

**STUDY GUIDE FOR THE  
ASSOCIATION FOR SOFTWARE TESTING  
BBST- TEST DESIGN SHORT COURSE**

**SHORT ANSWERS: On an exam, each question is worth 10 points.**

- S.1. What is a feature tour and how can you use one to help you create a function list?
- S.2. Compare and contrast variable coverage and error message coverage.
- S.3. Why characterize tours as a coverage-oriented test technique?
- S.4. What is a function list? What types of information would you expect to include in a function list and why types would you expect not to include in one?
- S.5. Compare and contrast transactions tours and feature tours.
- S.6. Compare and contrast data tours and variables tours.
- S.7. What is an operational mode and how does it fit with state-model based testing?
- S.8. What is the relationship between a claims tour and specification-based testing?
- S.9. What is the relationship between a benefits tour and scenario-based testing?
- S.10. What is exploratory testing and how is it different from scripted testing?
- S.11. Describe Bach's heuristic test strategy model and how to apply it as a risk-based testing tool.
- S.12. What is a quicktest? Why do we use them? Give two examples of quicktests.
- S.13. Compare and contrast "test idea" and procedurally-oriented "test cases"
- S.14. Describe the characteristics of a good test strategy.
- S.15. What are the differences between your testing strategy for a project and your testing mission for that project?
- S.16. Explain the statement, "Test techniques should manifest the test strategy." Use one or more examples in your explanation.
- S.17. Describe some similarities and differences between test techniques and test strategies.
- S.18. What is the difference between risk-based test design and risk-based test management?
- S.19. Why is it reasonable to describe a boundary test as a quicktest?
- S.21. Suppose that you follow the guidance of the domain testing lecture and assess the consequences (beyond the input filter) of setting a variable to a boundary value. Is this boundary testing still a quicktest? Explain why or why not.
- S.22. What is the difference between domain testing (focused on equivalence classes and boundaries along a primary dimension) and overflow or underflow testing focused on the same dimension?
- S.23. Give one or two examples of calculation errors (real or potential errors) in programs you know that quicktesting would not be suitable for exposing.

- S.24. Compare and contrast the ideas of initial state and modified-value bugs.
- S.25. In failure mode and effects analysis, what is the failure mode and what is the effect?
- S.26. Suppose that you organized your testing using a failure mode list. How would an effects analysis change your testing?
- S.27. What kinds of errors are you likely to miss with specification-based testing?
- S.28. What is an implicit specification? Give an example and describe how it is used in test design or bug reporting.
- S.29. What is ambiguity analysis and what kinds of bugs are you likely to expose with it? Give an example or two.
- S.30. Compare and contrast scenario testing and use-case-based testing. (Give one comparison and one contrast)
- S.31. Compare and contrast scenario testing and beta testing. (Give one comparison and one contrast)
- S.32. What is the basis for the claim that regression testing offers little information value?
- S.33. Contrast two techniques in terms of validity. Pick one technique that is more likely to generate tests with higher validity than the other, and explain why.
- S.34. Contrast two techniques in terms of power. Pick one technique that is more likely to generate tests with higher power than the other, and explain why.
- S.35. Contrast two techniques in terms of credibility. Pick one technique that is more likely to generate tests with higher credibility than the other, and explain why.
- S.36. Contrast two techniques in terms of non-redundancy. Pick one technique that is more likely to generate tests with higher non-redundancy than the other, and explain why.
- S.37. Contrast two techniques in terms of coverage. Pick one technique that is more likely to generate tests with higher coverage than the other, and explain why.
- S.38. Contrast two techniques in terms of ease of evaluation. Pick one technique that is more likely to generate tests with higher ease of evaluation than the other, and explain why.
- S.39. Contrast two techniques in terms of representativeness. Pick one technique that is more likely to generate tests with higher representativeness than the other, and explain why.
- S.40. Contrast two techniques in terms of information value. Pick one technique that is more likely to generate tests with higher information value than the other, and explain why.
- S.41. How is the notion of a best representative in domain testing different from the notion of a representative value in stratified sampling?
- S.42. Contrast primary versus secondary dimensions. Use examples to clarify your answer.
- S.43. In the Printer Options dialog in Open Office Impress, you can mark (Yes/No) for inclusion on a document:
- Page name
  - Date
  - Time
  - Hidden pages
- (a) Would you do a domain analysis on these (Yes/No) variables? Why or why not?

(b) What benefit(s) (if any) would you gain from such an analysis?

S.44. What is the difference between the input domain and the output domain? Use examples to clarify your answer.

S.45. What does it mean to say that two tests are equivalent? Explain your heuristics for classing tests as equivalent. Use examples to clarify your answer.

S.46. Compare and contrast “boundary” and “best representative”. Use examples to clarify your answer.

S.47. The domain testing schema advises you to “Create tests for the consequences of the data entered, not just the input filter.” Explain this. Use examples to clarify your points.

S.48. The domain testing schema advises you to “Determine whether this is an input variable or a result.” Explain this. Use examples to clarify your points.

S.49. Why are corner cases interesting when variables are independent but unlikely to be good tests when one variable constrains the other?

S.50. What is a combination chart? Draw one and explain its elements.

S.51. What is strong combination testing? What is the primary strength of this type of testing? What are two of the main problems with doing this type of testing? What would you do to improve it?

S.52. What is weak combination testing? What is the primary strength of this type of testing? What are two of the main problems with doing this type of testing? What would you do to improve it?

S.53. What is the difference between all-pairs and all-triples testing?

S.54. How does all-pairs testing address consequences of setting values for a group of variables? Explain, with examples.

S.55. Could you do all-pairs testing on result variables? Explain, with examples.

S.56. What would the challenges be of applying all-pairs testing to dates?

## **LONG ANSWERS: On an exam, each question is worth 20 points.**

L.1 Define the technique of function testing. Why should you use function tests? (Provide 3 reasons.) Why should you use techniques other than function tests? (Provide 3 reasons.)

L.2. What kind of information would you include in a fully detailed function list that you would not include (or not as completely) in a normal function list? Why would you include it? If you didn't put this type of information into a function list, how else would you capture it and use it in your testing (Give 3 examples.)

L.3. Give three examples of test techniques that differ in scope. Explain their scopes and how they are different.

L.4 Distinguish (use definitions) between coverage-focused, activities-focused, type-of-testers-focused, risk-focused, and oracle-focused test techniques? Can a technique be focused in more than one way? Provide three examples of this and briefly explain in each case how the technique is focused on each (of

2 or more) ways.

L.5. Consider a project in which you rely heavily on function testing as a primary technique. What improvements would you expect in the results of your testing if you added some scenario tests and some domain tests? Why?

L.6. Consider a project in which you rely heavily on specification-based testing as a primary technique. What improvements would you expect in the results of your testing if you added some risk-based tests and some user tests? Why?

L.7. Compare and contrast your approaches to testing if your primary information objective was to “Find important bugs” versus “Predict and control product support costs.” In your answer, briefly describe the type of product you are testing and several characteristics of the testing strategies you would apply in each case. Make it clear why one strategy is more appropriate for “Find important bugs” and the other strategy is more appropriate for “Predict and control product support costs.”

L.8. Compare and contrast your approaches to testing if your primary information objective was to “Assess the quality of the product” versus “Block premature product releases.” In your answer, briefly describe the type of product you are testing and several characteristics of the testing strategies you would apply in each case. Make it clear why one strategy is more appropriate for “Assess the quality of the product” and the other strategy is more appropriate for “Block premature product releases.”

L.9. Compare and contrast your approaches to testing if your primary information objective was to “Find important bugs” versus “Assess conformance to specifications.” In your answer, briefly describe the type of product you are testing and several characteristics of the testing strategies you would apply in each case. Make it clear why one strategy is more appropriate for “Find important bugs” and the other strategy is more appropriate for “Assess conformance to specifications.”

L.10. Compare and contrast your approaches to testing if your primary information objective was to “Minimize the risk of safety-related lawsuits” versus “Assess conformance to specifications.” In your answer, briefly describe the type of product you are testing and several characteristics of the testing strategies you would apply in each case. Make it clear why one strategy is more appropriate for “Minimize the risk of safety-related lawsuits” and the other strategy is more appropriate for “Assess conformance to specifications.”

L.11. You are testing the group of functions that let you create and format a spreadsheet..

Suppose that a critical requirement for this release is **scalability of the product**. What scalability issues might be present in a spreadsheet? List three. For each issue, list 2 types of failures that could involve scalability. For each type of failure, describe a good test for it and explain why that is a good test for that type of failure. (There are 6 failures, and 6 tests, in total). (NOTE: When you explain why a test is a good test, make reference to some attribute(s) of good tests, and explain why you think it has those attributes. For example, if you think the test is powerful, say so. But don't stop there, explain what about the test justifies your assertion that the test is powerful.)

L.12. You are testing the group of functions that let you create and format a spreadsheet.

Think in terms of *persistent data* (other than the data you enter into the cells of the spreadsheet). What persistent data is (or could be) associated with a spreadsheet? List three types. For each type, list 2 types of failures that could involve that data. For each type of failure, describe a good test for it and explain why that is a good test for that type of failure. (There are 6 failures, and 6 tests, in total). (NOTE: When you explain why a test is a good

test, make reference to some attribute(s) of good tests, and explain why you think it has those attributes. For example, if you think the test is powerful, say so. But don't stop there, explain what about the test justifies your assertion that the test is powerful.)

L.13. You are testing the group of functions that let you create and format a table in a word processor (your choice of MS Word or Open Office).

Think in terms of *compatibility with external software*. What compatibility features or issues are (or could be) associated with tables? List three types. For each type, list 2 types of failures that could involve compatibility. For each type of failure, describe a good test for it and explain why that is a good test for that type of failure. (There are 6 failures, and 6 tests, in total). (NOTE: When you explain why a test is a good test, make reference to some attribute(s) of good tests, and explain why you think it has those attributes. For example, if you think the test is powerful, say so. But don't stop there, explain what about the test justifies your assertion that the test is powerful.)

L. 14. Imagine testing Open Office Impress, and placing objects in documents. Describe three examples of bugs that you could hunt with modified-value testing? Why is this technique appropriate to these bugs?

L.15. Imagine testing the Amazon.com website. Give three examples of interference tests that might be useful for finding bugs in that site. Why are these types of tests useful for these types of bugs?

L.16. Imagine that you are testing the amazon.com website and you have physical access (and appropriate permissions) for testing its file systems. Describe a few file-system tests you could run on this site, how the system should handle them and how it might fail if it does not handle them appropriately.

L.17. What kinds of bugs would you expect to miss if you relied on quicktesting as your primary approach to testing? Give three examples, and explain why these are reasonable examples.

L.18. Look up a discussion of the concept of “Guidewords” in HAZOP. How does this idea similar to Bach’s Heuristic Test Strategy Model? If you were going to use HTSM to guide exploration the same way we could use HAZOP to guide testing, what would you do?

L.19. You are testing the group of functions that let you format a table in Open Office Impress.

List 5 ways that these functions could fail. For each potential type of failure, describe a good test for it, and explain why that is a good test for that type of failure. (NOTE: When you explain why a test is a good test, make reference to some attribute(s) of good tests, and explain why you think it has those attributes. For example, if you think the test is powerful, say so. But don't stop there, explain what about the test justifies your assertion that the test is powerful.)

L.20. Suppose that you organized your testing around a failure mode analysis. How would your testing change (what you are likely to find or how you would report it) if you supplemented this with scenario testing and function testing?? Explain why these are reasonable examples. Are there any ways in which these techniques won’t add much to your testing? Explain.

L.21. Suppose that you organized your testing around a failure mode analysis. How would your testing change (what you are likely to find or how you would report it) if you supplemented this with long-sequence regression testing and specification-based testing? Explain why these are reasonable examples. Are there any ways in which these techniques won't add much to your testing? Explain.

L.22. Suppose that you organized your testing around a failure mode analysis. How would your testing change (what you are likely to find or how you would report it) if you supplemented this with quicktesting and domain testing? Explain why these are reasonable examples. Are there any ways in which these techniques won't add much to your testing? Explain.

L.23. What is active reading? Explain how these study guide questions are a tool for helping you actively read/process the course videos and slides. Describe two other active reading techniques that you could use with the course videos and slides, and how you would use them

L.24. Briefly describe a product (your choice) and the kinds of information you would expect to be documented in implicit specifications rather than in the product's formal specifications. Explain the basis for your distinctions.

L.25. Suppose that you had no access to a company's internal development documentation. How could you develop specification-based tests of it? How thorough a set of tests could you develop? Explain.

L.26. Suppose that your primary test technique for a product was specification-based testing. (Identify a particular product and briefly describe it.). How would your testing change (what you are likely to find or how you would report it) if you supplemented this with long-sequence regression testing and domain testing? Explain why these are reasonable examples. Are there any ways in which these techniques won't add much to your testing? Explain.

L.27. Suppose that your primary test technique for a product was specification-based testing. (Identify a particular product and briefly describe it.). How would your testing change (what you are likely to find or how you would report it) if you supplemented this with function testing and scenario-based testing? Explain why these are reasonable examples. Are there any ways in which these techniques won't add much to your testing? Explain.

L.28. Suppose that your primary test technique for a product was specification-based testing. (Identify a particular product and briefly describe it.). How would your testing change (what you are likely to find or how you would report it) if you supplemented this with failure-mode-based testing and user testing? Explain why these are reasonable examples. Are there any ways in which these techniques won't add much to your testing? Explain.

L.29. Describe a traceability matrix.

- How would you build a traceability matrix for Open Office's word processor?
- What specification(s) are you tracing to and where would you get them?
- What is the traceability matrix used for?
- What are the advantages and risks associated with driving your testing using a traceability matrix?
- Give examples of advantages and risks that you would expect to deal with if you used a traceability matrix for any two of the following features of Open Office Writer:
  - Outlines
  - Tables
  - Fonts
  - Printing

L.30. Define a scenario test and describe the characteristics of a good scenario test.

Imagine developing a set of scenario tests for creating presentations in Google Docs.

- What research would you do in order to develop a series of scenario tests?
- Describe two scenario tests that you would use and explain how these would relate to your research and why each is a good test.

L.31. Suppose that scenario testing is your primary approach to testing. What controls would you put into place to ensure good coverage? Describe at least three and explain why each is useful.

L.32. Imagine that you were testing how OpenOffice Writer does outline numbering.

- Explain how you would develop a set of scenario tests that focus on this feature.
- Describe a scenario test that you would use while testing this feature.
- Explain why this is a particularly good scenario test.

L.33. What is a use case? How could you build a collection of use cases that had high coverage? What kinds of coverage would you expect to be able to optimize? Explain your reasoning.

L.34. Consider *domain testing* and *specification-based testing*. What kinds of bugs are you more likely to find with domain testing than with specification-based testing? What kinds of bugs are you more likely to find with specification-based testing than with domain testing?

L.35. Consider *scenario testing* and *risk-based testing*. What kinds of bugs are you more likely to find with scenario testing than with risk-based testing? What kinds of bugs are you more likely to find with risk-based testing than with scenario testing?

L.36. Consider *function testing* and *user-based testing*. What kinds of bugs are you more likely to find with function testing than with user-based testing? What kinds of bugs are you more likely to find with user-based testing than with function testing?

L.37. Consider *scenario-based combination testing* and *all-pairs combination testing*. What kinds of bugs are you more likely to find with *scenario-based combination testing* than with *all-pairs combination testing*? What kinds of bugs are you more likely to find with *all-pairs combination testing* than with *scenario-based combination testing*?

L.38. Consider *scenario testing* and *function testing*. What kinds of bugs are you more likely to find with *scenario testing* than with *function testing*? What kinds of bugs are you more likely to find with *function testing* than with *scenario testing*?

L.39. Compare and contrast creating a suite of scenario tests based on analysis of the product's potential users and the possible life histories of objects in the system. Pick a program (describe it enough that I can understand your answer) and describe a scenario of each type. Explain why each of these is a good example of a scenario of this type.

L.40. Compare and contrast creating a suite of scenario tests based on analysis of the transactions that someone could complete with the product and analysis of the potential activities of disfavored users of the system. Pick a program (describe it enough that I can understand your answer) and describe a scenario of each type. Explain why each of these is a good example of a scenario of this type.

L.41. Compare and contrast creating a suite of scenario tests based on analysis of the types of reports that the product can generate and the ways the software responds to different types of system events. Pick a program (describe it enough that I can understand your answer) and describe a scenario of each type. Explain why each of these is a good example of a scenario of this type.

L.42. Compare and contrast creating a suite of scenario tests based on analysis of the product's potential benefits and the history of complaints with this product or its competitors. Pick a program (describe it enough that I can understand your answer) and describe a scenario of each type. Explain why each of these is a good example of a scenario of this type.

L.43. Why would conversion of data from another application be an interesting basis for scenario testing? Consider converting data created in Microsoft PowerPoint for use in evaluating OpenOffice Impress. Describe the types of tests you would expect to create. Give a few examples. Remember, you are thinking about scenario tests, not function tests.

L.44 The lecture describes a schema for designing domain tests. Here are the first steps:

- A. Identify the potentially interesting variables.
- B. Identify the variable(s) you can analyze now. This is the variable(s) of interest.
- C. Determine the primary dimension of the variable of interest.
- D. Determine the type and scale of the variable's primary dimension and what values it can take.
- E. Determine whether you can order the variable's values (from smallest to largest).
- F. Determine whether this is an input variable or a result (or both).
- G. Determine how the program uses this variable.
- H. Determine whether other variables are related to this one.
- I. Partition the variable (its primary dimension)
  - If the dimension is ordered, determine its sub-ranges and transition points.
  - If the dimension is not ordered, base partitioning on similarity.
- J. Lay out the analysis in the classical boundary / equivalence class table. Test with best representatives.

Apply this method to this function:

- I, J, and K are unsigned integers. The program calculates  $K = I * J$ . For this question, consider only cases in which you enter integer values into I and J.
- Do an equivalence class analysis **on the variable K** from the point of view of the effects of I and J (jointly) on K. Identify the boundary tests that you would run (the values you would enter into I and J) in your tests of K.

*Note: In the exam, I might use*

- $K = I / J$             *or*
- $K = I + J$             *or*
- $K = \text{IntegerPartOf}(\text{SquareRoot}(I * J))$

L.45. Imagine testing a file name field. For example, go to a File Open dialog, you can enter something into the field.

- Do a domain testing analysis: List a risk, equivalence classes appropriate to that risk, and best representatives of the equivalence classes.
- For each test case (use a best representative), briefly explain why this is a best representative. Keep doing this until you have listed 10 best-representative test cases.

L.46. One of the common ways to describe how to identify variables, their equivalence classes and boundary cases is to rely on the specification. However, we can analyze many variables whether they are well-specified or not. Describe three examples of ordered variables, and explain how we could apply domain testing to each.

L.47. Why is it difficult to apply domain testing to non-ordered sets? Describe a variable whose values would be non-ordered and explain how you would apply a stratified sampling approach to it.

L.48. Compare and contrast testing input variables and result variables. Be specific. Use examples to clarify your explanation.

L.49. Compare and contrast all-pairs testing and scenario testing. Why would you use one over the other?

L.50. What is a data relationship table? Draw one and explain its elements. When would you use a table like this and what would you use it for?

L.51. We considered all-pairs as an approach for strictly independent variables. Why is this restriction important? Suppose you were testing four variables (A, B, C, D) that had 3 values each (A1, A2, A3 and similarly for B, C and D) but A1 was always an invalid combination with B2. How would you modify your all-pairs test set to handle this one dependence? Now, suppose that A1 is ALSO invalid with C3 or D3 and A2 is always invalid with B3, C2 or D3, and C1 is invalid with D2. How would you design your combination tests in this case?

L.52. Compare and contrast the mechanical, risk-based, and scenario-based approaches to developing combination tests. Discuss their strengths and weaknesses relative to each other. Use examples to clarify your points.

L.53. We are going to do some configuration testing on the Windows version of Open Office. We want to test it on

- Windows XP, Vista, and Windows 7 (the latest service pack level of each)
- Printing to an inkjet, an HP laser printer and a Xerox laser printer
- Connected to the web with a DSL modem, a cable modem, and a wireless card (802.11n)
- Using a mouse, a touchpad, and the keyboard
- With a 1024x768 display, an 1152 x 720, and a 1600 x 1200 display
- With 1 gB of Ram, 2 gB and 4 gB of RAM

- How many combinations are there of these variables?
- Explain what an all-pairs combinations table is
- Create an all-pairs combinations table.
- Explain why you think this table is correct.

*Note: In the exam, I might change the number of operating systems, printers, modem types, input devices, memory or displays*