The Evolution of the Software Professional

Changes to the practice and culture of software engineering over the last 35 years

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Computer Science: Who Cares?

Computer Graphics (1970's):

- One department, at one university
- Several faculty, a few more students
- $5,000,000 grant from ARPA

Computer Science: It Matters

Computer Graphics (2000's):

- Animated Content: $59b revenues
- Medical Imaging: $11b revenues
- Video Games: $46b revenues

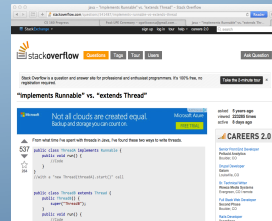
Software Engineering

IEEE Computer Society Definition:

"Software engineering is the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software, and the study of these approaches; that is, the application of engineering to software."

Game Changers in Our Profession

#1) The fast and ubiquitous access to the accumulated knowledge of humanity:

- Internet Infrastructure, Internet Content
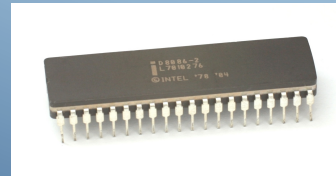- Cisco thinks 8.7 billion in 2012

Game Changers in Our Profession

#2) The evolution of fast, powerful, inexpensive, yet reliable hardware and software systems.

- 1978: Intel, 8086, 16-bit, 10 Mhz, 29K transistors
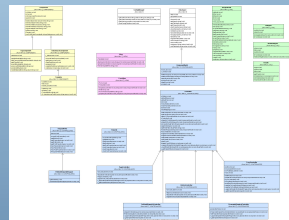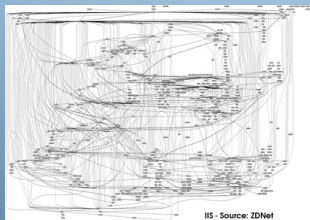- 2014: nVidia Tegra, 64-bit, 2.5 Ghz, 1G transistors

Game Changers in Our Profession

#3) Object Oriented Programming

- 1978: Fortran, Pascal, Cobol, C becoming popular
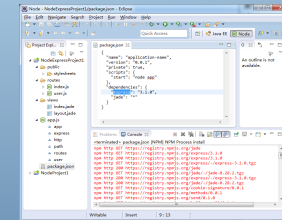- 2014: Ada, C++, Java, Python, Perl, etc.

IIS - Source: ZDNet

Game Changers in Our Profession

#4) Evolving Development Environments

- 1978: Card Reader, VT100 Terminal, Vi or Emacs
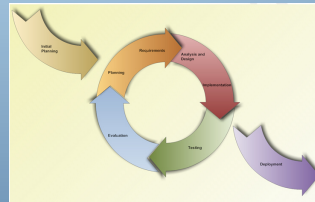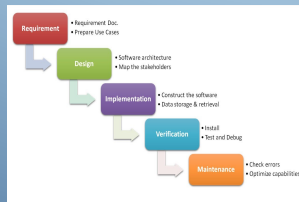- 2014: DevStudio, Eclipse, GitHub, Amazon Cloud

Game Changers in Our Profession

#5) Software Engineering Advances

- 1978: Waterfall Model, Source Control (maybe!)
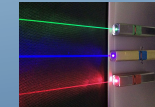- 2014: Agile Practices, Test Driven Development

Digital Magic

#6) Other advances in technology:

- Transistors (Small, Cheap, Fast Electronics)
- Lasers (Optical Media)
- Charge-Coupled Devices (Digital Imaging)
- Flat Panel Displays (Awesome Output)
- Fiber Optics (Lightspeed Communications)
- Flash Memory (Portable Data)
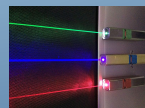- Mobile Communications (1G/2G/3G/4G/5G)

Digital Magic

#6) Other advances in technology:

- 1940's: Transistors (Small, Cheap, Fast Electronics)
- 1950's: Lasers (Optical Media)
- 1960's: Charge-Coupled Devices (Digital Imaging)
- 1960's: Flat Panel Displays (Awesome Output)
- 1970's: Fiber Optics (Lightspeed Communications)
- 1980's: Flash Memory (Portable Data)
- 1980's: Mobile Communications (1G/2G/3G/4G/5G)

Success Factors in this Profession

- You must know programming, operating systems, software engineering, etc.
- In addition, you must develop expertise that is specific to the domain in which you work
- You must be able to communicate your own ideas and understand those of others.
- You must have the ability to change and evolve along with technology.

Inevitability of Change

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