Testing

Types of Testing – Levels

- Unit Testing
  - H/W: circuits, circuit cards
  - S/W: modules, subroutines
- Integration Test
  - H/W: All circuit cards
  - S/W: All S/W modules
  - Integration with 3rd party equipment
- System Test
  - Complete H/W and S/W working as a product
- Performance/Reliability Testing
- Customer Acceptance Testing

System Testing

- Fundamental or Core Testing
  - Requirements testing
  - Exception testing
    - Boundary conditions
- Regression testing
  - Redo fundamental/core tests
  - Special case tests
- Testing time usually takes as long as the development/design phases

Reliability Testing

- These tests prove the product's propensity to fail
- This is based on the product's FIT rate which can be in terms of years
- Accelerated testing is performed
  - E.g. at high temperatures or other environmental conditions
- Shake and Brake testing
- Usually performed by a third party test lab to independently validate the tests

Shake testing

- If the product has a reliability spec for physical wear and tear then product would be exercised
  - vibration chamber
  - drop test
- Usually performed on prototypes and first manufactured product

Bake testing

- Most consumer/industrial products are designed to fail in years: MTBF
- To test for years before a product is released is expensive
- Usually, accelerated aging tests are performed to reduce the MTBF to a manageable time
  - Years to weeks
  - Operating the product at higher temperature, humidity, etc. is a way of aging the product.
  - Environmental chambers are used
- Usually performed on prototypes and first manufactured product