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Subject : Java Programming

Problem_Sheet_1

1. Write a java program to convert the temperature expressed in Fahrenheit degree into Celsius
Degree.

```java
private static void Temperature() {
    System.out.print("Enter the Fahrenheit: ");
    float Fahrenheit = input.nextFloat();
    System.out.printf("Fahrenheit = %.2f F\n", Fahrenheit);
    float Celsius = (Fahrenheit - 32) * (5.0f / 9.0f);
    System.out.printf("Celsius = %.2f C\n", Celsius);
    System.out.println();
}
```

```
> javac Main.java && java Main
Enter the Fahrenheit: 54
Fahrenheit = 54.00 F
Celsius = 12.22 C
```

2. Write a program that converts distances measured in kilometers to miles. One kilometer is
approximately 0.62 miles.

```java
private static void Distance() {
    System.out.print("Enter the Kilometers: ");
    float KiloMeter = input.nextFloat();
    System.out.printf("Kilometers = %.2f KM\n", KiloMeter);
    float Mile = (0.62f * KiloMeter);
    System.out.printf("Miles = %.2f mile\n", Mile);
    System.out.println();
}
```

```
Enter the Kilometers: 5
Kilometers = 5.00 KM
Miles = 3.10 mile
```

3. Develop a program to calculate Simple Interest & Compound Interest.

```java
   private static void Interest() {
       System.out.print("Enter the Principal, Time Period, Rate of
Interest: ");
       float Principal = input.nextFloat();
       float NumberOfYear = input.nextFloat();
       float RateOfInterest = input.nextFloat();
       System.out.printf("Principal = Rs. %.2f\n", Principal);
       System.out.printf("Time Period = %.2f Year(s)\n", NumberOfYear);
       System.out.printf("Rate of Interest = %.2f %%\n", RateOfInterest);
       float SI = (Principal * NumberOfYear * RateOfInterest) / 100;
       float CI = (Principal * (float) Math.pow((1 + (RateOfInterest /
100)), NumberOfYear)) - Principal;
       System.out.printf("Simple Interest = Rs. %.2f\n", SI);
       System.out.printf("Compound Interest = Rs. %.2f\n", CI);
       System.out.println();
   }
```

```
Enter the Principal, Time Period, Rate of Interest: 1000 2 5
Principal = Rs. 1000.00
Time Period = 2.00 Year(s)
Rate of Interest = 5.00 %
Simple Interest = Rs. 100.00
Compound Interest = Rs. 102.50
```

4. Write a program to calculate the volume and surface area of a sphere from its radius, given as
Input.

```java
   private static void Sphere() {
       System.out.print("Enter the Radius: ");
       float Radius = input.nextFloat();
       System.out.printf("Radius of Sphere = %.2f units\n", Radius);
```

```java
        float Volume = (float) ((4.0f / 3.0f) * Math.PI * Math.pow(Radius,
3));
        float SurfaceArea = (float) (4 * Math.PI * Math.pow(Radius, 2));
        System.out.printf("Volume of Sphere = %.2f cubic units\n", Volume);
        System.out.printf("Surface Area of Sphere = %.2f square units\n",
SurfaceArea);
        System.out.println();
    }
```

```
Enter the Radius: 10
Radius of Sphere = 10.00 units
Volume of Sphere = 4188.79 cubic units
Surface Area of Sphere = 1256.64 square units
```

5. Write a program that calculates the cost per square inch of a circular pizza, given its diameter
and price.

```java
    public static void Pizza() {
        System.out.print("Enter the Diameter of Pizza, Price: ");
        float Diameter = input.nextFloat();
        float Price = input.nextFloat();
        System.out.printf("Diameter of Pizza = %.2f Inch(s)\n", Diameter);
        System.out.printf("Price of Pizza = Rs. %.2f\n", Price);
        float Area = (float) (Math.PI * Math.pow((Diameter / 2), 2));
        float PricePerSquareInch = Price / Area;
        System.out.printf("Price per square inch of Pizza = Rs. %.2f\n",
PricePerSquareInch);
        System.out.println();
    }
```

```
Enter the Diameter of Pizza, Price: 22 110
Diameter of Pizza = 22.00 Inch(s)
Price of Pizza = Rs. 110.00
Price per square inch of Pizza = Rs. 0.29
```

6. Write a program that determines the distance to a lightning strike based on the time elapsed

between the flash and the sound of thunder. The speed of sound is approximately 1100 ft/sec
and 1 mile is 5280 ft.

```java
public static void Lightning() {
    System.out.print("Enter the time elapsed(in sec): ");
    float TimeElapsed = input.nextFloat();
    float SpeedOfLight = 1100; // ft per sec
    float Feet = (TimeElapsed * SpeedOfLight); // ft
    float Miles = (Feet / 5280f); // ft to mile
    System.out.printf("The lightning strike is approximately %.2f miles
away.\n", Miles);
    System.out.println();
}
```

```
Enter the time elapsed(in sec): 360
The lightning strike is approximately 75.00 miles away.
```

7. The distance between two cities (in km.) is given as an input. Write the program to convert and
print this distance in miles and feet.

```java
public static void Convert() {
    System.out.print("Enter the Distance between two cities(in Km): ");
    float Kilometers = input.nextFloat();
    float Miles = (0.621371f * Kilometers);
    float Feet = (3280.84f * Kilometers);
    System.out.printf("Distance between two cities = %.2f Km or %.2f
miles or %.2f ft\n", Kilometers, Miles, Feet);
    System.out.println();
}
```

```
Enter the Distance between two cities(in Km): 15
Distance between two cities = 15.00 Km or 9.32 miles or 49212.60 ft
```

8. Two points in a plane are specified using the coordinates (x1, y1) and (x2, y2). Write a program that calculates the slope of a line through two (non-vertical) points entered by the user.

```java
public static void Slope() {
    System.out.print("Enter the coordinates of the point (x1, y1): ");
    float[] Point1 = { input.nextFloat(), input.nextFloat() };
    System.out.print("Enter the coordinates of the point (x2, y2): ");
    float[] Point2 = { input.nextFloat(), input.nextFloat() };
    if (Point1[0] == Point2[0])
        System.out.println("The points are on the same vertical
line.");
    else {
        float Slope = (Point2[1] - Point1[1]) / (Point2[0] -
Point1[0]);
        System.out.printf("The slope of the line = %.2f\n", Slope);
    }
    System.out.println();
}
```

```
Enter the coordinates of the point (x1, y1): 1 1
Enter the coordinates of the point (x2, y2): 4 5
The slope of the line = 1.33
```

9. Write a program that determines the molecular weight of a hydrocarbon based on the number
of hydrogen, carbon, and oxygen atoms. You should use the following weights:
Atom Weight (grams/mole)
H 1.0079
C 12.011
O 15.9994

```java
public static void Weight() {
    System.out.print("Enter the number of Hydrogen(H), Carbon(C),
Oxygen(O) atoms: ");
    int hydrogenAtoms = input.nextInt();
    int carbonAtoms = input.nextInt();
    int oxygenAtoms = input.nextInt();
    float molecularWeight = (1.0079f * hydrogenAtoms) + (12.011f *
carbonAtoms) + (15.9994f * oxygenAtoms);
    System.out.printf("The molecular weight of %dH %dC %dO = %.2f
grams/mole\n", hydrogenAtoms, carbonAtoms,
```

```
                  oxygenAtoms, molecularWeight);
        System.out.println();
   }
```

```
Enter the number of Hydrogen(H), Carbon(C), Oxygen(O) atoms: 5 2 6
The molecular weight of 5H 2C 6O = 125.06 grams/mole
```

10. Write a program that accepts two points (see previous problem) and determines the distance
between them.

```
   public static void Euclidean() {
       System.out.print("Enter the coordinates of the point (x1, y1): ");
       float[] Point1 = { input.nextFloat(), input.nextFloat() };
       System.out.print("Enter the coordinates of the point (x2, y2): ");
       float[] Point2 = { input.nextFloat(), input.nextFloat() };
       float Distance = (float) Math.sqrt(Math.pow((Point2[0] -
Point1[0]), 2) + Math.pow((Point2[1] - Point1[1]), 2));
       System.out.printf("The Distance between 2 points = %.2f units\n",
Distance);
       System.out.println();
   }
```

```
Enter the coordinates of the point (x1, y1): 1 1
Enter the coordinates of the point (x2, y2): 4 5
The Distance between 2 points = 5.00 units
```

11. The Gregorian epact is the number of days between January 1st and the previous new moon.
This value is used to figure out the date of Easter.Write a program that prompts the user for a 4-digit year and then outputs the value of the epact.

```
   public static void Gregorian() {
       System.out.print("Enter a 4-digit year: ");
       int Year = input.nextInt();
       if (Year < 1000 || Year > 9999) {
           System.out.print("Please enter a valid 4-digit year.");
           return;
       }
```

```java
        int Century = Year / 100;
        int Epact = (8 + (Century / 4) - Century + ((8 * Century + 13) /
25) + 11 * (Year % 19)) % 30;
        System.out.println("The Gregorian epact for the year " + Year + "
is: " + Epact);
        System.out.println();
    }
```

```
Enter a 4-digit year: 2024
The Gregorian epact for the year 2024 is: 19
```

12. Five Bikers Compete in a race such that they drive at a constant speed which may or may not
be the same as the other. To qualify the race, the speed of a racer must be more than the average speed of all 5 racers. Take as input the speed of each racer and print back the speed of
qualifying racers

```java
    public static void Racer() {
        // System.out.print("Enter number of racers: ");
        // int NumberOfRacers = input.nextInt();
        int NumberOfRacers = 5;
        int[] SpeedOfRacers = new int[NumberOfRacers];
        int Average = 0;
        System.out.print("Enter the speed of " + NumberOfRacers + " racer:
");
        for (int i = 0; i < NumberOfRacers; i++) {
            SpeedOfRacers[i] = input.nextInt();
            Average += SpeedOfRacers[i];
        }
        Average /= NumberOfRacers;
        // System.out.println("Average speed: " + Average + " kmph");
        System.out.println("Speed of qualifying racers: ");
        for (int i = 0; i < NumberOfRacers; i++) {
            if (SpeedOfRacers[i] >= Average)
                System.out.println("Racer " + (i + 1) + " = " +
SpeedOfRacers[i] + " kmph");
        }
        System.out.println();
```

```
    }
```

```
Enter the speed of 5 racer: 95 100 104 92 97
Speed of qualifying racers:
Racer 2 = 100 kmph
Racer 3 = 104 kmph
Racer 5 = 97 kmph
```

13. Meadowdale Dairy Farm sells organic brown eggs to local customers. It charges $3.25 for a
dozen eggs, or 45 cents for individual eggs that are not part of a dozen. Write a program that
prompts a user for the number of eggs in the order and then display the amount owed with a
full explanation. For example, typical output might be, You ordered 27 eggs. That's 2 dozen at
$3.25 per dozen and 3 loose eggs at 45 cents each for a total of $7.85.

```java
public static void Egg() {
    System.out.print("Enter number of eggs: ");
    int NumberOfEggs = input.nextInt();
    int NumberofDozens = NumberOfEggs / 12;
    int NumberofLeftOver = NumberOfEggs % 12;
    float Price = (3.25f * NumberofDozens) + (0.45f *
NumberofLeftOver);
    System.out.printf("Total price of eggs = $%.2f", Price);
    System.out.println();
}
```

```
Enter number of eggs: 50
Total price of eggs = $13.90
```

14. Use the web to determine the current world population and the annual world population growth rate. Write an application that inputs these values, then displays the estimated world population after one, two, three, four and five years.

```java
public static void Population() {
    System.out.print("Enter the current world population: ");
    long CurrentPopulation = input.nextLong();
```

```java
        System.out.print("Enter the annual world population growth rate (as
a percentage): ");
        float GrowthRate = input.nextFloat();
        GrowthRate /= 100;
        System.out.println("Estimated World Population: ");
        for (int year = 1; year <= 5; year++) {
            double EstimatedPopulation = CurrentPopulation * Math.pow(1 +
GrowthRate, year);
            System.out.printf("Year %d: %.0f\n", year,
EstimatedPopulation);
        }
        System.out.println();
    }
```

```
Enter the current world population: 435769324
Enter the annual world population growth rate (as a percentage): 3
Estimated World Population:
Year 1: 448842391
Year 2: 462307650
Year 3: 476176866
Year 4: 490462159
Year 5: 505176010
```

15. Write a program that calculates your daily driving cost, so that you can estimate how much
money could be saved by car pooling, which also has other advantages such as reducing carbon
emissions and reducing traffic congestion. The application should input the following
information and display the user's cost per day of driving to work:
a) Total miles driven per day.
b) Cost per gallon of gasoline.
c) Average miles per gallon.
d) Parking fees per day.
e) Tolls per day.

```java
    public static void Driving() {
        System.out.print("Enter the total miles driven per day: ");
        float TotalMilesPerDay = input.nextFloat();
        System.out.print("Enter the average miles per gallon: ");
        float MilesPerGallon = input.nextFloat();
        System.out.print("Enter the cost per gallon of gasoline: ");
```

```java
        float CostPerGallon = input.nextFloat();
        float DailyGasolineCost = (TotalMilesPerDay / MilesPerGallon) *
CostPerGallon;
        System.out.print("Enter the parking fees per day: ");
        float ParkingFees = input.nextFloat();
        System.out.print("Enter the tolls per day: ");
        float TollsPerDay = input.nextFloat();
        float DailyDrivingCost = DailyGasolineCost + ParkingFees +
TollsPerDay;
        System.out.printf("Your daily driving cost is: $%.2f%n",
DailyDrivingCost);
        System.out.println();
    }
```

```
Enter the total miles driven per day: 6.20
Enter the average miles per gallon: 2.13
Enter the cost per gallon of gasoline: 57.45
Enter the parking fees per day: 10
Enter the tolls per day: 35
Your daily driving cost is: $212.23
```

16. Suppose you save $100 each month into a savings account with the annual interest rate 5%.
Thus, the monthly interest rate is After the first month, the value in the account becomes 100 * (1 + 0.00417) = 100.417 After the second month, the value in the account becomes
(100 + 100.417) * (1 + 0.00417) = 201.252 After the third month, the value in the account becomes (100 + 201.252) * (1 + 0.00417) = 302.507 and so on. Write a program that prompts the user to enter a monthly saving amount and displays the account value after the sixth month.

```java
    public static void Savings() {
        System.out.print("Enter the monthly savings amount: ");
        float SavingsAmount = input.nextFloat();
        // System.out.print("Enter the annual interest rate: ");
        // float AnnualRate = input.nextFloat() / 100f;
        float AnnualRate = 5 / 100f;
        float MonthlyRate = AnnualRate / 12f;
        Double AmountValue = 0.0;
        // System.out.print("Enter the number of months: ");
```

```
        // int Months = input.nextInt();
        int Months = 6;
        for (int i = 0; i < Months; i++) {
            AmountValue = (SavingsAmount + AmountValue) * (1 +
MonthlyRate);
        }
        System.out.printf("Your savings amount after %d months = $%.3f",
Months, AmountValue);
        System.out.println();
    }
```

```
Enter the monthly savings amount: 100
Your savings amount after 6 months = $608.811
```

17. Body Mass Index (BMI) is a measure of health on weight. It can be calculated by taking your
weight in kilograms and dividing by the square of your height in meters. Write a program that
prompts the user to enter a weight in pounds and height in inches and displays the BMI. Note
that one pound is 0.45359237 kilograms and one inch is 0.0254 meters.

```
    public static void Bmi() {
        System.out.print("Enter the weight(in pounds): ");
        float Pounds = input.nextFloat();
        System.out.print("Enter the Height(in inches): ");
        float Inches = input.nextFloat();
        float Weight = 0.45359237f * Pounds; // kilograms
        float Height = 0.0254f * Inches; // meters
        float BMI = Weight / (Height * Height);
        System.out.printf("BMI: %.2f", BMI);
        System.out.println();
    }
```

```
Enter the weight(in pounds): 104
Enter the Height(in inches): 66
BMI: 16.79
```

18. How cold is it outside? The temperature alone is not enough to provide the answer. Other
factors including wind speed, relative humidity, and sunshine play important roles in
determining coldness outside. In 2001, the National Weather Service (NWS) implemented the
new wind-chill temperature to measure the coldness using temperature and wind speed.

```java
    public static void WindChill() {
        System.out.print("Enter the temperature in Fahrenheit (between
-58°F and 41°F): ");
        float Temperature = input.nextFloat();
        while (Temperature < -58 || Temperature > 41) {
            System.out.print("Invalid input. Please enter a temperature
between -58°F and 41°F: ");
            Temperature = input.nextFloat();
        }
        System.out.print("Enter the wind speed in miles per hour (>= 2
mph): ");
        float WindSpeed = input.nextFloat();
        while (WindSpeed < 2) {
            System.out.print("Invalid input. Please enter a wind speed of
at least 2 mph: ");
            WindSpeed = input.nextFloat();
        }
        double WindChill = 35.74f + 0.6215f * Temperature - 35.75f *
Math.pow(WindSpeed, 0.16f)
                + 0.4275f * Temperature * Math.pow(WindSpeed, 0.16f);
        System.out.printf("The wind-chill temperature is: %.2f°F",
WindChill);
        System.out.println();
    }
```

```
Enter the temperature in Fahrenheit (between -58°F and 41°F): 28
Enter the wind speed in miles per hour (>= 2 mph): 8.5
The wind-chill temperature is: 19.65°F
```

19. Write a program that reads in investment amount, annual interest rate, and number of years,
and displays the future investment value.

```java
    public static void Investment() {
        System.out.print("Enter the investment amount: ");
        float InvestmentAmount = input.nextFloat();
        System.out.print("Enter the annual interest rate: ");
        float MonthlyRate = (input.nextFloat() / 100) / 12;
        System.out.print("Enter the number of years: ");
        int NumberOfMonths = input.nextInt() * 12;
        double FutureValue = InvestmentAmount * Math.pow((1 + MonthlyRate),
NumberOfMonths);
        System.out.printf("The future investment amount = $%.2f",
FutureValue);
        System.out.println();
    }
```

```
Enter the investment amount: 100
Enter the annual interest rate: 12
Enter the number of years: 5
The future investment amount = $181.67
```

20. Write an application that inputs one number consisting of five digits from the user, separates
the number into its individual digits and prints the digits separated from one another by three
spaces each.

```java
    public static void Digits() {
        System.out.print("Enter a five-digit number: ");
        int Number = input.nextInt();
        while (Number < 10000 || Number > 99999) {
            System.out.print("Invalid input. Please enter a five-digit
number: ");
            Number = input.nextInt();
        }
        int[] Digits = new int[5];
        for (int i = 0; i < 5; i++) {
            Digits[i] = Number % 10;
            Number /= 10;
        }
        for (int i : Digits) {
            System.out.print(i + "\t");
```

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

```
Enter a five-digit number: 54321
1      2      3      4      5
```

Source code

```java
import java.util.Scanner;

public class Main {
    private static Scanner input = new Scanner(System.in);

    public static void main(String[] args) {
        Temperature();
        Distance();
        Interest();
        Sphere();
        Pizza();
        Lightning();
        Convert();
        Slope();
        Weight();
        Euclidean();
        Gregorian();
        Racer();
        Egg();
        Population();
        Driving();
        Savings();
        Bmi();
        WindChill();
        Investment();
        Digits();
    }

    private static void Temperature() {
        System.out.print("Enter the Fahrenheit: ");
```

```java
        float Fahrenheit = input.nextFloat();
        System.out.printf("Fahrenheit = %.2f F\n", Fahrenheit);
        float Celsius = (Fahrenheit - 32) * (5.0f / 9.0f);
        System.out.printf("Celsius = %.2f C\n", Celsius);
        System.out.println();
    }

    private static void Distance() {
        System.out.print("Enter the Kilometers: ");
        float KiloMeter = input.nextFloat();
        System.out.printf("Kilometers = %.2f KM\n", KiloMeter);
        float Mile = (0.62f * KiloMeter);
        System.out.printf("Miles = %.2f mile\n", Mile);
        System.out.println();
    }

    private static void Interest() {
        System.out.print("Enter the Principal, Time Period, Rate of
Interest: ");
        float Principal = input.nextFloat();
        float NumberOfYear = input.nextFloat();
        float RateOfInterest = input.nextFloat();
        System.out.printf("Principal = Rs. %.2f\n", Principal);
        System.out.printf("Time Period = %.2f Year(s)\n", NumberOfYear);
        System.out.printf("Rate of Interest = %.2f %%\n", RateOfInterest);
        float SI = (Principal * NumberOfYear * RateOfInterest) / 100;
        float CI = (Principal * (float) Math.pow((1 + (RateOfInterest /
100)), NumberOfYear)) - Principal;
        System.out.printf("Simple Interest = Rs. %.2f\n", SI);
        System.out.printf("Compound Interest = Rs. %.2f\n", CI);
        System.out.println();
    }

    private static void Sphere() {
        System.out.print("Enter the Radius: ");
        float Radius = input.nextFloat();
        System.out.printf("Radius of Sphere = %.2f units\n", Radius);
        float Volume = (float) ((4.0f / 3.0f) * Math.PI * Math.pow(Radius,
3));
        float SurfaceArea = (float) (4 * Math.PI * Math.pow(Radius, 2));
```

```java
        System.out.printf("Volume of Sphere = %.2f cubic units\n", Volume);
        System.out.printf("Surface Area of Sphere = %.2f square units\n",
SurfaceArea);
        System.out.println();
    }

    public static void Pizza() {
        System.out.print("Enter the Diameter of Pizza, Price: ");
        float Diameter = input.nextFloat();
        float Price = input.nextFloat();
        System.out.printf("Diameter of Pizza = %.2f Inch(s)\n", Diameter);
        System.out.printf("Price of Pizza = Rs. %.2f\n", Price);
        float Area = (float) (Math.PI * Math.pow((Diameter / 2), 2));
        float PricePerSquareInch = Price / Area;
        System.out.printf("Price per square inch of Pizza = Rs. %.2f\n",
PricePerSquareInch);
        System.out.println();
    }

    public static void Lightning() {
        System.out.print("Enter the time elapsed(in sec): ");
        float TimeElapsed = input.nextFloat();
        float SpeedOfLight = 1100; // ft per sec
        float Feet = (TimeElapsed * SpeedOfLight); // ft
        float Miles = (Feet / 5280f); // ft to mile
        System.out.printf("The lightning strike is approximately %.2f miles
away.\n", Miles);
        System.out.println();
    }

    public static void Convert() {
        System.out.print("Enter the Distance between two cities(in Km): ");
        float Kilometers = input.nextFloat();
        float Miles = (0.621371f * Kilometers);
        float Feet = (3280.84f * Kilometers);
        System.out.printf("Distance between two cities = %.2f Km or %.2f
miles or %.2f ft\n", Kilometers, Miles, Feet);
        System.out.println();
    }
```

```java
    public static void Slope() {
        System.out.print("Enter the coordinates of the point (x1, y1): ");
        float[] Point1 = { input.nextFloat(), input.nextFloat() };
        System.out.print("Enter the coordinates of the point (x2, y2): ");
        float[] Point2 = { input.nextFloat(), input.nextFloat() };
        if (Point1[0] == Point2[0])
            System.out.println("The points are on the same vertical
line.");
        else {
            float Slope = (Point2[1] - Point1[1]) / (Point2[0] -
Point1[0]);
            System.out.printf("The slope of the line = %.2f\n", Slope);
        }
        System.out.println();
    }

    public static void Weight() {
        System.out.print("Enter the number of Hydrogen(H), Carbon(C),
Oxygen(O) atoms: ");
        int hydrogenAtoms = input.nextInt();
        int carbonAtoms = input.nextInt();
        int oxygenAtoms = input.nextInt();
        float molecularWeight = (1.0079f * hydrogenAtoms) + (12.011f *
carbonAtoms) + (15.9994f * oxygenAtoms);
        System.out.printf("The molecular weight of %dH %dC %dO = %.2f
grams/mole\n", hydrogenAtoms, carbonAtoms,
                oxygenAtoms, molecularWeight);
        System.out.println();
    }

    public static void Euclidean() {
        System.out.print("Enter the coordinates of the point (x1, y1): ");
        float[] Point1 = { input.nextFloat(), input.nextFloat() };
        System.out.print("Enter the coordinates of the point (x2, y2): ");
        float[] Point2 = { input.nextFloat(), input.nextFloat() };
        float Distance = (float) Math.sqrt(Math.pow((Point2[0] -
Point1[0]), 2) + Math.pow((Point2[1] - Point1[1]), 2));
        System.out.printf("The Distance between 2 points = %.2f units\n",
Distance);
        System.out.println();
```

```java
    }

    public static void Gregorian() {
        System.out.print("Enter a 4-digit year: ");
        int Year = input.nextInt();
        if (Year < 1000 || Year > 9999) {
            System.out.print("Please enter a valid 4-digit year.");
            return;
        }
        int Century = Year / 100;
        int Epact = (8 + (Century / 4) - Century + ((8 * Century + 13) /
25) + 11 * (Year % 19)) % 30;
        System.out.println("The Gregorian epact for the year " + Year + "
is: " + Epact);
        System.out.println();
    }

    public static void Racer() {
        // System.out.print("Enter number of racers: ");
        // int NumberOfRacers = input.nextInt();
        int NumberOfRacers = 5;
        int[] SpeedOfRacers = new int[NumberOfRacers];
        int Average = 0;
        System.out.print("Enter the speed of " + NumberOfRacers + " racer:
");
        for (int i = 0; i < NumberOfRacers; i++) {
            SpeedOfRacers[i] = input.nextInt();
            Average += SpeedOfRacers[i];
        }
        Average /= NumberOfRacers;
        // System.out.println("Average speed: " + Average + " kmph");
        System.out.println("Speed of qualifying racers: ");
        for (int i = 0; i < NumberOfRacers; i++) {
            if (SpeedOfRacers[i] >= Average)
                System.out.println("Racer " + (i + 1) + " = " +
SpeedOfRacers[i] + " kmph");
        }
        System.out.println();
    }
```

```java
    public static void Egg() {
        System.out.print("Enter number of eggs: ");
        int NumberOfEggs = input.nextInt();
        int NumberofDozens = NumberOfEggs / 12;
        int NumberofLeftOver = NumberOfEggs % 12;
        float Price = (3.25f * NumberofDozens) + (0.45f *
NumberofLeftOver);
        System.out.printf("Total price of eggs = $%.2f", Price);
        System.out.println();
    }

    public static void Population() {
        System.out.print("Enter the current world population: ");
        long CurrentPopulation = input.nextLong();
        System.out.print("Enter the annual world population growth rate (as
a percentage): ");
        float GrowthRate = input.nextFloat();
        GrowthRate /= 100;
        System.out.println("Estimated World Population: ");
        for (int year = 1; year <= 5; year++) {
            double EstimatedPopulation = CurrentPopulation * Math.pow(1 +
GrowthRate, year);
            System.out.printf("Year %d: %.0f\n", year,
EstimatedPopulation);
        }
        System.out.println();
    }

    public static void Driving() {
        System.out.print("Enter the total miles driven per day: ");
        float TotalMilesPerDay = input.nextFloat();
        System.out.print("Enter the average miles per gallon: ");
        float MilesPerGallon = input.nextFloat();
        System.out.print("Enter the cost per gallon of gasoline: ");
        float CostPerGallon = input.nextFloat();
        float DailyGasolineCost = (TotalMilesPerDay / MilesPerGallon) *
CostPerGallon;
        System.out.print("Enter the parking fees per day: ");
        float ParkingFees = input.nextFloat();
        System.out.print("Enter the tolls per day: ");
```

```java
        float TollsPerDay = input.nextFloat();
        float DailyDrivingCost = DailyGasolineCost + ParkingFees +
TollsPerDay;
        System.out.printf("Your daily driving cost is: $%.2f%n",
DailyDrivingCost);
        System.out.println();
    }

    public static void Savings() {
        System.out.print("Enter the monthly savings amount: ");
        float SavingsAmount = input.nextFloat();
        // System.out.print("Enter the annual interest rate: ");
        // float AnnualRate = input.nextFloat() / 100f;
        float AnnualRate = 5 / 100f;
        float MonthlyRate = AnnualRate / 12f;
        Double AmountValue = 0.0;
        // System.out.print("Enter the number of months: ");
        // int Months = input.nextInt();
        int Months = 6;
        for (int i = 0; i < Months; i++) {
            AmountValue = (SavingsAmount + AmountValue) * (1 +
MonthlyRate);
        }
        System.out.printf("Your savings amount after %d months = $%.3f",
Months, AmountValue);
        System.out.println();
    }

    public static void Bmi() {
        System.out.print("Enter the weight(in pounds): ");
        float Pounds = input.nextFloat();
        System.out.print("Enter the Height(in inches): ");
        float Inches = input.nextFloat();
        float Weight = 0.45359237f * Pounds; // kilograms
        float Height = 0.0254f * Inches; // meters
        float BMI = Weight / (Height * Height);
        System.out.printf("BMI: %.2f", BMI);
        System.out.println();
    }
```

```java
    public static void WindChill() {
        System.out.print("Enter the temperature in Fahrenheit (between
-58°F and 41°F): ");
        float Temperature = input.nextFloat();
        while (Temperature < -58 || Temperature > 41) {
            System.out.print("Invalid input. Please enter a temperature
between -58°F and 41°F: ");
            Temperature = input.nextFloat();
        }
        System.out.print("Enter the wind speed in miles per hour (>= 2
mph): ");
        float WindSpeed = input.nextFloat();
        while (WindSpeed < 2) {
            System.out.print("Invalid input. Please enter a wind speed of
at least 2 mph: ");
            WindSpeed = input.nextFloat();
        }
        double WindChill = 35.74f + 0.6215f * Temperature - 35.75f *
Math.pow(WindSpeed, 0.16f)
                + 0.4275f * Temperature * Math.pow(WindSpeed, 0.16f);
        System.out.printf("The wind-chill temperature is: %.2f°F",
WindChill);
        System.out.println();
    }

    public static void Investment() {
        System.out.print("Enter the investment amount: ");
        float InvestmentAmount = input.nextFloat();
        System.out.print("Enter the annual interest rate: ");
        float MonthlyRate = (input.nextFloat() / 100) / 12;
        System.out.print("Enter the number of years: ");
        int NumberOfMonths = input.nextInt() * 12;
        double FutureValue = InvestmentAmount * Math.pow((1 + MonthlyRate),
NumberOfMonths);
        System.out.printf("The future investment amount = $%.2f",
FutureValue);
        System.out.println();
    }

    public static void Digits() {
```

```java
        System.out.print("Enter a five-digit number: ");
        int Number = input.nextInt();
        while (Number < 10000 || Number > 99999) {
            System.out.print("Invalid input. Please enter a five-digit
number: ");
            Number = input.nextInt();
        }
        int[] Digits = new int[5];
        for (int i = 0; i < 5; i++) {
            Digits[i] = Number % 10;
            Number /= 10;
        }
        for (int i : Digits) {
            System.out.print(i + "\t");
        }
        System.out.println();
    }
}
```