**1) Write a program in java input year and check whether it is: a leap year or not.**

import java.util.Scanner;

public class practice {  
 public static void main(String[] args) {  
 Scanner scanner= new Scanner(System.*in*);  
  
 System.*out*.println("enter a year");  
 double year=scanner.nextDouble();  
 scanner.nextLine();  
  
 if (year%100==0 && year%400==0){  
 System.*out*.println("leap year");  
 }  
 else if(year %4==0){  
 System.*out*.println("leap year");  
 }  
 else{  
 System.*out*.println("not a leap year");  
 }  
  
 }  
}

**2) Write a java program to check if three given side lengths (integers) can make a triangle or not.**

import java.util.Scanner;  
  
public class mains2{  
 public static void main(String[] args) {  
 Scanner scanner = new Scanner(System.*in*);  
  
 System.*out*.println("Side 1: ");  
 int side1 = scanner.nextInt();  
 scanner.nextLine();  
  
 System.*out*.println("Side 2: ");  
 int side2 = scanner.nextInt();  
 scanner.nextLine();  
  
 System.*out*.println("Side 3: ");  
 int side3 = scanner.nextInt();  
 scanner.nextLine();  
  
 if(side3 < side2 + side1 && side1 < side2 + side3 && side2 < side1 + side3 ){  
 System.*out*.println("The three sides can make a triangle.");  
 }  
 else {  
 System.*out*.println("Triangle formation not possible: ");  
 }  
 }  
}

**3) Write a program in java to check the number is odd or even.**

import java.util.Scanner;  
  
public class mains2 {  
 public static void main(String[] args) {  
 Scanner scanner = new Scanner(System.*in*);  
  
 System.*out*.println("Enter number: ");  
 double a = scanner.nextDouble();  
 scanner.nextLine();  
   
 if (a % 2 == 0) {  
 System.*out*.println("Even Number");  
 }   
 else {  
 System.*out*.println("Odd number");  
 }  
 }  
}

4) Write a program in java to input three unequal numbers and display the smallest number

import java.util.Scanner;  
  
public class mains2 {  
 public static void main(String[] args) {  
 Scanner scanner = new Scanner(System.*in*);  
  
 System.*out*.println("Enter first number: ");  
 double a = scanner.nextDouble();  
 scanner.nextLine();  
  
 System.*out*.println("Enter Second number: ");  
 double b = scanner.nextDouble();  
 scanner.nextLine();  
  
 System.*out*.println("Enter Third number: ");  
 double c = scanner.nextDouble();  
 scanner.nextLine();  
  
 if (a < b && a < c) {  
 System.*out*.println(a + " is the smallest number");  
 } else if (b < a && b < c) {  
 System.*out*.println(b + " is the smallest number");  
 } else {  
 System.*out*.println(c + " is the smallest number");  
 }  
 }  
}

**5) Write a program in java to check the given number is positive or not.**

import java.util.Scanner;  
  
public class mains2{  
 public static void main(String[] args) {  
 Scanner scanner = new Scanner(System.*in*);  
   
 System.*out*.println("Enter any Number: ");  
 double num = scanner.nextDouble();  
 scanner.nextLine();  
  
 if (num == 0){  
 System.*out*.println("Neutral ");  
 }  
 else if (num > 0){  
 System.*out*.println("Positive number ");  
 }  
 else {  
 System.*out*.println("Negetive Number ");  
 }  
 }  
}

**6) Write a program to input a number and check whether it is a Kaprekar number or not.**

import java.util.Scanner;  
public class mains2 {  
 public static void main(String[] args) {  
 Scanner scanner = new Scanner(System.*in*);  
  
 System.*out*.print("Enter a positive whole number: ");  
 int n = scanner.nextInt();  
  
 scanner.close();  
  
 int square = n \* n;  
 int numDigits = (int) Math.*log10*(n) + 1;  
 int squareLength = (int) Math.*log10*(square) + 1;  
  
 int rightPart = square % (int) Math.*pow*(10, numDigits);  
 int leftPart = square / (int) Math.*pow*(10, numDigits);  
  
 boolean isKaprekarNumber = false;  
 if (squareLength == 2 \* numDigits) {  
 isKaprekarNumber = (rightPart + leftPart) == n;  
 }

else {  
 int leftPartAdjusted = leftPart / 10;  
 isKaprekarNumber = (rightPart + leftPartAdjusted) == n;  
 }  
  
 if (isKaprekarNumber) {  
 System.*out*.println(n + " is a Kaprekar number.");  
 } else {  
 System.*out*.println(n + " is not a Kaprekar number.");  
 }  
 }  
}

**7) Write a program to input 10 integers and print the second largest number. Assume that there is at least one second largest number in the given set of integers.**

import java.util.Scanner;  
  
public class mains2 {  
 public static void main(String[] args) {  
 Scanner scanner = new Scanner(System.*in*);  
  
 int[] numbers = new int[10];  
  
 System.*out*.println("Enter 10 integers:");  
 for (int i = 0; i < 10; i++) {  
 numbers[i] = scanner.nextInt();  
 }  
  
 scanner.close();  
  
 int largest = Integer.*MIN\_VALUE*;  
 int secondLargest = Integer.*MIN\_VALUE*;  
  
 for (int num : numbers) {  
 if (num > largest) {  
 secondLargest = largest;  
 largest = num;  
 } else if (num > secondLargest && num != largest) {  
 secondLargest = num;  
 }  
 }  
  
 System.*out*.println("The second largest number is: " + secondLargest);  
 }  
}

**8) Write a Java program to check whether a given number is a happy number or unhappy number.**

import java.util.HashSet;  
import java.util.Scanner;  
import java.util.Set;  
  
public class mains2 {  
 public static void main(String[] args) {  
 Scanner scanner = new Scanner(System.*in*);  
  
 System.*out*.print("Enter a positive integer: ");  
 int n = scanner.nextInt();  
  
 scanner.close();  
  
 Set<Integer> visitedNumbers = new HashSet<>();  
  
 while (n != 1 && !visitedNumbers.contains(n)) {  
 visitedNumbers.add(n);  
 n = *getNextNumber*(n);  
 }  
  
 if (n == 1) {  
 System.*out*.println("It's a happy number.");  
 } else {  
 System.*out*.println("It's an unhappy number.");  
 }  
 }  
  
 public static int getNextNumber(int n) {  
 int sum = 0;  
 while (n > 0) {  
 int digit = n % 10;  
 sum += digit \* digit;  
 n /= 10;  
 }  
 return sum;  
 }  
}

**9. WAP in Java, to create an ATM program for representing ATM transaction.**

import java.util.Scanner;

public class ATMProgram {

private static double balance = 1000; // Initial balance

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

int choice;

do {

displayMenu();

System.out.print("Enter your choice (1-4): ");

choice = scanner.nextInt();

switch (choice) {

case 1:

withdrawMoney(scanner);

break;

case 2:

depositMoney(scanner);

break;

case 3:

checkBalance();

break;

case 4:

System.out.println("Thank you for using the ATM. Goodbye!");

break;

default:

System.out.println("Invalid choice. Please enter a valid option.");

}

} while (choice != 4);

}

private static void displayMenu() {

System.out.println("ATM Menu:");

System.out.println("1. Withdraw Money");

System.out.println("2. Deposit Money");

System.out.println("3. Check Balance");

System.out.println("4. Exit");

}

private static void withdrawMoney(Scanner scanner) {

System.out.print("Enter the withdrawal amount: ");

double withdrawalAmount = scanner.nextDouble();

if (withdrawalAmount > 0 && withdrawalAmount <= balance) {

balance -= withdrawalAmount;

System.out.println("Withdrawal successful. Remaining balance: $" + balance);

} else {

System.out.println("Invalid withdrawal amount or insufficient funds.");

}

}

private static void depositMoney(Scanner scanner) {

System.out.print("Enter the deposit amount: ");

double depositAmount = scanner.nextDouble();

if (depositAmount > 0) {

balance += depositAmount;

System.out.println("Deposit successful. Updated balance: $" + balance);

} else {

System.out.println("Invalid deposit amount.");

}

}

private static void checkBalance() {

System.out.println("Your current balance: $" + balance);

}

}

**10) Write a Java program to check two numbers are Amicable numbers or not.**

import java.util.Scanner;

public class AmicableNumbers {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

int num1 = scanner.nextInt();

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

int num2 = scanner.nextInt();

if (areAmicableNumbers(num1, num2)) {

System.out.println(num1 + " and " + num2 + " are amicable numbers.");

} else {

System.out.println(num1 + " and " + num2 + " are not amicable numbers.");

}

}

private static boolean areAmicableNumbers(int num1, int num2) {

return (sumOfDivisors(num1) == num2) && (sumOfDivisors(num2) == num1);

}

private static int sumOfDivisors(int num) {

int sum = 1; // 1 is always a divisor

for (int i = 2; i <= Math.sqrt(num); i++) {

if (num % i == 0) {

sum += i;

// If the divisors are not the same, add the other divisor

if (i != (num / i)) {

sum += (num / i);

}

}

}

return sum;

}

}

**11. A number N is said to be a mystery number if the number can be expressed by the sum of two numbers.**

public class MysteryNumber {

public static void main(String[] args) {

findMysteryNumbers();

}

private static void findMysteryNumbers() {

System.out.println("Mystery Numbers between 22 and 198:");

for (int i = 22; i <= 198; i++) {

if (isMysteryNumber(i)) {

System.out.println(i);

}

}

}

private static boolean isMysteryNumber(int num) {

// Check if the number is a multiple of 11

if (num % 11 == 0) {

int tensPlace = num / 10;

int unitsPlace = num % 10;

// Check if the sum of place values of unit and tens place is 11

return (tensPlace + unitsPlace) == 11;

}

return false;

}

}

**12) Krishnamurthy Number**

import java.util.Scanner;

public class KrishnamurthyNumber {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

// Input a number

System.out.print("Enter a number: ");

int number = scanner.nextInt();

// Check if it's a Krishnamurthy number

if (isKrishnamurthyNumber(number)) {

System.out.println(number + " is a Krishnamurthy number.");

} else {

System.out.println(number + " is not a Krishnamurthy number.");

}

}

private static boolean isKrishnamurthyNumber(int num) {

int originalNumber = num;

int sum = 0;

while (num > 0) {

int digit = num % 10;

sum += factorial(digit);

num /= 10;

}

return sum == originalNumber;

}

private static int factorial(int n) {

if (n == 0 || n == 1) {

return 1;

} else {

return n \* factorial(n - 1);

}

}

}

**13) Create a Java program that converts the given number into words.**

import java.util.Scanner;

public class NumberToWords {

private static final String[] units = {

"", "One", "Two", "Three", "Four", "Five", "Six", "Seven", "Eight", "Nine"

};

private static final String[] teens = {

"", "Eleven", "Twelve", "Thirteen", "Fourteen", "Fifteen", "Sixteen", "Seventeen", "Eighteen", "Nineteen"

};

private static final String[] tens = {

"", "Ten", "Twenty", "Thirty", "Forty", "Fifty", "Sixty", "Seventy", "Eighty", "Ninety"

};

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter a number: ");

int number = scanner.nextInt();

if (number == 0) {

System.out.println("Zero");

} else {

System.out.println(convertToWords(number));

}

}

private static String convertToWords(int number) {

if (number < 0 || number > 99999) {

return "Invalid input. Please enter a number between 0 and 99999.";

}

if (number == 0) {

return "Zero";

}

String words = "";

// Handle thousands place

if ((number / 1000) > 0) {

words += convertToWords(number / 1000) + " Thousand ";

number %= 1000;

}

// Handle hundreds place

if ((number / 100) > 0) {

words += units[number / 100] + " Hundred ";

number %= 100;

}

// Handle tens and units place

if (number > 0) {

if (number < 10) {

words += units[number];

} else if (number < 20) {

words += teens[number - 10];

} else {

words += tens[number / 10] + " " + units[number % 10];

}

}

return words.trim();

}

}

**14. Create a java program to accept a number and check whether the number is perfect number or not.**

import java.util.Scanner;

public class PerfectNumber {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

// Input a number

System.out.print("Enter a number: ");

int number = scanner.nextInt();

// Check if it's a perfect number

if (isPerfectNumber(number)) {

System.out.println(number + " is a perfect number.");

} else {

System.out.println(number + " is not a perfect number.");

}

}

private static boolean isPerfectNumber(int num) {

int sum = 1; // Start with 1 because every number is divisible by 1

for (int i = 2; i <= Math.sqrt(num); i++) {

if (num % i == 0) {

sum += i;

// If the divisors are not the same, add the other divisor

if (i != (num / i)) {

sum += (num / i);

}

}

}

return sum == num;

}

}

**15) Write a menu driven program to input a month number between 1 to 12 and print the**

**corresponding month name. That is for 1 display January, for 2 display February for 3 display March, etc.**

import java.util.Scanner;

public class MonthName {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

int choice;

System.out.print("Enter the month number (1-12, 0 to exit): ");

choice = scanner.nextInt();

scanner.close()

switch (choice) {

case 1:

System.out.println("January");

break;

case 2:

System.out.println("February");

break;

case 3:

System.out.println("March");

break;

case 4:

System.out.println("April");

break;

case 5:

System.out.println("May");

break;

case 6:

System.out.println("June");

break;

case 7:

System.out.println("July");

break;

case 8:

System.out.println("August");

break;

case 9:

System.out.println("September");

break;

case 10:

System.out.println("October");

break;

case 11:

System.out.println("November");

break;

case 12:

System.out.println("December");

break;

case 0:

System.out.println("Exiting the program. Goodbye!");

break;

default:

System.out.println("Invalid month number. Please enter a valid option.");

}

} while (choice != 0);

}

}

**16. Write a program to input three integers and check whether it forms a Pythagorean triplet or not.**

import java.util.Scanner;

public class PythagoreanTriplet {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

// Input three integers

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

int a = scanner.nextInt();

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

int b = scanner.nextInt();

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

int c = scanner.nextInt();

// Check if they form a Pythagorean triplet

if ((a \* a + b \* b == c \* c) || (a \* a + c \* c == b \* b) || (b \* b + c \* c == a \* a)) {

System.out.println("The numbers form a Pythagorean triplet.");

} else {

System.out.println("The numbers do not form a Pythagorean triplet.");

}

}

}

**17) Java Hotel Menu Program that creates hotel menu to help customers place orders.**

import java.util.Scanner;  
public class practice {  
 public static void main(String[] args) {  
 Scanner scanner= new Scanner(System.*in*);  
  
 System.*out*.println("Welcome To Dhaba ");  
 System.*out*.println(" ");  
 System.*out*.println("To order South Indian Dish, Enter 1");  
 System.*out*.println("To order North Indian Dish, Enter 2");  
 System.*out*.println("To order Rajasthani Dish, Enter 3");  
 System.*out*.println("To order Gujrati Dish, Enter 4");  
 System.*out*.println("To order Bengali Dish, Enter 5");  
 System.*out*.println("To order Desserts, Enter 6");  
 System.*out*.println(" ");  
 System.*out*.println("To exit, Enter 9");  
  
 int choice = scanner.nextInt();  
 scanner.close();  
  
 if (choice == 1){  
 System.*out*.println("Welcome to Flavours of South");  
 System.*out*.println("You Get: ");  
 System.*out*.println("Idli, Dhosa,\nSamber, coconut chutney");  
 }  
 else if (choice == 2){  
 System.*out*.println("Welcome to Flavours of North");  
 System.*out*.println("You Get: ");  
 System.*out*.println("aloo paratha, gobi ka paratha,\nachaar ");  
 }  
 else if (choice == 3){  
 System.*out*.println("Welcome to Flavours of Rajasthan");  
 System.*out*.println("You Get: ");  
 System.*out*.println("water, laal maas,\nMirchi vada, mohan mass ");  
 }  
 else if (choice == 4){  
 System.*out*.println("Welcome to Flavours of Punjab");  
 System.*out*.println("You Get: ");  
 System.*out*.println("Khandvi, Dhokla,\nHandvo, Gathiya");  
 }  
 else if (choice == 5) {  
 System.*out*.println("Welcome to Flavours of Bengal");  
 System.*out*.println("You Get: ");  
 System.*out*.println("Mach bhaat, dim bhaat,\ndaal, chicken kasha, rasgulla");  
 }  
 else if (choice == 6) {  
 System.*out*.println("Welcome to Desserts");  
 System.*out*.println("You Get: ");  
 System.*out*.println("vanilla ice cream, rasgulla,\ngulab jamun");  
 }  
 else {  
 System.*out*.println("Thank you for visiting us again");  
 }  
 }  
}

**18) An interesting method of multiplication of integers (not very large numbers).**

**19) The 1st day of 2021 was Friday, write a Menu driven program to input any day number within the month of January and print which day was it. Also check whether the day number entered is a valid date or not.**

import java.util.Scanner;  
  
public class mains2 {  
 public static void main(String[] args) {  
 Scanner scanner = new Scanner(System.*in*);  
  
 int startDay = 5;  
 int maxDays = 31;  
 String[] days = {"Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday"};  
  
 System.*out*.print("Enter the day number within January: ");  
 int dayNumber = scanner.nextInt();  
  
 if (dayNumber >= 1 && dayNumber <= maxDays) {  
 int dayOfWeek = (startDay + dayNumber - 1) % 7;  
 System.*out*.println("The day number " + dayNumber + " in January was: " + days[dayOfWeek]);  
 } else {  
 System.*out*.println("Invalid day number.");  
 }  
 }  
}

**20) Sphenic Number**

public class SphenicNumber {

public static void main(String[] args) {

int number = 30; // Replace this with the number you want to check

if (isSphenicNumber(number)) {

System.out.println(number + " is a Sphenic Number.");

} else {

System.out.println(number + " is not a Sphenic Number.");

}

}

private static boolean isSphenicNumber(int num) {

int count = 0;

int[] primeFactors = new int[3];

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

while (num % i == 0) {

if (count < 3) {

primeFactors[count++] = i;

} else {

// If more than 3 prime factors found, it cannot be a sphenic number

return false;

}

num /= i;

}

}

// If exactly 3 distinct prime factors found and the product is the original number

return count == 3 && num == 1;

}

}