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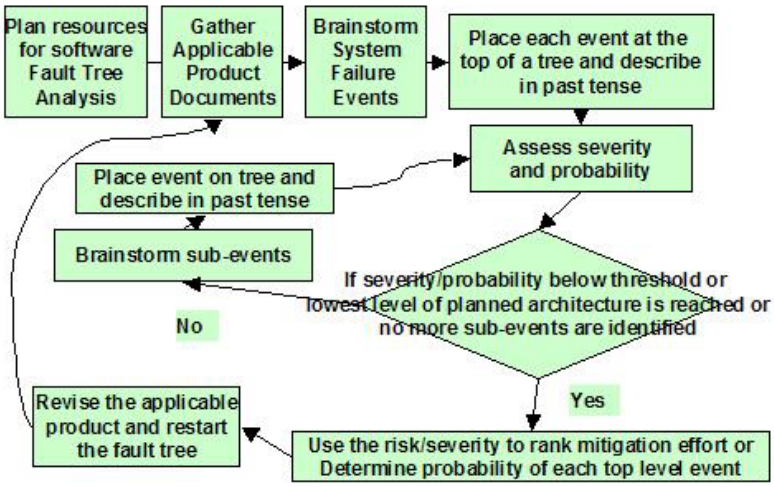
Software Fault Tree Analysis Course

Contrary to popular belief, software failure modes should be worked into a system level software fault tree as opposed to analyzing software faults in a vacuum. Another common but faulty approach is to treat software like a black box. For this analysis to be effective the software must be analyzed from a functional as opposed to black box perspective. For example – it's ineffective for the fault tree to have an event that says "Software failed". That's an example of a black box approach which is common but largely useless. The effective approach is to analyze how the software will fail in specific terms. Example: "The software inadvertently allowed <a specific prohibited state transition>". The software fault tree analysis training covers the methods employed for constructing a system fault tree with software failure modes.

The basic process for conducting the software FTA is shown below.



General process for adding software failure modes to a system level fault tree

Target audience

Software engineers, systems engineers, reliability engineers, safety engineers.

Each course attendee is able to…

- Add software failure events to a system fault tree
- Understand how software and hardware can together cause a failure
- Understand that many hazards can be caused by software or hardware or both
- Use the software FTA to supplement other analyses such as the software FMEA
- Understand how not to conduct a software FTA – don't treat software as a black box and don't analyze it in a vacuum.

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Related products and services

Related products	Related services
System software reliability analysis module	Software fault tree analysis service

Pricing

Call 321-514-4659 for a quotation.

Mapping to the IEEE 1633

The below table shows which sections of the IEEE 1633 Recommended Practices for Software Reliability are covered by this training class.

Section of IEEE 1633	IEEE Software reliability predictions	Integrating software and hardware reliability	Software FMEA	Software FTA	Reliability driven software	SRE for DoD Acquisitions	SRE planning
4.0 Roles, Approach, Concepts						X	x
5.1 Planning							
5.1.1 Characterize the software system	X					**	
5.1.2 Defines failures and criticality	X		X				
5.1.3 Perform a reliability risk assessment	X						
5.1.4 Assess the data collection system		X					
5.1.6 Develop a software reliability plan							x
5.2.1 Perform a defect root cause analysis			X			**	
5.2.2 Perform a software FMEA			X				
5.2.3 Perform a software FTA				X			

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Section of IEEE 1633	IEEE Software reliability predictions	Integrating software and hardware reliability	Software FMEA	Software FTA	Reliability driven software	SRE for DoD Acquisitions	SRE planning
5.3 Apply software reliability during development							
5.3.1 Identify/Obtain the initial system reliability objective		X				**	
5.3.2 Perform a software reliability assessment and prediction	X						
5.3.3 Sanity check the prediction	X						
5.3.4 Merge the software reliability predictions into the overall system reliability		X					
5.3.5 Determine an appropriate overall software reliability requirements		X					
5.3.6 Plan the reliability growth	X						
5.3.7 Perform a sensitivity analysis	X						
5.3.8 Allocate the required reliability to the software LRUs		X					
5.4 Apply software reliability during testing							
5.4.1 Develop a reliability test suite					X	**	
5.4.2 Increase test effectiveness through fault insertion			X		X		
5.4.3 Measure test coverage					X		
5.4.4 Collect fault and failure data		X					
5.4.5 Select Reliability growth models		X					
5.4.6 Apply software reliability metrics		X					
5.4.7 Determine accuracy of the predictive and reliability growth models	X	X					
5.5 Support release decision							
5.5.1 Determine release stability		X				**	
5.5.2 Forecast additional test duration		X					
5.5.3 Forecast remaining defects and effort required to correct them		X					
6.0 Software reliability models	X	X					
Annex A templates for SFMEA			X				
Annex B Additional methods for predicting software reliability during development	X						