Chapter 3 Homework – Selection Structures

Related Textbook Material: Chapter 3 in <u>Introduction to Programming with C++</u>, 3rd Edition, by Liang
Assignment: Work all problems by hand unless specifically instructed otherwise.

1) (24 pts) Work the following exercises 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 exercise unless otherwise noted.
   - Checkpoint Exercises 3.16 on p. 84
   - Checkpoint Exercises 3.21 on p. 93
   - Checkpoint Exercises 3.24 and 3.26 on p. 94
   - Checkpoint Exercises 3.36 on p. 102
   - Checkpoint Exercises 3.40 on p. 103

2-4) (32 points) Complete problems 2-4 on the attached worksheet. Simply fill in the worksheet and attach it to the rest of the assignment.

5. (11 pts) <u>Cost of shipping</u>: Write, compile, and test a C++ program that uses an **if-else structure** for problem 3.11 on page 108.
   - Use the format specified earlier (initial block of comments with TCC logo, name, description, etc.)
   - Display clear instructions so that the user understands the purpose of the program and what to enter.
   - When the shipping cost is display, include the symbol ($).
   - Run the program for the following 6 cases:
     - 1 weight in each of the valid ranges (4 cases)
     - 1 negative weight (display an appropriate message)
     - 1 weight over 20 lb (not 50 as the text states) with the message indicated in the text
   - Turn in a printout of the program and printouts of the 3 test cases.

6. (11 pts) <u>Find future dates</u>: Write, compile, and test a C++ program that uses an **if-else structure** for problem 3.5 on page 107.
   - Use the format specified earlier (initial block of comments with TCC logo, name, description, etc.)
   - Use the input & output format shown in the text examples.
   - Display an error message if the day entered is not in the range 0-6
   - Display an error message if the number of days elapsed is not positive
   - Run the program for the following 6 test cases:
     - The two sample cases shown in the text
     - Two more valid test cases (using days not already tested)
     - An invalid day
     - An invalid number of days elapsed
   - Turn in a printout of the program and printouts of the 6 test cases.

7. (11 pts) Day of the week: Write, compile, and test a C++ program that uses a **switch structure** where the user is prompted to enter a number (0 - 6) corresponding to the days of the week (0 = Sunday, 1 = Monday, etc.) and the program should display the name of the day. For example, if the user enters 2, the program should output Tuesday.
    - Use the format specified earlier (initial block of comments with TCC logo, name, description, etc.)
    - Give clear instructions so that the user knows what to enter.
    - Display an error message if the day entered is not in the range 0-6
    - Run the program for the following 5 test cases:
        o Valid cases for 3 different days of the week
        o A negative input
        o An input >= 7
    - Turn in a printout of the program and printouts of the 5 test cases.

8. (11 points) Convert temperature: Write, compile, and test a C++ program that uses a **switch structure** where the user is prompted to enter a temperature and a unit (c, C, f, or F). If the temperature is entered in degrees Fahrenheit it should be converted to degrees Celsius. If the temperature is entered in degrees Celsius it should be converted to Fahrenheit. Hint: Read the temperature as a double and the unit as a char.
    Example: Input: 35.2 c   Output: 35.2 degrees C = 95.4 degrees F

    - Use the format specified earlier (initial block of comments with TCC logo, name, description, etc.)
    - Give clear instructions so that the user knows what to enter.
    - The output should display the result in both degrees C and degrees F as real numbers.
    - The program should print an error message if an invalid unit is entered.
    - Test the program for the 7 inputs shown below.
        o 0 c
        o 100 C
        o 35.2 c
        o 32 f
        o 212 F
        o 95.4 F
        o Any number followed by an invalid letter
    - Turn in a printout of the program and printouts of the 7 test cases.

2. (12 pts) Determine whether each expression below is true, false, or invalid assuming that:
    int A = 5, B = 6, C = 4;

Problem	Expression	True, false, or invalid?
1	if (A = 5)	
2	if (A == 6)	
3	if (A)	
4	if (1 < B < 3)	
5	if (1 < B && B < 3)	
6	if(A < C)	
7	if('A' < 'C')	
8	if('A' > 60)	
9	if(B % 3 == 0)	
10	if(C%3 == 0)	
11	if(B%3)	
12	if(!(C%3))	

3. (5 pts) Determine the value of Result assuming that:
    int A = 5, B = 6, C = 4;

Problem	Expression	Value of Result
1	Result = (A - 5)? 2 : 3	
2	Result = (B < C)? 2 : 3	
3	Result = (B)? 2 : 3	
4	Result = (A/C + C/B)? 2 : 3	
5	Result = (C-B)? 2 : 3	

4. (15 pts) Determine the logical result for each Boolean expression below assuming that:
    int m = 6, n = -4;
    double x = -5.25, y = 0.0, z = 1.25E1;
    bool a = false, b = true, c = true;

Problem	Problem	True	False
1	m <= -n		
2	x < -sqrt(z)		
3	2 * abs(n) <= m + 2		
4	int(z) == 6*(n + m)		
5	(x <= y) && (y >= z)		
6	!(x > z)		
7	((m >= -n) && (x + z > y))		
8	!(-m <= n) || !(x + z > y)		
9	((m <= n) || (y - x > z))		
10	!((m > n) && !(x >= z))		
11	!a || ! b		
12	!(a && b)		
13	a || ! b		
14	(a && b) || c		
15	!a && (b || !c)		