ТМар		Semantic Design
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		Design Technique - Semantic

Lesson Objectives

- Semantic Design Technique
- Steps of the Design
- Example on the problem
- Variations





12.1 Introduction

- Semantics are semantic rules that specify data that should be met in order to be accepted by the object to be tested
- Testing of validity of input data: Relationship between data and input
- Deriving Principle
 - Coverage type > Decision Points: Modified Condition / Decision Coverage
- Quality characteristics
 - Security
 - Functionality
 - User friendliness



12.2 Steps

- Identify test situations
- Create logical test cases
- Create physical test case
- Specify initial data set
- Create test Script



12.3 Example Test Basis

- Laptop-Contracts
- By means of update function contracts for using a laptop can be added
- The employee has to be a P3. Besides that approval should be given by the senior manager and a laptop of type X has to be available. If these conditions are not met, then error message 1 will be displayed. If they are met, then a new contract can be added.
- For an employee with an existing contract the start date of the new contract should be after the end date of the previous contract. If this is not the case an error message 2 follows.



Step 1. Identify Test Situation

- Analyze semantic rules
- A semantic rule is a decision point that consist of one or more conditions, connected by AND and/or OR
- Valid situation:

IF (sem.rule) THEN valid entry/processing

ELSE Error Message

Invalid Situation:

IF (sem.rule) THEN Error Message **ELSE** valid entry/processing

Per semantic rule use modified condition / decision coverage



Step 1.1Analyze semantic rules- rule1

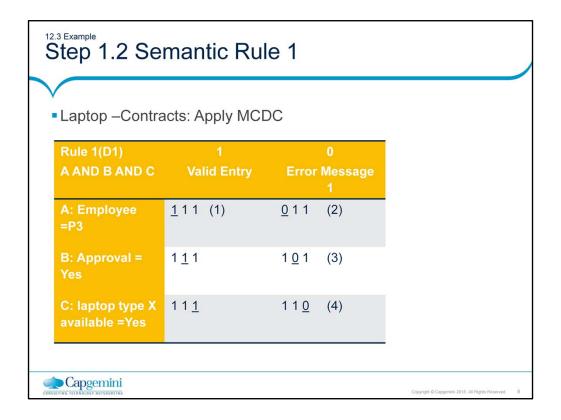
- Laptop-Contracts
- The first semantic rule: Describe valid situation

If employee=P3

AND approval=YES
AND laptop type X available =YES

Then Valid Entry
Else Error Message 1





Step 1.1 Analyze semantic rules- rule2

 The 2nd Semantic rule description are for valid situations, but here something else is of importance:

If A and B
Then Valid entry
Else

- Condition B only matters when condition A is met .
- The rule is described with the socalled
- "Imply Operator": So A->B

Α	В	A &B	
1	1	1	
1	0	0	
0	1	0	
0	0	0	

А	В	A - >B
1	1	1
1	0	0
0	1	1
0	0	1



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The conditions are checked one after another hence it can be considered as a conditional IF

The Conditional If Truth table explained:

Lets Consider

A: you participate in class

B: you get participation points

If you participate in class (A: true) and you get extra points (B: true) then the teacher's statement is true

If you participate in class (A: true) and you don't get extra points (B: false) then teacher's statement is false

If you don't participate in class (A: false) then the value of B is irrelevant because there is no way to know if teacher's statement is true or false. Therefore it is by default considered to be true.

12.3 Example

Step 1.1 Analyze semantic rules- rule2

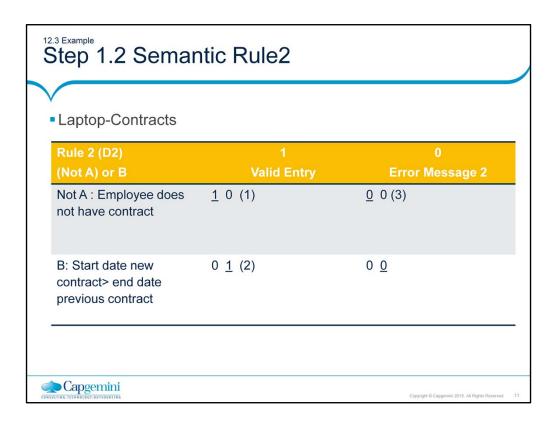
- "A->B" is equivalent with "(Not A) or B"
- "For an employee with an existing contract the start date of the new contract should be after the end date of the previous contract. If this is not the case an error message 2 follows."
- Can be written as:

If employee does not have a contract (Not A)

OR start date new Contract > end date previous contract (B)

Then Valid Entry
Else Error Message 2

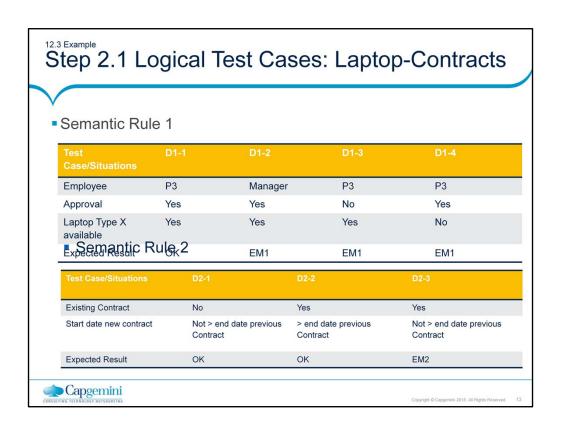




Step 2. Create Logical Test Cases

- Determine test situations, including expected result
 - Per semantic Rule





Step 3. Create Physical Test Case

- Make all parameters concrete where ever necessary
- Make expected result concrete for each test case



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Making concrete values means to make give values to the logical values

Step 3 Test Script

- Laptop-Contracts
- For semantic rule 1 the physical test case are 1-on-1 the logical test case
- For semantic rule 2 the logical test cases still have to be made more concrete

Test Case/Situations	D2-1	D2-2	D2-3
Existing Contract	No	Yes, with end date 30-11-08	Yes, with end date 30-11-08
Start date new contract	1-07-08	1-12-08	1-07-08
Expected Result	OK	OK	EM2



Step 4. Specify Initial data set

To execute the physical test cases data has to be present in database



Step 4 Initial data set

- Laptop-Contracts
- The following should be entered in the database:
 - Employee Mr. Jansse, Manager, approval of senior manager
 - Employee Mr. Jansen, P3, no approval of senior manager
 - Number of laptops of type X available: 1



Step 5: Create test script Laptop-contracts What is the most convenient order for executing the test cases D1-2 Select employee Jansse D1-3 Select employee Jansen EM1 Select 'Yes' at 'Approval' for Jansen and select '0' at '# laptops available' Select again employee Jansen Select '1'at '# laptops available' D1-1 Select again employee Jansen No EM and screen X appears D2-1 Add contract with start date 1-07-2008 and end Contract is saved Select employee Jansen, add contract with D2-3 EM₂ start date 1-07-2008 D2-2 Add contract with start date 1-12-2008 and end Contract is saved date 31-12-2008 Capgemini

12.4 Variations

- Less depth level coverage type:
- Decision points: condition/ Decision coverage
 - Less depth testing of (possibly of specific pre-selected) decision points (semantic rules)
- More depth level coverage type:
- Multiple condition Coverage
 - More in depth testing of (possibly of specific preselected) decision points (semantic rules)



Summary

- Semantic Condition Coverage was discussed
- The steps to apply Semantics
- Examples on these topics were discussed





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Add the notes here.

Review Question

- The deriving principle of Semantic Coverage Type is
 - MCDC
 - Condition Coverage
 - Paths
 - None of the above
- Semantic Rules deal with relationship between _____
- Semantic rules are usually described in
- Functional specifications of the relevant function or input screen
- The business rules that apply to the functions overall.
- Both
- None of the above



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Add the notes here.

Additional Reading

- Book
- Please read TMap Next pg 602-611 on coverage type MCDC
- Please read TMap Next page 687-690 on TTST SEM

