SE 101: Introduction to the Methods of Software Engineering
Quiz #3

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November 28, 2002 10:30 a.m.
30 min.

Student Name: _____
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No aids, texts, or notes are permitted. Questions appear on both sides of each page.

1. (8 marks) For each of the items on the left, fill-in-the-blank with the label of the type of intellectual property on the right (if any) that could best be used to protect the item.

__G__ Fabric colour	A. Copyright
__D__ Carpet pattern	B. Patent
__A__ Non-fiction book on World War II	C. Trademark
__C__ Name of a fast-food franchise	D. Industrial Design
__A__ Newspaper review of a movie	E. Integrated Circuit Topography
__A__ Blueprints for a building	F. Trade Secret
__E__ Faster microprocessor	G. Not protected (e.g., in public domain)
__B__ Wear-resistant rollerblade wheels	

2. (2 marks) List one strength of checklists as a hazard-identification technique.

- Codifies engineering experience of known hazards
- Checklists can be applied by novice safety analysts
- Easy-to-use reference manual of possible hazards to consider
- Safety analysis by checklist can be completed faster than other analysis techniques can

3. (2 marks) List one weakness of checklists as a hazard-identification technique.

- Checklists are not complete lists of possible hazards
- Safety analyst may incorrectly infer that the system is free of hazards if the system does not exhibit any hazard listed in a checklist of known possible hazards.

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4. (9 marks) In response to increased demand for air safety, the software company Automated Security is interested in producing a baggage scanner that automatically determines whether a suitcase may contain suspicious or dangerous items; such suitcases are then manually searched. (For example, the system's software might search the X-ray image of a suitcase, looking for objects that are shaped like weapons or that obstruct the view of the suitcase's other contents.)

   List three (3) quality attributes that airline passengers or security inspectors would likely want in such a system. For each attribute, provide an example of a *measurable* requirement (*i.e.,* a requirement that could be used to test whether the software exhibits the attribute).

   - **Performance, speed, throughput:** Scans 10 bags per minute
   - **Air safety:** Identifies for manual search 99% of the suitcases that actually contain weapons
   - **User safety:** Security inspectors are exposed to no more than 5 rem of X-ray radiation per year
   - **Small, size:** Must be no larger than 2 m×2 m×2 m
   - **Flexible, accommodating, Usable:** Must be able to accommodate suitcases that are 1 m × 1 m × 1 m or smaller
   - **Accurate, reliable:** Will not falsely identify suitcases more than 20% of the time
   - **Cheap:** No more than $1,000,000 per system

5. (6 marks) Safety analysis of a new system includes *discovering potential hazards*, *determining the effects of failure*, and *determining the causes of hazards or failures*. With respect to each of these tasks, describe from the prospective of liability what is the engineer's duty and what would constitute professional misconduct.
   - **Discovering hazards:** The engineer is responsible for discovering all knowable hazards.
   - **Effects of failure:** The engineer is responsible for lessening the chances of or effects of any accident that can lead to loss of life, health, property, or public welfare. Hence, the engineer must determine which failures lead to costly accidents and thus need attention.
   - **Causes of failures:** The engineer is responsible for lessening the chances of any hazard that can lead to loss of life, health, property, or public welfare. Knowing the causes of failures can help to identify ways of avoiding failures.

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6. (6 marks) For each of the following sentences, fill-in-the-blank with the most appropriate word or word phrase that is listed at the end of the sentence.

   a. The project, __which__ was already behind schedule, was eventually cancelled. (that, which)

   b. The project leader ___assured____ customers that the team would deliver a preliminary version of the software by the end of the month. (assured, ensured, insured)

   c. The proposed design change would have __affected_____ every module in the system. (affected, effected)

   d. Based on sample test results, the analyst ____inferred_____ that the software would work on 95% of the possible input. (deduced, inferred)

   e. The engineers must design systems ___such that_____ the systems fail in a safe mode. (so, so that, such that)

   f. The programmers couldn't decide ___whether___ they should reuse existing code or implement all of the code themselves. (if, whether)