

CS 311 Data Structures and Algorithms, Fall 2009  
**Quiz 2 Solutions**

Quiz 2 was given in class on Wednesday, September 16, 2009.

1. [2 pts] What is an “invariant”? (Circle one.)

- a. A condition that is true at all times during the execution of a program.
- b. A member function that does not modify the data members of an object.
- c. A language construct (for example, `const` in C++) that prevents a value from changing.
- d. A condition that is always true at a particular point in an algorithm.
- e. A value that never changes.
- f. An object whose data members cannot be modified, even though the object may not be `const`.

2. [3 pts] Write reasonable pre- and postconditions for the following function.

```
double calc(double x)
{
    double x2 = 2.0 * x;
    return std::sqrt(x2);
}
```

*For preconditions, we note that this function does not work if  $x$  is negative, since we cannot take the square root of a negative number. For postconditions, we want to say what the function does, in the form of a statement. Thus, we say what the return value is.*

Pre:

`x >= 0.`

Post:

Return value is `sqrt(2.*x).`