**Re-Exam Practice Problems**

1. The Konditorei coffee shop sells coffee at $10.50 a pound plus the cost of shipping. Each order ships at $0.86 per pound + $1.50 fixed cost for overhead. Write a program that inputs the number of pounds in an order and prints the total cost of the order, including shipping.

2. Write a program to compute the sum and average of a series of numbers values entered by the user. The program should first ask the user how many numbers there are. Then it should input the numbers one after another, then print their sum and average value. Your program should use a for loop.

3. An acronym is a word formed by taking the first letters of the words in a phrase and making a word from them using all capital letters. For example, RAM is an acronym for "random access memory". Note that all the letters of the acronym are capital letters even in the words are lower-case. Write a program that allows the user to enter a phrase and prints the acronym for that phrase.

4. Numerologists claim to be able to determine a person's character traits based on the "numeric value" of a name. The value of a name is determined by summing up the values of the letters of the name where 'a' is 1, 'b' = 2, …,'z' = 26. Upper- and lower-case letters are treated as equal. For example, "Tindell" would have value 20+9+14+4+5+12+12 = 76, which happens to be a very auspicious number.

Write a program that prints the numeric value of a name entered by the user.

5. Write a program that counts and prints the number of words in a sentence entered by the user.

6. Write a program that computes and prints the average length of the words in a sentence entered by the user.

7. A common utility on Unix/Linux systems is a small program called `wc`. This program analyzes a file to determine the number of lines, words and characters contained therein. Write your own program to input a filename and print the three numbers produced by `wc`. Your program should define a function with parameter a file name that returns the line count, word count and character count for the file.

8. Write and test a function to meet this specification.

```
SquareEach(nums)
```

`nums` is a list of numbers. Modifies the list by squaring each entry

9. Write and test a function to meet this specification.

```
sumList(nums)
```

`nums` is a list of numbers. Returns the sum of the numbers in `nums`.

10. Write and test a function to meet this specification.

```
toNumbers(strList)
```

`strList` is a list of strings of digit characters. Modifies each entry of the list by converting it to an integer.

11. Write and test a function `innerProd(x,y)` that returns the inner product of same-length lists x and y. The inner product of $[x_1, x_2,\ldots, x_n]$ and $[y_1, y_2,\ldots, y_n]$ is

$$x_1y_1 + x_2y_2 + \ldots + x_ny_n$$

12. Most companies pay time and a half for any hours worked above 40 in a given week. Write a program to input the number of hours worked and the hourly rate, then prints the total wages for the week.

13. The speeding ticket fine policy in Podunksville is $50 plus $5 for each mph over the limit plus a penalty of $200 for any speed over 90 mph. Write a program that inputs a speed limit and a clocked speed and either prints a message indicating the speed was legal or prints the amount of fine.

14. A formula for computing the date of Easter in the years 1982-2048, inclusive, is as follows. Let a = year % 19, b = year%4, c = year%7, d = (19*a + 24)%30, and e = (2*b+4*c+6*d+5)%7. The date of Easter is (d+e) days after March 22 (which could be in April). Write a program that inputs a year, verifies that it is in the proper range, and then prints the date of Easter that year.

15. The formula for Easter in problem 13 works for every year in the range 1900-2099 except for 1954, 1981, 2049, and 2076. For those years the computation in problem 13 produces a date that is one week too late. Modify your program from problem 13 to work for the entire range 1900-2099.

16. Write a program that inputs a date in the form month/day/year (all integers) and prints a message indicating whether the date is valid. For example, 5/24/1962 is valid but 9/31/2000 is not (September has only 30 days).

17. You are to write a Python program that **uses a while loop** to determine how long it takes to double an initial investment with a fixed annual percentage rate.

You should define a function named years_to_double with parameters start_amt and rate that returns the minimum number of years needed for the balance to be greater than or equal to 2*start_amt.

The main part of your program should prompt for and input the initial amount and the yearly interest rate, then call your function and print the answer.

You should run your program with a fixed rate and various initial investment and compare the results.

Also run your program with a fixed initial investment and various interest rates to see how the result changes with the interest rate.