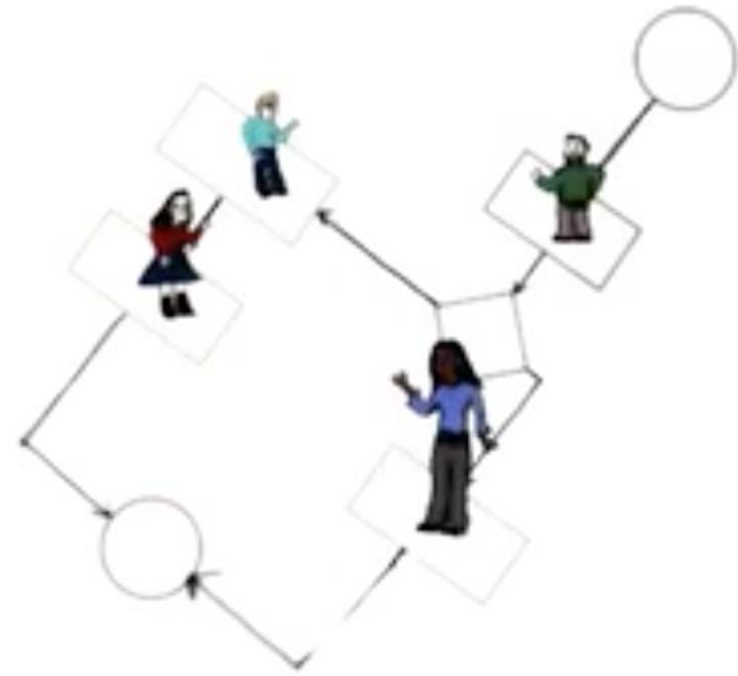


# CSE321 1-Software Engineering

Md Omar Faruque  
faruqe.cse@gmail.com



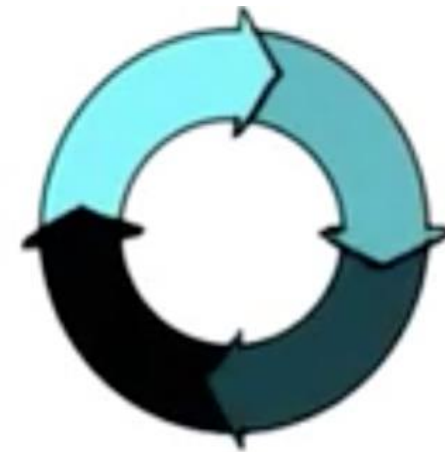
Projects



Process



Tools



Phases

**What is  
Software  
Engineering?**

**Why do  
we need  
it?**

WHAT IS SOFTWARE ENGINEERING?

# What is this?



- 4th of July fireworks?
- Flare gun in action
- Explosion of Ariane 5 rocket due to software errors

# What is this?



- 4th of July fireworks?
- Flare gun in action
- **Explosion of Ariane 5 rocket due to software errors**



# Crash!





Why is it so  
hard to  
build  
software ?



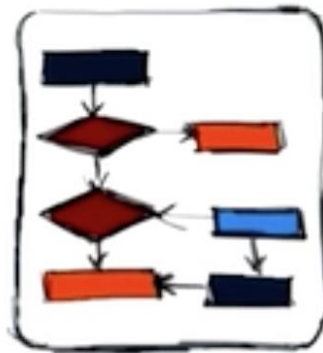
Why is it so  
hard to  
build good  
software ?



# Discipline of Software Engineering



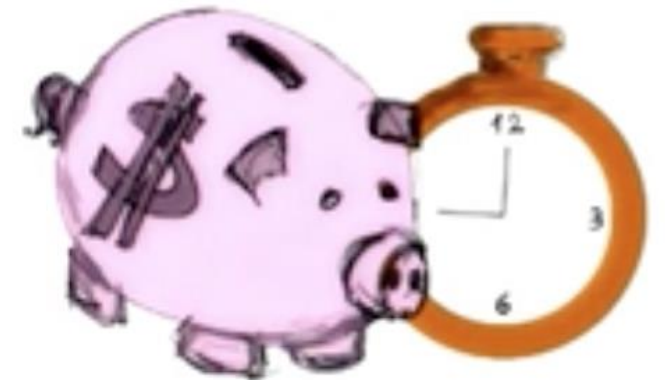
Methodologies



Techniques



Tools



High quality software that works and fits budget

# The 60's



Man on the moon



Woodstock



Polaroid

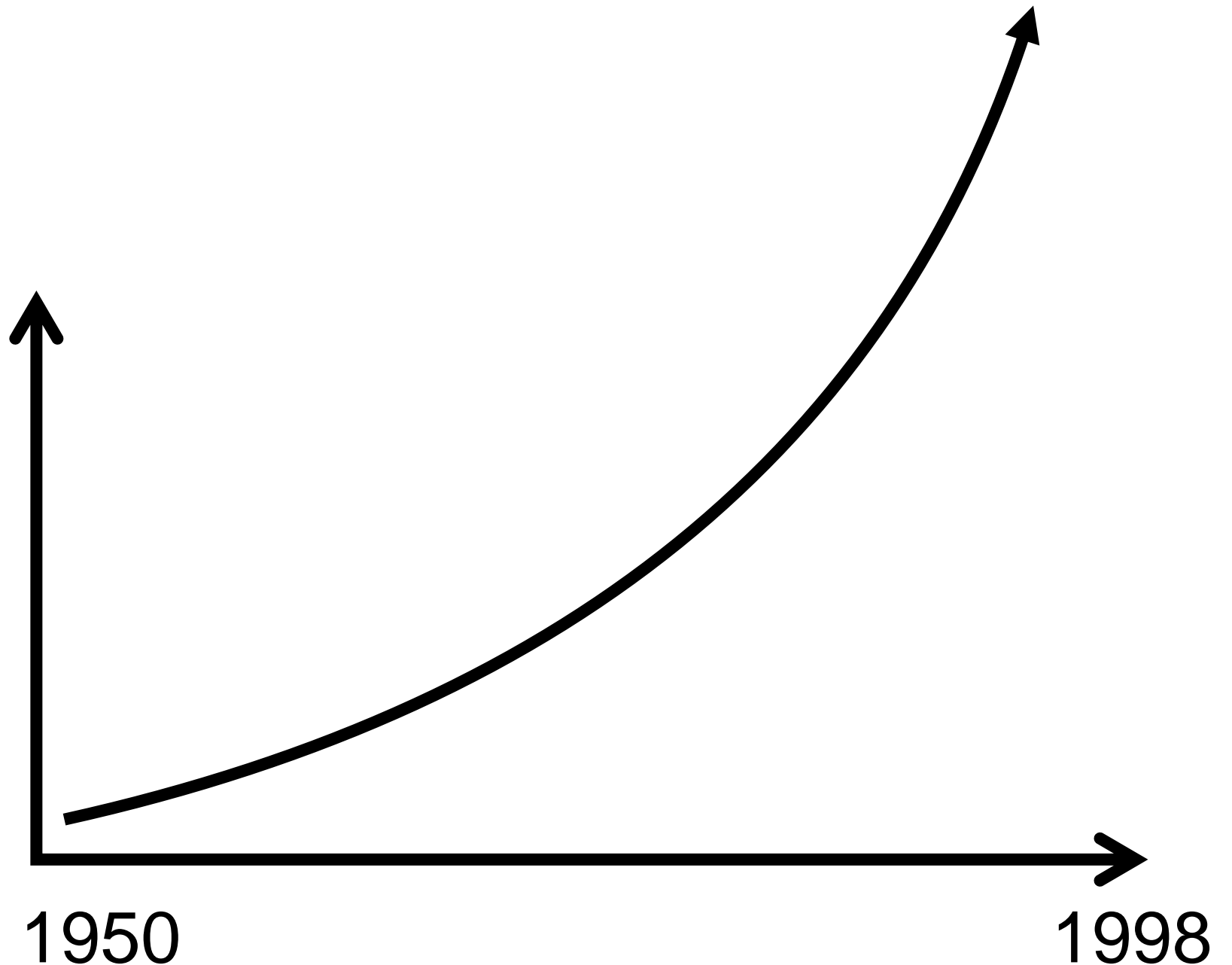




# Rising Demand for Software

**HW => SW**

Growth in NASA's  
Software Demand



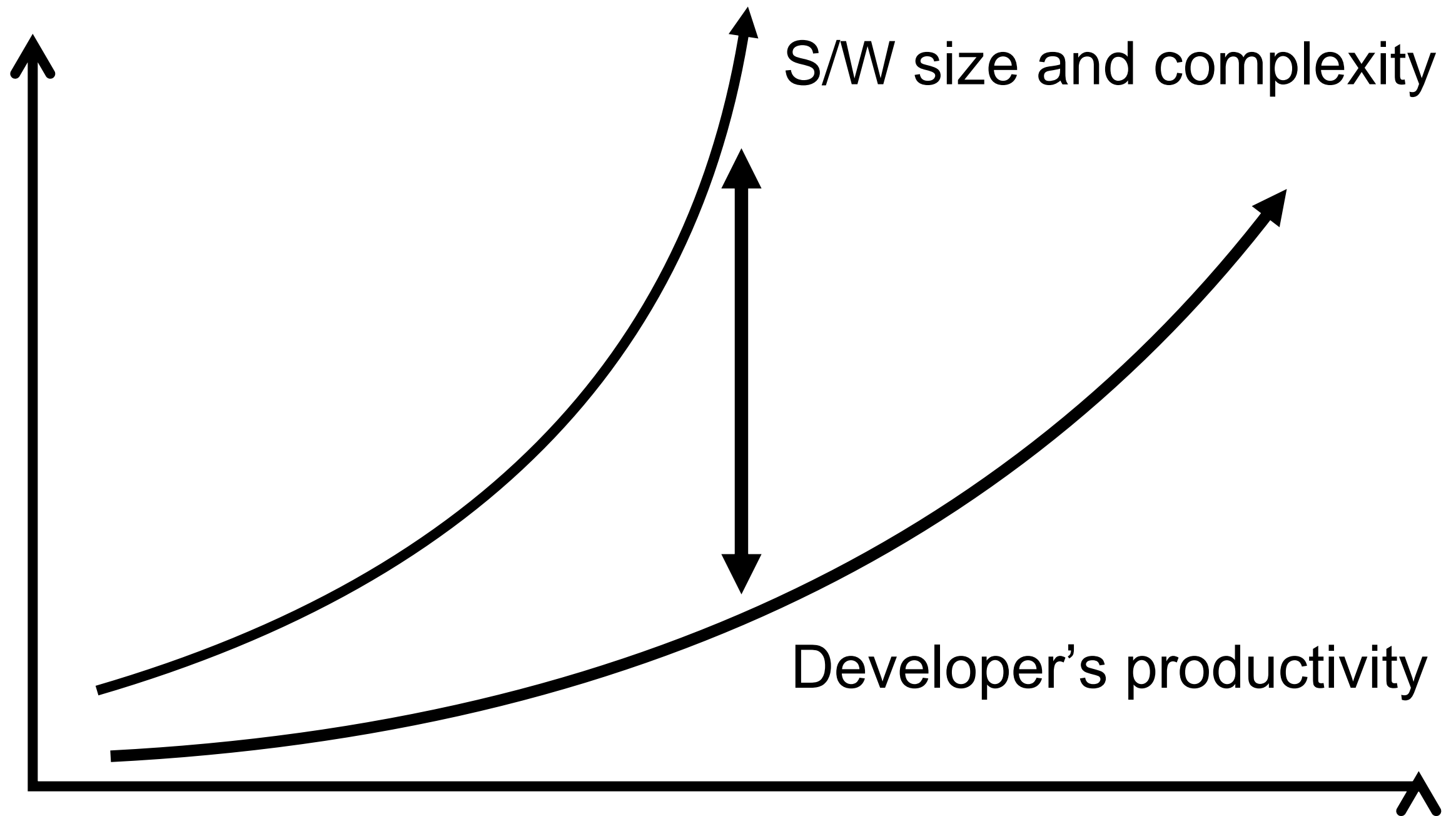
# Development Effort

Size (LOC)	Example
$10^2$	Class exercise
$10^3$	Small Project
$10^4$	Term Project
$10^5$	Word processor
$10^6$	Operating System
$10^7$	Distributed System

} Programming effort

} Software Engineering effort

# Developers Productivity Growth





# What are the major causes of the software crisis?

- ♦ Increasing cost of Computers
- ♦ Increasing product complexity
- ♦ Lack of programmers
- ♦ Slow programmer's productivity growth
- ♦ Lack of funding for software engineering research
- ♦ Rising demand for software
- ♦ Lack of caffeine in software development organizations

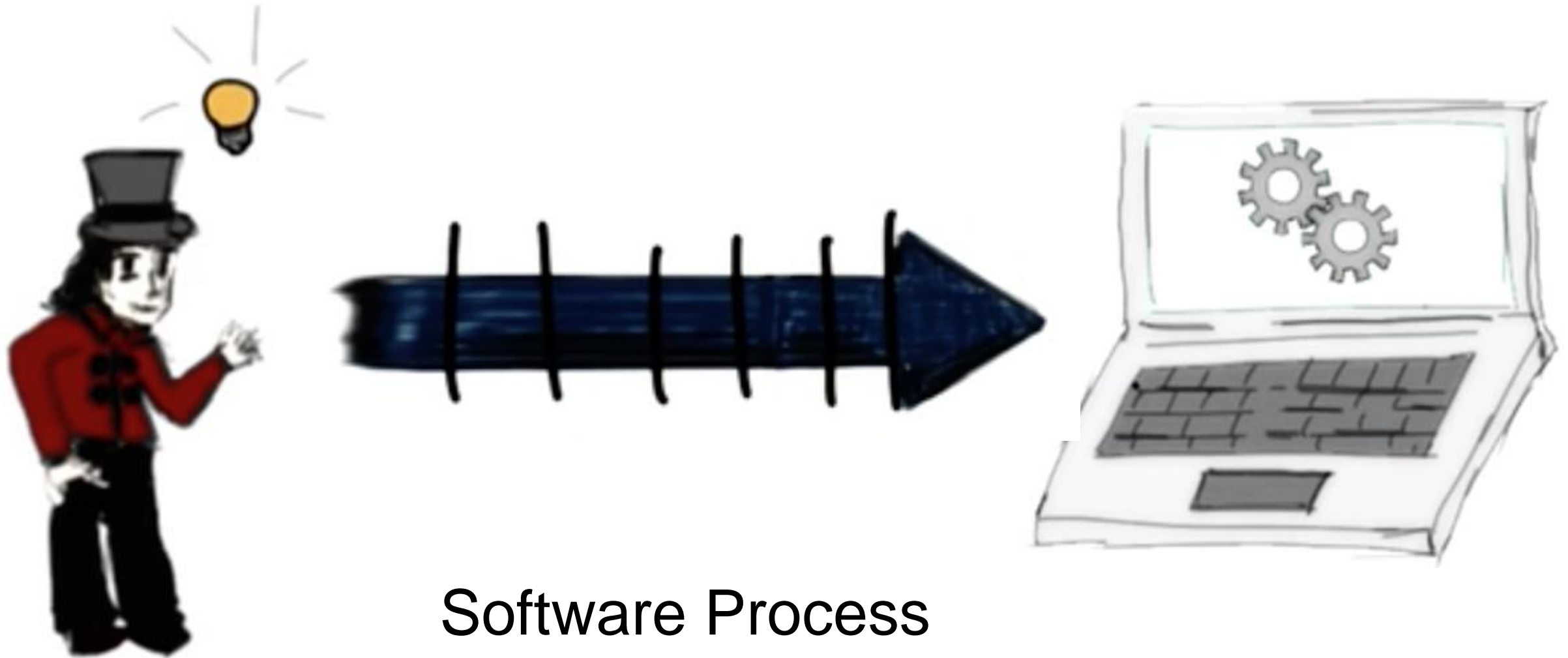
# What are the major causes of the software crisis?

- ♦ Increasing cost of Computers
  - **Increasing product complexity**
- ♦ Lack of programmers
  - **Slow programmer's productivity growth**
- ♦ Lack of funding for software engineering research
  - **Rising demand for software**
- ♦ Lack of caffeine in software development organizations

# STUDY OF 9 SOFTWARE DEVELOPMENT CONTRACTS



# Software Development

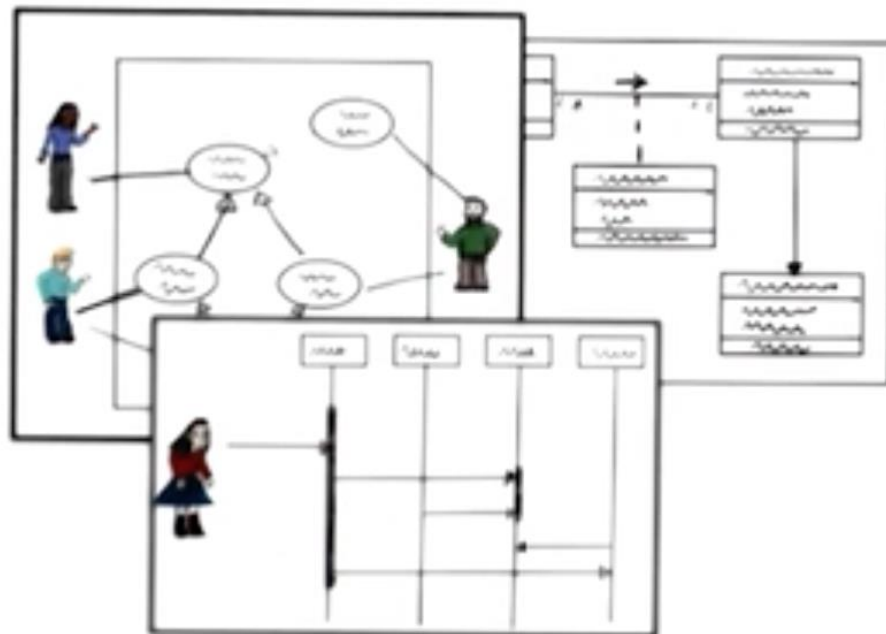
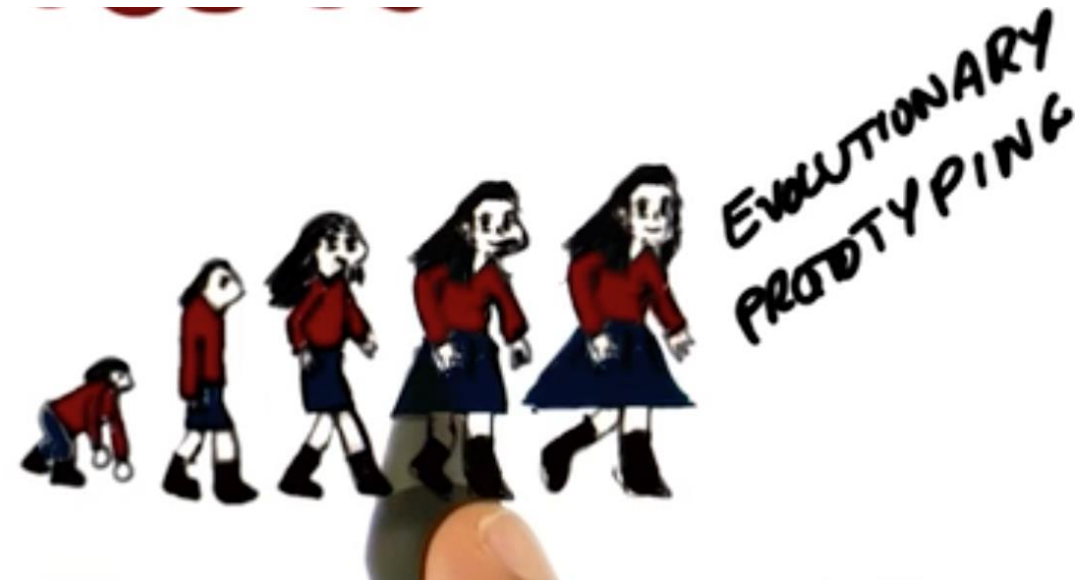


- Systematic
- Formal

# Software Process



WATERFALL



RUP  
VSP



# Questions

What is the largest software system on which you have worked?

How many LOC/day were you producing?

How many LOC/day do you think  
**professional** software engineers produce?

◆ 25

◆ 25-50

◆ 50-100

◆ 100-1000

◆ more than 1000

How many LOC/day do you think  
**professional** software engineers produce?

◆ 25

◆ 25-50

◆ **50-100**

◆ 100-1000

◆ more than 1000



# Software Phases



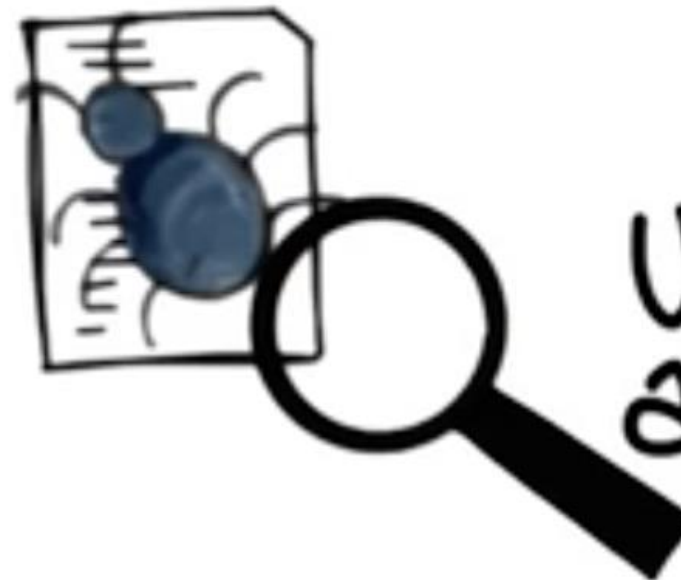
Requirements  
Engineering



Design



Implementation

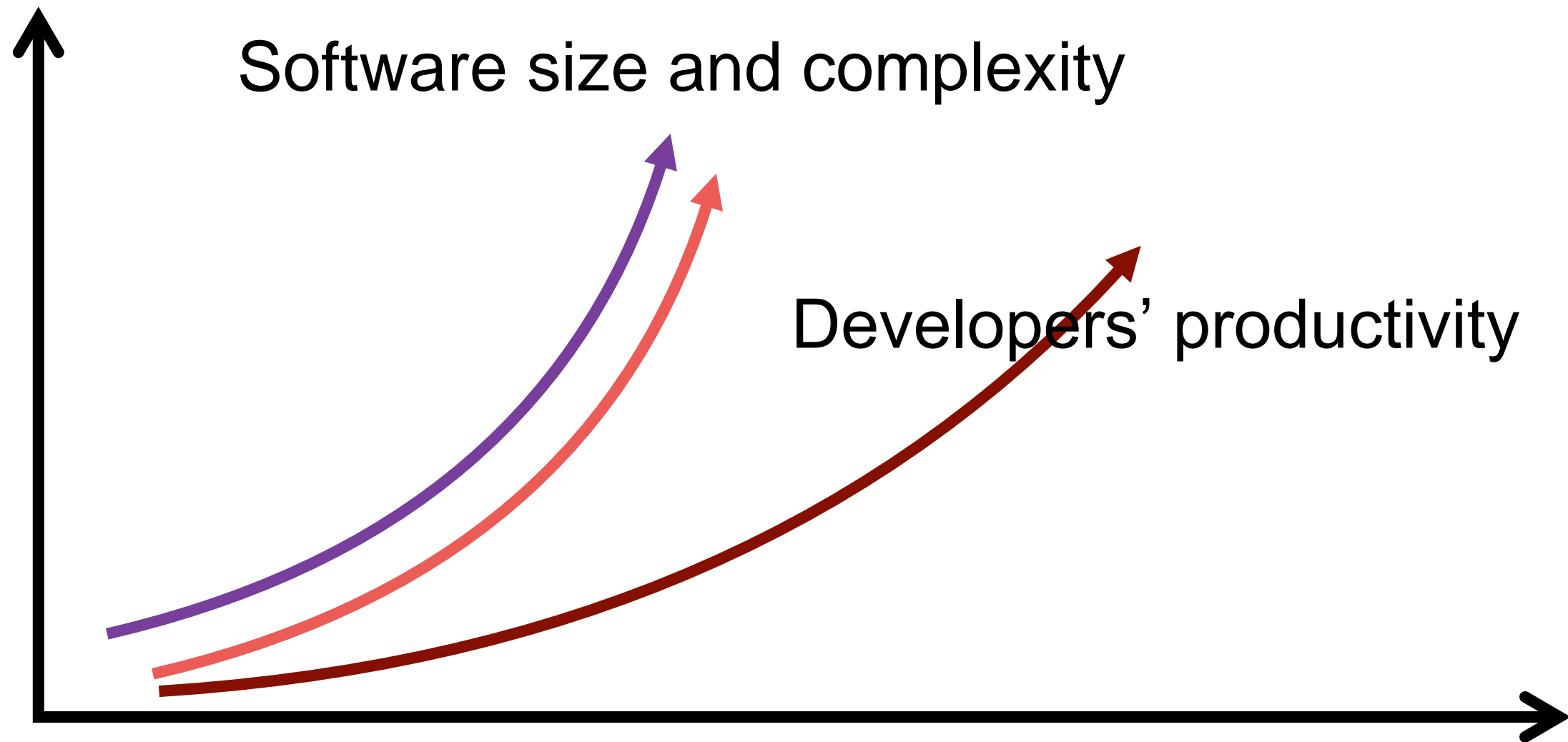


Verification  
and Validation



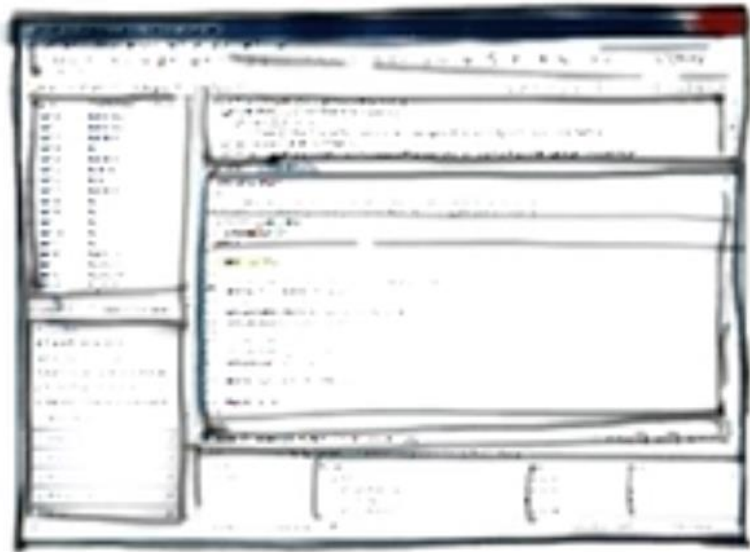
Maintenance

# Tools of the Trade



- Development: punch cards - > IDEs
- Language: Machine code -> High-Level Languages
- Debugging: Print lines -> Symbolic DEBUGGERS

# Tools of the Trade



IDE



VCS



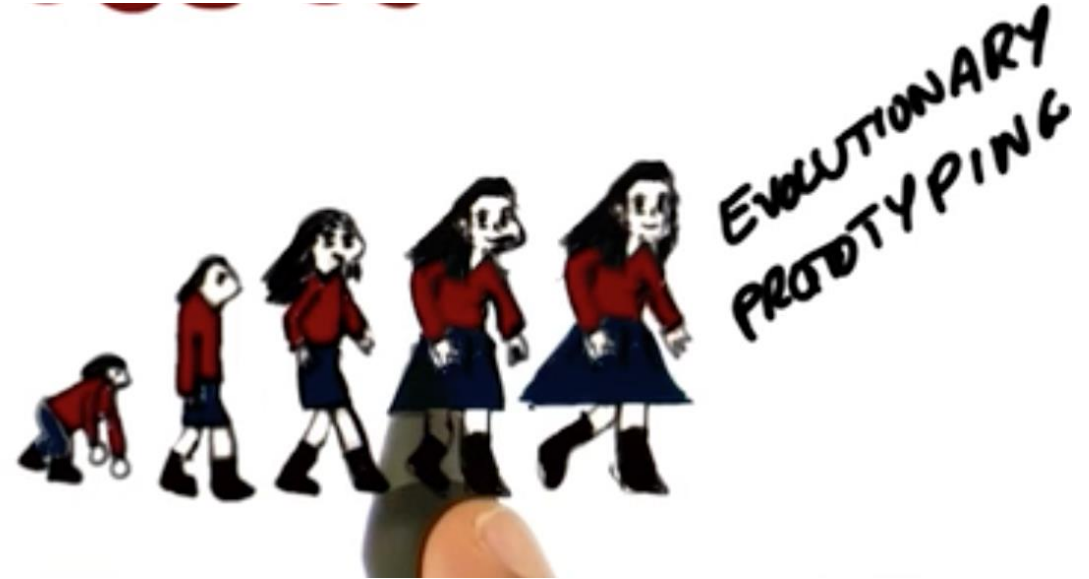
Coverage and  
Verification Tools

# Life Cycle Models

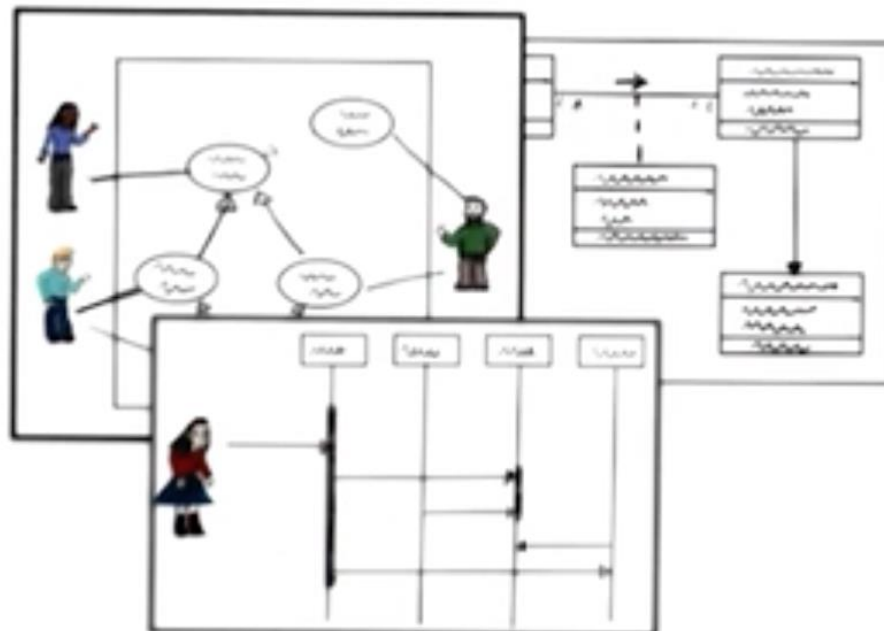
# Software Process



WATERFALL



SPIRAL



RUP  
USP

AGILE





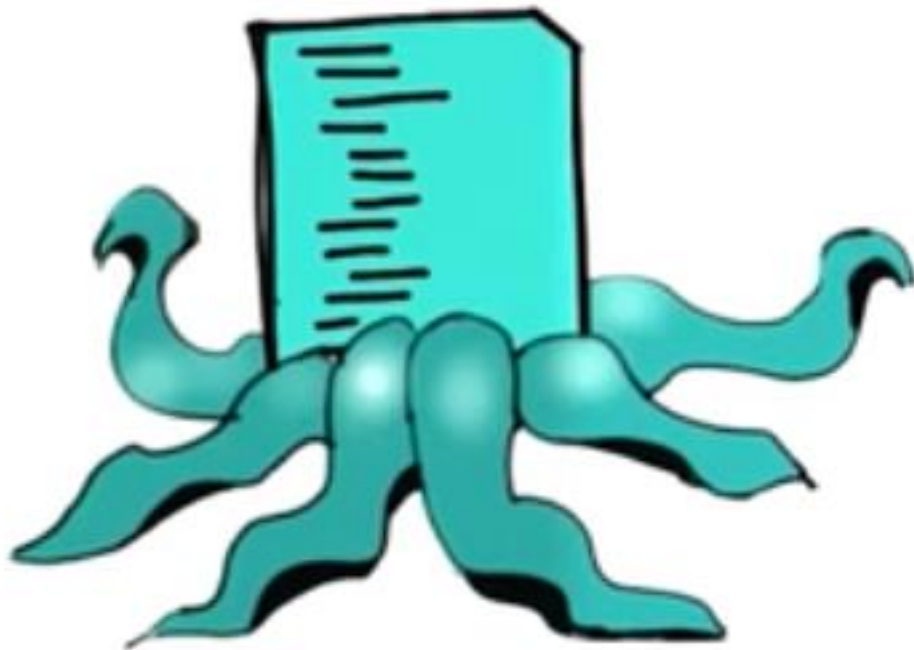




TECHNOLOGY



PEOPLE



PRODUCT



PROCESS