1. What is the difference between "for" and "while-do" loops? What is the difference between "while-do" and "do-while" loops?
2. Write a program called SumAverageRunningInt to produce the sum of 1, 2, 3, ..., to 100. Store 1 and 100 in variables lowerbound and upperbound, so that we can change their values easily. Also compute and display the average. The output shall look like:

The sum of 1 to 100 is 5050

The average is 50.5

1. Write a program called **HarmonicSum** to compute the sum of a harmonic series, as shown below, where *n*=50000. The program shall compute the sum from *left-to-right* as well as from the *right-to-left*. Are the two sums the same? Obtain the absolute difference between these two sums and explain the difference. Which sum is more accurate?



1. Write a program called **ComputePI** to compute the value of π, using the following series expansion. Use the maximum denominator (maxDenominator) as the terminating condition. Try maxDenominator of 1000, 10000, 100000, 1000000 and compare the PI obtained. Is this series suitable for computing PI? Why?



1. Write a program called **Fibonacci** to print the first 20 Fibonacci numbers F(n), where F(n)=F(n–1)+F(n–2) and F(1)=F(2)=1. Also compute their average. The output shall look like:

The first 20 Fibonacci numbers are:

1 1 2 3 5 8 13 21 34 55 89 144 233 377 610 987 1597 2584 4181 6765

The average is 885.5

1. Write a program called **ExtractDigits** to extract each digit from an int, in the reverse order. For example, if the int is 15423, the output shall be "3 2 4 5 1", with a space separating the digits.
2. Write a program called **CircleComputation** that prompts user for the radius of a circle in floating point number. The program shall read the input as double; compute the diameter, circumference, and area of the circle in double; and print the values rounded to 2 decimal places. Use System-provided constant Math.PI for pi. The formulas are:
3. A sales tax of 7% is levied on all goods and services consumed. It is also mandatory that all the price tags should include the sales tax. For example, if an item has a price tag of $107, the actual price is $100 and $7 goes to the sales tax.

Write a program using a loop to continuously input the tax-inclusive price (in double); compute the actual price and the sales tax (in double); and print the results rounded to 2 decimal places. The program shall terminate in response to input of -1; and print the total price, total actual price, and total sales tax

1. Caesar's Code is one of the simplest encryption techniques. Each letter in the plaintext is replaced by a letter some fixed number of position (n) down the alphabet cyclically. In this exercise, we shall pick n=3. That is, 'A' is replaced by 'D', 'B' by 'E', 'C' by 'F', ..., 'X' by 'A', ..., 'Z' by 'C'.

Write a program called **CaesarCode** to cipher the Caesar's code. The program shall prompt user for a plaintext string consisting of mix-case letters only; compute the ciphertext; and print the ciphertext in uppercase. For example,

1. A word that reads the same backward as forward is called a palindrome, e.g., "mom", "dad", "racecar", "madam", and "Radar" (case-insensitive). Write a program called **TestPalindromicWord**, that prompts user for a word and prints ""xxx" is|is not a palindrome".