



Software Engineering

Lecture 1

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Course Information

Primary Textbook:

- R. S. Pressman, *Software Engineering: A Practitioner's Approach*, 7th Edition
- K. Schwalbe, *Information Technology Project Management*, 6th Edition

Reference Textbook:

- I. Sommerville, *Software Engineering*, 9th Edition

No mobile phone usage during Lecture





Course Objective

To familiarize students to the fundamental concepts, techniques, processes, methods and tools of
Software Engineering

To help students to develop basic skills that will enable them to construct software of high quality

- Software that is reliable, and that is reasonably easy to understand, modify and maintain

To foster an understanding of why these skills are important



Motivation

Software can have huge impact in any aspect of our society

Where can we find software?



Some popular ones



The screenshot shows the Facebook homepage. At the top left is the Facebook logo. To its right are the login options: a checkbox for "Remember Me", a link for "Forgot your password?", an input field for "Email", an input field for "Password", and a "Login" button. Below the login section, on the left, is a promotional message: "Facebook helps you connect and share with the people in your life." This is accompanied by a world map with several orange person icons connected by dashed lines. On the right is the "Sign Up" section, which includes the text "It's free and anyone can join" and a form with the following fields: "Full Name:", "Your Email:", "New Password:", "I am:" with a "Select Sex:" dropdown, and "Birthday:" with "Month:", "Day:", and "Year:" dropdowns. Below the birthday fields is the text "Why do I need to provide this?" and a green "Sign Up" button. At the bottom of the sign-up section is a link: "To create a page for a celebrity, band or business, click here."



Google Search

I'm Feeling Lucky

Google.com.pk offered in: اردو

And even in





Conclusion

Software is almost everywhere!!!



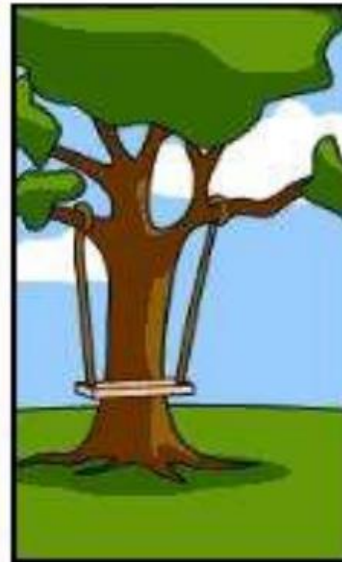
Problems in Software Development

Common issues

- The final software does not fulfill the needs of the customer
- Hard to extend and improve: if you want to add a functionality later its mission impossible
- Bad documentation
- Bad quality: frequent errors, hard to use, ...
- More time and costs than expected



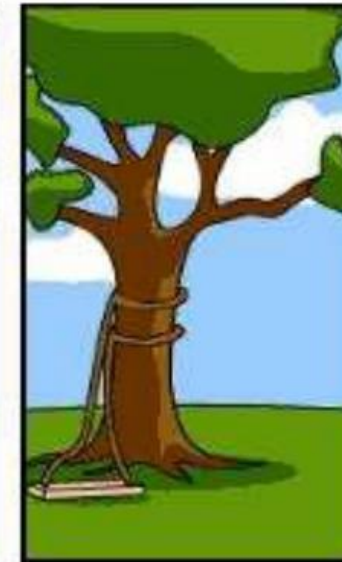
How the customer explained it



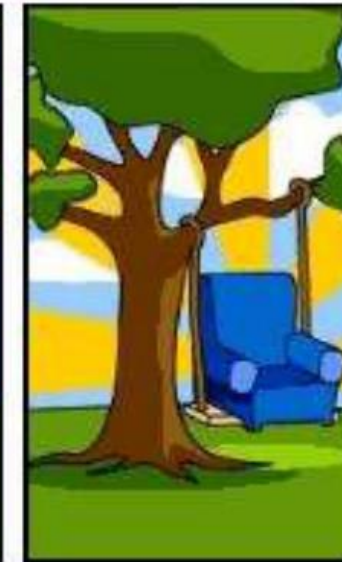
How the Project Leader understood it



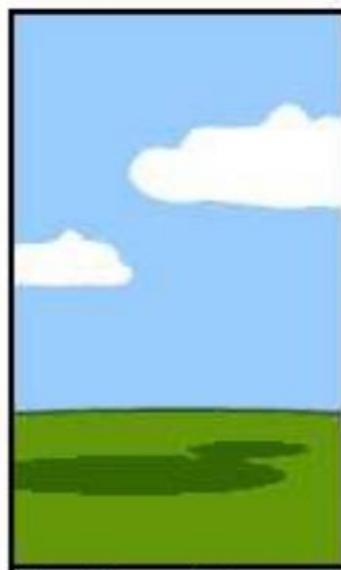
How the Analyst designed it



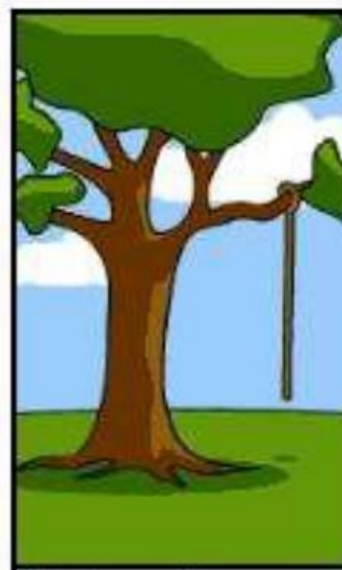
How the Programmer wrote it



How the Business Consultant described it



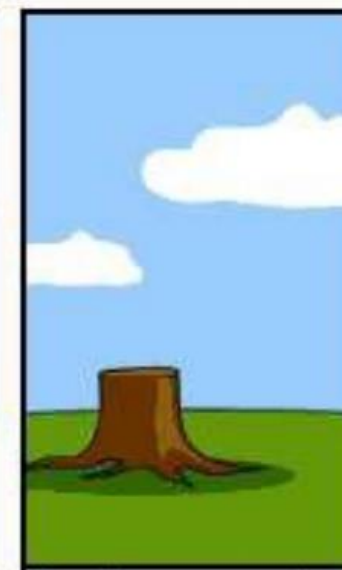
How the project was documented



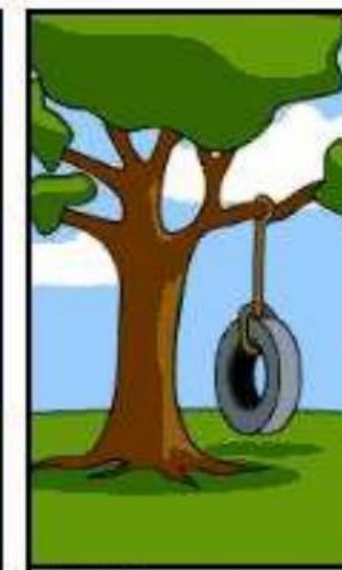
What operations installed



How the customer was billed



How it was supported



What the customer really needed

Ariane 5 Flight 501

Cause: design errors in the software

<https://www.youtube.com/watch?v=5tJPXYA0Nec>



Source: https://www.youtube.com/watch?v=gp_D8r-2hwk



Conclusion

Programming is NOT enough!

It is not enough to do your best: you must know what to do, and THEN do your best.

W. Edwards Deming



Solution



Software Engineering

The application of **systematic, disciplined, quantifiable** approaches to software **development, operation and maintenance***

**IEEE Standard 610.12-1990, IEEE Standard Glossary of Software Engineering Terminology, IEEE Standards Collection Software Engineering, IEEE (1997)*



Software Engineering

Objective is to produce software that is:

- **On time:** is deliver at the established date
- **Reliable:** does not crash
- **Complete:** good documentation, fulfill customer needs

Computer programs, procedures, and possibly associated documentation and data pertaining to the operation of a computer system

The software is instruction or computer program that when executed provide desired features, function, and performance

What is Software?

- Software is engineered
- Software doesn't wear out
- Software is complex

What is Engineering?

- Engineering is all about designing, building and testing things that solve real-world problems





Software Crisis

The notion of software engineering was first proposed in 1968 at a conference held to discuss what was then called the software crisis (Naur and Randell 1969)

It became clear that individual approaches to program development did not scale up to large and complex software systems. These were unreliable, cost more than expected, and were delivered late

Throughout the 1970s and 1980s, a variety of new software engineering techniques and methods were developed, such as structured programming, information hiding, and object-oriented development. Tools and standard notations were developed which are the basis of today's software engineering



Frequently asked questions about Software Engineering

Question	Answer
What is software?	Computer programs and associated documentation. Software products may be developed for a particular customer or may be developed for a general market
What are the attributes of good software?	Good software should deliver the required functionality and performance to the user and should be maintainable, dependable and usable
What is software engineering?	Software engineering is an engineering discipline that is concerned with all aspects of software production
What are the fundamental software engineering activities?	Software specification, software development, software validation and software evolution
What is the difference between software engineering and computer science?	Computer science focuses on theory and fundamentals; software engineering is concerned with the practicalities of developing and delivering useful software
What is the difference between software engineering and system engineering?	System engineering is concerned with all aspects of computer-based systems development including hardware, software and process engineering. Software engineering is part of this more general process