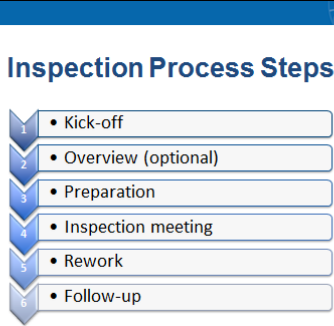
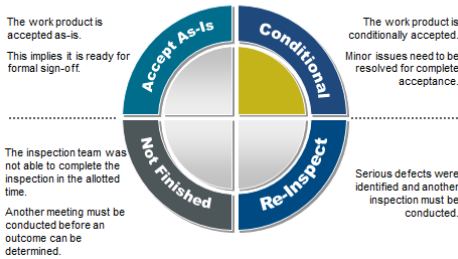
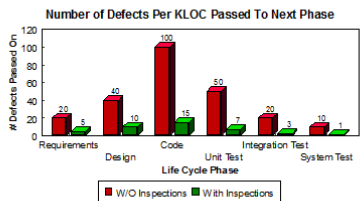


1	<div><div>UT</div><div><h2>Software Quality Reviews</h2><h3>Formal Inspection</h3></div></div>											
2	<div><div>UT</div><div><h2>Formal Inspection</h2><div><div></div><div><div><h3>Formal Inspection</h3><p>A formal evaluation technique in which a software work product is examined in detail by a person or group other than the work product author.</p><p>Purpose of the inspection is to identify defects, violations of standards, and other problems.</p><p>Specific steps must be followed.</p><p>Defect & effort data are collected.</p></div></div><div><small>SOURCE: Adapted from IEEE Standard Glossary of Software Engineering Terminology (IEEE 729)</small></div></div></div></div>	<p>In this lecture, I'll describe the formal inspection quality review model.</p> <p>The inspection is more formal and rigorous than the walkthrough model and it is considered to be an industry best practice for finding defects in software work products.</p> <p>Inspections have the highest defect detection rate of any defect identification technique...average defect detection rates of 60-90 percent, whereas the more informal walkthrough model averages 30-60 percent.</p> <p>So...what makes this model more formal? Several characteristics. There are specialized roles that some of the reviewers play, there are more steps than just the inspection meeting, there are rules for conducting the inspection meeting, and there is mandatory preparation and follow-up.</p> <p>The formal inspection review model was originally developed at IBM and was constructed specifically to mitigate the historical problems teams experienced with quality reviews of software work products.</p> <p>Let's look at this review model in more detail.</p>										
3	<div><div>UT</div><div><h2>Inspection Process Roles</h2><table><tr><td>Moderator</td><td><ul style="list-style-type: none">In charge of inspection processFacilitates inspection meetingEnsures all steps & rules are followed</td></tr><tr><td>Author</td><td><ul style="list-style-type: none">Requirements document author(s)Answers questionsResolves all issues he/she owns</td></tr><tr><td>Recorder</td><td><ul style="list-style-type: none">Logs issuesCompletes any paperwork</td></tr><tr><td>Presenter</td><td><ul style="list-style-type: none">Presents requirements document to review teamMay defer questions to document author(s)</td></tr><tr><td>Inspectors</td><td><ul style="list-style-type: none">Evaluate document for defectsEnsure requirements meet stakeholder needs</td></tr></table></div></div>	Moderator	<ul style="list-style-type: none">In charge of inspection processFacilitates inspection meetingEnsures all steps & rules are followed	Author	<ul style="list-style-type: none">Requirements document author(s)Answers questionsResolves all issues he/she owns	Recorder	<ul style="list-style-type: none">Logs issuesCompletes any paperwork	Presenter	<ul style="list-style-type: none">Presents requirements document to review teamMay defer questions to document author(s)	Inspectors	<ul style="list-style-type: none">Evaluate document for defectsEnsure requirements meet stakeholder needs	<p>Inspections require that some participants play specialized roles. There are five roles, and they are used to clearly define participant responsibilities and to help mitigate commonly encountered review problems.</p> <p>The moderator role is an extremely important one. The moderator is responsible for ensuring that all the steps in the inspection process are followed and that all the inspection process rules are complied with. The moderator is also responsible for facilitating the</p>
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	<p>inspection meeting.</p> <p>The author is the person (or persons) who authored the work product being inspected. The author is responsible for answering questions posed by the inspection team, for providing clarifying information, and for resolving any issues for which he or she is the designated owner.</p> <p>An issues list is a mandatory inspection work product, and the person assigned to play the role of recorder is responsible for logging the issues.</p> <p>The next role is the most unusual one. In the informal walkthrough model, the work product author typically walks the review team through the work product. In the formal inspection model, someone other than the author is selected to do this. Reasons for this include putting the focus on the work product instead of the author (which can mitigate defensiveness, particularly in design and code reviews), and to get an unbiased interpretation of the work product.</p> <p>For a requirements inspection, in particular, this is a very important and powerful role. I recommend to my clients to pick a developer or tester for this role in requirements inspections...someone who will have to use the requirements as input to their work process. This has been very effective at increasing defect detection and uncovering ambiguous or untestable requirements.</p> <p>Now...the traditional name for this role is reader, but I recommend the name presenter, because it more accurately reflects what the role is all about, and because historically people have interpreted reader literally...and actually just read the work product aloud...every single word. Experience has shown that the most effective way to implement this role is to present the work product by paraphrasing chunks of material rather than reading verbatim.</p> <p>The first four roles are the specialized roles. Anyone else on the inspection team falls into the category of general inspector. Like the participants in a walkthrough, inspectors are relevant stakeholders and perhaps subject matter experts who evaluate the work product for defects and ensure the work</p>
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		<p>product meets its requirements.</p> <p>Now, in practice, it is common for one person to play more than one role. For example, the moderator may also assume the role of recorder or a general inspector. Similarly, a general inspector may also play the role of recorder. When it comes to playing multiple roles, there are two guidelines that I ask my clients to treat as rules: the presenter should not play another role, and the author should not play another role. The presenter role is a full-time role during the inspection meeting, and having that individual play another role will slow down the meeting momentum and make the role less effective. With regard to the author not playing another role, experience has shown that it is most important for the author to focus full attention on participant comments and issues to ensure that correct resolution takes place.</p>
4	 <p>Inspection Process Steps</p> <ol style="list-style-type: none"> 1 • Kick-off 2 • Overview (optional) 3 • Preparation 4 • Inspection meeting 5 • Rework 6 • Follow-up 	<p>Another inspection characteristic that distinguishes it from the informal walkthrough process is that there are more steps than just a meeting. The steps help to give the inspection process structure and repeatability.</p> <p>The kick-off step starts the inspection process for a given work product. The author and moderator meet to verify that the work product is ready for inspection, the inspection team is selected, and the inspection meeting is scheduled. The traditional name for this step is planning, but I suggest the use of kick-off to my clients to give it the connotation that it usually takes minutes versus hours.</p> <p>The moderator decides whether the overview step is necessary. Traditionally, this step has been used to give the inspection team project background information and orientation, but moderators can use it for whatever they want to. Some moderators, for example, will get the inspection team together to review inspection scope, objectives, and rules.</p> <p>The preparation step is a mandatory step in the inspection process, because advance preparation is essential if the inspection meeting is to be effective. Participants are also typically asked to record and report their preparation times. The general rule of thumb is to expect preparation time to be about the</p>

		<p>same as meeting time. So, if there's a one hour inspection meeting it's expected that participants will spend about an hour preparing.</p> <p>During the inspection meeting, the work product is presented, issues are logged, and the inspection outcome is determined. The moderator is responsible for facilitating this step.</p> <p>If any issues need to be resolved, there is a rework step external to the meeting. And the moderator will appoint someone to follow-up with the issue owners to verify that the issues have been resolved. A follow-up activity may also be to re-inspect the work product if serious issues were identified.</p>																		
5	<h3>Inspection Meeting Outcomes</h3>  <p>Accept As-Is The work product is accepted as-is. This implies it is ready for formal sign-off.</p> <p>Conditional The work product is conditionally accepted. Minor issues need to be resolved for complete acceptance.</p> <p>Re-Inspect Serious defects were identified and another inspection must be conducted.</p> <p>Not Finished The inspection team was not able to complete the inspection in the allotted time. Another meeting must be conducted before an outcome can be determined.</p>	<p>A third characteristic of inspections that distinguish them from walkthroughs is that the outcomes of an inspection meeting are defined in advance.</p> <p>There are four basic outcomes as illustrated on the slide...accept as is, conditional acceptance, re-inspect, or the inspection is not yet finished and requires another meeting. Normally, we estimate how many meeting will be required in advance, so this outcome is usually known ahead of time</p> <p>Pre-defining the inspection meeting outcomes is a simple, but very powerful idea. The team knows, going into the meeting, that one of these outcomes will be assigned at the end of the meeting and it kind of pre-conditions peoples' thinking. This is something that could easily be incorporated into walkthroughs as well.</p>																		
6	<h3>Inspection Impact On Defect Removal</h3>  <table border="1"> <caption>Number of Defects Per KLOC Passed To Next Phase</caption> <thead> <tr> <th>Life Cycle Phase</th> <th>W/O Inspections</th> <th>With Inspections</th> </tr> </thead> <tbody> <tr> <td>Requirements</td> <td>20</td> <td>10</td> </tr> <tr> <td>Design</td> <td>40</td> <td>10</td> </tr> <tr> <td>Code</td> <td>100</td> <td>10</td> </tr> <tr> <td>Unit Test</td> <td>50</td> <td>10</td> </tr> <tr> <td>System Test</td> <td>20</td> <td>10</td> </tr> </tbody> </table> <p>Source: Adapted from Software Inspection: An Industry Best Practice, IEEE Computer Society, 1996</p>	Life Cycle Phase	W/O Inspections	With Inspections	Requirements	20	10	Design	40	10	Code	100	10	Unit Test	50	10	System Test	20	10	<p>In an earlier lecture, I talked about the error amplification phenomenon...uncaught defects that get through any life cycle phase are inherited by subsequent phases where some just pass thru and some cause additional defects to be created.</p> <p>This chart shows the impact that inspections can have on mitigating this phenomenon. It's based upon data obtained from a number of projects, some of which used inspections and some of which did not. The red bars show a measure of how many defects get through each life cycle phase when inspections were not used, and the green bars show the same statistic</p>
Life Cycle Phase	W/O Inspections	With Inspections																		
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Design	40	10																		
Code	100	10																		
Unit Test	50	10																		
System Test	20	10																		

		<p>for projects that used inspections. I plotted these to scale so that the effectiveness of inspections stand out visually. It's easy to see the dramatic impact that inspections can have.</p> <p>Now, not every organization uses inspections...nor do they need to. There's a bit of overhead with inspections...more people are required to play the roles and its best to provide people with training so they know how to do inspections correctly. Many of my clients, following the walkthrough guidelines I talked about earlier, have achieved results very close to those of the formal inspection model without the additional overhead.</p> <p>Regardless of the type of software quality review model used, what is most important is that it be effective at detecting and removing defects.</p>
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