Introduction to Programming I

Lab-3 Variables, Operators

Questions

1) Given the following pseudocode, write a program that executes it. Use floating-point types for all values.

```
Algorithm Problem1
read x
read y
compute p = x*y
compute s = x + y
total = s * s + p * (s - x)*(p + y)
print total
End Algorithm Problem1
```

2) Write a program that reads two integers from the keyboard, multiplies them, and then prints the two numbers and their product.
3) Write a program that extracts and prints the rightmost digit of the integral portion of a float.
4) Write a program that extracts and prints the second rightmost digit of the integral portion of a float.
5) We are all familiar with the fact that angles are measured in degrees, minutes, and seconds. Another measure of an angle is a radian. A radian is the angle formed by two radii forming an arc that is equal to the radius of their circle. One radian equals 57.295779 degrees. Write a program that converts degrees into radians. Provide good user prompts. Include the following test data in your run:

```
90° is 1.57080 radians
```

6) The formula for converting centigrade temperatures to Fahrenheit is:

$$F = 32 + \left(C \times \left(\frac{180.0}{100.0}\right)\right)$$

Write a program that asks the user to enter a temperature reading in centigrade and then prints the equivalent Fahrenheit value. Be sure to include at least one negative centigrade number in your test cases.

7) Write a program that converts and prints a user-supplied measurement in inches into
   a. foot (12 inches)
   b. yard (36 inches)
   c. centimeter (2.54/inch)
   d. meter (39.37 inches)
8) Write a program to create a customer's bill for a company. The company sells only five different products: TV, VCR, Remote Controller, CD Player, and Tape Recorder. The unit prices are $400.00, $220, $35.20, $300.00, and $150.00, respectively. The program must read the quantity of each piece of equipment purchased from the keyboard. It then calculates the cost of each item, the subtotal, and the total cost after an 8.25% sales tax.

The input data consist of a set of integers representing the quantities of each item sold. These integers must be input into the program in a user-friendly way; that is, the program must prompt the user for each quantity as shown below. The numbers in boldface show the user's answers.

```
How Many TVs Were Sold? 3
How Many VCRs Were Sold? 5
How Many Remote Controllers Were Sold? 1
How Many CDs Were Sold? 2
How Many Tape Recorders Were Sold? 4
```

The format for the output is shown in the following Figure

QTY	DESCRIPTION	UNIT PRICE	TOTAL PRICE
------	----------	----------	----------
XX	TV	400.00	XXXX.XX
XX	VCR	220.00	XXXX.XX
XX	REMOTE	35.20	XXXX.XX
XX	CD PLAYER	300.00	XXXX.XX
XX	TAPE RECORDER	150.00	XXXX.XX

		SUBTOTAL	XXXXX.XX
		TAX	XXXX.XX
		TOTAL	XXXXX.XX

Use either defined constants or memory constants for the unit prices and the tax rate. Use integer variables to store the quantities for each item. Use floating-point variables to store the total price for each item, the bill subtotal, the tax amount, and the total amount of the bill. Run your program twice with the following data:

```
SET 1 → 2  1  4  1  2
SET 2 → 3  0  2  0 21
```