SOFTWARE QUALITY ASSURANCE ENGINEERS AND TESTERS

A DEEP DIVE FOR SKILLS-BASED HIRING

REV: 04/04/16

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Occupation Overview: Software QA Engineers & Testers

Foundational Competencies

- **Critical Thinking:** Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.
- **Reading Comprehension:** Understanding written sentences and paragraphs in work-related documents.
- **Active Listening:** Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
- **Speaking:** Talking to others to convey information effectively.
- **Writing:** Communicating effectively in writing as appropriate for the needs of the audience.
- **Programming:** Writing computer programs for various purposes.
- **Monitoring:** Monitoring/assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
- **Complex Problem Solving:** Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
- **Quality Control Analysis:** Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
- **Systems Evaluation:** Identifying measures or indicators of system performance and the actions needed to improve or correct performance relative to the goals of the system.

Occupation-Specific Competencies

- **Basic General Database:** Demonstrated proficiency with SQL basics (e.g., selecting, inserting, updating, deleting records), at least one database management software application, and database fundamentals such as normalization, schemas, and relationships.
- **Basic Software Quality Assurance:** Demonstrated ability to design individual tests, create test scripts, and conduct tests and inspections of software to evaluate performance against requirements, quality, and performance. Includes the use of test tools such as LoadRunner and JMeter.
- **Basic Software Development:** Familiarity with the use of object oriented techniques, user experience and responsive design, web mobility, back-end processes, communication tools (such as AJAX), web services (including REST), a web framework, version control, and a development lifecycle methodology (such as Agile). .
- **Basic Core Coding Languages:** Familiarity with the concepts and ability to develop very basic front-end, back-end and / or mobile applications utilizing core coding languages (e.g., Java, C#, Objective C, JavaScript) on a development platform and integrating data storage (including SQL), libraries, methods, interfaces, and/or objects.
- **Basic Systems Design and Implementation:** Demonstrated ability to assist customers in the gathering of requirements and design, implement, and support simple technology solutions to existing business problems.
- **Basic Web Development Languages:** Basic familiarity with such commonly-used web development languages as AJAX, XML, HTML 5, and JavaScript.
- **Intermediate Scripting:** Demonstrated proficiency developing and using simple scripts that utilize common scripting languages such as PERL, Python, or shell scripts.
- **Basic Tech Support:** Familiarity with the use of some components of commonly-used computer hardware, software, applications, etc. and a basic ability to diagnose customer problems and provide troubleshooting and issue resolution support.
- **Intermediate Testing:** Demonstrated ability to design tests, create test scripts, ensure that test cases mimic user usage, and execute and validate unit, system, and performance test routines for a team; Demonstrated ability to use appropriate test tools.
- **Intermediate General Information Security:** Demonstrated ability to install, configure, troubleshoot, test, and maintain in a secure manner the portion of the IT environment under their responsibility (networks, communication, hardware, software, and other devices) to ensure their confidentiality, integrity, and availability.

Job Description (Example)

Develop and execute software test plans in order to identify software problems and their causes.

- Work in a cutting edge agile software development environment as a Software Test Engineer ensuring the quality of the architecture of our Enterprise software applications.
- Write automated tests at the services/integration and UI layers, using software automation tools.
- Leverage agile testing framework, design and code functional/integration test cases and scenarios pertaining to various components of the application that ensures the software meets the intended requirements that meets all established quality standards specified in test plan.
- Execute test cases and scripts; perform data validation; implement and maintain regression test cases.
- Assist developers with debugging defects/Prod tickets by reproducing them in the test environment; log and track problems (bugs).
- Work closely with product owners to understand product specifics and to create corresponding test plan, quality standards, and strategies for the project; participate in the constant improvement of our test automation and continuous integration practices.

Activities (Example List)

- Design test plans, scenarios, scripts, or procedures.
- Test system modifications to prepare for implementation.
- Develop testing programs that address areas such as database impacts, software scenarios, regression testing, negative testing, error or bug retests, or usability.
- Document software defects, using a bug tracking system, and report defects to software developers.
- Identify, analyze, and document problems with program function, output, online screen, or content.
- Monitor bug resolution efforts and track successes.
- Create or maintain databases of known test defects.
- Plan test schedules or strategies in accordance with project scope or delivery dates.
- Participate in product design reviews to provide input on functional requirements, product designs, schedules, or potential problems.
- Review software documentation to ensure technical accuracy, compliance, or completeness, or to mitigate risks.

Prioritized Foundational Competencies: Software QA Engineers & Testers

Most Common Required Competencies	
1	**Quality Control Analysis:** Understanding how to identify and test system boundaries, then conducting tests and inspections to evaluate quality or performance; leveraging basic concepts of coding to find areas of weakness (unintended values, system architecture, process flow); ability to focus on both micro and macro components of a products success.
2	**Critical Thinking:** Using logic and reasoning to first identify the requirements and purpose of a program to determine potential weaknesses; capturing and prioritizing the impact of identified bugs; taking on viewpoint of multiple possible users.
3	**Communication:** Applying reading, writing, and speaking skills to gather detailed system requirements for testing, thoroughly and accurately recording results, and presenting back to appropriate parties.

Most Common Break Point Competencies	
1	**Quality Control Analysis:** *See previous.*
2	**Active Listening:** Taking time to understand the points being made, asking questions and clarifying details as appropriate; incorporating details from interactions into testing plans and reports; drawing appropriate conclusions using previous experiences and knowledge.
3	**Critical Thinking:** *See previous.*

Most Preferred Competencies	
1	**Systems Evaluation:** Identifying measures or indicators of system performance and the impact of a change within the system, relative to the goals of the system; differentiating between perceived and actual performance value; familiarity with individual components and their connection to overall system.
2	**Active Listening:** *See previous.*
3	**Critical Thinking:** *See previous.*

Most Hard-to-Find Competencies	
1	**Programming:** Understanding the basics of computer programming (e.g., system structure, end-end data flow, application processes) to plan and act on testing procedures; ability to mimic the mindset of a developer during testing.
2	**Critical Thinking:** *See previous.*
3	**Complex Problem Solving:** Identifying unique issues and reviewing related information or patterns to categorize into larger system bugs; chasing issues back to origins and thoroughly recording possible causes; understanding interaction of smaller components in overall system.

Most Evolving Competencies	
1	**Programming:** Evolution driven by rapid change in the landscape of technology and its application to all aspects of business; changes make it important to be aware of how new architecture, processes, and tools are integrated into applications to inform new ways of testing.
2	**Critical Thinking:** Evolution driven by expanding number of possible end-users as more software packages are created with customization in mind; changes make it important to capture the multitude of ways software may be used in testing and bug identification.
3	**Complex Problem Solving:** Evolution driven by software becoming progressively more multi-faceted, with greater interconnectivity both internally and externally; changes make it important to expand how you design and implement QA testing (applying more efficient testing tools, expanded user pathway testing, increased reliance on multiple data connections).

Prioritized Occupation-Specific Competencies: Software QA Engineers & Testers

Most Common Required Competencies	
1	**Intermediate Testing:** Proficiency with how to design tests, create test scripts, ensure that test cases mimic user usage, execute and validate unit tests, and use appropriate test tools for their own changes. Proficiency with system and performance testing.
2	**Intermediate Scripting:** Demonstrated ability with the use of common scripting languages such as PERL, Python, or shell scripts.
3	**Basic Tech Support:** Familiarity with the use of some components of commonly-used computer hardware, software, applications, etc. and a basic ability to diagnose problems and provide troubleshooting and issue documentation; ability to independently operate technological tools.

Most Common Break Point Competencies	
1	**Intermediate Testing:** *See previous.*
2	**Intermediate Scripting:** *See previous.*
3	**Basic Tech Support:** *See previous.*

Most Preferred Competencies	
1	**Intermediate Testing:** *See previous.*
2	**Intermediate Scripting:** *See previous.*
3	**Basic General Database:** Demonstrated proficiency with SQL basics (e.g., selecting, inserting, updating, deleting records), at least one database management software application, and database fundamentals such as normalization, schemas, and relationships.

Most Hard-to-Find Competencies	
1	**Basic Core Coding Languages:** Familiarity with developing simple front-end, back-end and/or mobile applications utilizing core coding languages (e.g., Java, C#, Objective C, JavaScript) on a development platform; integrating data storage (including SQL), libraries, methods, interfaces, and objects; and using code analysis and debugging techniques.
2	**Intermediate Testing:** *See previous.*
3	**Basic General Database:** *See previous.*

Most Evolving Competencies	
1	**Basic Testing:** Evolution driven by occurrence of new application architectures and design methodologies; changes make it important to train with and apply latest testing tools while remaining informed on trends and focus of industry through participation in educational channels (industry associations, publications, continuing education).
2	**Intermediate General Information Security:** Evolution driven by information security becoming a key business focus as more complex systems bring greater vulnerability to sensitive data; changes make it important to keep credentials and methodologies up-to-date to protect from constantly evolving threats.
3	**Basic Systems Design and Implementation:** Evolution driven by customized software components being developed for every customer; changes make it important to best align technical solutions with business needs, QA feedback should help drive developers towards this end with actionable responses connecting current version of product with desired end-state.

Occupation Deep Dive: Software QA Engineers & Testers

Job Titles Within This Occupation

- Quality Assurance Engineer
- Quality Assurance Analyst
- Quality Assurance Tester
- Software Test Engineer
- Software Tester
- Quality Assurance Specialist
- Software Quality Assurance Engineer
- Product Assurance Engineer
- Quality Assurance Director
- Software Quality Engineer
- Automation Engineer
- Web QA Engineer
- Mobile QA Engineer

Certification and Education Preferences (Example)

- Certified Software Quality Analyst (CSQA)
- Certified Software Test Engineer (CSTE)
- ISTQB Certified Tester, Foundation Level (CTFL)
- Quality Improvement Associate Certification (CQIA)
- Certified Software Test Professional (CSTP)

Tools Used (Example List)

- SQL
- JAVA
- LINUX/UNIX
- Oracle
- Scrum
- Python
- Agile Development
- Lode Runner
- HP Quality Center
- Selenium
- Browser Technology
- SOA
- Jira
- Team Foundation Server (TFS)
- GitHub

Other Relevant Foundation Competencies

1	Critical Thinking
2	Reading Comprehension
3	Active Listening
4	Speaking
5	Writing
6	Programming
7	Monitoring
8	Complex Problem Solving
9	Quality Control Analysis
10	Systems Evaluation
11	Active Learning
12	Systems Analysis
13	Science
14	Judgment and Decision Making
15	Operations Analysis
16	Coordination
17	Time Management
18	Troubleshooting
19	Social Perceptiveness
20	Technology Design
21	Learning Strategies
22	Operation Monitoring
23	Instructing
24	Persuasion
25	Installation

Other Relevant Occupation-Specific Competencies

1	General Database
2	Software Quality Assurance
3	Software Development
4	Core Coding Languages
5	LINUX/UNIX
6	Systems Design and Implementation
7	Basic Web Development Languages
8	Scripting
9	Microsoft Stack
10	Tech Support
11	Microsoft Office
12	Business Process and Analysis
13	Project Management
14	Validation
15	Core Operating Systems
16	General Data Techniques
17	IT/Hardware
18	UI/UX Design
19	General Networking Tools and Concepts
20	Business Solutions
21	Back-end Web Tools and Framework
22	Network Protocols
23	Database Administration
24	Graphic Design
25	Web Development Concepts

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