Ch.3 Test Management

- There are 4 main topics:
  1. Test Planning
  2. Test Management
  3. Test Process
  4. Test Reporting

- Les see one by one

Test Planning

Sr. NO.	Question	Mark and year
1	What is test plan? List test planning activities.	4 marks, S-15, S-18 & 2 marks, S-17,
2	Write steps to prepare test plan, Also write features to be tested	4 marks, W-15
3	What is test planning	2 marks, S-16, W-17
4	State the contents of standard template of a test plan	4 marks, S-16
5	Explain in detail, How to prepare a test plan with suitable example	4 marks, W-18

- Test plan is a document describing the scope, approach, recourses and schedule of intended test activities.
- It is the basis for formally testing any s/w or product
- It identifies amongst other test items:
  - the features to be tested,
  - the testing tasks,
  - who will do each task,
  - degree of tester independence,
  - the test environment,
  - the test design technique,

- entry exit criteria,
- any risk requiring contingency(future event) planning to overcome risk,

- Test plan is a record of all testing process,
- Master test plan – addresses multiple test levels • Phase Test Plan – Typically address one test phase.

–Following are the activities done as a part of test planning:

- Preparing a test plan
- Deciding a test approach

- Setting up criteria for testing
- Identifying the responsibilities
- Staffing and testing need
- Resource requirement
- Test deliverables
- Testing tasks

Preparing a Test Plan/How to prepare test plan

- Test plan is to bestarted early in STLC
- It has to beshort , easy to understand and up-to-date.
- Test lead prepares test plan(testers are also involved).
- Once the plan is readytester will write test cases

- Sections of test plan template
- Selection of test plan document as per IEEE829 standard
  - Test plan identifier: Test ID
  - References: List of supporting documents
  - Introduction: The purpose and scope of project
  - Test Items: List of test items to be tested
  - Features to be tested: (login page, dash board etc)

- Features not to be tested: features which will be removed later
- Deciding a test approach: strategy of testing
- Setting up criteria for Testing: (Pass/Fail)
- Suspension Criteria: When to stop testing
- Test Deliverables: Documents to be delivered at each phase
- Testing Tasks: List of tasks need to be completed
- Resource Requirements: h/w, s/w, tools etc

- Identifying Responsibilities: roles and responsibilities of each test tasks
- Staffing and Training Needs: to improve skills
- Schedule: complete details from start to finish
- Risks and Contingencies: probability of risk and contingency to overcome those risks – Approvals:

- Steps for preparing a test plan:

–Analyze the product (learn product thoroughly)

- Develop test strategy -define scope of testing ,risk and issues
- Define objective of test
- Define test criteria
- Planning the resources
- Plan test environment
- Schedule and cost
- Test deliverables

- Test deliverables includes :
  - Scope
  - Methodology
  - Requirements
  - Criteria for pass-fail
  - Schedule

Sr. No.	Question	Mark and year
1	What are the advantages of test plan?	4 marks, S-17, S-18

- Advantages of Test Plan:
  1. Serves as a guide to testing throughout the development.
  2. We only need to define test points during the testing phase.
  3. Serves as a valuable record of what testing is done.

4. Entire test plan can be reused if regression testing is to be done later on.
5. Test plan itself could have defect. (test the test plan)

Sr. NO.	Question	Mark and year
1	Which features are included in test approach while preparing test?	4 marks, W-15
2	Describe the factors considered to decide test strategy of test approach	4 marks, S-18

Answer- Let's see next slide

Deciding Test Approach:

- Like any project, the testing also should be driven by a plan.

The test plan acts as the anchor.

- For the execution, tracking and reporting of the entire testing project.
  - Activities of test plan:
    1. Scope Management: Deciding what features to be tested and not to be tested.

2. Deciding Test approach /strategy: Which type of testing shall be done like configuration, integration, localization etc.
3. Setting up criteria for testing: There must be clear entry and exit.
4. Criteria for different phases of testing: The test strategies for the various features and combinations determined how these features and combinations would be tested.

5. Identifying responsibilities, staffing and training needs.
6. Identifying resource requirements.
7. Identifying test deliverables.
8. Testing tasks: size and effort estimation.

Sr. No.	Question	Mark and year

1	Why it is essential to setup criteria for testing? List any 3 criteria in different situations.	4 marks, W-15

- Setting up criteria for testing:
- There must be clear entry and exit criteria, pass or fail criteria, suspend criteria, Resume criteria for different phases of testing.

- The test strategies for the various features and combinations determined how these features and combinations would be tested.
- Entry & exit criteria: criteria to start and stop testing.
- Pass or fail: - Specify the criteria that will be used to determine whether each test item has passed or failed testing.

- Suspend Criteria: - Specify the criteria to be used to suspend test activity.

  - Defect causing frequent stoppage of testing activity.

- Resume Criteria: - Specify the criteria which must be redone when testing is resumed.
- Identifying Responsibilities, Staffing

- A testing project requires different people to play different roles.
- There are roles of test engineers, test leads and test managers.
- There is also role definition on the dimensions of the modules being tested or the type of testing.

- These different roles should complement each other.
- The different role definition should -
- Ensure there is clear accountability for a given task, so that each person knows what he or she has to do,
- Clearly list the responsibilities for various functions to various people, so that everyone knows how his or her work fits into the entire project.
- Complement each other, ensuring no one steps on an others' toes

- Supplement each other, so that no task is left unassigned.
- Role definition should not only address technical roles, but also list the management and reporting responsibilities.
- This includes frequency, format and recipients of status reports and other project-tracking mechanism.
- Staff training

- This activity of test planning will give the idea about the following points:
- 1. How many staff needs training?
- 2. Who are the attendees?
- 3. What training needs to be given?
- 4. What are the pre requisites of the training?
- 5. How long will be the training?
- 6. Where training will be conducted?

- Identifying Resource requirements

Sr. No.	Question	Mark and year
1	What factors shall be considered while selecting Resource requirements	4 marks, W-15

- Factors to be considered while selecting the resource requirements are:
  - People:
    - How many people are required?
    - How much experience they should possess?
    - What kind of experience is needed?
    - What should they beexpertise in?
    - Should they be full-time, part-time, contract, students?

- Equipment:
  - How many Computers are required?
  - What configuration (OS, RAM, Processor, Disk etc.) computers will be required?
  - What kind of test hardware is needed?
  - Any other devices like printers, tools, etc.
  - Licenses of all softwares
- Office and lab space:
  - Where will they be located?
  - How big will they be?
  - How will they be arranged?

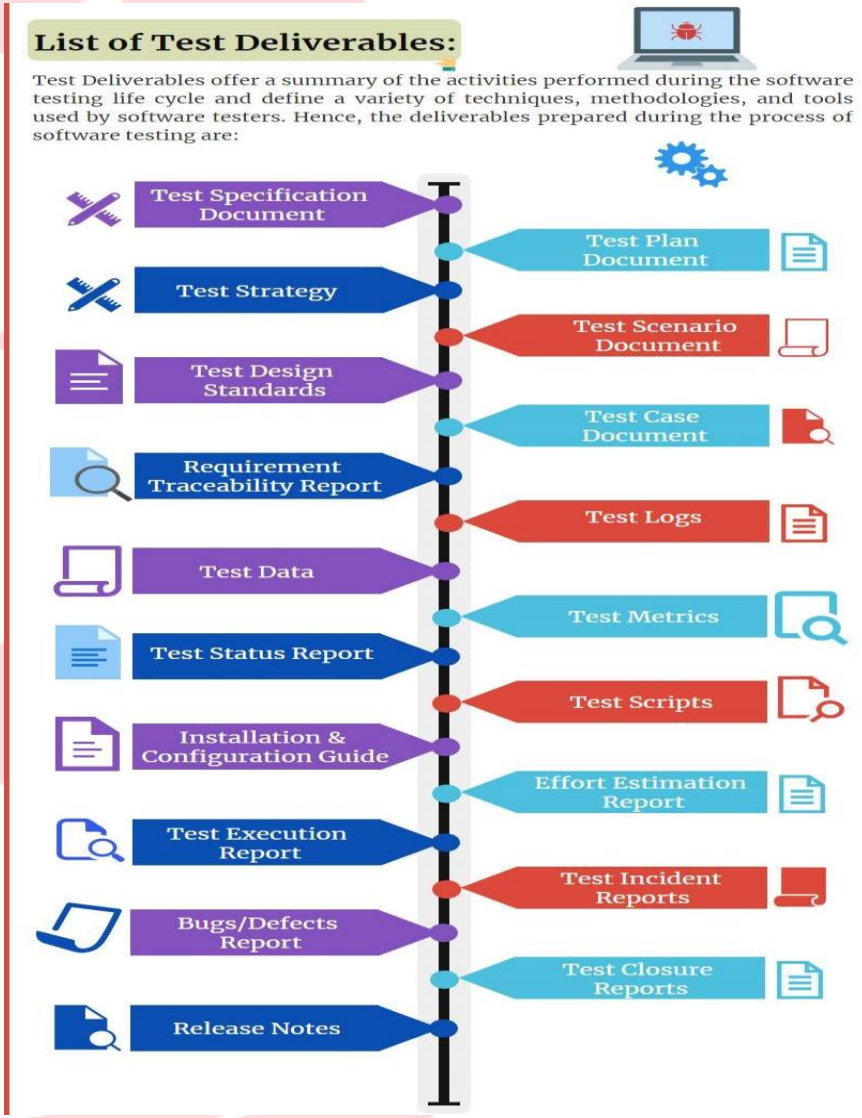
- Software: Word processors, databases, custom tools. What will be purchased, what needs to be written?
- Outsource companies:
  - Will they be used?
  - What criteria will be used for choosing them?
  - How much will they cost?

- Miscellaneous supplies: Disks, phones, reference books, training material.
- What else might be necessary over the course of the project?

- The specific resource requirements are project-, team-, and company-dependent, so the test plan effort will need to be carefully evaluated
- what will be needed to test the software.

- Test Deliverables and Milestones –
- Identifying test

	Question	Marks and year
1	Explain Test Deliverables in detail.	4 marks, S-15, W-17
2	What is Test Deliverables	4 marks, S-16, W-18



- Test Deliverables are the artifacts which are given to the stakeholders of software project during the software development lifecycle.
- There are different test deliverables at every phase of the software development lifecycle.

- Some test deliverables are provided before testing phase, some are provided during the testing phase and some after the testing cycles is over.

- The deliverables include following:

1. The Test Plan itself (Master test plan, Phase Test Plan, etc.)
2. Test case design specifications.
3. Test cases as well as any automation which is mentioned in the plan.
4. Test logs generated by executing the tests.
5. Test summery reports.

- The test plan describes the overall method to be used to verify that the software meets the product specification and the customer's needs.
- It includes the quality objectives, resource needs, schedules, assignments, methods etc.

- Test cases list the specific items that will be tested and describe the detailed steps that will be followed to verify the software.
- Bug reports describe the problems found as the test cases are followed.
- Test tools and automation are listed and described which are used to test the software.

- If the team is using automated methods to test software, the tools used, either purchased or written in-house, must be documented.
- Metrics, statistics, and summaries convey the progress being made as the test work progresses. They take the form of graphs, charts, and written reports.

- Milestones:

* milestones are the dates of completion given for various tasks to be performed in testing.

* These are thoroughly tracked by the test manager and are kept in the documents such as Gantt charts, etc.

- Testing Tasks (short note on Testing Tasks)
- Estimation happens broadly in following phases
  1. Size estimation
  2. Effort estimation
- Size estimation is used to show the actual amount of testing which is necessarily to be done. Number of factors contribute to the size estimate of a testing project.

–Size of product under test:

- Larger the product, normally, greater is the size of testing to be done.

- Few measures of size regarding product under test are as follows:
- Lines of Code (LOC) : It is considered little bit controversial point since it depend on language used, respective style of coding, compactness of programming, etc.

- Despite of all limitations Lines of Code is still considered as a popular measure for estimating size.
- A Function Point (FP): It pays most of attention on functionality of the system
- There are 5 parameters used to count function points:

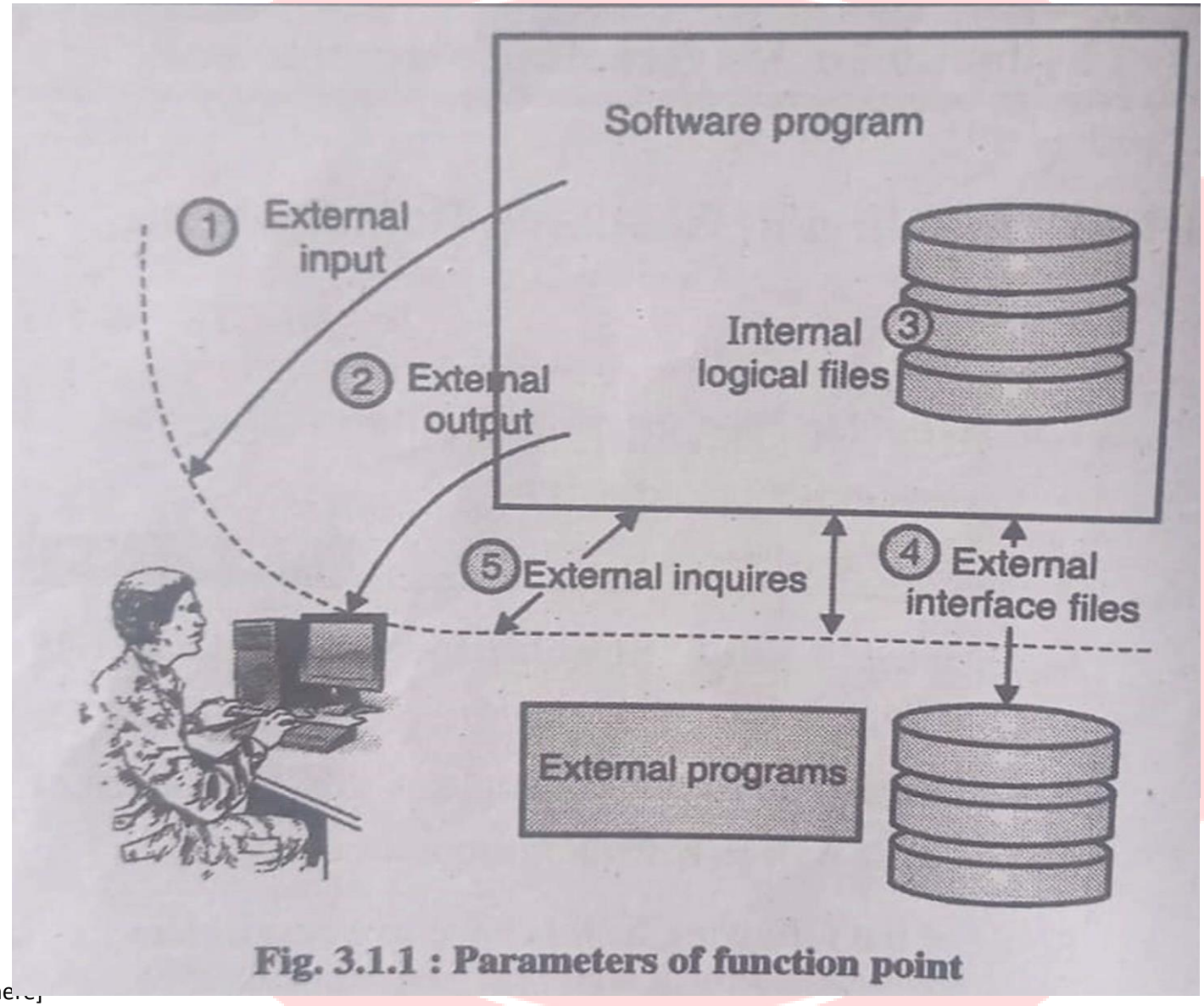


Fig. 3.1.1 : Parameters of function point

Parameter	Complexity	
External Input (Useful for counting Every input coming from outside, If Input can be data or control parameters)	Simple,.	the count of inputs is less and affects smaller amount of internal files
	Complex	Logical Internal files Simple,. (Every software system maintains internal files,
	Average	Complex
External Output (Useful for counting all Complex output provided by system)	Simple,.	functional information,
	Average	Logical data of system)

Parameter	Complexity	
If the count of inputs is high and affects smaller amount of internal files It lies in between simple and Complex If the count of Output is less If the count of Output is high It lies in between simple and		Complex If the number of record types is less If the number of record types is high in between simple and Complex

External Interface Files (Sharing files with some external software or may require files to pass on to input	Simple,.	If the number of record types is less
	Complex	If the number of record types is high
	Average	in between simple and Complex

for other function)		
External Enquiry (it is a mixture of input and output where user sends some data to ask about as input and	Simple,.	If query requires low processing and produce small amount of output data
	Complex	If query requires deep processing

system responds to the user with output of inquiry processed)		and produce large amount of output data
	Average	in between simple and Complex

Sr. No.	Question	Mark and year
1	What is test management?	2 marks, S-16, W-17

- Test Management:
- It refers to the activity of managing the software testing process.
- It is concerned with both test resources and test environment management.
- It is the role of test management to ensure that new or modified service products meet business requirements for which they have been developed or enhanced.

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- Aspects in the test management

1. Test infrastructure Management
2. Test people/Team management

Sr. No.	Question	Mark and year
1	Explain the Test infrastructure ?	4 marks, S-16, W-17

- Test infrastructure Management

1. The testing infrastructure consists of the testing activities, events, tasks, and processes that immediately support automated, as well as manual, software testing.

2. The stronger the infrastructure the more it provides the stability, continuity and reliability of the automated testing process.

- The testing infrastructure includes:
  - Test plan.
  - Test cases.
  - Baseline test data.
  - A process to refresh or roll back to baseline.
  - A dedicated test environment .
  - A dedicated test lab.
  - Integration groups and process.

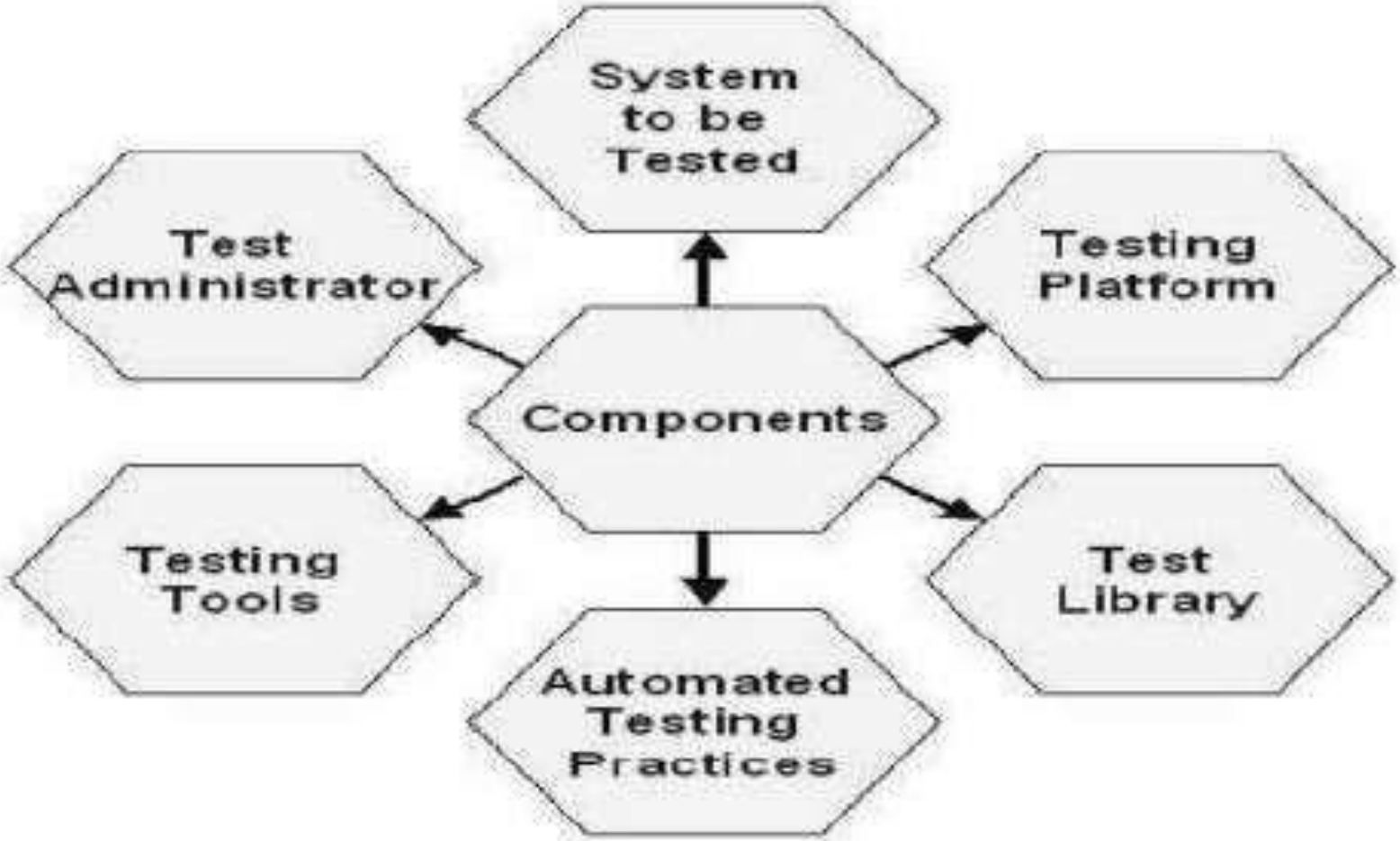
- Test case database, to track and update both automated and manual testing.
- A way to prioritize, or rank, test cases per test cycle.
- Coverage analysis.
- Defect tracking database.
- Risk management metrics/process.
- Version control system.
- Configuration management process.
- Metrics to measure improvement.

- A test case database (TCDB) (additional)
- A test case database captures all the relevant information about the test cases in an organization. Some of the entities and the attributes are given in following table

Entity	Purpose	Attributes
Test case	Records all the —staticl information about the tests	• Test case ID • Test case name (filename) • Test case owner • Associated files for the test case
Test case- product cross reference	Provides a mapping between the tests and the corresponding product features ; enables identification of tests for a given feature	• Test case ID • Modulate ID
Test case run history	Gives the history of when a test was run and what was the result; provides inputs on selection of tests for regression runs [redacted]	• Test case ID • Run date • Time taken • Run status (success/failure)
Test case – Defect cross reference	Gives details of test cases introduced to test certain specific defects detected in the product ;provides inputs on the selection of tests for regression runs	• Test case ID • Defect reference# (points to a record in the defect repository)

- Defect Repository

Entity	Purpose	Attributes
Defect details	Records all the — static information about the tests	• Defect ID • Defect priority /severity • Defect description • Affected product(s) • Any relevant version information (for example, OS version) • Customers who encountered the problem (could be reported by the internal testing team also) • Date and time of defect occurrence
Test case- product cross reference	Provides a mapping between the tests and the corresponding product features ; enables identification of tests for a given feature	• Test case ID • Modulate ID
Test case run history	Gives the history of when a test was run and what was the result; provides inputs on selection of tests for regression runs (see chapter 8)	• Test case ID • Run date • Time taken • Run status (success/failure)
Test case – Defect cross reference	Gives details of test cases introduced to test certain specific defects detected in the product ;provides inputs on the selection of tests for regression runs	• Test case ID • Defect reference# (points to a record in the defect repository)



Test Infrastructure

2) Test People Management

- Test team can comprises of individuals having varying skill levels, experience levels, expertise levels, different attitudes, and different expectations/interests/need.
- People management is an integral part of any project management and test planning.

- People management also requires the ability to hire, motivate, and retain the right people.

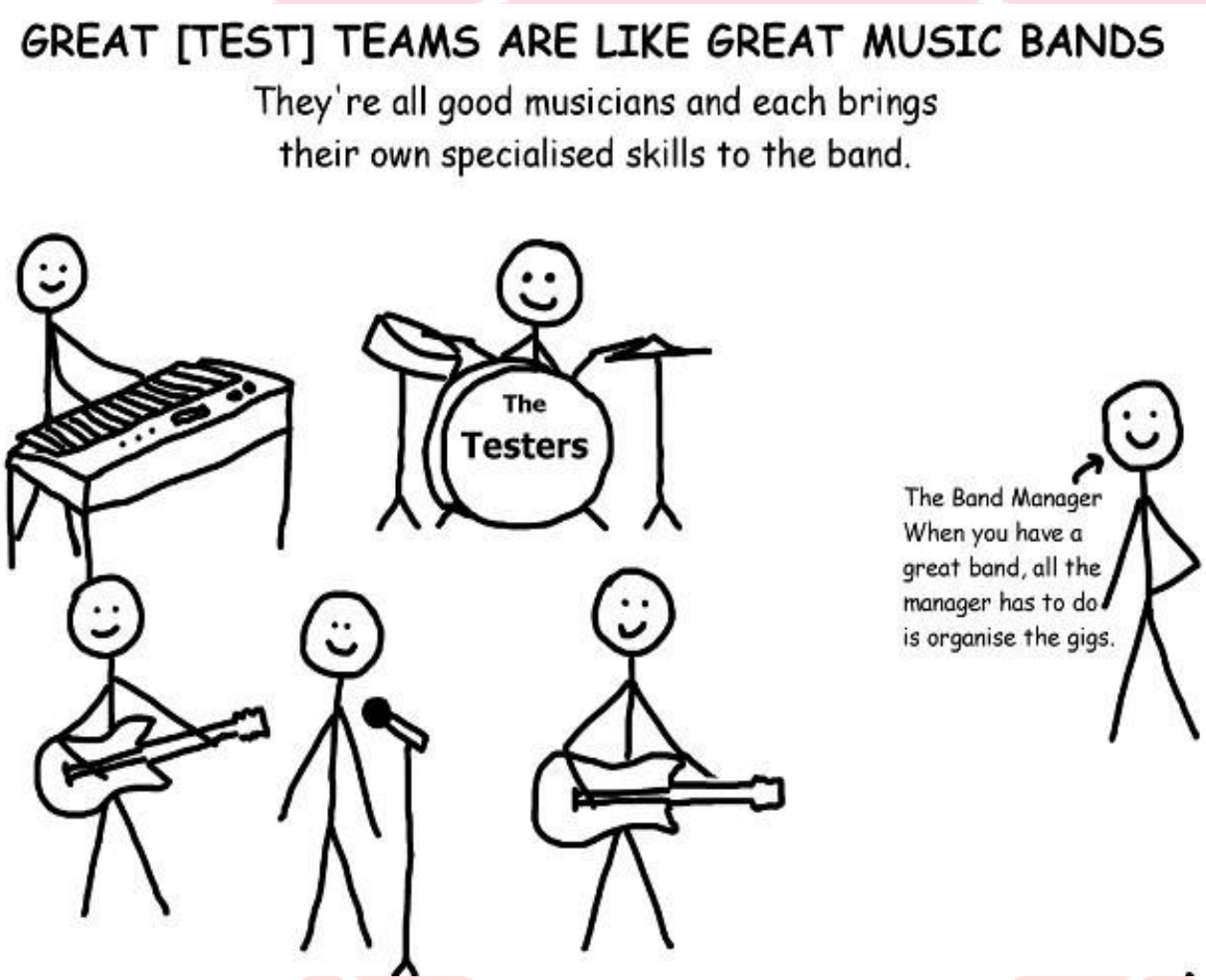
- These skills are seldom formally taught.
- Testing projects present several additional challenges.
- We believe that the success of a testing organization depends vitally on judicious people management skills.

- Test Lead/leadership responsibilities:
  - Identify how the test teams formed and aligned within organization
  - Decide the roadmap for the project
  - Identify the scope of testing using SRS(Source Requirement Specification) documents.
  - Discuss test plan, review and approve by management/ development team.
  - Identify required metrics
  - Calculate size of project and estimate efforts and corresponding plan.

- Identify skill gap and balance resources and need for training education.
- Identify the tools for test reporting , test management, test automation
- Create healthy environment for all resources to gain maximum throughput.
- Identify how the test teams formed and aligned within organization management/ development team.

- Test team responsibilities:

- Initiate the test plan for test case design
- Conduct review meetings
- Monitor test progress , check for resources, balancing and allocation
- Check for delays in schedule discuss, resolve risks if any.



Test Process

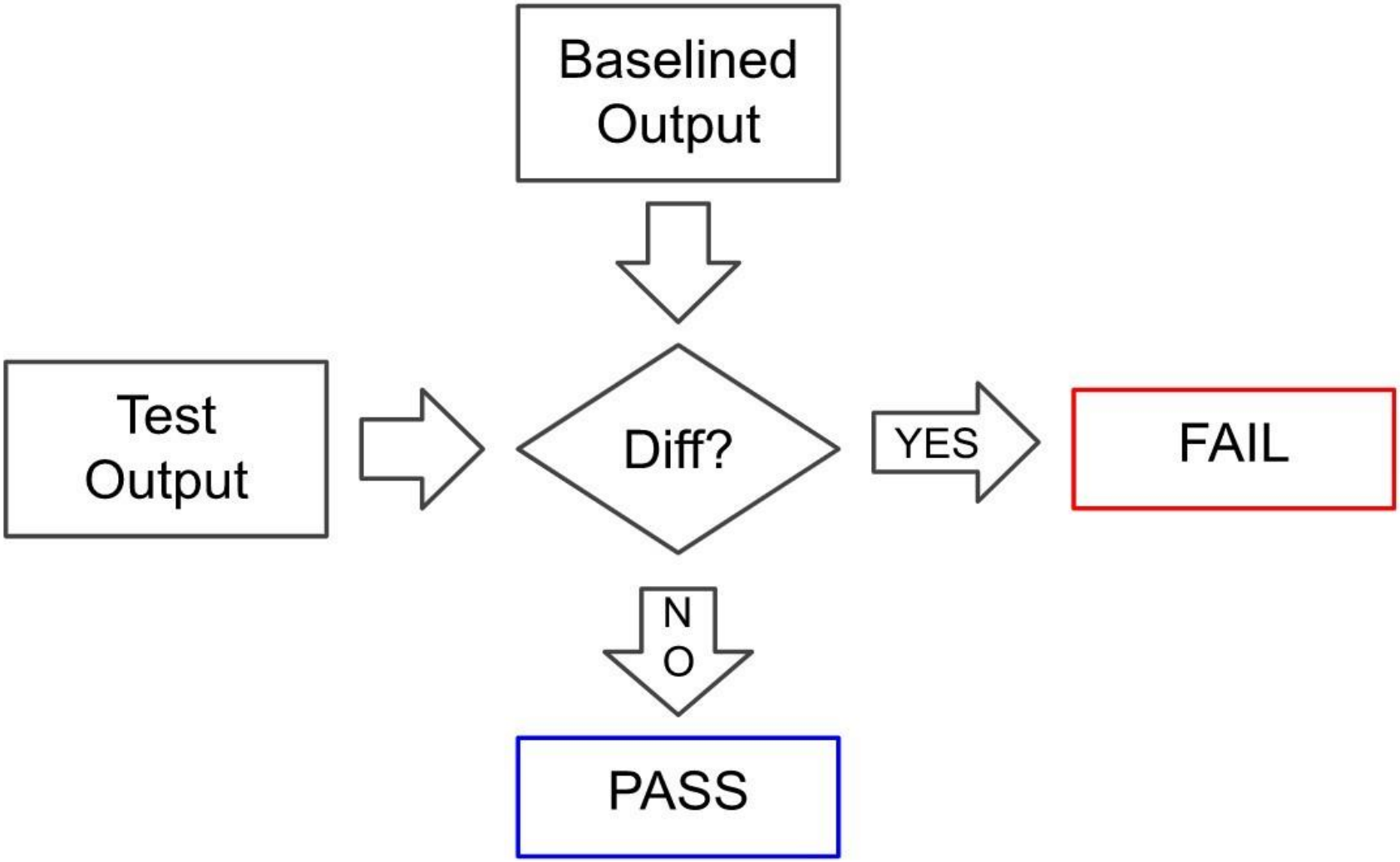
- Testing is not a single activity but it's a set of activities.
- It includes:

1. Base lining of test plan
2. Test Case Specification

- Base lining a test plan:
- Definition: Base line testing refers to the validation of documents and specifications on which test cases are designed.
- Base line testing is a non-functional testing.
- It is performed by testing engineers.
- It is related to benchmarking, also known as benchmark testing.

- A benchmark that forms the base of any new creation.
-
- Many problems are discovered and solved during baseline testing.
- This test forms the base for other testing to compare the performance of a new application or unknown application.

- For example, a new application is known to give a good performance for 1000 users at a time then baseline 1000 becomes a benchmark.



Sr. No.	Question	Mark and year
1	How Test case Specifications useful in designing Test case ?	4 marks, W-15
2	What are the things that Test case Specifications shall identify	4 marks

		, W-16
3	Describe test case specification of test process	4 marks , S-17

- Test Case Specification
- Test case Specification document describes detailed summery of what scenarios will be tested ,How they will be tested, how often they will be tested

- It specifies purpose of a specific test, identifies the required inputs and exepected results.
- Test case Specification has to be done separately for each unit, based on the approach specified in the test plan, the feature to be tested for each unit must be determined.
- The overall approach stated in the plan is refined into specific test techniques that should be followed

- Test plan is a collection of all test specifications for a given area. The test plan contains a high-level overview of what is tested for a given feature area.
- Test case specification identifiers:
- A way to uniquely identify a test case is as follows:

1. Test case objective Purpose of the test

1. Test Items Items required to run a particular test case(e.g. requirement specifications, design specifications, code, language etc)

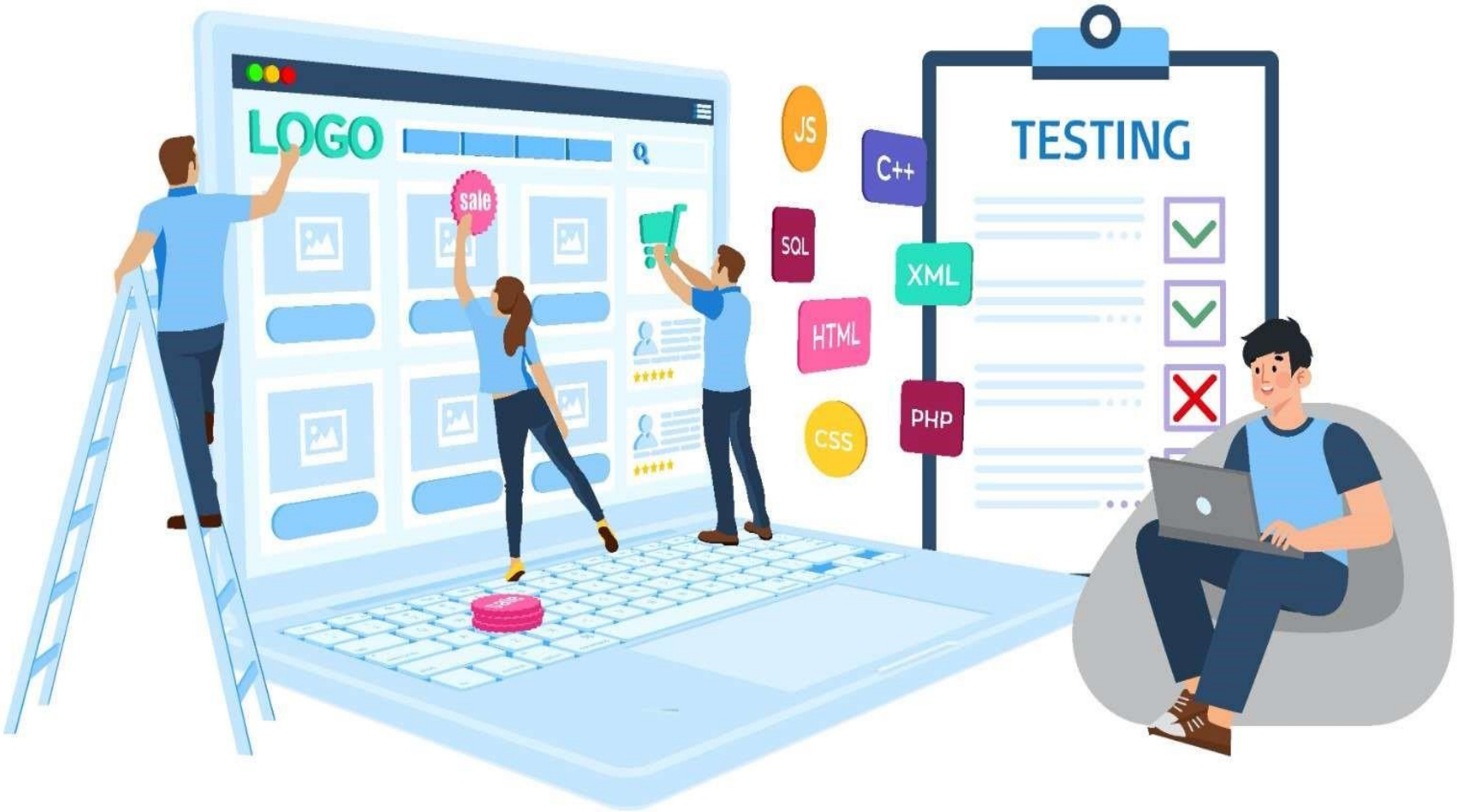
1. Input specifications	Description of what is required to execute the test case(input files, or value that must be entered in a particular field)
1. Output Expected Results	- Description of what the specifications system should look like
1. Environmental	Any specific environmental need like hardware needs and software tools, records ir files, interfaces etc.

- To sum up : A test case specification in software testing is a critical document that outlines the precise

steps and conditions for testing a specific aspect of a software application.

- It acts as a detailed blueprint, outlining precisely what scenarios need testing, how to conduct those tests, and how frequently they should be performed for a specific software feature.

• Test Reporting : Executing Test Cases



- Test Execution is the process of executing the tests written by the tester to check whether the developed code or functions or modules are providing the expected result as per the client requirement or business requirement.
- Test Execution comes under the phases of the Software Testing Life Cycle (STLC).

- In the test execution process, the tester will usually write or execute a certain number of test cases, and test scripts or do automated testing.

- If it creates any errors then it will be informed to the respective development team to correct the issues in the code.
- If the text execution process shows successful results then it will be ready for the deployment phase after the proper setup for the deployment environment.

- Test execution is useful in these cases:
  1. Validating the software requirements to ensure that the system functions as intended.
  2. Identifying and reporting defects or issues in the software by comparing actual results with expected results.
  3. Verifying that each component, module, or feature of the software performs as per the design and functional specifications.

4. Confirming that new changes or enhancements to the software do not negatively impact existing functionality.
5. Validating the software documentation.

- Solved Test Cases

Q. 3.4.1 Prepare six test cases for admission form for college admission. (Ref. Sec. 3.4.1) **S-15, W-17 4 Marks**

☑ **Ans. :**

Consider the college admission form having different fields such as Students Name, Fathers Name, Address, Phone, Caste, admission type, S.S.C percentage, SC Board, Submit button, Reset button.

Test Case Id	Test case Objectives	Input Data	Expected Result	Actual Result	Status
TC1	Name Field	Any name (abcd xyz)	It should accept the name	The name is accepted	Pass
TC2	Phone Field	Any number having less than 10 digits (1234)	It should not accept. Should give error message "Please enter valid phone number"	Error message "Please enter valid phone number"	Pass
TC3	Phone Field	Any alphabets (abcde)	It should give error message as "Only Numbers"	Error message as "Only Numbers"	Pass

Test Case Id	Test case Objectives	Input Data	Expected Result	Actual Result	Status
TC4	SSC Percentage Field	65	It should accept	It accepted	Pass
TC5	SSC Percentage Field	30	It should not accept. Should give error message.	Gives error message	Pass
TC6	Address Field	Any characters (A-51, Market road, Mumbai)	It should accept.	It accepted	Pass

Q. 3.4.5 Prepare and write four test cases for Library Management System of college. (Ref. Sec. 3.4.1) **(Likely Ques) (4 Marks)**

Ans. :

Sr. No.	Test Case	Expected Result	Test Result
1.	On the lick of ADD button	At first user have to fill all fields with proper data, if any error like entering text data instead of number or entering number instead of text is found then it gives proper message otherwise Adds Record To the Database	Successful
2.	On the Click of DELETE button	This DELETES the details of book by using Accession no.	Successful
3.	On the Click of UPDATE button	Modified records are Updated in database by clicking UPDATE button.	Successful
4.	On the Click of SEARCH button	Displays the details of book for entered Accession no. Otherwise gives proper error message.	Successful
5.	On the Click of CLEAR button	Clear all fields.	Successful

(Likely Ques) (4 Marks)

- REFER QP SOLUTION 5
- Test Cases PPT

Sr. No.	Question	Mark and year
1	Describe test reporting in detail	4 marks, S-15, S-18

2	Describe 2 types of test reports	4 marks, W-16
3	What are types of test report? Write contents of test summery report	4 marks, S-17

- Preparing test summery:

- Test needs continuous communication between test team and other teams
- Test Reporting: Test reporting is a means of achieving communication through the testing cycle.
- There are 3 types of test reporting.

1. Test incident report:

- A test incident report is communication that happens through the testing cycle as and when defects are encountered.
- A test incident report is an entry made in the defect repository.
- Each defect has a unique id to identify incident .
- The high impact test incident are highlighted in the test summary report.

2. Test cycle report:

- A test cycle involves planning and running certain test in a cycle,
- Each cycle referring a different build of the product.
- As the product progresses through the various cycles it is expected to stabilize.
- Test cycle report gives:

1. A summary of the activities carried out during that cycle.

2. Defects that are uncovered during that cycle based on severity and impact.
3. Progress from the previous cycle to the current cycle in terms of defect fixed.
4. Outstanding defects that not yet to be fixed in cycle.
5. Any variation observed in effort or schedule.

3. Test summary report:

- A test summary report has the role of a comprehensive documentation of the testing

activities conducted throughout the software development life cycle (SDLC).

- The final step in a test cycle is to recommend the suitability of a product for release.
- A report that summarizes the result of a test cycle is the test summary report.
- There are two types of test summary report:

  1. Phase wise test summary, which is produced at the end of every phase

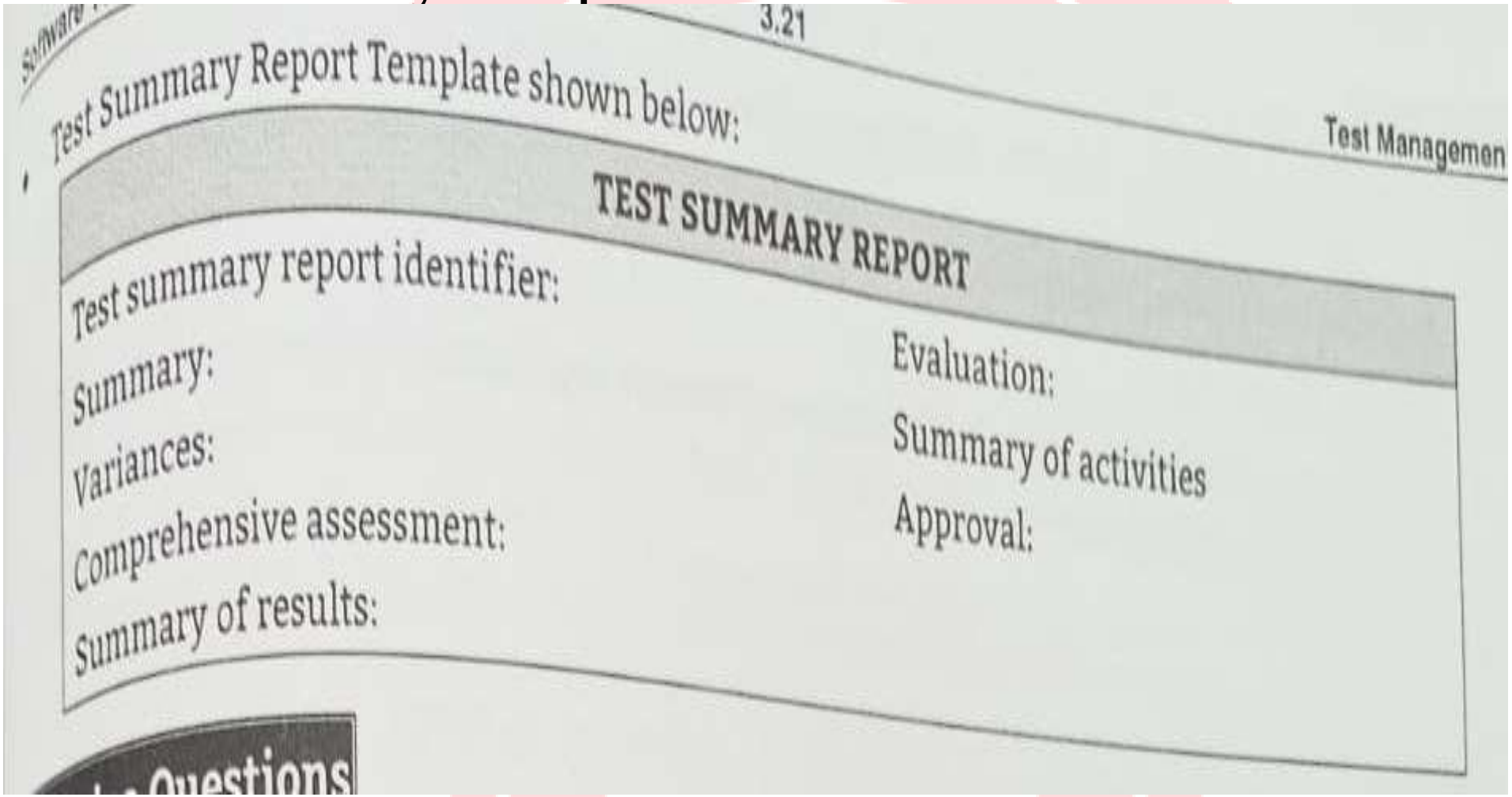
2. Final test summary report.

- Aspects covered by Test Summary Report:
- Project Information: name, version, date, time
- Test Objective: purpose of testing(every testing has different purpose).

- Test Summary: summary of testing process(executed, passed, failed, blocked, comments from testers).
- Defects: bugs and their status-open, closed, resolved-their severity and priority.

- Format Of Test Summary Report
- The standard for reporting is IEEE-829:1998

Test summery template



3.21

Test Summary Report Template shown below:

Test Managemen

TEST SUMMARY REPORT

Test summary report identifier:

Summary:

Variances:

Comprehensive assessment:

Summary of results:

Evaluation:

Summary of activities

Approval:

Questions

Sr. No.	Question	Mark and year
1	How to prepare a test summery report?	4 marks, S-15, S-18
2	State the components of test summery report?	4 marks, S-16,W-18

- Let's see in next slides

- There are 8 sections in of format of test summary report:

1. Test Summary Report Identifier: Unique ID Number
2. Summary: Testing process is summarized in a report . it also defines following details:
   A. Test Items: as per test plan
   B. Test Environment: as stated in test plan
   C. References: document that supports the report

3. Variances: any changes or deviations in the plan that are agreed by everyone in the reference document .
4. Comprehensive Assessment: determining quality and effectiveness of testing activities
5. Summary Of Result: details about the impact of testing

6. Evaluation: information about testing process, its limitations, drawbacks, failures, risk areas, good quality areas and features
7. Summary of Activities: efforts and time invested in testing activities
8. Approval: approvals from the authority in the form of signature and documentations.

- Advantages of Test Summary Report
  - It justifies and provides insight of testing efforts taken by team
  - Reports the current status of the project
  - Helps to measure quality of end product
  - Corrective actions can be taken with the help of test summary reports.
  - It is the final document to determine weather s/w is ready to release or not.

- Finally, A test plan answers the following questions:
  - WHAT is to be tested,
  - HOW it is to be tested,
  - WHO is to do the testing,
  - WHAT resources they will need,
  - WHEN they will do it, and
  - WHAT can go wrong.