The Joel Test:
12 Steps to Better Code

Emina Torlak
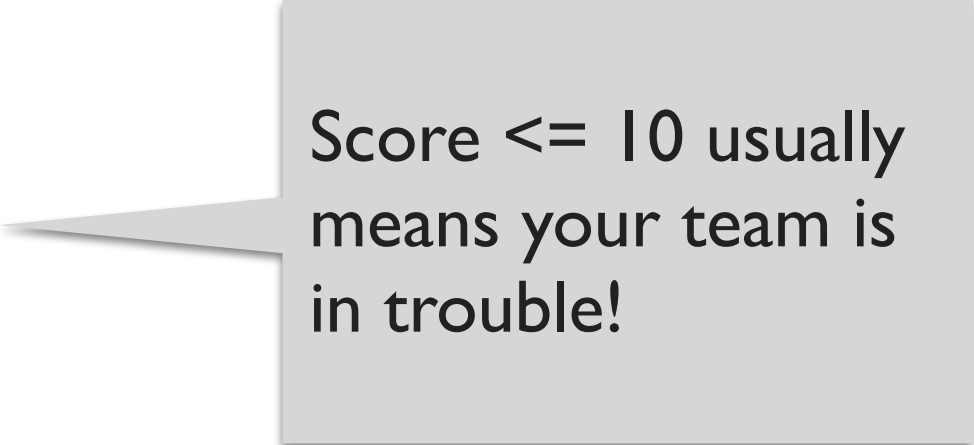
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Outline

1. Do you use source control?

2. Can you make a build in one step?

3. Do you make daily builds?

4. Do you have a bug database?

5. Do you fix bugs before writing new code?

6. Do you have an up-to-date schedule?

7. Do you have a spec?

8. Do you have quiet working conditions?

9. Do you use the best tools money can buy?

10. Do you have testers as part of the team?

11. Do you have interview candidates write code?

12. Do you do hallway usability testing?

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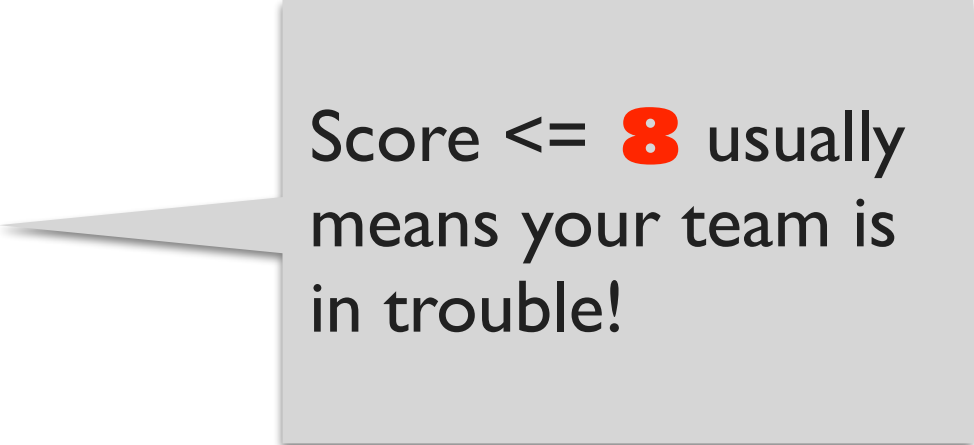Score <= 10 usually means your team is in trouble!

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- Source control …

  - allows multiple developers to collaborate

  - keeps project in consistent state

  - tracks changes and enable roll-back

  - manages multiple versions

  - saves data in case of a disaster

  - is the authoritative source for "daily build"

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The ZFR should indicate the state of your repository.

Can you make a build in one step?

- A single script that

  - [does a full checkout from scratch]

  - rebuilds every line of code

  - makes the binary executable files in all versions, languages and #ifdef combinations

  - [creates the installation package]

  - [creates the final media, web site, …]

- All steps are automated and exercised regularly

- So, why is this valuable?
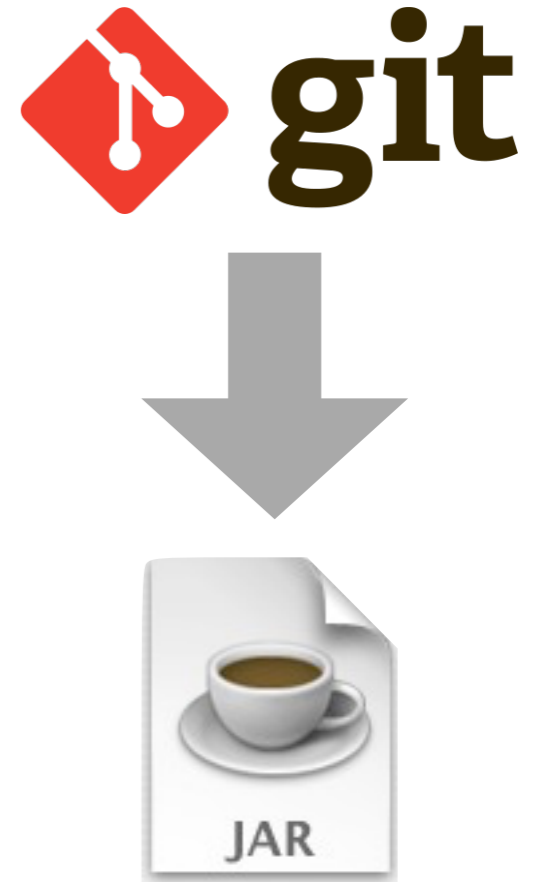
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The ZFR must include your build script or sequence.

Do you have a bug database?

- You can't keep the bug list in your head

    - especially with multiple developers and multiple customers

- Moreover, looking at the history of bugs can be insightful!

- To characterize a bug consider:

    - how to reproduce it

    - expected behavior, actual behavior

    - responsible party, status, priority

- Best to use what is integrated with your code hosting.

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For the beta release assignment, we'll be asking to see a log of your bugs.

Do you fix bugs before writing new code?

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- Why not fix them later?

  - Familiar with the code now

  - Harder to find (and fix) later

  - Later code may depend on this code (try building on quicksand…)

  - Bugs may reveal fundamental problems

  - Leaving all bugs to the end will make it harder to understand and keep the schedule

Do you have an up-to-date schedule?

- Keeps expectations realistic

  - For the team, customers, stakeholders

- Allows for more accuracy

  - Use experience to improve estimates

- Helps prevent feature creep

  - Don't take on anything without checking the schedule first

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For the SDS, we asked for a schedule. For later releases, we ask you to highlight any changes, and keep all documents up to date.

Do you have a spec?

- Easier to fix problems at the design stage

- You know what you are trying to build

  - So do your teammates and customer

- More likely that you build the right thing

  - Pieces fit together

  - Customer is satisfied

- Conceptual integrity for your project

- Undocumented code has low value

  - Hard to maintain and to extend

  - Hard to bring new developers on board

PRODUCT SPECIFICATION

Do you have hallway usability testing?

- Grab someone in the hallway and make them use your code

- Key idea: get feedback fast

- A little feedback now » lots of feedback later

- You will get most of the valuable feedback from the first few users
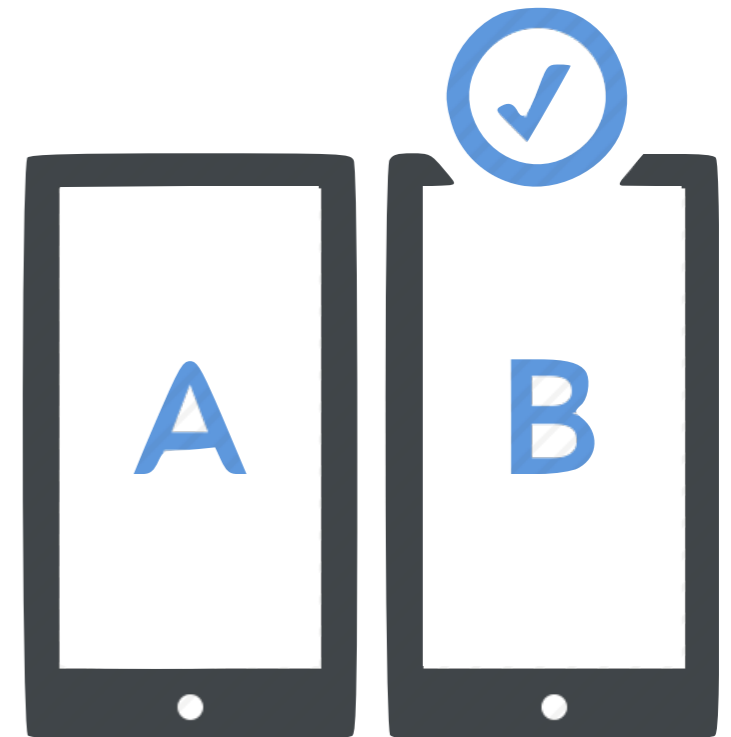
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> "The bummer about The Joel Test is that you really shouldn't use it to make sure that your nuclear power plant software is safe."

Mars code: Joel Test for safety-critical software

- Standard precautions for reducing risk in complex software systems

    - A good software architecture with a clean separation of concerns, data hiding, modularity, well-defined interfaces, and strong fault-protection mechanisms.

    - A good development process, with clearly stated requirements, requirements tracking, daily integration builds, rigorous unit and integration testing, and extensive simulation.

Gerard J. Holzmann.
Mars code, 2014.

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- Risk-based coding rules

  - Six compliance levels.

  - Level 3: "We require that the flight software as a whole, and each module within it, had to reach a minimal assertion density of 2%."

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- Tool-based code review

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- Formal methods

  - Used for critical software and hardware components.

  - Provides high assurance but requires expertise, time.

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Summary

The Joel Test for 403:

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