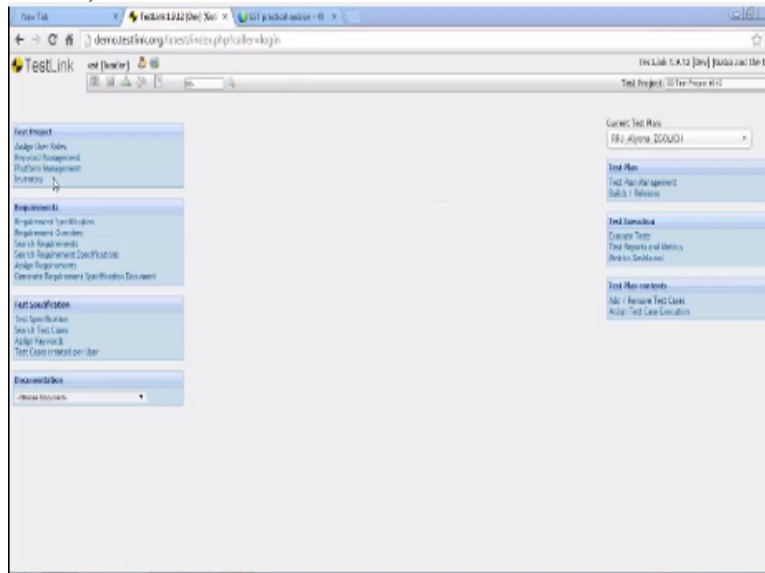Okay so continuation of the test link,
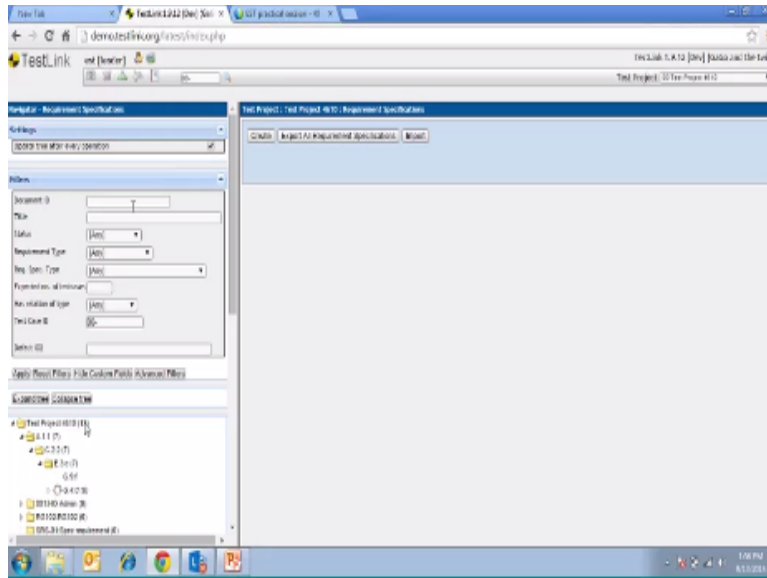(Refer Slide Time: 00:13)

along with the assignment of the roles and the test link we can also have some key word management platform arrangement is something like how you want to set up the environment like the test bed or the various of platform that module testing something like, say we have a fire box we have a Firefox, internet explorer, mobile, PC, so detail of the PC we can add something like, first PC having id set up.

This is what we want it have it at the platform, so this gives set for this project. Similarly we can create your own and try to export it to document or something like that, so that is what we can do with the platform management next one is the inventory, so inventory you know what is embedded project what are the materials or the configuration that we want to have it so we can create something like I have a PC with code warier IDE.

Then we have we tell what 0.0.11on there is the embedded software testing or bus to set up the embedded test environment hardware that we need to collect for this PC. MPS the triple 54 target board connected with BDM of the cheer time, so it is a connecter that is the special note we want to have we can have it, so we can save it you can see that the zip code warier PC with a IP address with the set up.

So this is how we can add the inventory, so in that form test bed and test environment set up, we can start with the requirements because requirements we would like to add to our test link management. So,
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Here you can see the folders the different direct structures where the repolitries are insisting and all that, so you can create your own test project,

(Refer Slide Time: 03:24)
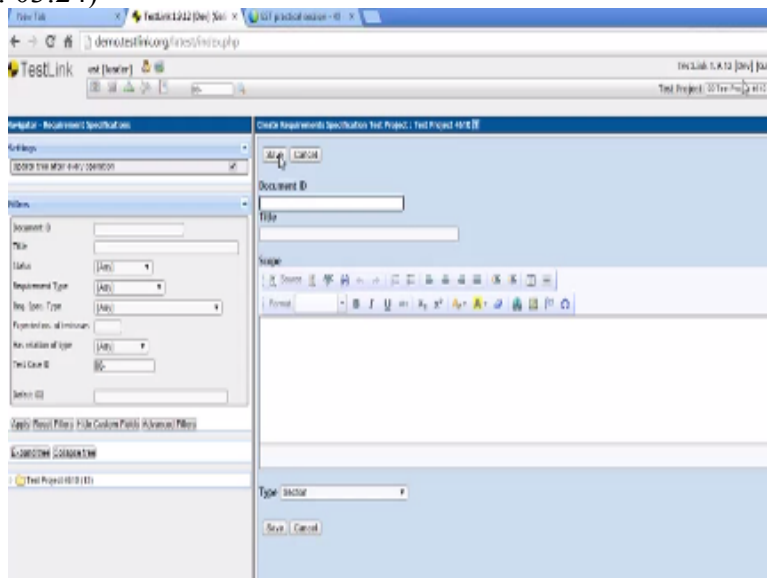
So under this we can have around or you want to create you can create a ring one that can be teddy is the test project, I am typing the input, and status is it is a trasstage, we can have a different state of liker that this specification is under the draft, review, rework, completed it is valid not testable or recheck this specification you can add, requirement type is say permission feature so use case type of requirement where we use it in a model based design.

Then interface requirement, non functional, constraint etc so it is a feature that's it, because with the session of this or if it is a requirement section, system requirement specifications, expected number of test cases, example we will take the mode only and try to understand. I have opened a test case document before that we need to understand the requirements, so where is the requirement it is a part of this only so I'll try to open that, it is here.
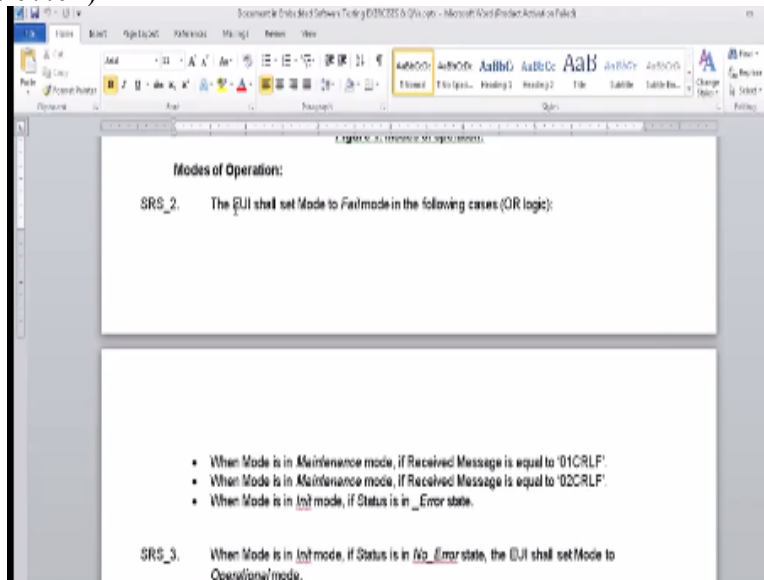
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So,
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Just try to list out some requirements SRS 2 and the test link for SRS 2 is about 10, so we can specify here number of test cases expected is 10 and has relation it interview for this document, first time itself while creating the test cases we can tell that I may have test cases of 5, 6, 10 whatever you can rework or give it second objective but that is the issued plan, so which can be reported, so it will be relation that you want to have for that you can have it like this relation or this feature is related something else we can create it.

It effect id anything you want you can add it, so that is how you can create it, you can apply this is want to have it under face, so you can see it created another test project main folder the word is the document id, so you want to have a document id whether corresponding it, so you will be have a document called as far as the UI same as you can keep it, software requirements, specifications or VOI.

And we can access the spots if you want, so now scope, scope of that specific requirement you can have it, we can have this say modes of operation we can paste it here SRS2.
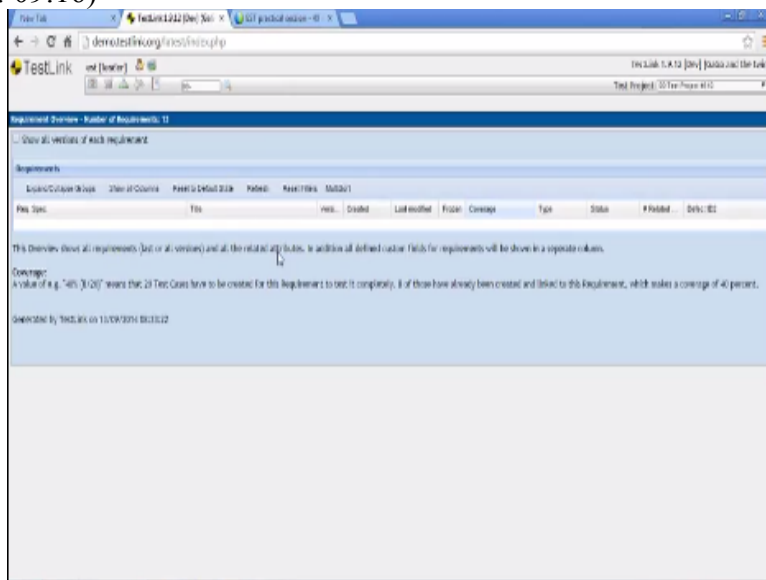(Refer Slide Time: 07:01)

Just copy it for example, let see what happens? You can paste it in that particular SRS it is SRS1 it is SRS2 since with the automated bold document it is done, so let try to clear this.
(Refer Slide Time: 07:19)
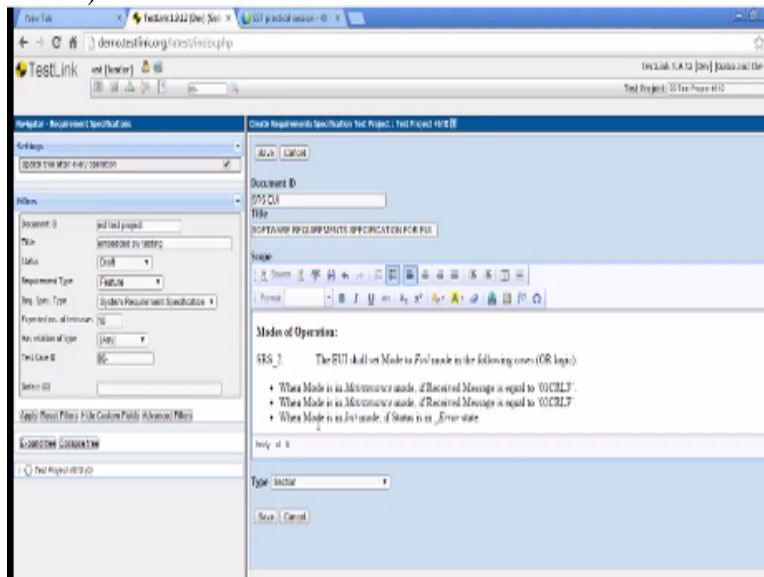
So type of this user recall this is all system regalement specification, and we will say this. So we can see requirement specification is which is been successfully created, similarly in next one we can create it or we can edit digesting 1 also. Suppose we want to edit that rest it to go to the software requirement or EOI. Here we have created you can see last one we created with this specification it becomes at,
(Refer Slide Time: 08:25)
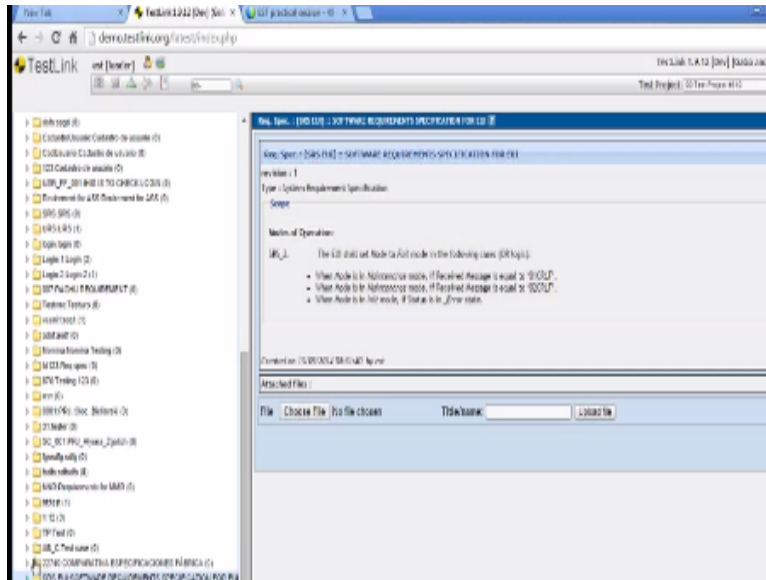
So the main folder we can see the version 1 for what you can update or add first version is created in the software requirement specification modes of operation is this, if you want another one you can create it or you can make them like this, so once we have if you want to attach you can few spiral and imported from that whatever it is we have you can give the title and imported to the entire test acres or what, so once you have created the software requirements, for that particular software requirements we can have a requirements over 3, so you can see here
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There are different requirements it will try to is here version created,
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Last modified, so frozen or not coverage that is there or not you can have a type's creator all this or it is a typical attributes of the software requirement application. So that is how you can see overview of the complete requirements, the nest one is you can search requirements if you have multiple requirements and you all try to look in to some requirements you can search the requirements or specifications then you can assign the requirements to a specific test cases or test case id.

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Test case id from 1, first we will try to create test cases that we probably we can take it further those requirements, so that will be better. Now having this entire requirements have been created you can go ahead with the specification. That is not list in the probably we can try to see when we have the test that we have attested to, we can accurate our test case id 01, it is 01 tile so we will go through the test case example provided.

So this is the modes of operation this is the title so we will try to put this in that, test suit I think that you want to identify that is suit you can make it as functional testing and any key word you

want to add it you can add it, status the end is a draft importance is very high it has other options like what is the important of this specific test? Exhibits type you want to have a manual or whatever it is you can know that two types of test link embed up.

On the target board so this can be tested on the target board. So expected in this solution is, so we will go through the test case one example and we will know the expected and all. So fail mode expected result in the fail mode, actual result when we execute only we will come to know, test cases we can add it something like to test the modes of operation, test case ID it can be same as this, this is 01 or specific test case ID you can give something like this.

We should be very unique capturing for each of the test cases, so any defect ID that we have found we can identify but before execution we will not know what is the actual outcome, so we can have leave it and later apply it, so once we have this we can apply it so that the test cases are corresponded to this gets added. So it is getting that,

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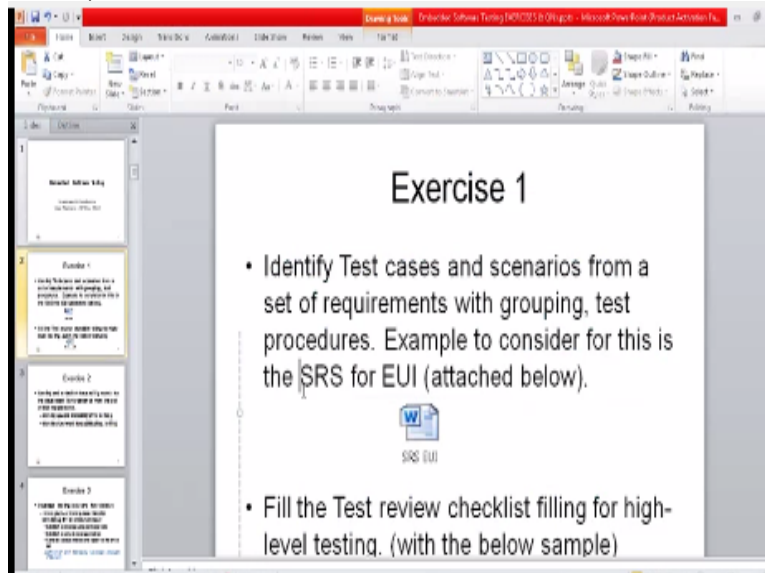
Try to change the test cases in to this, in case you want choose a file from title from the test case and add it here in to this project anything can be done. Whether that is create the test case which we have created, test specification and what we have output the test suit, test1 suit for this, this, this test suit dependence this functional testing did we had this so it has not created just try to create one more.

So we will try o create the test case ID again, first test case, modes of operation, test suit is a it can be any test suit something like functional testing it is straight on emit and key word anything you want you can add it hardware anything you can add it, that is all that is created by very admin when you have created the project so one of them you can select let us not select anything importance of this test case is under,

Sorry state of this particular modes of operation is a draft is that is for review, review progress, rework absolute something like that, so let us make it as a draft then importance of this test case is high medium low three type of importance we can assign we can make it as high, execution type it is an manual or automated you can make it as automated in such way we can expect the result something like face mode.

Because we know that test example we have created the expect result is fail actual result we know because we are not execute again test case description we can add it something like to test the modes of operation, so particularly we had to try to test SRS2 it is fail mode, so we can add that in detail. Test case ID same thing what we have created in the first case we can add it here, defect ID we have don't have defect ID now we can have it in later stages, once you have done we can apply this.

So this is going to be effected for that particular test, test project example. Somehow it should be listing it let us see, so once we have the test cases test specifications done, then we can add test cases similar to this, test cases we can search if we have multiple test cases by filtering what your title what test cases I am interested,

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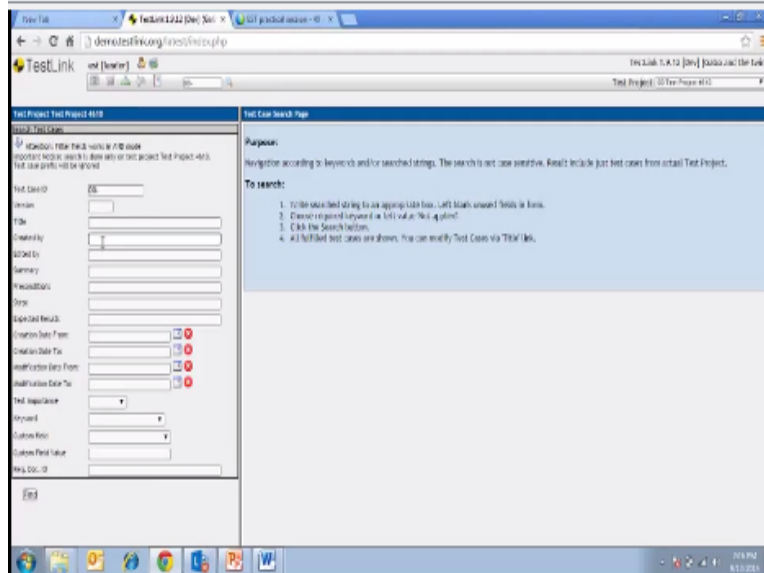
That it will display that particular, so we will try to select this one say find let us find it and see already somebody has created that is this one we can try to put this until display the test cases that is created for here and we can see that, so there are many options in terms of adding what is saying deleting but most of the time the deletion and modification will be done by the authorized people, authorized people in the sense deletion can be done by admin.

And modification can be done by that test designer but he will have to do a versioning why because he has to control the specification so there is a revision involved for that so every time he will create or adds will become a new revision this is how we can. There is another option called test case paged up user so we can see how many test cases are created by what you mean user, so let us try to understand neither called EST.

We have called for example we will try to filter by this and we will try to submit the query we should list no results are there we will try to add test case somehow that test case will not got added let us see may be the permission may not be there, function is testing without having added this one, so test specification, so in terms of test specifications we can add and we can assign the test cases and requirements we have seen.

The nest one is a test plan you want to add or different build for this test plan you can do the test plan management with the help of that, we have studied about this so in one of the sessions in

terms of how the test plan should be. So it take some time to load I think, so likewise you can see the test plan management details and test execution like we can execute test here execution means basically with the builds that we have based onto assigned and add the descript and aspects and similarly if you want to create a test suit execution linked with this we can create it but basically it is static way of doing test execution build, here we will add the execution,
(Refer Slide time: 24:43)
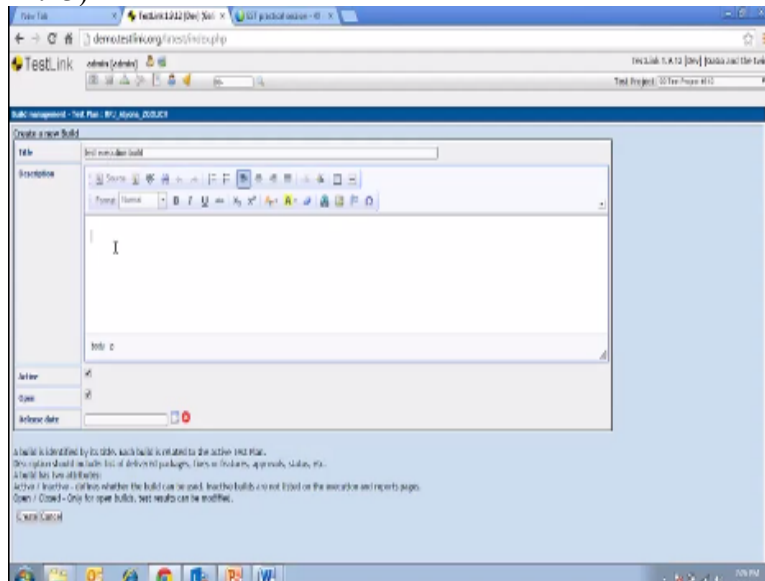
Details of the specific test suit, if it is like to open any dates you want to mention you can mention you can create it so this is the build this is going to have it, if you want to you can attach files also so it will be added in to that actually. So you can see it is listed out here so that specific thing.
(Refer Slider Time: 25:11)
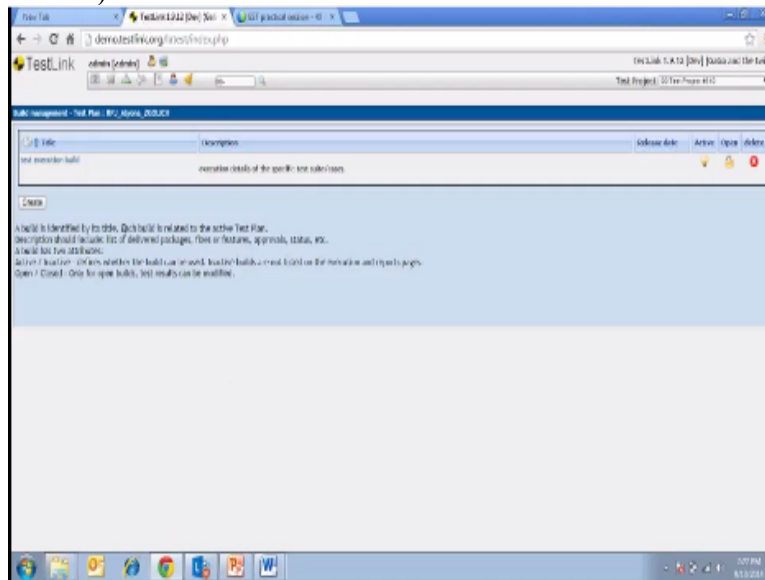
I said that we have done the build management of the test execution so you can see one or test cases other in or the if I have log in as a user I can see whatever test cases that are assigned to be and once I execute I will move into the next stage I am going to execute and report, see one

example they have so for me this build BBB one item is added here I am responsible for doing this test.
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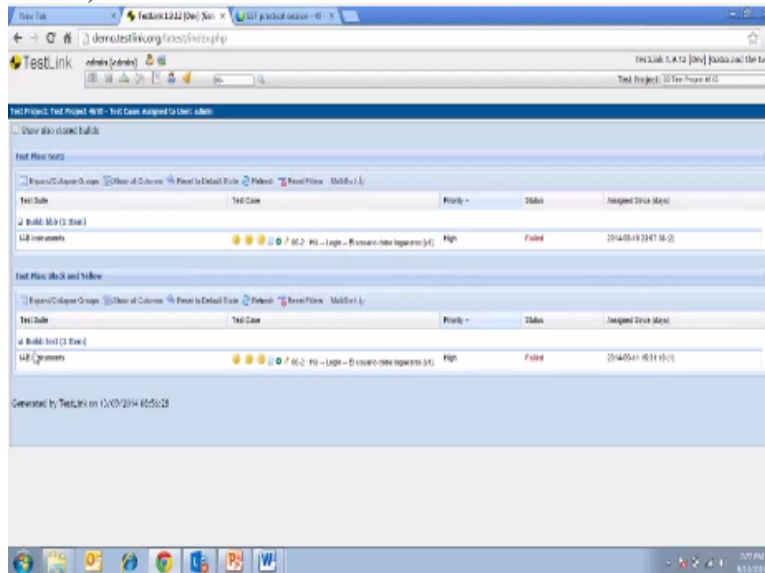
This is test 1, this is black and yellow some test is there this is an example, the next test reports and matrix so we you can see the reports in terms of test equation it is status and all that, so for example test plan report you can see you can filter any of these things and see the report. We can see test plan design report project.
(Refer Slide Time: 26:22)

Project plan, project suit likewise so we have seen this particular one project then we can see test report.
(Refer Slide Time: 26:39)
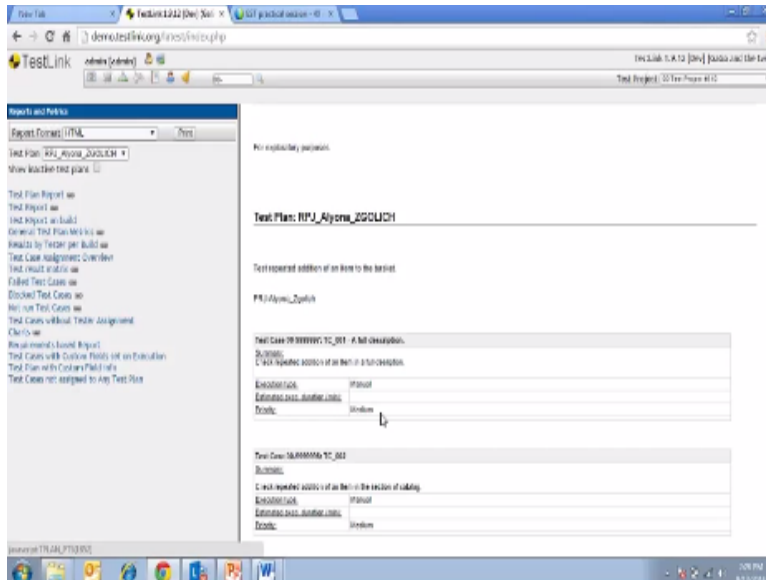
(Refer Slide Time: 26:52)
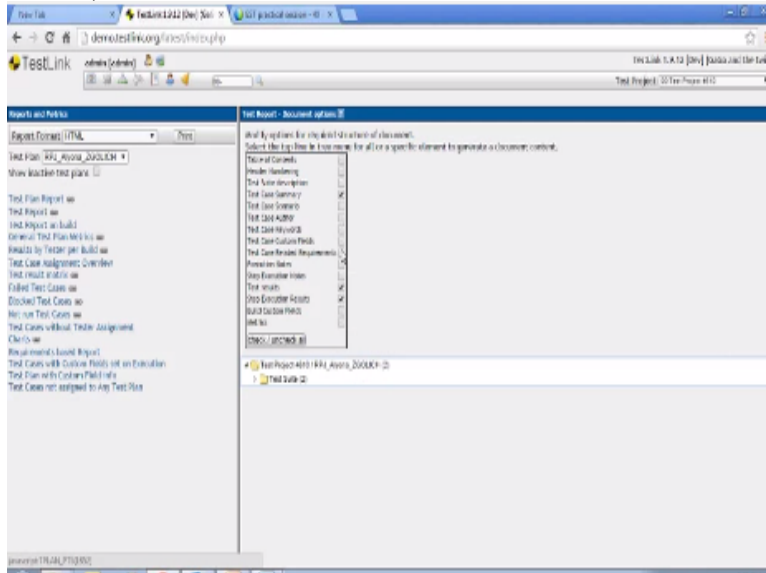
Similarly we can see some matrix in terms of how it can be reported to higher management or what the specifics of project like,
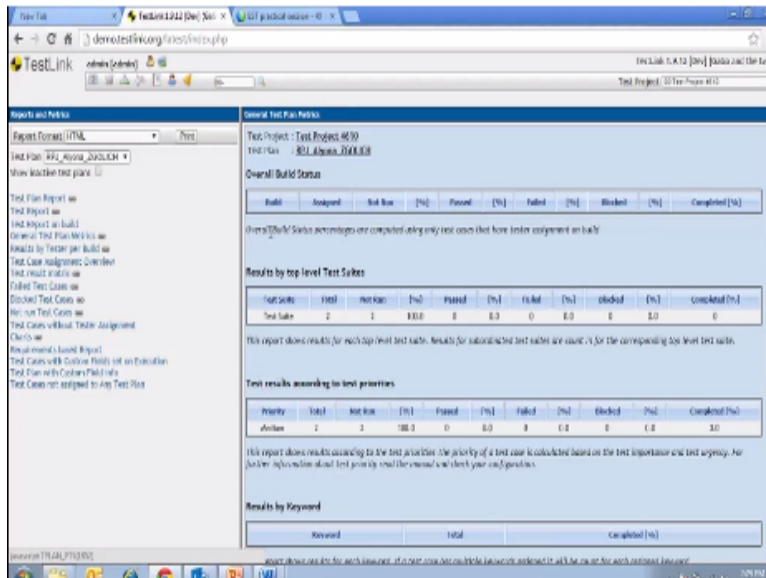
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Overall build status if you have turn like the builds are assigned and build is not executed failed passed complete report can be generated here you can see this top level test source there are two , two are not done 70%pass fail was not generated,

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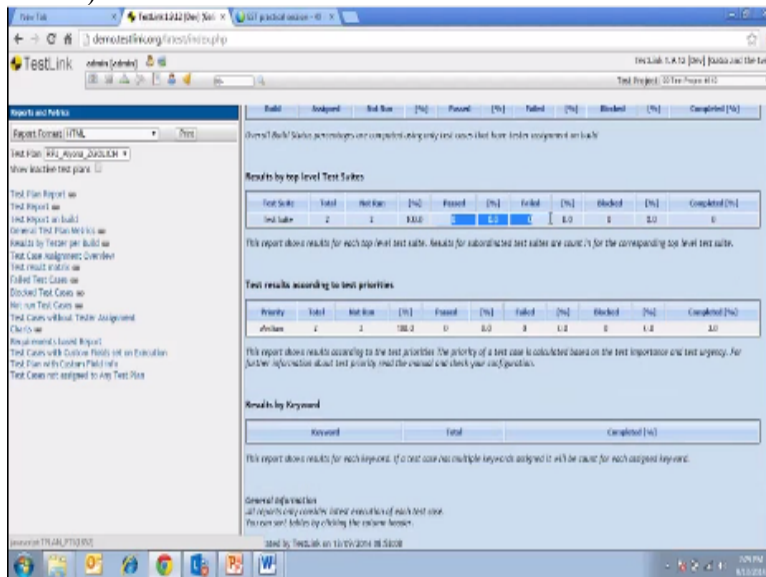
Because it is not executed, they going to test product is also we can see it and although by test suits for build also we can generate.

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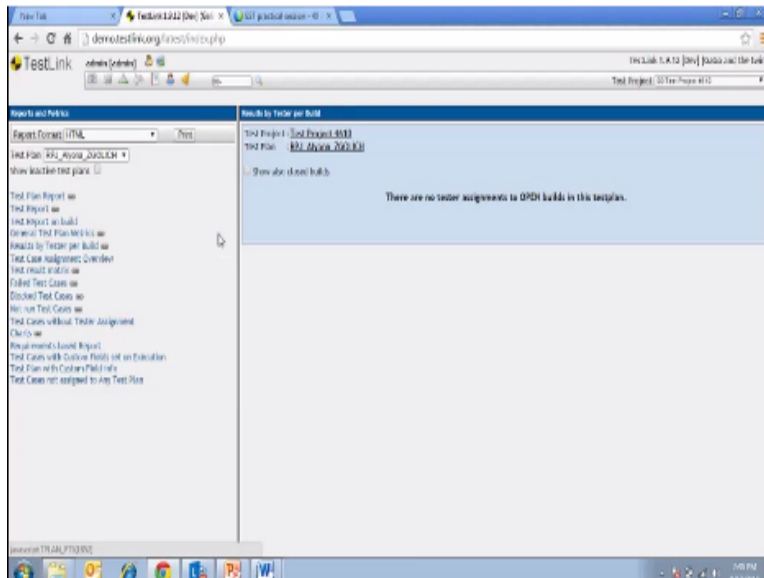
Test case assignment overview we can have it,
(Refer Slide Time: 27:53)
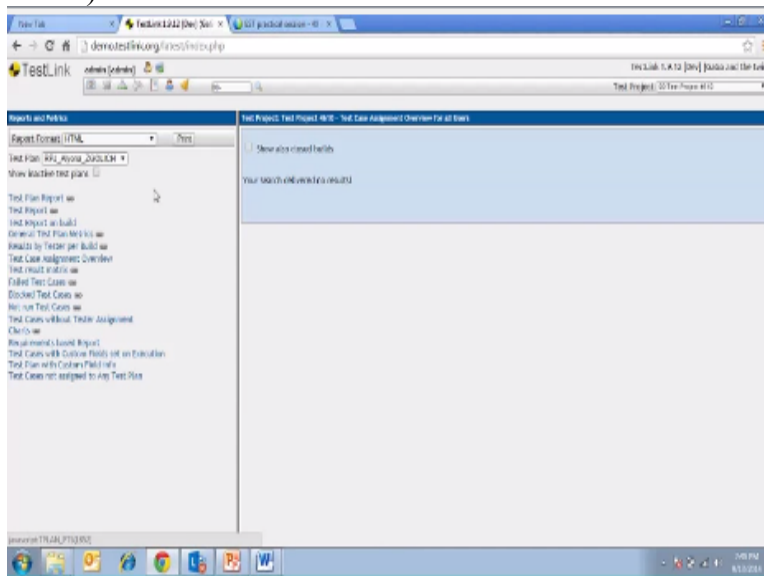
So test cases without test assignments so various matrixes can be reported this way. Like picking those particular items, so we will show that these particular test cases are not executed this way it will show. Some charge for in this can also be created in terms of pie chart or overall matrix,
(Refer Slide Time: 28:36)
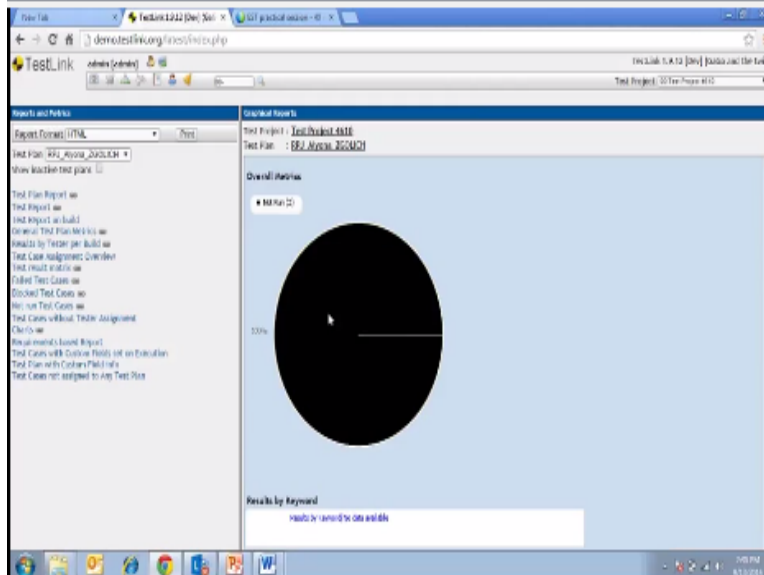
What are the tests that have been run or not on this project showing that not just two just showing the 100% not executed, so similarly top level suits in terms of results,
(Refer Slide Time: 28:50)
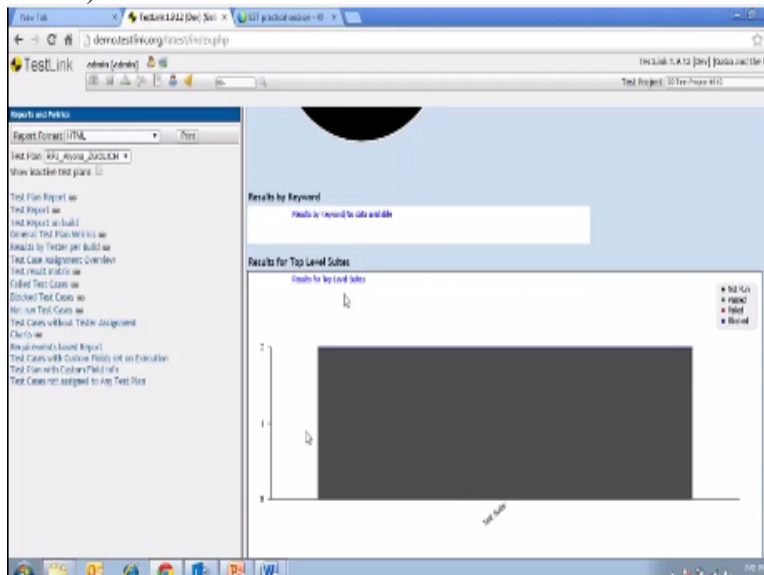
Test suit and numbers it can show the pie chart depending on the type of matrix that we want. So finally you can generate the requirement base report with chill report for each of the requirements what are the tests that have been done. We can see under this there are different types of test cases having different deep orderness. And these are called test cases not assigned to any of the test plan just basically test is created.

So once you link that it is going to show what is been linked? So that is how we can generate the reports and matrix of different tests that are under scope, similarly we can add some urgent tests in terms of priority, we can assign test execution and you can create a version of this. So that is how you can use the different projects and see more e3xample we try to understand, so in the3 metrics dash board that is part of test we can see the progress is 50%.

That is 4 out of 8 tests have been executed so far not on the other 50% passed is one out 8 that is 12% fail is 37% blocked is 0 so those specific test cases in terms of progress or each of the test plan we can see the metrics this can be exported using export option,

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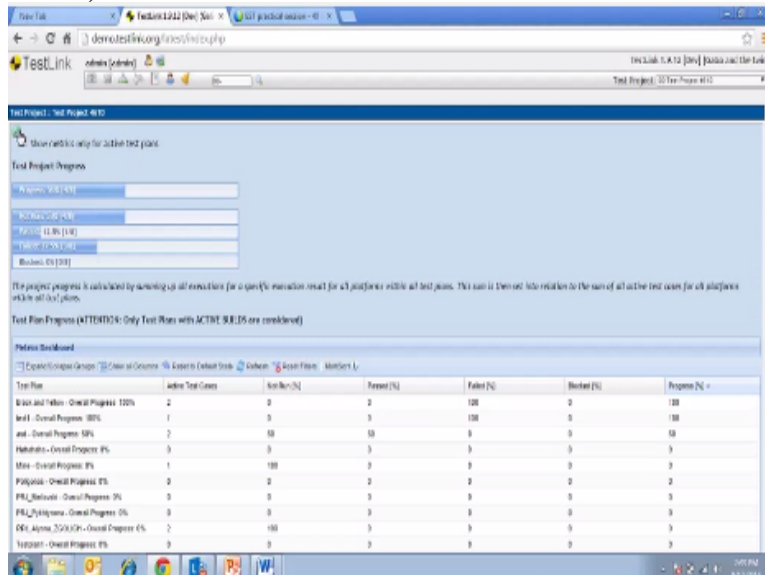
And there is other option in terms of failure pass and all that also we have executed I think the admin need to add it so you can link to bugzilla, so bugzilla is another similar tool where you can monitor track and report the different bugs that are come out of this particular test link activity so both can be correlatively linked that is the purpose of bugzilla, bugzilla can be tracked and managed with the help of that actually.

So that is how you can use the test link creating various requirements added to here test cases you can add it to here and manage the test cases, assign the users and add the test execution aspects and create the reports and matrix out of this test links, so totally it is a test management tool this can be used and reasons also be created so that this can be under configuration. So the basic thing about test link is we need to have the work flow created for the test link, like assign is a new way to create test project.

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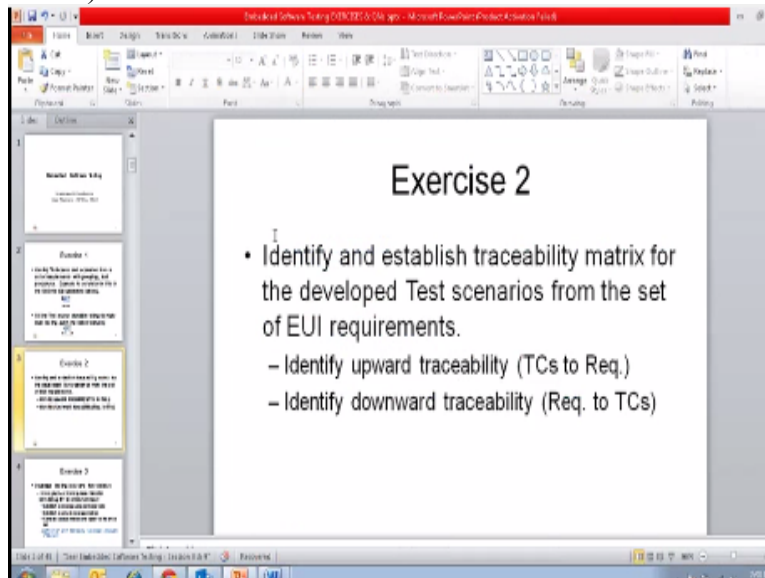
And assign it the particular though have it, just to assign the testers or engineers with the task then we need to copy paste the software requirement specification.

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Or you can input certain inputs it is supports that renewal documents or excel sheet so it will create test cases with empty test cases so we need to reorganize them into test suits, then create a content for the test cases using test specifications that are being organized with the test suit, test suit is something like having organized test cases correlated with test case. Then also we have this we can create regression testing and assign application,

And applicable test cases of this where we see there is a change or there is a failure that we need to fix and they execute those things we can create entire regression testing so that next time we need to work under the regression testing, then we are able to create test plan build and that all test cases in the test suit to that particular test plan. Then assign resources to test plan so that those resources are responsible for particular test cases.

Then assume QA got this first build of leads or candidates form under this and execute and record the testing with the result, so basically we want to evidence the execution and record the pass fail results in to this. Next step is assuming QA get new builder because the build is got a hue they going to have a ration now, so this blocking issues we need to need re execute or regression test to make sure that those tests have been passed.

If it is not passed we are going to report it to the higher side higher management assign that this many percentage have got passed and failed etc… so next step would be the manager have the test lead and other project relate test link holders want to see the results and status of testing and this stake holders including managers can create a accounts or they can have view of this disintegrity fault just or it is a record with a privilege,

To newly test results and generate the overall report of the progress of the tests. Suppose new changes happens to the existing functionality we see to modify existing test plan and add new test cases you want to add so that the robustness all it can be taken care. Test suits continue to execute as usual by generating various reports, so for new project again few it needs tutors about the steps to include limit for the test link.

So these steps with the thing one thing test link or workload with the help of this we are going to create the test link project test management and report it. So that is how we can use it.

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Exercise 6

- Walkthrough of Understand for C/C++, a static analysis tool:
  - Example embedded C code
  - Configure the project into Understand for C/C++ tool
  - Select the metrics for the analysis
  - Generate the project report
  - Analyze the report

So with that the practical sessions of vibrant software testing we learnt, we will try to look into that exercises so that you will have an understanding of all the theoretical practical aspects of embedded software testing, few of the examples have created here, I will circulate it,

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Objective Questions

1. Out of 4 levels of testing below, which one is mapped to Acceptance testing?
   A) Requirements
   B) Architecture Design
   C) Low level design
   D) Code

So all this tests objective questions are completed I will just walk through few examples in terms of theoretical as well as practical things, so out of four levels this objective type of questions we need to answer any of this four, out of four levels of testing below which one is mapped to acceptance testing? Requirements map or architecture design, low level design and code, so you need to choose one of this.

Similarly we have from the levels of testing,

(Refer Slide Time: 36:26)

Objective Questions

2. From the levels of testing, fill the missing one out of : System Testing, Acceptance Testing, Component Testing
   A. Regression Testing
   B. Integration Testing
   C. Unit Testing
   D. Black-box testing

Fill this thing one out, system testing acceptance testing component testing so which one is missing in this it is regression is missing, integration, unit or black box. Third one is

(Refer Slide Time: 36:40)

Objective Questions

3. What is the other context type of testing for Static Testing?

A. Maintenance Testing
B. Centralized Testing
C. Integration Testing
D. Dynamic Testing

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What is the other context type of test for static testing? Is it maintenance testing, centralized testing, integration or dynamic, so what is the other context type of static testing,
(Refer Slide Time: 36:51)

Objective Questions

4. What is the other context type of testing for Static Testing?

A. Maintenance Testing
B. Centralized Testing
C. Integration Testing
D. Dynamic Testing

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It is a same question, which additional test level could be introduced into,
(Refer Slide Time: 36:55)

Objective Questions

5. Which ADDITIONAL test level could be introduced into a standard V-model after system testing?

    A. System Integration Testing
    B. Acceptance Testing
    C. Regression Testing
    D. Component Integration Testing

A standard V-model after system tests, system integration testing, acceptance testing, regression tests, component integration testing. So like this I have a word about, objective function where there is a fill up gland is there out of this four we need to fill up.
(Refer Slide Time: 37:15)

Objective Questions

9. A white box testing technique that executes possible combinations of condition outcomes in each decision is

_____.

    A. Condition Coverage
    B. Decision/condition coverage
    C. Decision coverage
    D. Statement coverage

For example white box testing technique that executes possible combination of condition outcomes in each decision is what? Condition coverage or decision/condition coverage, decision coverage, or statement coverage.
(Refer Slide Time: 37:32)

The next type of objective question is a statement of objective question where which among the example, which among the following is the correct sequence to test execution? So all below are identified test cases and test cycles executes test scripts, set up environments, review the test cases. The next type will be set up test environment, identify test case, review test results, and execute test scripts. Set up test environments, identify test cases, test cycles, execut5e test scripts, review test results.

Next type of objective is
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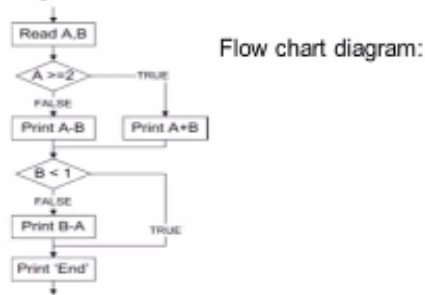Which of the following validates that multiple parts of the system interact according to the system design? Unit testing, user acceptance testing, integration tests, system testing. Next type of objective question is,
(Refer Slide Time: 38:21)

Objective Questions

Flow chart diagram:

Read A,B

A >= 2 — TRUE

FALSE

Print A-B   Print A+B

B < 1

FALSE

Print B-A   TRUE

Print 'End'

12. What is the minimum number of test cases required for 100% statement coverage and 100% decision coverage, respectively?
   A. Statement Coverage = 1, Decision Coverage = 3.
   B. Statement Coverage = 2, Decision Coverage = 3.
   C. Statement Coverage = 2, Decision Coverage = 2.

Is a flow diagram of a embedded system program, so what is the minimum number of test cases we want for 100% statement coverage and 100% decision coverage respectively? So you need to answer one of that statement coverage is 1, decision coverage is 3 or 2 3, 2, 2 or 3, 3 one of this will be answered for this so you need to understand flow you need to understand the edges nodes based on that we are going to have the statements how much minimum statement coverage we can have? How much you minimum decision coverage you can have? We know that there are two decisions here and there are two statements.

(Refer Slide Time: 39:12)

Objective Questions

13. When does Test Design begin in SDLC?
   A. Testing Phase
   B. Low Level Design Phase
   C. High Level Design Phase
   D. Requirements Phase

   D. Statement Coverage = 3, Decision Coverage = 3

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So what are the test design begin in SDLC, is it testing phase, low level design phase, high level design phase or requirement phase.

(Refer Slide Time: 39:25)

Objective Questions

14. Which technique is used in test case designing?

    A. Boundary Value Analysis

    B. Equivalence Class Partitioning
    C. All of the listed options

Which technique is used in test case designing? Boundary value analysis, equivalence class analysis, all of the listed options, we have audio track requirements in test cases, we should stop testing this is due to change a design so what is the impact.
(Refer Slide Time: 39:48)

Objective Questions

18. Due to a change in design, the requirements for an already coded critical software component got modified in its entirety. The developer had to modify the code based on the new requirements. Testing team is to choose the appropriate type of testing to minimize the impact to the project schedule. Based on the kind of testing needs, which type of test you would not choose for sure?
    A. System Testing
    B. Regression Testing
    C. Acceptance Testing
    D. Unit Testing

Where we are going to test it, next one is about
(Refer Slide Time: 39:53)

Objective Questions

19. Testers insert additional code into a program to collect information about program behavior during unit testing. This is called as _____.
   - A. Instrumentation
   - B. Integration Testing
   - C. Dynamic assertion
   - D. Inspection

Testers insert additional code into a program to collect information about program behavior unit testing what is this called as? Defect density is calculated by?
(Refer Slide Time: 40:03)

Objective Questions

20. Defect Density is calculated by _____.
   - A. Total no. of Defects/ Effort
   - B. Valid Defects/ Total no. of Defect
   - C. Invalid Defects/ Valid Defects
   - D. Valid Defects/ Effort

It is about test matrix so all sort of tests that we have covered in theory and practical I have got few questions, so with that the embedded software testing questions are cleared by equity and the questioner that you can answer those questions accordingly. So a list of questions in general,
(Refer Slide Time: 40:42)

Embedded SW Testing Questions

1. What is an embedded System and how its different than General system?
2. Identify at least 5 embedded systems surrounding us.
3. Why Embedded System Testing is needed?
4. What is V model?
5. What are the Test methods under Embedded Systems testing?
6. What are the main differences between the black-box and white-box testing differences?
7. Under what circumstances we use white-box testing?
8. What are the different types of integration testing?
9. Why we need Test plan and what are the elements that it identifies?
10. How TEmb method is different than normal embedded system testing?

For complete embedded software testing so there are about
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Embedded SW Testing Questions

11. Why do we need the EST test setup to be configured?
12. Provide a brief sentence for the below:
    ❖ Test Harness
    ❖ Test Bench
    ❖ Fault Injection
    ❖ IO
    ❖ ICD
    ❖ Breakpoint
    ❖ Simulator
    ❖ Emulator
    ❖ ICE
    ❖ Profile
13. Why Simulators can't be used for the complete testing? What is the major difference between Simulator and Emulator?

35 questions that I had put it here,
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Embedded SW Testing Questions

25. What is the significance of Prototyping life cycle?
26. Why its call V-Model?
27. What are the differences between V-Model vs. Nested V-Model vs. Multiple V-Model
17. What is the significance of Nested V-Model?
18. What are main elements of master test planning?
19. List the principles of embedded software testing and their importance?
20. Do we need target system based execution during static testing? If not, why?
32. What is the difference between static vs. dynamic testing?
33. What sort of systems the white box and black box systems are advantageous? Describe in brief.
34. What are the selection criteria that need to be considered for black box testing.
35. How coverage is defined for requirements based testing?

You can go through this also lie this is a basic about embedded software testing that theirs so whatever that 5 units that we have covered for embedded software testing all the questions have listed out here there are about 35 questions,

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Embedded SW Testing Questions

14. What is the significance of Prototyping life cycle?
15. Why its call V-Model?
16. What are the differences between V-Model vs. Nested V-Model vs. Multiple V-Model
17. What is the significance of Nested V-Model?
18. What are main elements of master test planning?
19. List the principles of embedded software testing and their importance?
20. Do we need target system based execution during static testing? If not, why?
21. What is the difference between static vs. dynamic testing?
22. What sort of systems the white box and black box systems are advantageous? Describe in brief.
23. What are the selection criteria that need to be considered for black box testing.
24. How coverage is defined for requirements based testing?

So this you need to answer based on what we have gone through in all the sessions earlier. For example about the general V model how it is applicated for test methods and why we need test plan? What is PFM method is all about? Then I have a question I mean about brief sentence about test hornets, test bench, test co ordination input output I is to d , break points, simulator, emulator, ice profile so basically there are embedded system basics if you are able to answer that means you are a good tester in terms of embedded software testing. So similarly we have prototyping life cycle V model significance of nested V model what sort of system we need? White box and black box testing what are the advantages? Or coverage depends in requirement basis testing similarly why it is called as V model? How cord is defined? Likewise we have about 25 questions for embedded software testing.