Help! I am Drowning in 2 Week Sprints

Please Tell me What NOT to Test!

vaco

Free Yourself

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During her more than 20 years of experience with financial, healthcare, and SaaS-based products, Mary has held VP, Director, and Manager level positions in various software development organizations.

A seasoned Leader and Coach in agile and testing methodologies, Mary has direct experience building and leading teams through large scale agile transformations. Mary's expertise is a combination of agile scaling, agile testing, and DevOps that her clients find incredibly valuable.

She is also Chief storyteller of the book **The Three Pillars of Agile Testing and Quality**, and avid keynote and conference speaker on all things agile and agile testing.

Agenda

1. Introduction
2. 3 Amigos
3. Risked Based Testing
4. Test Ideas
5. Test Case Gaps
6. Pareto
7. All Pairs
8. Wrap Up!

3 Amigos

3-Amigos

- Coined by George Dinwiddie
  - http://rgalen.com/agile-training-news/2014/4/13/3 teams
- Swarming around the User Story by:
  - Developer(s)
  - Tester(s)
  - Product Owner
- Conversation device – reminder for collaboration amongst relevant team members

Risk–Based Testing Background

- It starts with the realization that you can't test everything – ever!

  100% coverage being a long held myth in software development

- There are essentially 5 steps in most of the models

1. Decompose the application under test into areas of focus
2. Analyze the risk associated with individual areas – technical, quality, business, schedule
3. Assign a risk level to each component
4. Plan test execution, based on your SDLC, to maximize risk coverage
5. Reassess risk at the end of each testing cycle

Risk–Based Testing Background

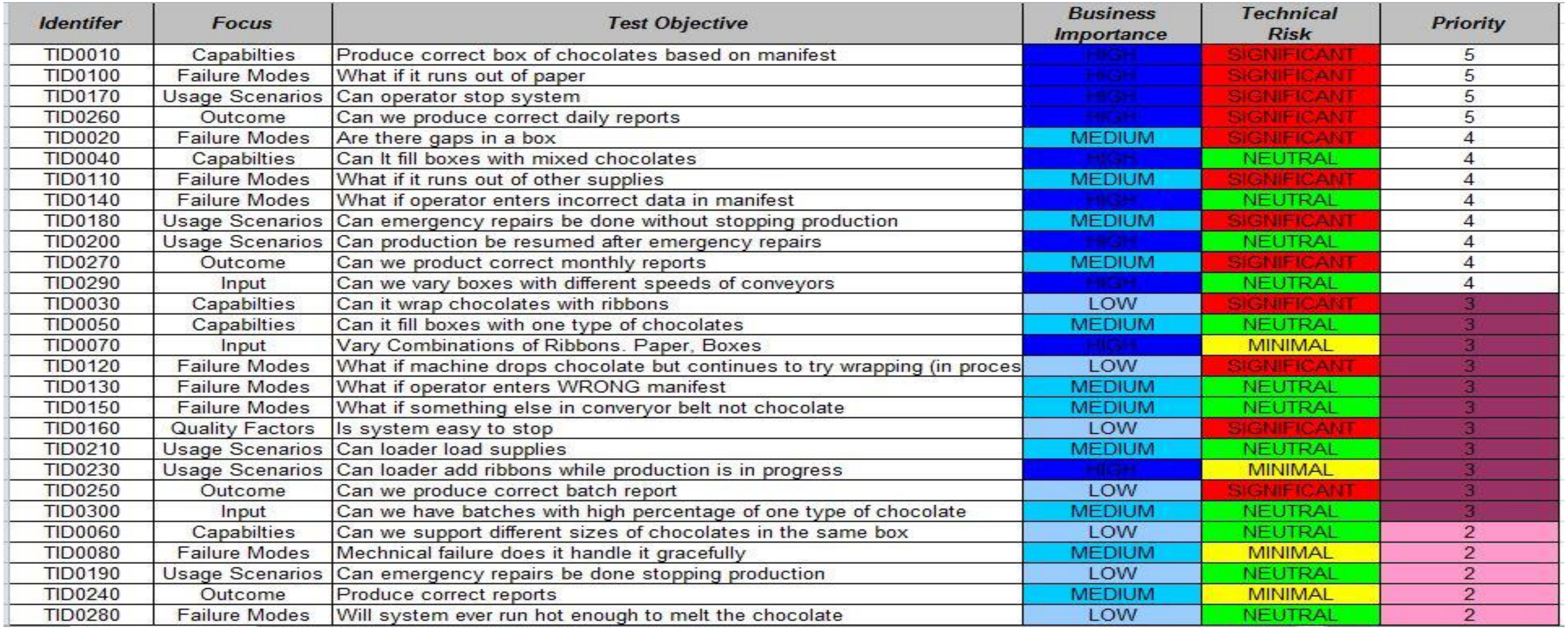
- Risk–Based Testing is effectively a risk mitigation technique
  - Not a prevention technique

- It’s about trade-offs
  - Human and physical resources
  - Ratio’s between Producers (Developers) and Consumers (Testers)
  - Time
  - Rework (retesting & verification)
  - Quality – Coverage vs. Delivery
  - Visibility into the trade-offs

Test Ideas

- What are they?
  - Risked based test planning technique
  - Created by Rob Sabourin
  - Replaces traditional waterfall test plan in Agile.

Test Ideas



Identifer	Focus	Test Objective	Business Importance	Technical Risk	Priority
TID0010	Capabilties	Produce correct box of chocolates based on manifest	HIGH	SIGNIFICANT	5
TID0100	Failure Modes	What if it runs out of paper	HIGH	SIGNIFICANT	5
TID0170	Usage Scenarios	Can operator stop system	HIGH	SIGNIFICANT	5
TID0260	Outcome	Can we produce correct daily reports	HIGH	SIGNIFICANT	5
TID0020	Failure Modes	Are there gaps in a box	MEDIUM	SIGNIFICANT	4
TID0040	Capabilties	Can It fill boxes with mixed chocolates	HIGH	NEUTRAL	4
TID0110	Failure Modes	What if it runs out of other supplies	MEDIUM	SIGNIFICANT	4
TID0140	Failure Modes	What if operator enters incorrect data in manifest	HIGH	NEUTRAL	4
TID0180	Usage Scenarios	Can emergency repairs be done without stopping production	MEDIUM	SIGNIFICANT	4
TID0200	Usage Scenarios	Can production be resumed after emergency repairs	HIGH	NEUTRAL	4
TID0270	Outcome	Can we product correct monthly reports	MEDIUM	SIGNIFICANT	4
TID0290	Input	Can we vary boxes with different speeds of conveyors	HIGH	NEUTRAL	4
TID0030	Capabilties	Can it wrap chocolates with ribbons	LOW	SIGNIFICANT	3
TID0050	Capabilties	Can it fill boxes with one type of chocolates	MEDIUM	NEUTRAL	3
TID0070	Input	Vary Combinations of Ribbons. Paper, Boxes	HIGH	MINIMAL	3
TID0120	Failure Modes	What if machine drops chocolate but continues to try wrapping (in proces	LOW	SIGNIFICANT	3
TID0130	Failure Modes	What if operator enters WRONG manifest	MEDIUM	NEUTRAL	3
TID0150	Failure Modes	What if something else in converyor belt not chocolate	MEDIUM	NEUTRAL	3
TID0160	Quality Factors	Is system easy to stop	LOW	SIGNIFICANT	3
TID0210	Usage Scenarios	Can loader load supplies	MEDIUM	NEUTRAL	3
TID0230	Usage Scenarios	Can loader add ribbons while production is in progress	HIGH	MINIMAL	3
TID0250	Outcome	Can we produce correct batch report	LOW	SIGNIFICANT	3
TID0300	Input	Can we have batches with high percentage of one type of chocolate	MEDIUM	NEUTRAL	3
TID0060	Capabilties	Can we support different sizes of chocolates in the same box	LOW	NEUTRAL	2
TID0080	Failure Modes	Mechnical failure does it handle it gracefully	MEDIUM	MINIMAL	2
TID0190	Usage Scenarios	Can emergency repairs be done stopping production	LOW	NEUTRAL	2
TID0240	Outcome	Produce correct reports	MEDIUM	MINIMAL	2
TID0280	Failure Modes	Will system ever run hot enough to melt the chocolate	LOW	NEUTRAL	2

Test Ideas - Sources

- Capabilities
- Failure Modes
- Quality Factors
- Usage Scenarios
- Creative Ideas
- States
- Data
- Environments
- White Box
- Taxonomies

Test Ideas

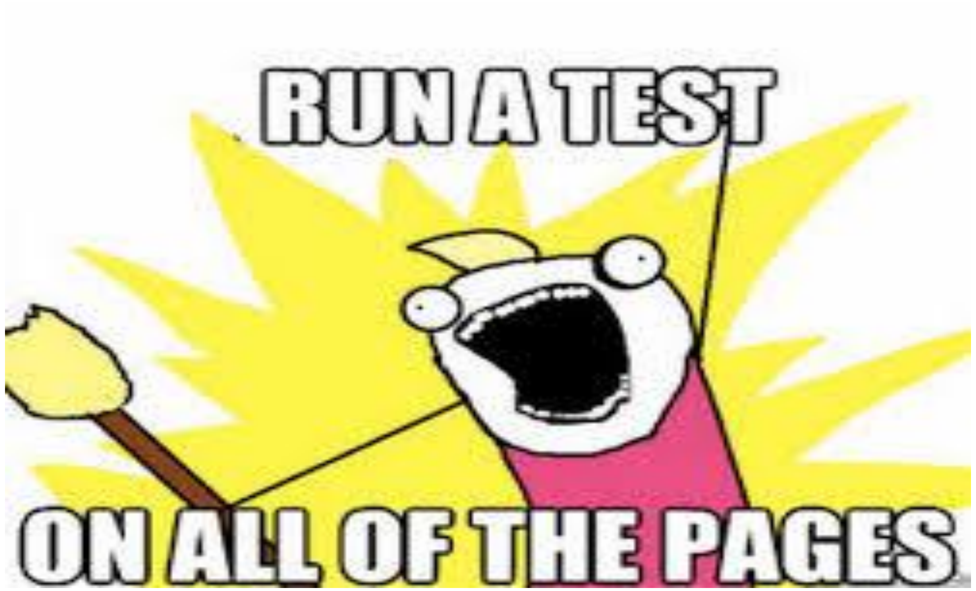
- How to find them?
  - Does system do what it is suppose to do?
  - Does the system do things it is not supposed to?
  - How can the system break?
  - How does the system react to it's environment?
  - What characteristics must the system have?
  - Why have similar systems failed?
  - How have previous projects failed?

Test Ideas - Process

- Life of a test idea
  - Comes into existence
  - Clarified
  - Prioritized
    - Test Now (before further testing)
    - Test before shipping
    - Nice to have
    - May be of interest in some future release
    - Not of interest in current form
    - Will never be of interest
  - Integrate into a testing objective

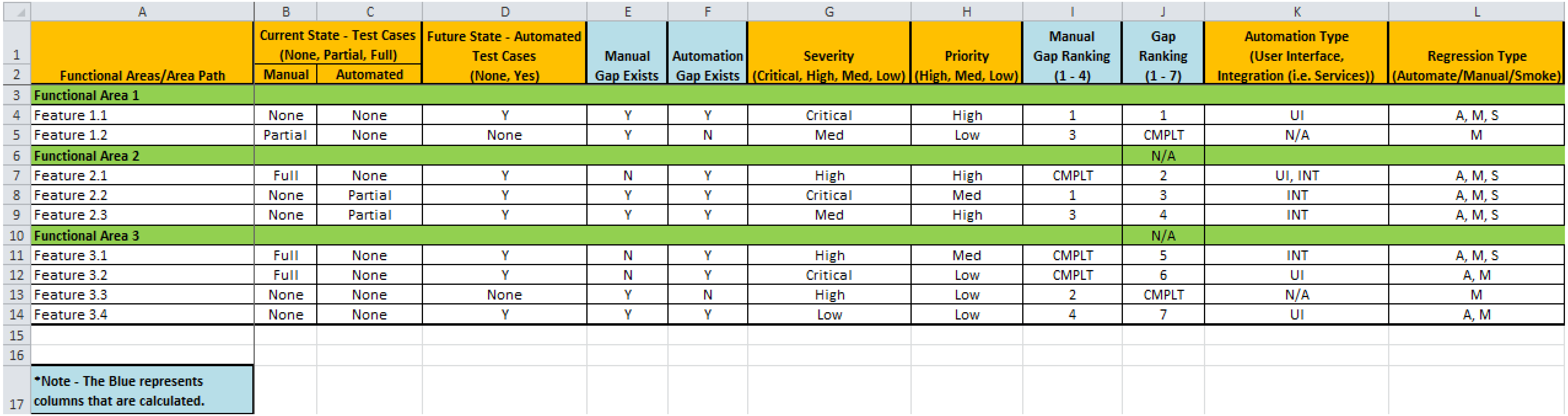
Test Ideas – 3 Amigos

- Test Triage Meeting
  - Review Context
    - Business – with PO
    - Technical – With Developer
  - Add or remove tests
  - Agree to where the cut line is



Test Case Gap Analysis

Test Case Gap Analysis

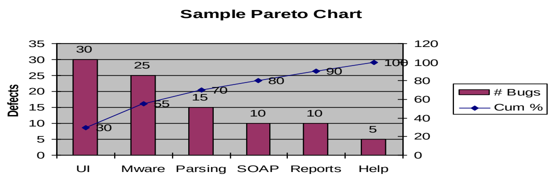


	A	B	C	D	E	F	G	H	I	J	K	L
1	Functional Areas/Area Path	Current State - Test Cases (None, Partial, Full)		Future State - Automated Test Cases (None, Yes)	Manual Gap Exists	Automation Gap Exists	Severity (Critical, High, Med, Low)	Priority (High, Med, Low)	Manual Gap Ranking (1 - 4)	Gap Ranking (1 - 7)	Automation Type (User Interface, Integration (i.e. Services))	Regression Type (Automate/Manual/Smoke)
2		Manual	Automated									
3	Functional Area 1											
4	Feature 1.1	None	None	Y	Y	Y	Critical	High	1	1	UI	A, M, S
5	Feature 1.2	Partial	None	None	Y	N	Med	Low	3	CMPLT	N/A	M
6	Functional Area 2									N/A		
7	Feature 2.1	Full	None	Y	N	Y	High	High	CMPLT	2	UI, INT	A, M, S
8	Feature 2.2	None	Partial	Y	Y	Y	Critical	Med	1	3	INT	A, M, S
9	Feature 2.3	None	Partial	Y	Y	Y	Med	High	3	4	INT	A, M, S
10	Functional Area 3									N/A		
11	Feature 3.1	Full	None	Y	N	Y	High	Med	CMPLT	5	INT	A, M, S
12	Feature 3.2	Full	None	Y	N	Y	Critical	Low	CMPLT	6	UI	A, M
13	Feature 3.3	None	None	None	Y	N	High	Low	2	CMPLT	N/A	M
14	Feature 3.4	None	None	Y	Y	Y	Low	Low	4	7	UI	A, M
15												
16												
17	*Note - The Blue represents columns that are calculated.											

Pareto Principle

Pareto Principle

Italian economist Vilfredo Pareto observed tha

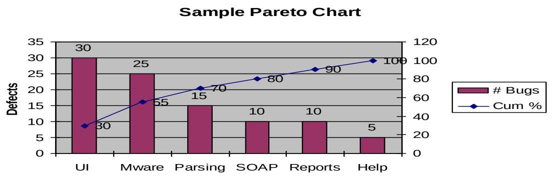


For many phenomena, 80% of the consequences stem from 20% of the causes

When analyzing personal wealth distribution in Italy.

- Also known as the 80-20 rule, the law of the vital few, and the principle of factor sparsity
- Joseph Duran brought the principle forward as a potential quality management technique
- In probability theory referenced as a Pareto distribution

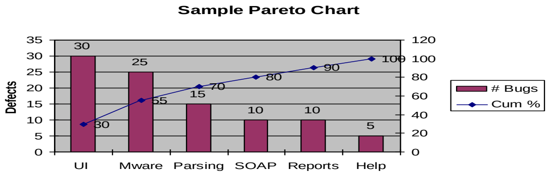
Pareto Principle “Thinking” Examples



- In a Toyota Prius warehouse –
  - 20% of the component boxes take up 80% of the space
  - 20% of the components make up 80% of the overall vehicle cost

- In software applications –
  - 20% of the application code produces 80% of the defects
  - 20% of the developers produce 80% of the defects
  - 20% of the test cases (ideas) find 80% of the defects
  - 20% of the test cases (ideas) take 80% of your time to design & test
  - 20% of the product will be used by 80% of the customers
  - 20% of the requirements will meet 80% of the need

Pareto Principle “Thinking” Examples

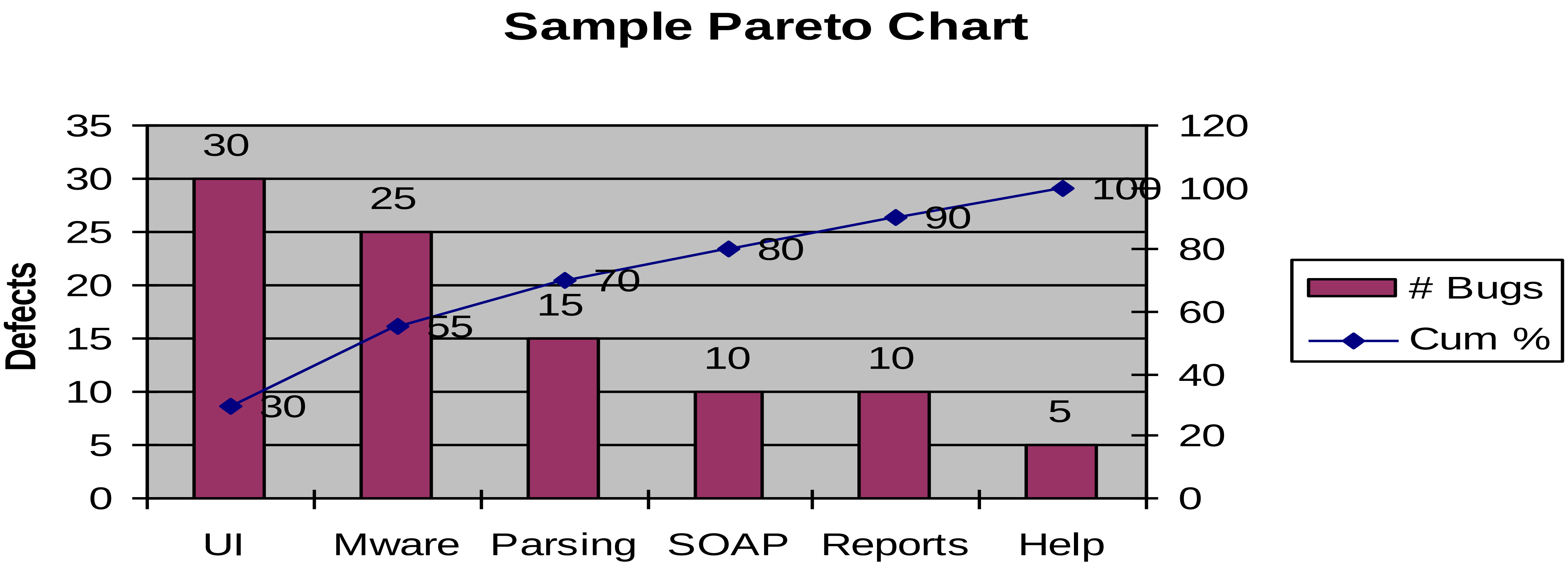


- Leads to the notion of defect clustering. Many have observed that software bugs will cluster in specific modules, classes, components, etc.

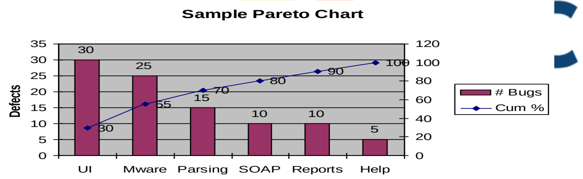
- Think in terms of stable or well made components versus error-prone, unstable, and fragile components. Which ones should receive most of your attention? Do the areas remain constant?

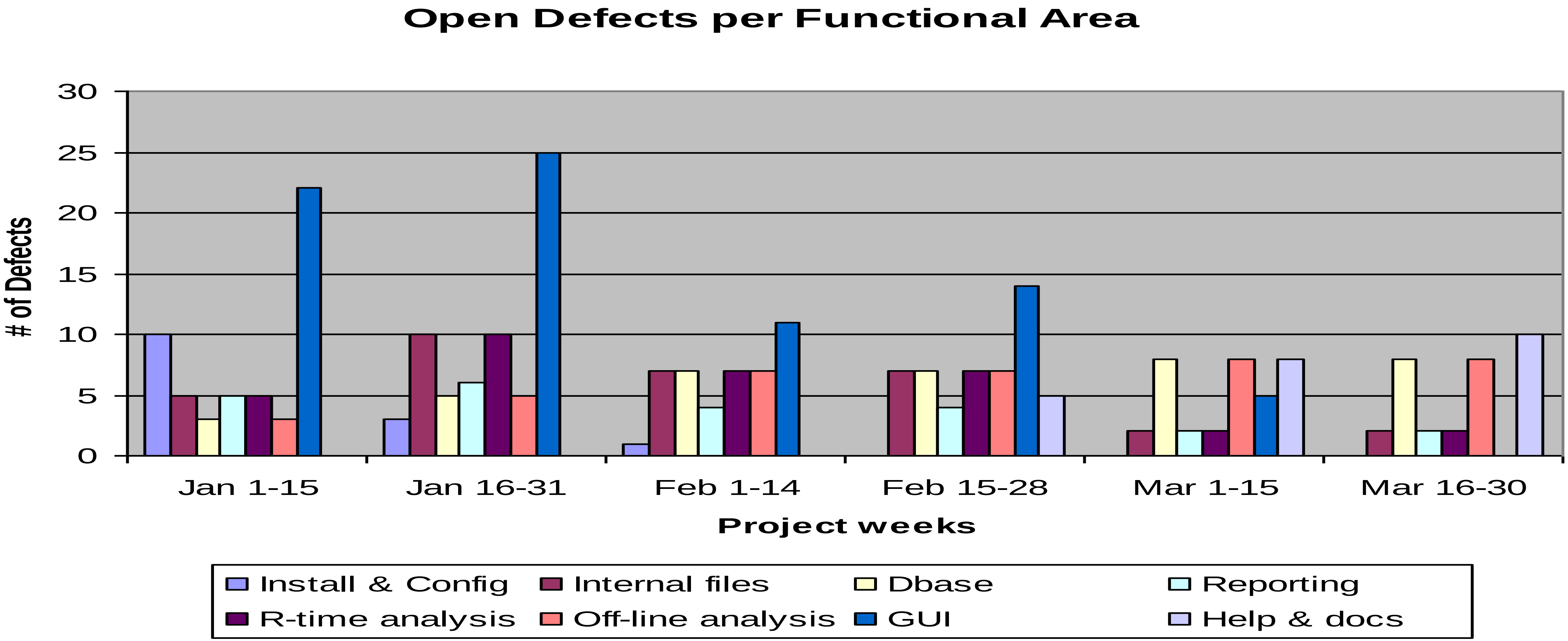
- Often, complexity plays a large part in the clustering. Either solution (*true*) complexity OR gold-plating (*favored*) complexity.

Open Defects per Functional Area Trending – Pareto (80:20 Rule) Chart

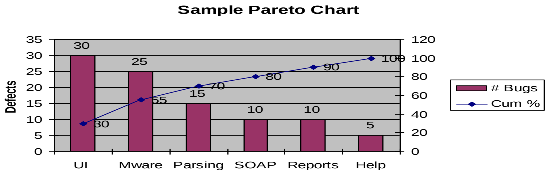


Open Defects per Functional Area
“Rolling” Pareto Chart





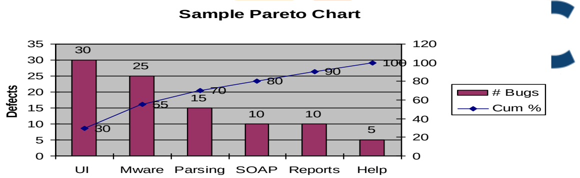
Pareto Principal Step 1 – Application Partitioning



- The first major challenge to Pareto-Based risk analysis is meaningfully partitioning your application. Here are some guidelines –
  - Along architectural boundaries – horizontally and/or vertically
  - Along design boundaries
  - At interface points – (API, SOA points, 3’rd party product integrations, external data acquisition points)

- Always do this in conjunction with the development team
- The partitioned areas need to be balanced – in approximate size & complexity
- Shoot for 5-12 meaningful areas for tracking

Pareto Principal Step 2 – Defect Tracking Setup



Sample Pareto Chart

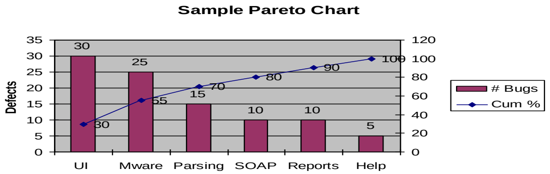
- Modify your DTS to support specific application component areas

- During triage, effectively identify and assign defect repairs and enhancements to component areas
  - Early on, testers will need development help to clearly identify root component areas (about 20% of the time)

- If you have historical defect data (w/o partitioning), you can run an application analysis workshop to partition data (post release) for future predictions

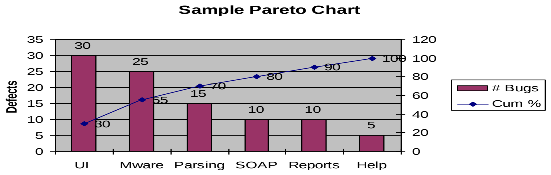
It does require discipline and a little extra effort…

Pareto Principal Application Analysis Workshop



- Sometimes you don’t have the time to start Pareto tracking before starting a project, so reflectively analyze Pareto for future planning –
  - Decompose your application or a sub-component of it if pressed for time
  - Gather defects surfaced
  - Gather your team (developers, testers)
  - Discuss locale for each bug and create distribution
  - Off-line create your curves and publish insights for the “next” release
  - Can also help fine-tune decomposition areas and train the test team in defect localization

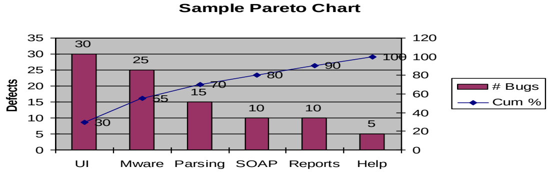
Pareto Principal Step 3 – Observations & Adjustments



- Project trending at a component level
  - Look for migration of risk and make adjustments
  - Look for stabilization or regressions (risk)
  - Identify high risk & low risk component areas at a project level
  - Map component rates to overall project goals
  - Trend open & high priority defects at a component level
  - Track or predict project “done”ness at a component level

- Weekly samples of 20% component focus areas – looking for *risk migration*
  - Sample weekly, then adjust focus across your testing cycles or iterations

Pareto Principal Tools



- Excel can be used to display Pareto like charts, with the cumulative percent trend needing to be simulated

- There are other packages available that will properly calculate & display Pareto Charts for you. Keeping in mind that it’s a Six Sigma tool, many are associated with supporting it.

All Pairs

All-Pairs Testing

- All-Pairs testing is a method of handling large scale combinatorial testing problems
  - Also referred to as Pairwise, Orthogonal Arrays, and Combinatorial Method
  - it identifies all pairs of variables that need to be tested in tandem – to achieve reasonably high coverage.

- Three primary references include –
  - Lee Copeland – *A Practitioners Guide to Software Test Design*
  - James Bach – Open Source, AllPairs implementation
  - Bernie Berger – *Efficient Testing with All-Pairs* 2003 StarEast paper

All-Pairs Testing Interoperability Testing

Client OS	Browser	App Server	Server OS
Win NT	IE 7	WebSphere	Win NT
Win Vista	IE 8	WebLogic	Linux
Linux	Safari 2	Apache	
MAC	Chrome	IIS	
	FireFox 3.0		
	FireFox 3.5		
	Opera 9		

- One *sweet spot* area for All-Pairs testing is interoperability. Something that faces web application testers every day.
- In this example, we want to examine browser compatibility across this specific set of system software levels – focusing on the browser
- Considering all combinations, there are (4 x 7 x 4 x 2) or 224 possible test cases for the example.

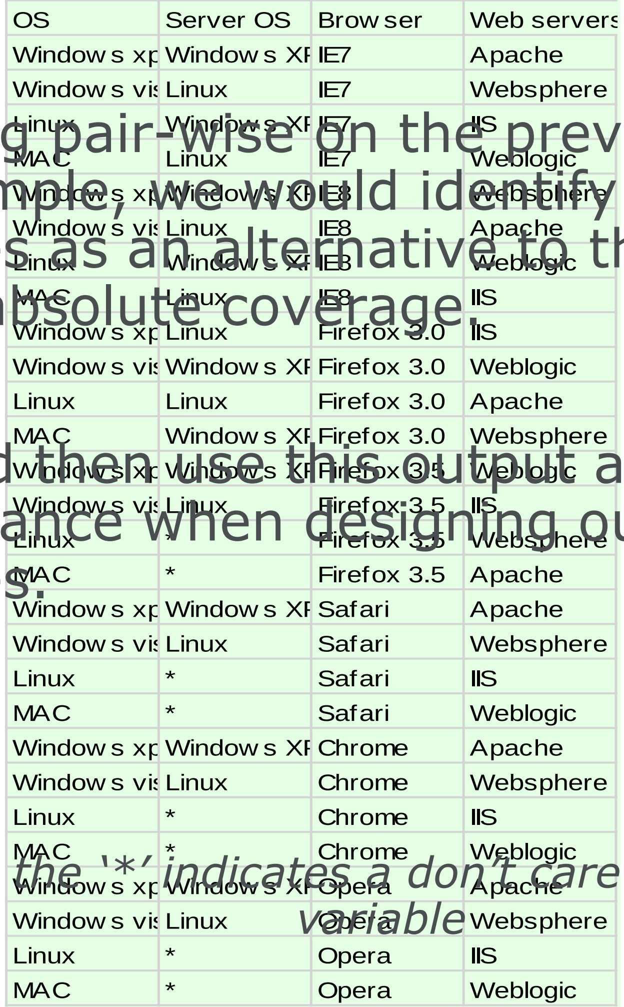
All-Pairs Testing Example

- In All-Pairs test design we are concerned with
  - Variables of a system
  - Possible values that variables could take

- Then we generate a list of test cases that represent the pairing of variables (*all pairs*) as the most interesting set of test cases to approach in your test design

Hexawise Testing Example

- Using pair-wise on the previous example, we would identify 28 test cases as an alternative to the 224 for absolute coverage.
- We'd then use this output as guidance when designing our test cases.



OS	Server OS	Brow ser	Web servers
Window s xp	Window s XP	IE7	Apache
Window s vis	Linux	IE7	Websphere
Linux	Window s XP	IE7	IIS
MAC	Linux	IE7	Weblogic
Window s xp	Window s XP	IE8	Websphere
Window s vis	Linux	IE8	Apache
Linux	Window s XP	IE8	Weblogic
MAC	Linux	IE8	IIS
Window s xp	Linux	Firefox 3.0	IIS
Window s vis	Window s XP	Firefox 3.0	Weblogic
Linux	Linux	Firefox 3.0	Apache
MAC	Window s XP	Firefox 3.0	Websphere
Window s xp	Window s XP	Firefox 3.5	Weblogic
Window s vis	Linux	Firefox 3.5	IIS
Linux	*	Firefox 3.5	Websphere
MAC	*	Firefox 3.5	Apache
Window s xp	Window s XP	Safari	Apache
Window s vis	Linux	Safari	Websphere
Linux	*	Safari	IIS
MAC	*	Safari	Weblogic
Window s xp	Window s XP	Chrome	Apache
Window s vis	Linux	Chrome	Websphere
Linux	*	Chrome	IIS
MAC	*	Chrome	Weblogic
Window s xp	Window s XP	Opera	Apache
Window s vis	Linux	Opera	Websphere
Linux	*	Opera	IIS
MAC	*	Opera	Weblogic

Note the '' indicates a don't care for this variable*

All-Pairs Testing Intent

- Defects
  - The ***hope*** of All-Pairs testing is that by running from 1-20% of your test cases you'll find 70% - 85% of your overall defects
- Coverage
  - By way of example (Cohen) a set of 300 randomly selected test cases provided 67% statement coverage and 58% decision coverage for an application. While 200 All-Pairs derived test cases provided 92% statement and 85% decision coverage.
- Important tests can be missed. Use sound judgment when creating tests and add as required

All-Pairs Testing Intent

- All-Pairs is simply a tool in your test design arsenal. Don’t use it alone or blindly!
- You won’t find all of your bugs exclusively using this tool!
- Often the strategy is to use All-Pairs to establish your baseline set of test cases
    - Then analyze other business critical combinations and add risk-based tests as appropriate

All-Pairs Testing Brainstorming Value Proposition

- What are some testing area opportunities for All-Pairs?

- UI type input / output variation testing (functional)
- Cross-platform (interoperability) testing
- Anything with high numbers of variables
- Scenario based testing, with path (variable) variation

- What are not?

- Performance testing, and most other non-functional testing
- Exploration
- Using it solely to derive your test cases

All-Pairs Testing Fails when…

A few cautions from James Bach & Patrick J. Schroeder in paper – *Pairwise Testing: A Best Practice That Isn’t*

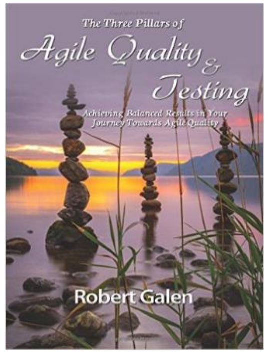
- You don’t select the right values to test with
- When you don’t have a good enough oracle
- When highly probable combinations get too little attention
- When you don’t know how the variables interact

All-Pairs Tools

- Let’s take a look at www.hexawise.com
  - We’ll be “driving”, but we expect you to login in later and try things out…
- Review:
  - Implementation of our earlier platform table
  - Implementation of Bernie Berger’s example

Wrapping up!

- There are a lot of old and new testing techniques that can used to enhance your agile testing journey.
- Here we discussed just a few…
- Read blogs, go to conferences, read our book☺


The Three Pillars of
Agile Quality & Testing
Achieving Balanced Results in Your Journey Towards Agile Quality
Robert Galen