Problem 1:

Use import declaration to prevent need for full qualification of Scanner class

Make a class called CalcAreaOfTriangle

Make a main method

Instantiate a new object of the Scanner class called scan

Declare all variables s, a, b, c, area, roundedArea as floats

Tell the user to input side a value

Use scan nextDouble method to record user input into variable a

Tell the user to input side b value

Use scan nextDouble method to record user input into variable b

Tell the user to input side c value

Use scan nextDouble method to record user input into variable c

Check to make sure all the sides can make a valid triangle

Perform computation for s

Calculate area using s

Use math round method to get a value with three decimal places

Print the roundedArea

Else print that the input side values do not make a valid triangle

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C:\Users\tcarlisle\Documents\CCSU\CS151\Assignments\Homework 2>java CalcAreaOfTriangle.java
What is the length of side 'a' of the triangle?
7
What is the length of side 'b' of the triangle?
9
What is the length of side 'c' of the triangle?
12

The area of the triangle is 31.305
```

Problem 2:

Use import declaration to prevent need for full qualification of Scanner class

Make a class called DetermineIfLeapYear

Make a main method

Instantiate a new object of the Scanner class called scan

Declare variables inputYear, remain4, remain100, remain400 as ints

Declare variables divis4, divis100, and divis400 as Boolean and initialize them to false

Tell user to input a year to check

Use scan nextInt method to record user input into variable inputYear

Determine remainder value when input year is divided by 4, 100, and 400

Check if input year is a year after Gregorian calendar is adopted

If it is, check if it is divisible by 4

If it is, set the bool divis4 to true

If it is a valid year, check if it is divisible by 100

If it is, set bool divis100 to true

If it is a valid year, check if it is divisible by 400

If it is, set bool divis400 to true

If divis4 is true check if it is divisible by 100 and not by 400 by checking the respective bools

If it is divisible by 4 and 100, but not 400, tell the user it is not a leap year

Otherwise, tell the user it is a leap year

Else it is not divisible by 4 (divis4 = false) tell the user it is not a leap year

And if the inputYear is less than 1582, tell the user this year was before the adoption of the Gregorian Calendar

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C:\Users\tcarlisle\Documents\CCSU\CS151\Assignments\Homework 2>java DetermineIfLeapYear.java
What year would you like to check?
1900

It's NOT a leap year!


C:\Users\tcarlisle\Documents\CCSU\CS151\Assignments\Homework 2>java DetermineIfLeapYear.java
What year would you like to check?
1904

It's a leap year!


C:\Users\tcarlisle\Documents\CCSU\CS151\Assignments\Homework 2>java DetermineIfLeapYear.java
What year would you like to check?
1905

It's NOT a leap year!
```

Problem 3:

Make a class called CalcTimeToHalvePopulation

Create a main method

Declare current population constants with the final modifier as float data types

Declare the variables that will hold the population values as we increment the year (yearlyMexPop and yearlyUSAPop) as double data types.

Declare the variable t and initialize it to 0. t is an int data type and will represent years as we increment

Use a while loop that will iterate for as long as the Mexican population is less than half the US population

Within the loop, calculate the Mexican population with the math pow method using the equation P = P0(1+r/100)^t

Within the loop, calculate the US population with the math pow method using the equation P = P0(1+r/100)^t

Print that year's population values for Mexico and US with the year from current date for reference

Increment the year (t++) for the next iteration of the loop

Once the Mexican population is greater than half the population of the US it will break the loop

Then print that it will require the current value in t minus 1 (due to the incrementation of t in the completion of the final iteration of the loop) for mexico's population to reach half of the US's.

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C:\Users\tcarlisle\Documents\CCSU\CS151\Assignments\Homework 2>java CalcTimeToHalvePopulation.java

The Mexican population after 0 years is 6.2E7 people, and the US population is 2.8E8 people.

The Mexican population after 1 years is 6.634000000000001E7 people, and the US population is 2.856E8 people.

The Mexican population after 2 years is 7.09838E7 people, and the US population is 2.91312E8 people.

The Mexican population after 3 years is 7.5952666E7 people, and the US population is 2.9713824000000006E8 people.

The Mexican population after 4 years is 8.126935262000002E7 people, and the US population is 3.030810048E8 people.

The Mexican population after 5 years is 8.695820730340002E7 people, and the US population is 3.09142624896E8 people.

The Mexican population after 6 years is 9.304528181463803E7 people, and the US population is 3.1532547739392E8 people.

The Mexican population after 7 years is 9.95584515416627E7 people, and the US population is 3.216319869417984E8 people.

The Mexican population after 8 years is 1.065275431495791E8 people, and the US population is 3.280646266806344E8 people.

The Mexican population after 9 years is 1.139844711700496 4E8 people, and the US population is 3.346259192142471E8 people.

The Mexican population after 10 years is 1.2196338415195312E8 people, and the US population is 3.413184375985321E8 people.

The Mexican population after 11 years is 1.3050082104258986E8 people, and the US population is 3.4814480635050267E8 people.

The Mexican population after 12 years is 1.3963587851557115E8 people, and the US population is 3.551077024775127E8 people.

The Mexican population after 13 years is 1.494103900116611E8 people, and the US population is 3.62209856527063E8 people.

The Mexican population after 14 years is 1.598691173124774E8 people, and the US population is 3.694540536576043E8 people.

The Mexican population after 15 years is 1.7105995552435085E8 people, and the US population is 3.7684313473075634E8 people.

The Mexican population after 16 years is 1.8303415241105545E8 people, and the US population is 3.843799974253714 7E8 people.

The Mexican population after 17 years is 1.958465430798293E8 people, and the US population is 3.920675973738789 6E8 people.

The Mexican population after 18 years is 2.0955580109541738E8 people, and the US population is 3.9990894932135653E8 people.


It will take Mexico 18 years to reach more than half of the US population!
```