Homework Assignment #2 – 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. (12 pts) If x = 4, y = 3, and z = 2, determine whether each expression below is true, false, or invalid.

Problem	Expression	True, false, or invalid?
1	if (x)	
2	if (x = 4)	
3	if (x = = 4)	
4	if ((z = 4) > x)	
5	if (2 < x < 3)	
6	if('k > 'K')	
7	if('J' = = 74)	
8	if("engine" < "engineer")	
9	if(x % 2 == 0)	
10	if(x % 2)	
11	if(x < 2 && x < -1 || x < 10)	
12	if(x < 2 && (x < -1 || x < 10))	

2. (5 pts) If x = 4, y = 3, and z = 2, determine the value of Result.

Problem	Expression	Value of Result
1	Result = (x < y) ? 5 : 10	
2	Result = (x > y) ? 5 : 10	
3	Result = (x) ? 5 : 10	
4	Result = (x - 4) ? 5 : 10	
5	Result = (x/z+x/z) ? 5 : 10	

3. (15 pts) Determine the logical result for each Boolean expression below assuming that:
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int m = -5, n = 8;
double x = -3.56, y = 0.0, z = 4.47e1;
bool a = true, b = true, c = false;
```

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

5. (17 pts) Write, compile, and test a C++ program that uses an **if-else structure** for 3.3 on page 107.
   - Use the format specified earlier (initial block of comments with TCC logo, name, etc)
   - Display instructions so that the user understands the purpose of the program and what to enter.
   - Run the program for the following 3 test cases (the first two cases are from the textbook). Turn in a printout of the program and printouts of the 3 test cases.

Case	a	b	c	d	e	f
1	9.0	4.0	3.0	-5.0	-6.0	-21.0
2	1.0	2.0	2.0	4.0	4.0	5.0
3	Values of your choice with a valid solution					

6. (17 pts) Write, compile, and test a C++ program that uses an **if-else structure** for problem 3.7 on page 108.
   - Use the format specified earlier (initial block of comments with TCC logo, name, etc)
   - Display instructions so that the user understands the purpose of the program and what to enter.
   - Display the results in increasing (non-decreasing) order.
   - Run the program for the following 6 test cases. Turn in a printout of the program and printouts of the 6 test cases. (The result should be the same in all 6 cases!)

Case	1st number entered	2nd number entered	3rd number entered
1	10	20	30
2	10	30	20
3	20	10	30
4	20	30	10
5	30	10	20
6	30	20	10

7. (17 pts) Write, compile, and test a C++ program that uses a **switch structure** where the user is prompted to enter a number (1-12) corresponding to a month and the program should display the name of the month. For example, if the user enters 3, the program should output March. An error message should be displayed for an invalid input.
   Turn in a printout of the program and printouts of the results testing 3 of the months and one invalid input.

8. (17 points) Write, compile, and test a C++ program that uses a **switch structure** for problem 3.9 on page 108. In particular:
   - Prompt the user to enter the month and the year.
   - Use a **switch structure** with cases 1-12 to determine the number of days in each month.
   - If month = 2 (February), also use an **if structure** to determine if the year is a leap year before determining the number of days in the month.
   - Display the number of days in the month.
   - Run the program for the following 6 test cases. Turn in a printout of the program and printouts of the 6 test cases. (The result should be the same in all 6 cases!)

Case	Month	Year
1	2	2019
2	2	2020
3	3	2019
4	3	2020
5	6	2019
6	6	2020