

Homework Assignment #2 – Selection Structures

Related Textbook Material: Chapter 4 in C++ for Scientists & Engineers, 4th Edition, by Bronson
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.

Part	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.

Part	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. (16 pts) Determine the logical result for each Boolean expression below assuming that:

```
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.	$m \leq n$		
2.	$x * x < \text{sqrt}(z)$		
3.	$2 * \text{abs}(m) \leq 8$		
4.	$\text{int}(z) == (6 * n - 4)$		
5.	$(x \leq y) \&\& (y \leq z)$		
6.	$!(x > y)$		
7.	$((m \leq n) \&\& (x + z > y))$		
8.	$!(m \leq n) \ \ !(x + z > y)$		
9.	$((m \leq n) \ \ (x + z > y))$		
10.	$!((m > n) \&\& !(x < z))$		
11.	$a \ \ !b$		
12.	$!(a \&\& b)$		
13.	$!a \ \ b$		
14.	$(a \&\& b) \ \ c$		
15.	$a \&\& (b \ \ c)$		
16.	$(a \&\& b) \ \ (a \&\& c)$		

4. (22 pts) Work the following exercises in the textbook:
Exercise 4.1, problems 1,3,4 (all parts)
Exercise 4.4, problem 2
5. (11 pts) Write, compile, and test a C++ program that uses an **if-else structure** for Exercise 4.3, Problem 4. Additionally display an error message if a negative number of credits are entered. Test the program for each of the 5 possible cases. Turn in a printout of the program and printouts of the 5 test cases.
6. (11 pts) Write, compile, and test a C++ program that uses an **if-else structure** to categorize triangles based on user inputs of 3 sides or 3 angles. First prompt the user to state whether side lengths or angles are to be provided. Then determine whether the triangle formed is either: Scalene, Isosceles, Equilateral or Acute, Right, Obtuse or Not Possible. Turn in a printout of the program and printouts of the 7 possibilities.
7. (11 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. (11 points) Repeat problem 5 above using a **switch structure**. In particular:
 - First use an **if structure** to print an error message and stop the program (return 1) if the number of credits is negative.
 - If the number of credits is not negative, use a **switch structure** with 4 cases, including the default case.