Assignment Module - 2

Q:- What is Exploratory Testing?
Answer:
Exploratory Testing is a **manual testing technique** in which the tester simultaneously **learns about the application, designs test cases, and executes them dynamically** without relying on pre-defined test scripts. It is an **experience-based testing approach** that focuses on exploring the system to discover defects using the tester's domain knowledge, creativity, and analytical skills.

Key Characteristics of Exploratory Testing:

1. **Unscripted Approach:** Testing is performed without formal test cases.
2. **Simultaneous Learning and Testing:** The tester learns about the application while testing it.
3. **Real-time Test Design:** Test scenarios are created and executed instantly.
4. **Experience-driven:** Relies on the tester's skills, product knowledge, and intuition.
5. **Flexible and Adaptive:** Allows testers to adjust their focus based on observations during testing.

When to Use Exploratory Testing:

- When **requirements are incomplete or unclear**.
- In **short testing cycles** where time is limited.
- For **new or unfamiliar applications**.
- To test **critical or complex modules** of the software.
- During **ad-hoc or regression testing**.

Advantages:

- Helps in quickly **identifying critical defects**.

- Requires **less preparation time** compared to scripted testing.
- Encourages **creativity and real-world scenarios**.
- Useful for **UI/UX and usability issues**.

Disadvantages:

- **Difficult to track coverage** formally.
- Highly **dependent on the tester's expertise**.
- **Defects may be hard to reproduce** if not documented properly.

Conclusion:

Exploratory Testing is a **valuable testing technique** when time is limited or requirements are unclear. It allows testers to think freely, adapt dynamically, and uncover defects that might be missed through traditional scripted testing.

Q: What is a Traceability Matrix?

Answer:
A **Traceability Matrix (TM)** is a document used in software testing to **map and trace requirements with test cases**. It ensures that **all requirements are covered by test cases** and helps track the testing progress.

Purpose of Traceability Matrix:

- To **verify coverage of all requirements**.
- To **identify missing test cases** for any requirement.
- To **ensure no extra or irrelevant test cases** are created.

Types of Traceability Matrix:

1. **Forward Traceability:** Maps requirements to test cases.
2. **Backward Traceability:** Maps test cases back to requirements.
3. **Bi-directional Traceability:** Tracks both forward and backward mappings.

Example:

Requirement ID	Requirement Description	Test Case ID
RQ-001	Login functionality	TC-001, TC-002
RQ-002	Password reset	TC-003

Q: What is Boundary Value Testing?

Answer:
Boundary Value Testing (BVT) is a **software testing technique** in which test cases are designed to check the **boundary values of input ranges**. It focuses on testing values **at the edges (boundaries)** because defects are more likely to occur at these points rather than in the middle of input ranges.

Key Points:

- It is a **black-box testing technique**.
- Tests are created for **minimum, maximum, just inside, just outside, and exact boundary values**.
- Helps in detecting errors in **input conditions** and **loop limits**.

Example:

If an input field accepts values from **1 to 100**:

- Valid Boundary Values: **1 and 100**
- Just Inside Boundaries: **2 and 99**

- Just Outside Boundaries: **0 and 101**

Advantages:

- Simple and effective in finding boundary-related defects.
- Reduces the number of test cases while increasing coverage.

Q: What is Equivalence Partitioning Testing?

Answer:
Equivalence Partitioning (EP) Testing is a **black-box testing technique** in which the input data is divided into **equivalence classes or partitions**, and only one value from each class is tested. It assumes that if one test value in a class works, all other values in that class will also work, thereby reducing the number of test cases.

Key Points:

- Divides input data into **valid and invalid partitions**.
- Only **one representative value** from each partition is tested.
- Helps in **minimizing test cases while maintaining coverage**.

Example:

If an input field accepts values from **1 to 100**:

- **Valid Partition:** 1 to 100 → (e.g., test value: 50)
- **Invalid Partition 1:** Less than 1 → (e.g., test value: 0)
- **Invalid Partition 2:** Greater than 100 → (e.g., test value: 101)

Advantages:

- Reduces redundant test cases.
- Ensures better coverage with fewer tests.

- Easy to design and execute.

Q: What is Integration Testing?

Answer:
Integration Testing is a **software testing level** in which individual modules or components are combined and tested as a group to verify that they work together correctly. It focuses on **data flow and interaction between modules**.

Key Points:

- Conducted **after unit testing** and before system testing.
- Ensures that **interfaces between modules** function properly.
- Detects issues like **data mismatch, communication errors, and integration defects**.

Types of Integration Testing:

1. **Big Bang Integration:** All modules are integrated and tested together.
2. **Incremental Integration:** Modules are tested and integrated step-by-step.
    - **Top-down approach**
    - **Bottom-up approach**
    - **Sandwich/Hybrid approach**

Example:

In an e-commerce app, test the integration of the **"Login module"** with the **"User Dashboard module"** and verify that after logging in, user details correctly appear on the dashboard.

Advantages:

- Identifies defects in **module interactions early**.
- Reduces risk of **system-level failures** later.

Q: What determines the level of risk?

Answer:
The level of risk in software testing is determined by two main factors:

1. **Probability (Likelihood) of Occurrence:**
    - How likely it is that a defect or failure will occur.
    - Higher probability means higher risk.
2. **Impact (Severity) of Consequences:**
    - The effect or damage caused if the defect occurs.
    - Higher impact means higher risk.

Formula:

Risk Level=Probability of occurrence×Impact of failure\text{Risk Level} = \text{Probability of occurrence} \times \text{Impact of failure}Risk Level=Probability of occurrence×Impact of failure

Example:

- A **login failure** in a banking app has **high impact and high probability**, so it is **high risk**.
- A **UI alignment issue** has **low impact**, so it is **low risk** even if it occurs frequently.

Other Factors Affecting Risk:

- Complexity of the system
- Business criticality of the feature
- Frequency of use by end-users
- Past defect history

Q: What is Alpha Testing?

Answer:
Alpha Testing is a **type of software testing** performed by **internal teams (developers and testers)** within the organization before releasing the product to real users. It is conducted in a **controlled environment** to identify bugs and issues early.

Key Points:

- Done at the **end of development** but before Beta Testing.
- Performed by **internal staff**, not end-users.
- Conducted in a **lab or in-house environment**.
- Focuses on **functionality, usability, and overall quality**.

Example:

Before launching a shopping app, the internal QA team tests all features (login, product search, checkout) in the development environment to ensure the app works correctly.

Advantages:

- Detects defects early in a controlled setup.
- Reduces risk of major issues in later stages.

Disadvantages:

- Limited to internal users, so **real-world usage issues may not be found**.

Q: What is Beta Testing?

Answer:
Beta Testing is a **type of software testing** conducted by **real users in a real environment** before the final release of the product. It helps to gather **user feedback** and identify any issues that were not detected during Alpha Testing.

Key Points:

- Performed by **end-users or customers** outside the organization.
- Conducted in the **real-world environment**.
- Focuses on **usability, performance, and user satisfaction**.
- Done after **Alpha Testing** and before the official launch.

Example:

A company releases a **beta version** of its mobile app to selected users to test its features and collect feedback on any bugs or improvements needed.

Advantages:

- Provides feedback from **real users**.
- Helps identify issues missed during internal testing.
- Improves **product quality and user satisfaction**.

Disadvantages:

- Defects found at this stage may be **costly to fix**.
- **Limited control** over the testing environment.

Q: What is Component Testing?

Answer:
Component Testing is a **type of software testing** in which individual components or modules of a software application are tested separately to ensure they work as expected. It is also known as **Module Testing** or **Program Testing**.

Key Points:

- Performed after **unit testing** and before **integration testing**.

- Tests **functionality of a single component/module** in isolation.
- Usually done by **developers or testers** using test stubs and drivers if required.

Example:

Testing the **"Login Module"** of an application independently to ensure it validates credentials correctly before integrating it with the dashboard module.

Advantages:

- Helps in **identifying bugs early** in specific modules.
- Easier to **isolate and fix defects**.

Disadvantages:

- Does not test **interactions between modules**.
- May require stubs/drivers to simulate dependent modules.

Q: What is Functional System Testing?

Answer:
Functional System Testing is a **type of testing** performed on the **entire integrated system** to verify that it meets the specified functional requirements. It focuses on **what the system does** rather than how it does it.

Key Points:

- It is a **black-box testing technique**.
- Conducted after **integration testing** and before user acceptance testing (UAT).
- Validates the system against **business and functional requirements**.
- Performed in an environment that closely resembles the **production environment**.

Example:

Testing an e-commerce application's **end-to-end flow**: user login → product search → add to cart → payment → order confirmation.

Advantages:

- Ensures the system works as per **functional specifications**.
- Detects missing or incorrect functionalities.

Disadvantages:

- Does not check non-functional aspects (e.g., performance or security).
- Requires clear and complete functional requirements.

Q: What is Non-Functional Testing?

Answer:
Non-Functional Testing is a type of software testing that focuses on evaluating the **quality attributes** of a software application rather than its specific functionalities. It examines **how well the system performs** under various conditions, including **speed, usability, security, reliability, scalability, and maintainability**. Unlike functional testing, which validates what the system does, non-functional testing measures **how efficiently it performs tasks** and ensures it meets **performance and user experience standards**.

Purpose of Non-Functional Testing:

- To ensure the system is **fast, secure, and reliable**.
- To check how the software behaves under **stress or heavy load**.
- To validate **usability and user satisfaction**.
- To identify **bottlenecks and weaknesses** in system performance.

Examples of Non-Functional Testing:

1. **Performance Testing:** Measures speed and responsiveness.
2. **Load Testing:** Evaluates system behavior under expected user load.
3. **Stress Testing:** Tests system limits under extreme conditions.
4. **Security Testing:** Ensures data protection and prevents unauthorized access.
5. **Usability Testing:** Checks user interface and ease of navigation.

Advantages:

- Improves software **quality and reliability**.
- Helps **prevent performance failures** in real-world use.
- Enhances **user experience** by ensuring efficiency and stability.

Disadvantages:

- Requires **specialized tools and environments**.
- Can be **time-consuming and costly**.

Q: What is GUI Testing?

Answer:
GUI Testing (Graphical User Interface Testing) is a type of software testing that checks the **visual elements and user interface** of an application to ensure they meet design specifications and function correctly. It focuses on verifying **buttons, menus, icons, text fields, colors, layouts, and navigation** to provide a smooth user experience.

Purpose of GUI Testing:

- To ensure the interface is **user-friendly and consistent**.

- To verify that all **visual elements work as intended**.
- To detect **design defects and usability issues**.

Examples of GUI Testing:

- Checking if buttons are clickable and lead to correct actions.
- Verifying alignment, font size, and color of text fields.
- Testing navigation flow between different screens or pages.

Advantages:

- Enhances **user experience and satisfaction**.
- Detects **visual and usability issues early**.

Disadvantages:

- Can be **time-consuming** due to multiple UI elements.
- Requires frequent updates if the UI design changes.

Q: What is Adhoc Testing?

Answer:
Adhoc Testing is an **informal and unstructured type of software testing** performed without any test cases or plans. It is usually done to **find defects randomly** using the tester's knowledge, experience, and intuition about the application.

Key Points:

- Performed **without documentation or predefined test cases**.
- Mainly used to **discover unexpected defects**.

- Requires testers with **good domain knowledge**.
- Often done after formal testing is completed.

Example:

Randomly clicking different buttons or entering unexpected inputs in a login form to check if it crashes or shows errors.

Advantages:

- Quickly finds **critical defects**.
- **No preparation time** needed.

Disadvantages:

- **Unstructured** and difficult to track.
- Coverage cannot be measured.

Q: What is Load Testing?

Answer:
Load Testing is a **type of performance testing** used to check how a system behaves under **expected user load**. It ensures that the software can handle the required number of users, transactions, or data volume without performance degradation.

Purpose of Load Testing:

- To measure the **system's response time and stability** under normal and peak loads.
- To identify **bottlenecks and performance issues**.
- To ensure the system can **handle expected traffic in real-world conditions**.

Example:

Testing an e-commerce website by simulating **1,000 concurrent users** browsing and placing orders to verify its speed and stability.

Advantages:

- Prevents **performance failures** in production.
- Ensures **smooth user experience** under load.

Disadvantages:

- Requires **specialized tools** (e.g., JMeter, LoadRunner).
- Can be **time-consuming and resource-intensive**.

Q: What is Stress Testing?

Answer:
Stress Testing is a **type of performance testing** used to evaluate how a system behaves under **extreme or beyond-normal load conditions**. Its goal is to determine the **breaking point of the system** and ensure it fails gracefully without data loss or security breaches.

Purpose of Stress Testing:

- To check the system's **stability and error-handling** under heavy load.
- To identify the **maximum capacity limits** of the software.
- To ensure the system recovers properly after failure.

Example:

Simulating **10,000 users on a website** when it is designed for 2,000 users to see if it crashes or slows down.

Advantages:

- Helps in identifying **performance bottlenecks**.

- Ensures the system can handle **unexpected traffic spikes**.

Disadvantages:

- Requires **specialized tools and high resources**.
- Can be **time-consuming and complex**.

Q: What is White Box Testing and its Types?

Answer:
White Box Testing is a **software testing technique** in which the **internal structure, code, and logic of the application are tested**. The tester needs programming knowledge to design test cases based on code coverage, conditions, and paths. It is also known as **Structural Testing or Glass Box Testing**.

Purpose of White Box Testing:

- To verify the **flow of inputs and outputs** through the code.
- To ensure that all **paths, loops, and conditions** are tested.
- To identify **logical errors, coding mistakes, and security issues**.

Types of White Box Testing:

1. **Unit Testing** – Testing individual functions or modules.
2. **Integration Testing** – Testing interactions between modules.
3. **Control Flow Testing** – Checking loops, conditions, and decision points.
4. **Data Flow Testing** – Verifying proper use of variables and data flow.
5. **Statement Coverage Testing** – Ensuring all statements in the code are executed.
6. **Branch Coverage Testing** – Testing all possible branches or decision outcomes.

7. **Path Testing** – Testing all possible execution paths in the code.

Example:

Testing a login function by reviewing its code logic (e.g., checking if conditions for valid username and password are coded correctly).

Q: What is black box testing? What are the different black box testing techniques?

Answer:
Black Box Testing is a **software testing technique** in which the tester evaluates the **functionality of the application without knowing its internal code or structure**. It is focused on **input-output behavior** and is also called **Behavioral Testing or Functional Testing**.

Purpose of Black Box Testing:

- To verify whether the software meets **functional requirements**.
- To identify **defects in features, interfaces, and usability**.
- Performed by testers without coding knowledge.

Black Box Testing Techniques:

1. **Equivalence Partitioning (EP):** Dividing inputs into valid and invalid classes and testing one value from each class.
2. **Boundary Value Analysis (BVA):** Testing inputs at their boundary limits (minimum, maximum, just inside, and just outside values).
3. **Decision Table Testing:** Using tables of conditions and actions to test combinations of inputs.
4. **State Transition Testing:** Testing the behavior of the system based on different states and transitions.
5. **Use Case Testing:** Deriving test cases from real-world use cases and user scenarios.
6. **Error Guessing:** Identifying defects based on tester's experience and intuition.

Example:

Testing a login page by entering valid and invalid credentials without knowing how the authentication code works internally.

Q: What are the Categories of Defects?

Answer:
Defects in software testing are categorized based on their **severity, nature, and impact** on the application. The main categories are:

1. Based on Severity:

- **Critical Defect:** Causes complete system failure or major functionality breakdown (e.g., application crash).
- **Major Defect:** Affects main functionality but system still works partially (e.g., payment failure in an e-commerce app).
- **Minor Defect:** Does not affect core functionality but impacts usability (e.g., broken UI alignment).
- **Trivial/Low Defect:** Cosmetic issues with negligible impact (e.g., spelling errors).

2. Based on Nature:

- **Functional Defect:** When the system does not perform as per functional requirements.
- **Performance Defect:** Issues related to speed, load, or response time.
- **Usability Defect:** Poor design or navigation affecting user experience.
- **Compatibility Defect:** Application not working on specific devices, browsers, or OS.
- **Security Defect:** Vulnerabilities that allow unauthorized access or data breaches.

3. Based on Detection Stage:

- **Requirements Defect:** Errors in requirement specifications.
- **Design Defect:** Mistakes in design or architecture.
- **Code Defect:** Bugs introduced during coding.
- **Environment Defect:** Issues caused by incorrect setup or configuration.

Q: Mention what bigbang testing is?

Answer:
Big Bang Testing is an **integration testing approach** where **all modules or components are combined and tested together as a single system** in one go, rather than testing them incrementally.

Key Points:

- Performed **after all modules are developed**.
- No intermediate integration is done.
- Useful for **small systems with limited modules**.

Advantages:

- Simple to implement for **small projects**.
- Saves time in preparing multiple integration phases.

Disadvantages:

- **Difficult to isolate defects** due to simultaneous integration.
- If the system fails, **root cause identification is complex**.
- High risk as testing is delayed until the end.

Example:

In a banking application, instead of testing login, funds transfer, and balance modules separately, all modules are integrated and tested together at once.

Q: What is the Purpose of Exit Criteria?

Answer:
Exit Criteria in software testing are the **conditions or requirements that must be met before ending a testing phase or project**. Its purpose is to ensure that the software is thoroughly tested and meets the defined quality standards.

Purpose of Exit Criteria:

- To **determine when testing can be stopped**.
- To ensure that **all planned test cases are executed**.
- To verify that **critical defects are resolved**.
- To ensure the **software meets acceptance and quality standards**.
- To confirm that **deliverables (test reports, defect logs, etc.) are completed**.

Examples of Exit Criteria:

- All **high-severity defects are fixed and retested**.
- **95% test case pass rate** achieved.
- No **outstanding critical defects** remain.
- **Test coverage goals** are met.

Q: When should Regression Testing be Performed?

Answer:
Regression Testing is performed to ensure that **new code changes, bug fixes, or enhancements do not negatively impact the existing functionality of the software**. It is necessary because even minor updates in the code can unintentionally affect other parts of the system.

When to Perform Regression Testing:

1. **After Bug Fixes:**
   When defects are fixed, regression testing ensures that the fix hasn't introduced new issues in other areas of the application.

2. **After Adding New Features or Enhancements:**
   New modules or functionalities may interfere with existing ones. Regression testing verifies that the application works as intended after these changes.

3. **After Code Refactoring or Optimization:**
   Modifying code for better performance or readability may break existing logic, making regression testing necessary.

4. **During Integration Testing:**
   As different modules are integrated, regression testing helps confirm that their combined functionality works properly.

5. **Before a Release or Deployment:**
   Regression testing is done at the end of a development cycle to ensure the product is stable before going live.

6. **After System Updates or Patches:**
   When updates, patches, or maintenance activities occur, regression testing ensures no side effects are introduced.

Importance:

Regression testing is crucial for **maintaining system stability and reliability** throughout the software development lifecycle. It helps ensure customer satisfaction by reducing the risk of introducing new defects.

Q: What are the 7 Key Principles of Software Testing? Explain in Detail.

Answer:
Software testing is guided by **7 key principles** that help ensure effective and efficient testing. These principles are universally accepted in the software testing industry and provide a foundation for quality assurance.

1. Testing Shows Presence of Defects (Not Absence):

- Testing helps in detecting defects but can never guarantee that the software is completely defect-free.
- Even if no defects are found, it doesn't prove the software is perfect; it only shows that no defects were detected under the given conditions.
- **Example:** Testing a banking app may show no issues in one scenario but could still have defects in untested conditions.

2. Exhaustive Testing is Impossible:

- It is impossible to test all possible inputs, paths, and scenarios due to time and resource constraints.
- Instead, testing should be focused on **risk-based and priority-based areas** where defects are more likely to occur.
- **Example:** Instead of testing all numeric inputs (1 to 1,000,000), testers choose representative values (e.g., boundary values and equivalence partitions).

3. Early Testing Saves Time and Cost:

- Testing should start as early as possible in the **Software Development Life Cycle (SDLC)** to detect defects at an early stage.

- Early detection reduces the cost and effort required to fix defects.
- **Example:** Finding a defect during requirement analysis is cheaper than fixing it after deployment.

4. Defect Clustering:

- Most defects are often concentrated in a **small number of modules or components**.
- By analyzing past defect data, testers can focus on these high-risk areas.
- **Example:** A payment gateway module in an e-commerce site may have more defects compared to the UI module.

5. Pesticide Paradox:

- Repeated execution of the same test cases will eventually fail to find new defects.
- To overcome this, test cases need to be **reviewed, updated, and enhanced** regularly.
- **Example:** Adding new test scenarios or varying data inputs helps discover fresh defects.

6. Testing is Context Dependent:

- Testing approaches vary based on the **type of application, industry, or project requirements**.
- For safety-critical software (e.g., medical devices), more rigorous testing is needed compared to a simple website.
- **Example:** A flight control system requires strict formal testing, while a blogging site may require basic functional testing.

7. Absence-of-Errors Fallacy:

- Just because the software is defect-free doesn't mean it is **usable or meets user needs**.
- Software must also fulfill business requirements and provide value to users.
- **Example:** A bug-free ATM application is useless if it doesn't allow cash withdrawal, which is a primary user requirement.

Conclusion:

These **7 principles of testing** guide testers in designing efficient strategies, prioritizing critical areas, and focusing on both defect detection and requirement validation to ensure software quality and user satisfaction.

Q: Difference between QA vs QC vs Tester

Answer:
Software development involves **Quality Assurance (QA)**, **Quality Control (QC)**, and **Testing**, each with distinct roles but all aimed at ensuring product quality.

1. Quality Assurance (QA):

QA is a **process-oriented activity** that focuses on **preventing defects**. It ensures that proper **processes, standards, and methodologies** are followed during development. QA involves **process definition, audits, and continuous improvement**. **Goal:** To improve the **development and testing process** to prevent defects from occurring.

2. Quality Control (QC):

QC is a **product-oriented activity** that focuses on **identifying defects in the final product**. It involves **inspection, reviews, and testing results** to ensure product quality. QC is performed **after QA processes** to verify that the final product meets quality standards. **Goal:** To detect and fix defects in the product before release.

3. Tester (Testing):

A **Tester** performs **testing activities** to identify defects in the software. Testers execute **test cases, report bugs**, and ensure the application functions as expected. Testing is part of **QC** but specifically focuses on **finding defects through execution**. **Goal:** To validate functionality and ensure the software meets requirements.

Comparison Table:

Aspect	Quality Assurance (QA)	Quality Control (QC)	Tester (Testing)
Focus	Process to prevent defects	Product to identify defects	Execution to find defects
Type	Preventive (Proactive)	Detective (Reactive)	Reactive (during execution)
Performed By	QA Team / Process Experts	QC Team / Reviewers	Testers
Objective	Improve process & standards	Ensure product meets standards	Find and report defects
Stage	During development	After development	During testing phase

QA ensures processes are correct (prevention), **QC** checks the product for defects (detection), and **Testers** execute tests to find bugs and validate software functionality.

Q: Difference between Smoke and Sanity Testing

Answer:
Smoke Testing and **Sanity Testing** are two important types of software testing that help ensure software stability after development or changes.

Smoke Testing:

Smoke Testing is a **high-level testing** performed to check whether the basic functionalities of the application work correctly. It is also known as **Build Verification Testing**. If the smoke test fails, the build is rejected. **Purpose:** To verify the stability of the build before proceeding to detailed testing. **Example:** Checking if the login page loads and allows login after a new build.

Sanity Testing:

Sanity Testing is a **narrow and focused testing** performed to verify that specific functionalities work after minor changes or bug fixes. It is a **subset of regression testing**. **Purpose:** To check whether recent changes have not affected existing functionalities. **Example:** After fixing a payment gateway bug, sanity testing is done to ensure payment works correctly.

Comparison Table:

Aspect	Smoke Testing	Sanity Testing
Purpose	Check basic build stability	Verify specific functionalities
Depth	Broad and shallow	Narrow and deep
Performed When	After new build is released	After minor changes or bug fixes
Focus	Overall application functionality	Specific module or feature
Type	Shallow initial testing	Subset of regression testing

Conclusion:

Smoke Testing ensures the build is stable for further testing, while Sanity Testing validates specific functionalities after changes or fixes.

Q: Difference between Verification and Validation

Answer:
Verification and **Validation** are two important quality assurance processes in software testing that ensure the correctness of software.

Verification:

Verification is the process of checking whether the software is built **according to the requirements and design specifications**. It focuses on **reviewing documents, plans, and code** without executing the program. **Purpose:** To ensure the product is being built correctly. **Example:** Reviewing requirement documents and design specifications.

Validation:

Validation is the process of checking whether the developed software meets the **business needs and expectations of the end-user**. It involves **executing the software** and testing its functionalities. **Purpose:** To ensure the right product is built for the user. **Example:** Testing the login function to confirm it works as per user requirements.

Comparison Table:

Aspect	Verification	Validation
Focus	Ensures software is built correctly	Ensures correct software is built
Method	Reviews, walkthroughs, inspections	Actual testing and execution
Stage	During development phase	After development phase
Performed By	QA team (process-focused)	Testing team (product-focused)

Objective	Prevent defects	Detect defects in the final product

Conclusion:

Verification checks whether the software is correctly built as per design, while Validation confirms whether it fulfills user requirements through execution and testing.

Q: Explain Types of Performance Testing

Answer:
Performance Testing is a type of testing used to evaluate the **speed, scalability, stability, and responsiveness** of a software application under different workloads. It ensures the software performs efficiently in real-world conditions. The main types of performance testing are:

1. Load Testing:

Load Testing measures the system's performance under **expected user load**. It verifies how the application handles normal traffic.
Example: Testing an e-commerce website with 1,000 users accessing it simultaneously.

2. Stress Testing:

Stress Testing checks the system's performance under **extreme or beyond-normal load conditions** to determine its breaking point.
Example: Increasing users beyond the expected limit until the website crashes.

3. Spike Testing:

Spike Testing evaluates how the system handles a **sudden increase or decrease in user load**.
Example: Simulating an instant surge of users during a flash sale.

4. Endurance (Soak) Testing:

Endurance Testing verifies the system's stability under **continuous load over a long period** to identify memory leaks or performance degradation.
Example: Running a banking app with 500 users continuously for 24 hours.

5. Volume Testing:

Volume Testing checks system performance with a **large amount of data** in the database.
Example: Testing a payroll system with millions of employee records.

6. Scalability Testing:

Scalability Testing ensures that the system can **scale up or down efficiently** based on increasing or decreasing user load.
Example: Adding more servers to see if performance improves under high traffic.

Conclusion:

These types of performance testing help identify bottlenecks, ensure system reliability, and improve user experience under different load conditions.

Q: What is Error, Defect, Bug, and Failure?

Answer:
In software testing, terms like **Error**, **Defect**, **Bug**, and **Failure** are closely related but have different meanings.

1. Error:

An **Error** is a mistake made by a developer or programmer while writing the code or designing the system. It is a **human mistake** that leads to incorrect or incomplete software.
Example: A developer writing `a = b + c` instead of `a = b - c`.

2. Defect:

A **Defect** is a deviation from the expected behavior found during the **development or testing phase** before releasing the product. It occurs when an error is detected in the code or design.
Example: The login page does not redirect to the dashboard as per the requirement.

3. Bug:

A **Bug** is a defect reported by a **tester during the testing phase**. It is logged in the bug tracking system and must be fixed by developers.
Example: During testing, a tester finds that clicking "Submit" does nothing and reports it as a bug.

4. Failure:

A **Failure** occurs when a defect or bug is not detected and reaches the **end user**, causing the software to behave incorrectly in production.
Example: After release, users find that the payment page crashes when processing transactions.

Key Difference Table:

Term	Stage Detected	Meaning	Example
Error	During development	Developer's mistake in coding or logic	Wrong formula written in code
Defect	During development/testing	Deviation from requirement	Login button doesn't work in testing
Bug	During testing	Defect reported by tester	Tester logs an issue in bug tracking tool
Failure	After release (production)	Defect impacting end-users	Payment crashes in live environment

Conclusion:

An error leads to a defect, which when detected by a tester becomes a bug, and if unresolved, results in failure in the production environment.

Q: Difference between Priority and Severity

Answer:
In software testing, **Priority** and **Severity** are used to classify defects or bugs based on their importance and impact on the software.

1. Severity:

Severity indicates the **impact of a defect on the functionality of the system**. It is related to how serious the defect is in terms of software operation.
Example: If the login page is not opening, it is a **high severity** defect because the core functionality is blocked.

2. Priority:

Priority defines the **order in which a defect should be fixed** based on business needs. It is determined by how urgently the defect should be resolved.
Example: A spelling mistake in the homepage banner is **low severity** but may be **high priority** if the client demo is scheduled soon.

Comparison Table:

Aspect	Severity	Priority
Definition	Impact of the defect on the system	Urgency to fix the defect
Focus	Technical issue (functionality)	Business needs and deadlines
Decided By	Tester or QA team	Product owner or project manager
Type	High, Medium, Low (impact level)	High, Medium, Low (fix urgency)
Example	System crash = High severity	UI typo during demo = High priority

Conclusion:

Severity measures **how serious a defect is**, while Priority decides **how quickly it should be fixed** based on business requirements.

Q: What is Bug Life Cycle?

Answer:
A **Bug Life Cycle** (or Defect Life Cycle) is the process that defines the **stages a bug goes through from identification to closure** in software testing. It helps track and manage bugs effectively to ensure they are fixed properly.

Stages of Bug Life Cycle:

1. **New:**
   The bug is detected and logged by a tester for the first time.

2. **Assigned:**
   The bug is assigned to a developer for analysis and fixing.

3. **Open:**
   The developer starts working on fixing the bug.

4. **Fixed:**
   The developer resolves the bug and marks it as fixed.

5. **Retest:**
   The tester retests the bug to verify if the fix is correct.

6. **Verified:**
   If the bug is fixed successfully and works as expected, it is marked as verified.

7. **Closed:**
   The tester closes the bug after confirming it no longer exists.

8. **Reopened (if needed):**
   If the bug persists even after fixing, it is reopened and sent back to the developer.

9. **Rejected/Deferred:**

    - **Rejected:** If the bug is invalid or not considered an issue.

    - **Deferred:** If the bug is valid but will be fixed in a future release.

Flow of Bug Life Cycle:

New → Assigned → Open → Fixed → Retest → Verified → Closed (or Reopened/Rejected/Deferred if necessary)

Conclusion:

The Bug Life Cycle helps in tracking the progress of defect resolution and ensures proper communication between testers and developers for high-quality software delivery.

Q: Explain the Difference between Functional Testing and Non-Functional Testing

Answer:
Functional Testing and **Non-Functional Testing** are two major types of software testing, but they differ in purpose, focus, and approach.

1. Functional Testing:

Functional Testing verifies that the **software functions according to the specified requirements**. It focuses on **what the system does** and ensures that each feature works correctly.

- **Objective:** Validate the actions and operations of the software.
- **Performed By:** Testers (manual or automation).
- **Examples:** Login validation, form submission, payment processing.
- **Techniques Used:** Black box testing techniques such as Equivalence Partitioning, Boundary Value Analysis.

2. Non-Functional Testing:

Non-Functional Testing evaluates the **performance and quality attributes** of the software rather than its functionalities. It focuses on **how well the system performs** under various conditions.

- **Objective:** Assess performance, usability, security, and reliability.
- **Performed By:** Testers with specialized tools and skills.
- **Examples:** Load testing, stress testing, security testing.

- **Techniques Used:** Tools like JMeter, LoadRunner for performance testing.

Comparison Table:

Aspect	Functional Testing	Non-Functional Testing
Focus	Validates what the system does	Validates how the system works
Objective	Check features against requirements	Check performance and quality attributes
Techniques	Black Box Testing methods	Specialized testing tools and methods
Examples	Login, signup, payments	Load, stress, usability, security testing
Importance	Ensures correct functionality	Ensures speed, scalability, and reliability

Conclusion:

Functional Testing ensures that software features meet requirements, while Non-Functional Testing ensures that the software performs efficiently and is user-friendly under different conditions. Both are essential for delivering a high-quality product.

Q: To create HLR & TestCase of

1) **(Instagram , Facebook) first page and chat functionality**

   Answer: instagram first page

2) **Facebook Login Page : https://www.facebook.com/**

   Answer: Facebook first page

Q: Difference between STLC and SDLC

Answer:
STLC (Software Testing Life Cycle) and **SDLC (Software Development Life Cycle)** are two different but closely related processes in software engineering. SDLC focuses on **software development**, while STLC focuses on **software testing**.

1. Software Development Life Cycle (SDLC):

SDLC is the process of **developing software from requirement gathering to deployment and maintenance**. It defines the **phases of software creation** such as planning, design, development, testing, and release. **Goal:** To deliver a fully functional software product that meets user requirements.
Key Phases of SDLC:

1. Requirement Analysis
2. System Design (HLD & LLD)
3. Coding/Development
4. Testing (Integration & System Testing)
5. Deployment
6. Maintenance

2. Software Testing Life Cycle (STLC):

STLC is a **subset of SDLC** that focuses only on **testing activities** to ensure software quality. It defines the **phases followed during testing** such as test planning, test design, execution, and closure. **Goal:** To detect defects and verify that the software meets requirements.
Key Phases of STLC:

1. Requirement Analysis (Test Basis Review)

2. Test Planning (Strategy, Tools, Effort Estimation)
3. Test Case Design & Development
4. Test Environment Setup
5. Test Execution
6. Defect Reporting and Tracking
7. Test Cycle Closure

Comparison Table:

Aspect	SDLC (Software Development Life Cycle)	STLC (Software Testing Life Cycle)
Focus	Development of software	Testing of software
Objective	Deliver a working software product	Ensure quality and defect-free software
Phases	Requirement → Design → Coding → Testing	Requirement → Planning → Test Cases → Execution
Performed By	Developers, Designers, Project Managers	Testers, QA Engineers
Outcome	Complete application/software	Validated and verified software

Conclusion:

SDLC covers the entire software development process, while STLC is a part of SDLC that focuses exclusively on testing to ensure the product is bug-free and meets user expectations.

Q: Difference between Test Scenarios, Test Cases, and Test Scripts

Answer:
In software testing, **Test Scenarios, Test Cases, and Test Scripts** are related but serve different purposes in the testing process.

1. Test Scenario:

A Test Scenario is a **high-level description of what to test**. It represents a feature or functionality to be validated. It answers **"What to test?"**
Example: Verify the login functionality of an application.

2. Test Case:

A Test Case is a **detailed set of steps with inputs, conditions, and expected results** to validate a specific functionality. It answers **"How to test?"**
Example:

- **Test Case ID:** TC_001
- **Scenario:** Login with valid credentials
- **Steps:** Open login page → Enter valid username & password → Click login
- **Expected Result:** User is redirected to the dashboard

3. Test Script:

A Test Script is an **automated sequence of instructions written in a programming or scripting language** to execute test cases. It is used in automation testing.
Example: A Selenium WebDriver script written in Java/Python to automate login functionality testing.

Comparison Table:

Aspect	Test Scenario	Test Case	Test Script
Definition	High-level idea of what to test	Detailed steps and conditions to test	Automated script for executing test cases
Focus	"What to test?"	"How to test?"	"Automate testing"
Nature	Broad and abstract	Detailed and structured	Automation-oriented
Example	Verify login functionality	Login with valid credentials (steps/result)	Selenium script automating login process
Used In	Manual and automation testing	Manual testing primarily	Automation testing

Conclusion:

Test Scenarios define the **scope of testing**, Test Cases provide **detailed instructions for execution**, and Test Scripts are **automation programs** used to run those cases efficiently.

Q: Explain what Test Plan is? What information should be covered?

Answer:
A **Test Plan** is a formal document that describes the **testing strategy, scope, objectives, resources, schedule, and activities** to be performed during the software testing process. It acts as a roadmap for testing and ensures that all testing efforts are organized and aligned with project requirements.

Purpose of a Test Plan:

- To define the **scope and objectives** of testing.
- To provide a **systematic approach** for testing activities.
- To ensure **clear communication** between stakeholders regarding testing strategies.
- To serve as a **reference document** for tracking and controlling the testing process.

Information Covered in a Test Plan:

1. **Test Plan Identifier:**
   A unique ID or version for reference.
2. **Introduction:**
   Overview of the project and purpose of testing.
3. **Objectives & Scope of Testing:**
   Define what features will be tested (in-scope) and what will not be tested (out-of-scope).
4. **Test Strategy/Approach:**
   Specify testing levels (unit, integration, system, regression) and techniques to be used.
5. **Test Deliverables:**
   List of documents and reports (test cases, test scripts, test reports).
6. **Test Items:**
   List of software modules/features to be tested.
7. **Environment Requirements:**
   Hardware, software, tools, and network setup needed for testing.
8. **Roles and Responsibilities:**
   Allocation of tasks to testers, leads, and managers.
9. **Schedule & Milestones:**
   Timeline of testing phases and deadlines.
10. **Entry and Exit Criteria:**
    Define the conditions to start (entry) and end (exit) testing phases.
11. **Resource Planning:**
    Details of team members, tools, and infrastructure needed.

12. **Risk Analysis and Mitigation:**
    Potential risks (e.g., delayed build, tool issues) and mitigation strategies.

13. **Test Metrics and Reporting:**
    Define how test progress and results will be tracked and reported.

14. **Approval:**
    Sign-off section by stakeholders or project managers.

Conclusion:

A well-defined test plan ensures structured testing, minimizes risks, and helps deliver a **quality product** by clearly outlining objectives, scope, schedule, and responsibilities.

Q: What is Priority?

Answer:
In software testing, **Priority** refers to the **order in which a defect or bug should be fixed** based on its **business impact and urgency**. It is decided from a **business or client perspective** and determines how soon the issue needs to be resolved.

Key Points about Priority:

- Priority is **business-driven**, not technical.
- High priority bugs must be fixed immediately as they affect critical functionality or client requirements.
- Low priority bugs can be fixed later as they have minimal impact.

Example:

- A typo in the company name on the homepage during a live client demo → **High Priority** (even if low severity).
- A minor UI alignment issue in a less-used section → **Low Priority**.

Priority Levels:

1. **High Priority:** Must be fixed immediately (e.g., login not working).
2. **Medium Priority:** Important but can wait for the next build.
3. **Low Priority:** Can be fixed later or in future releases.

Conclusion:

Priority defines **how quickly a defect should be fixed**, ensuring that the most business-critical issues are addressed first.

Q: What is Severity?

Answer:
In software testing, **Severity** refers to the **impact of a defect on the functionality or performance of an application**. It indicates **how serious the defect is from a technical perspective** and is usually decided by the testing team or QA.

Key Points about Severity:

- Severity is **technical-focused**, not business-focused.
- It measures how much the defect affects system functionality or user experience.
- High severity defects can cause major failures, while low severity defects may have minimal effect.

Example:

- **High Severity:** System crash when clicking "Pay Now" (core function is blocked).
- **Medium Severity:** Error in generating non-critical reports.
- **Low Severity:** A spelling mistake in a help tooltip.

Severity Levels:

1. **Critical/High Severity:** Defect causes complete failure of core functionality (e.g., app crash).

2. **Medium Severity:** Defect impacts functionality but has a workaround.

3. **Low Severity:** Minor defect with negligible impact on system usage.

Conclusion:

Severity defines the **extent of damage caused by a defect** and helps prioritize bug fixing from a technical standpoint.

Q: Bug Categories are…

Answer:
In software testing, **bugs (defects)** are categorized based on their **nature, cause, or impact** on the system. These categories help testers and developers prioritize and manage bug fixing effectively.

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1. Functional Bugs:

These occur when the software **does not function as expected** or deviates from the requirements.
Example: Login button not working or incorrect calculation in a billing system.

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2. Performance Bugs:

These are related to **speed, stability, or response time** issues in the application.
Example: Website taking too long to load or frequent server crashes under load.

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3. Usability Bugs:

These affect the **user experience (UX)** and make the application difficult to use.
Example: Poor navigation, unreadable font size, or unclear instructions.

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4. Compatibility Bugs:

These occur when the application does not work correctly on **different devices, browsers, or operating systems**.
Example: Web page breaking on Safari but working on Chrome.

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5. Security Bugs:

These are related to **vulnerabilities or loopholes** that can be exploited by attackers.
Example: Login bypass using SQL Injection or lack of HTTPS encryption.

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6. UI (User Interface) Bugs:

These are visual or design issues in the application interface.
Example: Misaligned buttons, overlapping text, or broken images.

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7. Logical Bugs:

These occur due to **incorrect programming logic** that causes unexpected behavior.
Example: Discount applied twice instead of once during checkout.

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8. Integration Bugs:

These happen when different modules or systems fail to work together properly.
Example: Payment gateway not connecting with the order management system.

Conclusion:

Bug categories such as **Functional, Performance, Usability, Compatibility, Security, UI, Logical, and Integration** help classify defects and streamline the debugging process.

Q: Advantages of Bugzilla

Answer:
Bugzilla is a popular, open-source bug tracking and defect management tool used by many organizations worldwide. It offers several advantages that make it a preferred choice for managing software bugs effectively.

- **Free and Open Source:** Bugzilla is completely free to use and customize, allowing organizations to avoid licensing costs and tailor the tool according to their needs.

- **Comprehensive Bug Tracking:** It provides detailed bug logging features including severity, priority, status, attachments, and comments. It also automatically detects duplicate bugs to avoid redundant work.

- **Advanced Search and Filtering:** Users can perform complex searches using various filters such as product, component, status, and keywords. These queries can be saved for repeated use, improving efficiency.

- **Customizable Workflow:** Bugzilla allows customization of fields, workflows, statuses, and resolutions to fit different team processes and project requirements.

- **Powerful Reporting and Metrics:** It offers built-in reports, charts, and dashboards that provide insights into project status and bug trends. Time tracking features help monitor the effort spent on bug fixing.

- **Email Notifications and Collaboration:** Bugzilla supports customizable email alerts for bug changes, comments, and status updates. Users can even create or update bugs through email, enhancing team communication.

- **Strong Security and Access Control:** Role-based access ensures that sensitive bugs are visible only to authorized users. It also includes protections against common security threats like SQL injection.

- **Scalability and Reliability:** Bugzilla can handle large volumes of bugs and complex projects, making it suitable for enterprise-level applications and open-source projects alike.

- **Integration Capabilities:** It supports APIs (XML-RPC, JSON-RPC) to integrate with version control systems, continuous integration tools, and test management software, enabling seamless workflows.

- **Proven Track Record:** Bugzilla has been used successfully by major organizations like Mozilla, Linux, and Eclipse, demonstrating its reliability and effectiveness.

Conclusion:
Bugzilla's flexibility, robust features, and open-source nature make it a powerful bug tracking tool that helps teams improve software quality through effective defect management.

Q: Difference between Priority and Severity

Answer:
Priority and **Severity** are key attributes used to classify defects in software testing, but they represent different concepts.

Priority refers to how soon a defect should be fixed, based on its **business importance** or urgency. It is decided by the product owner or project manager and determines the order in which bugs are addressed.
Example: A spelling mistake on the homepage during a product launch might have **high priority** despite low impact.

Severity indicates the **impact of a defect on the system's functionality or performance**. It is assessed by the tester or QA team and reflects how serious the bug is technically.
Example: A crash when clicking the "Submit" button is a **high severity** defect because it affects core functionality.

Aspect	Priority	Severity
Definition	Urgency of fixing the defect	Impact of the defect on system operation
Decided by	Business team / Product owner	Tester / QA team
Focus	Business impact and deadlines	Technical impact on functionality

Levels	High, Medium, Low	Critical, Major, Minor
Example	Typo on homepage needing quick fix	System crash preventing use

Conclusion:
Priority decides **when** a bug should be fixed, while severity decides **how serious** the bug is. Both help teams manage defect resolution efficiently.

Q: What are the Different Methodologies in Agile Development Model?

Answer:
Agile is a flexible and iterative software development approach that focuses on collaboration, customer feedback, and rapid delivery of small, functional increments. Within the Agile umbrella, several methodologies provide specific frameworks and practices for implementation. The main Agile methodologies include:

1. Scrum:

Scrum is one of the most widely used Agile frameworks. It organizes work into fixed-length iterations called **Sprints** (usually 2-4 weeks). Key roles include the **Product Owner**, **Scrum Master**, and **Development Team**. Scrum emphasizes daily stand-up meetings, sprint planning, sprint reviews, and retrospectives to continuously improve processes.

2. Kanban:

Kanban is a visual approach to Agile that uses a **Kanban board** to represent work items and their status. It focuses on **continuous delivery** and limiting work in progress (WIP) to improve flow. Kanban doesn't prescribe fixed iterations but encourages constant prioritization and adaptability.

3. Extreme Programming (XP):

XP focuses on improving software quality and responsiveness to changing customer requirements. It promotes practices such as **pair programming**, **test-driven development (TDD)**, **continuous integration**, and frequent releases. XP encourages close collaboration between developers and customers.

4. Lean Software Development:

Inspired by Lean manufacturing principles, Lean Software Development aims to eliminate waste, optimize processes, and deliver value faster. Key principles include **just-in-time development**, **amplifying learning**, and **empowering the team**.

5. Crystal:

Crystal is a family of Agile methodologies (Crystal Clear, Crystal Orange, etc.) tailored to different team sizes and project criticality. It emphasizes people, communication, and simplicity, allowing teams to adapt processes to their needs.

6. Feature-Driven Development (FDD):

FDD is a model-driven, short-iteration process focused on delivering features. It involves specific steps like developing an overall model, building a feature list, planning by feature, designing, and building by feature.

Summary Table:

Methodology	Key Features	Typical Use Case
Scrum	Time-boxed sprints, defined roles	Teams needing structured iterative cycles
Kanban	Visual workflow, WIP limits, continuous delivery	Teams focused on flow and flexibility
Extreme Programming (XP)	Emphasis on code quality, TDD, pair programming	High-quality software with changing requirements
Lean	Waste elimination, value delivery	Process optimization and efficiency

Crystal	People-centric, adaptable	Small to large teams with variable criticality
Feature-Driven Development (FDD)	Feature-centric, model-driven	Projects needing feature-based progress tracking

Conclusion:

Agile offers multiple methodologies to suit different team structures and project requirements. Selecting the right methodology depends on the team's size, project complexity, and goals for flexibility and delivery speed.

Q: Explain the difference between Authorization and Authentication in Web testing.What are the common problems faced in Web testing?

Answer:
Authentication and **Authorization** are two key security concepts in web testing, often confused but fundamentally different:

- **Authentication** is the process of verifying the identity of a user or system. It answers the question, **"Who are you?"** Common authentication methods include username/password, OTP, biometrics, or OAuth.

- **Authorization** determines what an authenticated user is allowed to do. It answers the question, **"What can you do?"** Authorization controls access levels to resources and functionalities based on user roles or permissions.

Example:

- When a user logs in by entering a username and password, that's **authentication**.

- After logging in, the system grants access to certain pages based on the user's role (e.g., admin or regular user) — that's **authorization**.

Common Problems Faced in Web Testing:

1. **Browser Compatibility Issues:**
   Web applications may behave differently across browsers (Chrome, Firefox, Safari, Edge) or versions. Testing must ensure consistent UI and functionality.

2. **Security Vulnerabilities:**
   Web apps are prone to issues like SQL injection, XSS (Cross-Site Scripting), CSRF (Cross-Site Request Forgery), and weak session management.

3. **Performance Issues:**
   Slow page loads, server response delays, and issues under heavy traffic can degrade user experience.

4. **Responsive Design Problems:**
   Ensuring the website renders correctly on various screen sizes and devices (mobiles, tablets, desktops).

5. **Broken Links and Navigation Errors:**
   Links leading to wrong or dead pages disrupt user flow.

6. **Form Validation Errors:**
   Improper input validation can lead to data corruption or security risks.

7. **Session Management Problems:**
   Issues with login persistence, session timeout, and logout functionality can affect security and usability.

8. **Data Integrity Issues:**
   Incorrect handling of user data during form submission or database transactions.

9. **Third-Party Integration Failures:**
   Failures in payment gateways, APIs, or other external services can disrupt functionality.

Conclusion:

Authentication and Authorization ensure secure access control in web applications, while comprehensive web testing must address common issues like browser compatibility, security vulnerabilities, and performance to deliver a reliable user experience.

Q: To create HLR & TestCase of WebBased (WhatsApp web)

1. WhatsApp Web : https://web.whatsapp.com/

- **Create TestCases on Whatsapp Group Chat.**

  Answer: ➕ WhatsApp

Q: Create TestCases on

1. **Write a scenario of only Whatsapp chat messages**

   Answer: ➕ Whatsapp chat messages
2. **Write a Scenario of Pen**

   Answer: ➕ PEN
3. **Write a Scenario of Pen Stand**

   Answer: ➕ Pen Stand
4. **Write a Scenario of Door**

   Answer: ➕ Door
5. **Write a Scenario of ATM**

   Answer: ➕ ATM

6. **Write a scenario of Microwave Owen**

   Answer: ➕ Microwave Oven
7. **Write a scenario of Coffee vending Machine**

Answer: Coffee Vending Machine

8. **Write a scenario of chair**

   Answer: Chair

9. **To Create Scenario (Positive & Negative)**

   Answer:

10. **Create Test Cases on Compose Mail Functionality.**

    Answer: Compose Mail Functionality

Q: When to use Usability Testing
Answer:
Usability Testing is used to evaluate how easy and user-friendly a product or application is for end users. It helps identify design and interaction issues that may affect user experience and ensures the product meets user expectations.

Usability Testing is mainly used during the design phase to test wireframes or prototypes and detect usability issues early. It is performed before product launch to validate that the interface is intuitive and simple to use. When new features are introduced, usability testing ensures they are easily understood by users. It is also used when redesigning an application to confirm that the changes improve user experience rather than confuse users.

Usability Testing is necessary when there are frequent user complaints or high drop-off rates, as it helps identify pain points and barriers in navigation. It is used for competitor benchmarking to compare usability and improve competitiveness. Continuous usability testing is performed even after release to improve product adoption, customer satisfaction, and reduce support queries.

It is also used for accessibility testing to ensure the product is usable by people with disabilities, such as screen reader compatibility and proper color contrast. For applications with critical tasks (like banking apps), usability testing ensures tasks are completed efficiently without confusion.

Conclusion:
Usability Testing is important during design, before launch, and throughout the product lifecycle. It ensures the application is simple, accessible, and efficient, leading to better user satisfaction, higher adoption rates, and reduced usability issues.

Q: What is the procedure for GUI Testing?
Answer:

GUI (Graphical User Interface) Testing is a type of software testing that verifies the visual elements of an application to ensure they meet specifications and function correctly. It focuses on testing screens, menus, buttons, icons, text fields, and other user interface elements for consistency, usability, and correctness.

Procedure for GUI Testing:

1. **Understand the Requirements:**
   Review GUI specifications, design documents, and requirements to identify what needs to be tested.

2. **Prepare Test Environment:**
   Set up the required hardware, software, browser, and display settings to ensure the test environment matches real user conditions.

3. **Identify GUI Elements to Test:**
   List all components like buttons, menus, text fields, labels, drop-down lists, icons, and navigation elements.

4. **Design Test Cases:**
   Create detailed test cases for each GUI element, including visual properties (color, size, font), alignment, functionality, and behavior.

5. **Perform Manual GUI Testing:**
   Interact with each GUI component manually to check appearance, usability, and response to user actions. Verify alignment, spelling, and consistency.

6. **Conduct Functional Testing on GUI:**
   Test GUI components such as buttons, input fields, and navigation links to ensure they perform the intended actions.

7. **Automate GUI Testing (if required):**
   Use tools like Selenium, QTP, or TestComplete for repetitive GUI tests across multiple browsers or platforms.

8. **Check Usability and Consistency:**
   Ensure that colors, fonts, layouts, and design patterns are consistent across screens and meet usability standards.

9. **Validate Error Handling:**
   Test how the GUI displays error messages and handles invalid inputs or incorrect actions.

10. **Cross-Browser and Resolution Testing:**
    Verify GUI compatibility across different browsers, devices, and screen resolutions.

11. **Report Defects:**
    Log any defects found during testing in a bug-tracking tool with screenshots and details for developers to fix.

12. **Re-Test and Regression Testing:**
    After fixes, re-test GUI elements and conduct regression testing to ensure new changes don't affect the existing interface.

Conclusion:

GUI Testing ensures that the application's interface is visually correct, user-friendly, consistent, and works across various platforms. It is essential for improving user experience and meeting design specifications.