BİL 102 – Computer Programming
HW 02

Last Submission Date: March 05, 2014 – 09:00

Part 1 (40 pts): In this part you will write a Boolean algebra calculator program. The calculator will have the following functionalities (write a function for each, with the given prototype). Note that you will **not** use any logical operators (!, &&, ||) in your functions.

1. Conjunction (and - Λ)
   int conj(int x, int y) : returns 1 if x=y=1, returns 0 otherwise

2. Disjunction (or - V)
   int disj(int x, int y) : returns 0 if x=y=0, returns 1 otherwise

3. Negation (not - ¬)
   int not(int x) : returns 0 if x=1, returns 1 otherwise

4. Material Implication
   int mate(int x, int y) : returns ¬x V y

5. Exclusive Or
   int excl(int x, int y) : returns (x V y) Λ ¬(x Λ y)

Part 2 (45 pts): Write a function that tests if your calculator satisfies Monotone Laws. The function will have the following prototype:
   void testMonotone()

The following laws will be tested in the function:
1. Associativity of V : x V (y V z) = (x V y) V z
2. Associativity of Λ : x Λ (y Λ z) = (x Λ y) Λ z
3. Commutativity of V : x V y = y V x
4. Commutativity of Λ : x Λ y = y Λ x
5. Distributivity of Λ over V : x Λ (y V z) = (x Λ y) V (x Λ z)
6. Identity for V : x V 0 = x
7. Identity fir Λ : x Λ 1 = x
8. Annihilator for Λ : x Λ 0 = 0

Note that the function will **not** get any input from the user (x, y and z will be defined in the function) and will write the results to “results.txt” file.

Part 3 (15 pts): Write a menu for your calculator with the following options (use switch structure):

1. Conjunction
2. Disjunction
3. Negation
4. Material Implication

5. Exclusive Or
6. Test the calculator with Monotone Laws
7. Exit

*Good user interface designs will be rewarded with some extra points. (output formatting, instructions…)

General:

1. Obey honor code principles.
2. **Read your homework <u>carefully</u>** and follow the directives about the I/O format (data file names, file formats, etc.) and submission format **<u>strictly</u>**. Violating any of these directives will be penalized.
3. Obey coding convention.
4. Do not forget to put the required **tags** in the main function.
5. Your submission should include the following files **<u>and NOTHING MORE</u>** (no data files, object files, etc):
   HW01_<student_name>_<studentSirname>_<student number>_part1.c
   HW01_<student_name>_<studentSirname>_<student number>_part2.c
   HW01_<student_name>_<studentSirname>_<student number>_part3.c
   Put all of these files in a folder named as below, compress and upload the folder.
   HW01_<student_name>_<studentSirname>_<student number>
6. Do not use non-English characters in any part of your homework (in body, **file name**, etc.).
7. Deliver the printout of your work **until the last submission date**.