CS 4501/6501: Quiz 12

21-Nov-2017

Names:

Instruction: Answer the questions as concisely as you can. Please write neatly; if I can't read it I have to mark it wrong.

Consider the following code:

```
static void fun (boolean a, boolean b, boolean c)
{
   boolean d = a && b;
   boolean e = d || c;
   if (e)
      System.out.println("Hello!");
   else
      System.out.println("Good Bye!");
}
```

1. (3 pts.) Fill in the table below with the output generated by the given mutations of the code above. As a sample, I've solved the quiz for mutants on variable **a**. In the table, I only show where the output is <u>different</u> (------ means the same output as the original program), and hence the mutant is (strongly) killed.
   (Reminder: we are considering first-order mutation testing; i.e., only one change per mutant)

   Answer:

Row	a	b	c	Original	mutant1 d=**T** && b	mutant2 d=**F** && b	mutant3 d=a && **T**	mutant4 d=a && **F**	mutant5 e=d || **T**	mutant6 e=d || **F**
1	T	T	T	Hello!	------	------	------	------	------	------
2	T	T		Hello!	------	Good Bye!	------	Good Bye!	------	------
3	T		T	Hello!	------	------	------	------	------	Good Bye!
4	T			Good Bye!	------	------	Hello!	------	Hello!	------
5		T	T	Hello!	------	------	------	------	------	Good Bye!
6		T		Good Bye!	Hello!	------	------	------	Hello!	------
7			T	Hello!	------	------	------	------	------	Good Bye!
8				Good Bye!	------	------	------	------	Hello!	------

2. (1 pt.) Are any of these mutants equivalent? If so, which one(s)?

   Answer: No
3. (2 pts.) Which pairs of rows (in the GACC sense) strongly kill all of the mutants that affect variable **a**?

   Answer: (2,6)
4. (2 pts.) Which pairs of rows (in the GACC sense) strongly kill all of the mutants that affect variable **b**?

   Answer: (2,4)
5. (2 pts.) Which pairs of rows (in the GACC sense) strongly kill all of the mutants that affect variable **c**?

   Answer: {3, 5, 7} x { 4, 6, 8}
   or
   (3,4), (3,6), (3,8) (5,4), (5,6), (5,8) (7,4), (7,6), (7,8)

Note that the mutation pairs exactly line up with the GACC tool for the predicate `a&&b||c`