Chapter 4 Homework

Reading Assignment:
Read Chapter 4 in Introduction to Programming with C++, 3rd Edition, by Liang

Problem Assignment:
Submit each of the following by the assigned due date.

1) (40 pts) Work the following problems in the textbook. Work each problem by hand (not using the compiler). ***Be sure to write out the instructions for each problem and include the given information.*** Work all parts for each problem unless otherwise noted.
   a) Checkpoint Exercise 4.1 on p. 121
   b) Checkpoint Exercises 4.8, 4.9, and 4.10 on p. 126
   c) Checkpoint Exercise 4.20 on p. 138
   d) Checkpoint Exercises 4.24, 4.25, and 4.26 on p. 144

2) (60 pts) Write C++ programs for each of the following. For each program:
   - Use the TCC template (see next page). Complete the items listed in the template.
   - Include plenty of comments.
   - The output should be neatly and clearly formatted.
   - Use good programming style and proper indentation.
   - Turn in a printout of the program and printouts for all required test cases.
   A) ***Vowel or Consonant***? Write a program for ***Programming Exercise 4.10*** on p. 151 in the textbook.
      - Testing: Run the program for two vowels, two consonants, and two invalid characters

   B) ***Phone Key Pads***: Write a program for ***Programming Exercise 4.15*** on p. 152 in the textbook.
      - Testing: Run the program for:
         o The first three letters in your last name (all lowercase)
         o The first three letters in your first name (all uppercase)
         o Three invalid characters

   C) ***Formatted Table***: Write a program to print a small formatted table showing material and density according to the following specifications:
      - Prompt the user to enter the names of two materials and their densities. Use the densities from the table provided below.
      - Read the material names as strings.
      - Print 2 tables similar to the output shown below, but use ***lead*** and ***steel*** for the materials.
         o Table 1: Use the following formatting:
            ▪ Left justification
            ▪ 12 total spaces for each item in the table
            ▪ Fixed format
            ▪ 8 digits after the decimal point
            ▪ Show trailing zeros
            ▪ The table heading should also be left justified

- o Table 2: Use the following formatting:
  - Right justification
  - 18 total spaces for each item in the table
  - Scientific format
  - 4 digits after the decimal point
  - Show trailing zeros
  - The table heading should also be right justified

Sample Output

```
Enter name for material #1: Aluminum
Enter density for material #1 in g/cm^3: 2.72
Enter name for material #2: Bronze
Enter density for material #2 in g/cm^3: 8.52

Table 1:
Material    Density(g/cm^3)
Aluminum    2.72000000
Bronze      8.52000000

Table 2:
          Material   Density(g/cm^3)
            Copper        2.7200e+000
            Bronze        8.5200e+000
Press any key to continue . . .
```

Table of material densities

Material	Density (g/cm^3)
Aluminum	2.72
Bronze	8.52
Lead	11.34
Steel	7.85

Note: If you copy the output into Word or Notepad, you might notice that your tables are no longer properly aligned. Change the font to ***Courier New*** (not a TrueType font) to fix the problem. Non-TrueType fonts use the same amount of space for each character. TrueType fonts do not.