BTC-210

AGILE USE CASE WORKSHOP FOR BUSINESS ANALYSTS

Course outline

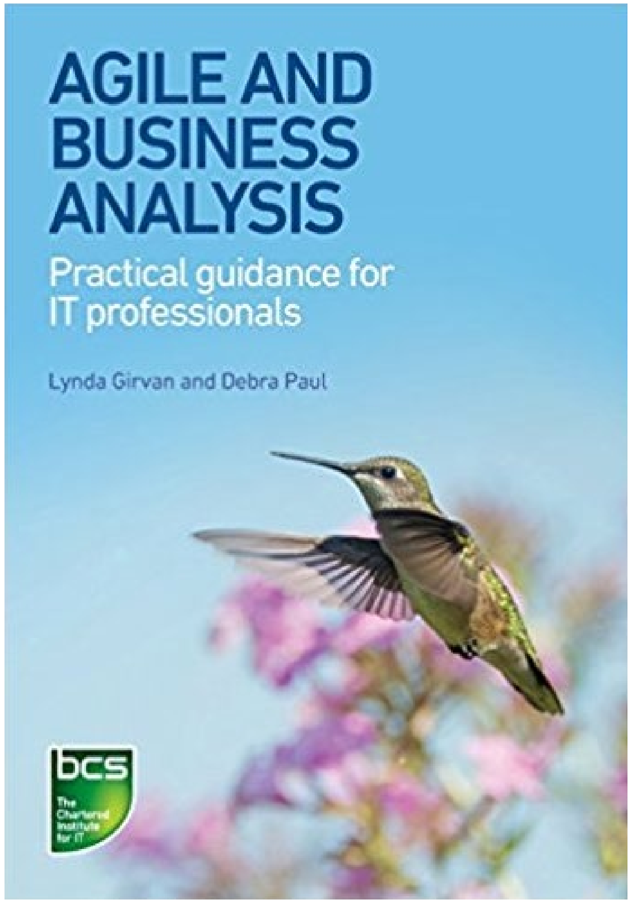
- Two days

Related courses

- Business Analysis
- Software Testing
- Scrum certification
- Project management certification (PMI)

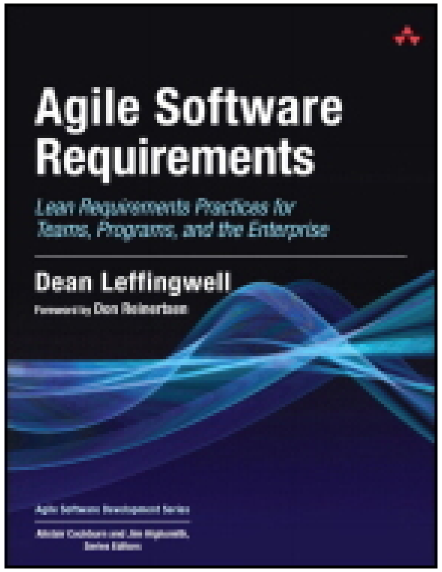
Book

- **Agile and Business Analysis: Practical guidance for IT professionals**ynda Girvan and Debra Paul, BCS Learning and Development Ltd., 2017


AGILE AND BUSINESS ANALYSIS
Practical guidance for IT professionals
Lynda Girvan and Debra Paul
bcs
The Chartered Institute for IT

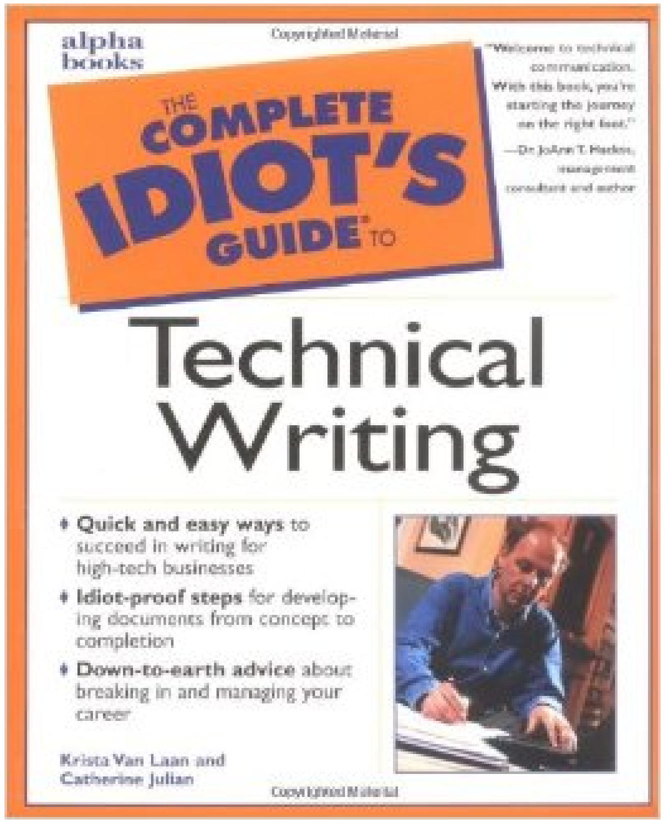
Books, recommended

- **Agile Software Requirements: Lean Requirements Practices for Teams, Programs, and the Enterprise,** Dean Leffingwell, 2010


Agile Software Requirements
Lean Requirements Practices for Teams, Programs, and the Enterprise
Dean Leffingwell
Foreword by Don Reinertsen
Agile Software Development Series
Alistair Cockburn and Jim Highsmith, Series Editors

Books, recommended

- **Complete Idiot's Guide to Technical Writing**, Krista Van Laan and Catherine Julian, Alpha Books, 2001



alpha books

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"Welcome to technical communication. With this book, you're starting the journey on the right foot."
—Dr. JoAnn T. Hackos, management consultant and author

THE COMPLETE IDIOT'S GUIDE® TO

Technical Writing

- Quick and easy ways to succeed in writing for high-tech businesses
- Idiot-proof steps for developing documents from concept to completion
- Down-to-earth advice about breaking in and managing your career

Krista Van Laan and Catherine Julian

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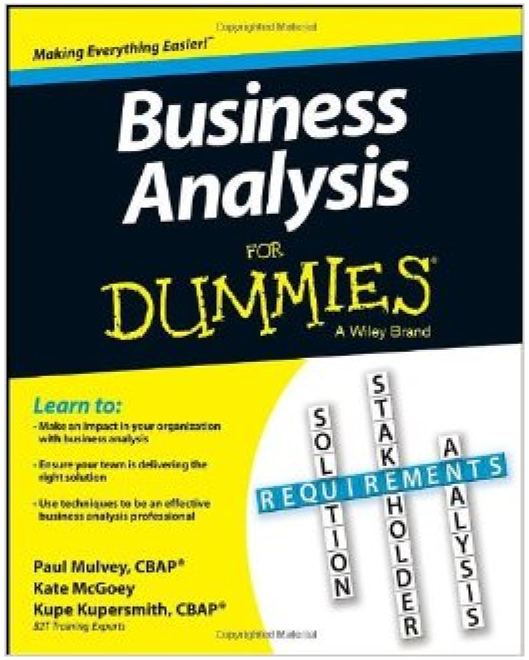
Books, recommended

- **Business Analysis For Dummies** by Kupe Kupersmith, Paul Mulvey, Kate McGoey. July 2013 – recommended
  - $13 used Amazon


Making Everything Easier!
Business Analysis
FOR
DUMMIES
A Wiley Brand
Learn to:
Make an impact in your organization with business analysis
Ensure your team is delivering the right solution
Use techniques to be an effective business analysis professional
Paul Mulvey, CBAP®
Kate McGoey
Kupe Kupersmith, CBAP®
SOLUTION
STAKEHOLDER
REQUIREMENTS
ANALYSIS

Resources

- **https://github.com/doughoff/BTC-210**
- **Modern Analyst**
  - http://modernanalyst.com/

Business analysis overview

TODAY IS THE THREE-YEAR ANNIVERSARY OF OUR FIRST MEETING TO DISCUSS PROJECT REQUIREMENTS.
AND WE'RE STILL DISCUSSING REQUIREMENTS. DOES ANYONE ELSE SEE A PROBLEM HERE?
WHEN YOU'RE DONE, CAN WE TALK ABOUT REQUIREMENTS?
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4/4/02

Business analysis values

- Efficiency
  - reuse of documentation
  - reuse of business processes and metrics
  - elimination of rework
  - prevention of bugs
- Effectiveness
  - making the customer/stakeholder satisfied with the result
- Productivity
  - maximizing the velocity of the project team

Business analysis vision

- Decrease the risk of losing value by
  - Understanding the domain of the business problem
  - Communicating domain to team members and stakeholders
- NOT
  - the design vision
    - create a solution plan to the business problem that best addresses the domain and the business constraints

Business analysis strategy goals

- Increase the level of domain understanding
- Produce adequate documentation
  - to manage project
  - to support the next stages of the project
- Assure quality of project

Business analysis tactical goals

- Strategy – enterprise analysis
- Analysis
  - Identify and define – apply business values
  - Gather – understand the domain
  - Structuring – organize the data
  - Verification – get feedback
  - Document and present – make the data useful
- Design – merge data with constraints
- Development – technical analysis, BDD, TDD
- Testing – scenario and system test design

Business analysis operational goals

- Strategy – business plan. CSFs
- Analysis
  - Identify and define – glossary, stakeholder info
  - Gather – interviews, surveys, workshops, observation, user stories
  - **Structure** – KPIs, sequencing, data dictionary, use cases, priorities
  - **Verify** – trends, artefact verification
  - Document and present – requirements docs
- Design – prototypes, interfaces, screen shot scenarios
- Development – state, activity/flowchart models
- Testing – data dictionary validations

Agile overview

LOOK THIS NEW AGILE THING: TO DEAL WITH UNPREDICTABLE EVENTS AND THINGS WE CANNOT CONTROL IN OUR PROJECTS
Dilbert characters Scott Adams Inc.
WE CAN PRIORITIZE, REDUCE THE SCOPE, CHANGE REQUIREMENTS AT ANY TIME AND INCREASE THE CHANCES OF SUCCESS OF THE PROJECT
Punch your own at http://dilbert.com
LOOK, THIS IS YOUR NEW PROJECT, WITH FIXED DEADLINE, FIXED SCOPE AND FIXED QUALITY: YOU CAN BE "AGILE" INSIDE THIS TRIANGLE !!!

Agile overview

- **Principles** not a process
  - 12 principles based on 4 values
- **Quality,** simplicity (not just simple)
- Originally about software development
  - now mostly driven by project management

Agile manifesto and values

- The Manifesto for Agile Software Development
  - http://www.agilemanifesto.org/
- We value
  - **individuals and interactions** over processes and tools
  - **customer collaboration** over contract negotiation
  - **working software** over comprehensive documentation
  - **responding to change** over following a plan

Agile principles

- Process
  - **Work on artefacts early and continuously**
  - Measure progress with reviewed and approved models
  - Manage changing requirements in models and documents
- Quality
  - **Satisfy the customer**
  - Create high quality artefacts
  - Keep artefacts resilient to change but stay simple
  - Have teams do self reviews and change by results
- Teamwork
  - **Create and review artefacts with customers**
  - Work with customers daily
  - Use self-organizing teams
  - Meet with other analysts face-to-face
  - Let the engaged analysts run with the project

Agile terms

- **Backlog:** a prioritized list of requirements or work items that is frequently updated
- **Definition of done/definition of ready:** setting acceptance criteria for a requirement
- **Personas:** a way of identifying and describing users of the system
- **User stories:** a way of capturing requirements
- **Story mapping**
- **Story splitting:** breaking down stories that are too big

Scrum

WE'RE MOVING TO AN AGILE METHODOLOGY FOR SOFTWARE DEVELOPMENT.
I DON'T KNOW ALL OF THE DETAILS, BUT I THINK ONE OF YOU HAS TO BE DESIGNATED THE SCRUMBAG.
DOES THAT SOUND RIGHT?
IT'S BETTER THAN I EXPECTED.
Dilbert.com
@ScottAdamsSays
2-6-17
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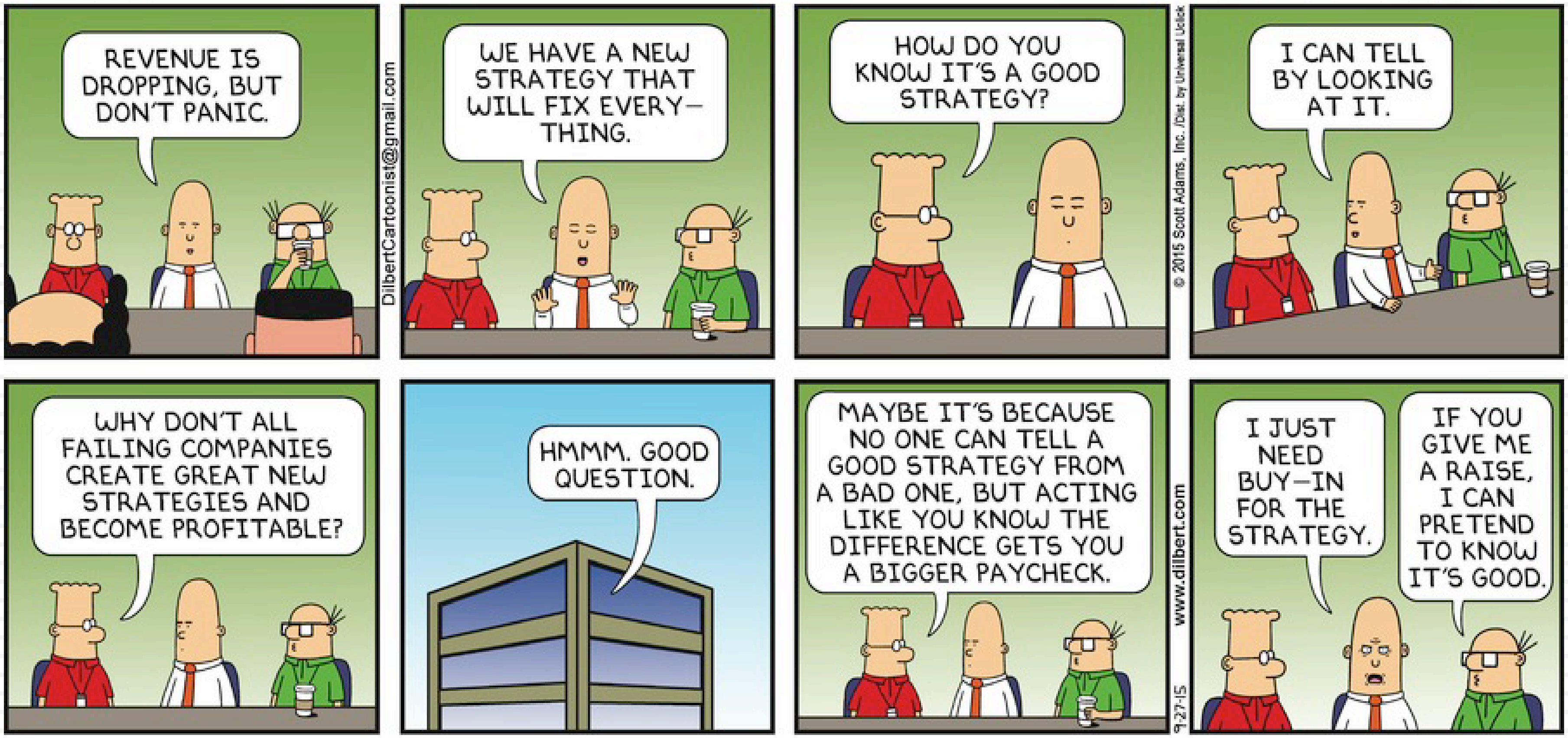
Scrum analysis tasks

- User stories
  - Create and put into product backlog
  - Prioritize on a wall
  - Roll up stories into features into themes
  - Work out details continuously with stakeholders
  - Re-prioritize as necessary
  - Complete requirement just before development
- Use change control
- Confirm software usability, relevance and business value throughout entire process with business users.

Scrum roles

- Product Owner (BA tasks)
  - represents the needs of the business, documents and prioritizes system requirements for backlogs
- Scrum Team
  - a cross-disciplinary team charged with undertaking the agreed work in each sprint
- Scrum Master
  - facilitates the team's work, removing project impediments and ensuring that appropriate Scrum practices are being followed by the team.

Strategy phase


REVENUE IS DROPPING, BUT DON'T PANIC.
WE HAVE A NEW STRATEGY THAT WILL FIX EVERY-THING.
HOW DO YOU KNOW IT'S A GOOD STRATEGY?
I CAN TELL BY LOOKING AT IT.
WHY DON'T ALL FAILING COMPANIES CREATE GREAT NEW STRATEGIES AND BECOME PROFITABLE?
HMMM. GOOD QUESTION.
MAYBE IT'S BECAUSE NO ONE CAN TELL A GOOD STRATEGY FROM A BAD ONE, BUT ACTING LIKE YOU KNOW THE DIFFERENCE GETS YOU A BIGGER PAYCHECK.
I JUST NEED BUY-IN FOR THE STRATEGY.
IF YOU GIVE ME A RAISE, I CAN PRETEND TO KNOW IT'S GOOD.
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9-27-15

Enterprise planning

- Strategic goals and long-term architecture
- Executive level planning
  - supported by SMEs acting as BAs
- Important to document
  - business goals tied to mission
  - business plan for project tied to business goals

Artefact: The business plan

- Creates the domain where value is found
  - project ties to business goals
  - use cases tie to project
- Important to document:
  - clear problem statement
  - assets needed
  - stakeholders
    - systems
    - internal
    - external
  - value estimate
  - constraints

Artefact - CSFs

- Rolling up selected metrics to help
  - direct activity,
  - correct and teach,
  - validate decisions,
  - justify plans
- two to five per project
- goals/objectives of value achievement
- Often called high-level or business requirements

Optional artefacts

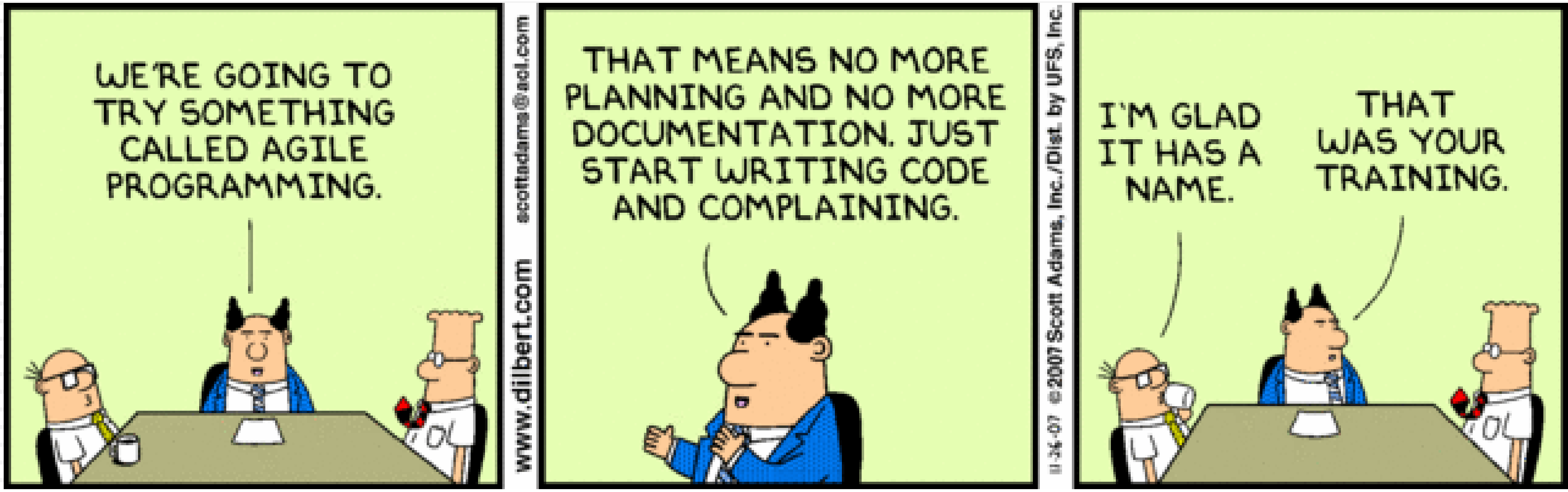
- feasibility study
- top-level architecture
- project strategy plan
- operations concept document

Agile application

- Process
  - **Work on artefacts early and continuously**
  - Measure progress with reviewed and approved models
  - Manage changing requirements in models and documents
- Quality
  - Create high quality artefacts
  - Keep artefacts resilient to change but stay simple
- Teamwork
  - Meet with other analysts face-to-face

Analysis phase - identify and define

glossary, CSFs


WE'RE GOING TO TRY SOMETHING CALLED AGILE PROGRAMMING.
THAT MEANS NO MORE PLANNING AND NO MORE DOCUMENTATION. JUST START WRITING CODE AND COMPLAINING.
I'M GLAD IT HAS A NAME.
THAT WAS YOUR TRAINING.
scottadams@aol.com
www.dilbert.com
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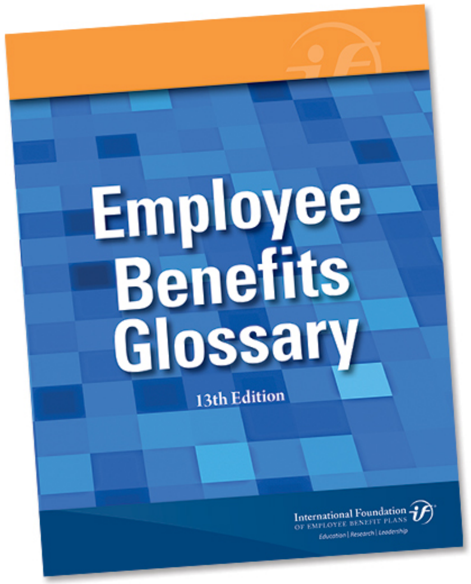
Artefact - Glossary

- Dictionary of common business terms relevant to project
  - use these terms consistently in use cases
  - follow the mapmaker's rule


Employee Benefits Glossary
13th Edition
International Foundation of Employee Benefit Plans
Education | Research | Leadership

Artefact: Stakeholder profiles

- Use the list of people from the business case to start. Add others as needed.
- Create table of information with:
  - role, responsibilities,
  - interests,
  - success criteria,
  - concerns,
  - technical proficiency,
  - work environment
- Used for
  - elicitation sessions to create workflow for use cases
  - selecting SMEs for verification of use cases

Agile terms

- Definition of Done
  - A Scrum term for CSFs usually applied to user stories
- Minimum Viable Product
  - the goals that provide enough scope for users to see value in what has been decided to be a final product
  - project management decision
  - release management

Agile application

- Process
  - **Work on artefacts early and continuously**
- Quality
  - **Satisfy the customer**
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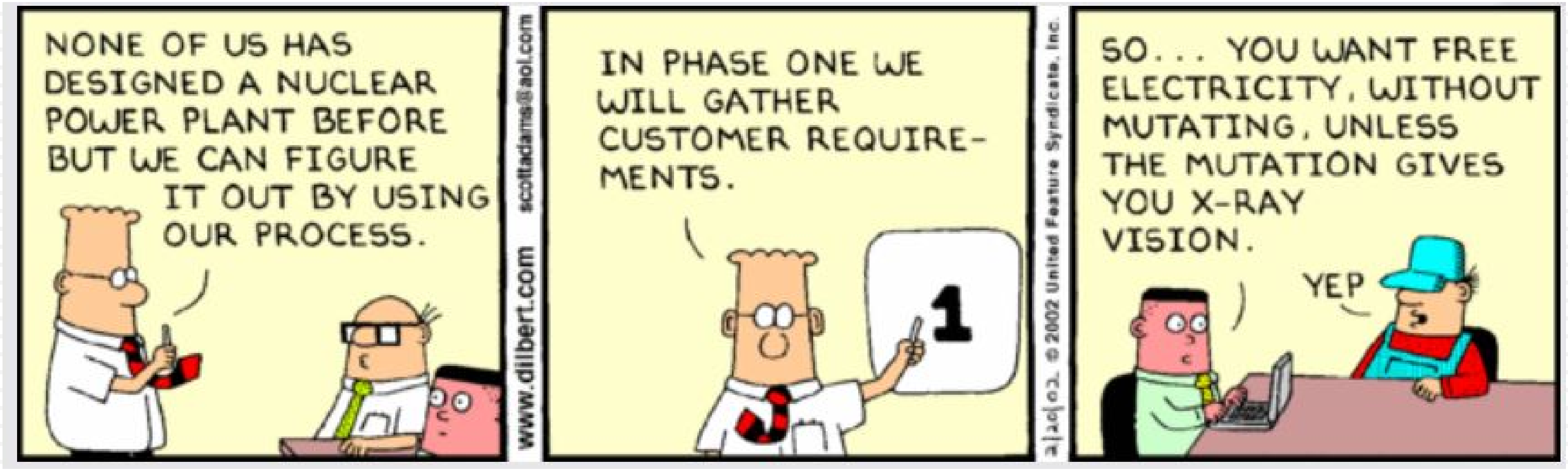
- Teamwork
  - **Create and review artefacts with customers**
  - Work with customers daily
  - Meet with other analysts face-to-face

Analysis phase - gathering

interviews, surveys, workshops, observation, user stories, document review


NONE OF US HAS DESIGNED A NUCLEAR POWER PLANT BEFORE BUT WE CAN FIGURE IT OUT BY USING OUR PROCESS.
www.dilbert.com scottadams@aol.com
IN PHASE ONE WE WILL GATHER CUSTOMER REQUIREMENTS.
1
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SO... YOU WANT FREE ELECTRICITY, WITHOUT MUTATING, UNLESS THE MUTATION GIVES YOU X-RAY VISION.
YEP

Gathering tools/techniques

- interviews, surveys, workshops, observation, user stories, document review
  - talking with stakeholders
  - output is usually unstructured text
- Design tools/techniques are very useful here also
  - people don’t always have words
  - advise stakeholders that this is not UX/GUI
- Creates the raw data for use cases

User stories

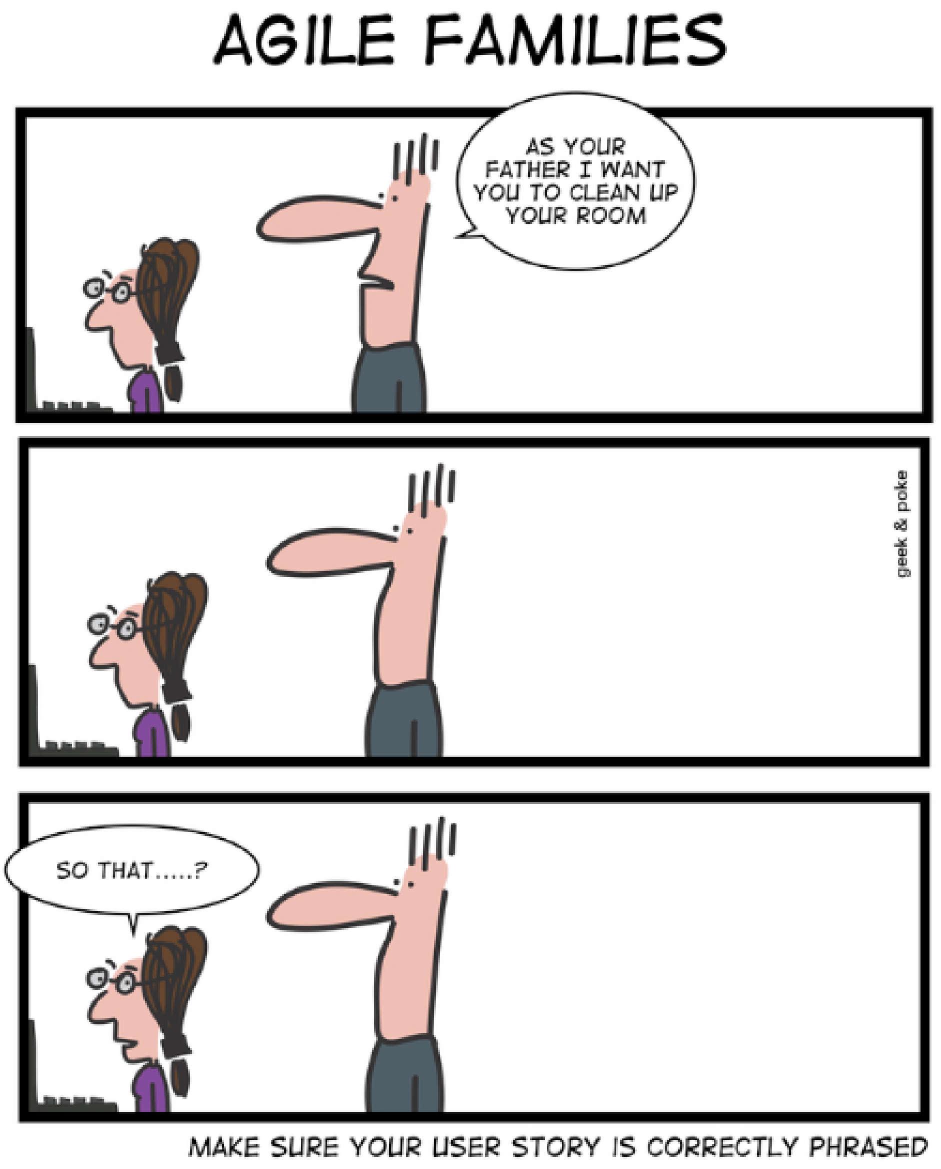
EXTREME PROGRAMMING
I CAN'T GIVE YOU ALL OF THESE FEATURES IN THE FIRST VERSION.
scottadams@aol.com
www.dilbert.com
AND EACH FEATURE NEEDS TO HAVE WHAT WE CALL A "USER STORY."
© 2002 United Feature Syndicate, Inc.
1/10/03
OKAY, HERE'S A STORY: YOU GIVE ME ALL OF MY FEATURES OR I'LL RUIN YOUR LIFE.

The user story technique

- As a <some user role>,
  I need the system to <high-level functional requirement> so that I can <get some value>.
- Often mistaken as a requirements analysis tool
- A project management tool
  - to create a tokens for a future conversation – **main intent**
  - to track scope for progress reports
  - to assign deadlines
  - gathered from stakeholders – not rewritten

User story problems

- Poor at defining granularity
  - Use cases provide goals
  - Epics, themes, features?
- Business value is usually not defined
  - Goals = business value
- Not enough detail to implement
  - Use cases give detail
- Informal use cases are better


AGILE FAMILIES
AS YOUR FATHER I WANT YOU TO CLEAN UP YOUR ROOM
SO THAT.....?
geek & poke
MAKE SURE YOUR USER STORY IS CORRECTLY PHRASED

Agile application

- Process
  - **Work on artefacts early and continuously**
  - Measure progress with reviewed and approved models
  - Manage changing requirements in models and documents
- Quality
  - **Satisfy the customer**
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  - Work with customers daily
  - Use self-organizing teams
  - Meet with other analysts face-to-face
  - Let the engaged analysts run with the project

Analysis phase - structuring

KPIs, sequence, data dictionary, use cases

PRODUCT DEVELOPMENT
FIRST WE'LL COVER THE WALLS WITH BRAIN-STORM IDEAS.
HOW ABOUT SOME-THING THAT TURNS BOREDOM INTO CHOCOLATE CAKE?
I SHOULD HAVE DONE THIS AFTER LUNCH.
ROAST BEEF MITTENS?
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Structuring

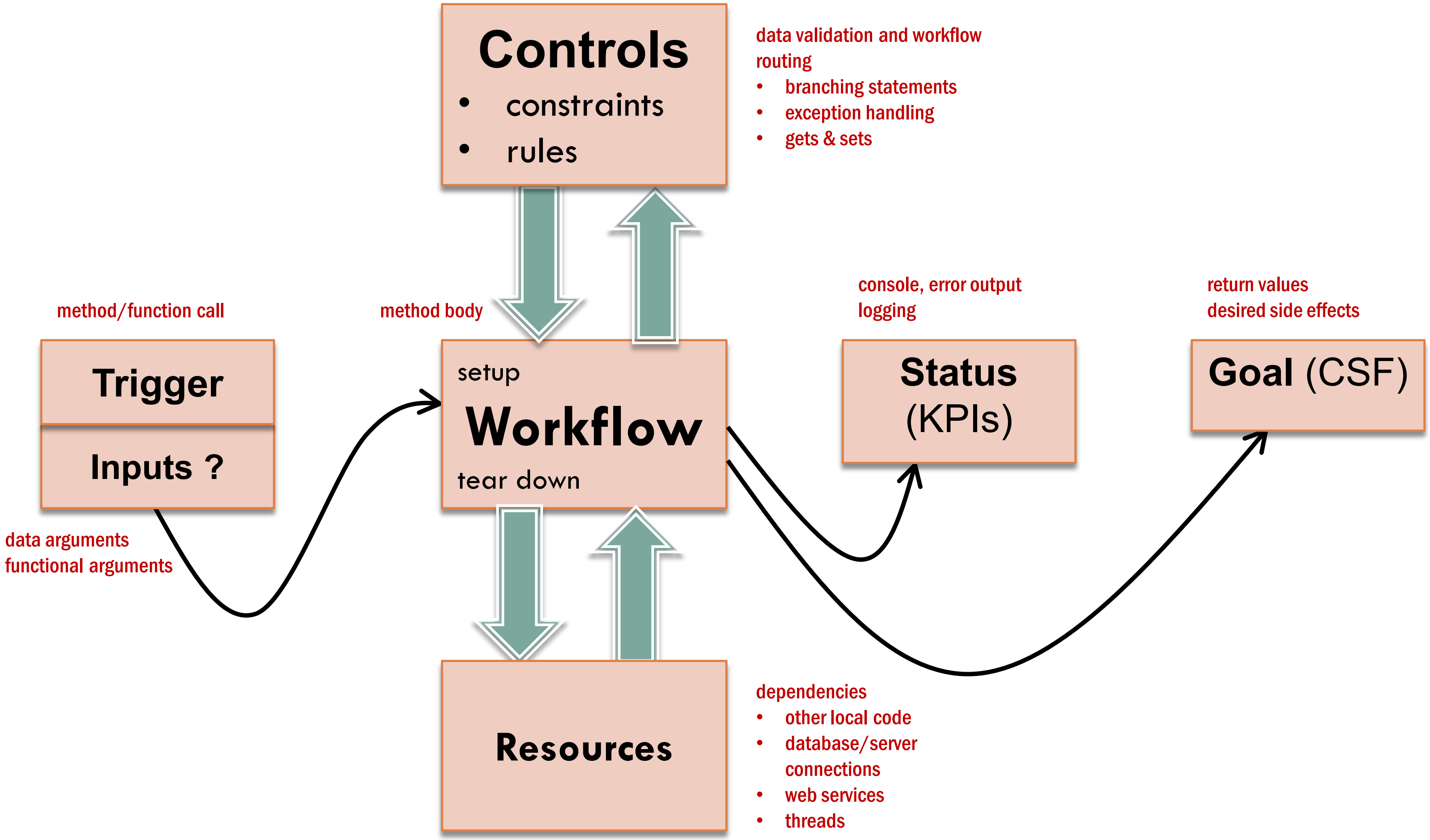
- Converting the data into models for each audience
  - business users
  - programmers and DBAs
  - network administrators
  - management
- Business language for best communication

Structuring

- Two main system categories
  - data
  - processes
- Similar to writing recipes
  - ingredients
  - instructions
  - output: inventory list, recipe book, menu, kitchen designer

A generic process/service model

the process parts in computer language



Artefact: KPIs

- Success criteria for processes
- two to five per CSF
- measured with quantity of agreed upon units

Artefact - data dictionary

- Business language data entities required by the system/role to
  - know about
  - track for changes
  - remember to use later
  - report on
- The second most useful document after the use case
  - Use cases use complex data type names
  - Rules are captured here for reuse

Artefact - data dictionary

- Formal document recording data entities
    - Name, address, city, state, zip, phone, …
- Basic
    - Name/description
    - Parts (attributes/fields)
        - simple data – text, dates, numbers, flags
        - other entities
    - Relationships
        - cardinality
        - dependencies
    - Capacity, security, integrity

Agile

- Affinity diagram (data dictionary)
  - incomplete view of project
  - adds noise from stakeholders
  - useful as gathering tool

Artefact: use case

- Focuses on functional requirements
- Requirements must be of the same granularity
  - start at the goal level
- Detail matches the need
- Non-functional requirements are captured on a case by case basis
  - when important to that specific functional one.

Use case benefits

- Efficiency
  - Creates enough detail
    - for design to eliminate rework
  - Uses sequenced functional requirements
    - to eliminate scope creep
  - Documents testable tasks and scenarios
    - For reusability in technical analysis and testing
- Effectiveness
  - Defines scope at the goal level
    - for better project management
- Productivity
  - Uses business language
    - to maximize understanding of project

Analysis – use case basics

actor table, use case names, priority

I RANKED ALL OF YOUR ASSIGNMENTS BY PRIORITY SO YOU WON'T WASTE TIME ON UNIMPORTANT STUFF.
E-Mail: SCOTTADAMS@AOL.COM
EVERYTHING IS AN "A" PRIORITY EXCEPT FOR "PERSONAL LIFE."
© 1995 United Feature Syndicate, Inc.
2-4
THIS HELPS A LOT.
I'M STILL WORKING ON THE LIST OF "MUST DO" "B" PRIORITIES.

Use case definition

- A unit of scope containing
  - a **repeatable**
  - ordered **sequence** of tasks
  - by an initiating party
  - to support a business **goal** (provides value)
- One happy path
  - creates a backbone for errors and extra paths

Use case project types

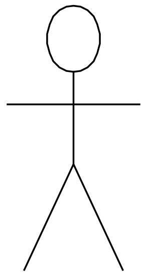
- Types
  - Business - Goals for employee roles
  - System - Goals for a system under development or maintenance
  - Mixed – goes between business and system to get to goal
- Box the use cases by type

Use case process

- **Gather** user expectations
- **Structure** with analysts
  - Find actors
  - Find use case names
  - Write use case details
    - Increase detail when important
    - Invite SMEs when unclear
  - Refactor if complex
- **Verify** with analysts and SMEs
- **Document** use case relationships
- **Present** use cases to users

Actors

- Should have been called roles.
- Actors initiate a use case.
- Actor roles enforce the ability to do processes
  - Actors describe security group names that have **permission** sets.
  - For any two actors, one will have a unique use case that the other doesn't do.



Actor name

Artefact - Actor table

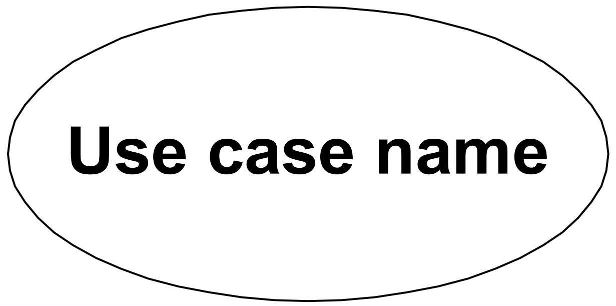
- Identifies and classifies system users by roles and responsibilities
- Includes
  - Names of actual stakeholders (people/systems)
  - Description
  - Related job titles
  - Location
  - Level of expertise
  - Domain expertise
  - Frequency of use

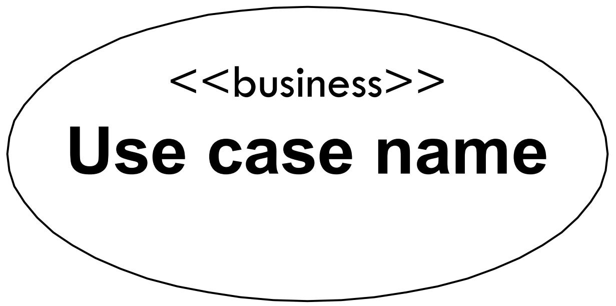
Exercise: actor table

- For each job title or person:
  - customer, manager, executive, visitor, preferred customer, returning customer, customer with a bad credit card, marketing person, guest, unknown user, administrator, programmer, hacker, search engine
- Use an actor name
  - Use **user** and **admin** (easy)
  - Or use all different actor names (hard)
  - Or something in between
- Each actor must have a unique use case that no one else can do.

Use case names

- Use verb-noun clause syntax
- Use domain words
  - The mapmaker’s rule
- Don’t goldplate
  - Keep notes to ask users later though





Granularity – scope quantity

- **Group of goals**
  - What broad grouping of goals do you want the system or <role> to do?
  - manage, handle, control, do, work with, take care of
  - Higher level manager
- **Goal**
  - What sequence of steps leading to a goal will give value to the business?
  - Scope like PM's WBS: 3 - 10 days of work
  - Lower level manager
  - Target for initial requirements document

Granularity - scope quantity

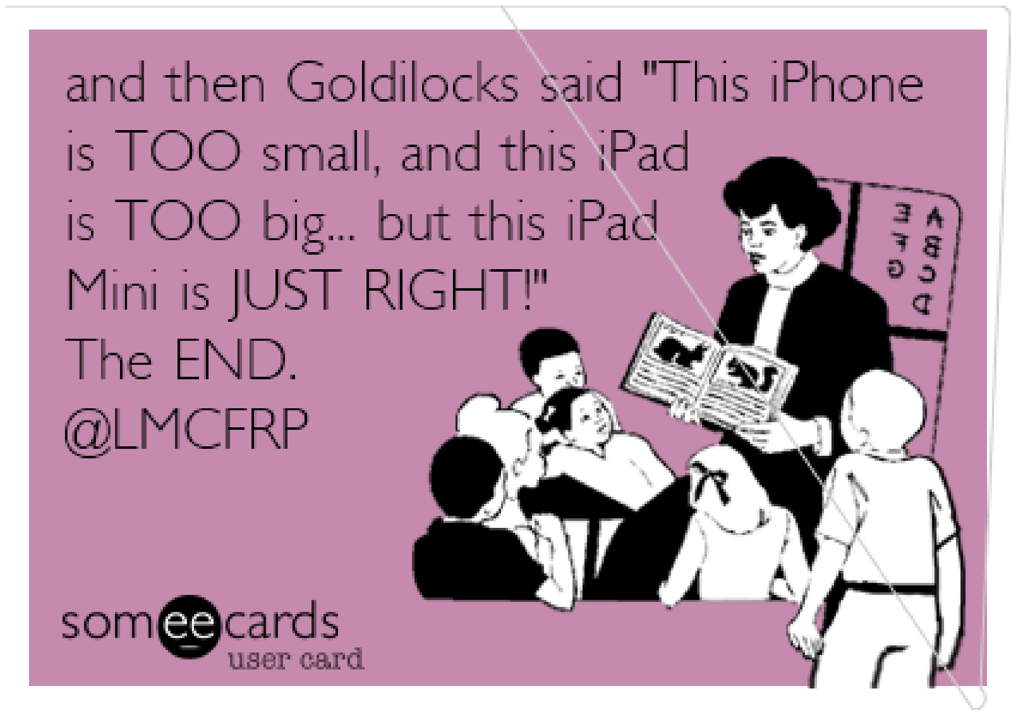
- **Partial goal** / group of tasks
  - What are the individual or named processes in the scenario?
  - no or little business value by itself
  - Staff
- **Task**
  - What are the specific actions that need to happen that are the basic steps of the scenarios?
  - Staff SME
- **Design "requirement"**
  - an idea about how it should be built
  - Record as a design recommendation

Granularity – breaking up groups

- Groups of goals can be broken up into goals by
  - difference in final results
  - use of different business rules
  - separating simple and complex tasks
  - using different data sets
  - difference in middle tasks
  - seeing a CRUD combination

Granularity - scope quantity

- Too small
  - Log in
  - Log out
  - Search
- Too big
  - Manage accounts
- Just right
  - Deliver package
  - Adjust account
  - Edit personal data


and then Goldilocks said "This iPhone is TOO small, and this iPad is TOO big... but this iPad Mini is JUST RIGHT!" The END.
@LMCFRP
someecards
user card

Use case levels

- Aim to deliver business value – a goal
- Groups of goals will come out easily
  - Break them into individual value parts
  - Use SMEs to help
- Partial goals will distract you
  - Look for what they are a part of
- Groups can organize partials or goals

Use case validation

- Is it repeatable? Could you do it 1000 times?
  - Walk up, do it, walk away.
  - Does the system return to the **same state** it was in before you started the use case?
    - I can do it, then you can do it.
    - If not, then it's part (task, function) of a bigger use case
- The business gains **value**
  - What was the **goal** that was achieved?
- Strong actionable verb
  - Vague verbs indicate a **group** of use cases

Exercise – actors and names

- Brainstorming
  - Round-robin questions first, then more open discussion
  - No criticism
  - Then apply the rules after you run out of ideas
  - Humorous ideas don't end the session, they sometimes spark new results.
- Actors table – candidates
- Use case summary – candidate and validated
- Actors table – validated

Prioritization

- When to prioritize
  - Early
  - Progressively
- Value to project management
  - Selection of scope based on budget and schedule.
  - Understanding user desire
- How to prioritize value
  - It’s not how important to the stakeholder it is, it’s about the business
  - Don’t ask the stakeholder for “their” priority

Prioritization – from the stakeholder

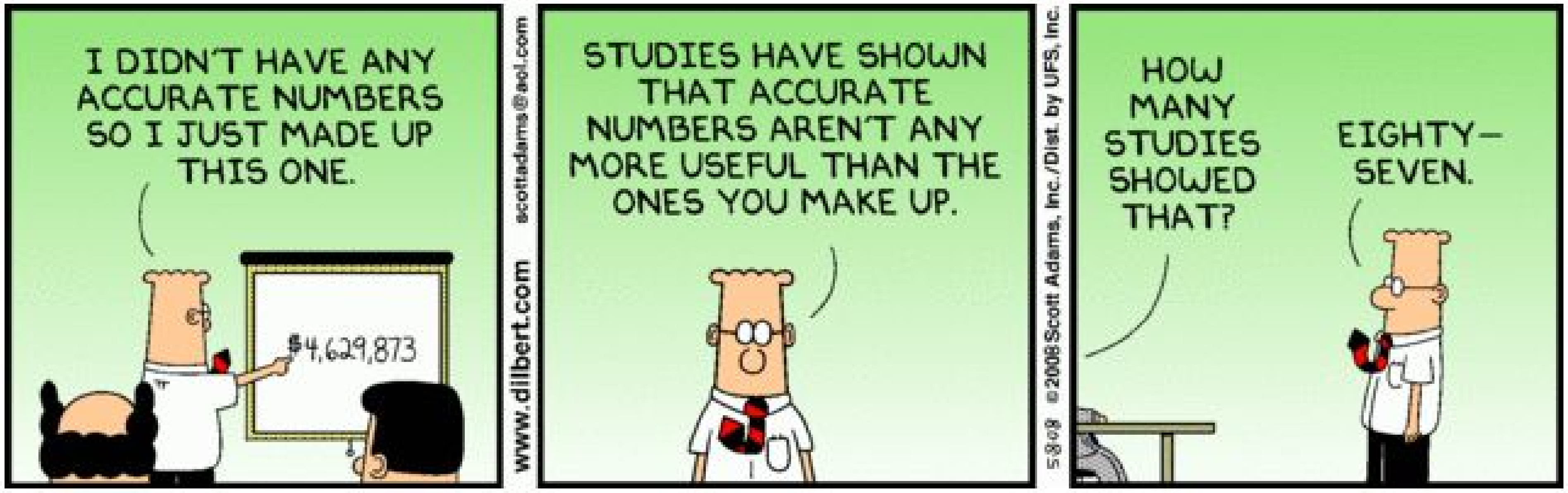
- Not recommended for business value
- Levels – 1,2,3 or mandatory, desirable, nice to have
- Kano – Dissatisfiers, Satisfiers, Delighters
- Analytical Hierarchy Prioritization – compares pairs
- WSJF - User business value, Time criticality, Risk reduction/opportunity enablement
- MoSCoW = must have, should have, could have, want to have but won't have this time

Prioritization – business value

- Essential
  - Scope of use (impact)
    - how much of the business will it improve?
    - how many of the staff will it help?
    - Externally equated to target market
  - Business value (urgency)
    - how much do you wish the business had it now?
    - how bad will the business look if it fails in the future?
    - what level of person is asking for it?
    - Externally equated to price willing to pay
- Optional
  - Anything else important to the business

Prioritization

- Using weighted averages
  - "I'll give it a 9.27"
  - No units = no metrics = no standard
  - Use for understanding but not communications


I DIDN'T HAVE ANY ACCURATE NUMBERS SO I JUST MADE UP THIS ONE.
$4,629,873
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www.dilbert.com
STUDIES HAVE SHOWN THAT ACCURATE NUMBERS AREN'T ANY MORE USEFUL THAN THE ONES YOU MAKE UP.
©2008 Scott Adams, Inc./Dist. by UFS, Inc.
5-8-08
HOW MANY STUDIES SHOWED THAT?
EIGHTY-SEVEN.

Prioritization

- Other categories to use
  - ROI
  - Satisfaction
- Negative risk = Impact * Urgency * probability of failure

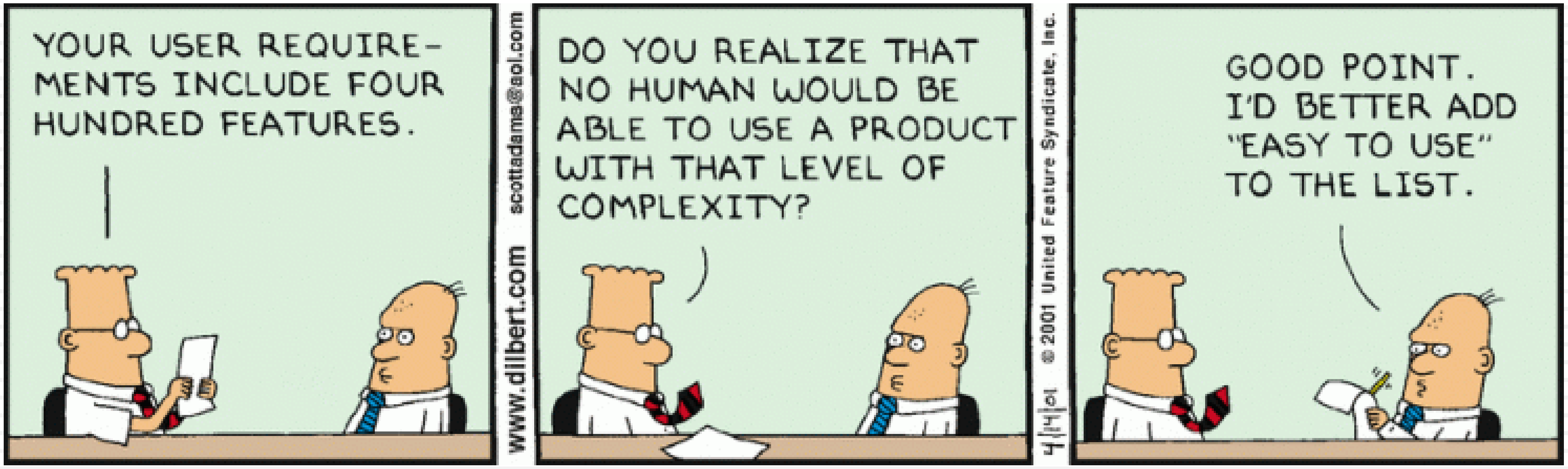
Use case prioritization

- Well-scoped use cases can be used by project managers to estimate project size.
- Priorities can help meet schedule and budget
- **Exercise** - prioritization

Estimation

- User stories – many methods
  - volume (granularity), knowledge, uncertainty, complexity, ideal days, estimation poker, T-shirt sizing, relative velocity
- Use cases – same as work package
  - 3-10 days of effort based on knowledge and complexity.

Use cases – functional detail


YOUR USER REQUIREMENTS INCLUDE FOUR HUNDRED FEATURES.
DO YOU REALIZE THAT NO HUMAN WOULD BE ABLE TO USE A PRODUCT WITH THAT LEVEL OF COMPLEXITY?
GOOD POINT. I'D BETTER ADD "EASY TO USE" TO THE LIST.
www.dilbert.com scottadams@aol.com
4/14/01 © 2001 United Feature Syndicate, Inc.

Course of events

- Always a “happy path”
  - A success scenario
  - Problems will be captured later
- No conditionals
  - No if-then-else statements
  - Multiple partial sequences (loops) should be expressed as optional parts.
- Detail level
  - as much detail as possible without design
- No design (without constraints)
  - e.g. button click, submit buttons or anything that connects system to hardware, software, tools, or materials

Course of events

- Syntax
  - The use case starts when the actor …
  - Response: The system …
- Possibly multiple actors could initiate the use case
- Numbering
  - Group one or more statements/tasks together
  - Smaller increments are better when you need to start in the middle at a specific spot due to an error.
  - Start with system does… usually.

Functional detail - tasks

- Tasks are sequenced low-level activities that can't be broken down any further
- The task statement contains
  - A responsible party/noun
  - The action/verb to be done
  - A description of the things/direct object which the verb acts on.
- A system functional requirement starts with "the <system> shall …"
- A business functional requirement starts with "the <role> shall …"

Process rules – happy paths

- A rule to two happy paths is 2 use cases
  - not an error path
- The **functional** part of a requirement…
  - The system shall print a report …
- …May be modified with a **rule** part
  - …**If/when** sales are > 100,000 then using rate chart DF3
  - …Use rate chart DF3 **when** sales are > 100,000
  - …On Thursday
  - …When I say so

Too much in a use case

- Any use of conditional logic for workflow will indicate separate use cases when
  - The outcome is different
  - Steps are skipped
  - Steps are not always included
  - A rule is used to alter workflow to another happy path

Alternative flows

- Done after structuring so numbering is done once.
- Two types
  - **Extension** points return back where you came from after an optional set of steps. <<extends>>
  - **Failure** points stop the use case, return you to a different point, or fix the problem and let you continue.
- Write in your choice of styles (informal, formal)
  - **Bad thing happens** (13, 15) – try to fix and return to 12.
- Include a return point or end the use case.

Extension points

- **Extension points** are optional partial goals
- The point at which the non-error extension set of tasks starts is where it returns when it is finished.
- An path that is extra to the flow
  - a gift wrap
  - additional product offer to accept
  - a search to do before continuing

Use case alternative flows (failure)

- Generally tied to a rule that fails
- Written in informal or formal style

Specifying rules for failures

- Short one-time use rules are better included in use case documentation below the functional statement
  - The system validates the amount.
    - RULE: **Available funds** - Account balance is larger or equal to than amount requested.
    - RULE: **Daily total withdrawal**: Amount requested is less or equal to **R24 MAXIMUM WITHDRAWAL AMOUNT**
    - RULE: **Increments** – Must be in increments of $20.
- Larger rule tables, decision trees, or reused rules are better in a separate document and referred to.
    - **R24 MAXIMUM WITHDRAWAL AMOUNT**: $500 per day starting at midnight.

Exercise – course of events

- Write out a set of instructions that is your tasks for
  - getting ready for work
  - fixing a lunch
  - washing a dog
  - painting a wall

Analysis phase - verification

I INVITED A CLIMATE SCIENTIST TO EXPLAIN THE RISK OF CLIMATE CHANGE TO OUR COMPANY.
HUMAN ACTIVITY IS WARMING THE EARTH AND WILL LEAD TO A GLOBAL CATASTROPHE.
HOW DO SCIENTISTS KNOW THAT?
IT'S EASY. WE START WITH THE BASIC SCIENCE OF PHYSICS AND CHEMISTRY.
THEN WE MEASURE CHANGES IN TEMPER-ATURE AND CO2 OVER TIME.
WE PUT THAT DATA INTO DOZENS OF DIFFERENT CLIMATE MODELS AND IGNORE THE ONES THAT LOOK WRONG TO US.
THEN WE TAKE THAT OUTPUT AND RUN IT THROUGH LONG-TERM ECONOMIC MODELS OF THE SORT THAT HAVE NEVER BEEN RIGHT.
WHAT IF I DON'T TRUST THE ECONOMIC MODELS?
WHO HIRED THE SCIENCE DENIER?
DilbertCartoonist@gmail.com
www.dilbert.com

Verify granularity

- Strong actionable verb
  - Vague verbs indicate a **group** of use cases
- The business gains **value**
  - What was the **goal** that was achieved?
  - No value at the end **to the business** indicates that this small group of tasks is a part of another use case

Verify analysis language

- Can the **system** functionality be applied to a phone interface?
  - If you talk about a GUI then that’s design.
  - Design language is appropriate when there is a project constraint to use a specific design

Verify testability

- Does your complete scenario meet the walk-away test?
  - Walk up, do it, walk away
- Does the system return to the **same state** it was in before you started the use case?
  - I can do it, then you can do it.
  - If not, then it's part (task, function) of a bigger use case

Verify completeness

- Can you define a requirement (at a higher level) that summarizes a group of requirements?
- Can you define a requirement (at a lower level) that is a part of the requirement?
- Are there other higher scenarios that would use this use case?
- Are there other lower scenarios that would use this use case?

Verify granularity

- Any use of conditional logic for workflow will indicate separate use cases when
  - The outcome is different
  - Steps are skipped
  - Steps are not always included
  - A rule is used to alter workflow
- Break use case in to individual use cases and then structure later

Verify lack of design

- Can the **system** functionality be applied to a phone interface?
  - If you talk about a GUI then that's design.
- If you talk about **how** something is done, that's a rule or design.
  - If there are constraints, a design feature like a screen, mouse, or keyboard works.

Verify use case course of events

- Completeness check – role playing game
  - Person = system or role
  - Data known by system listed on one sheet of paper
  - Designs sketched on paper, hold up when active
  - Messages passed on sticky notes, one for request, one for response, data recorded

Verify use case course of events

- Testability check -play out differently
  - Use data range boundary values
  - Substitute more extreme values
  - Repeat more times
  - Make environment worse

Exercise – verify course of events

- Apply tests to your course of events from the previous exercise.

Use cases – more detail

THE MARKETING DEPARTMENT HAS ASKED US TO MAKE OUR PRODUCTS MORE ROBUST.
NONE OF US KNOWS WHAT THAT MEANS.
SO WE CAN EITHER CANCEL THIS MEETING AND GO ASK THEM. . .
OR WE CAN PRETEND THAT ARGUING WITH EACH OTHER ABOUT THE TRUE MEANING OF "ROBUST" IS JUST AS GOOD.
WHILE THAT OPTION IS STUPID, IT WOULD GIVE US THE ILLUSION OF DOING SOMETHING USEFUL RIGHT NOW.
WOULD IT BE ETHICAL TO IGNORE THE LONG-TERM INTERESTS OF STOCKHOLDERS JUST TO FEEL GOOD ABOUT OURSELVES FOR A FEW MINUTES?
I THINK ROBUST MEANS IT HAS LOTS OF FEATURES.
IT MEANS STURDY!
DilbertCartoonist@gmail.com
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www.dilbert.com

Use case sections

- Metadata
- Course of events / task sequence
- Optional
  - Preconditions
  - Post-conditions
    - Guarantees (minimal & maximum success)
  - Alternative flows – options
  - Alternative flows - errors

Use case metadata

- Recommended
  - Name – verb-noun syntax
  - ID and date
  - Actor(s)
  - Stakeholder originator
  - Priority (goal level and above, business value not personal)

Use case metadata

- Optional
  - Project
  - System / subsystem
  - Date updated
  - Cross-references
    - Business rules, data, prompts & menu text, designs
  - Level
  - Tracing
  - Index

Use case metadata

- Optional
  - Purpose
  - Explanations
  - Examples of ways to meet
  - Stability
  - Complexity
  - Stakeholders’ interests

Non-functional requirements

- Placed in use case notes, another category, or other documents
- Use cases can have specific NF requirements
  - security issues
  - capacity needs
  - maintenance needs
- Tests
  - What adjective or adverb describes how all/a subset of the functional parts should behave?
  - What details do not affect what the functionality of the system or <role> does?

Non-functional requirement types

- Notes
- Security
- SLAs (expectations of performance)
- Quality or integration
- Data dictionary – data rules
- Process rules
- Interfaces
- Design recommendations
- Prompts, menus, and messages

Pre- and post-conditions

- Pre-conditions
  - block the use case from doing the first step.
  - validate the state of the software before anything happens specific to that use case.
  - A log on is not a pre-condition in a system use case
- Post-conditions restate the important points connected to the goal.
  - Optional usually

Agile

- User story acceptance criteria
  - same as post-conditions in use case

Special requirements / notes

- Put things like SLAs and location or time needs in a special category.
- Non-functional requirements that are specific to this use case should be documented with the use case.
- Admin people can understand why a requirement should be met.

Using references

- Move out the details that are not functional
  - Small detailed parts are OK for clarity.
    - Sub points, mark the type
  - Use the specific document to capture reusable or complex rules, designs, etc.
    - Rules
    - Data dictionary
    - Designs - menus, screens
    - Externalized text – prompts, error messages
  - Use character style to show rules & data dictionary items

Exercise – use case detail

- Create pre-conditions / post-conditions if any
- Write/use course of events
- Create sections and reference for
  - Data dictionary [DD] or just bold text
  - Business rules [R#] or subpoint – and bold text
  - Designs [D#] – screen prototypes
  - Reports [R#] – report prototypes
- Create error flows
- Create alternative flows

Analysis phase - documentation

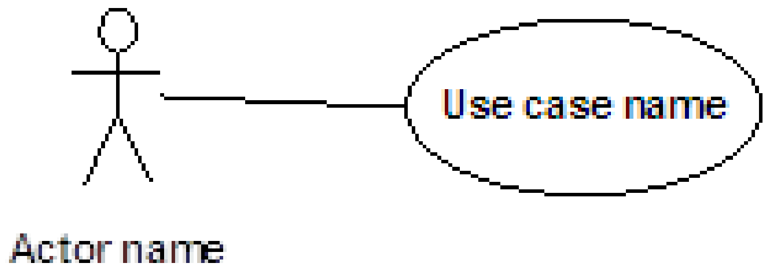
I'LL NEED TO KNOW YOUR REQUIREMENTS BEFORE I START TO DESIGN THE SOFTWARE.
FIRST OF ALL, WHAT ARE YOU TRYING TO ACCOMPLISH?
I'M TRYING TO MAKE YOU DESIGN MY SOFTWARE.
I MEAN WHAT ARE YOU TRYING TO ACCOMPLISH WITH THE SOFTWARE?
I WON'T KNOW WHAT I CAN ACCOMPLISH UNTIL YOU TELL ME WHAT THE SOFTWARE CAN DO.
TRY TO GET THIS CONCEPT THROUGH YOUR THICK SKULL: THE SOFTWARE CAN DO WHATEVER I DESIGN IT TO DO!
CAN YOU DESIGN IT TO TELL YOU MY REQUIREMENTS?

Use case text styles

- Mix 'n' match
- Informal – the story
  - An elevator speech
  - Use for a table of contents
  - A descriptive sentence or paragraph
- Formal – all the facts
  - When it's important to be clear
  - Up to several pages

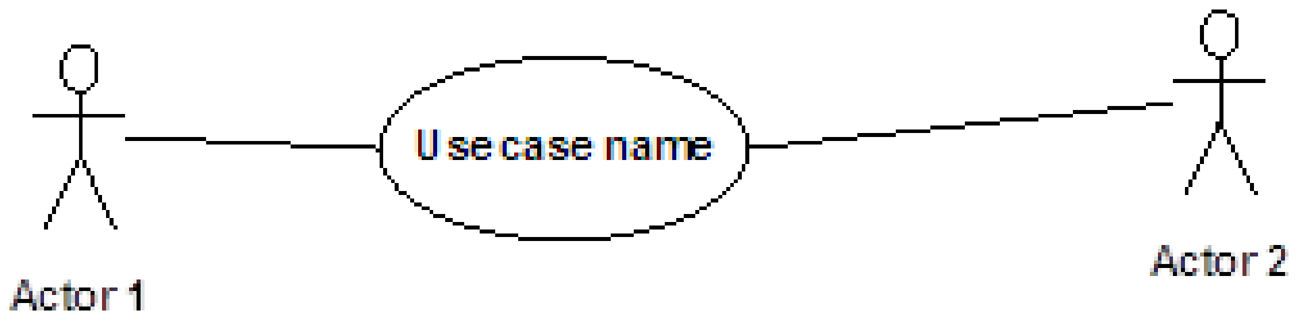
Use cases and actors

- Only to show scope, granularity and triggers!
  - No sequences so no arrows!
- Split diagrams into readable sections.
- Only show actors who initiate use cases on diagrams.
- Keep lines from crossing when possible



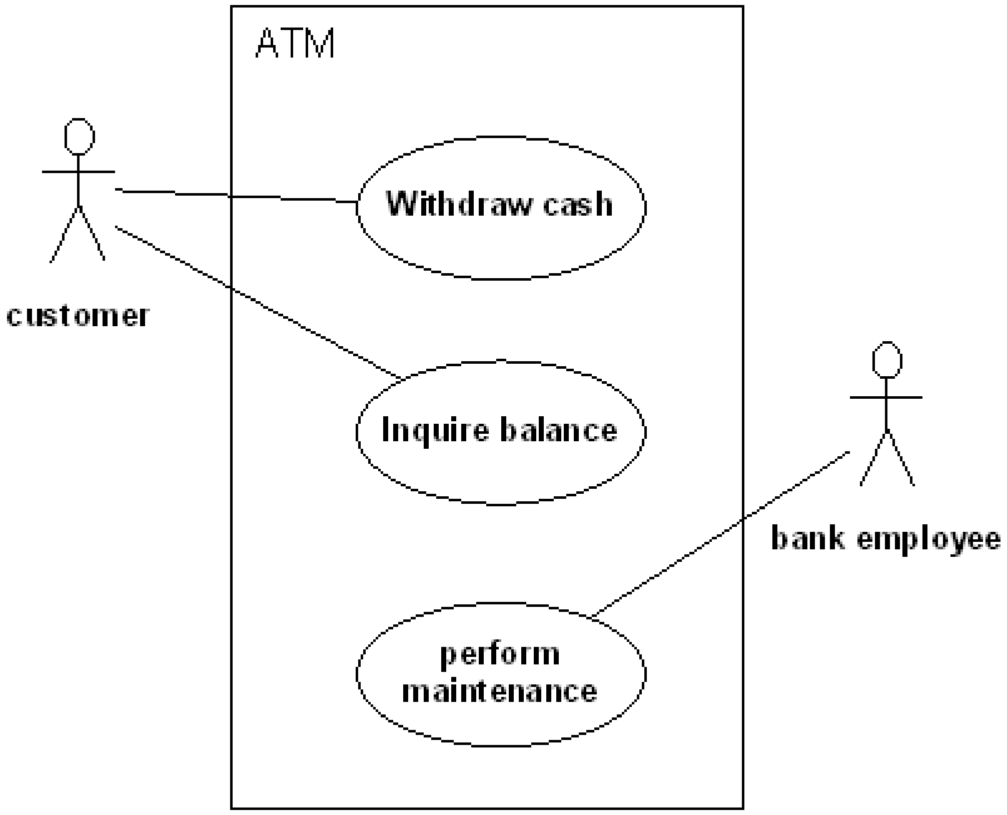
Use cases and actors

- Place actor on either side, but no directionality.
  - Not a flow or sequence diagram, but a scope diagram.
- Keep lines from crossing when possible
- **Exercise** – use case diagram



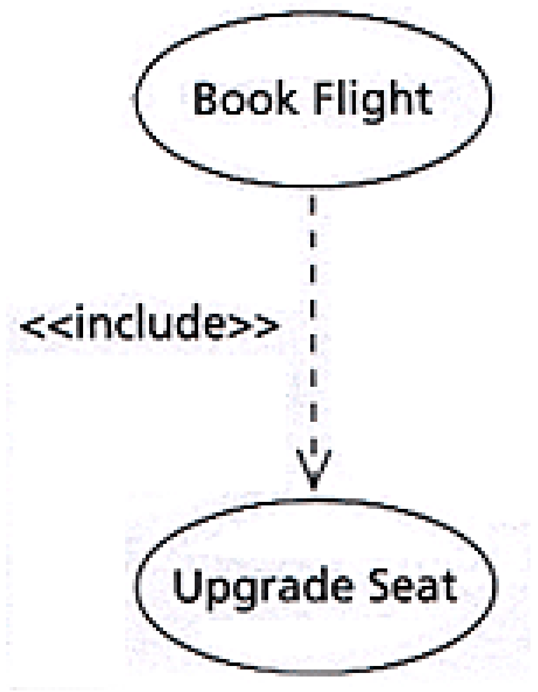
Domain

- The box of a domain surrounds the use cases but not the actors.



Includes

- Use special includes when
  - users expect that name (log in)
  - options are important to see
- Shown as use case ellipse with a dependency arrow and stereotype (category surrounded with <<European quotes>>).
- Include is a partial goal level, not goal level.

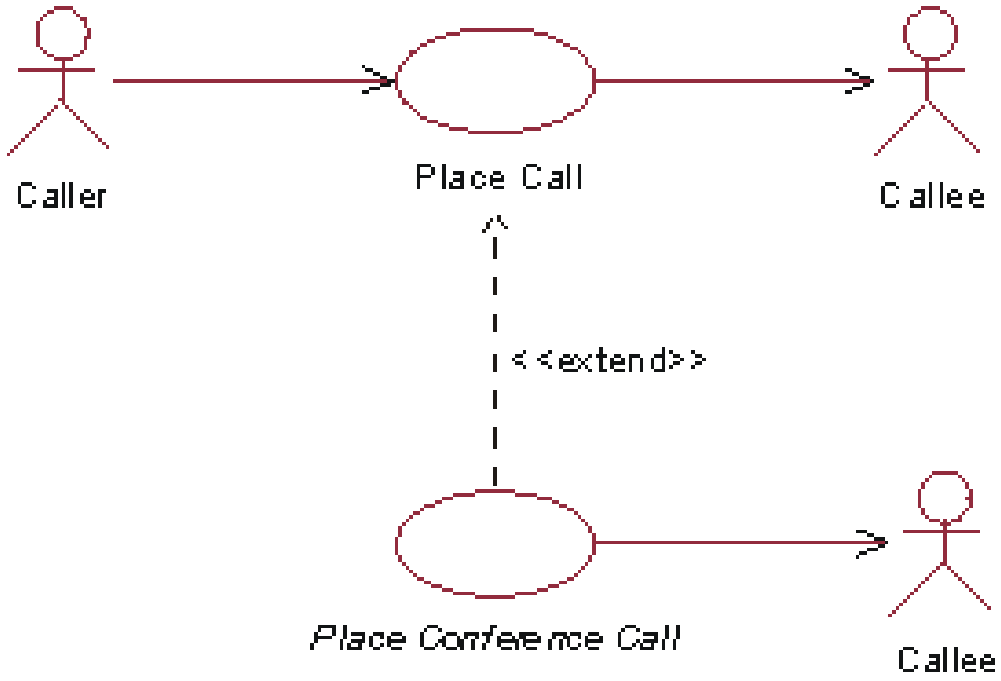


Include vs. different use case

- Write includes into use cases as bolded names in course of events
  - **Do Log On (SF24)** workflow returns here
  - <<includes>> **Do Log On (SF24)**
- Alternate flow (extends) – separate section not in course of events
  - Optional partials
    - **(#3) Print Receipt (SF33)**
    - (#3) <<extends >> **Print Receipt (SF33)**

Extends

- Dashed arrow pointing from optional extension point to use case – a dependency
  - (diagram incorrectly uses arrows on solid lines and shows non-actor)

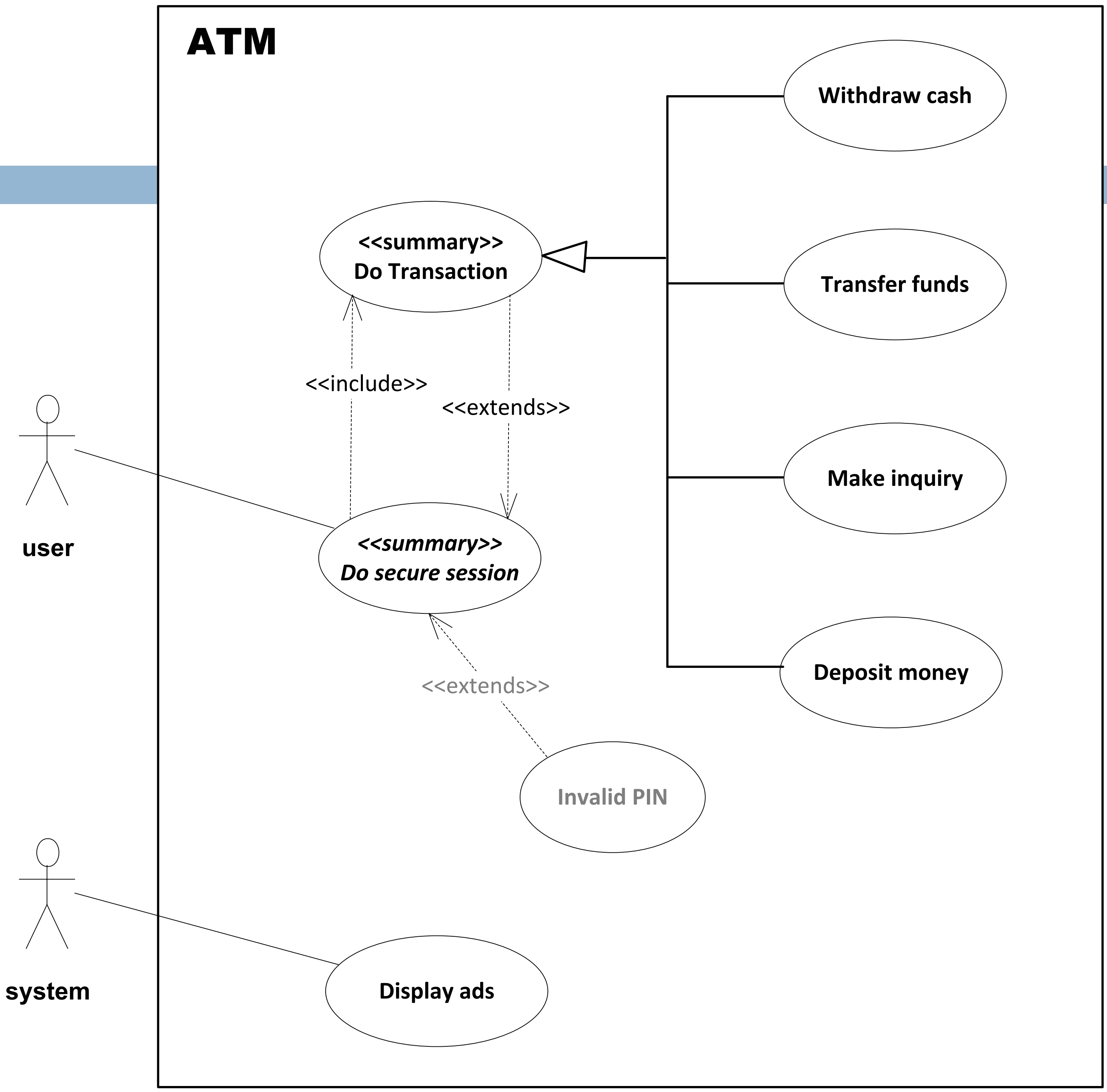


Security pattern

- Security is a use case wrapper around other use cases
  - Start session (authenticate)
  - <<include>> Do secure process
  - End session (clean up and deaccess)
- This is allows for <<extends>> Do another secure process as an option
- Don’t do
  - <<include>> Start secure session
  - Process tasks…
  - <<include>> End secure session

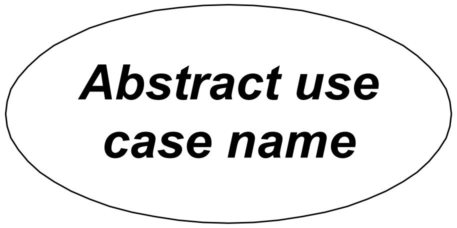
Security

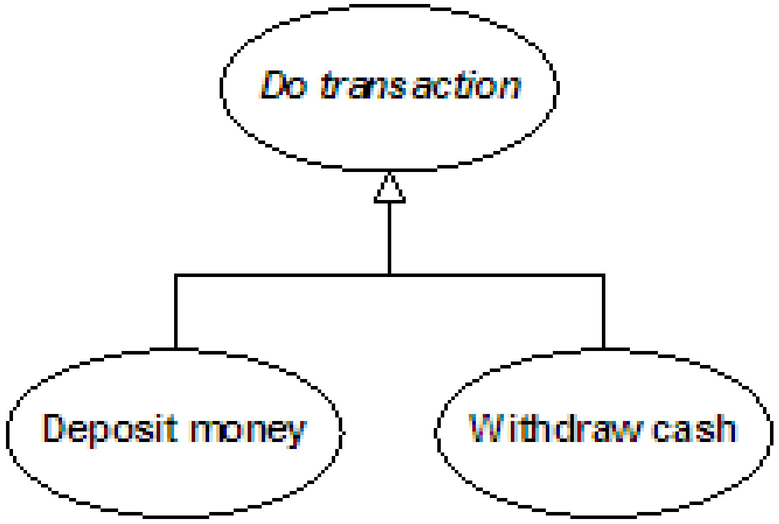
- Summary = group
- Invalid PIN is an error path



Use case structure - groups

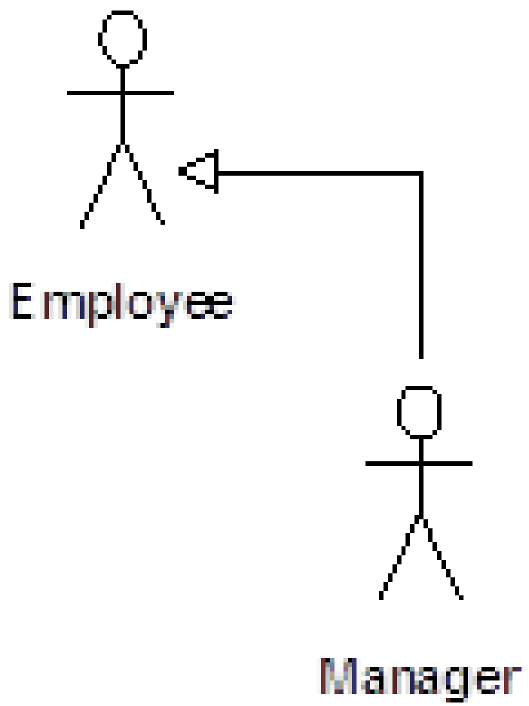
- Use grouping when it cleans up a use case diagram and makes it easier to understand.
- Produce several versions of the functionality





Role generalization

- Actors can share use case initiation
- Show with generalization arrow



Structuring for security roles

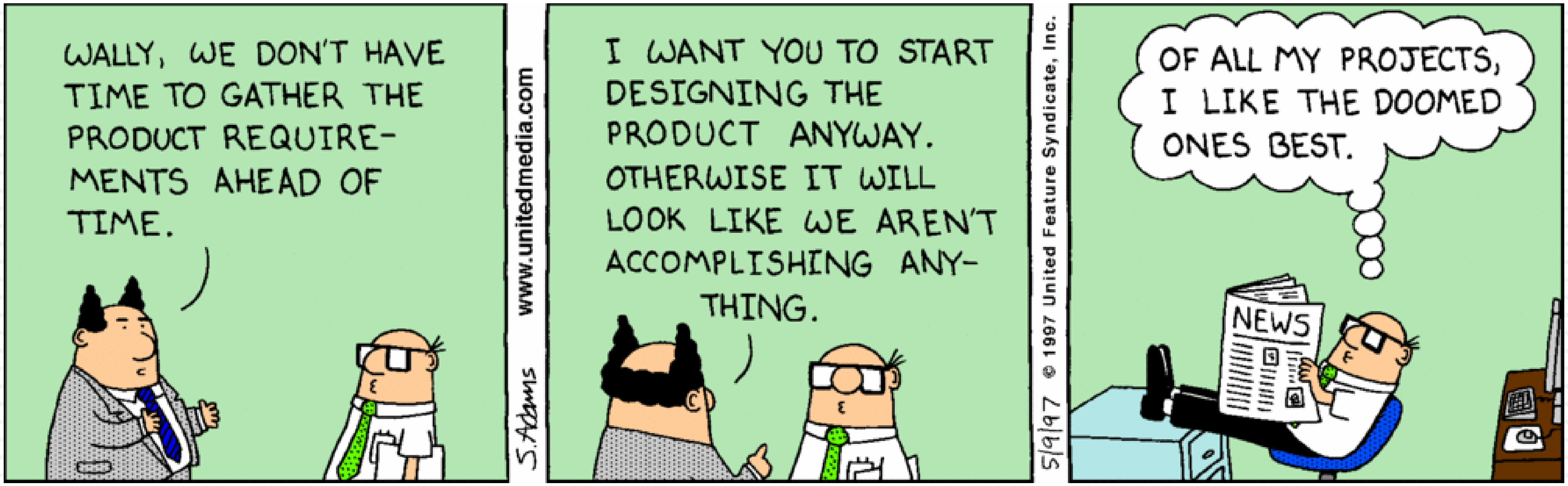
- Security is a use case wrapper around other use cases
  - Start session (authenticate)
  - <<include>> Do secure process
  - End session (clean up and deaccess)
- This is allows for <<extends>> Do another secure process as an option
- Don’t do
  - <<include>> Start secure session
  - Process tasks…
  - <<include>> End secure session

Use case diagram tools

- Text driven
  - https://yuml.me/diagram/usecase/draw

Design phase

prototypes, interfaces, screen shot scenarios


WALLY, WE DON'T HAVE TIME TO GATHER THE PRODUCT REQUIRE-MENTS AHEAD OF TIME.
www.unitedmedia.com
S. Adams
I WANT YOU TO START DESIGNING THE PRODUCT ANYWAY. OTHERWISE IT WILL LOOK LIKE WE AREN'T ACCOMPLISHING ANY-THING.
5/9/97 © 1997 United Feature Syndicate, Inc.
OF ALL MY PROJECTS, I LIKE THE DOOMED ONES BEST.
NEWS

System dependencies

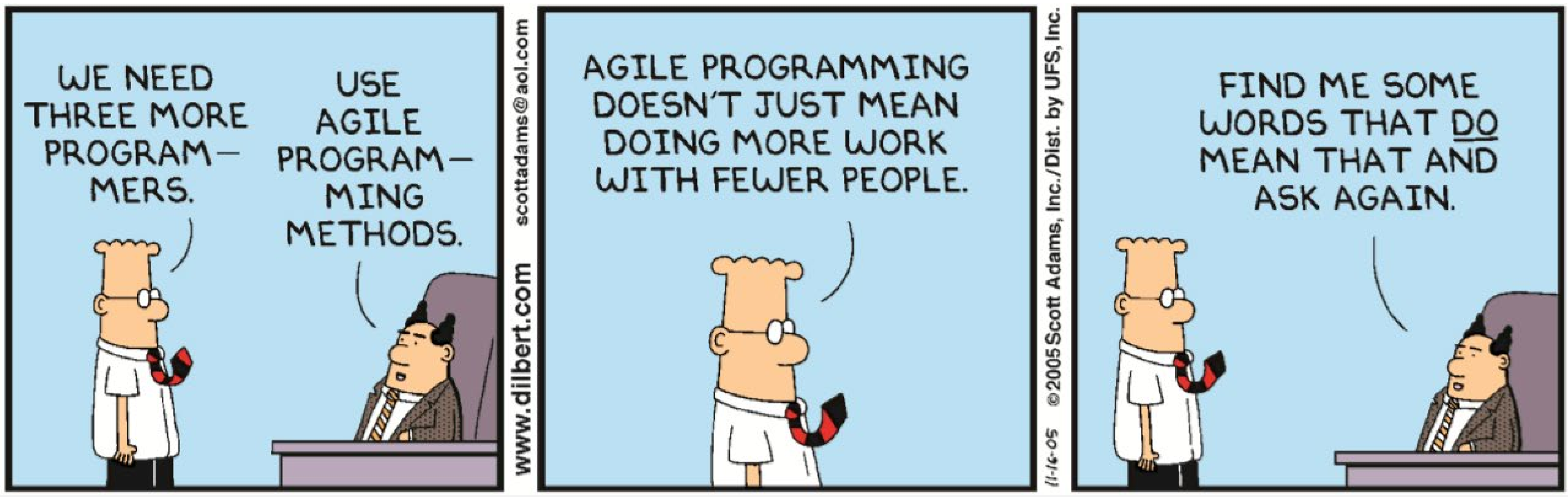
- Fitting the requirements to the constraints
  - moving functions to systems
  - moving functions to subsystems
  - moving functions to libraries/components/DLLs
  - systems talking to other systems (APIs)
  - refactoring systems

Dual purpose tools

- Tools here can be used in analysis when constraints are known.
  - paper reports
  - web page wireframes
  - screen navigation

Development phase

state, activity/flowchart models

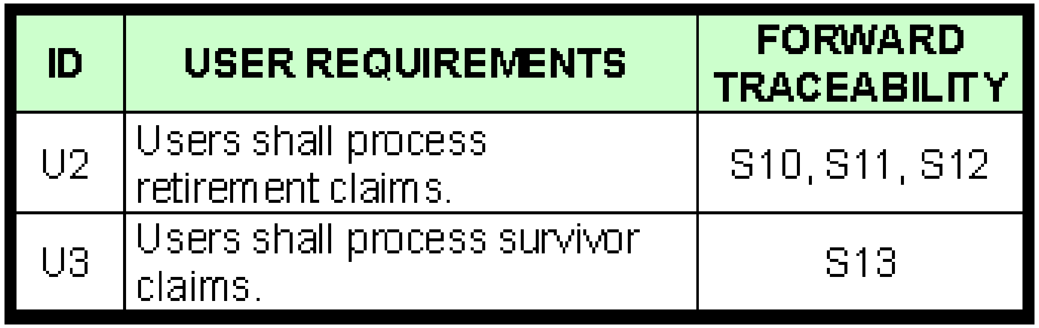

WE NEED THREE MORE PROGRAM-MERS.
USE AGILE PROGRAM-MING METHODS.
www.dilbert.com scottadams@aol.com
AGILE PROGRAMMING DOESN'T JUST MEAN DOING MORE WORK WITH FEWER PEOPLE.
11-16-05 ©2005 Scott Adams, Inc./Dist. by UFS, Inc.
FIND ME SOME WORDS THAT DO MEAN THAT AND ASK AGAIN.

Programming models

- State chart
  - use to show change in data over a complete process
  - order status over a transaction
- Activity diagram
  - use to show a time structured flow of process
  - can be divided into swim lanes for functional segmentation

Traceability

- Use words “roll-up” and “drill-down” to talk about relationships between levels with business language.
- All higher level requirements have lower levels
- All lower level requirements have higher level
- Traceability matrix
  - Assigns codes
  - Tracks relationships



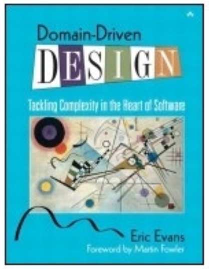
ID	USER REQUIREMENTS	FORWARD TRACEABILITY
U2	Users shall process retirement claims.	S10, S11, S12
U3	Users shall process survivor claims.	S13

Traceability

- Used to show
  - completion of requirements in coding
  - test coverage of code
  - areas affected by bugs

Resources

- **Domain-Driven Design: Tackling Complexity in the Heart of Software** by Eric Evans. Addison-Wesley Professional, Aug 2003
- **Analysis Patterns** by Martin Fowler
- For programmers
  - Larman, Craig 1998. *Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design.* Prentice Hall PTR. (get the 2nd version not the 3rd)


Domain-Driven
DESIGN
Tackling Complexity in the Heart of Software
Eric Evans
Foreword by Martin Fowler

Testing phase

test case design, data dictionary validations

I DON'T THINK I HAVE YOUR FULL ATTENTION.
IT'S ASOK'S TURN TO LISTEN. IF YOU SAY ANYTHING USEFUL, HE'LL SEND US AN INSTANT MESSAGE.
HE'S ASLEEP.
HE'S EMPLOYING HEURISTICS.
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Test case design

- Use cases provide test case designs
- Scenario clean/positive tests
  - The happy path of the use case course of events
- Scenario dirty/negative tests
  - The course of events with a specific alternative path to produce a failure and how to handle it
- System tests
  - Any notes for non-functional requirements can be tested

Data dictionary validation

- used to provide data sets to test cases for clean and dirty tests
- best when described with equivalence class partitioning
  - tests use boundaries

Data dictionary validation

- Add to each entity entry
- Constraints / rules
  - Validation – bounds, members
  - Dependency
  - Formats for input and output
  - Examples
- How it is used
  - read/write
  - aggregated/processed report