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Verifies correctness of	Verifies correctness of
design.	manufactured h/w.
Performed by simulation,	Two-part process:
h/w emulation, or formal	1. Test generation
methods.	2. Test application
Performed once prior to manufacturing.	Test application performed on every manufactured device.
Responsible for <i>quality of design</i> .	Responsible for <i>quality of devices</i> .













- Two types of faults:
  - <u>Permanent</u>: Faults that change the functional behavior of a system permanently.
    - Incorrect connections in ICs, PCBs
    - Incorrect IC masks
    - Functional design errors
      - EASIER TO DETECT
  - <u>Non-permanent</u>: They occur at random times, and affect the system's functional behavior for finite, but unknown periods of time.

**DETECTION & DIAGNOSIS IS DIFFICULT** 

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• Two classes of non-permanent faults:
• Transient Faults:
• Caused by environmental conditions such as cosmic rays, α particles, humidity, pressure, vibration, etc.
• Example: Bit changes in RAMs caused by α-radiation (called *soft errors*; no permanent damage).



- Caused by non-environmental conditions, such as loose connections, ageing components, critical timing, etc.
- Behave like permanent failure for the duration of the failure.
- Can be detected by continuously repeating the test.





























