

CMPSCI 520
Homework #5
November 24, 2008
Due: December 5, 2008
Draft

- 1) An SOA can form the basis for
 - o interaction of various divisions of an organization in a secure environment,
 - o integration of data and information cooperating organizations (distinct business entities) to facilitate business transactions and
 - o a “mash-up” of services offered by various organizations to form ad hoc applications customized for a common user of the services
 - a) Discuss the issues (problems to be addressed) in realization of each of these models
 - b) Contrast Service-Oriented Architectures (SOA) and Web Services (WS)
- 2) Inspections, walkthroughs and code reading are forms of reviews.
 - a) Distinguish among these three techniques in terms of focus, number and type of persons involved, formality, and any other characteristic you feel is pertinent.
 - b) What are the primary advantages and disadvantages of reviews?
 - c) What are the two most important features of an effective inspection? Why?
- 3) Define or describe and discuss:
 - a) Symbolic model checking vs. automata theoretic model checking
 - b) Finite-State Verification vs. mathematical reasoning
 - c) Conservative models
- 4) Consider the following code fragment for a GCD algorithm:

```
int F (int a, int b)
{
    int g = a, m = b;
    if (a < b) {g =b; m = a;}
    while (m)
    {
        int s = g;
        g = m;
        m = s % m;
    }
    return
g;
}
```

- a) Draw a control flow graph for this code fragment
- b) Define “live variables” as used in data flow analysis.
 - i) Is “live variable” analysis a forward or reverse flow problem?
 - ii) When would you use “all paths” and when would you use “any paths” in “live variable” analysis?
 - iii) Define IN & OUT functions and the GEN & KILL sets for “live variable” analysis