Teaching Software Testing

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What Testing Techniques Are Used in Your Software Projects?

Most of our projects involve development of new hardware as well as software.

Most require high reliability and some are safety critical.

- **System level requirements** are just as important as software requirements.

- We often require use of **special purpose testing equipment** that is unique to the product being developed.

- Test **procedures and results must often be carefully recorded (documented)** and are often audited.
What Testing Techniques Do New Hires Not Know?

Results vary, but:

- Many know software but know **too little about hardware**
- Some don’t seem to understand the **underlying principles** – only how to use specific languages or tools
- Few of them know **testing discipline**:
  - Developing effective test plans
  - Documenting the results of testing (test reports)
  - Testing the test code
What Testing Tools Do You Use?

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  - Simulate the system before building it
  - Compare actual results with simulated results to find underlying causes of problems
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- **Automated Testing / Test Generation**
  - Requires very good discipline in defining requirements
  - Can potentially save a lot of time and money
What Are Your Testing Needs Where Current Staff are Not Well Prepared and Research is Needed?

- **Integration of hardware and software testing methods and tools**
  - The problems are often complex and may involve both hardware and software failures

- **Automatic testing**
  - Sometimes the system is too high in performance to do traditional testing
  - Examples:
    - With high speed networking, you may need to see and track individual packets
    - With multi-core systems the interactions between cores can be very hard to see with traditional testing methods
Bottom Line

- **You Must Consider the Complete System/Product, Not Just the Software**
  - Software developers must understand how the hardware works

- **Testing Begins At the Start of the Project**
  - Test plans should be initiated by system/software designers, not by “testers”.
  - “Test First” – don’t write code if you don’t know how you will test it
  - Requirements may change, but you must make them as specific as possible
    - Are the requirements testable?
    - Are they unambiguous?
Questions?