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After successful completion of the testing by the testing team technical team will deploy the appln to prodⁿ environment

5) Maintenance or Support or Release →

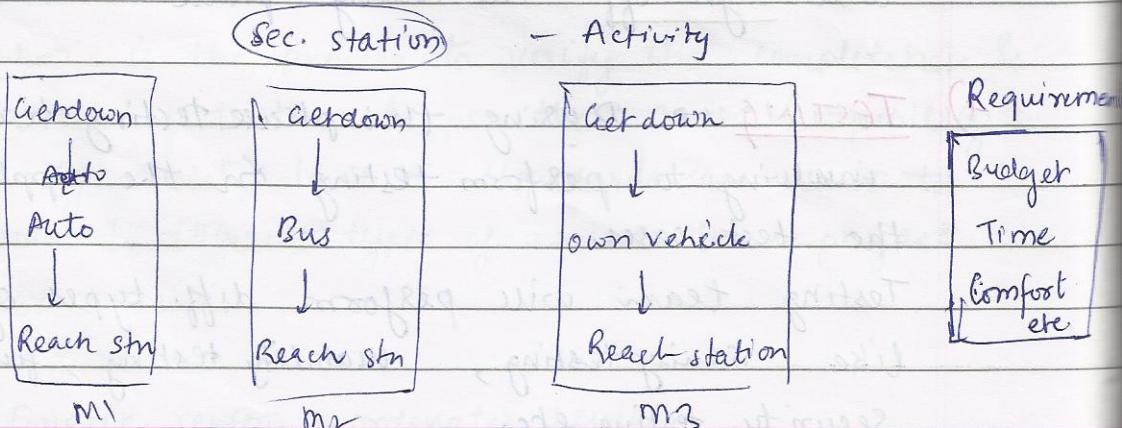
During this phase client or end user will be involving to use the appln in the production environment.

SDLC MODELS (or) Methodologies →

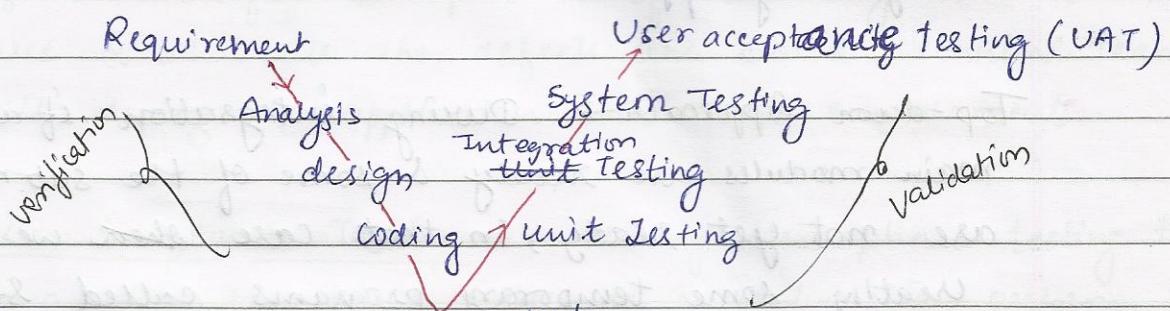
we have different models of SDLC available in industry. Based on the requirement of the clients we will decide which model is suitable for which project. This will be deciding by higher level management of the company along with the clients.

1. V- Model
2. Waterfall model
3. Prototype model
4. RAD model (Rapid application development)
5. Spiral model
6. AGILE model
7. Fish model

ex



- ① V- Model → V model is verification & validation model.
 This model is suitable for large scope projects in which clients are having the stable requirements.
 In this model both the development & testing activities goes parallelly.



Requirement → same as ^{standard} SDLC

Analysis → "

Design → "

Coding → "

Unit Testing → During this phase development team will be involving to perform testing on individual modules.

If every module is working fine they will integrate all the modules, make it as a single application & they will deploy that application into testing environment

Integration testing → During this phase both testing & development team will be involving to conduct integration testing to verify whether the flow b/w all the modules in the application is working or not.

Becoz ~~is~~ every module was working fine during unit testing. But after integrating all the individual modules & make it as a single application, the flow b/w all the modules in the application may or may not work.

There are 4 different types of approaches we have in integration testing:

- i) Top-down approach
- ii) Bottom-up approach
- iii) Sandwich approach
- iv) Big-bang approach

Top-down Approach → During integration if all the main modules are ready & some of the sub-modules are not yet ready, in that case when we are creating some temporary programs called stubs which is acting as a submodule.

Bottom-up Approach → During integration if all the sub-modules are ready & some of the main modules are not yet ready, in that case we are creating some temporary programs called drivers which is acting as main modules.

Sandwich approach → During integration if some of the submodules & main modules are not yet ready, in that case we are creating some temporary programs called stubs & drivers which are acting as submodules & main modules.

Big-bang approach → In this approach whenever we completed all the modules then only they are integrating all the modules & make it as a single application.

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System Testing → During this phase testing team will be involving to perform testing on the application by executing the test cases.

- Testing team will perform different types of testings like Sanity testing, usability testing, functionality testing etc.
- After successful completion of executing all the test cases & when all the defects are closed technical team will deploy the application into UAT environment.

User Acceptance Testing → During this phase testing team along with the client will be involving to perform testing on the application by executing the testing cases.

After successfully completion of executing all the test cases & when all the defects are closed technical team will deploy the application into production environment

*² Verification & Validation →

Verification → is the process to verify whether we are following the right process or not for completion of a project.

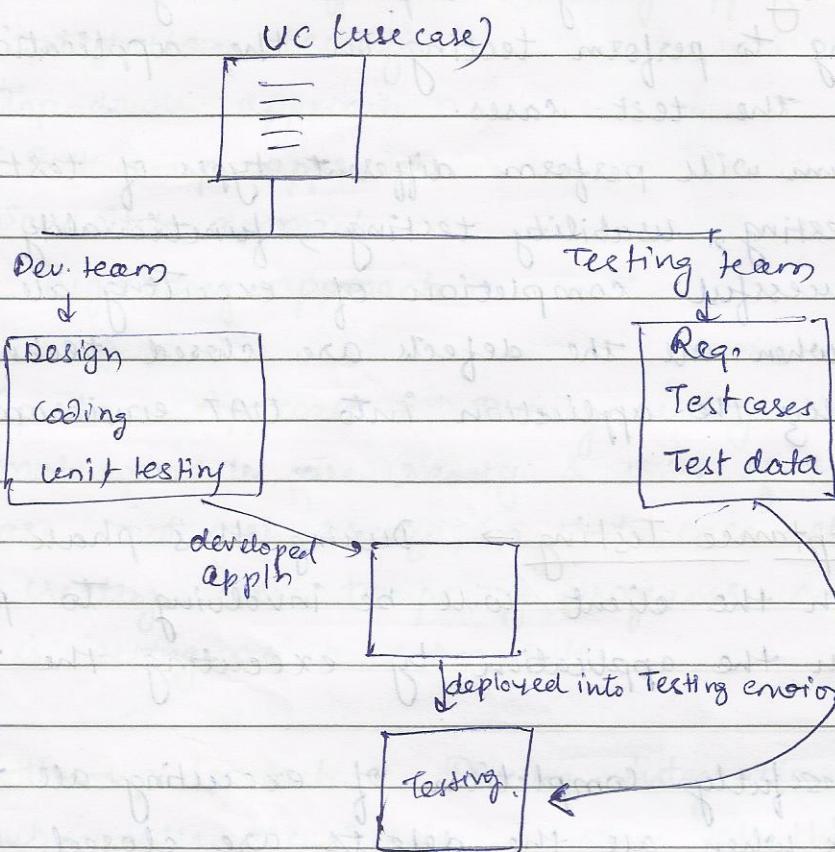
In so simple words verification is "Are we developing the application in a right manner or not".

ex Reviews, code walk throughs etc.

Validation → is the process to verify whether we developed the right project or not.

In simple words validation is "Did we develop the right appln or not".

ex Sanity testing, functionality testing etc.



2)

WATERFALL MODEL →

This model is suitable for small scope projects whose clients are having the limited budget.

In this model after development completion of development activities only testing activities will start

Phases: Requirement

Analysis

Design

Coding

Testing

Release / Maintenance

Differences b/w V-Model & Waterfall model →

V-Model

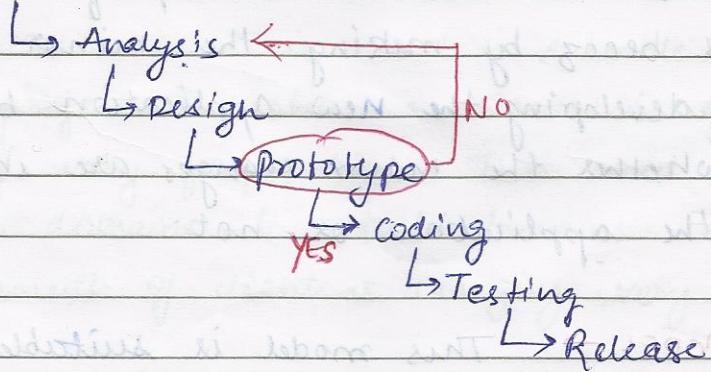
- 1) V-Model is suitable for large scope project
- 2) Both development & testing activities goes parallelly in V-model
- 3) We can maintain the accuracy in project by using V-model because development team is developing the application & after that one dedicated team for testing will perform testing on application

Waterfall

- 1) It is suitable for small scope projects
- 2) After completion of development activities only testing activities will start in this model
- 3) We can not maintain the accuracy by using waterfall model in the project becoz development team will develop the application & after that they themselves will start performing testing on the application

- 3) PROTOTYPE MODEL → This model is suitable for the projects in which the clients are not having the clear requirements & also clients are not having an idea of final application.

Requirements



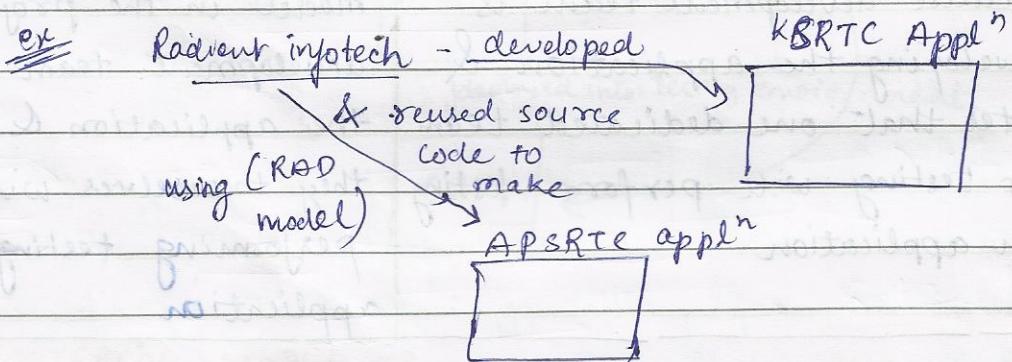
In this model, based on the available requirements of the client, we will analyse the requirements & designs the prototype. If the prototype has accepted by the client

We will write the coding for the prototype, test the application & release the application to the client.

→ If the client has not accepted the prototype, we need to analyse the requirements again & design the another prototype. This cycle continues until the prototype has accepted by the client.

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4) RAD Model → This model is suitable for the projects in which clients are not having the sufficient time for completion of the project.

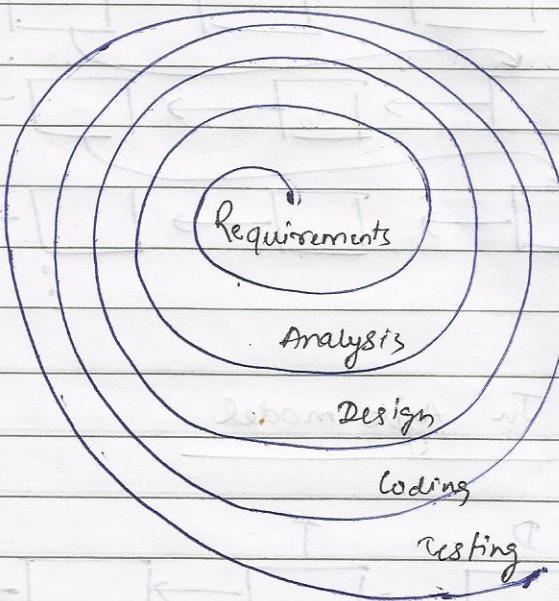


In this model we are developing the new application by using the existing source code of similar application.

In this model we are giving less preference to the development activities & more preference to testing activities becoz by making the minor changes only we are developing the new application but we need to verify whether the minor changes are impacting successfully in the application or not.

5) SPIRAL MODEL → This model is suitable for the projects in which clients are expecting 100% accuracy in the project.

This model is suitable for NASA applications, scientific projects, & research projects in which clients are expecting 100% accuracy.



→ In this model we are involving in every phase repeatedly for multiple times. so that for involving in every phase for multiple times we are maintaining the accuracy

Advantage → 100% Accuracy

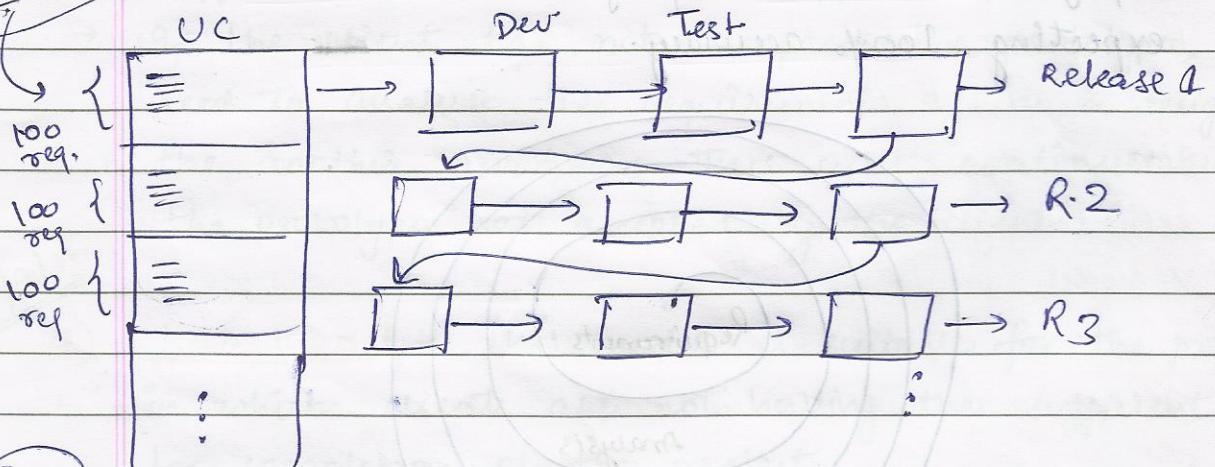
Disadvantage → Very expensive model & time taking

- 6) AGILE MODEL → This model is suitable for the large scope project in which requirements of the client is changing very frequently. This model is suitable for banking domains & retail domains in which the requirements of client is changing very frequently.

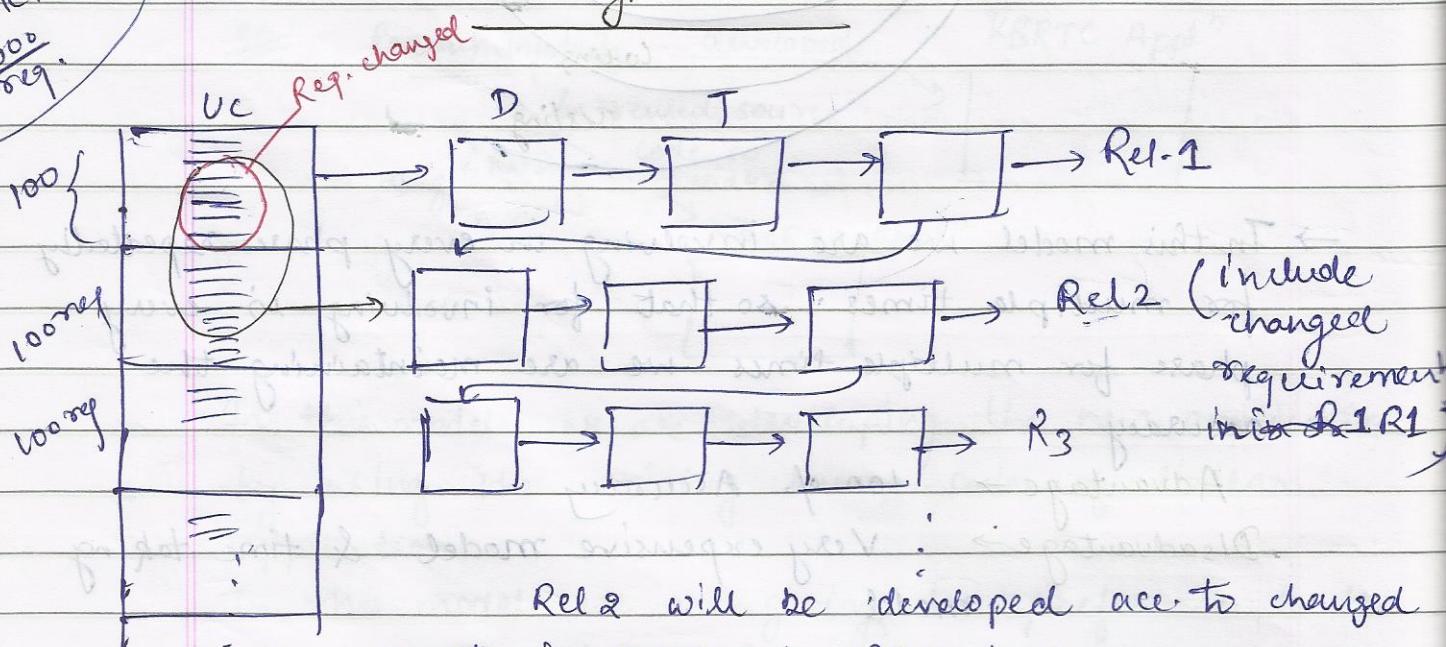
In V-model

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ICICI → client
1000 - Requirements



In Agile model



Rel2 will be developed acc. to changed requirements in Rel 1 & Rel2 is w

- In this model the requirements of the client is changing frequently so that we need to enhance the applⁿ based on the changed requirements, test the applⁿ & release the applⁿ to the client in a very frequent manner

STLC (Slow Testing Life Cycle) (or) QM H213 (F)
TESTING PROCESS (or) TESTING LIFE CYCLE
(or) END - TO - END PROCESS OF TESTING \Rightarrow

STLC is the process which we are following to complete the testing activities in a project.

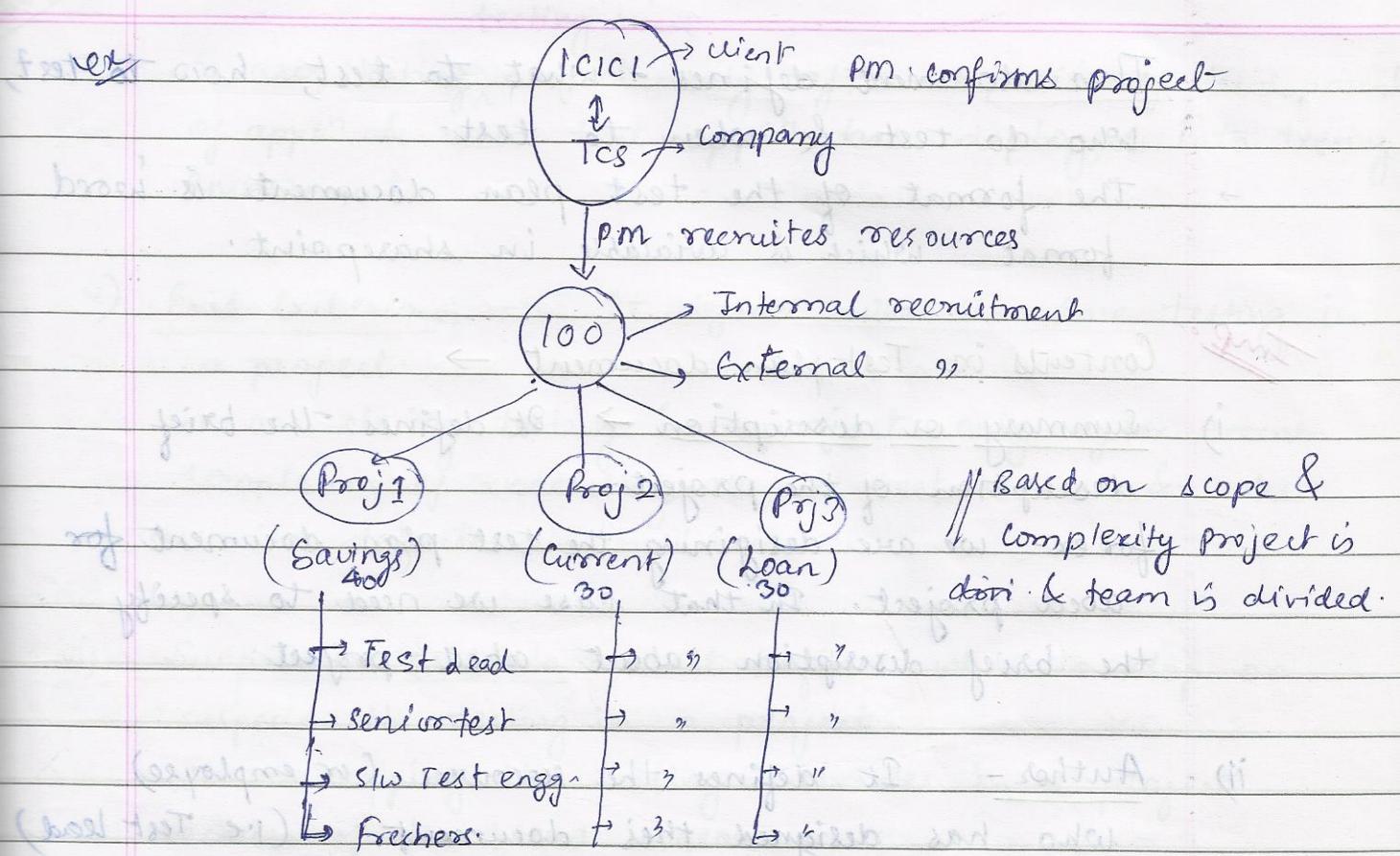
Different phases in STLC :-

- 1) Test initiation { management activities }
- 2) Test plan
- 3) Identified testable requirements (or) test objectives
- 4) Test case design
- 5) Test data preparation
- 6) Test case execution in testing environment
- 7) Defects
- 8) Test case execution in UAT
- 9) Defects
- 10) Regression testing
- 11) Test closure

i) Test initiation \rightarrow

This is the first phase in STLC. Once the project has been confirmed b/w the client & company project manager for testing (Test manager) will be involving to form the team by recruiting the resources.

- i) PM is recruiting the resources in two diff. ways:
- i) Internal Recruitment
- ii) External Recruitment



Internal recruitment - Recruiting the resources from within the company (i.e. bench resources) is called internal recruitment.

External recruitment - Recruiting the resources from outside the company (other companies) is called external recruitment.

→ After completion of recruiting the resources pm will be dividing entire client work into individual projects based on the scope & complexity. After that project manager will be assigning the recruited resources to the individual projects based on the designation, experience & skillset.

2) TEST PLAN → During this phase test lead alongwith a senior members in a project will be involving to design the test plan document.

Test plan document is the high level document or route-map document for testing.

This document defines - what to test, how to test, who do test & when to test.

- The format of the test plan document is 'word format' which is available in sharepoint.

Imp Contents in Test plan document →

- Summary or description → It defines the brief description of the project.
for ex- we are designing the test plan document for abcd project. In that case we need to specify the brief description about abcd project.
- Author - It defines the resource (or employee) who has designed this document (i.e Test lead)
- Reviewed by → It defines the resource who has reviewed this document (project manager or client)
- Entry criteria

Testing

B.Tech

when to start testing	← Entry criteria	→ f2 completed
when to stop testing	← Suspension criteria	→ suspended due to some prob.
when to continue	← Resumption criteria	→ continue B test
when to close testing	← Exit criteria	→ when all subjects are cleared

→ Entry criteria defines when to start in testing in a project

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(P2)

testing in a

we are starting project only after completion of development of appn & when that appn has deployed into testing environment

v) Exit Criteria → It defines when to close testing in a project.

we are closing testing in a project only after execution of executing all the test cases & when all the defects are closed.

vi) Suspension Criteria → It defines when to stop or suspend the testing in a project.

We are stopping the testing activities in a project because of the below reasons :

- a) Environment issues (appn will not open)
- b) Exceptions
- c) application crashes

vii) Resumption Criteria → It defines when to continue or resume testing in a project. we can continue testing in a project because of the below reasons:

- a) when environment issues got resolved
- b) when exceptions got cleared
- c) when application crashes got cleared

viii) Resources → It defines the resources who is going to work in this project that includes offshore team, onshore team, BA team, Project manager & client.

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- ix) features to be tested → It defines the features or functionalities which we need to test in the project in current release.
- x) features not be tested → It defines the features or functionalities which we need not be test in the current release.
- ex - for example as per the client requirement we need to test 300 functionalities in a current release out of 400 functionalities in an application so that we need to specify the 300 functionalities which we need to test in "features to be tested" content & rest of the functionalities which we need not to test will be specified in "features not be tested" content.
- xi) Testing types to be used → It defines the testing types which we have to use to perform testing on the application.
- ex For windows: we need not to perform security testing, Performance testing, Performing the testing types will be different from application so that whichever the testing type we required, those will be specifying in this content.
- but for web appl" we need to do performance testing & security testing
- xii) Automation tools to be used → It defines the automation tools which we are going to use to perform testing on the application.
- ex QTP, Selenium, Load Runner etc.

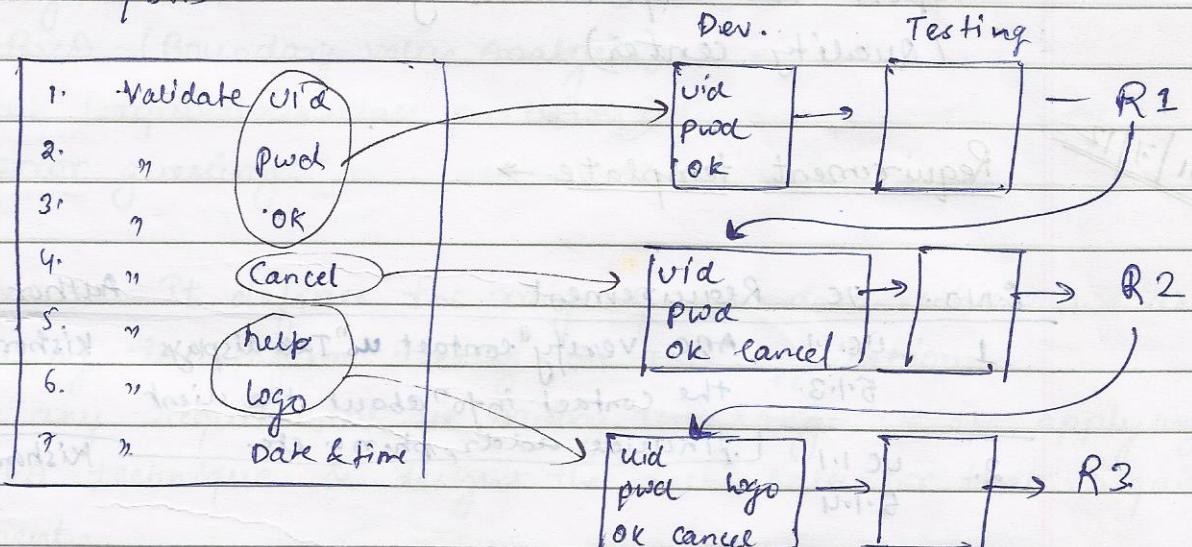
xiii) Technologies to be used → It defines the technologies which development team has used to develop the application
ex java, .net, SAP, Mainframe etc.

xiv) Test strategy → It defines the strategy or approach which we are following to complete the testing in the project.

3) IDENTIFY THE TESTABLE REQUIREMENTS →

During this phase testing team will be involving to identify the testable requirement in a project

UC / BRS



SNo.	UC	Requirement	Author	Date

(A1)

(Q2)

Testable requirement → is the requirement which we need to test in the current release.

Some requirement is a use case document we already tested in the past releases & some of the requirements we are going to release in future releases so that whenever the requirement we need to test is the current release those requirements we are identifying as the testable requirements.

We are identifying the testable requirements in a testable excel sheet & after completion of identifying requirements we are conducting reviews. After completion of client review, client will sign off the requirements & then will export the requirement from excel sheet to QC (Quality center).

Requirement template →

S.NO.	UC Requirement	Author	Date
1	UC 1.1 ABC - verify "contact us" Tab displays 5.1.3. the contact info about the client	Kishore	07/31
2.	UC 1.1 include addr, ph. no. etc. 5.1.4	Kishore	07/31

4) TEST CASE DESIGN → During this phase testing team will be involving to design the test cases for the identified requirements.

Test case → A sequential elaborated executable format of the requirement is called test case.

Why test cases are required in every project?

Test cases are mandatory to perform testing in every project becoz in every project we are getting the requirement in a shortcut format. With the short cut format of the requirements we cannot able to complete testing in a project that is the reason we are elaborating the shortcut formats of requirements in a sequential executable order.

At the time of elaborating the requirement into test cases, we are following some techniques. These techniques we called it as ~~as~~ Test case design techniques or testing techniques or black box testing techniques.

→ There are 3 diff. types of techniques we are following to design the test cases:

i) BVA (Boundary value Analysis)

ii) ECP (Equivalence class partition)

iii) Error guessing

BVA → It defines the range of the data which we are using to perform testing on the application

If any requirement is having the range, we are applying BVA technique & designs the test case for that requirement.

ex 1. VID should accept 4-10 characters

Min - 4 - Pass

Max - 10 - Pass

Min+1 - 3 - Fail

Max-1 - 9 - Pass

Min+1 - 5 - Pass

Max+1 - 11 - Fail

There are 6 classes are available in BVA :

- i) \min
 - ii) \max
 - iii) $\min + 1$
 - iv) $\max + 1$
 - v) $\min - 1$
 - vi) $\max - 1$

other ex → password should accept 5-15 characters

min - 5 - pass

~~max - 15 - pass~~

min-1 - 4 - fail

max -1 - 14 - Pass

$m_{ln+1} = 6$ - Pass

max + 1 - 16 - fail

max + 1 - 16 - fail

Ex Prepare the BVA for the calendar which should accept the dates from 01-01-2000 to 01-01-2100
(MM DD YY) (MM DD YY)

min - 01 01 2000 - pass

max - 01012100 - pass

min-1 - 812 31 1999 - fail

max -1 - 12 31 2099 - pass

min +1 - 01 02 2000 - pass

max +1 - 01 02 2100 - fail

ex Prepare the BVA for the calendar which should accept the dates from 02-01-2004 to 03-01-2004

min - 02 01 2004 Pass

May - 03-01-2004 pass

min-1 - 01-31-2004 fail

map - 1 - 02-29 - 2004 Pass

min + 1	-	02 - 02 - 2004	Pass
max + 1	-	03 - 02 - 2004	fail

* ex Prepare the BVA for local mobile phone no. which should starts with 9.

min	-	starts with 9	- Pass
max	-	start with 9	- Pass
min - 1	-	start with less than 9	- fail
max - 1	-	Start with 8, 7, ..	- fail
min + 1	-	starts with more than 9	- fail
max + 1	-	" "	- fail

Min	-	9000000000	- Pass
max	-	9999999999	- Pass
Min - 1	-	8999999999	- fail
Max - 1	-	9999999998	- Pass
Min + 1	-	9000000001	- Pass
Max + 1	-	10000000000	- fail

ECP (Equivalence class partition)

- It defines whether the data is valid or invalid which we are using to perform testing on the application
- If any requirement is having the valid or invalid data we need to prepare the ECP for design the test case for that requirement
- There are two classes available in ECP
 - Valid
 - Invalid

Ex

UID should accept only alphabets

Valid	Invalid
a-z	0-9
A-Z	special characters
	spaces

Ex Pwd should accept only alphanumeric characters

Valid	Invalid
a-z	special characters
A-Z	spaces
0-9	

Ex Prepare the ECP for the PAN Numbers

Valid	Invalid
0000	000000
a-z	aaaaaaaa
A-Z	special characters
0-9	Spaces

Error guessing → This is the experienced based technique. Based on the experience tester will guess the errors & designs the test cases.

There is no proper procedure for this.

1/8/12

Note:- In every project testing team is designing the test cases only based on the requirements & not based on the application becoz at the time of writing the test cases development team is developing the appln so that we are designing the test cases only based on the requirements.

Test case template → A template or format which we are using to design the test cases is called Test case template.

- We are designing the test cases in Excel in every project based on the requirements of the client.
- There are 3 different types of templates we are using to design the test cases in the project.
 - i) Standard template
 - ii) Test case template without using test management tool
 - iii) Test case template with using test management tool

Real time
templates

- 1) Standard template → In this template we are designing all the test cases in single excel sheet & executing the test cases from Excel sheet itself.

S.No.	VC	Test Name	Step No.	Description	Expected Result	Actual Result	Status	Comment
ER → 1.	5.1 Req. 3	abcd	1	m	m	m	Pass	m

SNO. → It defines the serial no. of the test case or test case no.

Use case → It defines the requirement info. That means on which requirement basis we are designing the test case, we need to specify that requirement info in this content.

Test Name → It defines the name of the test case

Step No. → It defines the step number of the test case.

The min. no. of steps in a test case should be 1 & maximum will be unlimited that depend on requirement.

Description → It defines the activity or action which we are

performing on the application.

ex → Enter user id

Enter password

Click on login button

Select the check box

Launch the application

close the application

Select radio button etc.

Expected Result → It defines what we are expecting from the application as per the client requirement after performing the activity on the application.

ex → Application should be launched

OK button should be disabled

Link should be enabled

Edit box should be focused etc.

Actual Result → It defines what actually applⁿ is showing after performing the activity on applⁿ

ex → Application has launched

OK button is in disable mode

Link is in enable mode

Edit box is in focused mode etc.

Status → It defines the status of the step

If the expected result is same as actual result the

status of ^{step} test will be pass & if the expected result is mismatching with the actual result then

status of step is failed.

Comments → It defines the comments of step

- ii) Test case template without using test management tool →
 This template is suitable for the projects in which they are not using any test management tools like Quality Center (QC), test director (TD), Bugzilla etc.
 → In this template we are designing one test case in 1 excel sheet & executing the test cases from excel sheet itself.

UC	StepNo.	Description	E.R	A.R	Status	Comment
Sheet1						

shows test case no.

- iii) Test case template with using test management tool →
 This template is suitable for the projects in which we are using any one of the test mgmt tools like QC, TD, Bugzilla etc.
 In this template we are designing 1 test case in 1 excel sheet, after the completion of designing test cases we are exporting T.C's from excel sheet to test mgmt tool & executing the T.C's from test mgmt tool.

UC	StepNo.	Description	E.R

Note:- At the time of designing test cases, we are writing only upto expected result.
 Actual result & status we are writing only during the execution time.

Example → ①

Req. 1 → Valid user should able to login to the gmail application by entering user id, password & click on login button

UC	Step No.	Description	E.R
-	1	Launch Gmail application	Gmail application should be launched
	2.	Valid VID, pwd, Login	'VID, Pwd, Login' should be available in gmail appln'
	3.	Enter valid VID Enter valid pwd Click on Login	"User should able to login into the appln"

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Ex-② Req: user id should accept 4-10 characters in abcd application

1. VID should accept 4-10 characters

UC	Step No.	Description	Expected Result
	1.	Launch abcd application	abcd appln should be launched
	2.	Enter VID as 4 characters Enter validpwd Click on OK button	User should be able to logon to the application
	3.	Enter VID as 10 characters Enter valid pwd Click on OK button	User should be able to logon to appln

4.	Enter VID as 3 characters Enter valid pwd click on OK button	user should not be able to login
5.	Enter VID as 5 characters Enter valid pwd click on OK button	user should be able to login to appl'
6.	Enter VID as 9 characters Enter valid pwd click on OK button	user should be able to login
7.	Enter VID as 11 characters Enter valid pwd click on OK button	user should not be able to login to appl'

min. \rightarrow 4 - Pass
 max \rightarrow 10 - pass
 min+1 \rightarrow 3 - fail
 max+1 \rightarrow 9 - Pass
 min+1 \rightarrow 5 - Pass
 max+1 \rightarrow 11 - fail

VID	_____
Pwd	*****
OK	

Ex ③ Req: user id should accept only alphabets

U.C	StepNo	Description	Expected Result
	1.	Launch abc application	abc appl' should be launched
	2.	Enter VID as a to z or A to Z : characters Enter valid pwd Enter \$OK button	user should be able to login to abc application.

3.	Enter VID using 0-9 characters Enter valid pwd click on OK	User should not be able to login to application
4.	Enter VID using special characters Enter valid pwd click on OK	User should not be able to login
5.	Enter VID using combination of A to Z, 0-9 & special characters. Enter valid pwd click on OK	User should not be able to login
6.	Enter VID as spaces Enter valid pwd click on OK	User should not be able to login

before preparing T.C prepare ECP

Ex-4)

- Req:
- 1) User can able to see VID, password & login buttons in 'registration' application.
 - 2) Login button should be disabled when user enters user id & login button will be enabled when user enters password.
 - 3) Inbox screen will display when user clicks on login button.

VC	Step No.	Description	Expected Result
	1.	Launch 'Registration appl'	'Registration appl' should be launched
	2.	Verify VID, pwd & Login buttons	VID, pwd, Login buttons should be available

3. Enter valid uid
4. Enter valid pwd
5. click on login

Login button should be disabled
Login button should be enabled
Inbox screen should be displayed.

Ex-⑧ Req: 1) 'OK' button will be in disabled when user enters 'name' in registration application. and OK button becomes enabled when user enters 'address'

2) 'Save' button will be in focused mode when user selects 'city' & save button becomes unfocused when user selects 'state'.

3) 'Submit' button will be in disabled when user enters 'phone no.' & it becomes enabled & focused when user enters 'PAN NO.'. Registration application will be closed automatically when user clicks on submit button.

Name :	<input type="text"/>	
Address :	<input type="text"/>	
city :	<input type="text"/>	
state :	<input type="text"/>	
Ph No. :	<input type="text"/>	
PAN No. :	<input type="text"/>	
<input type="button" value="OK"/>	<input type="button" value="Save"/>	<input type="button" value="Submit"/>

UC	Step No.	Description	E.R
	1.	Launch Reg. appln	Reg. appln should be launched
	2.	Enter user name	OK button should be disabled

3.	Enter address	OK button should be enabled
4.	Select city option	Save button should be in focused mode
5.	Select state option	Save button should be unfocused.
6.	Enter phone no	Submit button should be disabled
7.	Enter PAN No	Submit button should become enabled & focused
8.	Click on submit button	Reg. appln should be closed automatically.

Ex-⑥

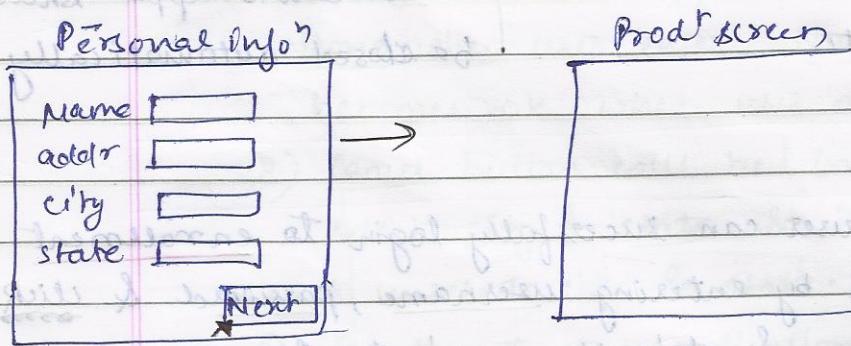
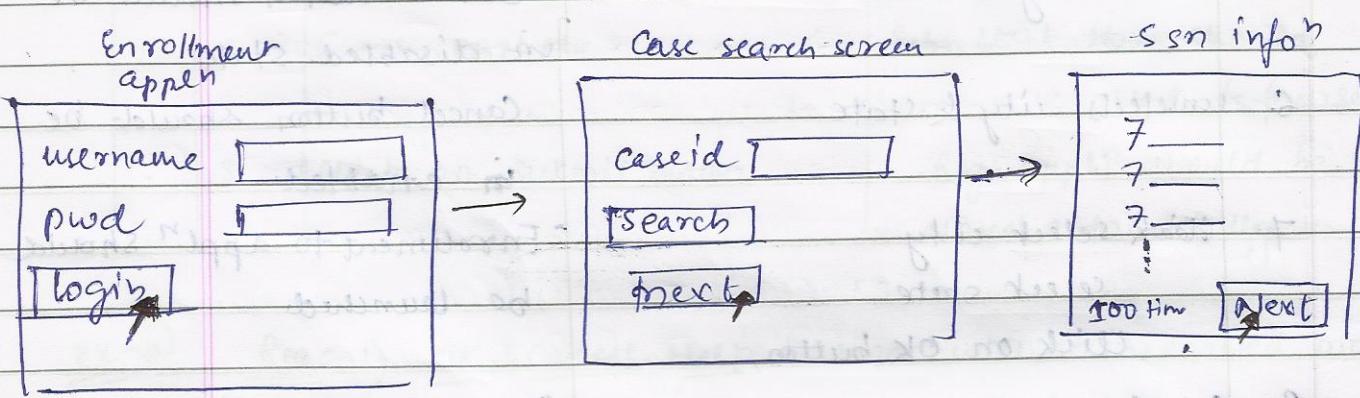
- Req: 1) OK, Cancel, Help buttons will be in enabled mode in enrollment application: OK button becomes Done when user enters Name & Done button becomes OK when user enters address.
- 2) Cancel button will be in disabled when user select city & state & it becomes enabled when user unselects city & state.
- 3) Enrollment to application will launch automatically when user clicks on OK button after selecting city & state.
- 4) Enrollment to appln will close automatically when clicks on delete button in enrollment to appln after selecting the gender as male.

V.C Step No.	Description	E-R
1.	Launch enrollment appl'n	Enrollment appl'n should be launched
2.	Verify OK, cancel, Help button	OK, cancel, Help buttons should be in enabled mode
3.	Enter user Name	OK button should become done
4.	Enter address	Done button becomes OK
5.	Select city & state	Cancel button should be in disabled state
6.	Unselects city & state	Cancel button should be in enabled
7.	Click select city select state click on OK button	Enrollment to appl'n should be launched
8.	Select gender as male click on delete	Enrollment to appl'n should be closed automatically

~~3/8/12~~
~~Ex-7~~

- Req:
- 1) Valid user can successfully login to enrollment application by entering username, password & click on login button & defaulty navigates to case search screen
 - 2) user can able to see case id edit box & search button & user can sucessfully search for the case by entering caseid & click on search button
 - 3) user navigates to ssn (social security no.) info screen when clicks on next button in case search screen, user can able to see 100 ssn numbers in ssn info screen & every ssn no. should start with 7.

- 4) user navigates to personal infoⁿ screen when clicks on next button in ssn infoⁿ screen & user can able to see name, address, city, state fields in personal infoⁿ screen.
- 5) user navigates to prod^t screen when clicks on next button in personal infoⁿ screen.



O.C	Step No.	Description	Expected Result
1.		Launch the Enrollment app ⁿ	Enrollment app ⁿ should be launched
2.		Enter valid username Enter valid pwd click on login	User should login navigate to case search screen
3.		Verify whether caseid box & search button are present or not	caseid box & search button should be present in case search screen

Alt + Enter → to write in new line soon in same cell.

(56)

4.	Enter case id click on search	user should successfully search the case id
5.	click on next in case search screen	user should navigate to ssn info ⁿ screen
6.	Verify 100 ssn numbers in ssn info ⁿ screen	100 ssn numbers should be present in ssn info ⁿ screen
7.	Verify whether every s. ssn no. starts from 7 or not (or) verify ssn screen	Every ssn no. should be starts with 7
8.	click on next button in ssn info ⁿ screen	user should navigate to personal info ⁿ screen.
9.	Verify name, address, city, state field in personal info ⁿ screen (or) Verify PI screen.	Name, addr., city, state field should be present in PI screen
10.	click on next button	user should navigates to prod ^t screen.

Ex-⑧ Reg:

- 1) user can able to see 5 products along with apply buttons
in prod^t screen of screen of enrollment application
→ user Navigates to pre rating question screen
when click on apply button for the first prod. &
user can able to see two questions along with the
Yes No radio buttons
- 2) user navigates to medical question screen when clicks
on next button in pre rating question screen after
selecting both the questions as yes