

**Exercise 1. Sum and Average of Integers:**

Write a program to sum a sequence of integers, and calculate their average. Assume that the first integer read with scanf specifies the number of values to be entered. Your program should read only one value each time scanf is executed. A typical input sequence might be

```
7 678 234 315 489 536 456 367
```

where the 7 indicates that the subsequent 7 values are to be summed. (1 point)

**Exercise 2. Converting Celsius to Fahrenheit.**

Write a program that converts temperatures ranging between 30°C and 50°C to the Fahrenheit scale. The program should print a table displaying temperatures in the two scales side by side. (1 point)

[Hint :  $^{\circ}F = \frac{9}{5}C + 32$ ]

**Exercise 3. Calculating the Sum of Multiples.**

Write a program to calculate and print the sum of all multiples of 7 from 1 to 100. (1 point)

**Exercise 4. Factorials.**

The factorial function is used frequently in probability problems. The factorial of a positive integer n (written n! and pronounced “n factorial”) is equal to the product of the positive integers from 1 to n. Write a program that evaluates the factorials of the integers from 1 to 5. Print the results in tabular format. What difficulty might prevent you from calculating the factorial of 20 (1 point)

**Exercise 5. Triangle-Printing Program.**

Write a program that prints the following pattern. Use for loops to generate the pattern. All asterisks (\*) should be printed by a single printf statement of the form `printf("%s", "*");` (this causes the asterisks to print side-by-side).

[Hint: the pattern requires that each line begin with an appropriate number of blanks.]

```
  *
  **
 ***
****
*****
*****
*****
```

**Lab assignment:**

(5 points)

Write a C program assignment.c that reads a string from the keyboard and prints the frequency ( number of occurrences) of each of the vowels (a, e, i, o and u) in it.

**Sample run:**

```
> Enter a sentence: You don't know about me without you have read a book by
the name of The Adventures of Tom Sawyer; but that ain't no matter
A/a:10      E/e:10      I/i:2      O/o:12      U/u:6
```

**Bonus exercise:**

(5 points)

Calculate the value of  $\pi$  from the infinite series

$$\pi = 4 - \frac{4}{3} + \frac{4}{5} - \frac{4}{7} + \frac{4}{9} - \frac{4}{11} + \dots$$

Print a table that shows the value of  $\pi$  approximated by one term of this series, by two terms, by three terms, and so on.

How many terms of this series do you have to use before you first get 3.14? 3.141? 3.1415? 3.14159?