# CHARACTERIZATION TESTING:

## MITIGATING RISK OF CHANGES AROUND LEGACY CODE.

Characterization Testing – written and presented by Martin Mayer

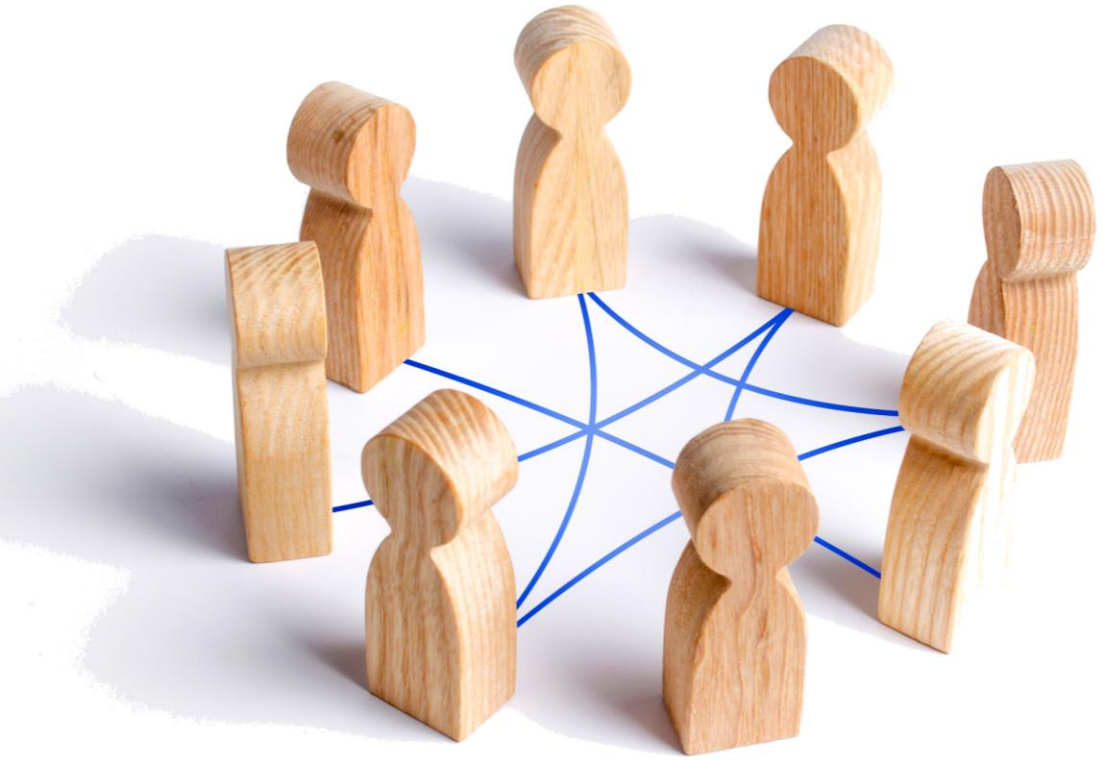
**28.01.2021 The SocialCode.**

Sorted.

# MY APPROACH, NOT THE APPROACH.

Please contribute to add value to this session:

- Ask questions
- Give honest feedback
- Share your own experiences and conclusions



# SCAN ME!

# GLOSSARY OF TERMS, SLIDE DECK AND CODE EXAMPLES

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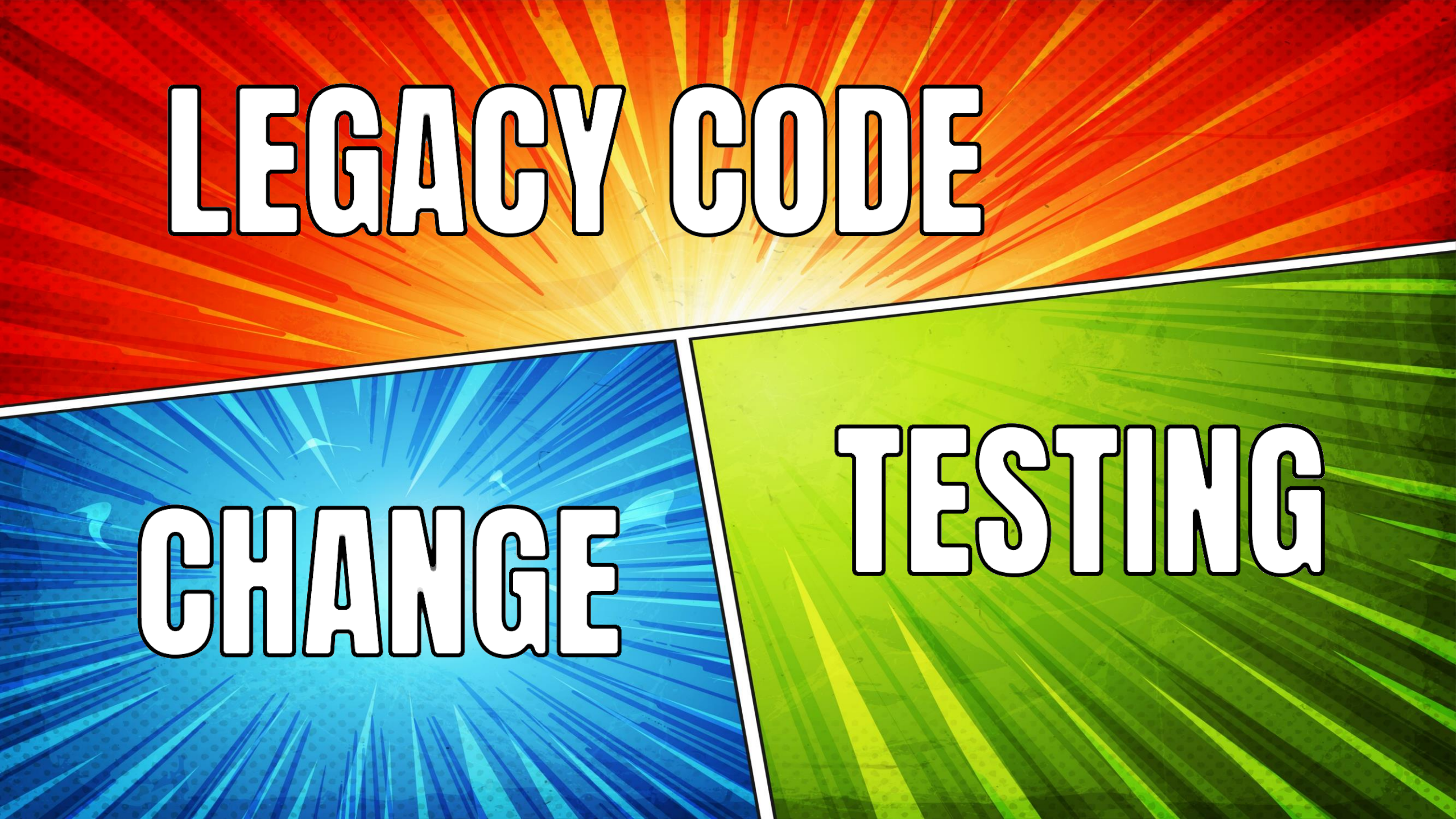
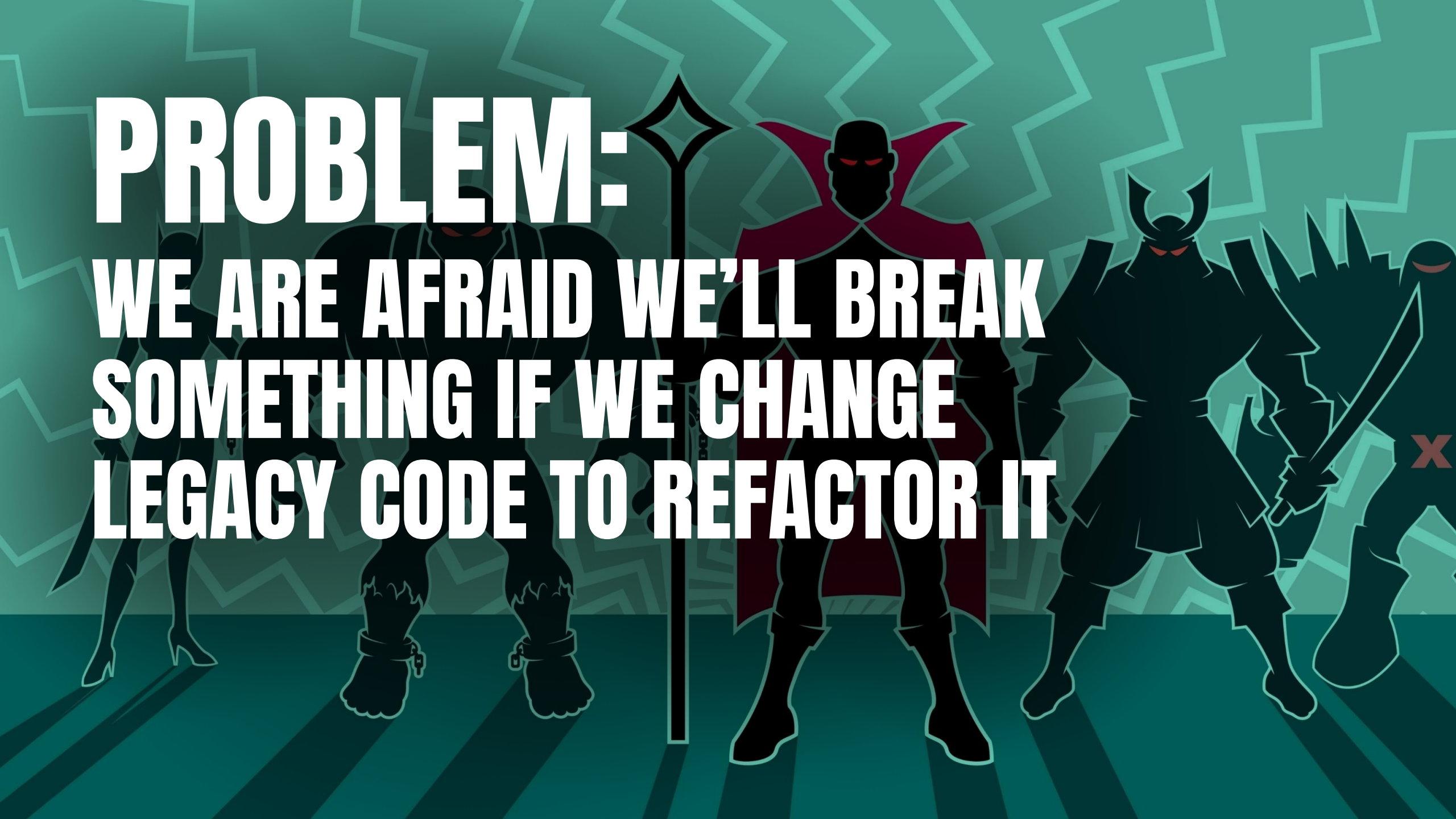
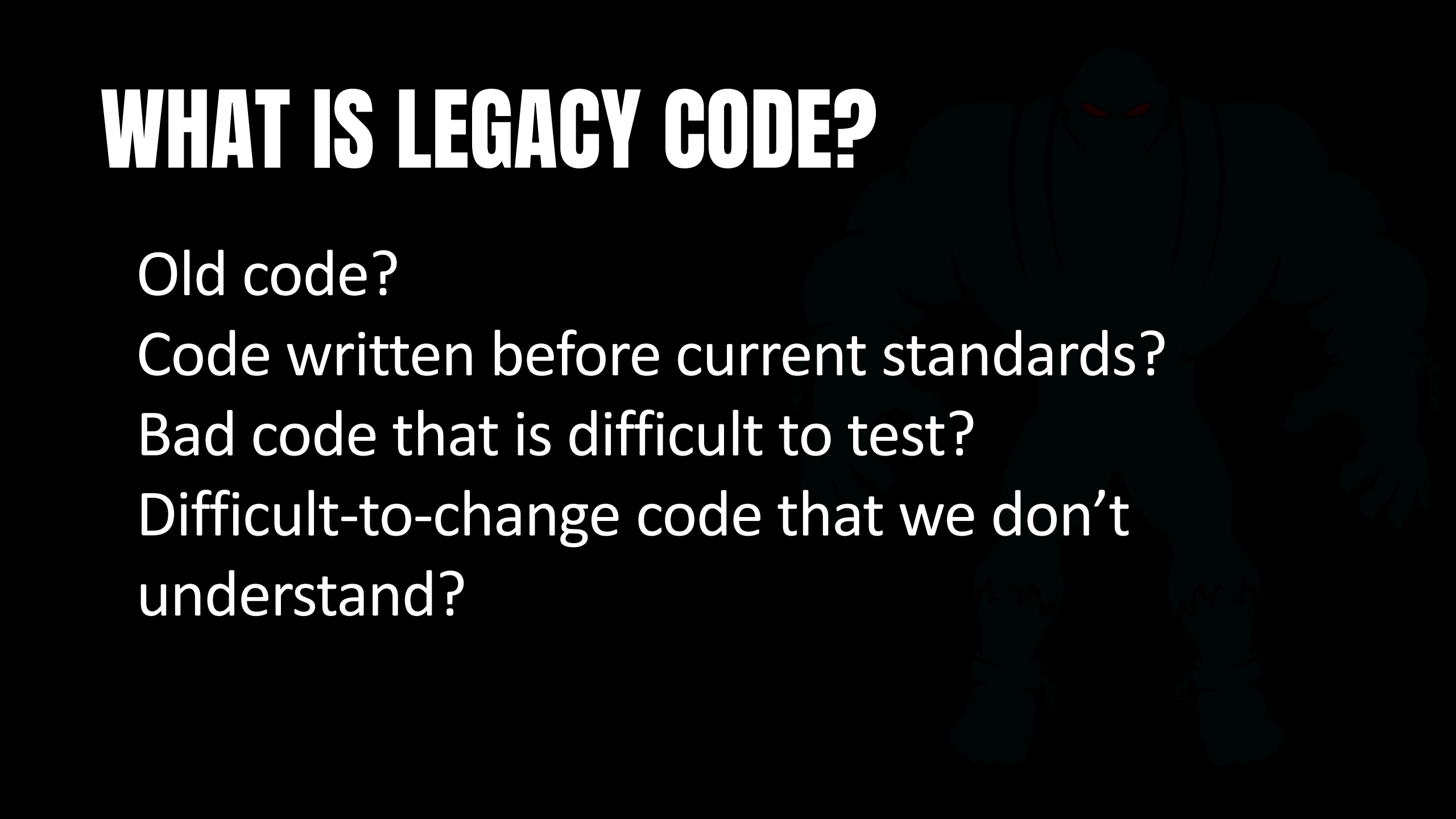

LEGACY CODE
CHANGE
TESTING


PROBLEM:
WE ARE AFRAID WE'LL BREAK SOMETHING IF WE CHANGE LEGACY CODE TO REFACTOR IT

# WHAT IS LEGACY CODE?

Old code?
Code written before current standards?
Bad code that is difficult to test?
Difficult-to-change code that we don’t understand?



# WHAT IS LEGACY CODE?

“simply code without tests”

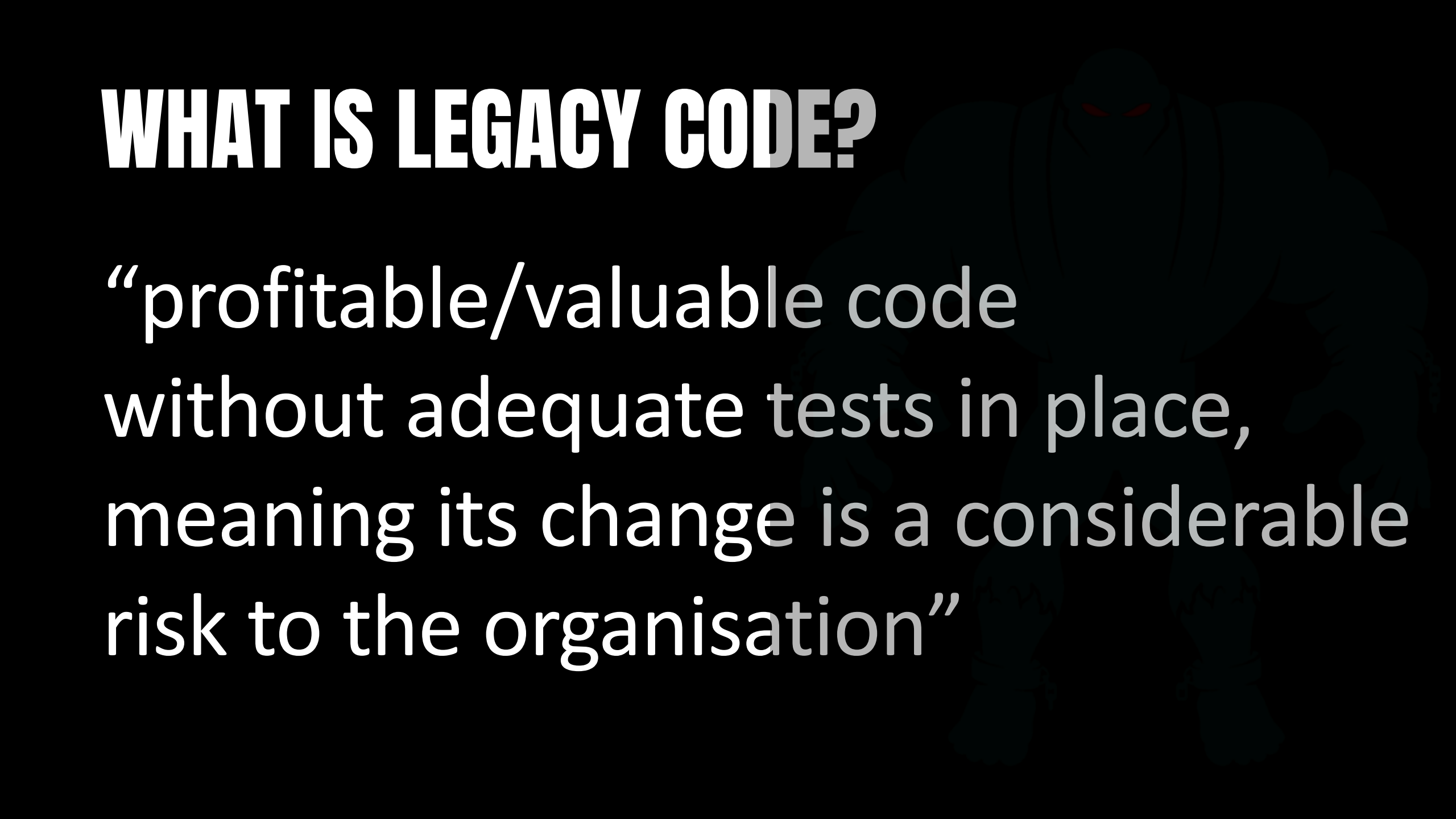
Working Effectively with Legacy Code, Michael Feathers

# WHAT IS LEGACY CODE?

“profitable code
that we feel afraid to change”

Surviving Legacy Code with Golden Master and Sampling,
J. B. Rainsberger

# WHAT IS LEGACY CODE?



"profitable/valuable code without adequate tests in place, meaning its change is a considerable risk to the organisation"

# IF IT'S SO RISKY, THEN WHY CHANGE LEGACY CODE TO REFACTOR IT?

# WHY CHANGE VALUABLE WORKING CODE?

Customer requirements

Bug fixes

Compliance

Security concerns

etc.

# WHY REFACTOR?

Prepare for a value-adding change
Code may be reusable
Write code that is easier to read and debug
Make code changes safer and faster
Easier to estimate effort
Reduce time to skill up

# POTENTIAL SOLUTION:
# CHARACTERIZATION TESTING

# WHAT IS CHARACTERIZATION TESTING?

A form of exploratory testing
Produces (mostly) automated tests
Informs our regression cases
Forms a benchmark
Aims to capture and preserve all the value

# REASONS FOR CHARACTERIZATION TESTING

1. Code isn’t well covered by tests
2. Requirements are unclear
3. Code isn’t clean and readable
4. Adding coverage would add safety

# START TESTING!

# START TESTING!

1. Start with the simplest unit of code
2. Assess if more logging should be added
3. Consider the structure of our test
4. Record all of the valued output to file
5. Create the test case source – our inputs

# START TESTING!

6. “Arrange” – set up the test prerequisites
7. “Act” – call the subject under test
8. “Assert” – manual and automated options to assess if the result is “Pass” or “Fail”

# PROS


We can test code we don’t understand

Set up a benchmark before changes

Enables testing at relative speed

Easy general approach to learn and teach others

Supports open-box and closed-box testing

Fun to work with

# CONS


Takes time and hard work

Can easily mean a lot of test cases and slow cycles

Depending on framework, a lot boilerplate code

Tests can be brittle as they depend on the detail

# ALTERNATIVES / SUPPLEMENTARY TASKS

# ALTERNATIVES / SUPPLEMENTARY TASKS: CODE AND REQUIREMENTS ANALYSIS

Understand the requirements and cover all code with appropriate unit, integration and end-to-end tests

# ALTERNATIVES / SUPPLEMENTARY TASKS: FEATURE FLAGS

Set up a new version of the code (starting with a direct copy) and make modifications there
Preserve the original version in source using a “feature flag” stored somewhere in remote configuration to switch between versions

# ALTERNATIVES / SUPPLEMENTARY TASKS: FEATURE BRANCHES

In our version control, branch off our main source to a new feature branch and make changes there – we can then deploy either that branch or main to a test environment and verify there – comparing results from the 2 deployments

# ALTERNATIVES / SUPPLEMENTARY TASKS: MANUAL EXPLORATORY TESTING

Slow but can be used to research the code behaviour before writing characterization tests
Also a good alternative for components that are hard to test with automation

# ALTERNATIVES / SUPPLEMENTARY TASKS: DEBUG EXISTING CODE

Debug to reverse engineer how the code is currently behaving

# ALTERNATIVES / SUPPLEMENTARY TASKS: OBSERVABILITY

Develop additional logging to:

- trace behaviour
- monitor errors

# ALTERNATIVES / SUPPLEMENTARY TASKS: AUGMENT AUTOMATED REGRESSION TESTS

Set up a new version of the code (starting with a direct copy) and make modifications there
Preserve the original version in source using a “feature flag” stored somewhere in remote configuration to switch between versions

# IMPLEMENTATION OPTIONS: OWN SIMPLE TEST FRAMEWORK

Write test framework from scratch

Record outputs to file and play inputs from file

Capture logged string data to save as part of the output file

# IMPLEMENTATION OPTIONS: APPROVAL TESTS LIBRARY

ApprovalTests library supports multiple languages

It standardises syntax but the test code is quite brittle and contains a lot of boilerplate

# HOW CAN I TRY THIS?

- Follow the references listed in this slide deck
- Organise a session with your peers – at work or in a community like this
- Follow the code examples I've shared
- … or the tutorials with frameworks such as ApprovalTests

# SCAN ME!

## GLOSSARY OF TERMS, SLIDE DECK, REFERENCES AND CODE EXAMPLES

http://bit.ly/39g9JNG

# CONNECT

Connect with me on LinkedIn:

https://bit.ly/3sYslJF

# ANY QUESTIONS?