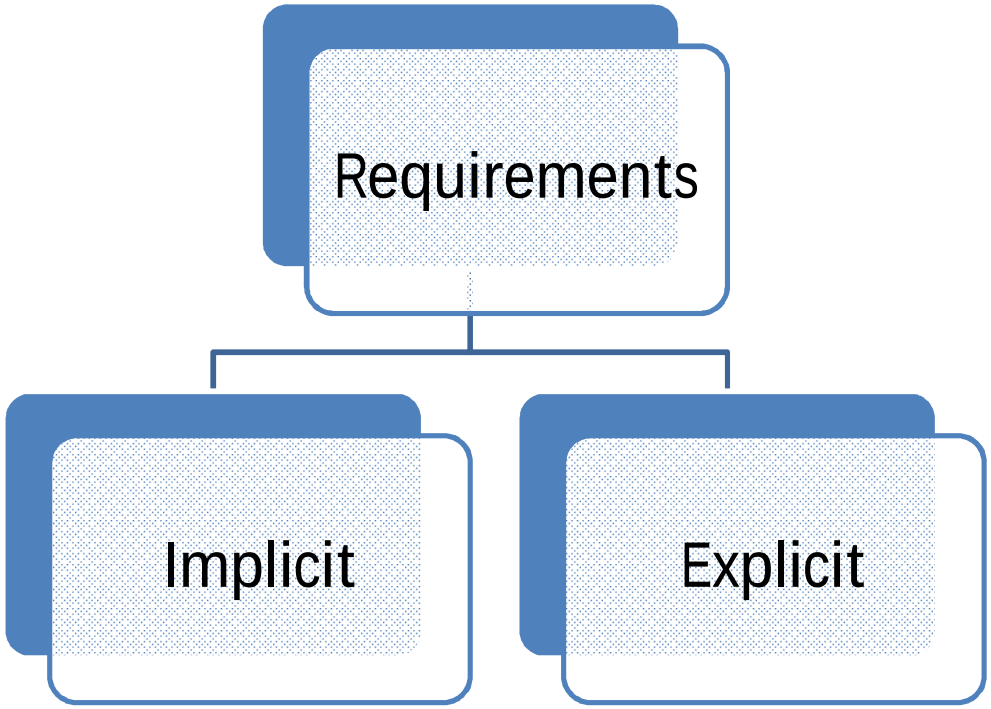
Requirements based Testing

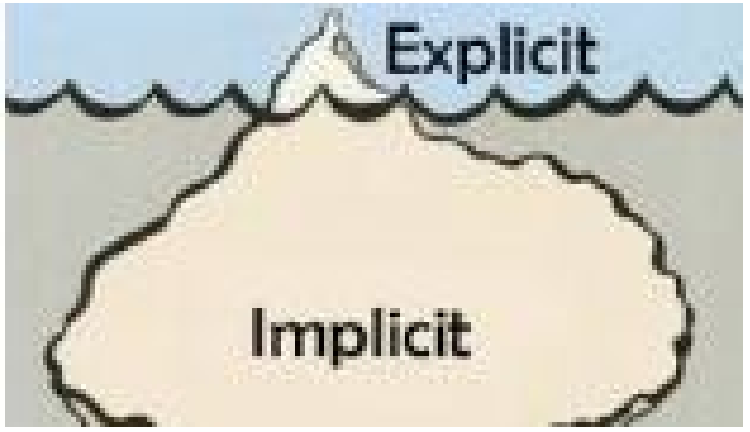
Unit 2
Test Case Design Strategies

Test case Design Strategies - Using Black Box Approach to Test Case Design - Boundary Value Analysis - Equivalence Class Partitioning - State based testing - Cause-effect graphing - Compatibility testing - user documentation testing - domain testing - Random Testing - Requirements based testing - Using White Box Approach to Test design - Test Adequacy Criteria - static testing vs. structural testing - code functional testing - Coverage and Control Flow Graphs - Covering Code Logic - Paths - code - complexity testing - Additional White box testing approaches-Evaluating Test Adequacy Criteria.



stated and documented

not documented but assumed to be incorporated



Lock and Key - Specification

- RTM contains
  - Requirement Identifier
  - Description
  - Priority
  - Test condition
  - Test case IDs
  - Phases of testing

Sample requirements specification for lock and key system

Requirement Identifier	Description	Priority
BR-01	Inserting the key numbered KEY09 and turning it CW should facilitate locking	H
BR-02	Inserting the key numbered KEY09 and turning it ACW should facilitate unlocking	H
BR-03	Only key no. KEY09 should be used for lock and unlock	H
BR-04	No other object can be used for lock	M
BR-05	No other object can be used for unlock	M
BR-06	Lock should not open even with a heavy object	M
BR-07	Should be made of metal and weight should be 150 grams	L
BR-08	Lock and unlock directions should be changeable for usability of left-handers	L

Requirements Traceability Matrix

Req. ID	Description	P	Test conditions	Test case Ids	Phase of Testing
BR-01	Inserting the key numbered KEY09 and turning it CW should facilitate locking	H	Use Key KEY08	TC1	Unit, Component
BR-02	Inserting the key numbered KEY09 and turning it ACW should facilitate unlocking	H	Use Key KEY08	TC2	Unit , Component
BR-03	Only key no. KEY09 should be used for lock and unlock	H	Use Key KEY08 to lock Use Key KEY08 to unlock	TC3 TC4	Component
BR-04	No other object can be used for lock	M	Use Key KEY08 Use hairpin Use toothpick	TC5 TC6 TC7	Integration

Requirements Traceability Matrix

Req. ID	Description	P	Test conditions	Test case Ids	Phase of Testing
BR-05	No other object can be used for unlock	M	Use Key KEY08 Use hairpin Use toothpick	TC8 TC9 TC10	Integration
BR-06	Lock should not open even with a heavy object	M	Use stone to break the lock	TC11	System
BR-07	Should be made of metal and weight should be 150 grams	L	Use Weighing machine	TC12	System
BR-08	Lock and unlock directions should be changeable for usability of left-handers	L	----------	----------	Not implemented

Relationship between requirements and test cases

- One to one
  - For each requirement there is only one TC ex BR01
- One to many
  - one requirement Many TC Ex BR03
- Many to one
- Many to Many
- One to None –
  - The set of requirements can have no TC. (Rq not implemented or it has the lowest priority) Ex BR08.

Role of RTM

1. RTM provides a tool to track the testing status of each requirement without missing any requirements
2. Identifies defects in the high priority area by prioritization
3. Time limit – Omit low priority TCs.

Sample test execution data

Req.ID	P	TC	Total TCs	TC passed	TC Failed	% pass	No of defects
BR01	H	TC1	1	1	0	100	1
BR02	H	TC2	1	1	0	100	1
BR03	H	TC3 TC4	2	1	1	50	3
BR04	M	TC5 TC6 TC7	3	2	1	67	5
BR05	M	TC8 TC9 TC10	3	3	0	100	1
BR06	L	TC11	1	1	0	100	1
BR07	L	TC12	1	1	0	100	0
BR08	L			0	0	0	1
Total	8		12	10	2	83	12

After execution of Test cases, the test results can be used to collect metrics such as,

1. Total No. of TCs passed
2. Total No. of TCs passed
3. Total number of defects in requirements
4. Number of requirements completed
5. Number of requirements pending

Observation from the table

1. 83% of passed TCs correspond to 71 % of requirements being met (five out of seven requirements met, one requirement is not implemented)

Thank you