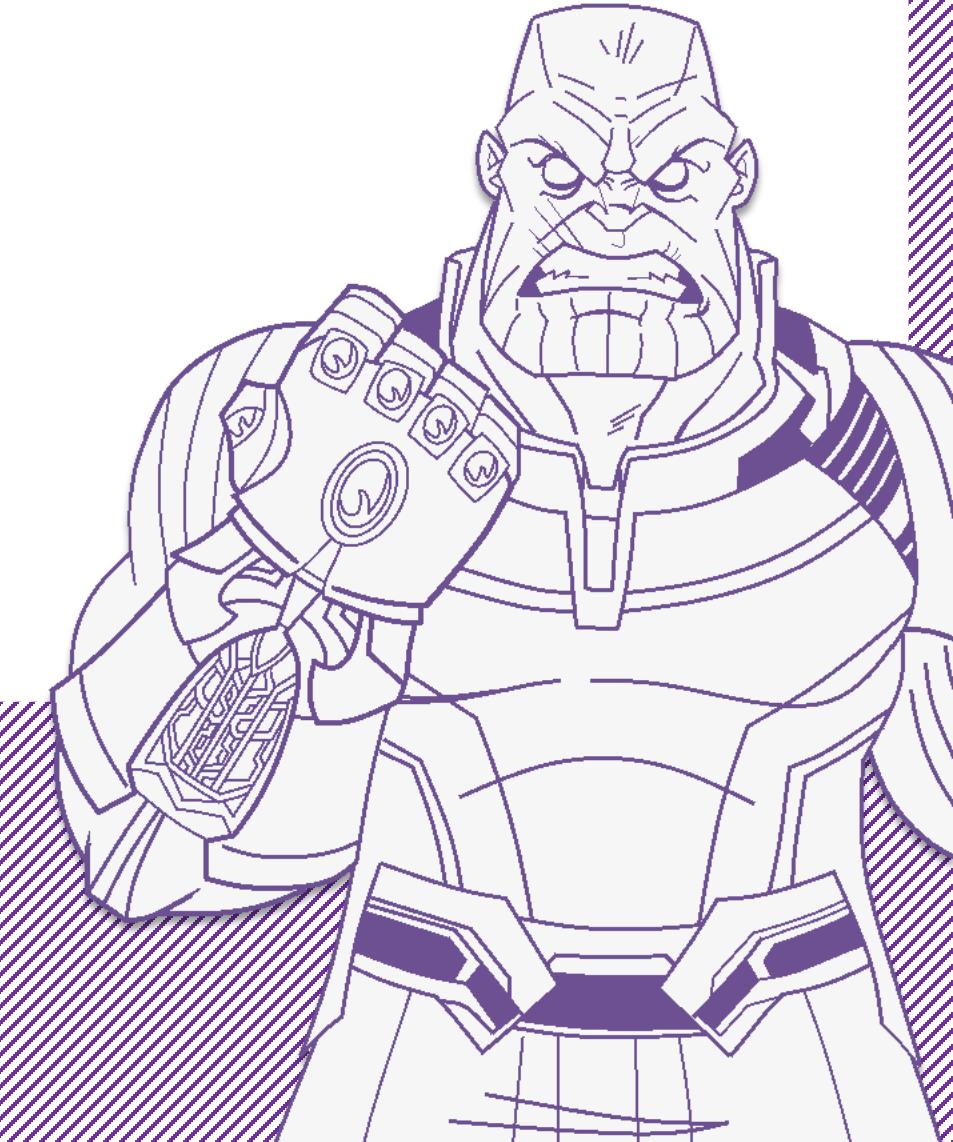


AUTOMATION FIREHOSE

BE STRATEGIC
AND TACTICAL

BY THOMAS HAVER...



AGENDA...

ABOUT

ORIGIN
STORY

APPROACH

FRAMEWORK & TOOLS

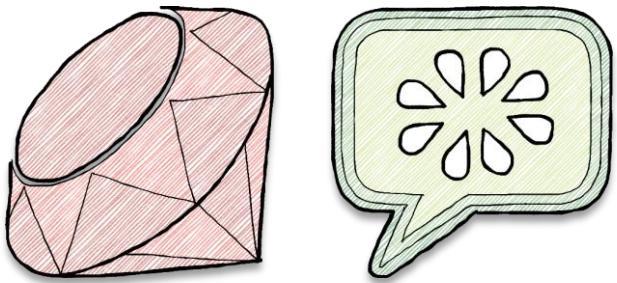
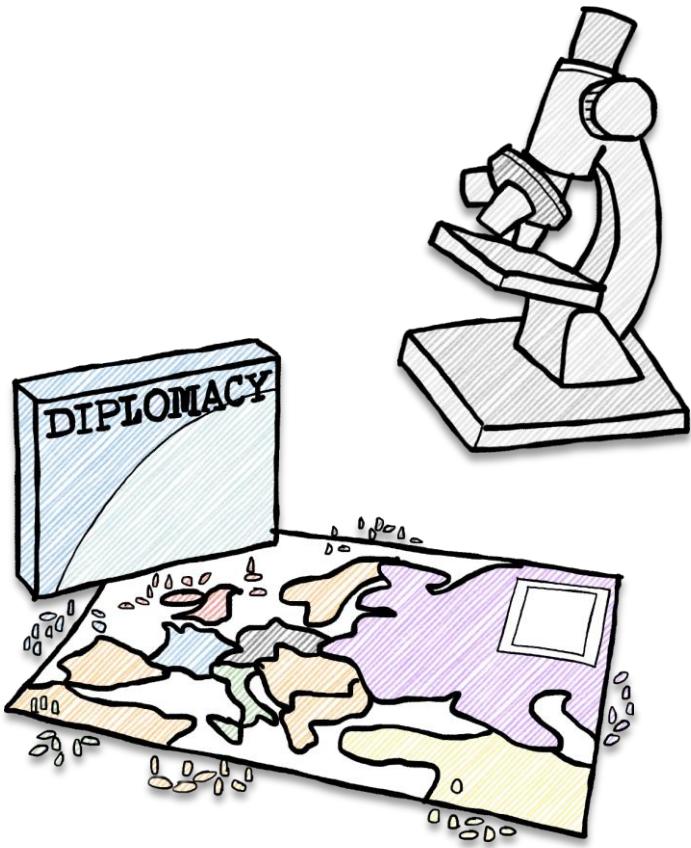
CHALLENGES

SCHEDULE

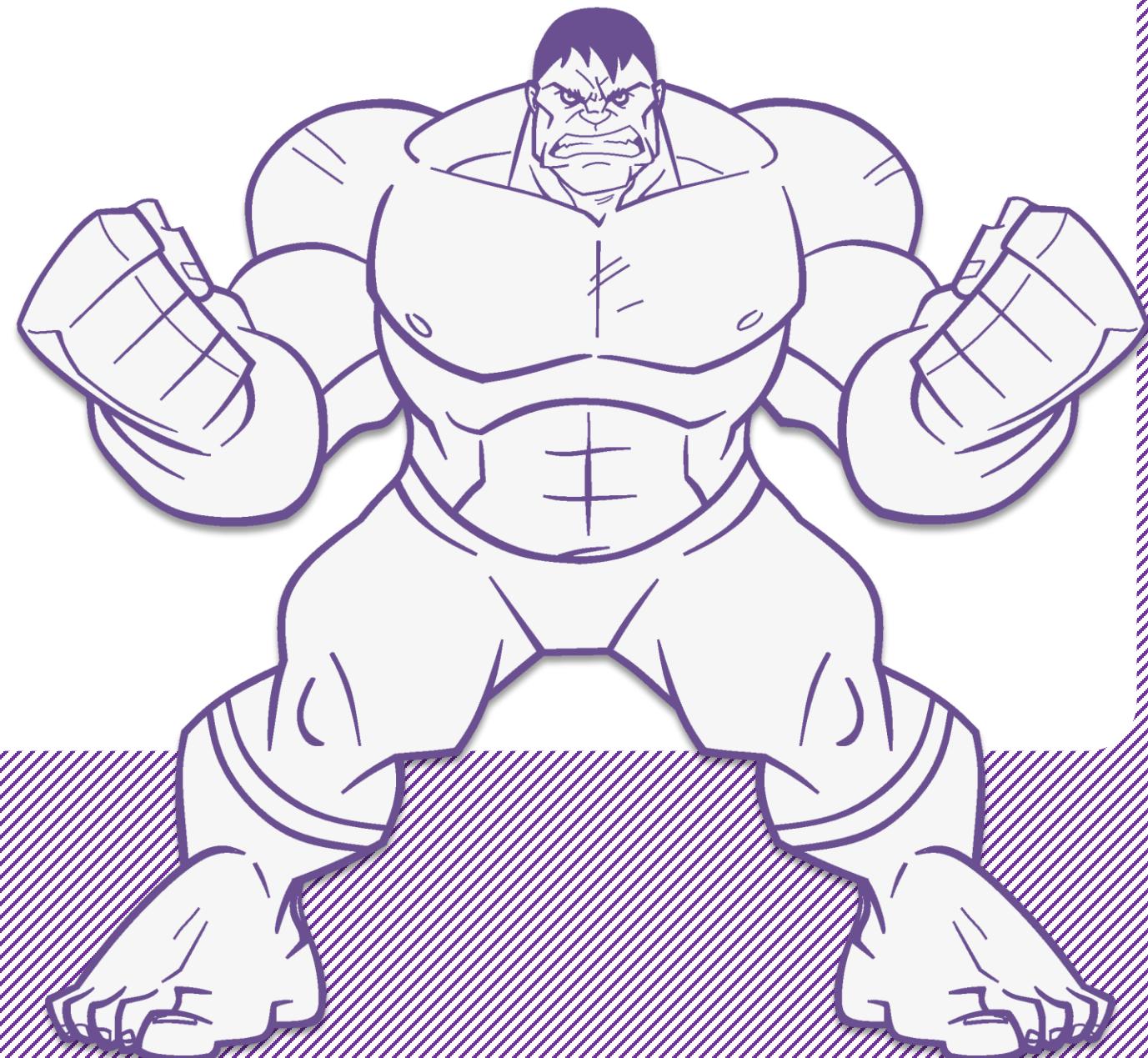
QUALITY STANDARDS

METRICS

ABOUT...



ORIGIN STORY



STRATEGY AND TACTICS...



STRATEGY (N) – A PLAN OF ACTION OR POLICY DESIGNED TO ACHIEVE A MAJOR OR OVERALL AIM.

TACTICS (N) – THE ART OR SKILL OF EMPLOYING AVAILABLE MEANS TO ACCOMPLISH AN END.

TEST COVERAGE EXAMPLE...

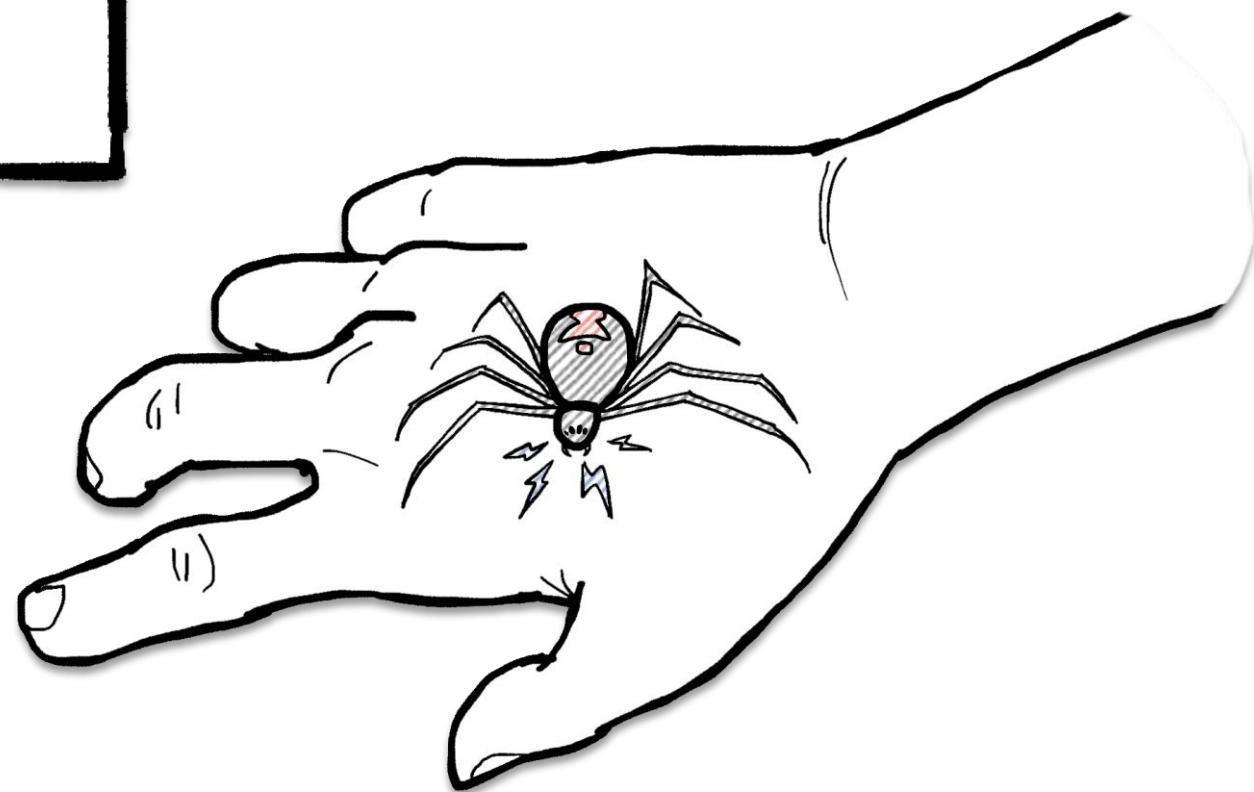


PRIMARY TESTING VARIABLES

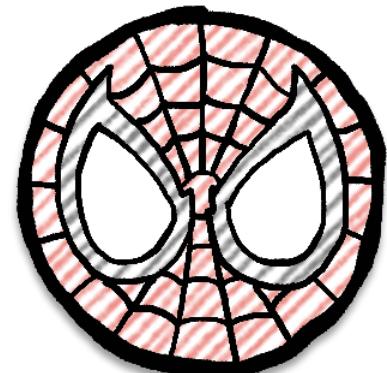
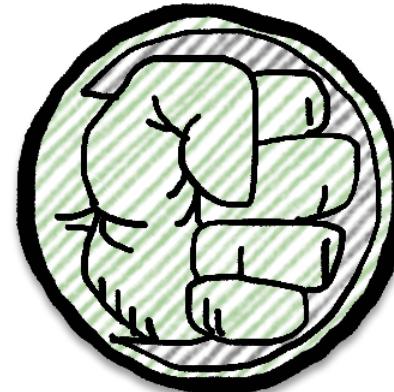
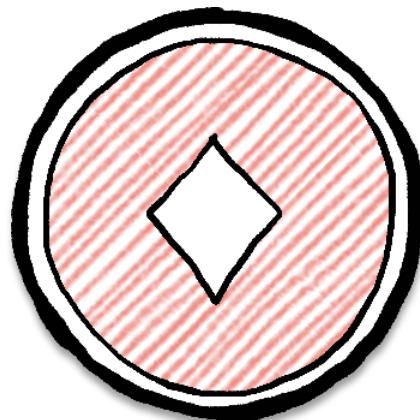
- INTERNET EXPLORER VERSION (FOR MS04-025)
- INTERNET EXPLORER 5.01 SERVICE PACK 2
- INTERNET EXPLORER 5.01 SERVICE PACK 3
- INTERNET EXPLORER 5.01 SERVICE PACK 4
- INTERNET EXPLORER 5.5 SERVICE PACK 2
- INTERNET EXPLORER 6
- INTERNET EXPLORER 6 SERVICE PACK 1
- INTERNET EXPLORER 6 SERVICE PACK 1 (64-BIT EDITION)
- INTERNET EXPLORER 6 FOR WINDOWS SERVER 2003
- INTERNET EXPLORER 6 FOR WINDOWS SERVER 2003 (64-BIT EDITION)
- WINDOWS VERSION (FOR MS04-025)
- MICROSOFT WINDOWS NT® WORKSTATION 4.0 SERVICE PACK 6A
- MICROSOFT WINDOWS NT SERVER 4.0 SERVICE PACK 6A
- MICROSOFT WINDOWS NT SERVER 4.0 TERMINAL SERVER EDITION SERVICE PACK 6
- MICROSOFT WINDOWS 2000 SERVICE PACK 2
- MICROSOFT WINDOWS 2000 SERVICE PACK 3
- MICROSOFT WINDOWS 2000 SERVICE PACK 4
- MICROSOFT WINDOWS XP AND MICROSOFT WINDOWS XP SERVICE PACK 1
- MICROSOFT WINDOWS XP 64-BIT EDITION SERVICE PACK 1
- MICROSOFT WINDOWS XP 64-BIT EDITION VERSION 2003
- MICROSOFT WINDOWS SERVER® 2003
- MICROSOFT WINDOWS SERVER 2003 64-BIT EDITION
- MICROSOFT WINDOWS 98
- MICROSOFT WINDOWS 98 SECOND EDITION (SE)
- MICROSOFT WINDOWS MILLENNIUM EDITION (ME)

AUTOMATION TOOLS - ORIGIN STORY...

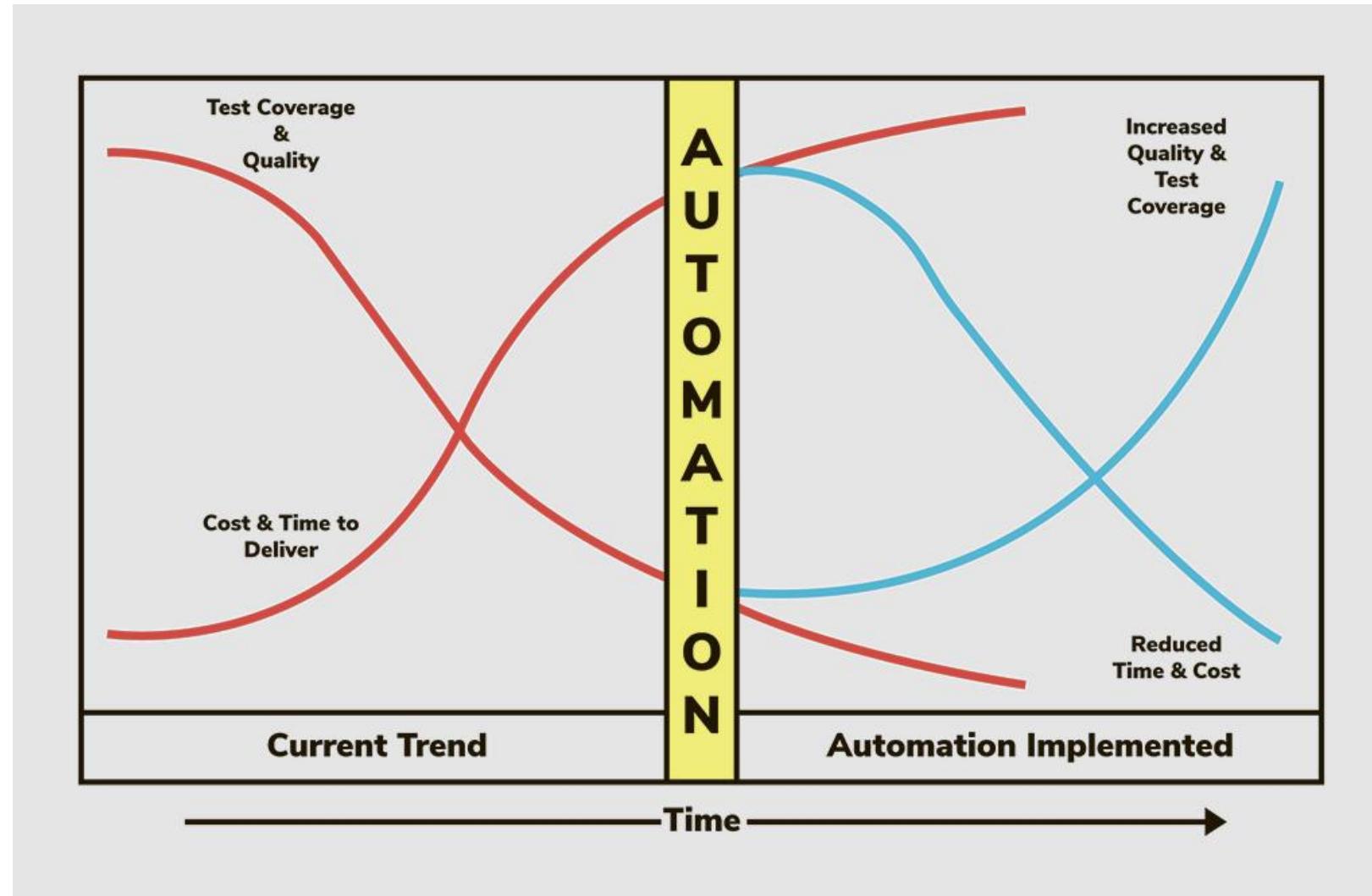
PROMISE TO:
SAVE TIME
AND LOWER COSTS
WHILE RAISING QUALITY



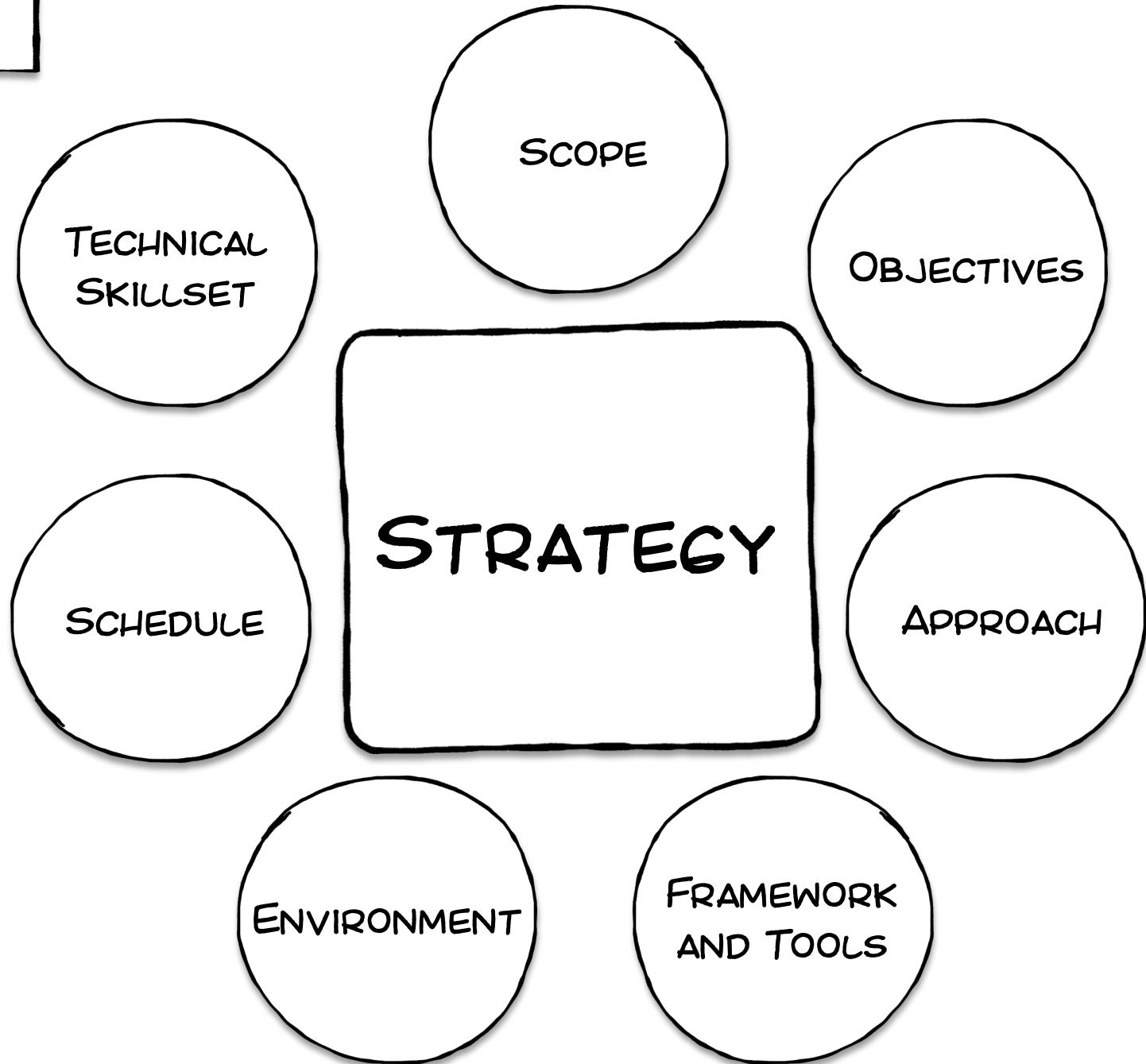
AUTOMATION CHALLENGES – AUDIENCE...



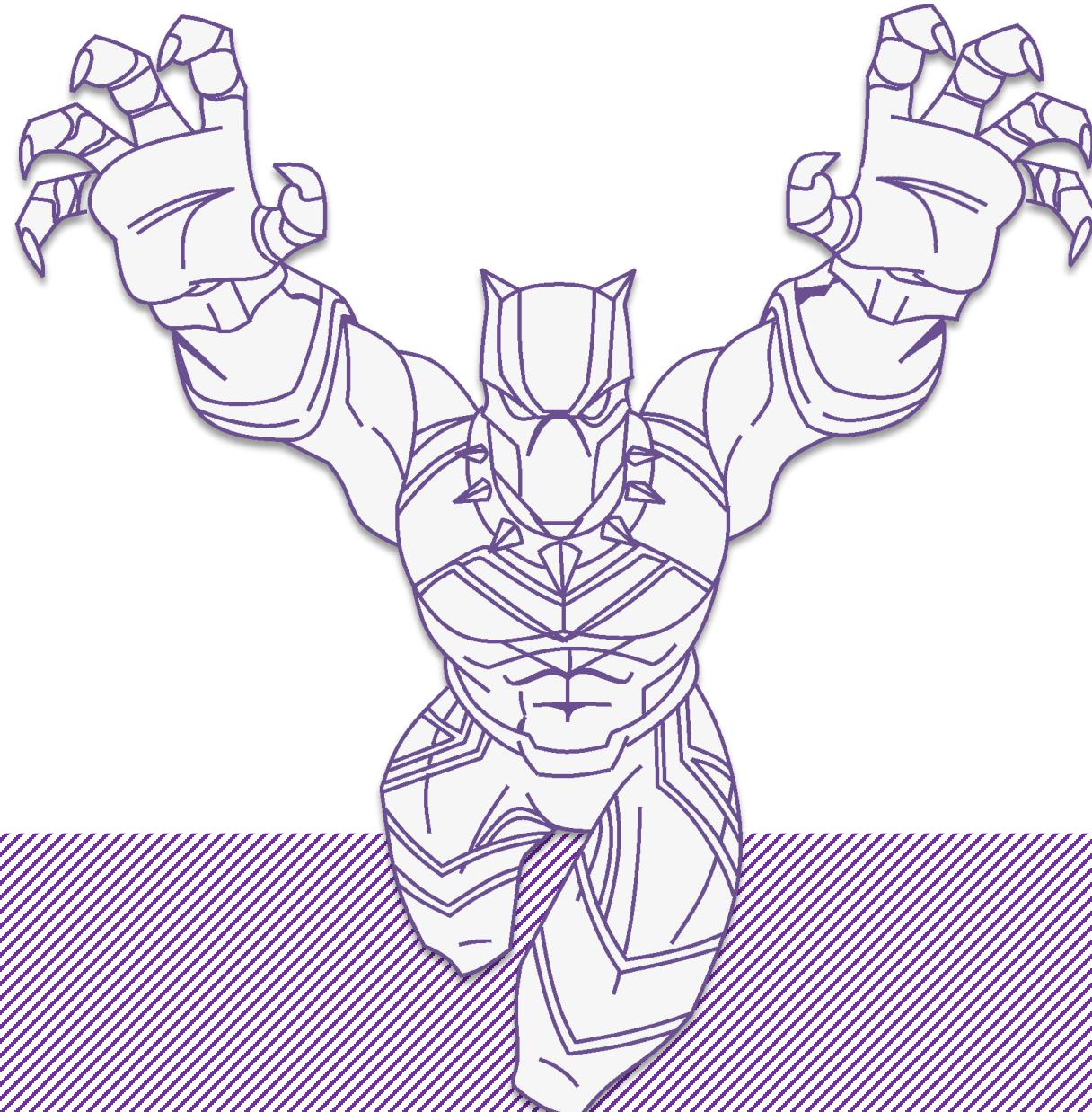
ULTIMATE GOAL...



STRATEGY...



APPROACH



WHAT SHOULD WE AUTOMATE?



IS THE TEST OR TASK GOING TO BE REPEATED? HOW OFTEN?

HOW MUCH TIME COULD BE SAVED?

ARE THE REQUIREMENTS, THE TEST, OR TASK LOW RISK, STABLE, OR UNLIKELY TO CHANGE OFTEN?

IS THE TEST OR TASK SUBJECT TO HUMAN ERROR?

IS THE TEST OR TASK TIME CONSUMING?
DOES IT CONTAIN SIGNIFICANT DOWNTIME BETWEEN TEST STEPS?

IS THE TEST OR TASK REPETITIVE?

AUTOMATION COSTS...

EVERY NEW TEST SCRIPT
SHOULD FACTOR IN
MAINTENANCE COSTS.

TEST AUTOMATION SCRIPTS
SHOULD BE TREATED THE SAME
AS DEVELOPMENT CODE.

- SOME BASIC COSTS:
- AUTOMATION TOOLS
 - OS UPGRADES
 - LANGUAGE UPGRADES

DOCUMENTATION AROUND IMPLEMENTATION
AND ONBOARDING.

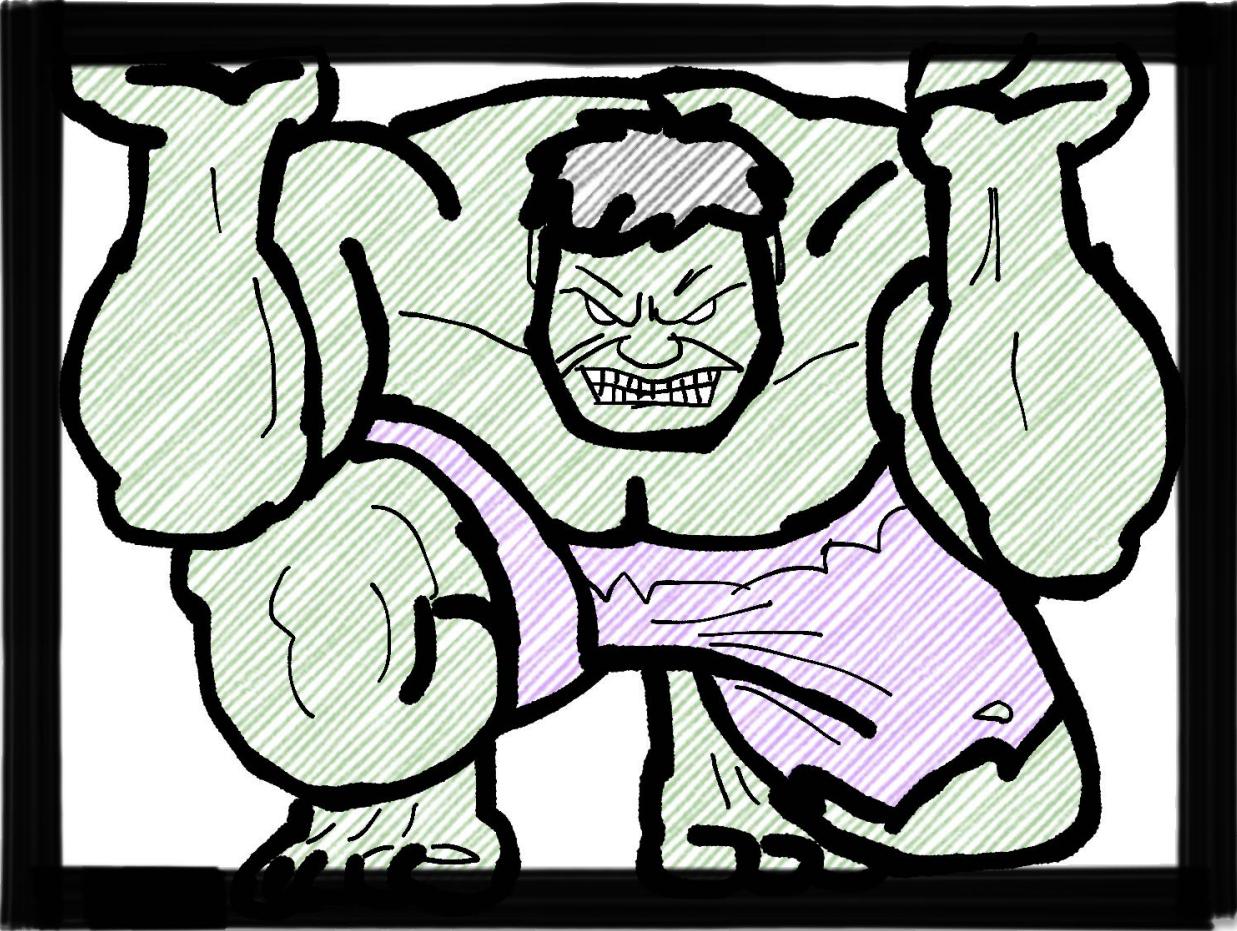


ORGANIZATIONAL CONSTRAINTS...

WE ARE LIMITED BY DELIVERY SCHEDULE, PROJECT BUDGET, AND TECHNICAL SKILLSET.

AUTOMATE BASED ON THE FREQUENCY OF USE OR CRITICALITY, INCLUDING LEGAL RISK.

LOOK FOR COMPLEX MANUAL SCENARIOS THAT REQUIRE DATA OR ENVIRONMENT SETUP.



GOOD TEST AUTOMATION...

GOOD TEST AUTOMATION

TRUSTWORTHY
AND
REPEATABLE

ENHANCES
TESTING
INSTEAD OF
REPLACING IT

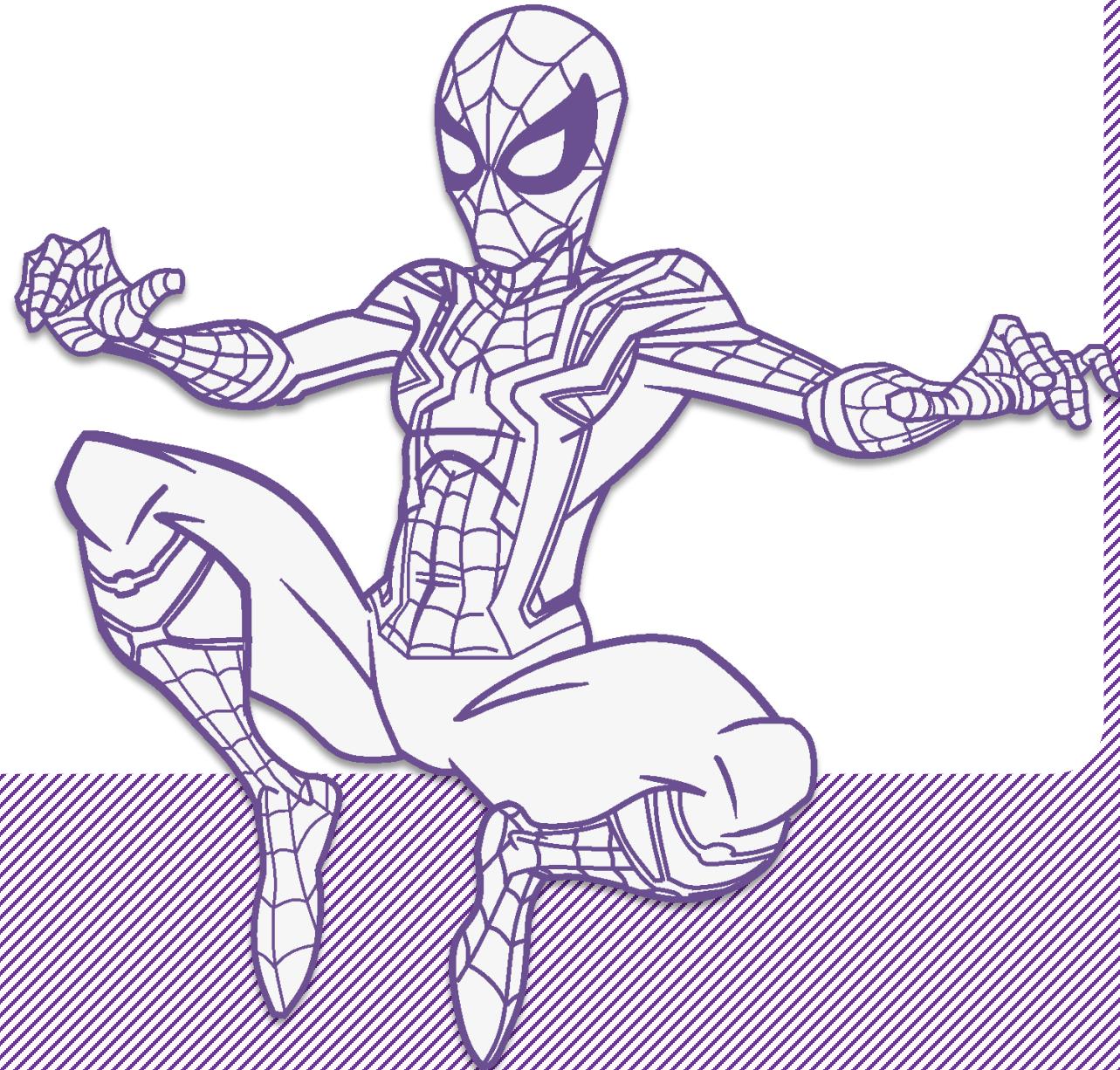
HELPS TESTERS
DO THEIR JOB
INSTEAD OF
REPLACING THEM

FOCUSED AND
INFORMATIVE

PART OF THE
SDLC

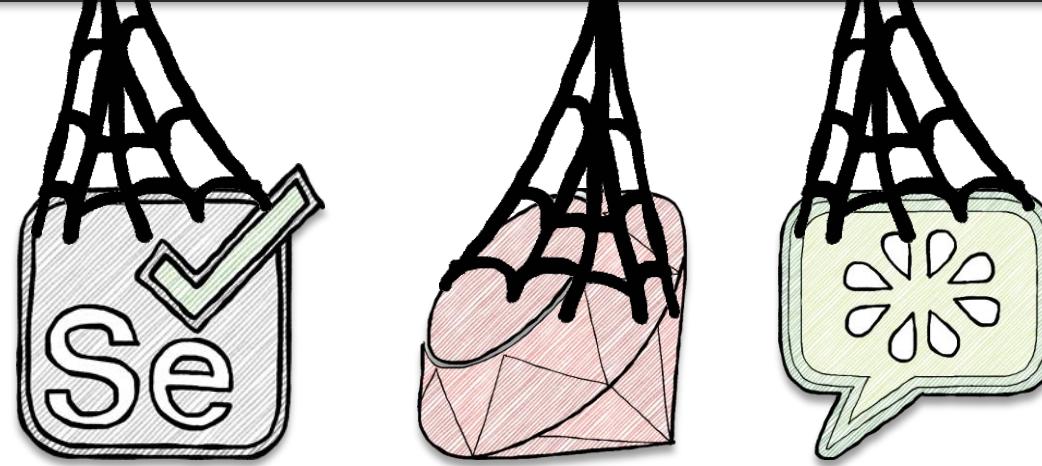
SCOPE IS
BEYOND
SIMPLE
AUTOMATED
CHECKS

FRAMEWORK AND TOOLS

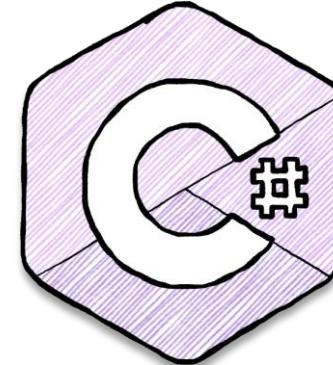
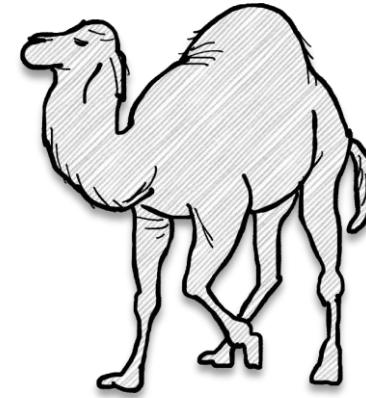
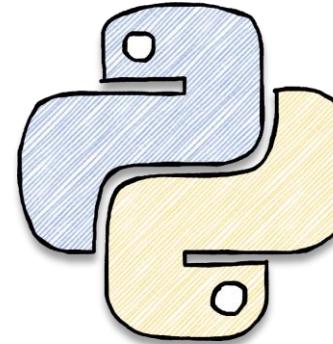
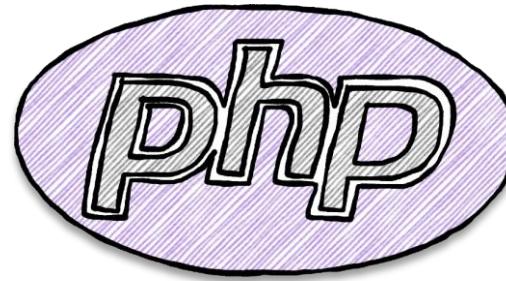


FRAMEWORK AND TOOLS...

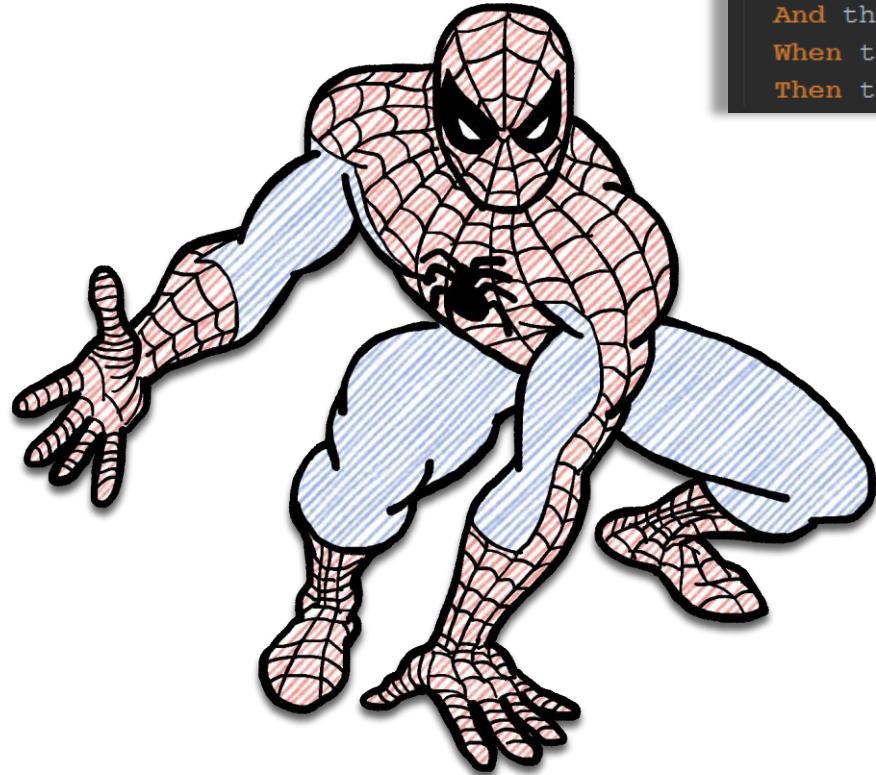
```
@regression @pbi40490 @testcaseid57569 @smoke_test  
Scenario: Verify valid login for Business tab  
    Given the user visits the Huntington website  
    And the user clicks the business login widget  
    And the user finds the Home Welcome page with valid business login  
    When the user clicks business log in  
    Then the application navigates to the Business online Home page
```



FRAMEWORK AND TOOLS...



AUTOMATION CODING STANDARDS...



Scenario: A user who selects a predictive search question is redirected to the Search Results page

Given the user visits the Huntington website
And the user fills in "money" for ask huntington search
When the user selects the 1st ask huntington predictive search questions result
Then the application navigates to the Search Results page

```
When /^the application(?: navigates to|remains on) the (.+) page$/ do |page_name|
  application_is_on_page?(page_name).should be_true
end

When /^the user clicks(?: the| a)? (.+)$/ do |page_element|
  Watir::Wait.until(10) {@current_page.send(page_element.tr(' ', '_').downcase + '_element').exists?}
  @current_page.send(page_element.tr(' ', '_').downcase + '_element').focus
  @current_page.send(page_element.tr(' ', '_').downcase + '_element').click
end

When /^the user goes back to the previous page$/ do
  @current_page.navigate_back
end
```

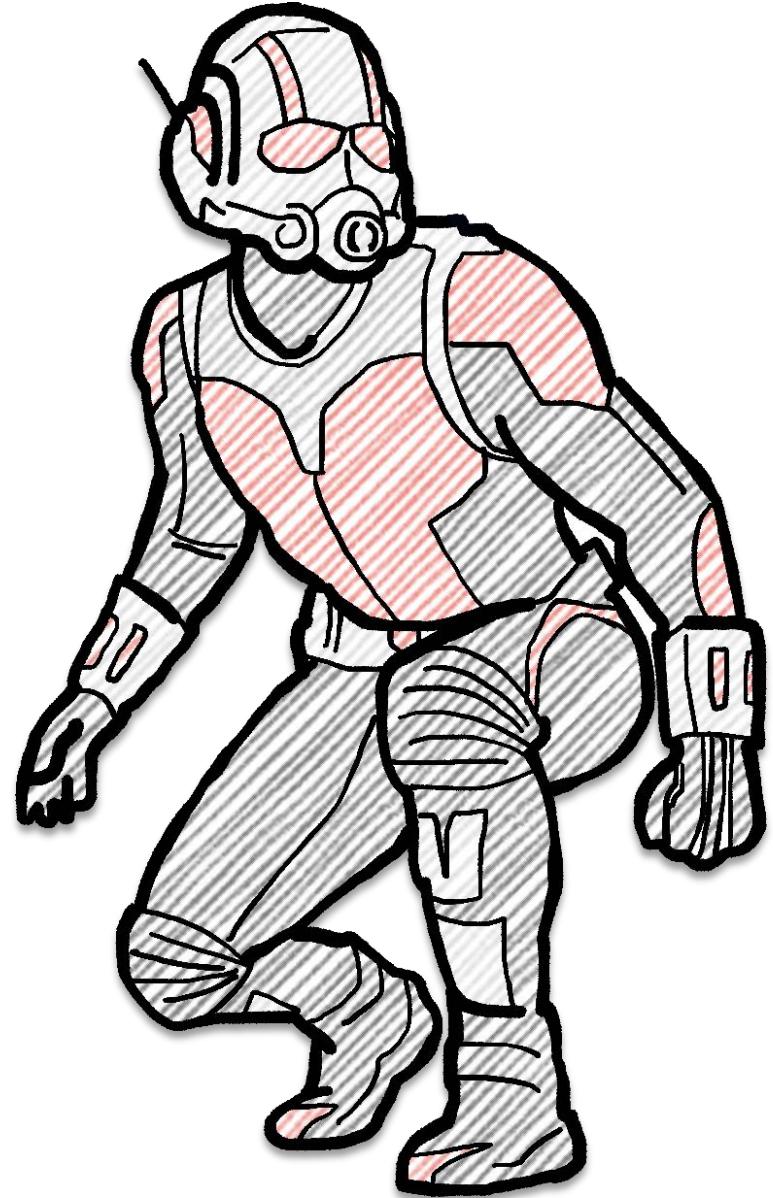
UNIT AND INTEGRATION TESTS...

UNIT TESTING

- FASTEST METHOD OF TESTING
- EASIER DEBUGGING
- REUSABLE
- INDEPENDENT

INTEGRATION TESTING

- INTERFACES OR MODULES TESTED AS A GROUP
- ENSURE COMPONENTS WORK AS EXPECTED
- MORE ROBUST THAN FLAKY UI FOR REPEATABLE TASKS
- EXAMPLES OF TOOLS/FRAMEWORK: SPOCK, JASMINE, FITNESSE, VECTORCAST/C++, CITRUS, LDRA



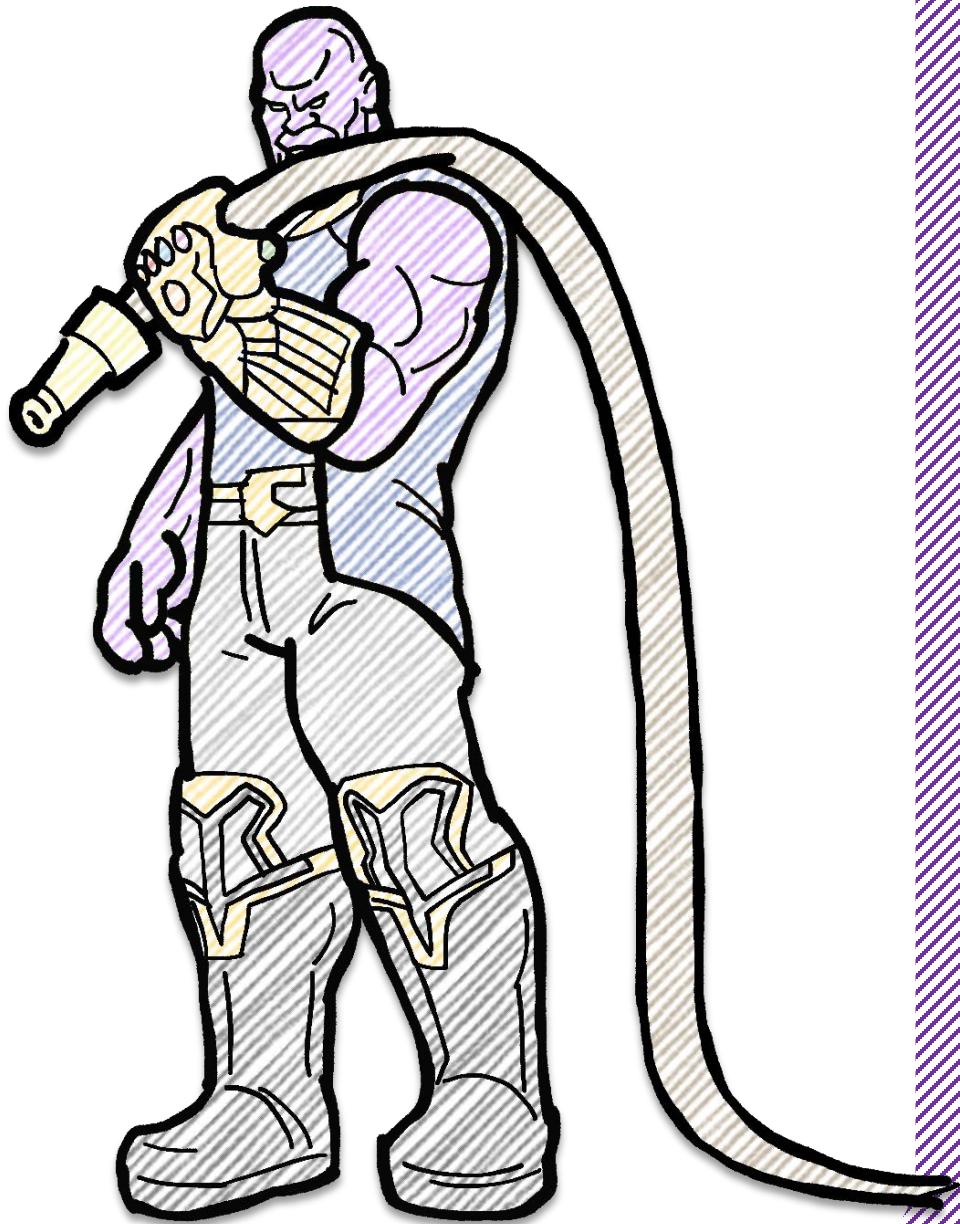
CHALLENGES



AUTOMATION FIREHOSE...

I'M GOING TO AUTOMATE ALL OUR TEST CASES AND THERE'S NOTHING YOU CAN DO TO STOP ME!

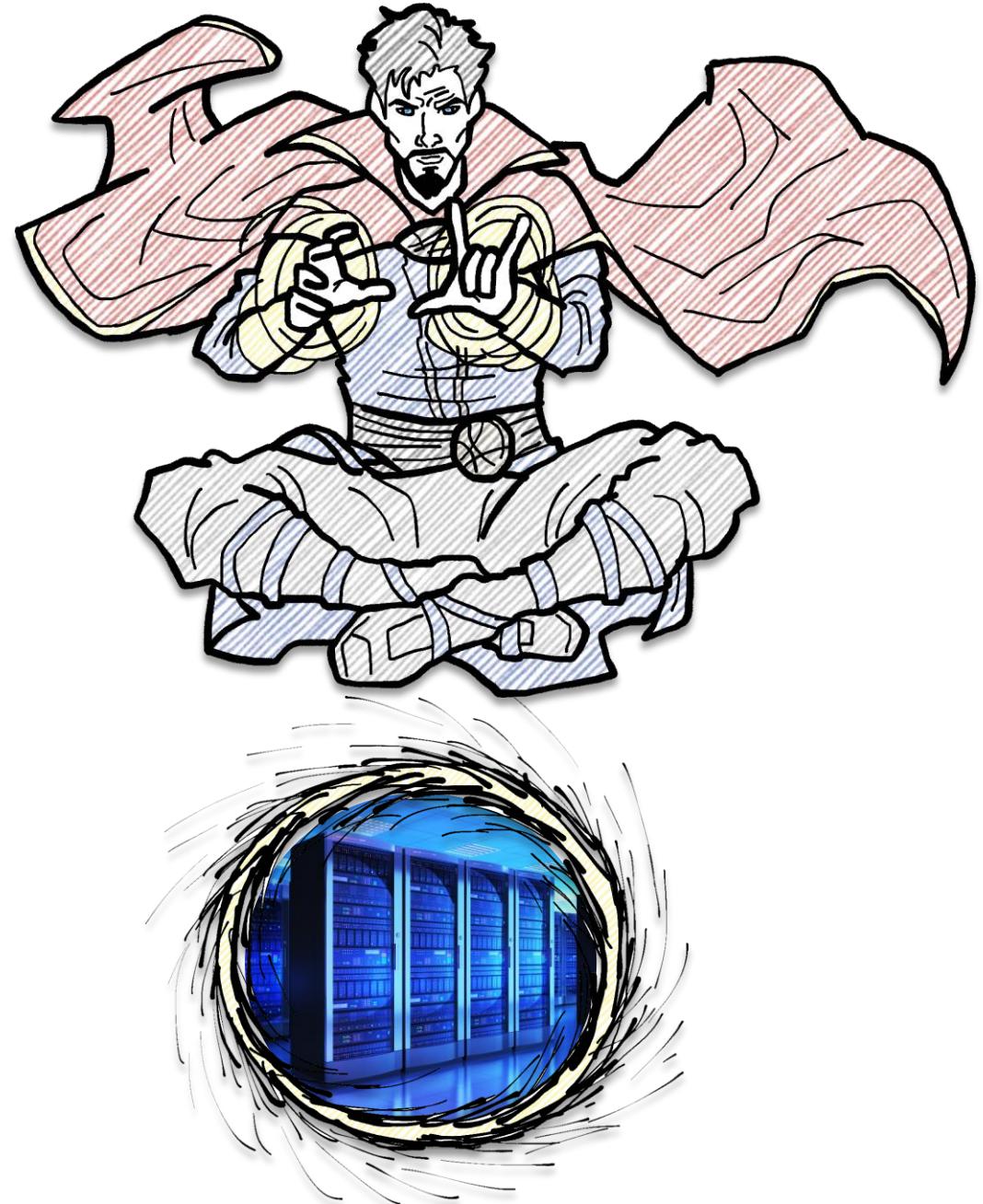
JUST BECAUSE A SCENARIO CAN BE AUTOMATED DOES NOT MEAN IT SHOULD BE AUTOMATED. ADOPT A RISK-BASED APPROACH FOR AUTOMATION.



DATA FAILURE...

MY SCRIPTS CAN RUN ANYWHERE!

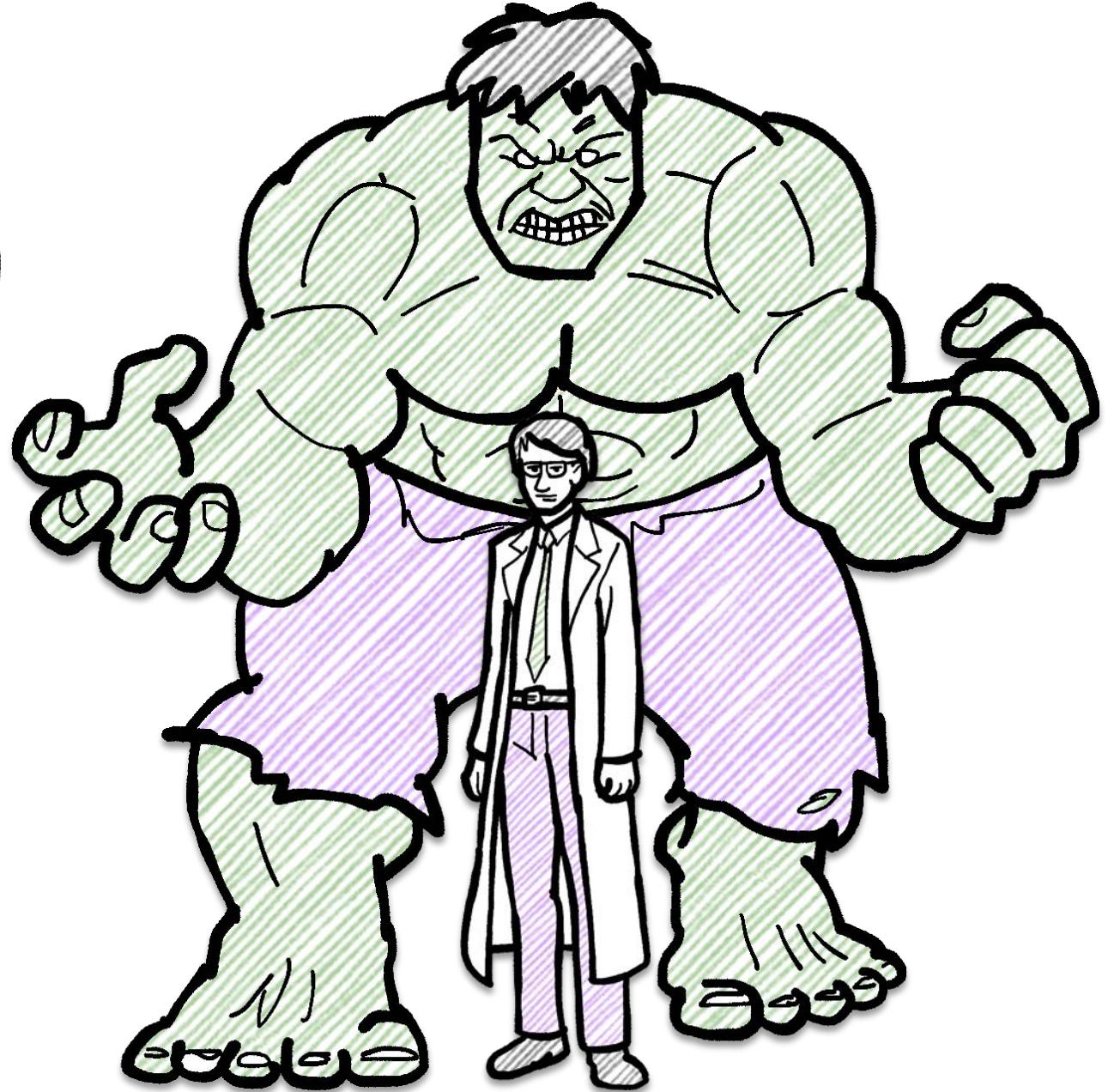
AUTOMATION SHOULD BE CROSS-ENVIRONMENT COMPATIBLE. THAT MEANS TEST DATA GENERATION & MANIPULATION SHOULD BE AN UP-FRONT CONCERN. INCLUDE TEST DATA ACCESS IN THE READY-STATE CRITERIA FOR TESTING.



FLICKERING TESTS...

SO WHAT IF MY TESTS ARE FLICKERING.
THEY'RE DONE AND WE'RE FOCUSED ON THE
NEXT PROJECT ANYWAY!

AUTOMATED TESTS THAT DON'T
CONSISTENTLY PASS ARE SOON
IGNORED BY THE ENTIRE TEAM. THE
EXECUTION REPORT AND
NOTIFICATION EMAILS SHOULD MEAN
SOMETHING. EITHER FIX OR REMOVE
FLICKERING TESTS (AND EXAMINE WHY
YOU WROTE A FLICKERING TEST TO
BEGIN WITH).



LONG TESTS...

I VALIDATED EVERYTHING IN ONE TEST.
MY 300 STEP SCRIPT WORKS GREAT!
...SOMETIMES.

UNIT TESTS AND INTEGRATION TESTS
SHOULD TAKE PRIORITY OVER UI
TESTS. THEY RUN MORE QUICKLY AND
ARE MORE ROBUST. AUTOMATE UI AS
NEEDED TO VERIFY END-USER
BEHAVIOR.

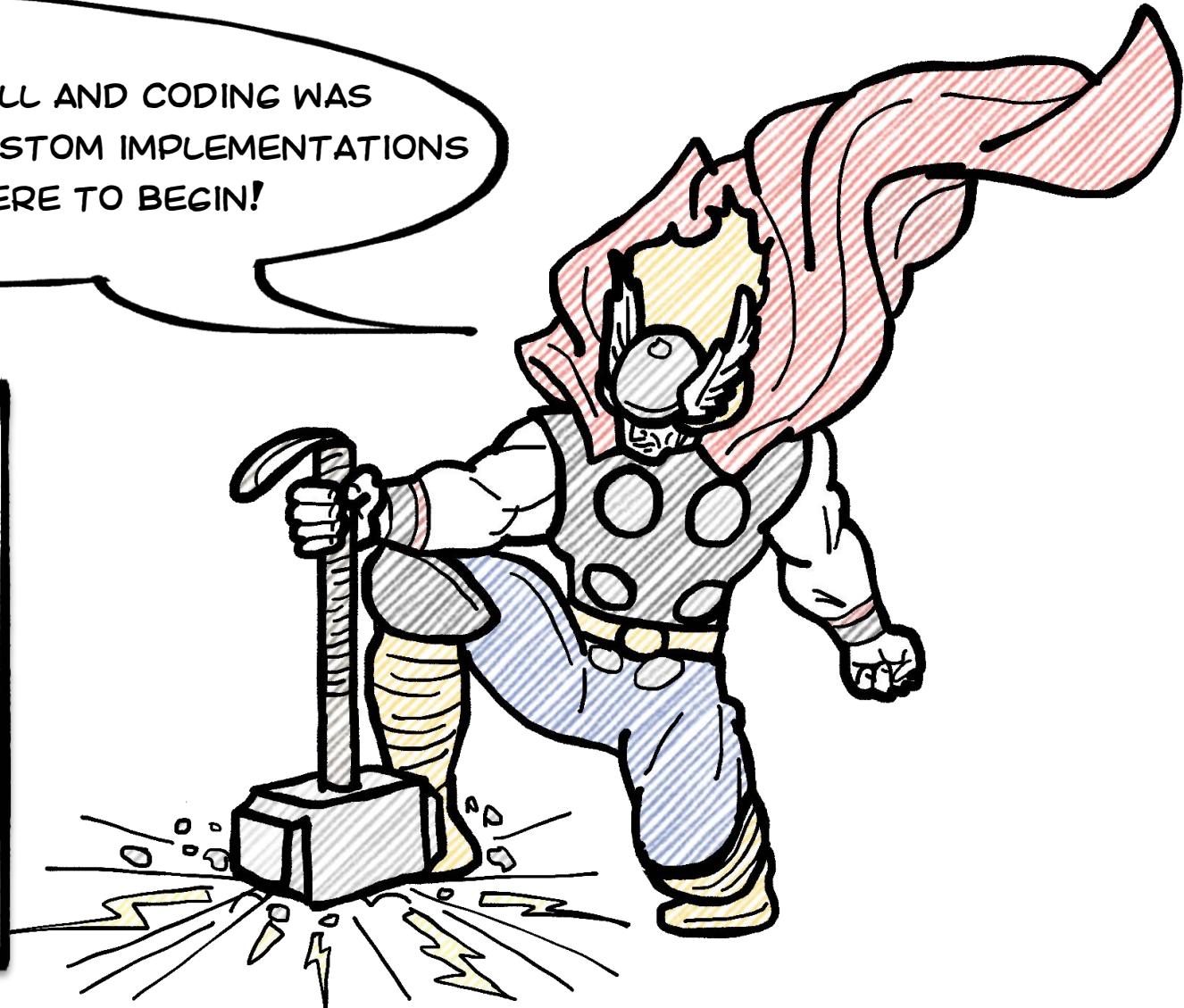


SHAKY FOUNDATION...

OUR AUTOMATION SUITE STARTED OFF SMALL AND CODING WAS EASY ENOUGH, BUT NOW THERE ARE SO MANY CUSTOM IMPLEMENTATIONS AND WORKAROUNDS I DON'T KNOW WHERE TO BEGIN!

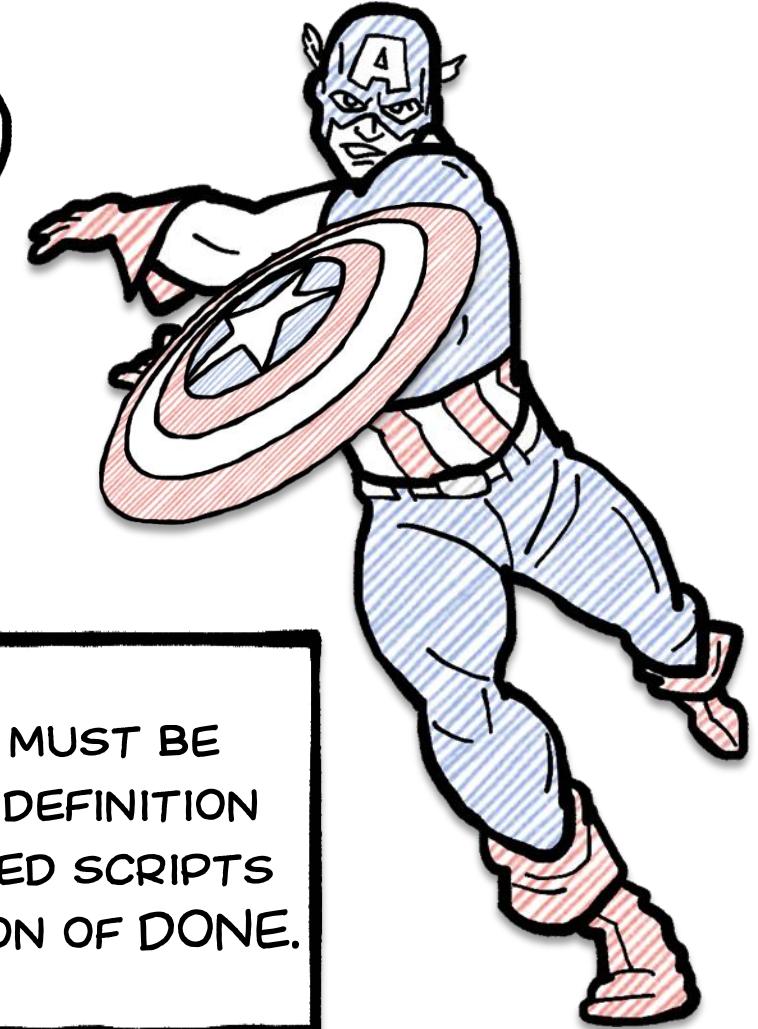
TREAT THE AUTOMATION CODE THE SAME WAY YOU WOULD WANT GOOD DEVELOPMENT CODE TO BE TREATED:

IMPLEMENT BEST PRACTICES (DRY, KISS) WITH SCHEDULED CODE REVIEWS, CODE ANALYSIS TOOLS, AND REFACTORING SESSIONS.



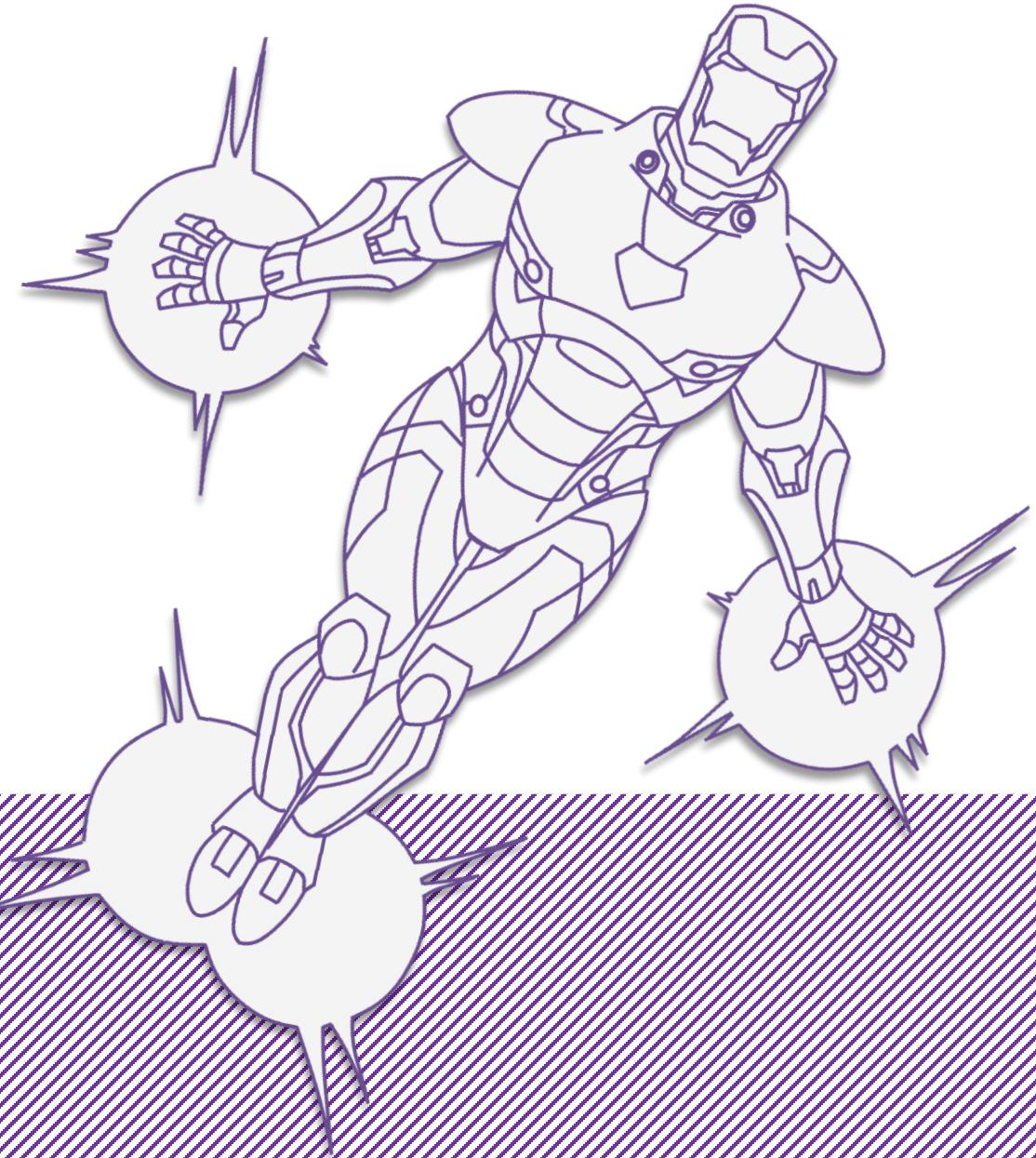
LAGGING BEHIND DEVELOPMENT...

WE DON'T HAVE TIME TO AUTOMATE DURING A SPRINT. WE HAVE TO FINISH THE STORY CARDS AND HAVE TOO MANY MEETINGS!

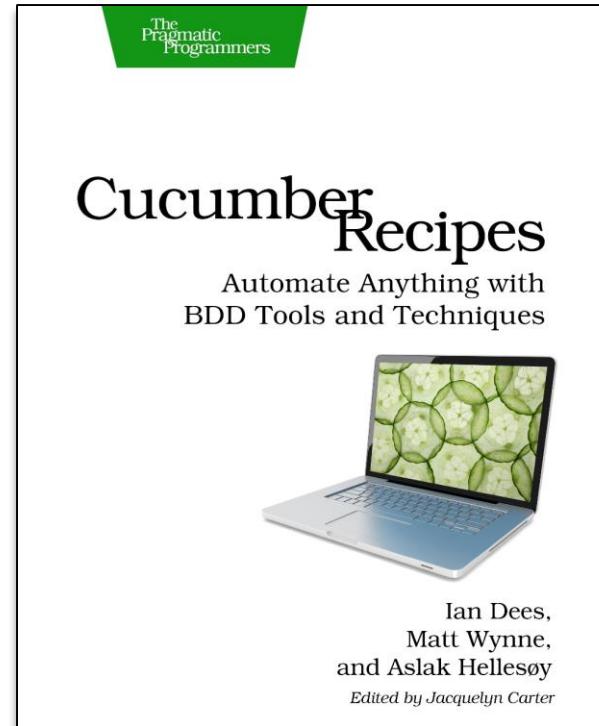
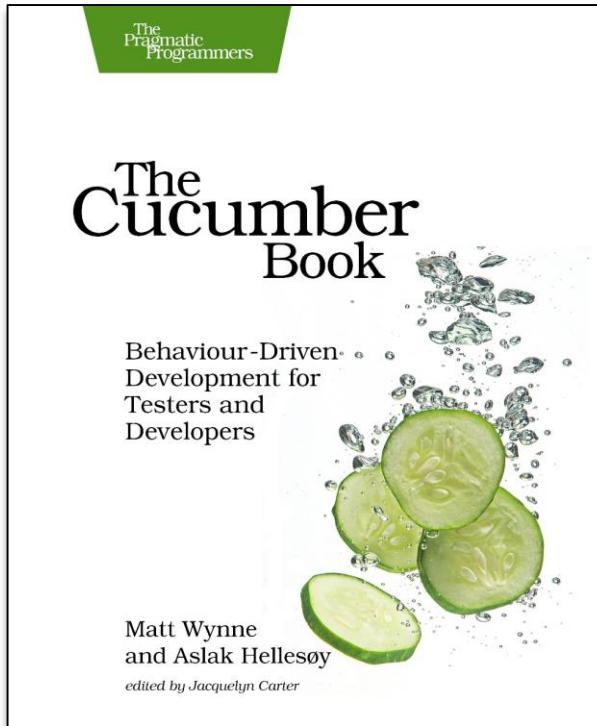


AUTOMATION FEASIBILITY MUST BE INCORPORATED INTO THE DEFINITION OF READY AND COMPLETED SCRIPTS MUST BE IN THE DEFINITION OF DONE.

SCHEDULE



EXAMPLE MAPPING BY MATT WAYNE...



DISCOVERY

FORMULATION

AUTOMATION

THE EXAMPLE MAP - PROCESS...



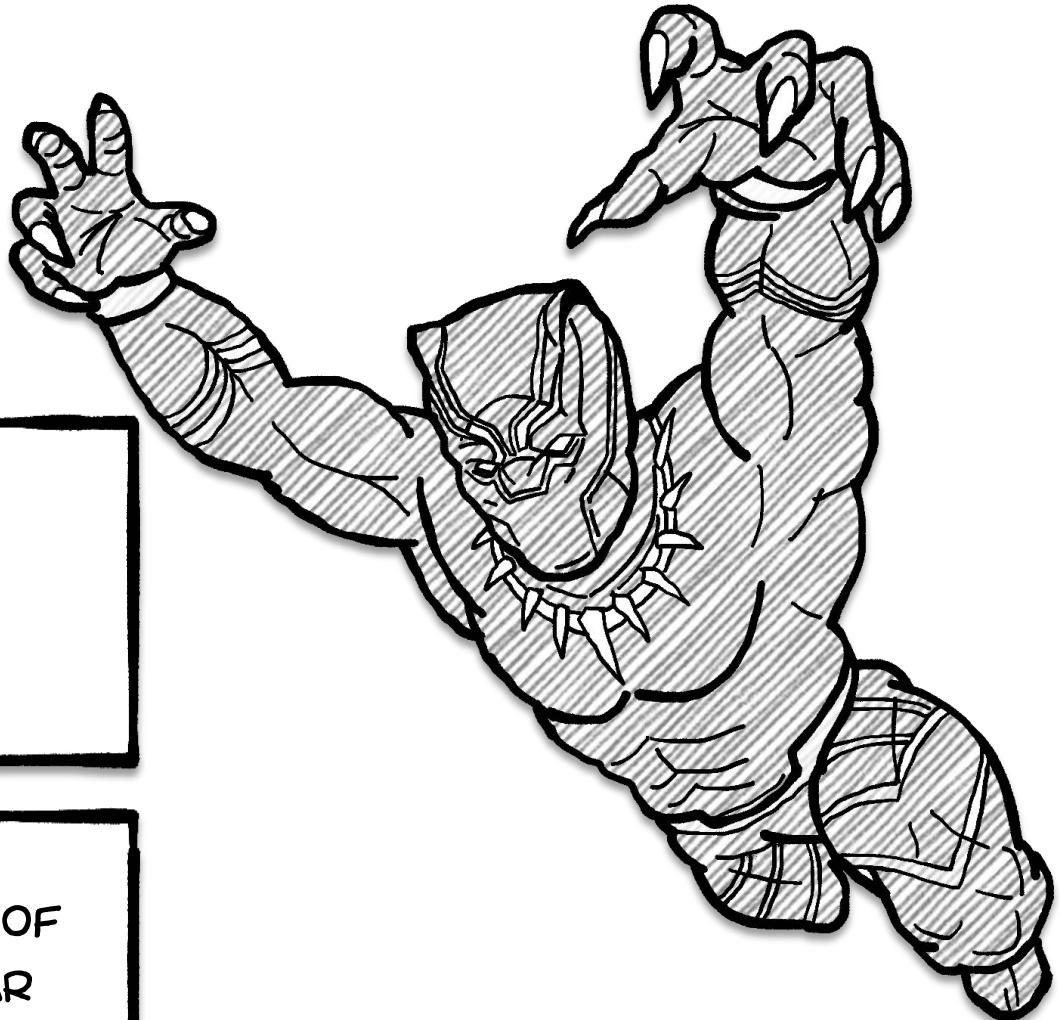
THE EXAMPLE MAP - BENEFITS...

CREATES A
SHARED
UNDERSTANDING.

EXAMPLES BECOME
USER SCENARIOS.

RULES BECOME
ACCEPTANCE
CRITERIA.

REDUCES REWORK OF
LARGE OR UNCLEAR
STORIES.



THE EXAMPLE MAP - FEEDBACK...

UNDERSTANDING OF THE USER STORY

QUESTION

DEVELOPMENT WORK IS NOT
READY TO BEGIN

RULE

USER STORY MIGHT BE
TOO LARGE

EXAMPLE
"THE ONE
WHERE..."

RULE MIGHT BE
TOO DENSE.

THE EXAMPLE MAP - EXAMPLE...

ROOM MUST BE
AVAILABLE

SCHEDULE A
WORKSHOP

WORKSHOP WITHIN
NORMAL HOURS

AT LEAST 50% OF
ALL PARTICIPANTS
AVAILABLE

WHAT IF ONE OR
MORE TRAINERS
ARE UNAVAILABLE?

SCHEDULED DURING
TIMEFRAME WHEN
ATTENDEES DON'T
HAVE MEETING
CONFLICTS

ACCEPTABLE WORK
HOURS BETWEEN
8AM AND 5PM EST

WORKSHOP
SCHEDULED ON DAY
WHEN ATTENDEES
ON-SITE

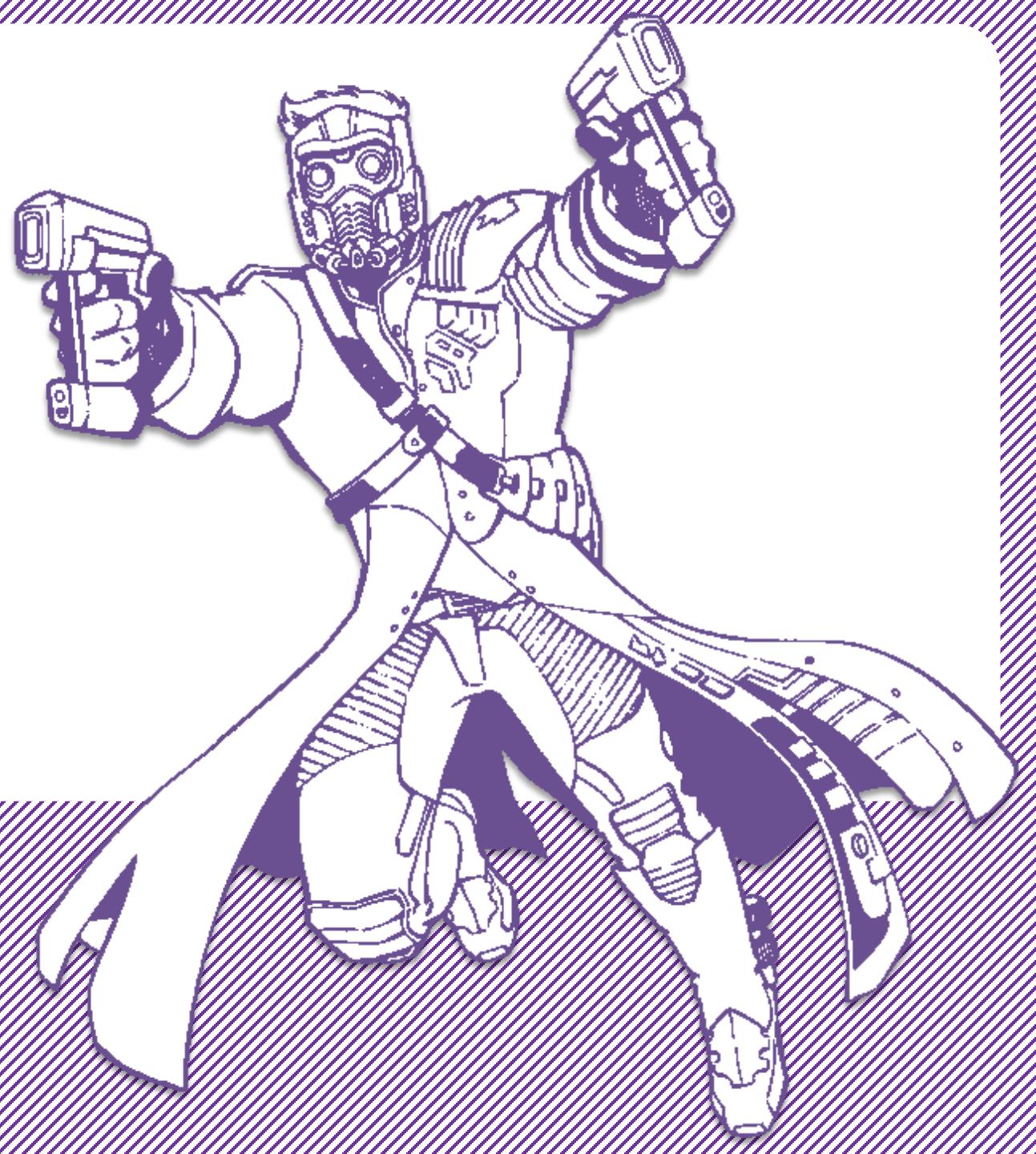
IS CATERING
REQUIRED?

A WORKSHOP WITH
5 PEOPLE OR MORE
MUST BE RESERVED
IN MEETING ROOM

SCHEDULED DURING
TIMEFRAME WHEN
ATTENDEES DON'T
HAVE MEETING
CONFLICTS

DOES THE MEETING
ROOM REQUIRE A
PROJECTOR?

QUALITY STANDARDS



REGRESSION REVIEW...

TEST LEAD COMPILES A LIST OF ALL NEW RELEASE SCRIPTS AND REGRESSION SCRIPTS

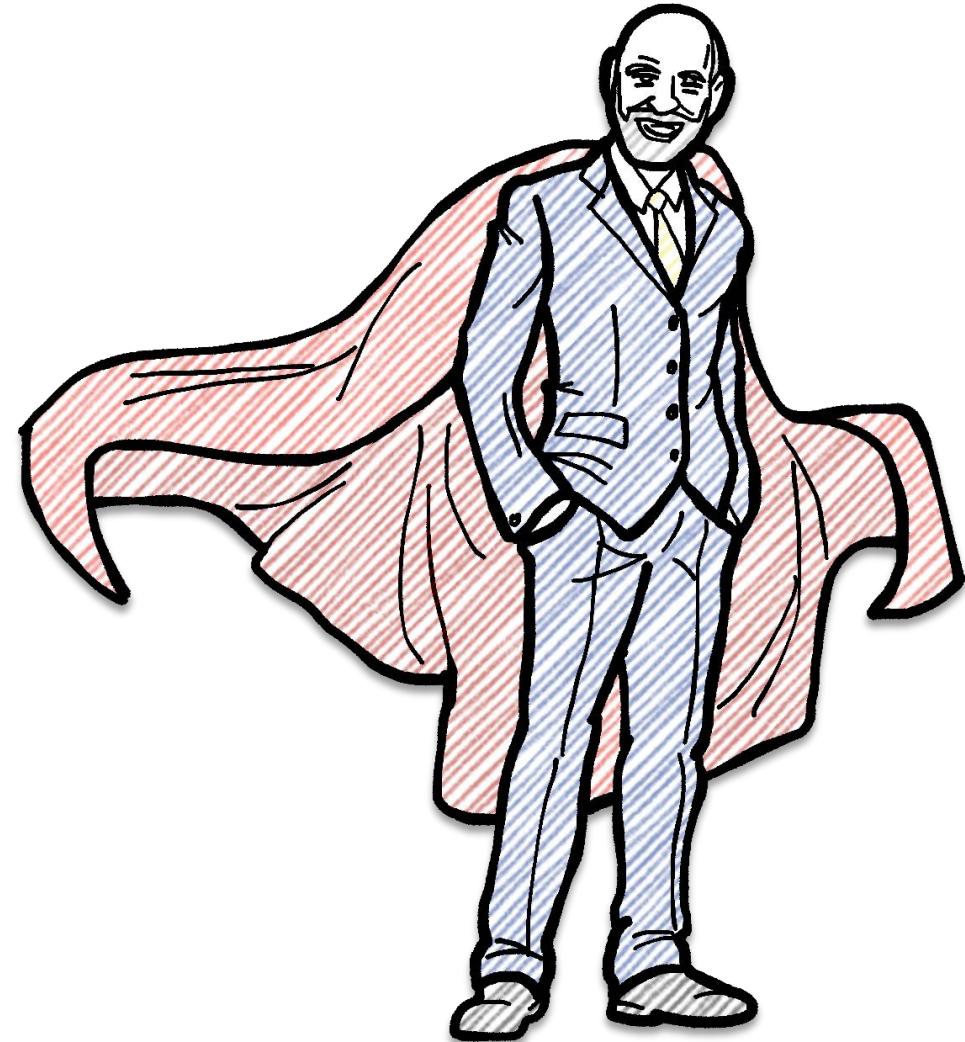
BUSINESS PROVIDES METRICS ON APPLICATION USAGE BROKEN DOWN BY FEATURE

PROD SUPPORT PROVIDES METRICS ON INCIDENTS FOR THAT APPLICATION FOR THE RELEASE & PRIOR PERIOD

APPLICATION MANAGER PROVIDES LIST OF UPCOMING PROJECTS WITH HIGH-LEVEL FEATURE CHANGES



CODE REVIEWS AND REFACTORING...



“I’M NOT A
GREAT PROGRAMMER;
I’M JUST A GOOD
PROGRAMMER WITH
GREAT HABITS.”

CODE REVIEWS...



ALL POSSIBLE
AUTOMATION
SCRIPTS FOR THE
FEATURE ARE
INDEED SCRIPTED

THE AUTOMATION SCRIPTS ARE
UNDERSTANDABLE BY THE TEAM

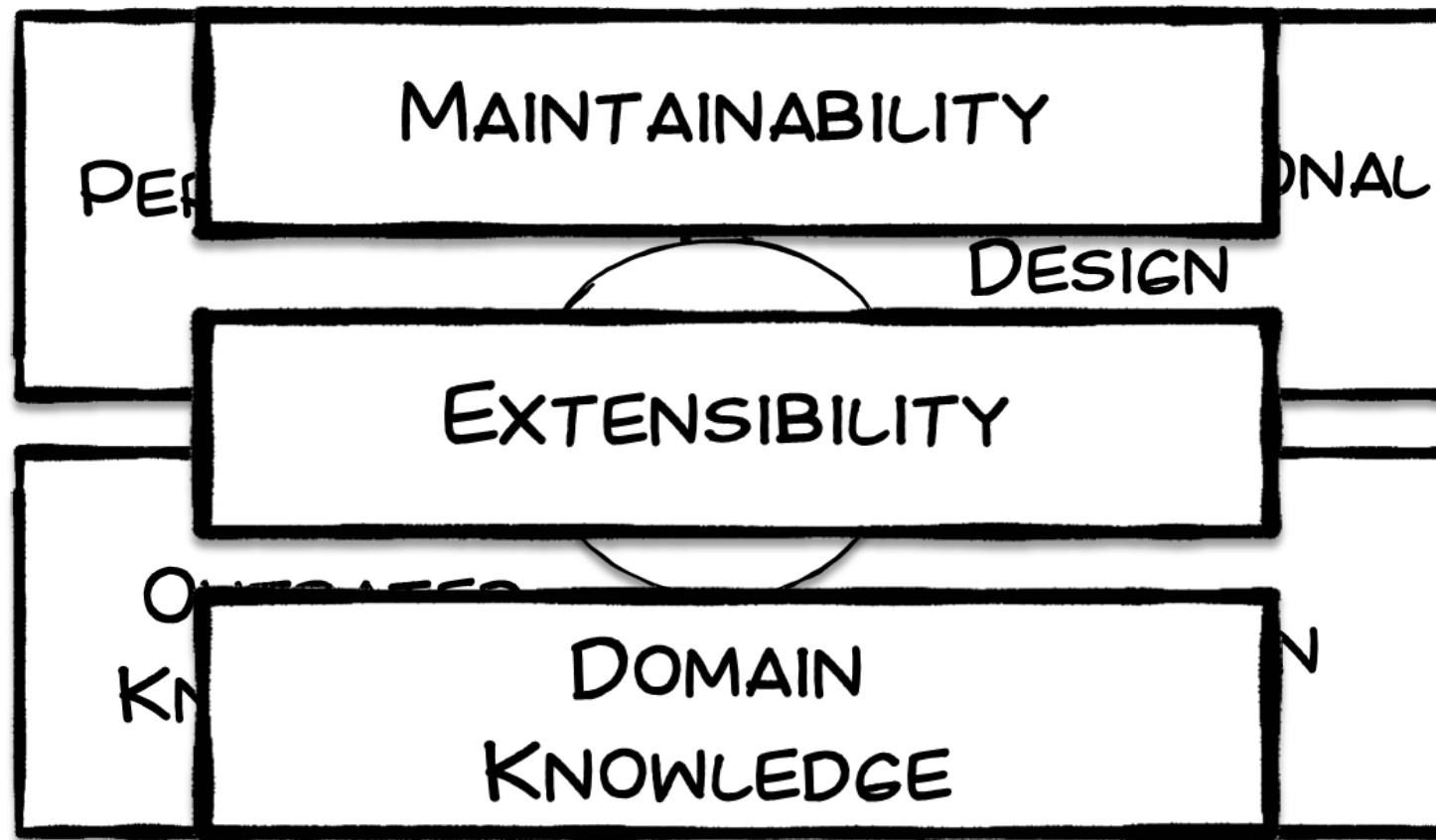
THE FEATURES AND
SCENARIOS BEST
REPRESENT THE
STATE OF THE
APPLICATION (LIVING
DOCUMENTATION)

THE AUTOMATION SCRIPTS DON'T
DUPLICATE EFFORT ALREADY PRESENT

ALL REQUIRED OBJECTS AND DATA
NEEDS ARE ADDRESSED

ALL STANDARDS & PRACTICES ARE
FOLLOWED (TRACEABILITY, GHERKIN,
FORMATTING, ETC.)

REFACTORING...



I AM
GROOT!



IMPLEMENTATION...



TEAM LEADER

- SCHEDULING
- DELEGATION OF WORK
- FOCUS AREA SELECTION
- BUG REPORT

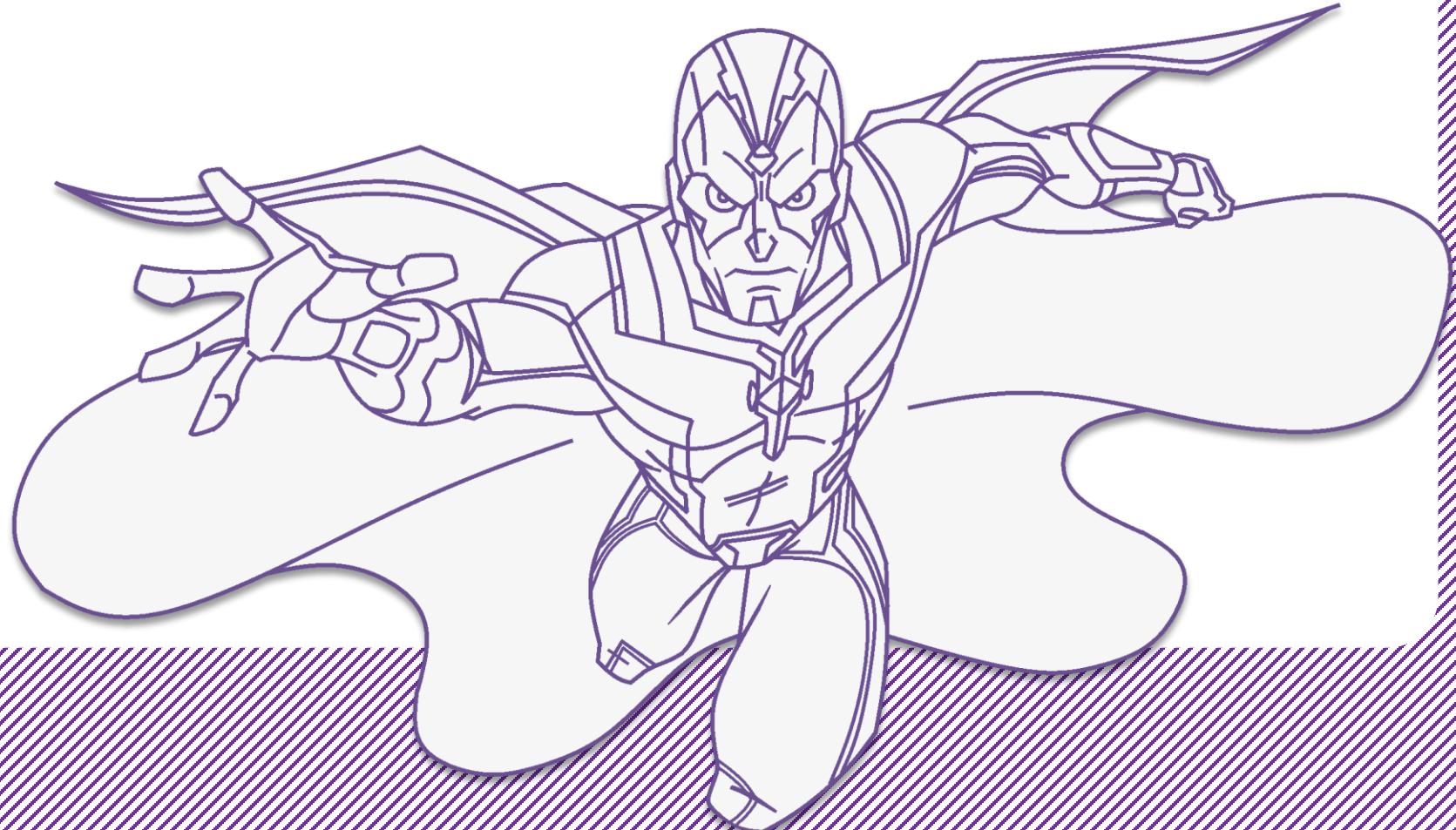
AUTOMATION GUIDE

- TECHNICAL RESOURCE
- SESSION TRACKING
- ACTION ITEMS
- IMPROVEMENT STATUS
- REPORT

FOCUS AREA

- CODE METRIC REPORT
- FEATURE ITEM
- PROJECT RELEASE
- REGRESSION
- CI REPORT

METRICS



TEST COVERAGE - PERCENT AUTOMATION...

THE PERCENT OF AUTOMATION FOR AN APPLICATION'S REGRESSION, PROJECT RELEASE, OR DEPLOY/PATCH VALIDATION (SMOKE TESTS).

$$PA\% = ATC / TC$$

PA = PERCENT AUTOMATION

ATC = # OF AUTOMATED TEST CASES

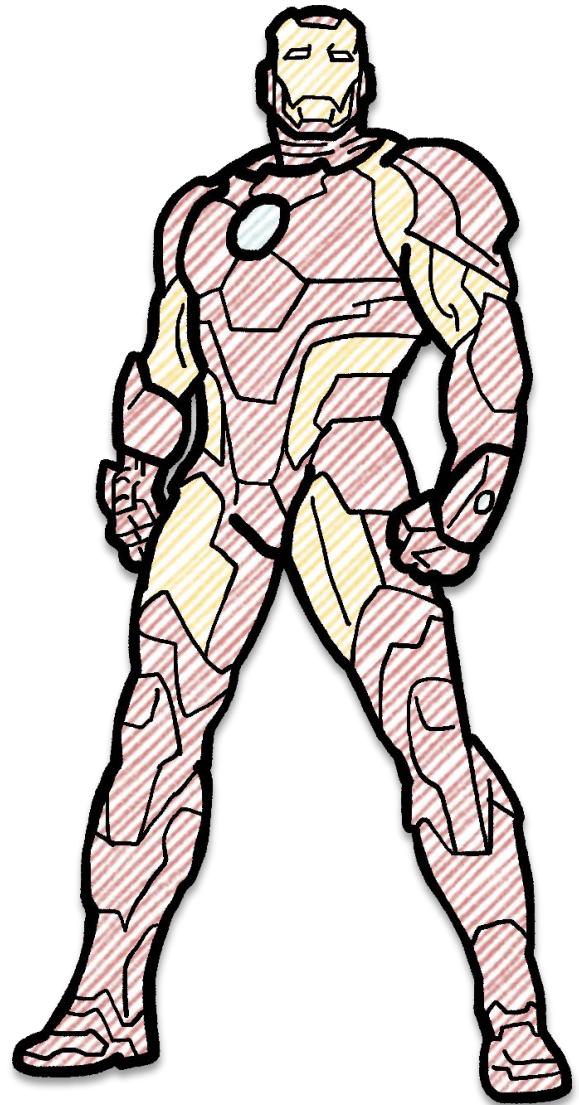
TC = # OF TOTAL TEST CASES

TEST COVERAGE - EXECUTION FREQUENCY...

THE MORE FREQUENTLY AN APPLICATION IS TESTED, THE BETTER THE TEST COVERAGE FOR CHANGES TO THAT APPLICATION (PROJECT OR PATCHING).

TO MEASURE PRE- AND POST-AUTOMATION EXECUTION BENEFITS, COMPARE THE FREQUENCY OF TESTING IN THREE PRIMARY CATEGORIES BEFORE AND AFTER AUTOMATION:

- REGRESSION: THE CORE FUNCTIONALITY OF THE EXISTING APPLICATION
- RELEASE: THE ADDED FUNCTIONALITY TO THE EXISTING APPLICATION
- PRODUCTION SUPPORT / SMOKE TESTS: ANY PATCHING, HOT FIXES, OR DEPLOYMENTS TO TEST CRITICAL FUNCTIONALITY



TEST COVERAGE - PERCENT BUSINESS RULE...

THE PERCENT OF BUSINESS RULES COVERED WITH SPECIFICATIONS (TEST CASES) FOR REGRESSION, PROJECT RELEASE, OR DEPLOY/PATCH VALIDATION (SMOKE TESTS).

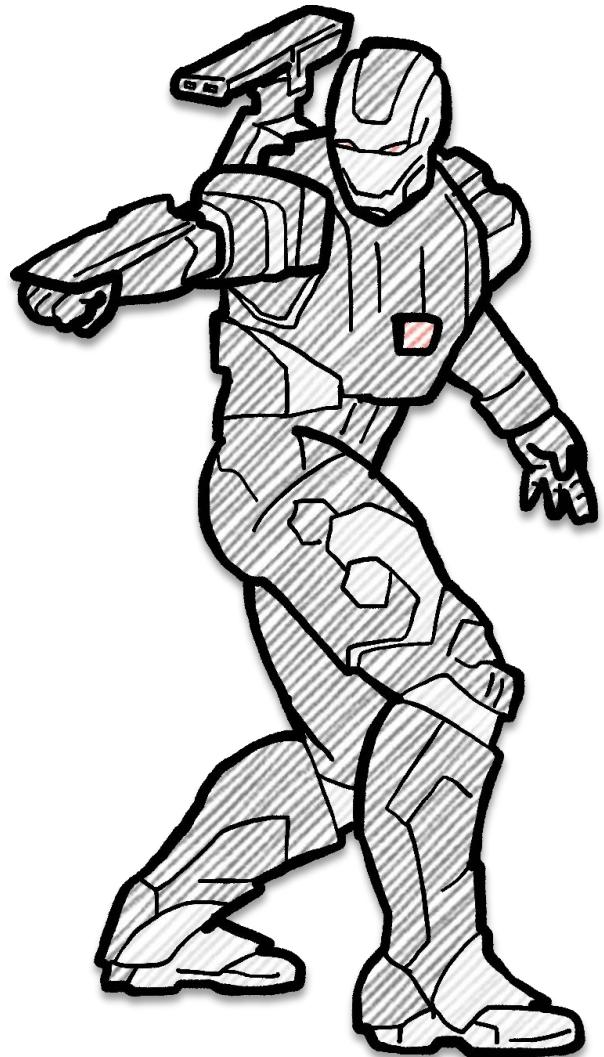
$$\text{PBR (\%)} = \text{SPE} / \text{BR}$$

PBR = PERCENT BUSINESS RULE

SPE = # BUSINESS RULES WITH SPECIFICATIONS

BR = # TOTAL BUSINESS RULES

APPLICATION QUALITY - DEFECT SAVINGS...



DEFECT SAVINGS IS THE ESTIMATE IN SAVINGS FOR EACH DEFECT FOUND BY AUTOMATION.

THE SYSTEMS SCIENCES INSTITUTE AT IBM ESTIMATES ON AVERAGE EVERY SOFTWARE BUG FOUND IN PRODUCTION COSTS \$10,000 TO FIX AND \$1,500 TO FIX IN QA.

FOR EACH DEFECT FOUND BY AUTOMATION, ASSOCIATE A COST FOR THE BUG THAT OTHERWISE WOULD HAVE GONE TO PRODUCTION.

APPLICATION QUALITY - DEFECT COVERAGE...

A MEASURE OF THE TOTAL KNOWN DEFECTS CHECKED BY AUTOMATION DIVIDED TOTAL NUMBER OF DEFECTS IN THE SYSTEM.

$$DC = DA / TD$$

DC = DEFECT COVERAGE

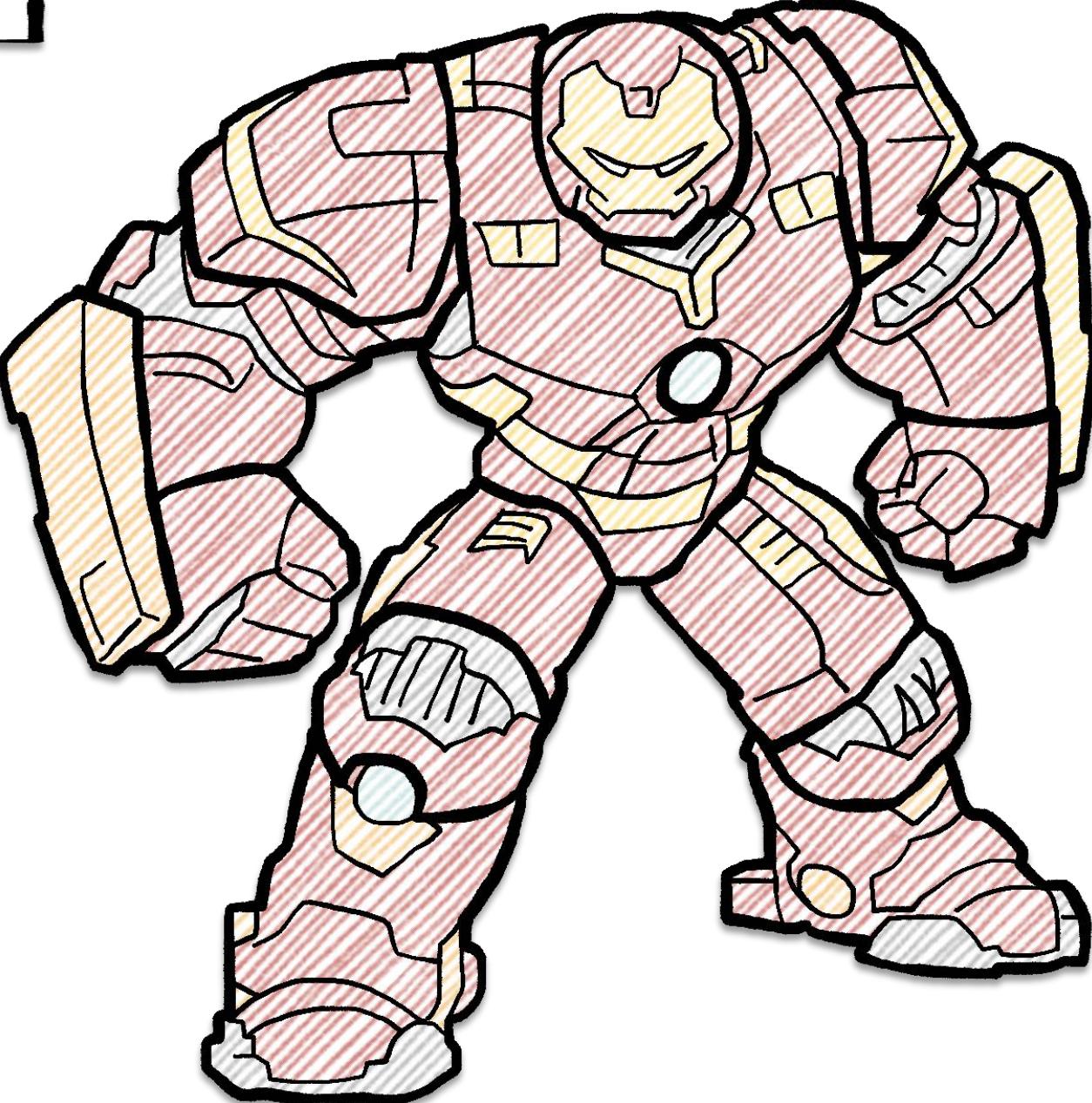
DA = # OF DEFECTS CHECKED BY AUTOMATION

TD = TOTAL # OF DEFECTS

APPLICATION QUALITY - DEFECT TREND...

DEFECT TREND IS THE MEASURE OF DEFECTS IN ENVIRONMENT AFTER SOME CHANGE IS INSTITUTED AT A PARTICULAR PHASE IN THE SDLC.

FOR EACH SDLC PHASE, RECORD WHEN DEFECTS ARE FOUND. COMPARE THE TREND AT EACH PHASE FOR A GIVEN PROJECT AND ACROSS MULTIPLE PROJECTS BASED ON PROJECT SIZE.



TIME SAVINGS - EXECUTION COST...

$$TS = (MET - AET) * COUNT * ENV * USER$$

TS = TIME SAVINGS

MET = MANUAL EXECUTION TIME

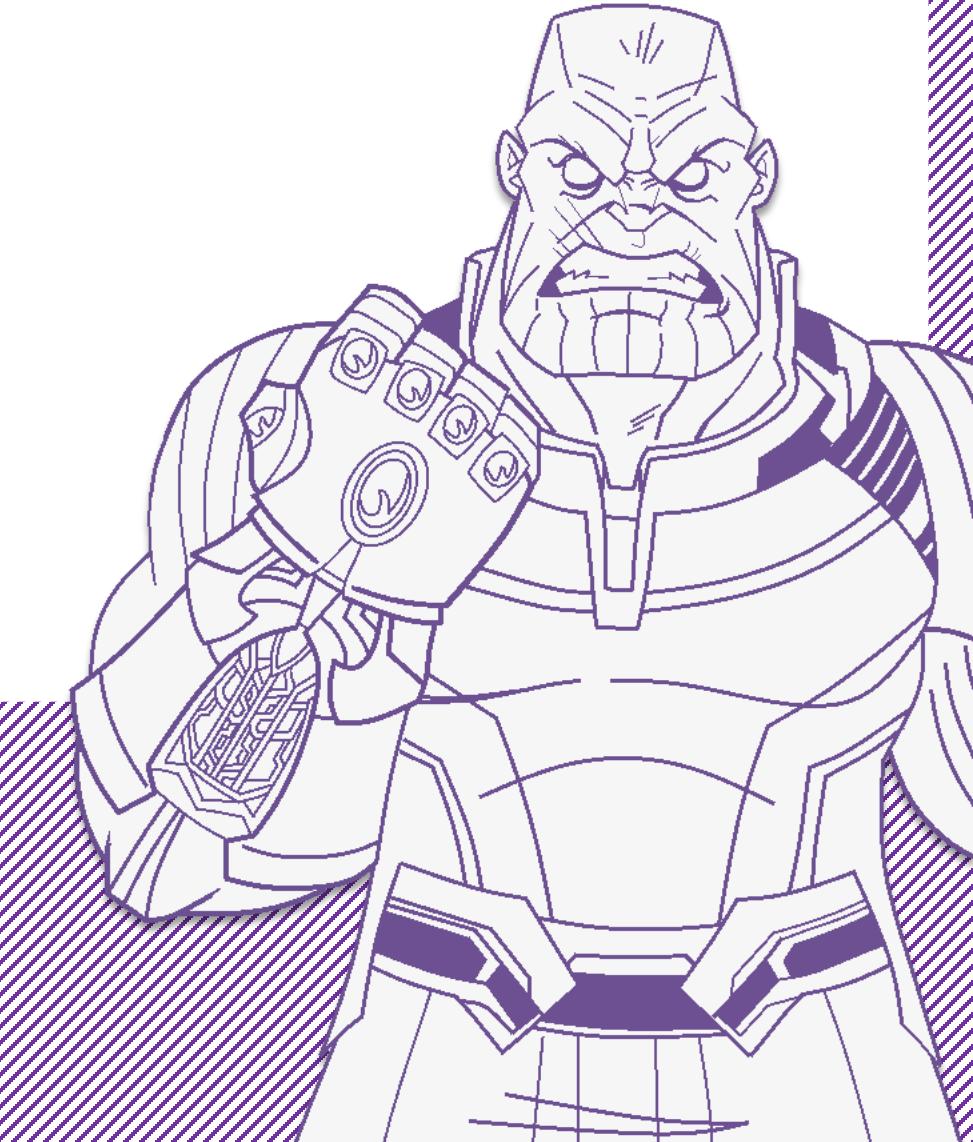
AET = AUTOMATION-INCLUSIVE EXECUTION TIME

COUNT = MINIMUM NUMBER OF TEST ACTIVITY EVENTS

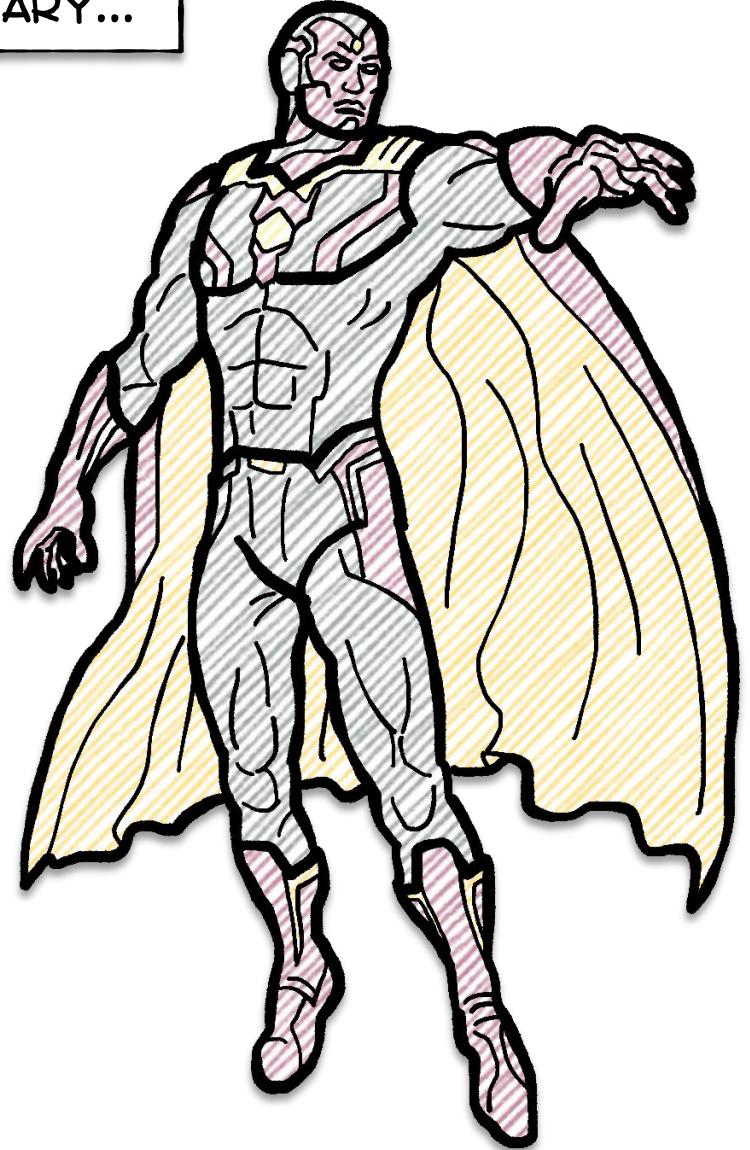
ENV = NUMBER OF ENVIRONMENTS TESTED

USER = NUMBER OF USER COMBINATIONS TESTED

SUMMARY



SUMMARY...

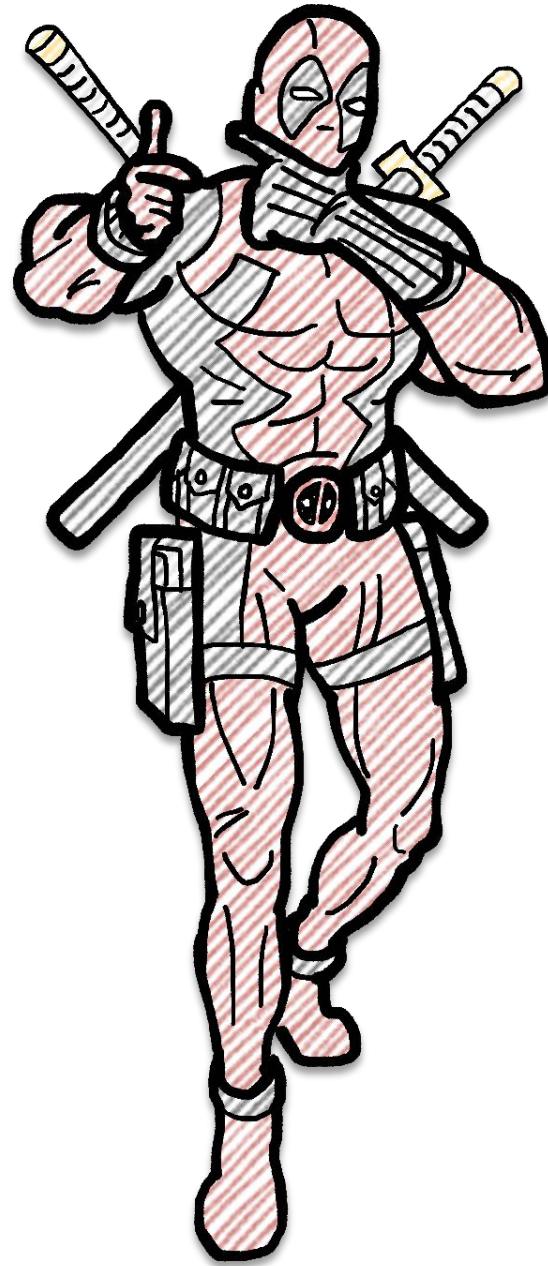


FOCUS ON THE FASTEST, MOST ROBUST TESTS. CREATE UI & E2E TESTS AS NEEDED.
UNIT > SERVICE > UI > E2E

BUILD BASED ON PROBABILITY OF FAILURE, IMPACT ON BUSINESS, AND COMPLEXITY.

BUDGET, SCHEDULE, AND TECHNICAL SKILLSET WILL ALWAYS LIMIT THE PATH FORWARD.

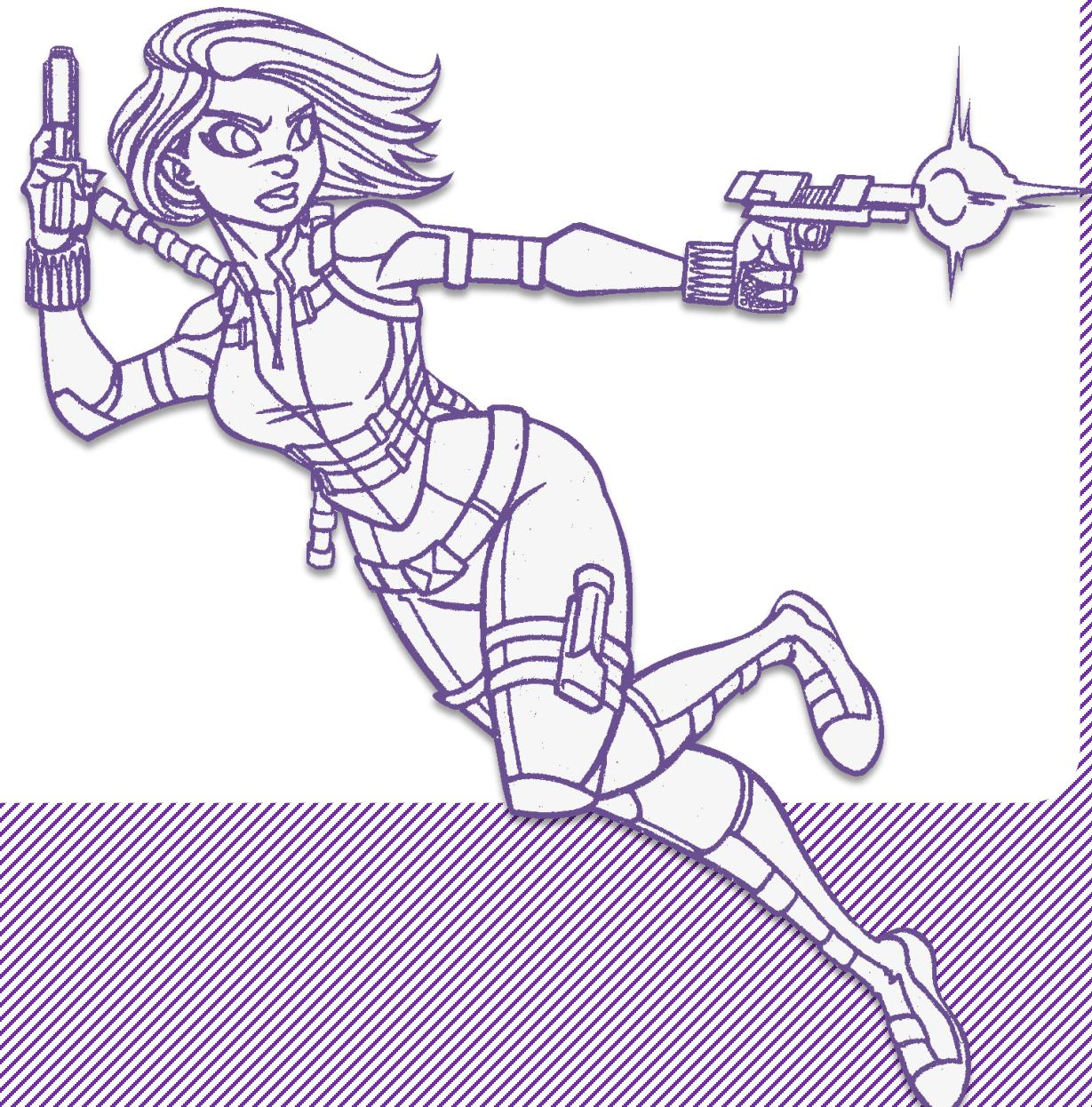
QUESTIONS?



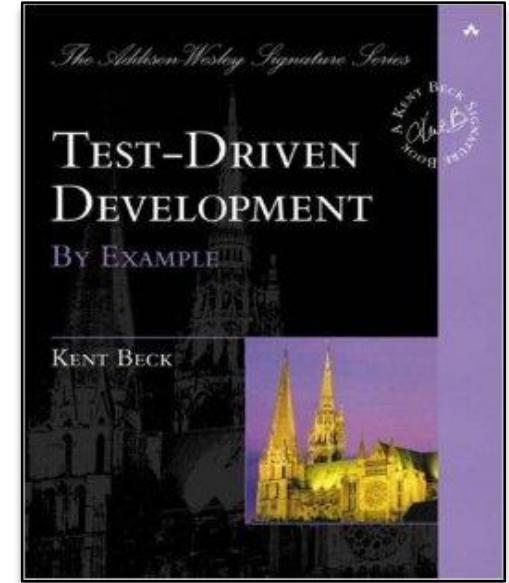
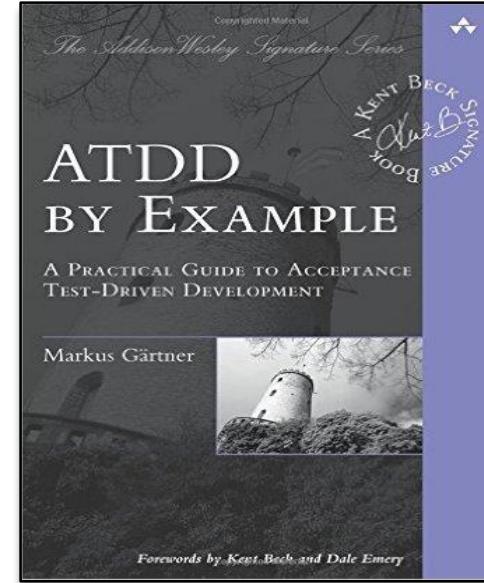
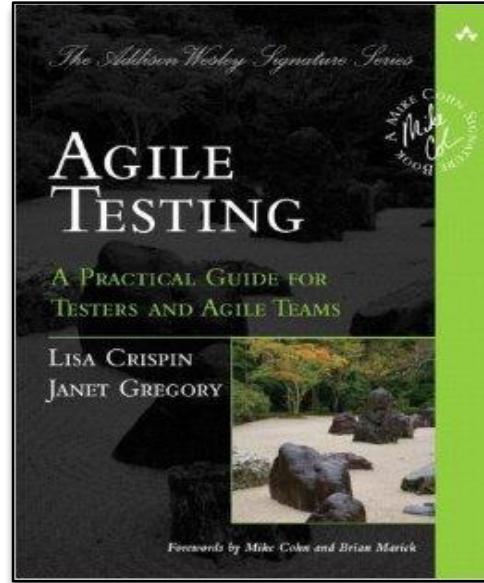
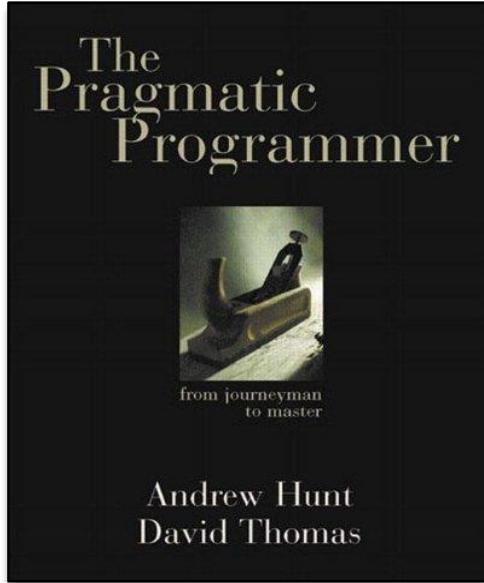
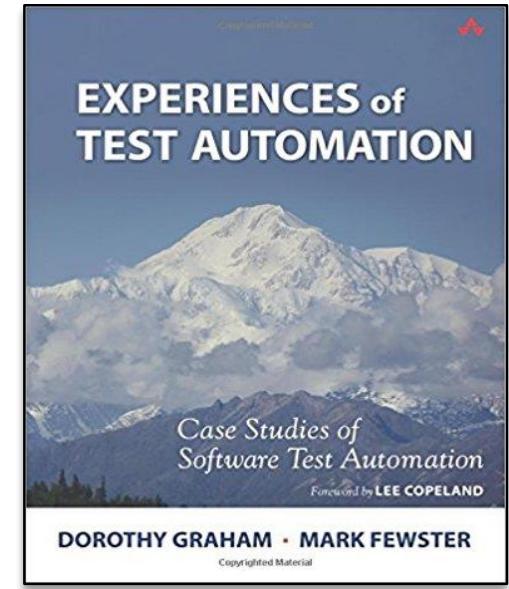
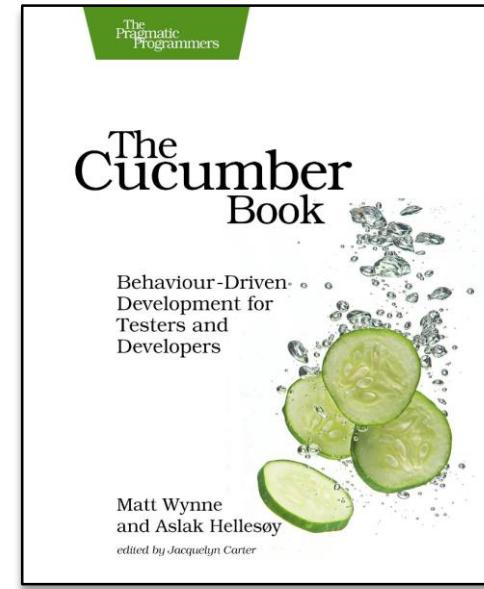
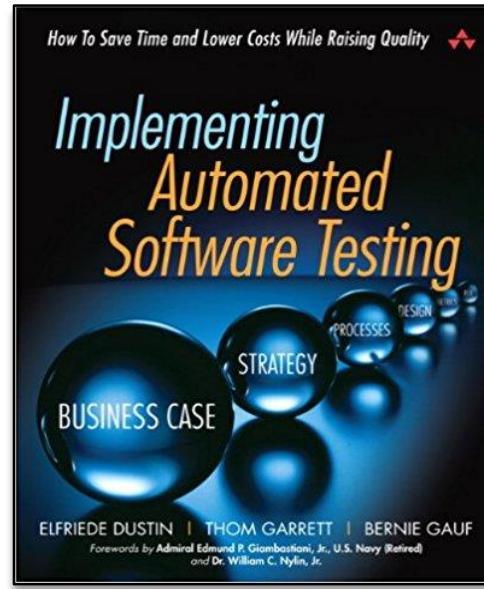
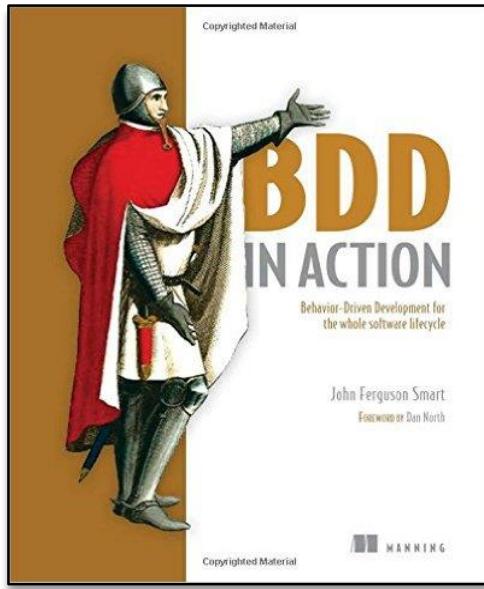
QUESTIONS?



RESOURCES



BOOKS...



APPENDIX...

- BROWSER ANALYTICS
 - [HTTPS://ANALYTICS.USA.GOV/DATA/](https://analytics.usa.gov/data/)
 - [HTTP://NETMARKETSHARE.COM/](http://netmarketshare.com/)
- INTERNET EXPLORER
 - [HTTPS://BLOGS.MSDN.MICROSOFT.COM/IE/2004/08/17/THE-BASICS-OF-THE-IE-TESTING-MATRIX/](https://blogs.msdn.microsoft.com/ie/2004/08/17/the-basics-of-the-ie-testing-matrix/)
- UNIT & INTEGRATION
 - [HTTPS://WWW.SOFTWARETESTINGHELP.COM/UNIT-TESTING-TOOLS/](https://www.softwaretestinghelp.com/unit-testing-tools/)
- SELENIUM
 - [HTTPS://GITHUB.COM/SELENIUMHQ/SELENIUM/WIKI/DESIREDCAPABILITIES](https://github.com/SeleniumHQ/selenium/wiki/DesiredCapabilities)
- AUTOMATION MAINTENANCE
 - [HTTPS://BLOG.TESTPROJECT.IO/2018/03/20/MAINTAINING-VALUE-AUTOMATIONS-FORGOTTEN-COST/](https://blog.testproject.io/2018/03/20/maintaining-value-automations-forgotten-cost/)