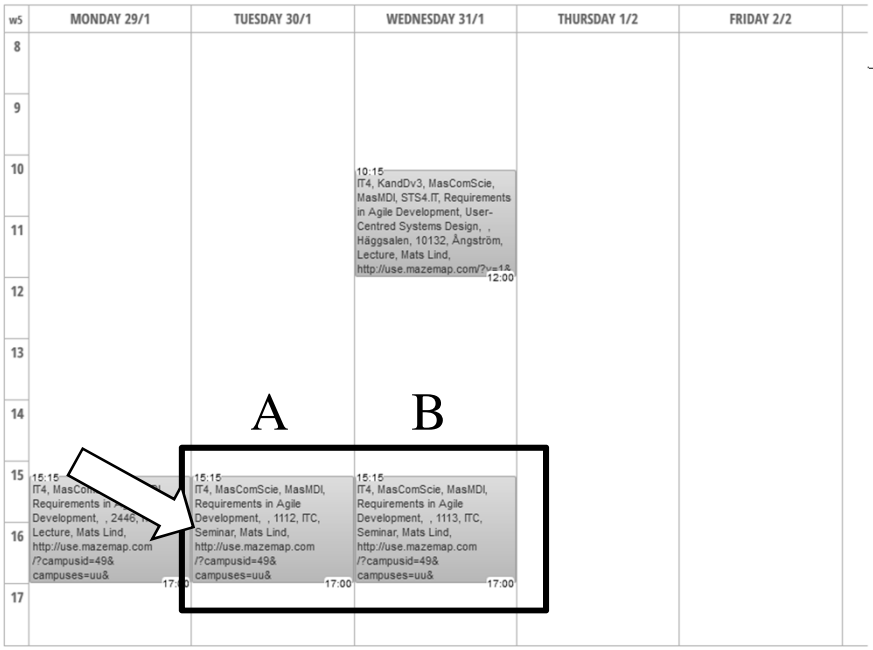
Some more about the project

1



Finding a project

Two guidelines on finding a system/work to analyze and work with:

- You need to find at least one knowledgeable person in the work process that is to be supported by your new, proposed system. This person must be willing to be interviewed by you a few times for at least an hour or so every time.
- The work process supported should not be a computer game or any other system primarily oriented towards entertaining or educating its users.

3

Project milestones and their deadlines

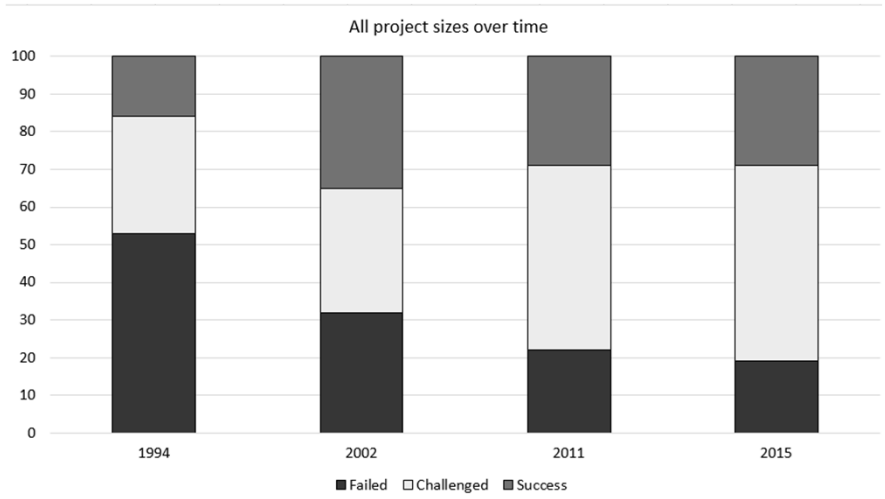
Deadline group membership: Wednesday Jan 24 at 10.00.

Five milestones:

- Milestone 1: A short written description of the work you have selected to analyze and a description of what models you will use in the project and motivations as to why these were selected. Deadline for submission => A&B: Mon, Jan 29 at 23:59.
- Milestone 2: Documentation of work and users your system supports
  Deadline for submission => A & B: Mon, Feb 5 at 23:59.
- Milestone 3: User stories based on your analysis.
  Deadline for submission => A&B: Tue, Feb 12 at 23:59
- Milestone 4: First sketch of the UI of your proposed system.
  Deadline for submission =>A&B: Mon, Feb 19 at 08:00.
- Milestone 5: Paper and pen prototype of your new system
  Deadline for submission =>A&B: Mon, Mar 5 at 23:59.

4

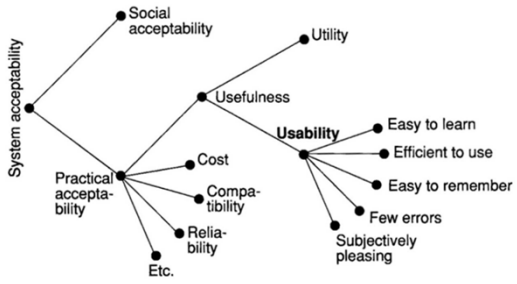
How big are the problems? (2015)



From Chaos reports by the Standish group

5

- (*Usability is*) the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.



Now, let's start…

The basic premise

- Professional software is usually created by people with an education in computer science.
- Computer science is about finding programmable solutions to comparatively well defined problems.

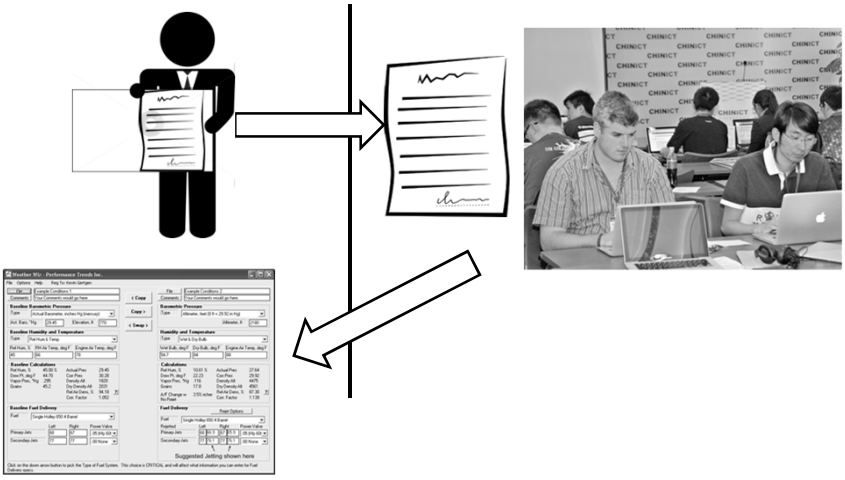
Example

- We want to be able to perform complicated calculations on massive datasets.
  - How do we store the data best?
  - How do we quickly find a single datum in the dataset?
  - How can we efficiently perform the calculations?
  - Which is the best way to sort the results of the calculations?

Common trait

- Computer science methods require the problem to be solved by the computer program to be clearly stated.

Historically this has been accomplished by asking the customer to provide a 'requirements specification'



However, this method is not very successful

As we saw in the CHAOS results, most development projects are:

- delayed
- more expensive than predicted
- and in 20% of the cases, simply aborted

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WHY?

Two main reasons

1. The developers were unable to complete a system meeting the original requirements on time and budget
   - As software projects become large more developers are needed. More people mean more difficulties in handling who is doing what and how
2. The delivered system does not meet the customer's expectations
   - The software developers interpret this as that the customer has changed her mind, i.e. the requirements have changed or been added to.
   - From their perspective they did a good job since they produced a system that met the requirements!

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Metric mishap caused loss of NASA orbiter

September 30, 1999

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CNN NASA lost a 125 million Mars orbiter because a Lockheed Martin engineering team used English units of measurement while the agencys team used the more conventional metric system for a key spacecraft operation, according to a review finding released Thursday.

The units mismatch prevented navigation information from transferring between the Mars Climate Orbiter spacecraft team in at Lockheed Martin in Denver and the flight team at NASAs Jet Propulsion Laboratory in Pasadena, California.

Lockheed Martin helped build, develop and operate the spacecraft for NASA. Its engineers provided navigation commands for Climate Orbiters thrusters in English units although NASA has been using the metric system predominantly since at least 1990.

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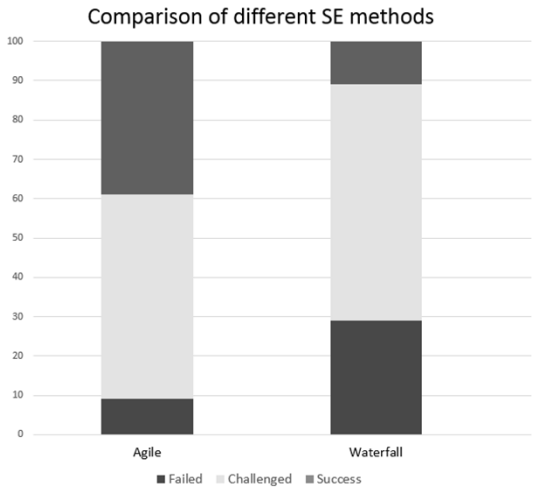
Is being dealt with by Software Engineering research and methods where agile methods seem promising

Agile and Waterfall



From Chaos reports by the Standish group

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Two main reasons

1. The developers were unable to complete a system meeting the original requirements on time and budget
   - As software projects become large more developers are needed. More people mean more difficulties in handling who is doing what and how
2. The delivered system is not accepted by the customer without changes ('requirements creep')
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Why is it so difficult (maybe even impossible) to formulate valid requirements!

The answer has at least four different facets

- The ‘open’ nature of work
- Human cognitive functioning
- The nature of human communication
- Human social functioning

Open nature of work

A note on the word ‘system’

- Many students of IT think of a computer and/or a program when the word ‘system’ is used
- However, here we will now use it in a broader meaning:

‘System’

Merriam-Webster (meaning 1 of 4):

A regularly interacting or interdependent group of items forming a unified whole

- a group of interacting bodies under the influence of related forces
  - a gravitational system
- an assemblage of substances that is in or tends to equilibrium
  - a thermodynamic system
- a group of body organs that together perform one or more vital functions
  - the digestive system
- a group of related natural objects or forces
  - a river system
- a group of devices or artificial objects or an organization forming a network especially for distributing something or serving a common purpose
  - a telephone system; a heating system; a highway system; a computer system

Open nature of work

Natural systems are complex

i, Difficult/impossible to predict and control

- E.g. weather
- Even worse when humans are part of the system
  - War
  - Economy
  - Business ecosystems
  - Basically any human endeavor…

Open nature of work

The nature of programming is to be structured and complete

Thus it is common in software development to look at complex natural systems, such as work:

- in lesser detail than is needed to understand the situation for the workers, the 'anthill' and not the 'ants', and
- disregard its unpredictability, i.e. the open nature of work

Is work always complex?

- It might not be in very controlled environments
  - But then it is probably already automated!

Remember the question:

Why is it so difficult (maybe even impossible) to formulate valid requirements!

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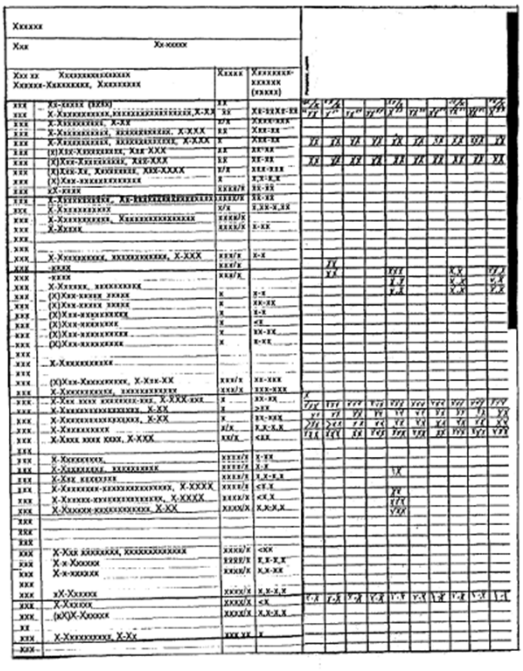
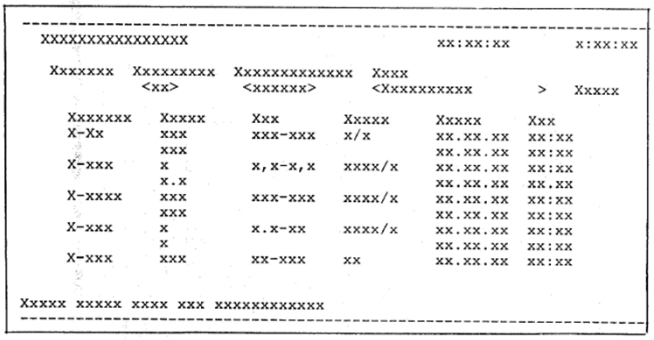
Characteristics of human memory

- Partly procedural
- Always associative
- Constructive





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D. R. GODDEN AND A. D. BADDELEY

Table 1. *Mean number of words recalled in Expt. I as a function of learning and recall environment*

Learning environment	Recall environment: Dry — Mean recall score	S.D.	Recall environment: Wet — Mean recall score	S.D.	Total
Dry	13·5	5·8	8·6	(3·0)	22·1
Wet	8·4	3·3	11·4	(5·0)	19·8
Total	21·9	—	20·0	—	—

t of learning and recall environment was, however, highly
); d.f. = 1, 12; $P = < 0{\cdot}001$). Thus the effect on recall of the e

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That's why it's so difficult to formulate valid requirements!