

FUNDAMENTALS OF SOFTWARE TESTING

MSc. TRAN THI BICH HANH





WHAT IS SOFTWARE TESTING?

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Definitions

Glenford Myers: "Testing is the process of executing a program with the intent of finding errors."

IEEE: "Testing is an activity in which a system or component is executed under specified conditions, the results are observed and recorded, and an evaluation is made of some made of some aspect of the system or component."

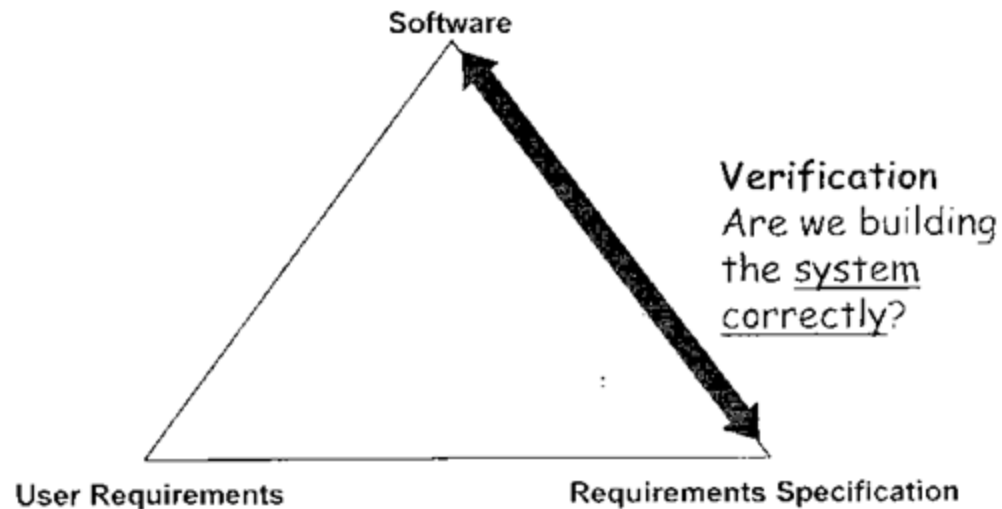
In summary: Evaluate SW product -> meets requirements? works as expected? detect defects?

**Software testing is the process of
process of checking if software is
software is built correctly
according to the design.**

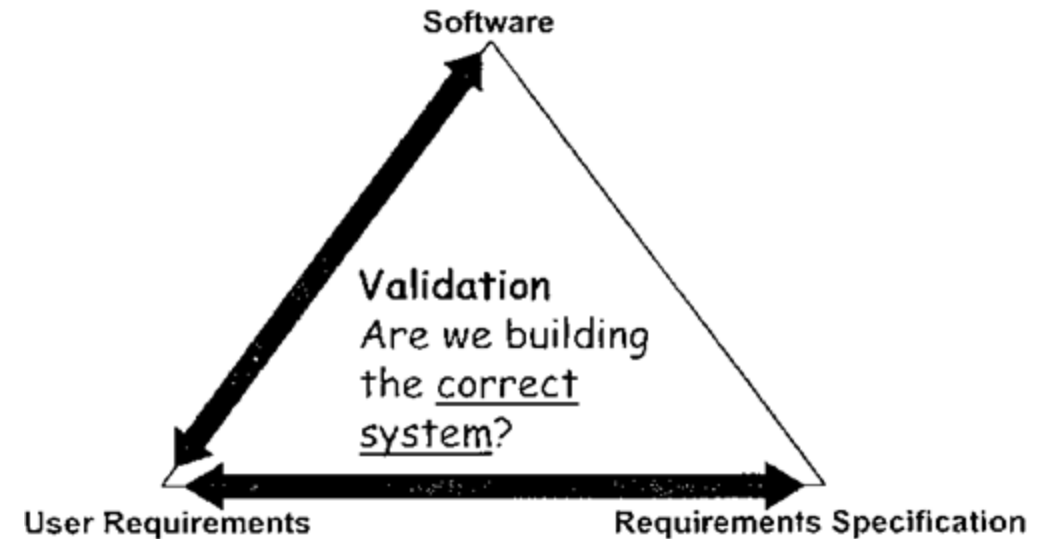
TRUE or FALSE

VERIFICATION vs. VALIDATION

Verification



Validation



WHY IS TESTING NECESSARY? NECESSARY?



WHY IS TESTING NECESSARY?



Cost of defects

Late detection = expensive



Ensures quality

Verifies software meets requirements and functions correctly



Increases reliability & security

Identifies vulnerabilities and stability issues



User satisfaction

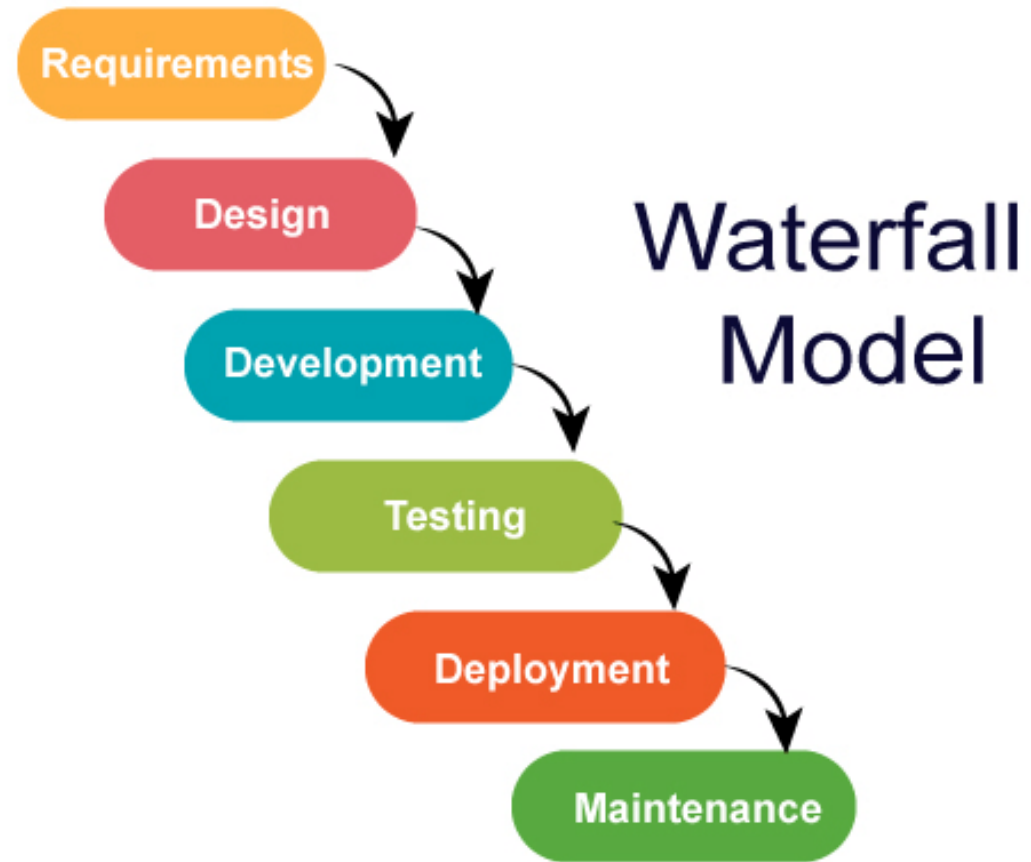
Delivers a better experience with fewer problems

WHEN SHOULD TESTING START?

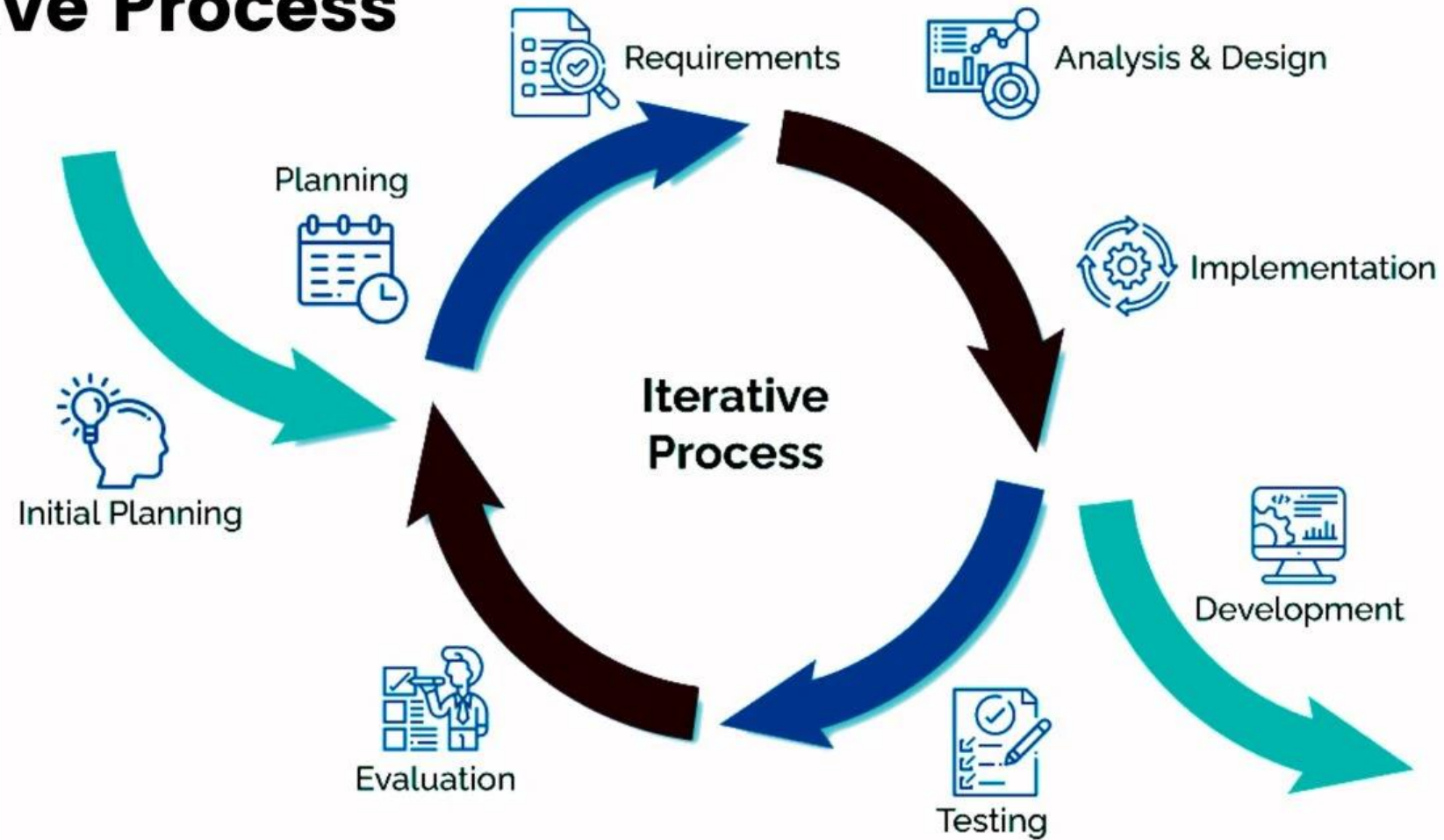
Testing is the final stage in the software development process.

TRUE or FALSE

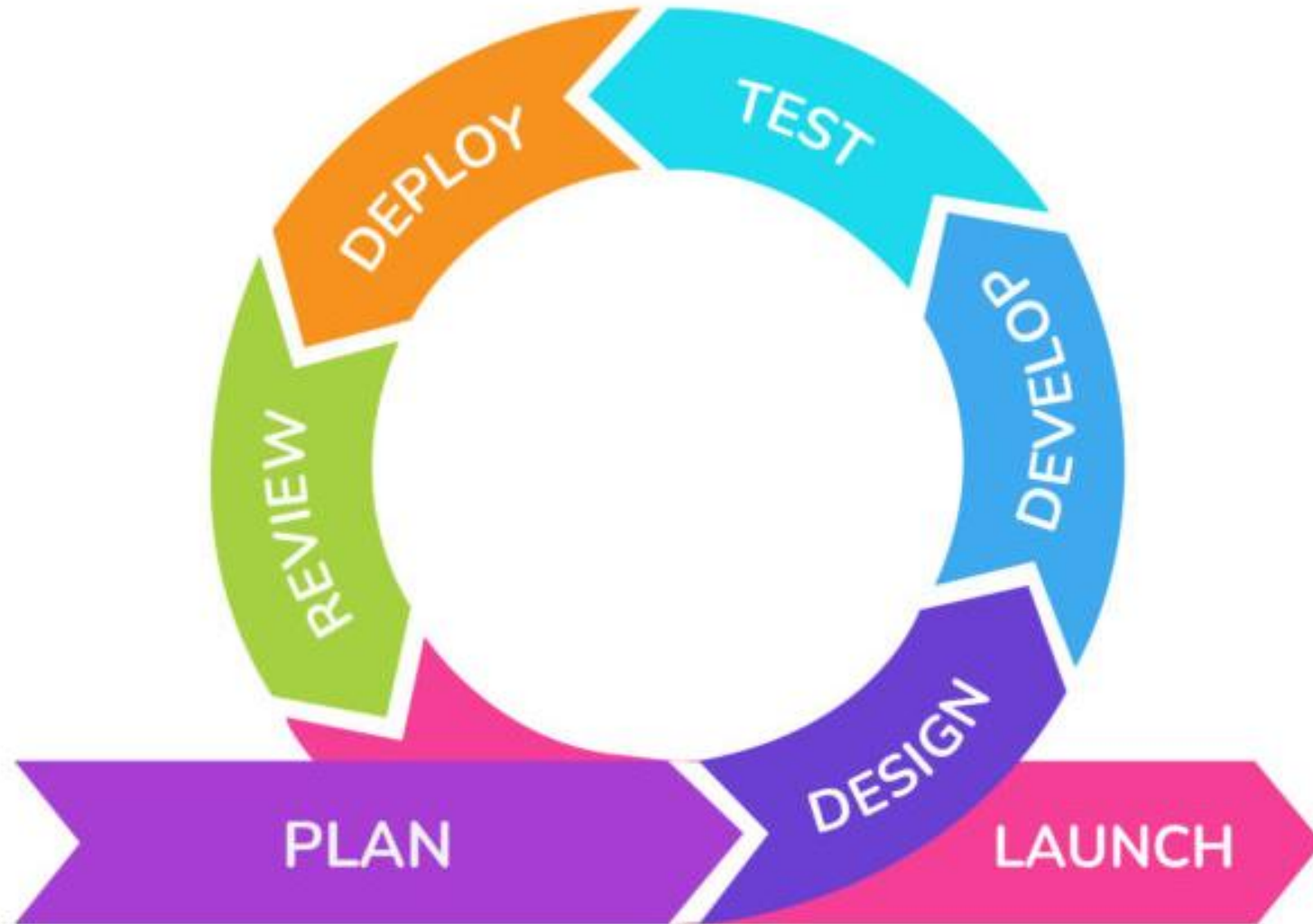
Waterfall model



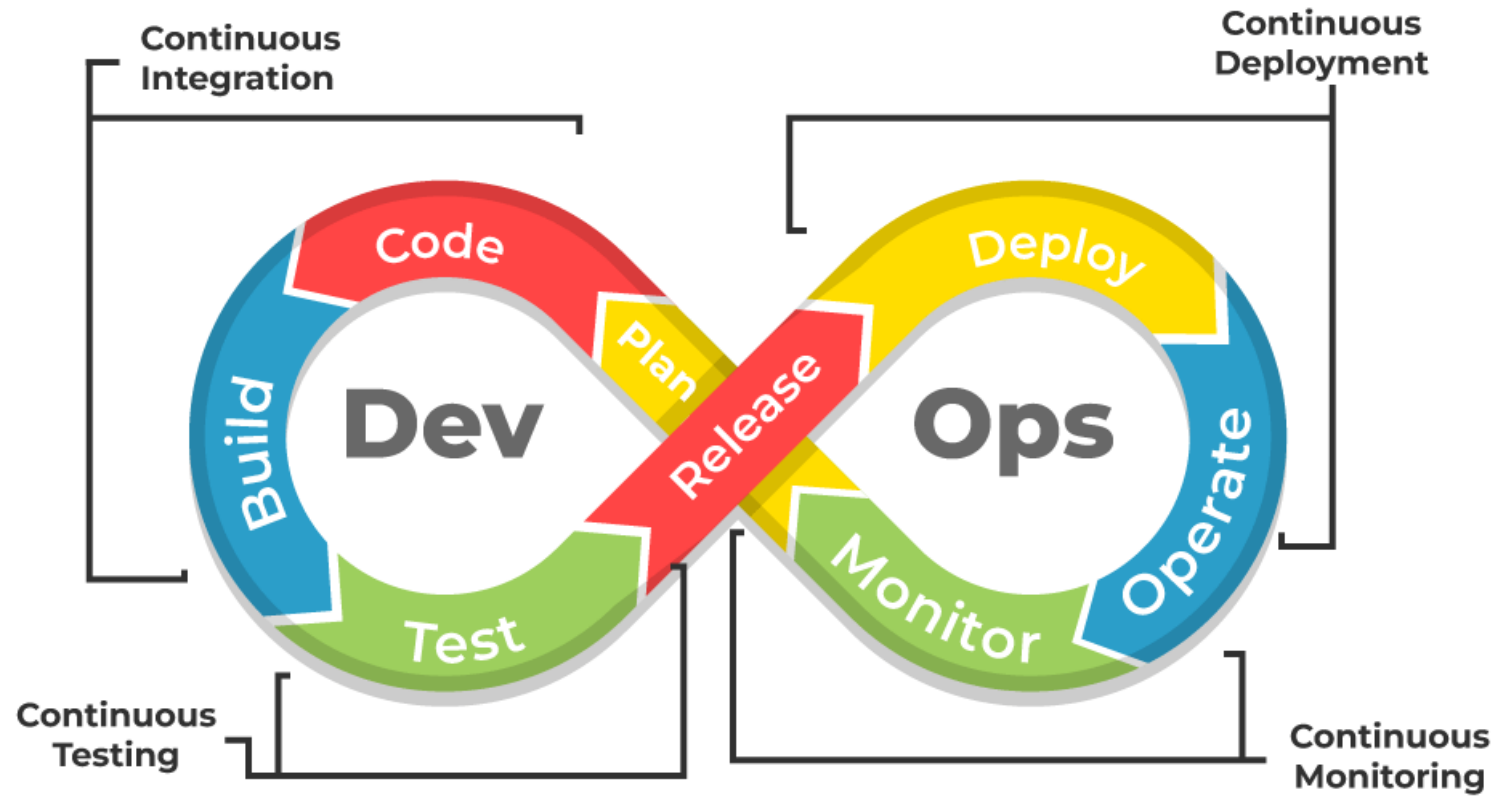
Iterative Process



Agile



DevOps



The app is buggy when used.

Who is responsible?

**The dev, the tester, or the customer?
customer?**



How the customer explained it



How the Project Leader understood it



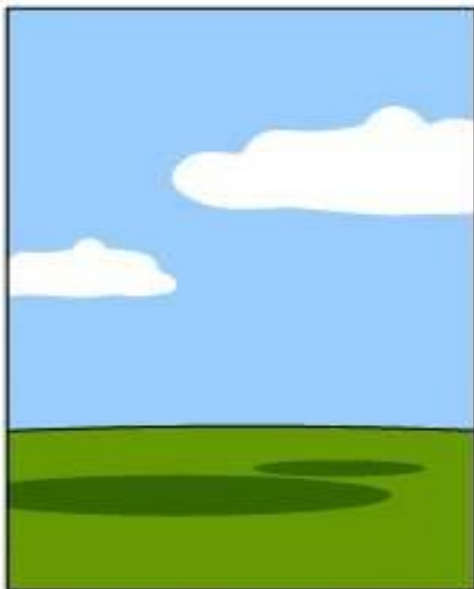
How the Analyst designed it



How the Programmer wrote it



How the Business Consultant described it



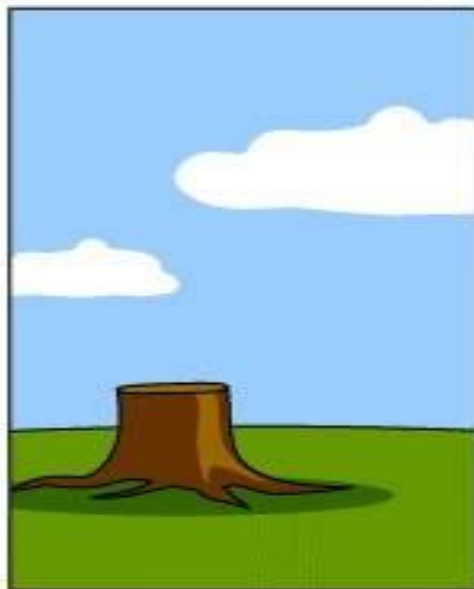
How the project was documented



What operations installed



How the customer was billed

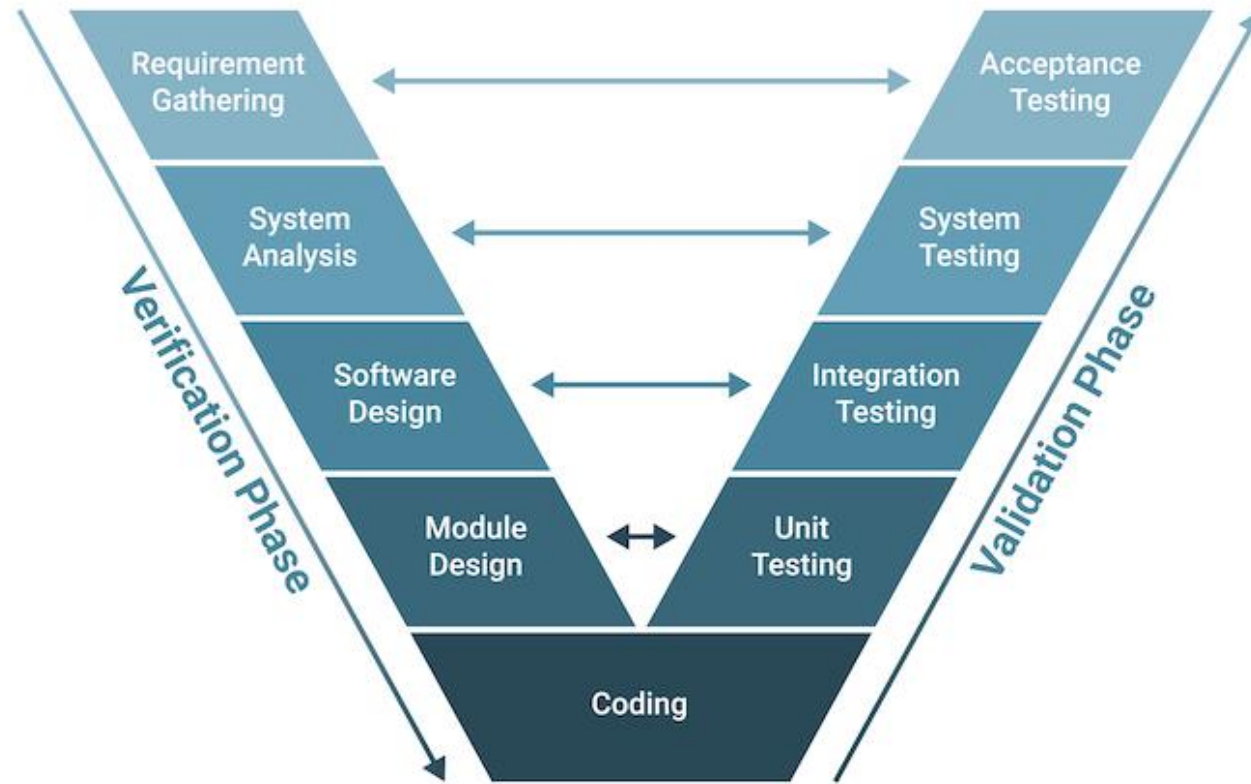


How it was supported



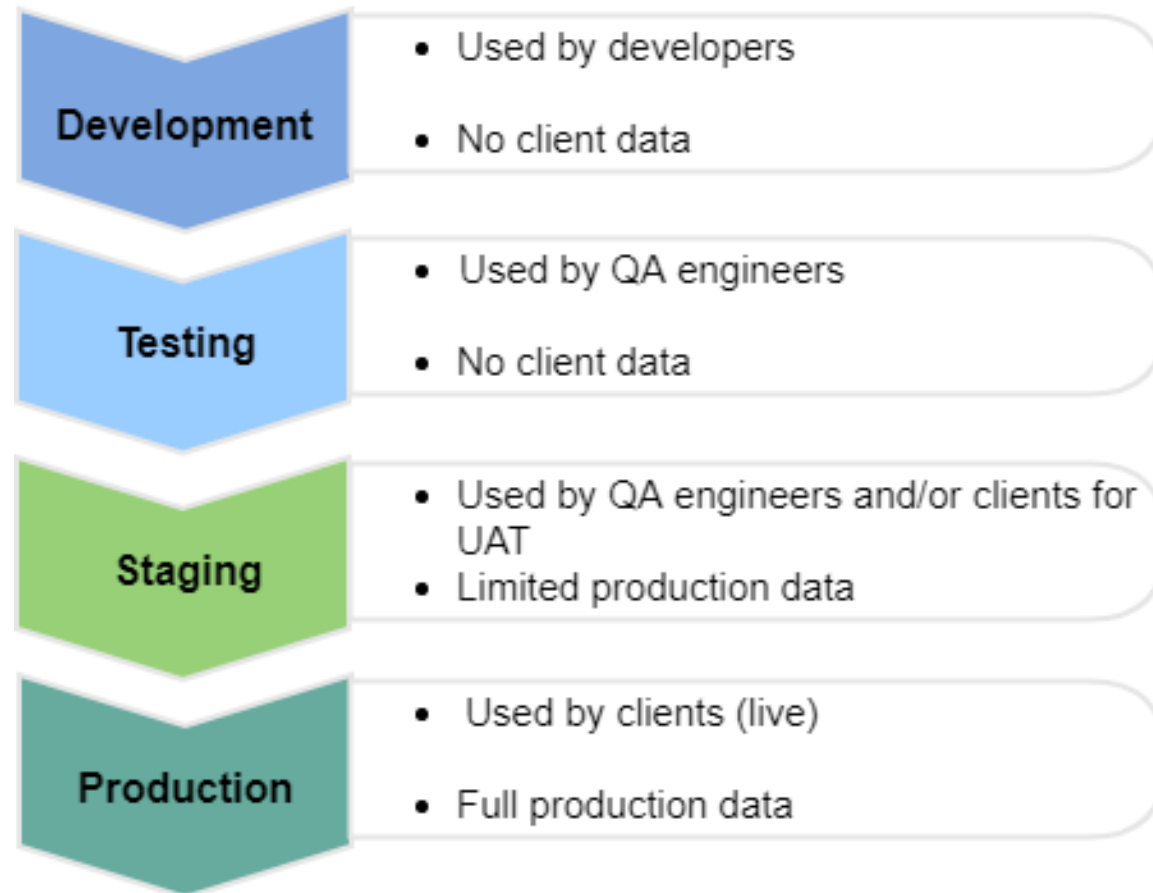
What the customer really needed

V-Model

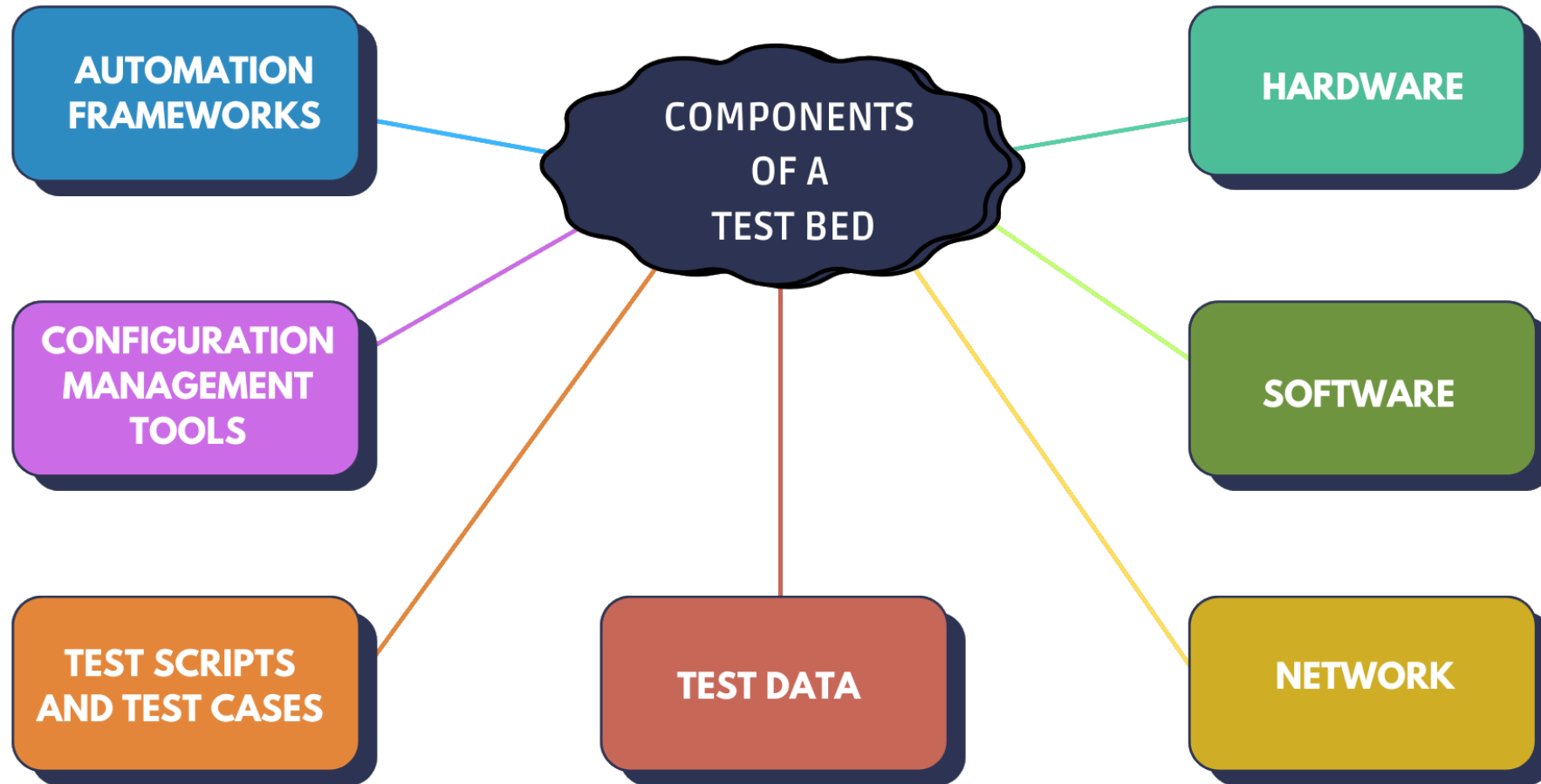


WHERE DOES TESTING OCCUR?

Software Development Environment



TEST BED – TEST ENVIRONMENT



HOW IS TESTING PERFORMED?

**It's possible to test an application
without running it.**

TRUE or FALSE

HOW IS TESTING PERFORMED?

Manual Testing

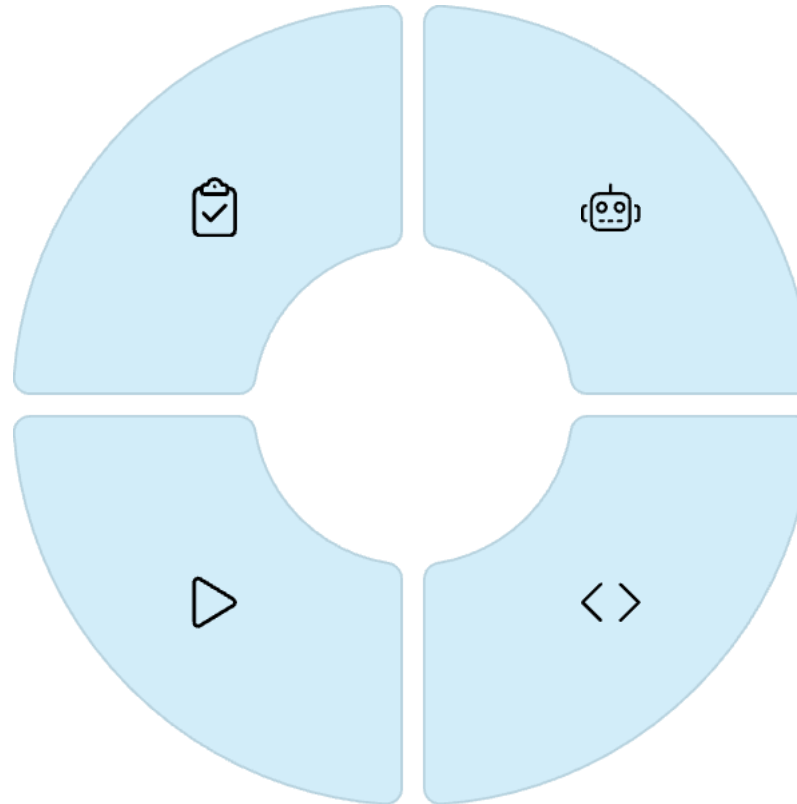
Human testers executing test cases
without automation tools

- Exploratory testing
- Usability testing
- Ad-hoc testing

Dynamic Testing

Executing code to observe behavior

- Functional testing
- Integration testing
- System testing



Automated Testing

Using tools to execute tests and compare
actual outcomes with expected outcomes

- Unit testing
- Regression testing
- Performance testing

Static Testing

Examining code without execution

- Code reviews
- Static analysis
- Documentation reviews

Testing vs. Debug

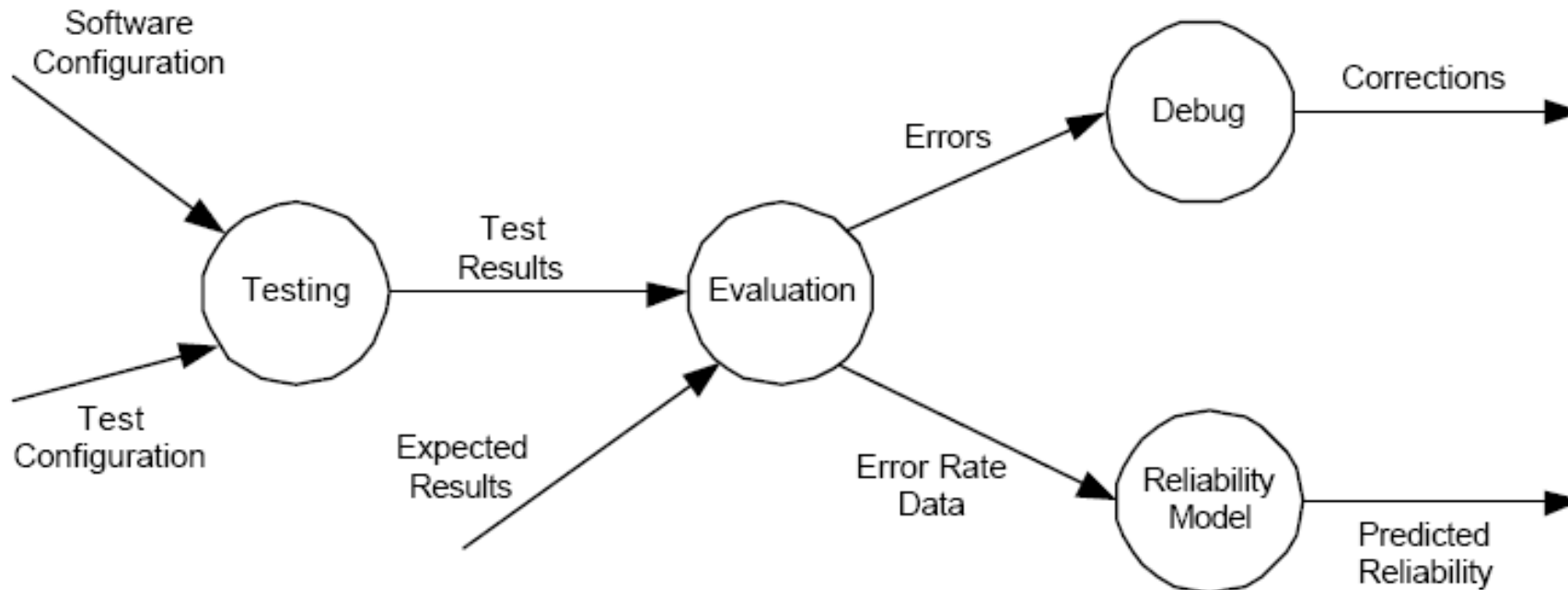
TESTING vs. DEBUG

Testing

- finding input that cause the program to fail

Debug

- the process of finding a fault given by a failure



WHAT DOES A TESTER DO? DO?



WHAT DOES A TESTER DO?



Test Planning

Defining test strategy, scope, and approach



Test Design

Creating test cases and test data



Test Execution

Running tests and comparing actual results with expected results



Defect Reporting

Documenting and tracking issues found during testing



Test Analysis

Evaluating test results and providing quality insights

QA, QC & Testing

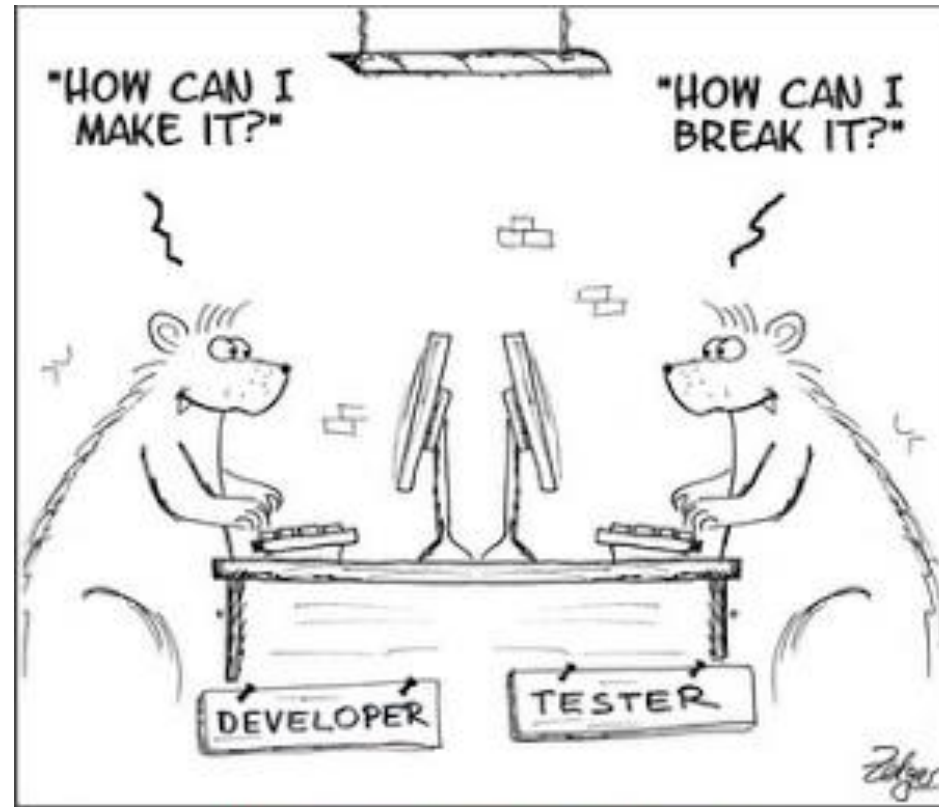
Aspect	Quality Assurance	Quality Control	Testing
Focus	The PROCESS	The PRODUCT	A major activity within within QC
Goal	Ensure development & maintenance processes are established and followed to achieve desired quality	Identify defects in the product	Designing test cases, execution, reporting results
Nature	Preventive	Detective	Both preventive and detective



Anyone can test.

TRUE or FALSE

Developer vs. Tester



They are not so much different,
but they have different path for the same goal,
to improve quality!!

Tester is a “low-level” job.

TRUE or FALSE

Salary for Software Developer

Salary for Software Developer

All Categories 📍 All location

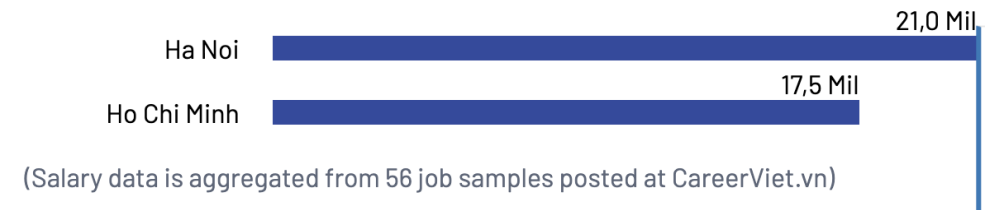
[Methodology](#)



Salary medium 16,9 Mil/ month

Min Avg	12,9 Mil	Max Avg	21 Mil
Salary min	5 Mil	Salary max	60 Mil

Average Salary (Per month)



<https://vietnamsalary.careerviet.vn/>

Salary for Software Tester

Salary for Software Tester

All Categories 📍 All location

[Methodology](#)



Salary medium 18,8 Mil/ month

Min Avg **13,7 Mil**

Salary min **6 Mil**

Max Avg

24 Mil

Salary max

57,5 Mil

Average Salary (Per month)

Ho Chi Minh

(Salary data is aggregated from 14 job samples posted at Care

<https://vietnamsalary.careerviet.vn/>

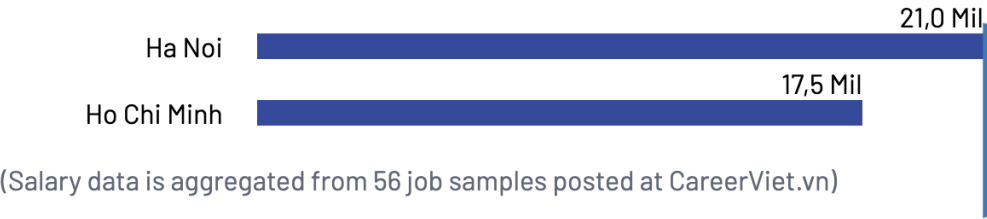
Salary for Software Developer

All Categories 📍 All location

[Methodology](#)



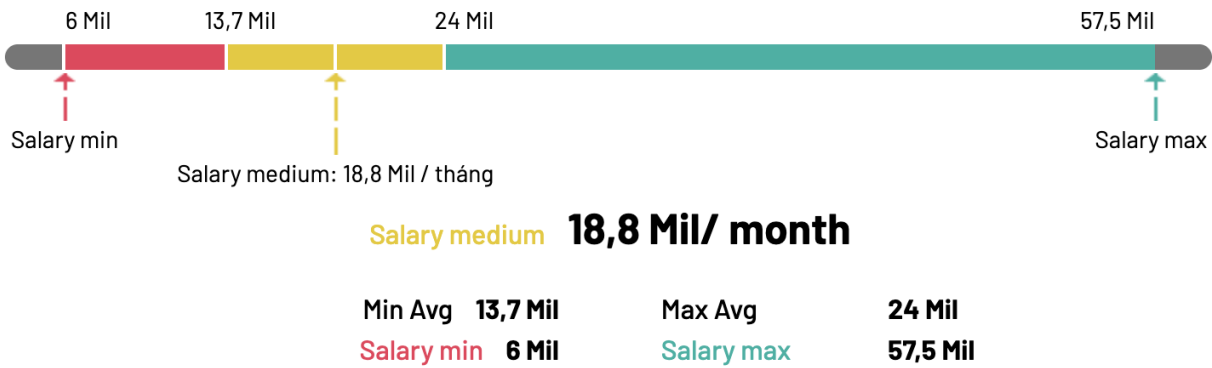
Average Salary (Per month)



Salary for Software Tester

All Categories 📍 All location

[Methodology](#)



Average Salary (Per month)



Career Development Model

Tester

An entry level position that focuses heavily on test execution

Test Analyst

Focuses on full lifecycle testing - planning, designing and executing tests

Senior Test Analyst

Displays subject matter and/or technical expertise playing a major role within the test team

Team Lead

Leads a test team to ensure strategies are implemented and undertaken appropriately at client sites

Test Consultant

Manages test teams, authors and implements test strategies, monitors and reports on progress

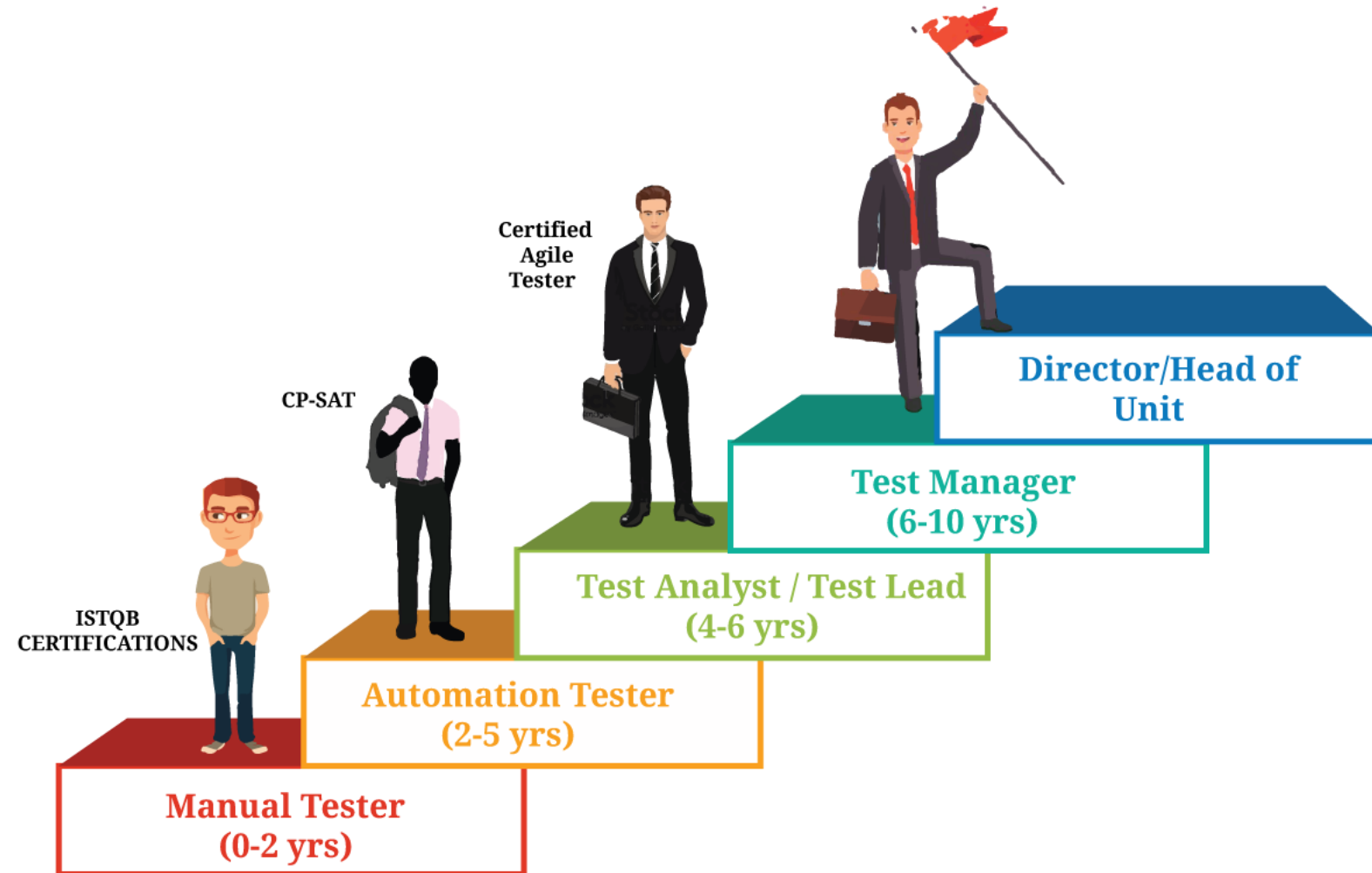
Senior Test Consultant

Manages multiple teams and projects, preparing realistic and achievable project plans and strategies

Principal Consultant

Leads complex projects, defining and implementing test strategies, playing a pivotal role in client and staff support and development

SOFTWARE TESTING



ACTIVITY – JOB DESCRIPTION

- **Objective:**

Know the job description, requirements and duties about many positions in QA & QC job

- **How to:**

1. Small groups (3-4 students).
2. Search recruitment news for 10 QC & QA job description (either in Vietnamese or in English).
3. Write a summary report:
 1. Source Links to the recruitments / News
 2. Summary the job description, task list / duties, requirements / qualifications about each position in QA & QC job



Key Qualities of a Great Software Tester?

**Software Testing is more suitable
for women than men.**

TRUE of FALSE



Sharp Analytical Thinking



Problem Decomposition

Break complex issues into testable components



Pattern Recognition

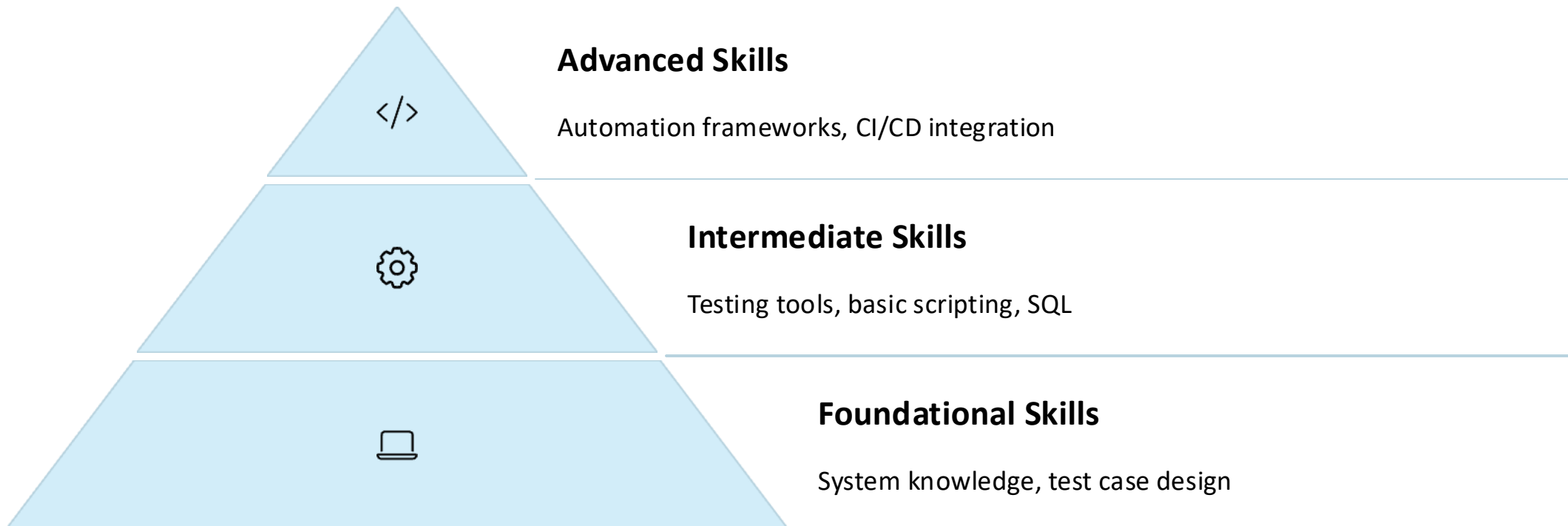
Identify recurring issues across different scenarios



Logical Reasoning

Connect cause and effect in system behaviors

Technical Proficiency



Meticulous & Detail-Oriented

Thoroughness

Leave no stone unturned in testing testing scenarios



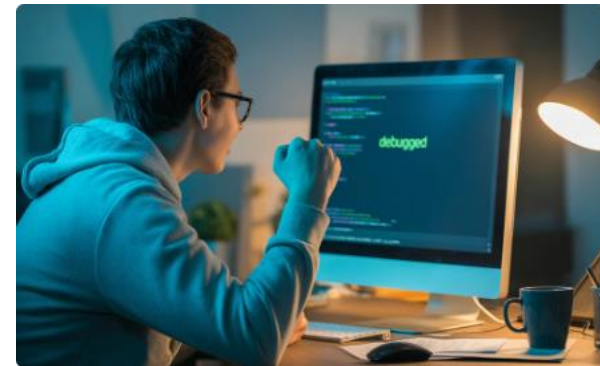
Organization

Maintain clear documentation and and test cases



Precision

Spot subtle inconsistencies others miss



Effective Communication

Technical Translation

Convert complex issues into understandable terms for stakeholders
stakeholders

Clear Reporting

Document bugs with precise steps to reproduce

Collaborative Feedback

Provide constructive input to developers
developers

Growth Mindset





Critical & Inquisitive Thinking



Question Assumptions

Challenge "it works" without verification



Explore Edge Cases

Test boundaries and unexpected inputs



Think Like Users

Anticipate real-world usage patterns



Predict Failure Points

Identify where systems might break

Patience & Persistence



Methodical Testing

Thoroughly work through test cases



Resilience

Maintain focus during repetitive tasks



Determination

Pursue elusive bugs until resolved

TESTING PRINCIPLES

SEVEN TESTING PRINCIPLES (ISTQB)



Testing shows the presence of defects, not their absence

The goal is to find defects. Not finding any doesn't mean there are no more.



Exhaustive testing is impossible

Except for trivial cases. Prioritization & smart techniques are needed.



Early testing saves time and money

The earlier a defect is found and fixed, the cheaper it is.



Defects cluster together

A small number of modules usually contain most of the defects (Pareto Principle 80/20).



Beware of the pesticide paradox

Repeating the same old tests won't find new bugs. Test cases need to be updated.



Testing is context-dependent

Testing a game is different from testing a medical system. Type, risk, purpose dictate strategy.



Absence-of-errors fallacy

Fixing many defects doesn't mean the system is successful if it doesn't meet user needs or is hard to use.

ACTIVITY - PRINCIPLES IN PRACTICE

- **Objective:** Deeper understanding of principles through real-world application.
- **How to:**
 1. Small groups (3-4 students).
 2. Assign each group 1 principle.
 3. Discuss real-world examples/scenarios (5-7 minutes).
 4. Each group shares.
- **Connect to reality!**



