Software Quality Assurance

Module 6

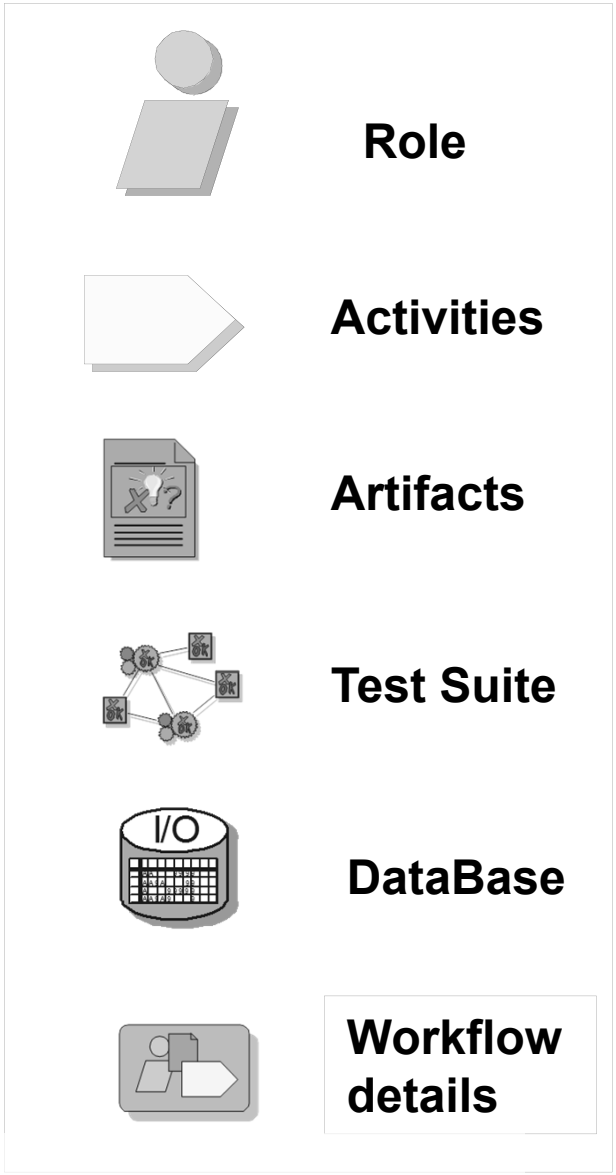
Define Evaluation Mission

Module 6 Agenda

- **Definition of the workflow:**
  Define Evaluation Mission
- Defining the mission of the test group
- Defining the goal for test documentation

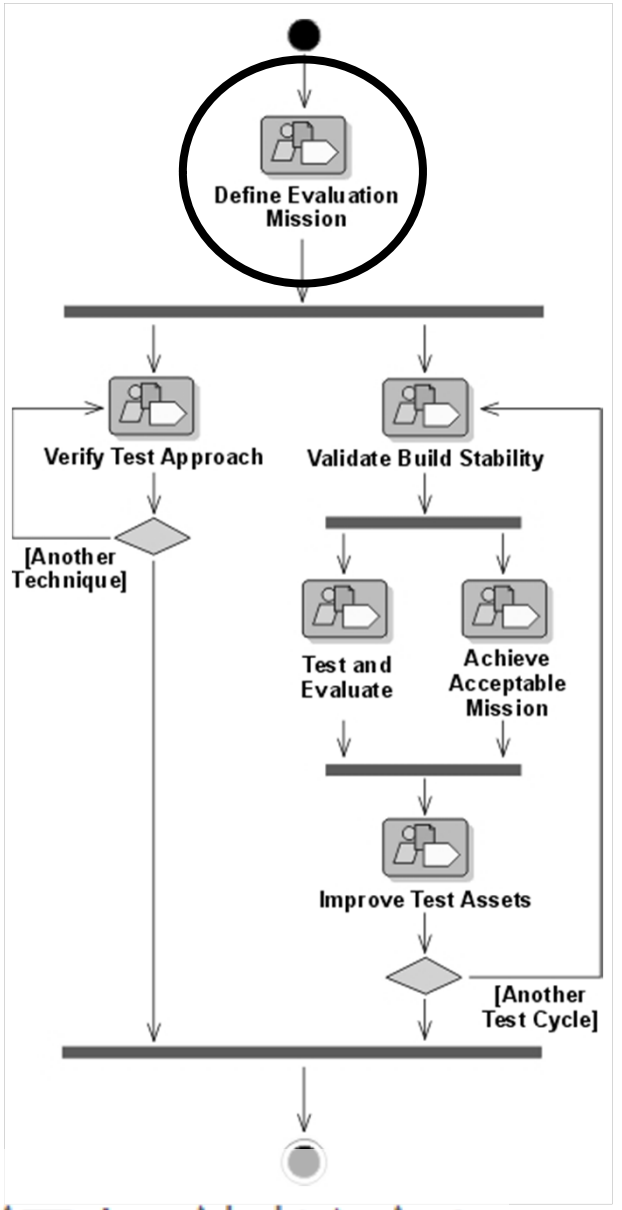
Review: Where We've Been

- In the introductory module we discussed the concepts of *quality* and *test ideas*
- In the last module, we introduced some of the basic elements in the RUP Test content
- We'll use those basic RUP elements throughout the remainder of the course to help provide context for what we'll learn.



Define Evaluation Mission

- In this module, we begin with the workflow detail Define Evaluation Mission
- The Mission focuses on the high-level objectives of the test team for the current iteration
  - What things should motivate us to test?
  - Why these things (and not others)?



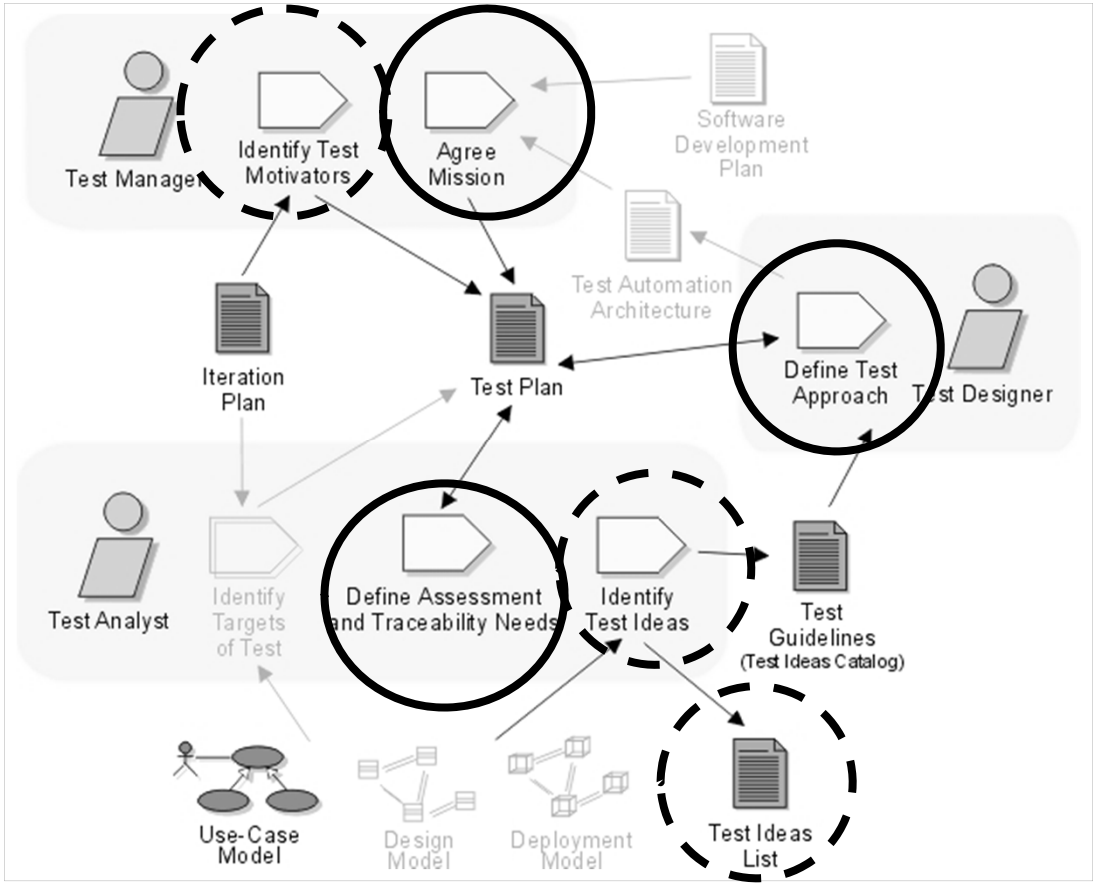
Define Evaluation Mission

The purpose of this workflow detail is to:

- Identify the appropriate focus of the test effort for the iteration.
- Gain agreement with stakeholders on the corresponding goals that will direct the test effort
- For each iteration, work is focused mainly on:
  - Identifying the objectives for, and deliverables of, the testing effort
  - Identifying a good resource utilization strategy
  - Defining the appropriate scope and boundary for the test effort
  - Outlining the approach that will be used
  - Defining how progress will be monitored and assessed.

Define Evaluation Mission

- This module focuses on the activities that capture the goals of our testing efforts.
- We will look at different *Missions* that test teams use, and consider the implications on the corresponding *Test Approach* those teams take.
- These are the activities that create the *Test Plan*.



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Exercise 6.1: Which Group is Better?

Testing Group 1

	Found pre-release
Function A	100
Function B	0
Function C	0
Function D	0
Function E	0
Total	100

Testing Group 2

Function A	50
Function B	6
Function C	6
Function D	6
Function E	6
Total	74

Two groups test the same program.

- The functions are equally important
- The bugs are equally significant

Exercise 6.2: Which Group is Better?

	Found pre-release	Found later	Total
Function A	100	0	100
Function B	0	12	12
Function C	0	12	12
Function D	0	12	12
Function E	0	12	12
Total	100	48	148
Function A	50	50	100
Function B	6	6	12
Function C	6	6	12
Function D	6	6	12
Function E	6	6	12
Total	74	74	148

So? Purpose of Testing?

- The typical testing group has two key priorities.
  - Find the bugs (preferably in priority order).
  - Assess the condition of the whole product (as a user will see it).
- Sometimes, these conflict
  - *The mission of assessment is the underlying reason for testing, from management's viewpoint. But if you aren't hammering hard on the program, you can miss key risks.*

Missions of Test Groups Can Vary

- Find defects
- Maximize bug count
- Block premature product releases
- Help managers make ship / no-ship decisions
- Assess quality
- Minimize technical support costs
- Conform to regulations
- Minimize safety-related lawsuit risk
- Assess conformance to specification
- Find safe scenarios for use of the product (find ways to get it to work, in spite of the bugs)
- Verify correctness of the product
- Assure quality

Exercise 6.3: What Is Your Mission?

- Pick a company and a product
  - Probably your own
  - If you don't want to use your current one, pick one everyone knows
- Form project teams
- What's the test mission?

A Different Take on Mission: Public vs. Private Bugs

- A programmer's public bug rate includes all bugs left in the code at check-in.
- A programmer's private bug rate includes all the bugs that are produced, including the ones fixed before check-in.
- Estimates of private bug rates have ranged from 15 to 150 bugs per 100 statements.
- What does this tell us about our task?

- Testers are looking into the programmer's (and tools') blind spots.
- Merely repeating the types of tests that the programmers did won't yield more bugs.
- The tester's methods should be different from the programmer's.

Defining the Test Approach

- The test approach (or “testing strategy”) specifies the techniques that will be used to accomplish the test mission.
- The test approach also specifies how the techniques will be used.
- A good test approach is:
  - Diversified
  - Risk-focused
  - Product-specific
  - Practical
  - Defensible

Defining the Test Approach

- Diversified
  - Include a variety of techniques. Each technique is tailored to expose certain types of problems, and is virtually blind to others. Combining them allows you to find problems that would be hard to find if you spent the same resource on a narrower collection of techniques.

- Risk-focused
  - Tests give you the opportunity to find defects or attributes of the software that will disappoint, alienate, or harm a stakeholder. You can't run all possible tests. To be efficient, you should think about the types of problems that are plausibly in this product or that would make a difference if they were in this product, and make sure that you test for them.

Defining the Test Approach

- Product-specific
  - Generic test approaches don't work. Your needs and resources will vary across products. The risks vary across products. Therefore the balance of investment in different techniques should vary across products.
- Practical
  - There's no point defining an approach that is beyond your project's capabilities (including time, budget, equipment, and staff skills).
- Defensible
  - Can you explain and justify the work that you are doing? Does your approach allow you to track and report progress and effectiveness? If you can't report or justify your work, are you likely to be funded as well as you need?

Heuristics for Evaluating Testing Approach

- James Bach collected a series of heuristics for evaluating your test approach. For example, he says:
  - Testing should be optimized to find important problems fast, rather than attempting to find all problems with equal urgency.
- Please note that these are heuristics – they won't always the best choice for your context. But in different contexts, you'll find different ones very useful.

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What Test Documentation Should You Use?

- Test planning standards and templates
  - Examples
  - Some benefits and costs of using IEEE-829 standard based templates
  - When are these appropriate?
- Thinking about *your* requirements for test documentation
  - Requirements considerations
  - Questions to elicit information about test documentation requirements for your project

IEEE Standard 829 for Software Test Documentation

- Test plan
- Test-design specification
- Test-case specification
  - Test-case specification identifier
  - Test items
  - Input specifications
  - Output specifications
  - Environmental needs
  - Special procedural requirements
  - Intercase dependencies
- Test-procedure specification
- Test-item transmittal report
- Test-log

We often see one or more pages per test case.

Considerations for IEEE 829

- What is the documentation cost per test case?
- What is the maintenance cost of the documentation, per test case?
- If software design changes create documentation maintenance costs, how much inertia do we build into our system? How much does extensive test documentation add to the cost of late improvement of the software? How much should we add?
- What inertia is created in favor of invariant regression testing?
- Is this incompatible with exploratory testing? Do we always want to discourage exploration?

Considerations for IEEE 829 (cont.)

- What is the impact on high-volume test automation? If the documentation cost per test case is high, how can you afford to create a multi-million test case project?
- How often do project teams start to follow 829 but then give it up mid-project? What does this do to the net quality of the test documentation and test planning effort?
- What requirements are filled by following a template based on 829?
- Which stakeholders gain a net benefit from IEEE standard documentation?
- What benefits do they gain and why are those benefits important to them?

Requirements for Test Documentation

- There are many different notions of what a good set of test documentation would include. Before spending a substantial amount of time and resources, it's worth asking what documentation should be developed (and why?)
- *Test documentation is expensive and it takes a long time to produce. If you figure out some of your main requirements first, you might be able to do your work in a way that achieves them.*

Test Docs Requirements Questions

- **Is your test documentation a *product* or a *tool*?**
  - A product is something that you give to someone else to use. They pay for it. You will probably follow whatever standard they request, subject to their willingness to pay for it.
  - In contrast, if the documentation is merely an in-house tool, it doesn't have to be any more complete, more organized, or more tidy than the minimum you need to help you meet your objectives.

Write a Purpose Statement for Test Documentation

- Try to describe your core documentation requirements in *one sentence* that doesn't have more than three components.
- Examples:
  - The test documentation set will primarily support our efforts to find bugs in this version, to delegate work, and to track status.
  - The test documentation set will support ongoing product and test maintenance over at least 10 years, will provide training material for new group members, and will create archives suitable for regulatory or litigation use.

Exercise 6.4: Purpose for Your Test Documentation?

- Use the company and product from Ex. 6.3
- Reform project teams
- What's the test *documentation* goal?

Review: Define Evaluation Mission

- What is a Test Mission?
- What is your Test Mission?
- What makes a good Test Approach (Test Strategy)?
- What is a Test Documentation Mission?
- What is your Test Documentation Goal?