

Course Application Design

Creating beautiful and reliable applications
From requirements to specifications

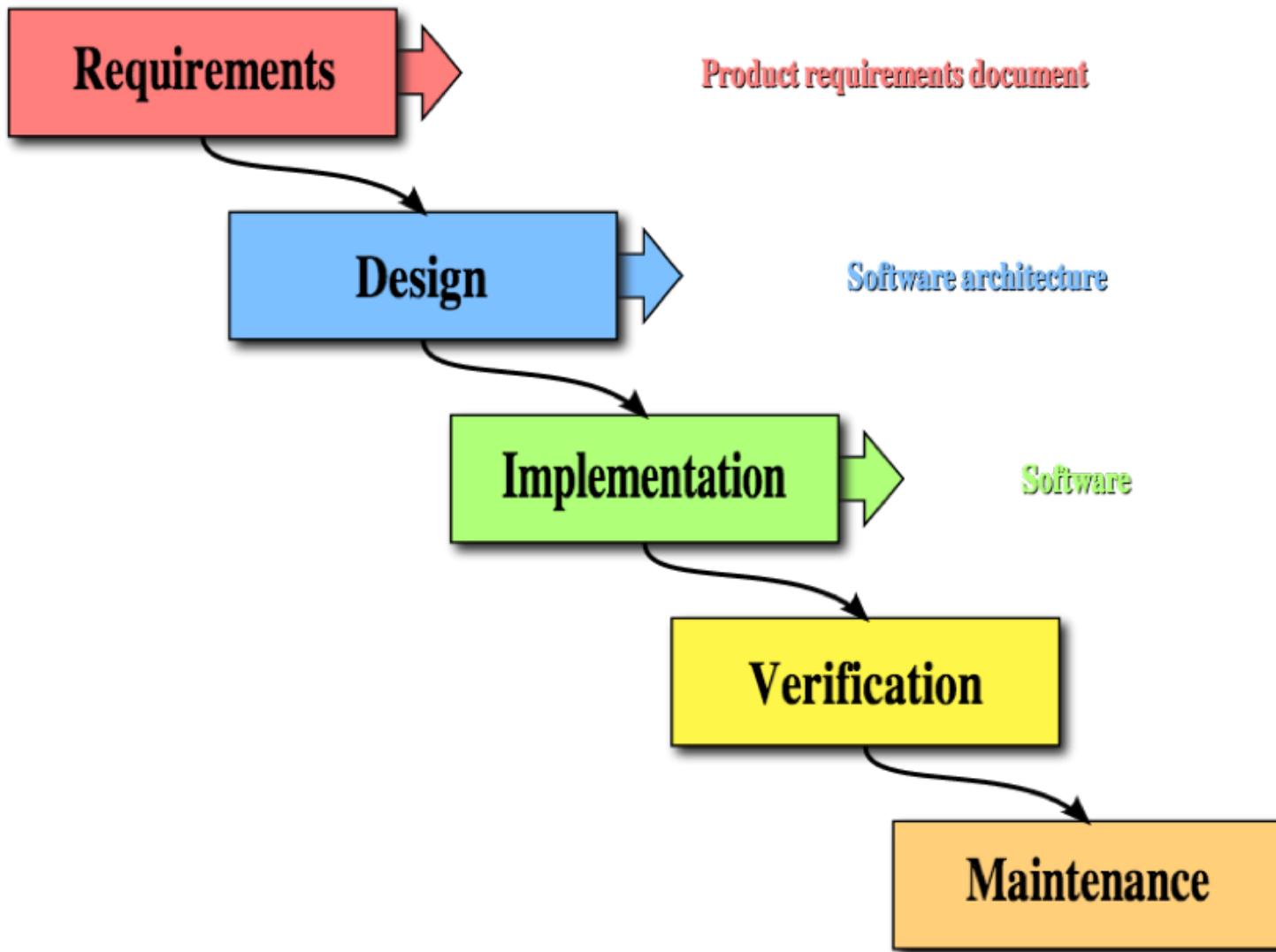
Michiel Noback
Institute for Life Sciences and Technology
Hanze University of Applied Sciences



Presentation contents

- In this presentation we'll address some aspects of the design process:
- Going from assignment to specifications and initial design

The software development process



Part one

Gathering requirements

Gathering and specifying requirements

You will have to define prioritized specifications, Use Cases and a user interface (GUI/UI) design based on information you obtain from the end-user and/or client, taking into account time, resources and technical feasibility

Requirements analysis

- Requirements analysis encompasses
 - Meeting with the client, interviewing her to get an idea of what is needed, how the software will be used and by what type of users
 - Translating this information into a set of specifications (or use cases or features) that both of you agree upon

Phases in requirements analysis

Requirements analysis includes three types of activity:

- ***Eliciting requirements***: the task of communicating with customers and users to determine what their requirements are. This is sometimes also called requirements gathering.
- ***Analyzing requirements***: determining whether the stated requirements are unclear, incomplete, ambiguous, or contradictory, and then resolving these issues.
- ***Recording requirements***: Requirements might be documented in various forms, such as natural-language documents, use cases, user stories, or process specifications.

Interviewing rules (1)

- Have a Question/Checklist. At best this is a list of what the interviewer wants to know.
- Listen. Really listen
- Get specific
- Mirror:
 - "Let me see if I got this right: ..."
 - "So you're saying that "
- Give the interviewee ample time to respond

Interviewing rules (2)

- Breaking the Jargon Barrier
- Find out how important each feature is
- Reduce it To Writing: you should reduce every interview to writing and show a summary to the interviewee

User stories

- A user story is one or more sentences in the everyday or business language of the end user or user of a system that captures what a user does or needs to do as part of his or her job function
- It often has this form:

"As a <role>, I want <goal/desire> so that
<benefit>"

Use case

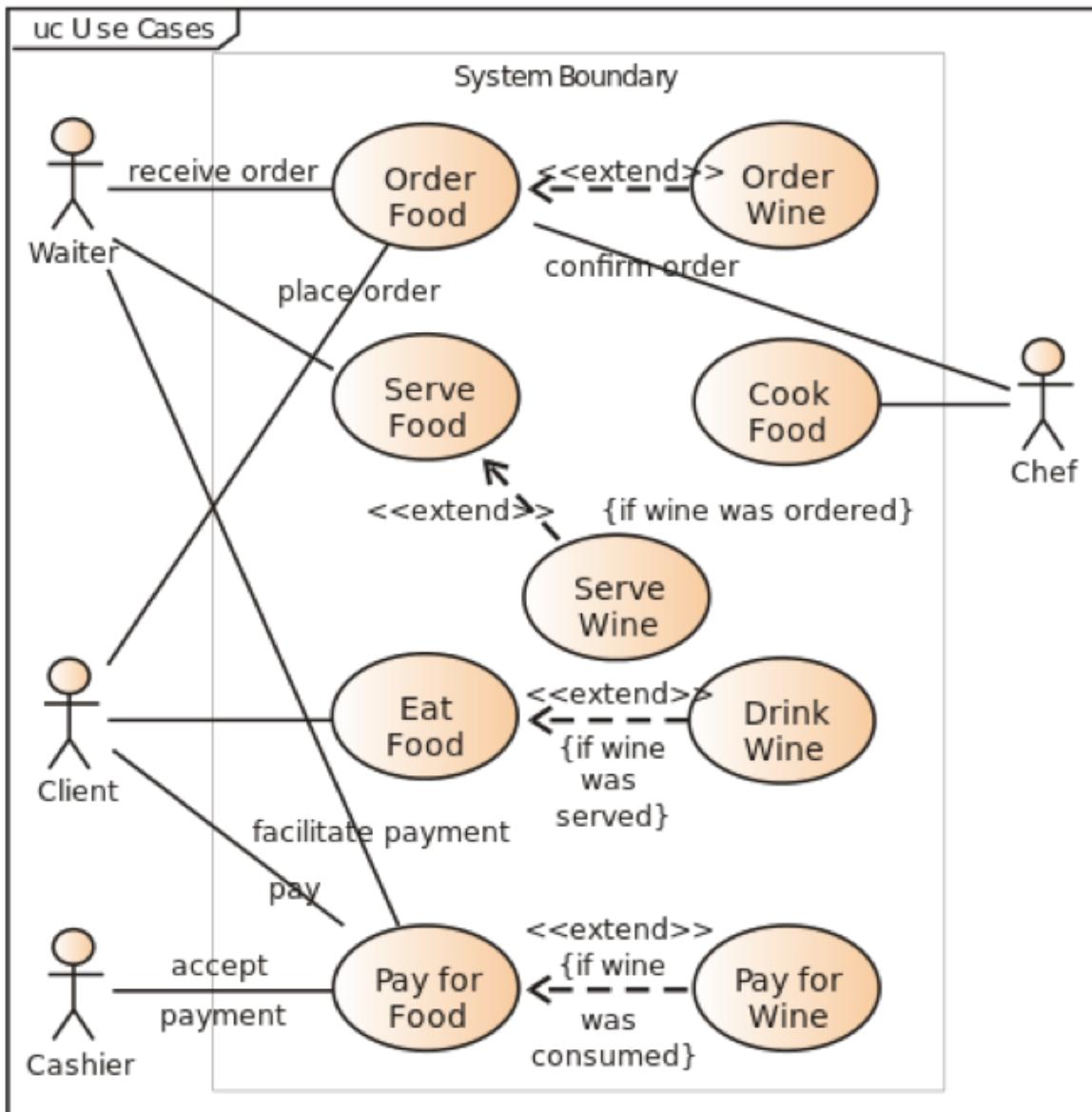
- A use case is a list of steps, typically defining interactions between a role ("actor") and a system, to achieve a goal. The actor can be a human or an external system.

Use Case
Number: 1

Use Case
Name: Buyer Places a Bid

Description: An EBAY buyer has identified an item they wish to buy, so they will place a bid for an item with the intent of winning the auction and paying for the item.

Use case UML



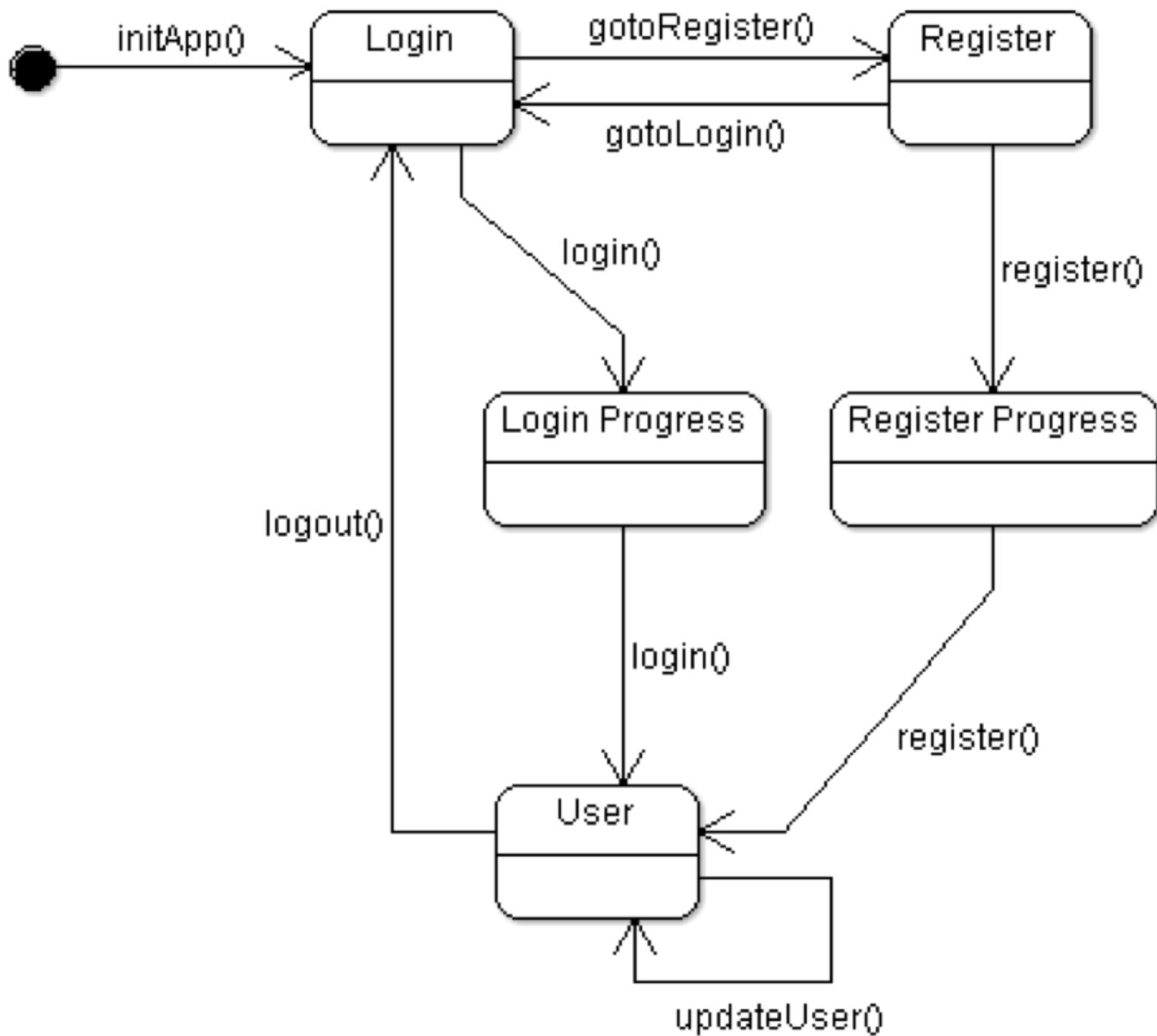
Use case

- The following link provides an excellent set of instructions for specifying use cases

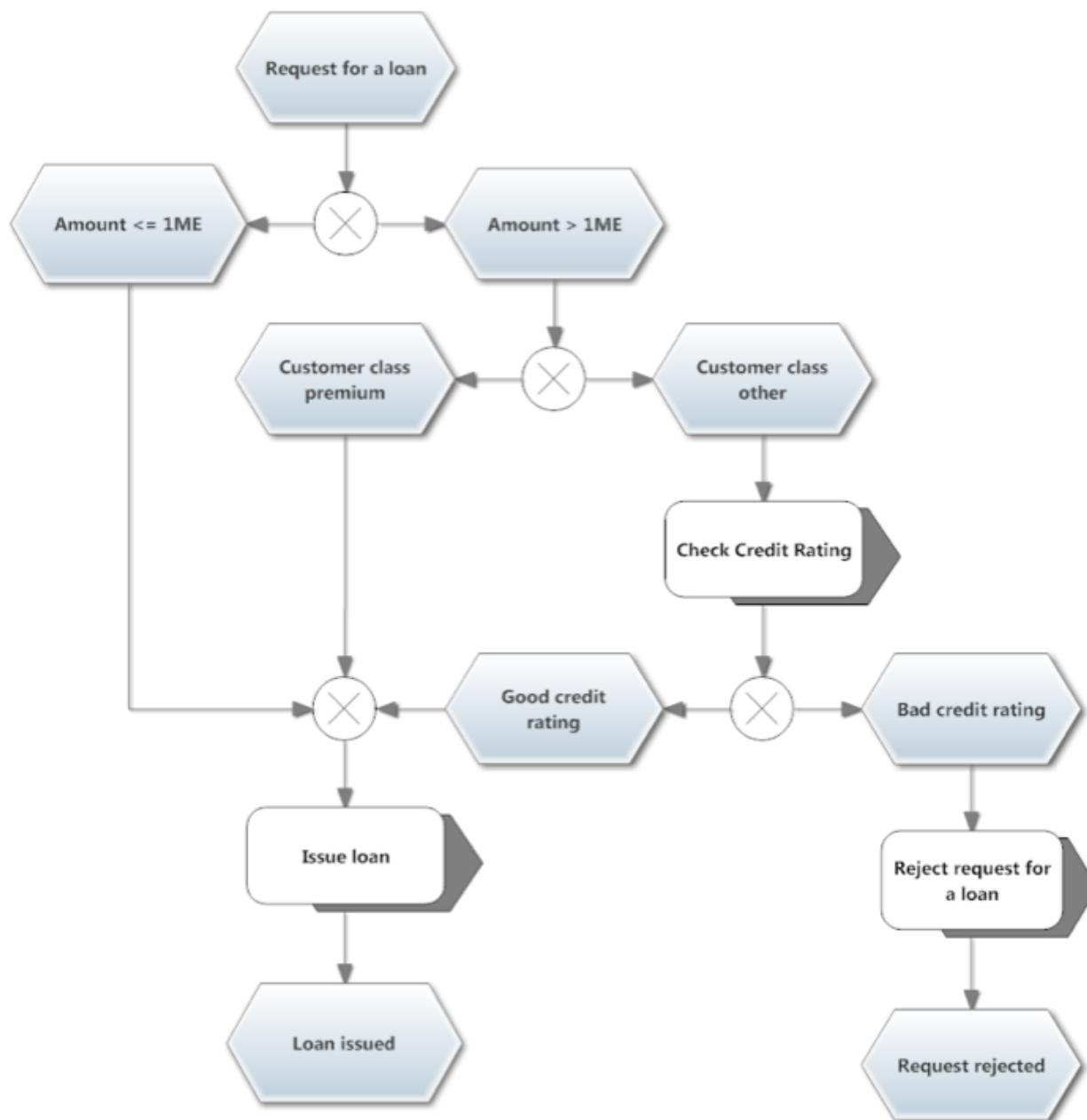
http://www.gatherspace.com/static/use_case_example.html

Process specifications

- Process specification is the provision of clear, detailed directions to follow a series of steps to complete a task



Loan Application Process Example



Types of requirements

Requirements are categorized in several ways:

- Customer
- Operational
- Performance
- Utilization
- Effectiveness
- Environment
- Architectural
- Behavioral
- Functional
- Design Requirements
- ...

see http://en.wikipedia.org/wiki/Requirements_analysis

Part two

Defining specifications: Writing Software Requirements Specification

Software Requirements Specification

- Establishes the basis for agreement between the customers and the suppliers on what the software product is to do.

What should the SRS address?

- a) Functionality. What is the software supposed to do?
- b) External interfaces. How does the software interact with people, the system's hardware, other hardware, and other software?
- c) Performance. What is the speed, availability, response time, recovery time of various software functions, etc.?
- d) Attributes. What are the portability, correctness, maintainability, security, etc. considerations?
- e) Design constraints imposed on an implementation. Are there any required standards in effect, implementation language, policies for database integrity, resource limits, operating environment(s) etc.?

What are the characteristics of a great SRS?

- Correct
- Unambiguous
- Complete
- Consistent
- Ranked for importance and/or stability
- Verifiable
- Modifiable
- Traceable

Part three

Interface design

Interface/UX design

- Actually, this is still a part of the specifications phase
- However, since it is really important, and will in practice extend well into the implementation phase, it deserves a separate section in this presentation

User Experience

- Let's take the oldest definition of this concept
- *All the aspects of how people use an interactive product: the way it feels in their hands, how well they understand how it works, how they feel about it while they're using it, how well it serves their purposes, and how well it fits into the entire context in which they are using it (Alben 1996).*

User Experience guidelines

- These are the guidelines we will address in this course:
 - The tool serves the purpose of the end-user well
 - The end-user understands how the tool works
 - The end-user feels good about using the tool

What not to make

Bulk Rename Utility

File Actions Options Help

Name	New Name	Sub...	Type	Size	Created	Mo
100923-Chandigarh-1	01-delhi-erstes-photo.JPG		JPG F...	2 MB	21.11...	11.
100927-Kharar	02-delhi-imbau.JPG		JPG F...	3 MB	21.11...	11.
101007-Kharar-Hardv	03-delhi-eis.JPG		JPG F...	2 MB	21.11...	11.
101015-Jaipur-Jaisalr	04-delhi-ventilator.JPG		JPG F...	3 MB	21.11...	11.
101019-Jaisalmer-Jod	05-delhi-northem-palace-fe...		JPG F...	3 MB	21.11...	11.
101031-Udaipur-Goa	06-delhi-northem-palace-ve...		JPG F...	3 MB	21.11...	11.
101102-Goa	07-delhi-humuyans-tomb.JPG		JPG F...	2 MB	21.11...	12.
dia-abend	08-delhi-eichhoemchen.JPG		JPG F...	2 MB	21.11...	12.
dia-abend.blog						
Für-das-Blog						

RegEx (1) R
Match 0
Replace 00
 Include Ext.

Repl. (3) R
Replace
With
 Match Case

Remove (5) R
First n 0 Last n 0
From 0 to 0
Chars Words

Add (7) R
Prefix
Insert
at pos. 0
Suffix
 Word Space

Auto Date (8) R
Mode None
Type Creation (Cur
Fmt DMY
Sep. Seg.
Custom
 Cent. Off. 0

Numbering (10) R
Mode None at 0
Start 1 Incr. 1
Pad 0 Sep.
Break 0 Folder
Type Base 10 (Decimal)
Roman Numerals None

File (2) R
Name Keep

Case (4) R
Same
Excep.
 Digits High Trim
 D/S Accents Chars
 Sym. Lead Dots Non

Move/Copy (6)
None 1 None 1 Sep.
 R

Append Folder Name (9) R
Name None Sep. Levels 1

Extension (11) R
Same

Selections (12)
Filter Folders Hidden
 Match Case Files Subfolders
Name Len Min 0 Max 0
Path Len Min 0 Max 0

New Location (13)
Path
 Copy not Move
 Reset
 Revert
 Rename

** Working on multiple computers? Synchronize your files across computers with **ViceVersa PRO**. [Click Here To Find Out More ...](#)

187 Objects (0 Selected) Favourite D:\bilder\2010-Max-Indien\dia-abend.blog

PROBE MATCH

CLOSE

HELP

Target String

UGGGGGGGGAUURACUCU

MATCH



Clear

RevCompl

Compl

Auto



EXPERT

Use weighted mismatches

IUPAC

Check rev.compl. too



Mark in database



Write Result to field 'tmp'



PT_SERVER

localhost: SSU_rRNA.arb

Search depth

SEARCH UP TO NULL MISMATCHES

Number of Hits: 497

PRINT

Match SAT

Searched for

UGGGGGGGGAUURACUCU

name	fullname	mis	N_mis	wmis	pos	ecoli	rev	
*	EscCo100 Escherichia coli	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU
*	EntRgg15 Enterobacter agglomerans	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU
*	EntAsbu2 Enterobacter asburiae	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU
*	SerFica4 Serratia ficaria	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU
*	EntSaka2 Enterobacter sakazakii	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU
*	EntInte2 Enterobacter intermedium	0	0	0.0	1861	139	0	ACUGCCCUGA-----GGAAACCGGU
*	EntGerg2 Enterobacter gergoviae	0	0	0.0	1861	139	0	ACUGCCCUGA-----GGAAACCGGU
*	EntAmni2 Enterobacter amnigenus	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU
*	EntAero5 Enterobacter aerogenes	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU
*	SerLiqu2 Serratia liquefaciens	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU
*	KlePne20 Klebsiella pneumoniae	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU
*	KleOxyt9 Klebsiella oxytoca	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU
*	KlePlan2 Klebsiella planticola	0	0	0.0	1861	139	0	ACUGCCUGA-----GGAAACCGGU

This could work

Reports

subscribers.

In-Stock Shirts Ju...
In-Stock: Ampersand Shirts
Sent on 6/5/13 to 275 subscribers.

In-Stock Shirts and...
In-Stock: Multi-Color Triangle Shirts and Sketchbooks
Sent on 5/3/13 to 260 subscribers.

Stock Alert, 08/05/...
In-Stock: Tri-Color Long Sleeve Shirt
Sent on 8/6/12 to 180 subscribers.

In-Stock Shirts June 2013

In-Stock: Ampersand Shirts
Sent on June 5, 2013 to Shirts Waiting List
274 of 275 emails successfully delivered.

Open rate	56.6%	Click rate	10.9%
155	Opens	30	Clicks
1	Bounced	2	Unsubs
0	Cleaned	0	Complaints

24-hour performance

The chart displays a series of blue circular markers connected by a line, representing the number of opens per hour. The x-axis is labeled with time points: 2:00 PM, 1:00 AM, and 1:00 PM. The y-axis represents the count of opens, which starts at approximately 155 at 2:00 PM, fluctuates slightly, and then remains relatively stable around 100-120 opens per hour from 1:00 AM to 1:00 PM.

Time	Opens
2:00 PM	155
2:30 PM	160
3:00 PM	150
3:30 PM	145
4:00 PM	140
4:30 PM	135
5:00 PM	130
5:30 PM	135
6:00 PM	140
6:30 PM	135
7:00 PM	130
7:30 PM	135
8:00 PM	140
8:30 PM	135
9:00 PM	130
9:30 PM	135
10:00 PM	140
10:30 PM	135
11:00 PM	130
11:30 PM	135
12:00 AM	140
12:30 AM	135
1:00 AM	140
1:30 AM	135
2:00 AM	130
2:30 AM	135
3:00 AM	140
3:30 AM	135
4:00 AM	140
4:30 AM	135
5:00 AM	140
5:30 AM	135
6:00 AM	140
6:30 AM	135
7:00 AM	140
7:30 AM	135
8:00 AM	140
8:30 AM	135
9:00 AM	140
9:30 AM	135
10:00 AM	140
10:30 AM	135
11:00 AM	140
11:30 AM	135
12:00 PM	140
12:30 PM	135
1:00 PM	140

It can be this simple

The image shows a screenshot of the Grooveshark website. At the top, there is a navigation bar with a search icon, the Grooveshark logo, language selection (English), account creation, and login options. On the left, a sidebar menu includes Home, My Library, People, Favorites, Now Playing, Smart Playlists, Popular, Recent, Playlists, and New Playlist. The main content area features a large search bar with the placeholder "Search for Music" and a magnifying glass icon. The background has a yellow-to-blue gradient with a starry pattern. At the bottom, there is a footer with social media links (Facebook, Twitter, Tumblr), navigation links (Advertise, Band Promos, VIP, Privacy, Copyrights, Help, Sneak Peak, Mobile, Merch!, Themes), and control icons for volume, shuffle, repeat, and radio.

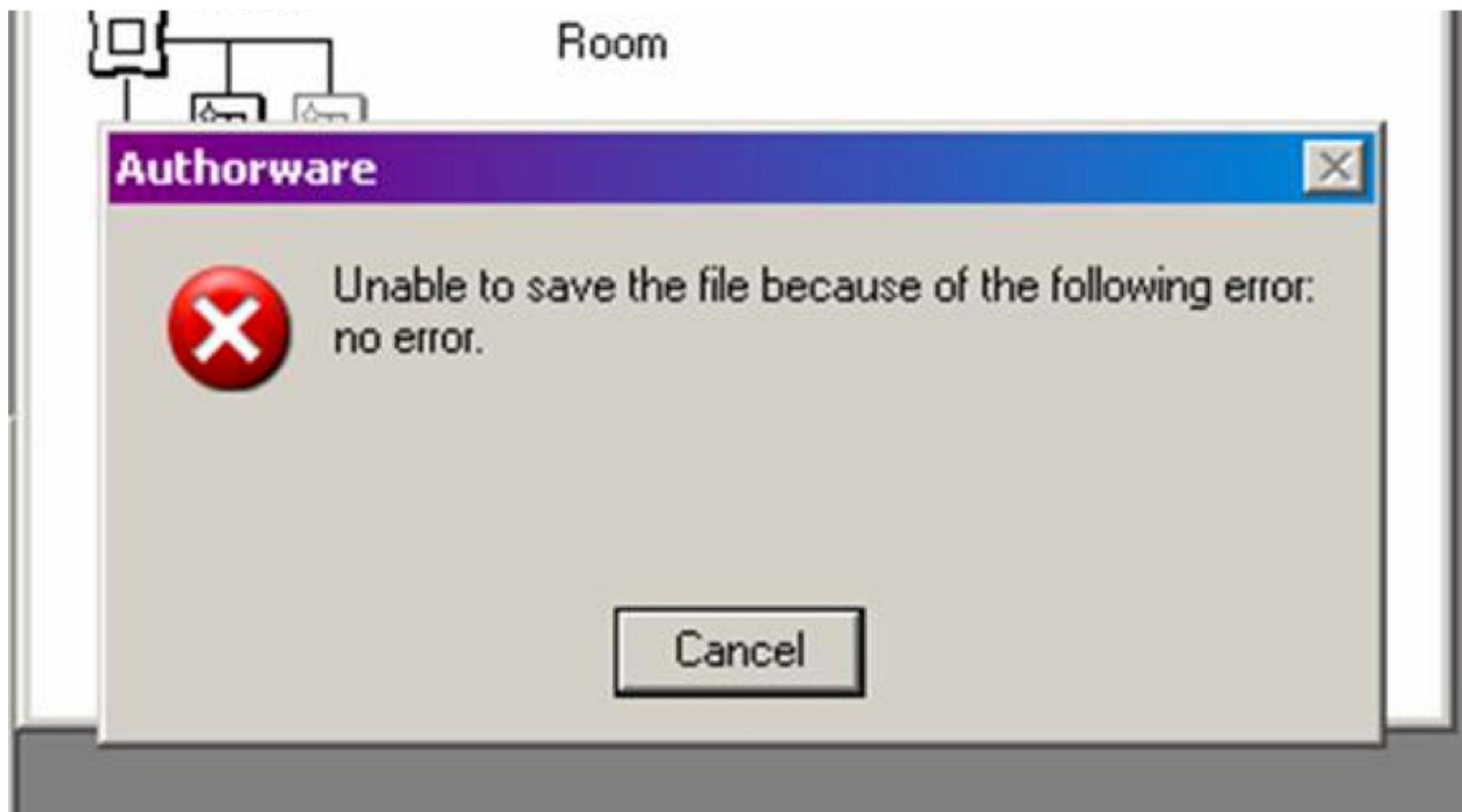
User Interface design rules (1)

- Consistency between pages, functions, and options is vital
- Make it easy to undo or repair mistakes
- Highlight changes
- Enable Keyboard Shortcuts
- Use Familiar Standards and Conventions
- Offer Personalization Options

User Interface design rules (2)

- Use Tooltips and Integrated Help Messages
- Use Tabbed Navigation and Buttons for Actions
- Use Relevant Icons and Labels
- Keep Things Simple: e.g. hide expert options from everyday use

Be informative of errors



Don't let your guts spill out

Apache Tomcat/5.0.19 - Error report - Mozilla

File Edit View Go Bookmarks Tools Window Help

http://localhost:8080/login/index.faces

Go Search

HTTP Status 500 -

type Exception report

message

description The server encountered an internal error () that prevented it from fulfilling this request.

exception

```
org.apache.jasper.JasperException: /index.jsp(16,21) No tag "inputText" defined in tag library imported with prefix "h"
	org.apache.jasper.compiler.DefaultErrorHandler.jspError(DefaultErrorHandler.java:83)
	org.apache.jasper.compiler.ErrorDispatcher.dispatch(ErrorDispatcher.java:402)
	org.apache.jasper.compiler.ErrorDispatcher.jspError(ErrorDispatcher.java:236)
	org.apache.jasper.compiler.Parser.parseCustomTag(Parser.java:1346)
	org.apache.jasper.compiler.Parser.parseElements(Parser.java:1598)
	org.apache.jasper.compiler.Parser.parseBody(Parser.java:1827)
	org.apache.jasper.compiler.Parser.parseOptionalBody(Parser.java:1100)
	org.apache.jasper.compiler.Parser.parseCustomTag(Parser.java:1405)
	org.apache.jasper.compiler.Parser.parseElements(Parser.java:1598)
	org.apache.jasper.compiler.Parser.parseBody(Parser.java:1827)
	org.apache.jasper.compiler.Parser.parseOptionalBody(Parser.java:1100)
	org.apache.jasper.compiler.Parser.parseCustomTag(Parser.java:1405)
	org.apache.jasper.compiler.Parser.parseElements(Parser.java:1598)
	org.apache.jasper.compiler.Parser.parse(Parser.java:171)
	org.apache.jasper.compiler.ParserController.doParse(ParserController.java:258)
	org.apache.jasper.compiler.ParserController.parse(ParserController.java:139)
	org.apache.jasper.compiler.Compiler.generateJava(Compiler.java:237)
```

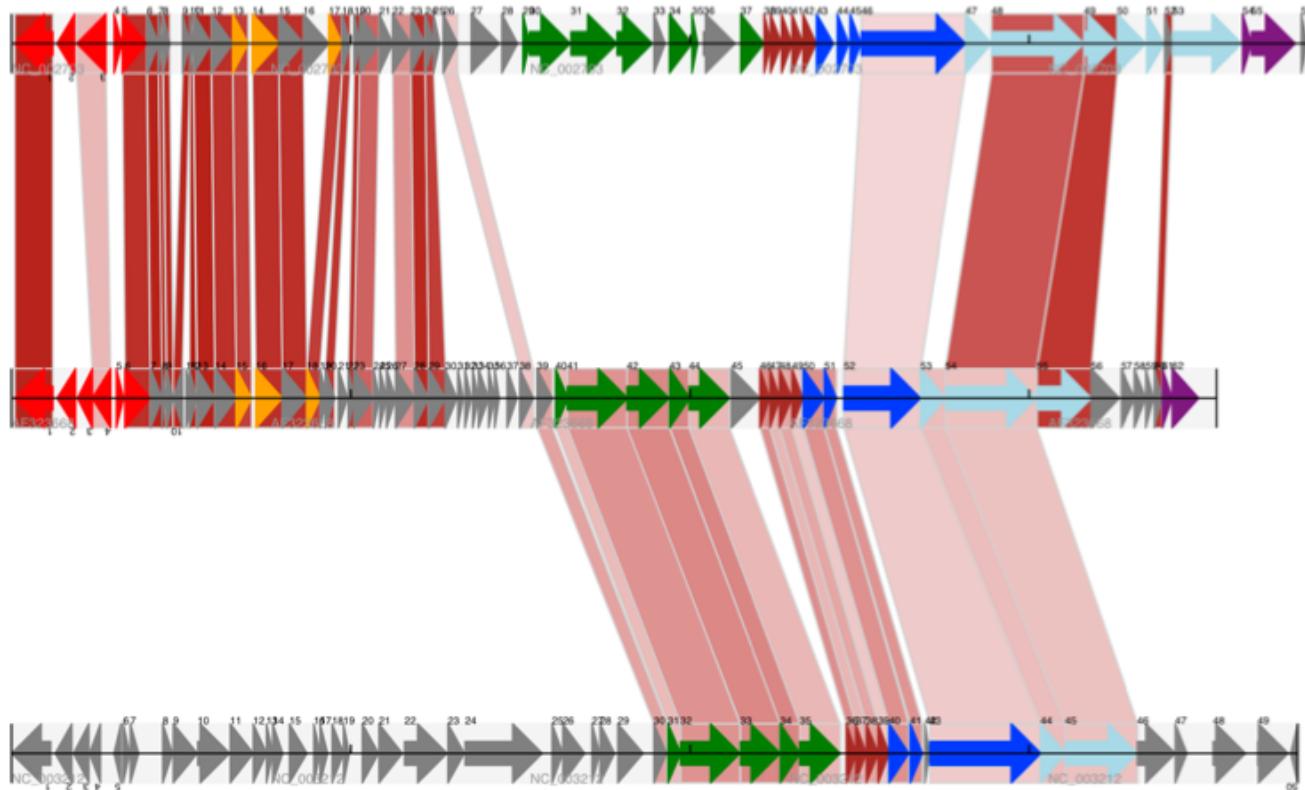
Suggest workable solutions

Cannot connect to the internet!

**Please go online to fix this
problem**

Data visualization challenges

- Often, you will need to reduce large amounts of complex data to a visual form the user intuitively understands



Data visualization techniques

- Use standards where they apply: pie charts, bar charts and scatter plots are understood by everyone
- Keep tables (yes you can use those too!) readable

Part four

Putting it all together

End-products

- The end-product of the requirements gathering & specification phase is a document describing the what the software will do in the form of
 - Use cases
 - User stories
 - Features
 - Processes
 - User interface examples
- You are free to use the combination of forms that suits your needs!