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Software Product Value and Stakeholders

Zheying Zhang

Day 1: Introduction and overview

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Who am I?

1995	B. Eng. in computer science, Sichuan (Union) University
1997	MSc in information technology, University of Jyväskylä, Finland
2004	PhD, University of Jyväskylä, Finland
2004 – 2012	Assistant professor, University of Tampere (uta), Finland
2012 – present	University lecturer, uta, Finland
2013	Adjuct professor in software development, uta, Finland
2015 -	Head of MSc degree program in software development, SIS, uta, Finland

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Tampere

- University of Tampere started computer science in 1965 (first CS professor Reino Kurki-Suonio in the Nordic countries).

Photos from http://www.eu2006.fi/MEDIA_SERVICES/PHOTOS/FINLAND/EN_GB/TAMPERE/INDEX.HTM and http://www.sis.uta.fi/~csolsp/

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Visit Tampere, Finland,
https://www.youtube.com/watch?v=lizkpmxi7Uk

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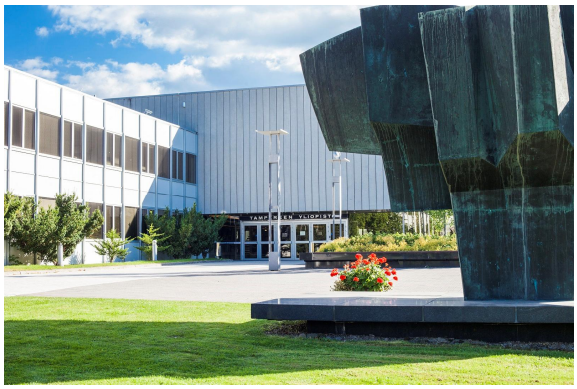
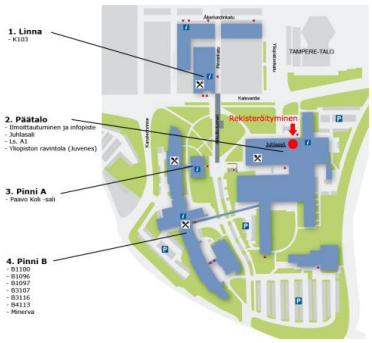
University of Tampere, before 2019



UNIVERSITY
OF TAMPERE



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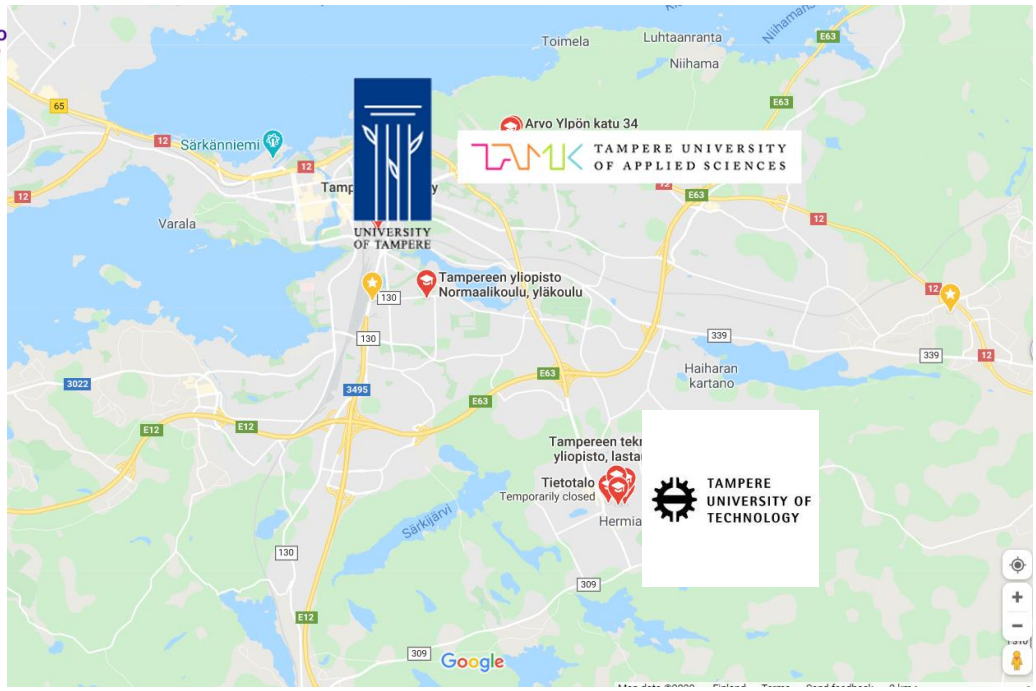

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Tampere University (TAU), 1.1.2019

UNIVERSITY OF TAMPERE

TAMPERE UNIVERSITY OF TECHNOLOGY

Tampere University
Tampere University of Applied Sciences

TAMPERE UNIVERSITY OF APPLIED SCIENCES

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Faculty of Information Technology and Communication Sciences (ITC)

- Research and teaching at the Faculty of Information Technology and Communication Sciences (ITC) draws on our unique combination of recognised expertise across a range of disciplines, including the humanities, natural sciences, engineering, social sciences, and theatre and drama. It is made up of four units
  - Computing Sciences
  - Electrical Engineering
  - Communication Sciences
  - Languages

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Master's degree programmes in **Computing Sciences**, taught in English

2019-2020 and before

- Master's Degree Programme in Software development (SDE)
- Master's Degree Programme in Computational Big Data Analytics (CBDA)
- Master's Degree Programme in Human Technology Interaction
- Etc.

2020-2021

- Master's Degree Programme in Computing Sciences
  - Data Science, MSc
  - Machine Learning , MSc (Tech)
  - Statistical Data Analysis , MSc
  - Human Technology Interaction, MSc
  - Human Technology Interaction, MSc (Tech)
  - Software, Web & Cloud (SWC), MSc
  - Software, Web & Cloud (SWC), MSc (Tech)
- etc.

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Collaboration with SCU

- Academic exchange agreement between TAU and SCU
- Agreement of the 3+1+1 Joint Program was signed in 2010
  - 2-10 SCU exchange students in computer science visit UTA every year
  - No tuition fee during the exchange year!
- Teacher visiting and summer courses since 2011
- Research collaboration

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My teaching and research

- Teaching
  - Requirements engineering
  - MSc thesis seminar in software development
  - Metamodeling for software development
  - Software product line engineering
  - Supervised over 60 MSc degree students
- Research
  - requirements management, variation management in software product line, metamodeling and modeling, software reuse, etc.
  - Over 50 peer-reviewed scientific articles
  - 1 PhD has graduated, and currently supervise 2 PhD students

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Who are you?

- Which study year are you studying?
- What have you studied?
- How often did you attend lectures in English? Are you interested in the exchange program with TAU?

- Have you done the Software Engineering course?
- Have you ever attended any software development project?

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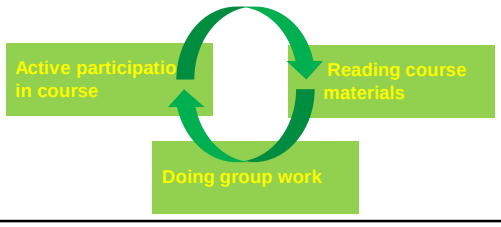
What is the course? - Software product value and stakeholders, 16h

- Product value analysis and project planning
  - Understanding the problem domain, goal, stakeholders, needs, requirements, and value
  - Stakeholders involved
  - A social process
- A guest talk on case study – a fresh view from the industry KONE
  - Guest speaker: Lulu Zhang, Head of Enabling Technologies, Application Management, Kone 通力 Corporation
- Teaching assistant
  - 张振波 1045465018@qq.com



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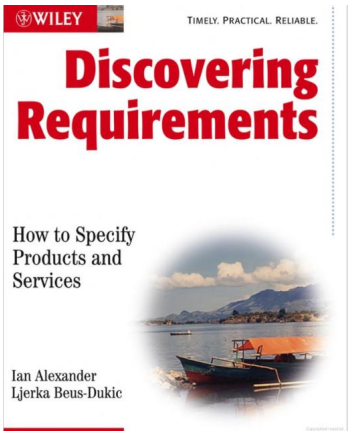
Textbook

- Alexander, Ian (Ian F.), and Ljerka. Beus-Dukic. *Discovering Requirements : How to Specify Products and Services* . Chichester, England ;: Wiley. Print.



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How is the course arranged?

	Wed. Aug 5	Thu. Aug 6	Fri. Aug 7	Sat. Aug 8
14 - 18	• Introduction and overview • Understanding the problem domain • Product value • Group work1	• Project vision and scope, NABC • Stakeholder identification and analysis • Group work1 presentation • Group work2	• Considerations in needs elaboration • Context of use • Creativity • Techniques • Group work2 presentation • Group work3	• Case analysis KONE • Discussion and summary • Group work3 presentation • Individual reports

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How your learning outcomes will be evaluated?

- Course participation (16 points)
- Group work (55 points)
  - 15 (Day1) + 20 (Day2) +20 (Day3) = 55 points
- Individual essay (29 points)

- 16 + 55 + 29 = 100 points <- the grade you receive in the course

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Questions?

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Outline

- Brief introduction
- Understanding the problem domain for software development
- Product value

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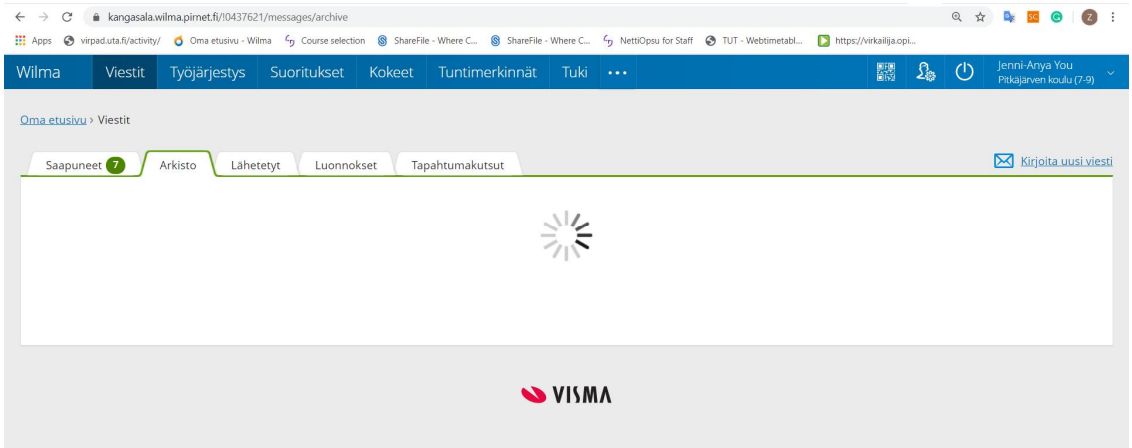
Example 1: ” Wilma is a safe web service where all kinds of information can be shared in real-time.” - https://www.visma.fi/inschool/en/



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Ex
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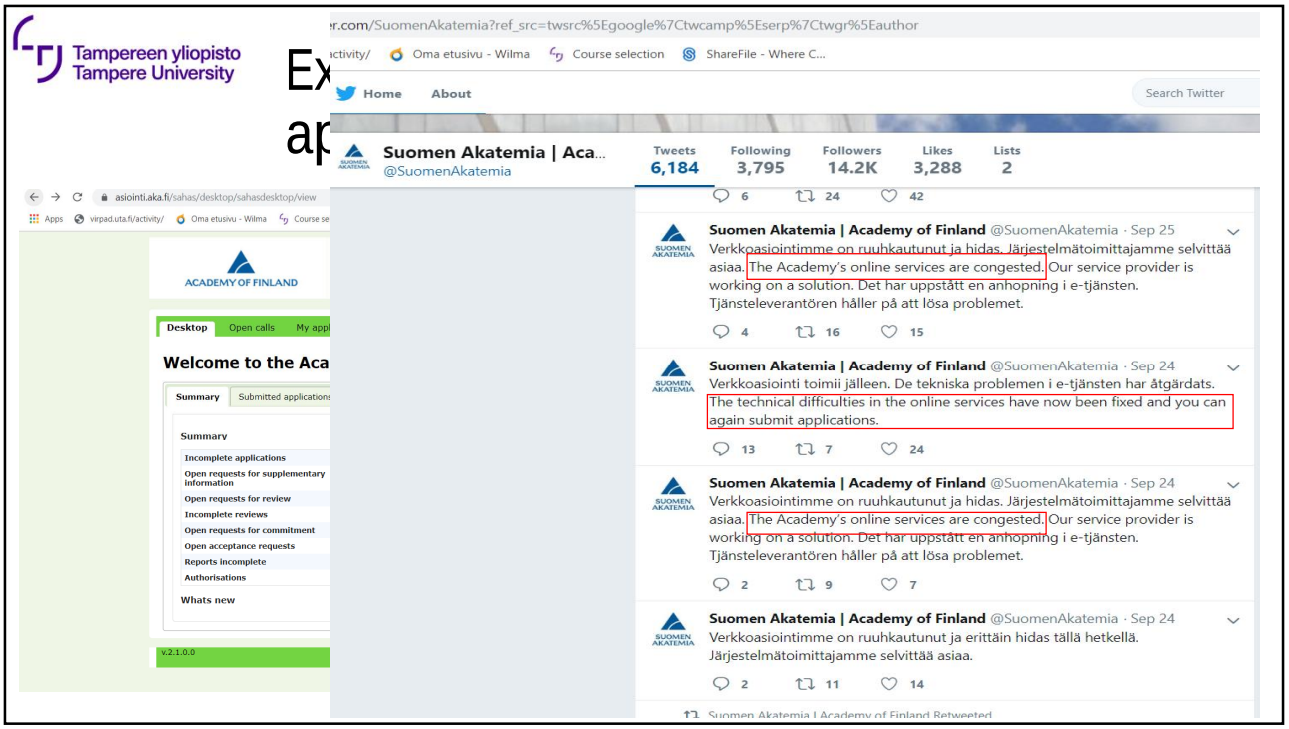

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How about the *exceptional or unwanted scenarios* when the system was launched or updated?

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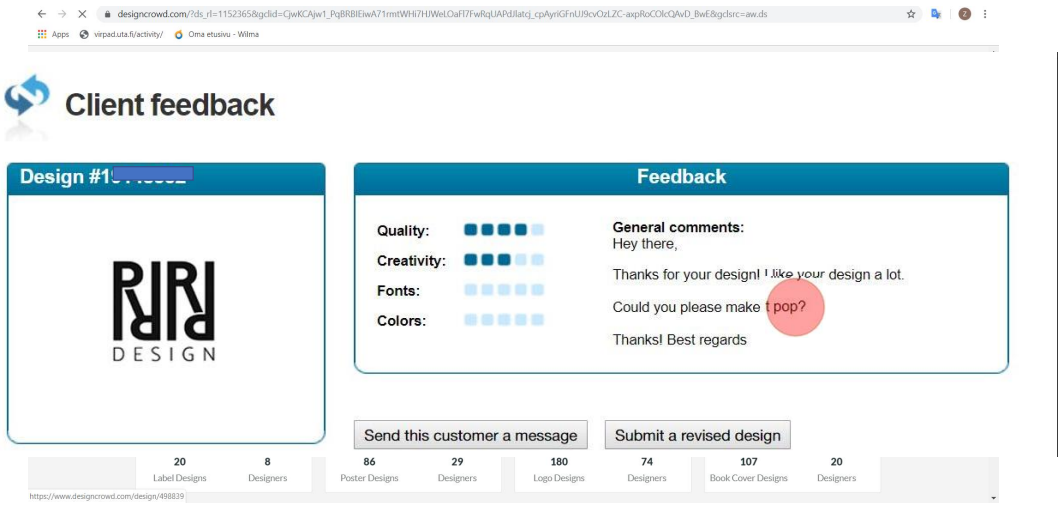
Example 3: a logo design need for a freelance designer



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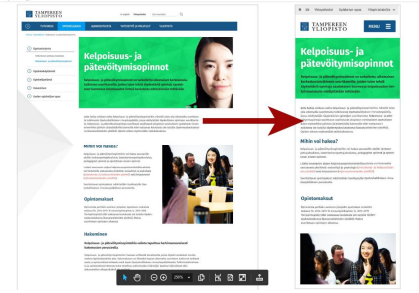
What does the ”pop” mean? What is the *goal* of the client?

Example 4: UTA webpage renewal 2016 (the admission page)

Admissions website

- Students' #1 wish: all the information in one place, less clicking and jumping
- Our #1 mission: help the applicant in a confusing situation (schools -> faculties)
- Conclusion: The admissions website is the place to make your programme stand out



Admissions website

What applicants wish to find on the programme page?

- o Programme profile and related research at UTA
- o Skills acquired, career opportunities
- o Structure of studies (diagram), course contents
- o Options within studies
- o Eligibility criteria
- o Application process (link to 8)
- o Student testimonials
- o Contact information

The content of the "Admission page" led to big discussion among professors and the head of the programmes.

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Did the project address the *goals* and *needs* of different groups of *stakeholders* (students, professors, programme directors, tutors, etc.)? Is there enough time located for acquiring their needs and opinions?

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Goals

- Goals are things to achieve, and are represented in the form of needs or objectives, and elaborated into requirments
  - Business objectives, business targets, senior management goals: describe metrics the business must meet in order to solve one or more problems
    - E.g. "coach people to a healthy and active life"
  - Project vision and scope: the basic purpose of an organization or project, i.e. the single thing set up to achieve
    - E.g. "walk tracker to track dauly steps, burning calories, and display the data"
  - Stakeholder goals, user requirements: statements by beneficiaries of what they need
    - E.g. "low power consumption", "help lose weight"
  - Product feature, quality and constraints
    - e.g. "drink reminder"; "charts reporting calories, time, distance"; "no GPS tracking"

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Goals vs. Requirements

- Goals <> Requirements
  - Goals belong to different stakeholders
  - Goals may conflict
  - Goals indicate what is hoped for
- Articulating the goals is a great starting point, and needs are transformed into stakeholder requirements

Making good wine is simple but not easy.

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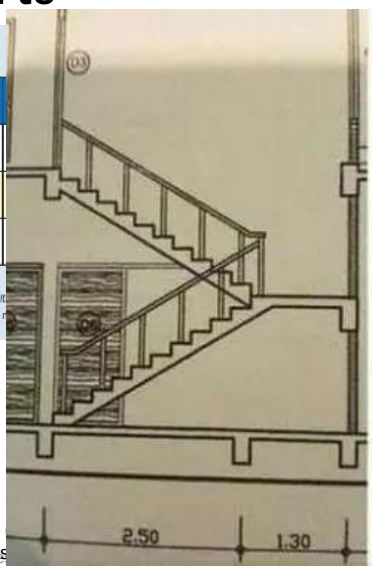
The state of practice of IT projects – Chaos reports

MODERN RESOLUTION FOR ALL PROJECTS

	2011	2012	2013	2014
SUCCESSFUL	29%	27%	31%	28%
CHALLENGED	49%	56%	50%	55%
FAILED	22%	17%	19%	17%

The Modern Resolution (OnTime, OnBudget, with a satisfactory result) of all software projects from FY2011 - 2015 wi... database. Please note that for the rest of this report CHAOS Resolution will refer to the Modern Resolution definition ... Resolution definition.



Hastie and Wojewoda, Standish Group 2015 Chaos Report - Jennifer Lynch, https://www.infoq.com/articles/standish-chaos

Factors of success in 2015 Chaos report

CHAOS FACTORS OF SUCCESS

FACTORS OF SUCCESS	POINTS	INVESTMENT
Executive Sponsorship	15	15%
Emotional Maturity	15	15%
User Involvement	15	15%
Optimization	15	15%
Skilled Resources	10	10%
Standard Architecture	8	8%
Agile Process	7	7%
Modest Execution	6	6%
Project Management Expertise	5	5%
Clear Business Objectives	4	4%

https://www.infoq.com/articles/standish-chaos-2015

”Projects in NASA found that they could reduce project overruns substantially (30% to 130% overrun to 10% to 20%) by investing 5%-9% of the total project time on requirements as opposed to 0.5% to 4%. Investing enough in good requirements has a clear payoff.” (http://www.gilb.com/Requirements)

Importance of understanding the customer needs!

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Requirements errors are likely to be the most common class of error

- Requirement errors typically comprise over 40% of all errors in a software project (Leffingwell and Widrig, 2003)
  - U.S. air force projects: ”36% of all defects were due to faulty requirements translation. Only 9% of these errors were resolved in the requirements phase” (Sheldon 92)
- Error propagation in software development lifecycle

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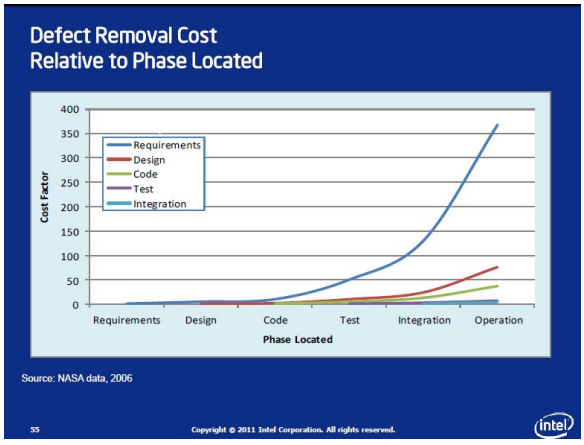
Requirements errors are likely to be the most expensive errors to fix



E. Simmons (2011), 21st Century Requirements Engineering: A Pragmatic Guide to Best Practices, excerpt from PNSQC 2011 Proceedings

- As much as a 200:1 cost savings results from finding errors in the reqs. stage versus finding errors in the maintenance stage
- Requirement errors typically cost over 10 times more to repair than other errors (Davis 1993)

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Requirements-related errors can be dangerous

- London Ambulance Dispatching System (1993): fatal delays
  - Wrong assumptions on crew behavior, ambulance localization system, radio communication, ...
- Case studies of London underground system in 1995 by Neumann
- Recent failures
  - In 2018, a software miscalculation in one of Uber's self-driving cars caused the death of a pedestrian (https://arstechnica.com/tech-policy/ 2018/05/report-software-bug-led-to-death-in-ubers-self-driving-crash/)
  - In 2018, the malfunction of the plane's flight-control system causes the crash of Lion Air Boeing 737 Max 8 jetliner into the Java Sea, which killed all 189 passengers and crew (https://www.viva64.com/en/b/ 0445/). Half a year later, in 2019 Ethiopian Airlines Boeing 737 crashed just outside Addis Ababa killing 157.

- LAS (1993). Report of the Inquiry into the London Ambulance Service, Communications Directorate, South West Thames Regional Authority, Feburary.
- Neumann, P. G. (1995). Computer related risks. Addison-Wesley

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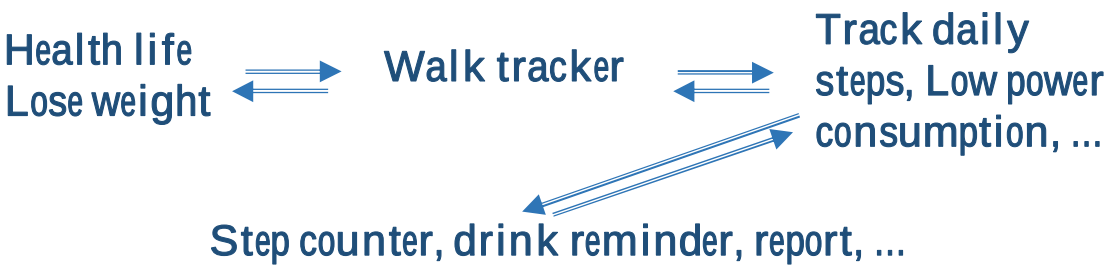
Making good wine is simple but not easy.



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Outline

- Brief introduction
- Importance of understanding the problem domain for software development
- Value
  - The amount and nature of value in a particular product or service always lie in the eye of the beholder

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Value

- A customer need is a motive that prompts a customer to buy a product or service.
- *"Everything is worth what its purchaser will pay for it."* - Publilius Syrus, first century B.C.
- A product provider must have an accurate understanding of what would value.
  - Value - the worth in monetary terms of the benefits a customer receives in exchange for the price to be paid
  - Benefits - technical, economic, service, and social benefits
  - The benefits well address the needs

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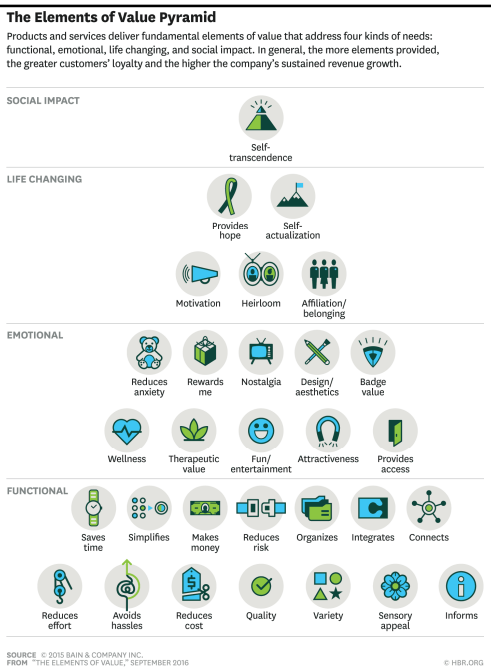
The Elements of Value

- The conceptual roots of the model is traced to the psychologist Abraham Maslow's "hierarchy of needs", 1943
- 4 kinds of value in the elements of value pyramid, i.e. functional, emotional, life changing, and social impact
  - The model ranges from the physiological and safety needs to self-actualization and self-transcendence
  - people cannot attain the needs at the top until they have met the ones below



E. Almquist, J. Senior, and N. Bloch (2016) The Elements of Value. Harvard Business Review. Sept. 2016

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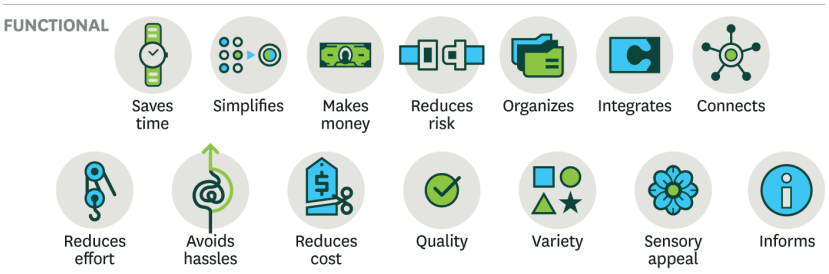
Functional

- Functional elements are based on a *product attribute that provides the customer with functional utility.*
- *E.g. Alipay*
  - send/receive money from your peers - simplifies, avoid hassle, etc.;
  - scan & pay – save time, reduce effort
  - book air/rail/movies tickets, order food from local restaurants or book a taxi – variety
  - Etc.

支付宝 ALIPAY



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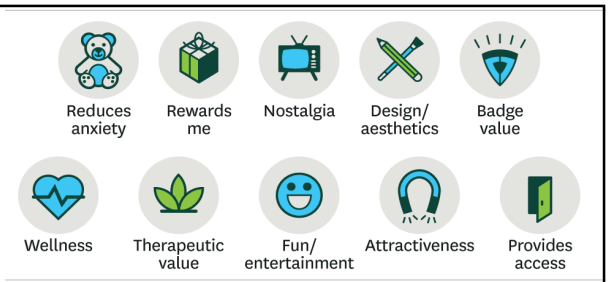
Emotional



- Emotional elements provide customers with *a positive feeling when they purchase or use a particular product.* They add richness and depth to the experience of owning and using the product.
- Facebook: “on this day” - nostalgia
- Wechat: Sticker gallery; selfies stickers; games – fun/entertainment
- Xiaomi Mi Band: Sleep-cycle smart alarm – wellness, therapeutic value

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Life changing

- Life changing elements provide an opportunity for *someone to communicate his or her self-image.*
- Inwardly focused, focusing on the act of using the product, primarily addressing consumers’ personal needs, such as providing hope, self-actualization, affiliation and belonging or motivation
  - Spotify added a music-streaming feature for runners that detects their tempo and finds music to match it (motivation).
  - StopDia (Pienet Teot) provides fitness advice, nutrition plans to help slim waist, to improve eating habits (provides hopes).

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Social impact

- Social impact elements convey the sense of doing good for others
- Helping other people or society more broadly
  - E.g. When TOMS sells a pair of shoes or eyewear, a new pair of shoes goes to an impoverished child or part of the profit goes to save the eyesight of people in developing countries.
  - E.g. a smart traffic light system which can self-adjusted intervals between light switch: avoid hassle, reduce risk, save time -> reduces anxiety -> motivation -> reduce carbon emissions, protect environment

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Patterns of value

- Some elements do matter more than others
  - Products and services must attain a certain minimum level
  - the critical elements
    - food and beverages - appealing in taste and smell -> *sensory appeal*
    - *Netflix -> reduces cost, variety*
- *Putting the elements to work*
  - Understand the elements critical to business
  - Implement critical elements before attempting to add new ones
  - Refine product designs to deliver more elements, e.g. quality, save time, reduce cost

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Groups and group work (55 points)

- Day 1: product value analysis, due at 12pm, Aug. 6, 2020
  - Read the article *E. Almquist, J. Senior, and N. Bloch (2016) The Elements of Value. Harvard Business Review. Sept. 2016* (see the attached pdf file)
  - Select a product or service, and use "the elements of value" model to (15 points)
    a) Clarify the produce or service to be analysed; - 2p
    b) identify and analyze the four categories of elements of value (from the functional level to the social impact level) the product/service delivers; - 8p
    c) besides the elements of value elements delivered by the selected product, are there elements which are critical but missing or insufficiently delivered? If yes, discuss how to refine the software to strengthen or deliver these value elements. If no, discuss the new elements which could be added to the software. – 5p
  - Prepare for a document to answer the above questions.
  - In addition, Groups 1, 13, 4, 11 and 6 prepare for a presentation (including 3 or 4 slides) of the product value analysis tasks, and present it tomorrow (Aug. 6) in the course (有一说一确实组, 东拼西凑组, 下岗工人再就业队, 这个需求有难度, 没有名字组)

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Groups for the group work

序号	组名	组长（格式：姓名_学号）	组员（格式：姓名_学号、）
1	有一说一确实组	汪力_2017141463022	周旺_2017141463073、刘舒月_2017141463174、耿雨萱2017141463060、曹志铭_2017141463062、胡旭_2017141463002
2	影流之组	高彤_2017141463088	张南南_2017141463047、曾毅君_2017141463200、郭锦宏_2017141463127、刘凡兴_2017141463189、郭家豪_2017141463102
3	Cardigan	郑涵辞_2017141463169	陈犍淞_2017141463024、张起川_2017141463165、颜上葳_2017141463211、李阳_2017141463136、方嘉豪_2017141463075
4	下岗工人再就业队	刘盈盈_2017141463042	陈熳熳_2017141463041、余坚_2017141463212、喻婷_2017141463182、金闿_2017141501002、周文举_2017141463005
5	五七同城	彭文俊_2017141463086	王敬_2017141463030、冷进森_2017141463132、王樱尧_2017141012054、陈迎语_2017141412028、冯宇瑶_2017141463107
6	没有名字组	龙行超_2017141463145	秦阳_2017141012052、李岳聪_2017141411169、苏昌盛_2017141231170、祁伟_2017141411023、刘志新_2017141463027
7	喇叭组	潘林洋_2017141463110	张和平_2017141463162、张起扬_2017141463057、淡云飞_2017141463215、罗小鹏_2017141463147、张凯_2017141463164
8	就这就这组	杨鑫_2017141463157	李仁杰_2017141463019、刘民皓_2017141463141、于泽洋_2017141463091、唐继_2017141463154、覃超伟_2017141463029
9	秃头小队	费宇辰_2017141463101	何思迪_2017141463172、胡雨晴_2017141463011、雷娜_2017141463061、周蓓佳_2017141463183、宋俐潼_2017141223035、朱兵寒_2017141463006
10	阿勇废了，下一组	陶航_2017141463218	赵欣_2017141463093、蒋辰昊_2017141463076、江勇_2017141463085、张绍林_2017141463099、江昊_2017141463131
11	这个需求有难度	吴迪_2017141463221	马子寅_2017141463050、欧承忠_2017141463148、唐郅杰_2017141463155、欧阳佳航_2017141463149、唐晔晨_2017141463078
12	就很牛皮	冯康慧_2017141463124	李冰洋_2017141463048、刘文鹏_2017141221034、张文松_2017141463166、李祝行_2017141463204、李征雨_2017141463139、张起扬_2017141463057
13	东拼西凑组	邓诗汗_2017141463223	朱子豪_2017141463198、周雪梅_2017141463044、王明威_2017141463092、范重阳_2017141463108、李可_2017141463003、苏锐程_2017141463151

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