There is never enough time to do it right the first time, but there is always enough time to do it over.
Anti-Patterns:
- Tests don’t map to requirements
- Requirements aren’t tested
- Reqts/design elements missing
- Gold plating (extra functionality)

Traceability
- Creating something traces to a quality check on the result
  - **Verification**: you did something the way you said you’d do it
  - **Validation**: the thing you created behaves the way it should
- Ensure nothing left out; nothing added that shouldn’t be there
Traceability Examples

- **Design traceability**
  - Requirement $\rightarrow$ design $\rightarrow$ implementation
  - Requirement $\rightarrow$ test

- **SQA traceability**
  - Confirm process is being carried out
  - Process step $\rightarrow$ document/artifact $\rightarrow$ quality metric

- **Safety analysis traceability**
  - Confirm all hazards successfully mitigated
  - Hazard $\rightarrow$ requirement $\rightarrow$ mitigation $\rightarrow$ validation

- **Defect traceability**
  - Ensure that all bugs are fixed
  - Bug report $\rightarrow$ defect identified $\rightarrow$ fix task $\rightarrow$ code check-in $\rightarrow$ regression test
## REQUIREMENTS TRACEABILITY MATRIX

**Project Name:** Online Flight Booking Application

<table>
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<td><strong>Functional Requirement ID#</strong></td>
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</table>

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Traceability for Hazard Mitigation

Mader et al. 2013:
http://doi.ieeecomputersociety.org/10.1109/MS.2013.60
Traceability Best Practices

- **Trace everything in design package**
  - Even simple traceability checks can find problems
    - **Gold plating**: design item not traced to a requirement
  - Everything in design has an ID tag for traceability
    - Map left and right sides of V to each other
    - Map each layer of V upward and downward
  - Trace changes to see what else they affect

- **Traceability pitfalls**
  - Making granularity of trace IDs too big causes problems
  - Re-numbering breaks auto-generated document sections used as trace IDs
  - Don’t use the wrong tool
    - Spreadsheets don’t scale to big projects
    - Big project tools might be overkill where a spreadsheet approach will do
I used to think correlation implied causation.

Then I took a statistics class. Now I don’t.

Sounds like the class helped.

Well, maybe.