SWEBOK KA #4: Software Testing

The Software Engineering Body of Knowledge (SWEBOK) features 11 knowledge areas (KAs). The fourth KA is Software Testing. The Software Testing KA is focused on verification of the behavior of software using test cases. It includes five topics, as shown in Figure 1. These topics are Software Testing Fundamentals, Test Levels, Test Techniques, Test Related Measure, and Test Process.

The Software Testing Fundamentals topic covers the basic definitions in the area of software testing. Testing-related terminology includes terms such as fault, failure, and error. Some of the key issues of testing include test selection criteria, defect identification, and limitations of testing. Testing is related to many other activities, like debugging and programming.

The Test Levels topic discusses the levels of testing that are employed. The target of the test could be a single module, a group of modules, or the entire system. This correlates to the test stages of unit testing, integration testing, and system testing. Testing can also have differing objectives. Some of the main objectives include acceptance testing, conformance testing, regression testing, and usability testing.

The Test Techniques topic introduces many of the techniques used for testing. Some techniques, like ad hoc and exploratory testing are based on the software engineer’s intuition and experience. Specification-based testing includes techniques like boundary-value analysis and random testing. Code-based techniques can be sub-divided into control-flow based and data-flow based criteria. Fault-based techniques are aimed at revealing faults and include things like error guessing and mutation testing. Usage-based techniques are operational profile and software reliability engineered testing. There are also techniques which are used based on the nature of the application, such as object-oriented testing, web-based testing, and GUI testing. Finally it is important to consider the selection and combination of these techniques.

The Test Related Measure topic focuses on the measurements involved with testing. When performing evaluation of a program under test, measures of fault types and density are useful. When performing evaluation of the test performed, measures of coverage effectiveness are used.

The Test Process topic covers aspects of the test process. Practical considerations are items such as attitude, test guides, process management, and documentation. The activities included in testing are: planning, test-case generation, test environment development, execution, test results evaluation, problem reporting, and defect tracking.

Figure 1. Breakdown of Topics for the Software Testing Knowledge Area

