

Introduction to Software Engineering

Chapter 1 (Sommerville)

Fall Semester 2021
1st Semester 1443 H

What is Software?

“Computer programs and associated documentation.”

What is Software Engineering?

“Software engineering is an **engineering discipline** that is concerned with **all aspects of software production** from the early stages of system specification through to maintaining the system after it has gone into use”.

“It includes techniques that support program specification, design, and evolution”.



History of software engineering

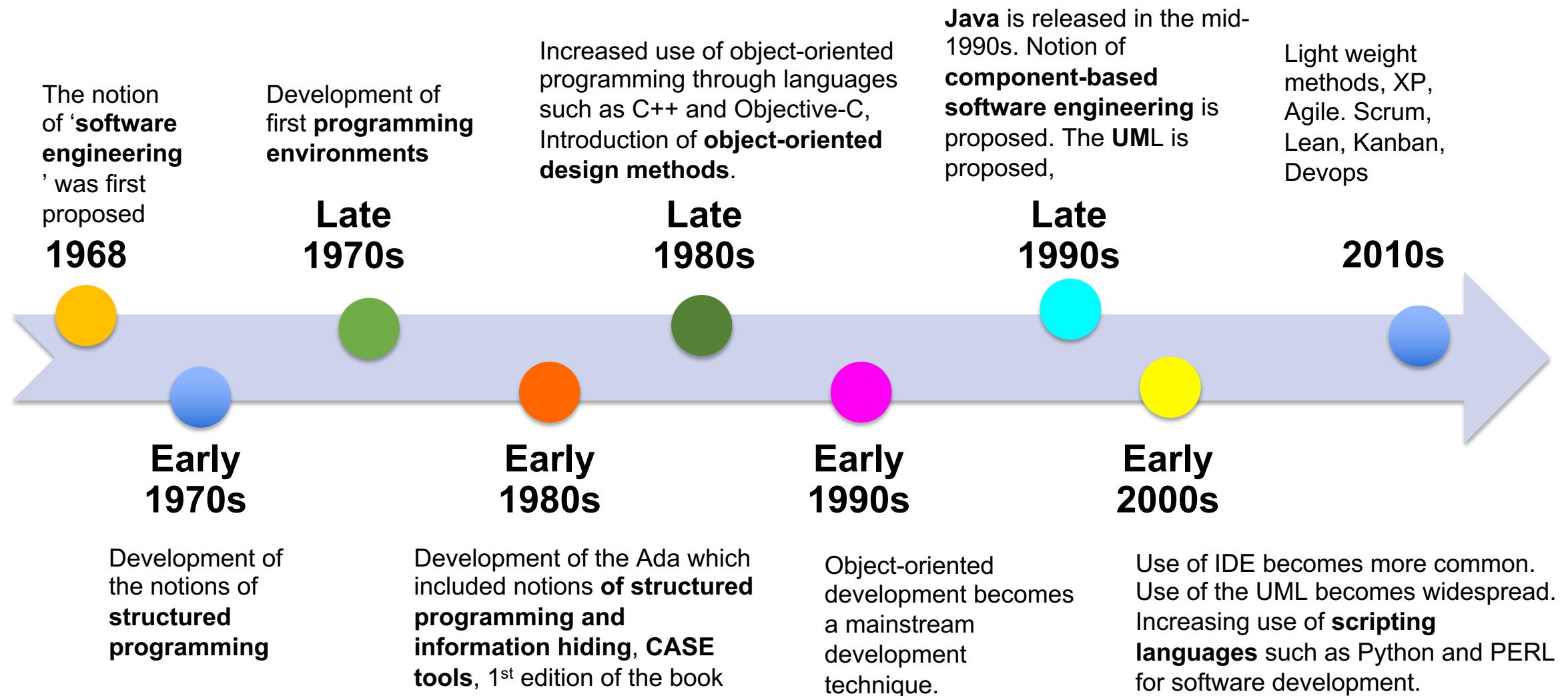
The notion of 'software engineering' was first proposed in 1968 at a conference held to discuss what was then called the 'software crisis' (Naur and Randell, 1969). It became clear that individual approaches to program development did not scale up to large and complex software systems. These were unreliable, 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 and are now extensively used.

<http://www.SoftwareEngineering-9.com/Web/History/>

The software Crisis (Video)

History of Software Engineering



Why is Software Engineering Important?

- The need to produce reliable and trustworthy systems economically and quickly.
- It is usually cheaper, in the long run, to use software engineering methods and techniques for software systems rather than just write the programs as if it was a personal programming project.
- It enables us to build complex systems in a timely manner and with high quality
- For most types of systems, the majority of costs are the costs of changing the software after it has gone into use.

Professional Software

**Professional
Software is ..**

“Developed for specific business purposes, for inclusion in other devices, or as software products such as information systems”

“Developed by teams rather than individuals.”

“Maintained and changed throughout its life.”

Types of software products

Software products may be developed for

1- a particular customer (*bespoke*)

or may be developed for

2- a general market (*generic/off-the-shelf*).

Activity: Software Types



Quality of Software

The behavior
of the software
while
executing

The structure and
organization of the
system programs
and associated
documentation

Quality / Non-Functional Attributes

Activity: What is the most important attribute for the following software systems?



Performance



Reliability



Security



Availability



Usability



Maintainability



WhatsApp



Product characteristics	Description
Maintainability	Software should be written in such a way so that it can evolve to meet the changing needs of customers. This is a critical attribute because software change is an inevitable requirement of a changing business environment.
Dependability and security	Software dependability includes a range of characteristics including reliability, security, and safety. Dependable software should not cause physical or economic damage in the event of system failure. Malicious users should not be able to access or damage the system.
Efficiency	Software should not make wasteful use of system resources such as memory and processor cycles. Efficiency therefore includes responsiveness, processing time, memory utilization, etc.
Acceptability	Software must be acceptable to the type of users for which it is designed. This means that it must be understandable, usable, and compatible with other systems that they use.

Essential attributes of good software

Key points

- What is software?
- What is software engineering?
- History of software engineering
- Why is software engineering important?
- Types of Software
- Quality attributes of software

Thank you

