Software Testing

Error Categories

by   J. Janvier (Jay/文宇)

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Syntax Errors

- Programmer did not respect the syntax of the language,
- Most development environments intercept these errors,
- Code does not compile, application does not run,
- Easy to find, Solution: update code

Compilation Errors (or Compile-Time Errors)

- Can be result of Syntax Error(s) (older generation IDE's),
- Can be caused by defects in the compiler,
- Code does not compile, application does not run,
- Can be easy up to difficult to find, Solution: update code

Error Categories

Semantic Errors (or Logical Errors)

- Code compiles, Application runs,
- Error is caused by bad requirements, bad software designs and/or wrong program logic(!),
- Is found after application startup and results in wrong system behavior,
- Easy to Difficult to find, Solution: update documents and/or code

Run-Time Errors

- Code compiles, application runs,
- Error is caused by bad requirements, bad software designs and/or wrong code,
- Is found after startup of the application and results in system (functions) failure,
- Easy to Difficult to find, Solution: update documents and/or code

Error Categories

An error/bug is normally categorized when it occurs or is found.
However an error/bug can be categorized differently when the cause is known.

e.g. Null-pointer exception crashes an application => Runtime Error; however it is caused due to a mistake in the syntax of the code => Syntax Error.

Therefor it is common in companies to use a severity rating for errors/bugs found.

e.g. Critical, Major, Minor:
Critical bug, means that it prevents normal operation of the software system.
Major bug, the system can continue to operate, but with limited functionality.
Minor bug, the error doesn't affect the functioning of the system in a direct way.

Error Categories Overview

	Caused In	Caused by	Discovered During	Code Compiles?	Application Runs?	Discover Difficulty	Note
Syntax Errors	Code	Programmer	Compiling (at latest)	No	No	Easy	
Compilation Errors	Code Compiler	Programmer, Compiler Software	Compiling	No	No	Easy up to Difficult	
Semantic Errors	Requirements, Designs, Code	Requirements eng., Designer/Architect, Programmer	After application startup	Yes	Yes	Easy up to Difficult	Results in wrong system behavior
RunTime Errors	Requirements, Designs, Code	Requirements eng., Designer/Architect, Programmer	After application startup	Yes	Yes	Easy up to Difficult	Results in system (functions) failure (e.g. crash)

Excercises:

- Arianne 5 Rocket
- Toyota Cars – Sticky Gas Pedals

Questions?