SE-4831: Software Quality Assurance
Lab 4 Part 2: Performing your inspections and assessing their effectiveness

This lab represents the second portion of a two week lab sequence. In this week, you will actually perform the inspection and with the help of the moderator, analyze the effectiveness of the inspection.

1. Key Lab Activities

- Conduct a inspection meeting, discussing the defects found by the inspectors in their inspection preparation and logging them on the log sheet
- Calculate metrics based on the effectiveness of the inspection
- Construct a summary report

2. Introduction

Last week, you prepared for a formal Fagan inspection. As a senior design team, you determined an artifact that you desired to have inspected. You then hired a moderator. After settling on the artifact, you injected defects into the artifact in order to have a baseline of known issues. This modified artifact was then archived and distributed to the inspection team. The individual inspectors then inspected the document against a set of provided instructions. In today's lab, inspection meetings will be held to determine their findings as well as analyze their effectiveness.

3. Lab Schedule

In today's meeting, two inspections will be conducted. The first inspection, named "Alpha Inspection", will involve an inspection meeting with the first set of inspectors. The moderator will meet with the inspectors and the scribe will log the findings on the defect summary report (Excel datasheet). It is important, for the purposes of this lab, that inspectors are honest about which defects they found and did not find. Inspection meetings should take approximately 40 minutes. If the meeting should wrap up early, the scribe can go through and inform the inspectors of the missed injected defects. However, if this occurs, the inspectors should not disclose this information to anyone until after the second inspection is completed. Otherwise, the second set of inspectors may be "biased".

After a brief break, inspection teams will reconvene for the second inspection, "Beta Inspection". The process will then be repeated. This inspection should also take approximately 40 minutes.

After these two inspections meetings have completed, groups should reconvene to look at the effectiveness of the inspection. The moderator will report back to the team on the inspection and will lead the team in generating a report on the effectiveness of the inspection. To facilitate this,

it may be advantageous for the moderator to transfer the spreadsheet into a Google doc or other format which facilitates information being shared by the team members.

4. Metrics to Collect and Calculate

Each artifact should be measured for length. While many different methods can be used, for the purposes of this inspection, we will use the length in pages. To do this, simply count the length of your document. To insure uniformity, fonts should be set to approximately 12 point Times New Roman Font (or equivalent). Each section of the document (title page, contents, definitions, etc.) should be paginated onto a separate page. If it is not possible to do this, simply estimate the results. This length will be deemed the length of the inspection material, and used in subsequent calculations.

If the item happens to be code, the lines of code should be counted and divided by 50 to obtain an approximate page count.

After completing this step, complete the table shown below (this form is available on the course website as an Excel form.). This table indicates the length of the document, the time spent in preparation and inspections. This table will have raw data that is helpful for answering the questions which follow. For the capture recapture yield, assume that injected defects are the tagged set of defects

Raw Data Table

	Reviewer Performance							
	1	2	3	4	5	6	7	8
Length of document reviewed (Pages)								
Preparation Time (Minutes)								
Review Meeting Time (Minutes)								
Review Rate (Pages / Hour) (Prep Time Only)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Review Rate (Pages / Hour) (Prep Time + Review Meeting Time)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Number of Injected Defects								
Number of Major Injected Defects								
Number of Injected Defects Found								
Number of Major Injected Defects Found								
Total number of defects found								
Total Number of Major Defects Found								
Number of Unique defects found								
Number of Unique Major Defects Found								
Estimated Total Defects (Based on Individual Effectiveness and Injected Defects)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Estimated Total Major Defects (Based on Individual Effectiveness and Injected Defects)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Yield (Based on capture - recapture mechanism of injected defects)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Major Yield (Based on Capture - recapture mechanism of injected defects()	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Yield (Based on total count of defects from all reviewers. Calculated as # found by individual divided by total number found)								

5. Questions

Please answer the following questions to the best of your ability. You may place the data in tabular format and then provide a brief discussion of the findings referring to the data if that makes more sense.

Q1: Using the injected defects as the "tagged group" and all defects found in both inspections, what is an estimate of the total number of defects present within the artifact (including injected defects)?

Q2: Using the equations $\sigma^2 = \dfrac{(A+1)*(B+1)*(A-C)*(B-C)}{(C+1)^2*(C+2)}$, $UPI = T + 1.96\sigma$, and $LPI = T - 1.96\sigma$, what are the UPI and LPI for the number of defects in the artifact?

Q3: Approximately how many defects remain within the artifacts that were not found by the inspectors (including injected defects)?

Q4: If the unfound injected defects are removed from consideration, approximately how many unfound defects remain within the artifact?

Q5: Using the individual inspectors who found the most defects as the tagged set, estimate the total number of defects in the artifact as if each of the other inspectors were within the second set of inspectors. Do this both with the injected defects included and the excluded from the calculations.

Q6: What are the UPI and LPI for the number of defects based on this calculation? How does this compare with the answer for Q2?

Q7: Approximately how many defects remain within the artifacts that were not found by the inspectors? If the unfound injected defects are removed from the count, how many "real" defects are estimated to remain? How close is this to the answer for Q4?

Q8: Using inspection which collectively found the most defects (either Inspection #1 or Inspection #2) as the tagged set, estimate the total number of defects in the artifact using the other inspection as the non-tagged set. Repeat this both including and excluding the injected defects.

Q9: What are the UPI and LPI for the number of defects based on this calculation? Repeat this both including and excluding the injected defects.

Q10: Approximately how many defects remain within the artifacts that were not found by the inspectors? If the unfound injected defects are removed from the count, how many "real" defects are estimated to remain? How close is this to the answer for Q4 and Q6?

Q11: Using only the injected defects as a baseline, if only one inspector had inspected your artifact, and the inspector who had the lowest yield amongst the injected defects was that inspector, how confident as a team would you be in the effectiveness of the inspection?

Q12: Using the result of Q1 as an estimate for the total number of defects within the artifact, and assuming that the inspector with the best yield did not participate in the inspection process, what impact would this have on the overall inspection effectiveness? How many uncovered defects would not be discovered?

6. Plots

6.1. Yield versus inspection rate

Plot on an XY plot the relationship between inspection rate and yield, with yield (based on the total found in the inspection) being the vertical access and inspection rate being the horizontal axis. Is there a relationship?

6.2. Injected Yields and Overall Yields

Plot on a graph the inspector versus the yields. For this plot, on the x axis, each of the inspector should be represented as a data point (inspector 1, 2, etc.) On the plot, plot the yield of the injected defects that the inspector had. On a second plot, plot the yield that the inspector had versus the total number of defects found in the artifact. Does there appear to be a pattern between the two?

6.3. Estimated versus LPI and UPI

On a chart (most likely a bar chart, plot the estimate, UPI, and LPI for the estimates of the total number of defects present in the product? How close are they? In general, do the estimates fall within the UPI and LPI's of the other estimates, or are they significantly different? Do this both including and excluding the injected defects.

7. Deliverables

7.1. Assessment Forms (Due January 14, 2014 from all persons)

Each team leader should complete the Software Peer Inspection Participant Evaluation Form, which assesses the readiness of the inspectors to participate in the peer inspection.

Each inspector should complete the Software Peer Inspection Team Moderator Evaluation Form, which assesses the preparation of the moderator for the peer inspections.

7.2. Inspection Log Form (Due January 14, 2014)

Prior to lab next week, each team leader should upload the inspection log using the web upload script showing the total defects found in the inspection and all pertinent data.

7.3. Report (One per group, submitted from the moderator with support from all team members)

Each senior design team should submit a report with the following information:
1. Introduction -> What are you trying to accomplish with this lab? What are its goals and objectives?

2. Questions -> Answer succinctly the questions posed above. Make certain data / values are provided, as well as an interpretation of those values. It is important not only to provide the data, but also a brief analysis of the data.

3. Plots: Include the plots as well as a discussion of the plots. Is there a trend within the data?

4. Things gone right / Things gone wrong -> This section shall discuss the things which went correctly with this experiment as well as the things which posed problems during this lab. Overall, did you have the right inspectors for your artifact?

5. Conclusions -> This section shall discuss what has been learned from this laboratory experience. Also indicate those things which you may do differently based on this lab experience.

Reports should be submitted electronically through the web script by 23:59 on January 14, 2014.

Note: While the moderator is responsible for the final deliverable, each member of the team is responsible for understanding the material presented in the report as well as being able to make the calculation included in the report.

8. Software Peer Inspection Participant Evaluation Form

Moderator Name: _____

Artifact inspected: _____

Inspection #1:

Questions	Inspector #1	Inspector #2	Inspector #3	Inspector #4
Inspector Name				
Amount of preparation time spent prior to lab preparing for the inspection (record in minutes)				
Did the Inspector spend adequate time in advance of the inspection preparing for the inspection meeting?	Yes / NO	Yes / NO	Yes / NO	Yes / NO
Did the Inspector come prepared with a listing of discovered defects within the artifact?	Yes / NO	Yes / NO	Yes / NO	Yes / NO
Were the defects discovered by the Inspector substantial?	Yes / NO	Yes / NO	Yes / NO	Yes / NO
Did the Inspector actively participate in the inspection, presenting discovered issues in a professional manner?	Yes / NO	Yes / NO	Yes / NO	Yes / NO
Did the inspectors focus on finding the defects versus resolving the defects?	Yes / NO	Yes / NO	Yes / NO	Yes / NO
Comments (On back)				

Inspection #2:

Questions	Inspector#1	Inspector#2	Inspector#3	Inspector#4
Inspector Name				
Amount of preparation time spent prior to lab preparing for the inspection (record in minutes)				
Did the Inspector spend adequate time in advance of the inspection preparing for the inspection meeting?	Yes / NO	Yes / NO	Yes / NO	Yes / NO
Did the Inspector come prepared with a listing of discovered defects within the artifact?	Yes / NO	Yes / NO	Yes / NO	Yes / NO
Were the defects discovered by the Inspector substantial?	Yes / NO	Yes / NO	Yes / NO	Yes / NO
Did the Inspector actively participate in the inspection, presenting discovered issues in a professional manner?	Yes / NO	Yes / NO	Yes / NO	Yes / NO
Did the inspector focus on finding the defects versus resolving the defects?	Yes / NO	Yes / NO	Yes / NO	Yes / NO
Comments (On back)				

9. Software Moderator Evaluation Form

Inspector Name: _____

Moderator Name: _____

Artifact inspected: _____

Inspection #1:

Questions	Team leader #1
Were the roles and responsibilities for you as a Inspector clearly identified?	Yes / NO
Was the artifact to be inspected of sufficient size for the preparation time and inspection time given?	Yes / NO
Did the moderator provide the document to you with adequate advanced timing in order for you to properly prepare for the inspection in advance of the lab session?	Yes / NO
Was the inspection package complete, including all required materials as well as instructions on the material to be inspected?	Yes / NO
Did the moderator keep the inspection on task and working in an efficient manner and avoiding personal blame being placed on individual engineers?	Yes / NO
Did the moderator properly record all discovered defects on the meeting log, applying the appropriate severity rating?	Yes / NO
Did the moderator remain neutral about aiding in the discovery of injected defects?	Yes / NO

Comments (On Back)

Moderator Name: _____

Artifact inspected: _____

Inspection #2:

Questions	Team Leader #2
Were the roles and responsibilities for you as a Inspector clearly identified?	Yes / NO
Was the artifact to be inspected of sufficient size for the preparation time and inspection time given?	Yes / NO
Did the moderator provide the document to you with adequate advanced timing in order for you to properly prepare for the inspection in advance of the lab session?	Yes / NO
Was the inspection package complete, including all required materials as well as instructions on the material to be inspected?	Yes / NO
Did the moderator keep the inspection on task and working in an efficient manner and avoiding personal blame being placed on individual engineers?	Yes / NO
Did the moderator properly record all discovered defects on the meeting log, applying the appropriate severity rating?	Yes / NO
Did the moderator remain neutral about aiding in the discovery of injected defects?	Yes / NO

Comments (On Back)