



Linköpings universitet

Exam
TDDD04: Software Testing
Wednesday August 14, 2009
(14-18 o'clock)

- No aids beyond writing equipment are accepted.
- Write clearly! Please use only one side of each paper and don't address more than one question per page.
- Justify your answers!
- Leave room for comments during grading.

Good luck!

- Inga hjälpmedel förutom skrivmedel är tillåtna. Skriv tydligt!
- Skriv bara på en sida av pappret och behandla bara en uppgift per pappersblad.
- Ge dina svar tydliga motiveringar.
- Lämna plats för kommentarer vid rättning.

Lycka till!

Mariam Kamkar: 013-281949

(I) Basic Definitions:

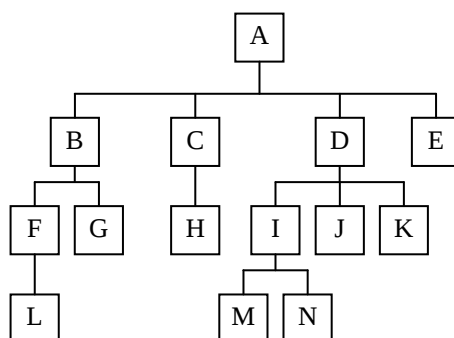
1. Describe/Define the terminologies below: (2 p)
 - (a) Incident
 - (b) Test
 - (c) Test case
2. Name different levels of testing. (2 p)

(II) Unit & Integration Testing:

3. What is the definition of Exhaustive Testing. Give an example. (2 p)
4. Identify the Equivalence Classes (EC) for the following specification. (2 p)

Specification: the program accepts five to nine inputs which are 3 digit integers greater than 100.

5. Pairwise Testing: (3 p)
 - (a) What is Pairwise testing?
 - (b) When is it proper to use it?
 - (c) Name one of the techniques used to identify all the pairs for creating test cases.
6. The following figure illustrates the component hierarchy in a software system. Describe the sequence of tests for integration of the components using a bottom-up approach and a sandwich approach. (4 p)





7. You have recently started to work at Good Software Company (GSC). As a testing expert you soon find out that the GSC bug report system is inefficient, and you suggest that both developers and users of GSC products shall be provided with the possibility to report the bugs in a web form and that a moderator is assigned to review incoming bug reports. Your boss replies: "We already have such a web form. It consists of a field where users can enter their name and what went wrong. All bug reports are stored directly into our bug database for our programmers to start working with. It is very convenient." Explain to your boss:

(a) The basic properties of a useful bug report and illustrate with a sketch how a good bug report web form could look like. (4 p)

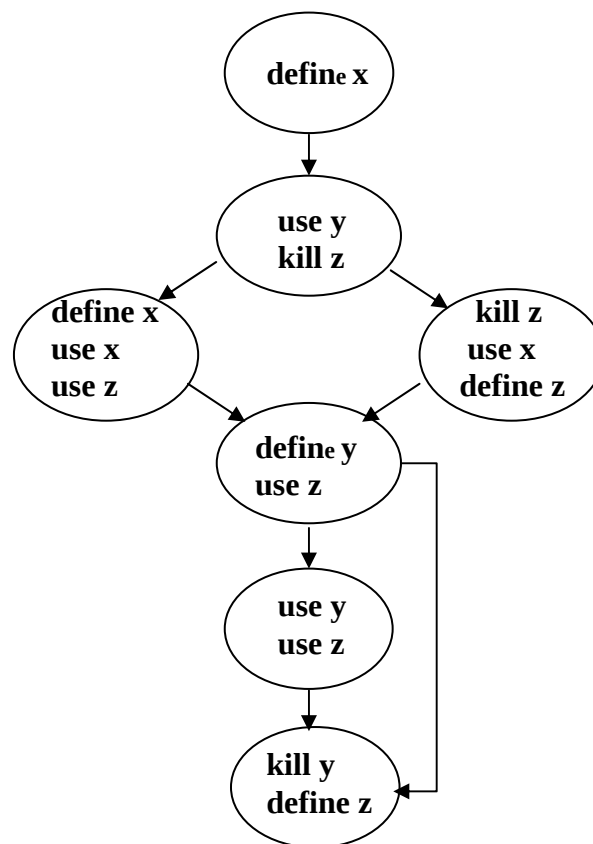
(b) Which potential problems can be avoided by having a moderator to review incoming bug reports. (2 p)

(c) How the above can increase the overall productivity? (2 p)

8. Early data flow analysis often is centered on a set of faults that are known as define/reference anomalies.

Given the following notations and the control flow graph annotated with define-use-kill information, for each variable examine the define-use-kill patterns along the control flow graph and the kind of anomaly it could generate. (3 p)

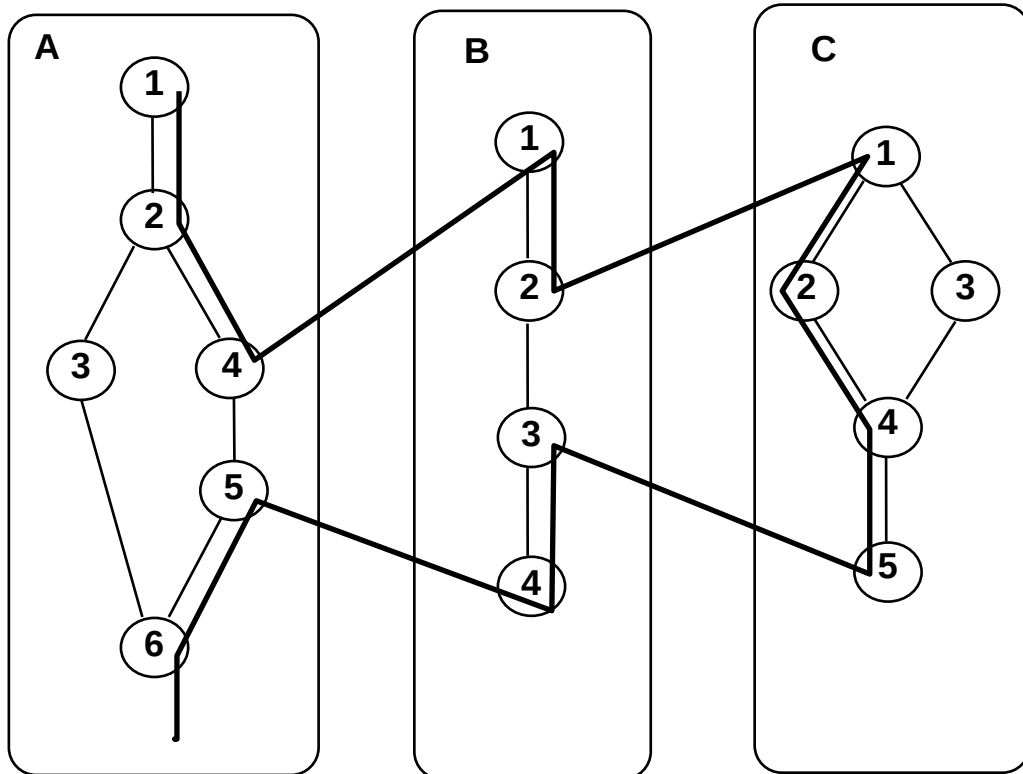
- **d**: defined, created, initialized, etc.
- **k**: killed, undefined, released
- **u**: used for something
- **~d**: the variable does not exist, then it is defined
- **~u**: the variable does not exist, then it is used
- **~k**: the variable does not exist, then it is killed



9. Path-Based Integration: (5 p)

Definition: An MM-Path is an interleaved sequence of module execution paths (MEP) and messages.

In the following figure module A calls module B, which in turn calls module C.



- (a) Identify Source nodes and Sink nodes in module A, B and C.
- (b) Identify Module Execution Paths (MEP).

(III) Sytem Testing:

10. Complete the following sentence: (1 p)

The objective of system test is to ensure that

11. What is regression testing? (1 p)
12. Name and describe 3 kinds of Acceptance Testing. (3 p)



Linköpings universitet

13. **Specification:** the character in column 1 must be an “A” or a “B”. The character in column 2 must be a digit. In this situation, the file update is made. If the first character is incorrect, message XNC is issued. If the second character is not a digit, message XND is issued.

Based on the specification above: (4 p)

- (a) Identify causes and effects.
- (b) Design a cause-effect graph with constraint from identified causes and effects.
- (c) Propose a decision table for testing the software.

(IV) Test Automation:

14. Describe following Scripting techniques. (3 p)

- (a) Linear
- (b) Structured
- (c) Data driven

15. Refactoring: (3 p)

- a) What is refactoring?
- b) When to refactor?