        String[] strNumArr = String.valueOf(userNum).split("");

*// iterate backwards and print the number by digit.*

        for (int i = strNumArr.length - 1; i >= 0; i--) {

            System.out.print(strNumArr[i]);

        }

    }

}

**Question 7**

Write a program that reads a set of integers, and then prints the sum of the even and odd integers.

Show the answer.

public class SetEvenOdd {

    public static void main(String[] *args*) {

        int[] intArr = new int[] { 5, 10, 15, 7, 9, 12, 54, 19, 21, 25, 30, 31, 98, 99, 101 };

        int evenSum = 0;

        int oddSum = 0;

        for (int i = 0; i < intArr.length; i++) {

            if (intArr[i] % 2 == 0)

                evenSum += intArr[i];

            else

                oddSum += intArr[i];

        }

        System.out.printf("Even sum = %d\nOdd sum = %d", evenSum, oddSum);

    }

}

**Question 8**

Write a program that prompts the user to input a positive integer. It should then output a message indicating whether the number is a prime number.

Show the answer.

import java.util.Scanner;

public class PrimeInput {

    public static void main(String[] *args*) {

        Scanner console = new Scanner(System.in);

        int choice;

        do {

            System.out.print("Input a positive Integer: ");

            choice = console.nextInt();

        } while (choice < -1);

*// check if the choice is prime.*

        boolean flag = true;

        if (choice < 2)

            flag = false;

        else if (choice == 2)

            flag = true;

        else {

*// iterate from 2 to the root floor + 1*

            double rootDouble = Math.sqrt(choice);

            long rootInt = Math.round(rootDouble);

            for (int i = 2; i < rootInt + 1; i++) {

                if (choice % i == 0)

                    flag = false;

            }

        }

        console.close();

        if (flag)

            System.out.printf("%d is a prime number", choice);

        else

            System.out.printf("%d is not a prime number", choice);

    }

}

**Question 9**

Write a program to calculate HCF of Two given number.

Show the answer.

import java.util.Scanner;

public class HCF {

    public static void main(String[] *args*) {

        Scanner console = new Scanner(System.in);

        System.out.print("Enter the first integer: ");

        int num1 = console.nextInt();

        System.out.print("Enter the second integer: ");

        int num2 = console.nextInt();

        console.close();

        int largeNum = 0;

        int smallNum;

        int res;

*// if the numbers are the same then HCF is just that number*

        if (num1 == num2) {

            res = num1;

        } else {

*// ordering the numbers by their size. HCF calculated by division.*

            if (num1 > num2) {

                largeNum = num1;

                smallNum = num2;

            } else {

                largeNum = num2;

                smallNum = num1;

            }

            int remainder = largeNum;

*// Contiually divide the denominator by the remainder until their is no*

*// remainder. The last denominator is the answer.*

            while (remainder != 0) {

                remainder = largeNum % smallNum;

                largeNum = smallNum;

                smallNum = remainder;

            }

            res = largeNum;

        }

        System.out.printf("The HCF of %d and %d is %d", num1, num2, res);

    }

}

**Question 10**

Write a do-while loop that asks the user to enter two numbers. The numbers should be added and the sum displayed. The loop should ask the user whether he or she wishes to perform the operation again. If so, the loop should repeat; otherwise it should terminate.

Show the answer.

import java.util.Scanner;

public class AskSum {

    public static void main(String[] *main*) {

        Scanner console = new Scanner(System.in);

        int num1;

        int num2;

        char choice;

        do {

            System.out.print("Input the first number: ");

            num1 = console.nextInt();

            System.out.print("Input the second number: ");

            num2 = console.nextInt();

            int sum = num1 + num2;

            System.out.printf("The sum is %d.\nWould you like to try again (Y/N)? ", sum);

            choice = console.next().charAt(0);

        } while (choice == 'Y' || choice == 'y');

        console.close();

    }

}

**Question 11**

Write a program to enter the numbers till the user wants and at the end it should display the count of positive, negative and zeros entered.

Show the answer.

import java.util.Scanner;

import java.util.ArrayList;

public class EnterNums {

    public static void main(String[] *main*) {

        Scanner console = new Scanner(System.in);

        ArrayList<Integer> numList = new ArrayList<>();

*// store entries in a list then do my operations for pos, neg, and zeroes*

        char choice;

        do {

            System.out.print("Input an integer: ");

            int numEntered = console.nextInt();

            numList.add(numEntered);

            System.out.printf("%d stored\nWould you like to enter another number (Y/N)? ", numEntered);

            choice = console.next().charAt(0);

        } while (choice == 'Y' || choice == 'y');

        console.close();

*// iterate through list return the counts*

        int posCount = 0;

        int negCount = 0;

        int zeroCount = 0;

        for (int num : numList) {

            if (num > 0)

                posCount++;

            else if (num < 0)

                negCount++;

            else

                zeroCount++;

        }

        System.out.printf("\nQuantity of Numbers Entered\n\*-\*-\*-\*-\*-\*-\*-\*\nPositive: %d\nNegative: %d\nZeroes: %d",

                posCount, negCount, zeroCount);

    }

}

**Question 12**

Write a program to enter the numbers till the user wants and at the end the program should display the largest and smallest numbers entered.

Show the answer.

import java.util.Scanner;

import java.util.ArrayList;

public class LargestSmallest {

    public static void main(String[] *main*) {

        Scanner console = new Scanner(System.in);

        ArrayList<Integer> numList = new ArrayList<>();

*// store entries in a list then do my operations for largest and smallest*

        char choice;

        do {

            System.out.print("Input an integer: ");

            int numEntered = console.nextInt();

            numList.add(numEntered);

            System.out.printf("%d stored\nWould you like to enter another number (Y/N)? ", numEntered);

            choice = console.next().charAt(0);

        } while (choice == 'Y' || choice == 'y');

        console.close();

*// iterate through list return the counts*

        int smallest = numList.get(0);

        int largest = numList.get(0);

        for (int num : numList) {

            if (num > largest)

                largest = num;

            else if (num < smallest)

                smallest = num;

        }

        System.out.printf("Largest number is %d.\nSmallest number is %d", largest, smallest);

    }

}

**Question 13**

Write a program to print out all Armstrong numbers between 1 and 500. If sum of cubes of each digit of the number is equal to the number itself, then the number is called an Armstrong number.  
For example, 153 = ( 1 \* 1 \* 1 ) + ( 5 \* 5 \* 5 ) + ( 3 \* 3 \* 3 )

Show the answer.

public class ArmstrongNum {

    public static void main(String[] *args*) {

*// armstrong number is cube each digit*

*// get the sum and then check against original num*

*// if they are the same, Armstrong Num!*

        for (int i = 1; i <= 500; i++) {

*// convert to string for iteration*

*// i is still the original number make variable for the sum*

            int sum = 0;

            String[] numStr = String.valueOf(i).split("");

            for (String num : numStr) {

                int strToNum = Integer.parseInt(num);

*// cube it!*

                double cubed = Math.pow(strToNum, 3);

                sum += cubed;

            }

            if (sum == i)

                System.out.print(i + " ");

        }

    }

}

**Question 14**

Write a program to print Fibonacci series of n terms where n is input by user :  
0 1 1 2 3 5 8 13 21 .....

Show the answer.

import java.util.Scanner;

import java.util.ArrayList;

public class Fibonacci {

    public static void main(String[] *args*) {

*// get user input*

        Scanner console = new Scanner(System.in);

        int userNum;

        do {

            System.out.print("Input a non negative integer: ");

            userNum = console.nextInt();

        } while (userNum < -1);

*// store the sequence in List, skip the first two*

        ArrayList<Integer> seq = new ArrayList<>();

        seq.add(0);

        seq.add(1);

        if (userNum > 1) {

            for (int i = 2; i <= userNum; i++) {

                int nextNum = seq.get(i - 2) + seq.get(i - 1);

                seq.add(nextNum);

            }

        }

        console.close();

        if (userNum == 0) {

            seq.remove(1);

        }

        for (int num : seq) {

            System.out.print(num + " ");

        }

    }

}

**Question 15**

Write a program to calculate the sum of following series where n is input by user.   
1 + 1/2 + 1/3 + 1/4 + 1/5 +…………1/n

Show the answer.

import java.util.Scanner;

public class SumOfSeries {

    public static void main(String[] *args*) {

*// get user input*

        Scanner console = new Scanner(System.in);

        int userNum;

        do {

            System.out.print("Input a positive integer: ");

            userNum = console.nextInt();

        } while (userNum < 1);

*// store the sequence in List, skip the first two*

        double sum = 0.0;

        for (int i = 1; i <= userNum; i++) {

            sum += 1.0 / i;

        }

        console.close();

        System.out.printf("The harmonic sum is %.2f", sum);

    }

}

**Question 16**

Compute the natural logarithm of 2, by adding up to n terms in the series  
1 - 1/2 + 1/3 - 1/4 + 1/5 -... 1/n  
where n is a positive integer and input by user.

Show the answer.

import java.util.Scanner;

public class NaturalLog {

    public static void main(String[] *args*) {

*// get user input*

        Scanner console = new Scanner(System.in);

        int userNum;

        do {

            System.out.print("Input a positive integer: ");

            userNum = console.nextInt();

        } while (userNum < 1);

        console.close();

*// store the sequence in List, skip the first two*

        double sum = 0.0;

        for (int i = 1; i <= userNum; i++) {

*// at pos 1, I'm subtracting 1/2 from 1*

            if (i % 2 == 0) {

                sum -= 1.0 / i;

            } else {

                sum += 1.0 / i;

            }

        }

        System.out.printf("The harmonic sum is %.2f", sum);

    }

}

**Question 17**

Write a program that generates a random number and asks the user to guess what the number is. If the user's guess is higher than the random number, the program should display "Too high, try again." If the user's guess is lower than the random number, the program should display "Too low, try again." The program should use a loop that repeats until the user correctly guesses the random number.

Show the answer.

import java.util.Scanner;

import java.util.Random;

public class GuessRandom {

    public static void main(String[] *main*) {

        Random rand = new Random();

        int randomNum = rand.nextInt(101);

        Scanner console = new Scanner(System.in);

        int choice;

        System.out.print("Input a an Integer: ");

        choice = console.nextInt();

        while (choice != randomNum) {

            if (choice > randomNum) {

                System.out.print("Too high, try again: ");

                choice = console.nextInt();

            } else if (choice < randomNum) {

                System.out.print("Too low, try again: ");

                choice = console.nextInt();

            }

        }

        console.close();

        System.out.printf("Correct! The answer was %d", randomNum);

    }

}

**Question 18**

Write a program to print following :

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| public class ArtI {      public static void main(String[] *args*) {          int rows = 4;          int cols = 10;          for (int i = 0; i < rows; i++) {              for (int j = 0; j < cols; j++) {                  System.out.print("\*");              }              System.out.println();          }      }  }    public class ArtII {      public static void main(String[] *args*) {          int len = 5;          for (int i = 0; i < len; i++) {              for (int j = 0; j <= i; j++) {                  System.out.print("\*");              }              System.out.println();          }      }  }    public class ArtIII {      public static void main(String[] *args*) {          int len = 5;  *// Iterate normal on outer loop*          for (int i = 0; i < len; i++) {  *// spaces come first and iterate to decrease spaces as i gets larger*              for (int j = 0; j <= len - i; j++) {                  System.out.print(" ");              }  *// next come the asterisks which increase with i.*              for (int k = 0; k <= i; k++) {                  System.out.print("\*");              }              System.out.println();          }      }  }    public class ArtIV {      public static void main(String[] *args*) {  *// spaces: 8 / 2, 6 / 2, 4 /2, 2, 0*  *// asterisks:1, 3, 5, 7, 9*  *// make the spaces before the asterisk and then make new line*          int len = 5;          for (int i = 0; i < len; i++) {  *// spaces come first and their loop ends*  *// spaces = 4, 3, 2, 1, 0*              for (int j = 0; j < len - i - 1; j++) {                  System.out.print(" ");              }  *// next come the asterisks which grow*  *// 1, 3, 5, 7, 9*              for (int k = 0; k < 2 \* i + 1; k++) {                  System.out.print("\*");              }              System.out.println();          }      }  }    public class ArtV {      public static void main(String[] *args*) {  *// spaces: 8 / 2, 6 / 2, 4 /2, 2, 0*  *// asterisks:1, 3, 5, 7, 9*  *// make the spaces before the asterisk and then make new line*          int len = 5;          int count = 1;          for (int i = 0; i < len; i++) {  *// spaces come first and their loop ends*  *// spaces = 4, 3, 2, 1, 0*              for (int j = 0; j < len - i - 1; j++) {                  System.out.print(" ");              }  *// next come the asterisks which grow*  *// 1, 3, 5, 7, 9*              for (int k = 0; k < 2 \* i + 1; k++) {                  System.out.print(count);              }              System.out.println();              count++;          }      }  }    public class ArtVI {      public static void main(String[] *args*) {  *// asterisks:1, 3, 5, 7, 9*  *// make the spaces before the asterisk and then make new line*          int len = 5;  *// instead of int, use a structure?*          int count = 1;          for (int i = 0; i < len; i++) {  *// spaces come first and their loop ends*  *// spaces = 4, 3, 2, 1, 0*              for (int j = 0; j < len - i - 1; j++) {                  System.out.print(" ");              }  *// next come the asterisks which grow*  *// 1, 3, 5, 7, 9*              for (int k = 0; k < 2 \* i + 1; k++) {                  if (k == i)                      System.out.print(1);                  else if (i == k - 1 || i == k + 1)                      System.out.print(2);                  else if (i == k - 2 || i == k + 2)                      System.out.print(3);                  else if (i == k - 3 || i == k + 3)                      System.out.print(4);                  else                      System.out.print(count);              }              System.out.println();              count++;          }      }  } | | | | | |
|  |  |  |  |  |  |

**Question 19**

Write a program to compute sinx for given x. The user should supply x and a positive integer n. We compute the sine of x using the series and the computation should use all terms in the series up through the term involving xn

sin x = x - x3/3! + x5/5! - x7/7! + x9/9! .......

import java.util.Scanner;

public class SinX {

    public static void main(String[] *args*) {

        Scanner console = new Scanner(System.in);

        int choice;

        do {

            System.out.print("Input a positive Integer: ");

            choice = console.nextInt();

        } while (choice < 0);

        System.out.print("Supply an integer for x: ");

        int x = console.nextInt();

        console.close();

*// 1 = x, 3 = x^3/3! 5 =*

        double sinResult = 0.0;

        boolean isAddition = true;

        for (int i = 1; i < choice \* 2; i += 2) {

            if (i == 1) {

                sinResult += x;

                isAddition = false;

            } else if (!isAddition) {

                sinResult -= Math.pow(x, i) / SinX.factorial(i);

                isAddition = true;

            } else if (isAddition) {

                sinResult += Math.pow(x, i) / SinX.factorial(i);

                isAddition = false;

            }

        }

        System.out.print(sinResult);

    }

    public static int factorial(int *num*) {

        if (*num* < 2)

            return 1;

        else {

            return *num* \* factorial(*num* - 1);

        }

    }

}

**Question 20**

Write a program to compute the cosine of x. The user should supply x and a positive integer n. We compute the cosine of x using the series and the computation should use all terms in the series up through the term involving xn

cos x = 1 - x2/2! + x4/4! - x6/6! .....

import java.util.Scanner;

public class Cosine {

    public static void main(String[] *args*) {

        Scanner console = new Scanner(System.in);

        int choice;

        do {

            System.out.print("Input a positive Integer: ");

            choice = console.nextInt();

        } while (choice < 0);

        System.out.print("Supply an integer for x: ");

        int x = console.nextInt();

        console.close();

*// 1 = x, 3 = x^3/3! 5 =*

        double cosineResult = 0.0;

        boolean isAddition = true;

        for (int i = 0; i < choice \* 2; i += 2) {

            if (i == 1) {

                cosineResult += 1;

                isAddition = false;

            } else if (!isAddition) {

                cosineResult -= Math.pow(x, i) / Cosine.factorial(i);

                isAddition = true;

            } else if (isAddition) {

                cosineResult += Math.pow(x, i) / Cosine.factorial(i);

                isAddition = false;

            }

        }

        System.out.print(cosineResult);

    }

    public static int factorial(int *num*) {

        if (*num* < 2)

            return 1;

        else {

            return *num* \* factorial(*num* - 1);

        }

    }

}