There is never enough time to do it right the first time, but there is always enough time to do it over.
Traceability

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>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Business Requirement ID#</strong></td>
<td><strong>Functional Requirement ID#</strong></td>
<td><strong>Priority</strong></td>
</tr>
<tr>
<td><strong>Business Requirement / Business Use case</strong></td>
<td><strong>Functional Requirement / Use Case</strong></td>
<td><strong>Test Case ID#</strong></td>
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<tr>
<td><strong>BR_1</strong></td>
<td><strong>FR_1</strong></td>
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<tr>
<td>Reservation Module</td>
<td>One Way Ticket booking</td>
<td>TC#001 TC#002</td>
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<td><strong>FR_2</strong></td>
<td>Round Way Ticket</td>
<td>TC#003 TC#004</td>
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<td><strong>FR_3</strong></td>
<td>Multicity Ticket booking</td>
<td>TC#005 TC#006</td>
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<td>TC#007 TC#008</td>
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<td><strong>FR_5</strong></td>
<td>By Debit Card</td>
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<td><strong>FR_6</strong></td>
<td>By Reward Points</td>
<td>Medium TC#010 TC#011</td>
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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