

# Software Evolution: the Definition

## Software Evolution – L1T1

Dr. Vadim Zaytsev aka @grammarware, February 2021



*Software Evolution*

**is about**

**studying software**

**that already exists**



# Some More Data

- ~30% projects are new, ~70% are maintenance
- 90% costs of a software system is in maintenance
- 0.1–10 bugs per 1000 LOC
- 43% of existing banking systems built on COBOL, 15% new
- 75% of business data processed by COBOL
- 80% of in-person transactions run COBOL
- 95% ATM swipes rely on COBOL code
- 200+ BL0C in use, 250/343ML0C per codebase
- Replacement costs at \$25 per line

# Software Maintenance is...

- Modification of a software product
  - **after** delivery

**21%** • to **correct** faults, or

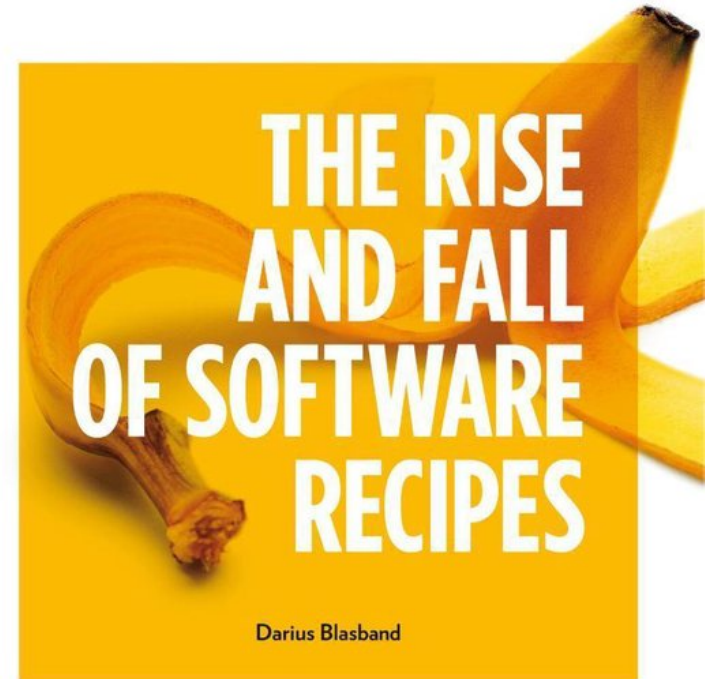
**50%** • to **improve** performance or other attributes, or

**25%** • to **adapt** the product to a modified environment

**4%** • or to **prevent** future issues

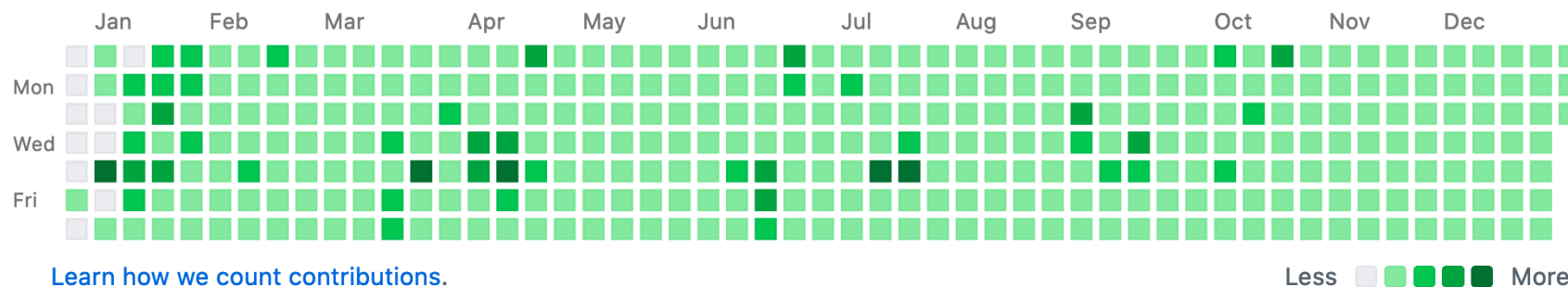
# Legacy Software is...

- Large and complex
  - Took years to build
  - Took even longer to debug
  - Business critical
  - Old and valuable
- 
- *Legacy code often differs from its suggested alternative by actually working and scaling.*



# Introduction

- Vadim Zaytsev aka [@grammarware](#)
  - research (VU , , )
  - teaching ()
  - industry (, raincode LABS)  
mainframe to .NET

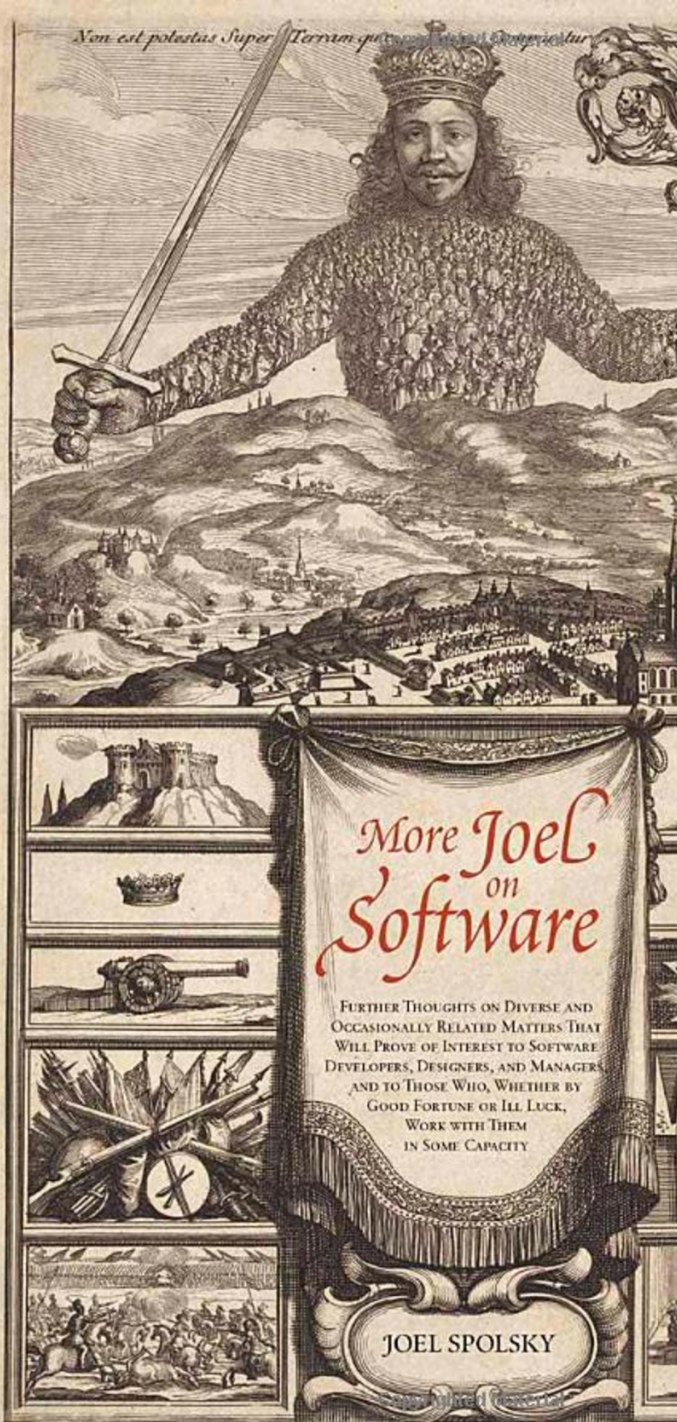


ANNIVERSARY EDITION WITH FOUR NEW



# THE MYTHICAL MAN-MO

FREDERICK P. BROOKS, JR



Copyrighted Material

Microsoft

# CODE COMPLETE

# 2

Second Edition



A practical handbook of software construction

Steve McConnell

Two-time winner of the Software Development Magazine Jolt Award

Copyrighted Material

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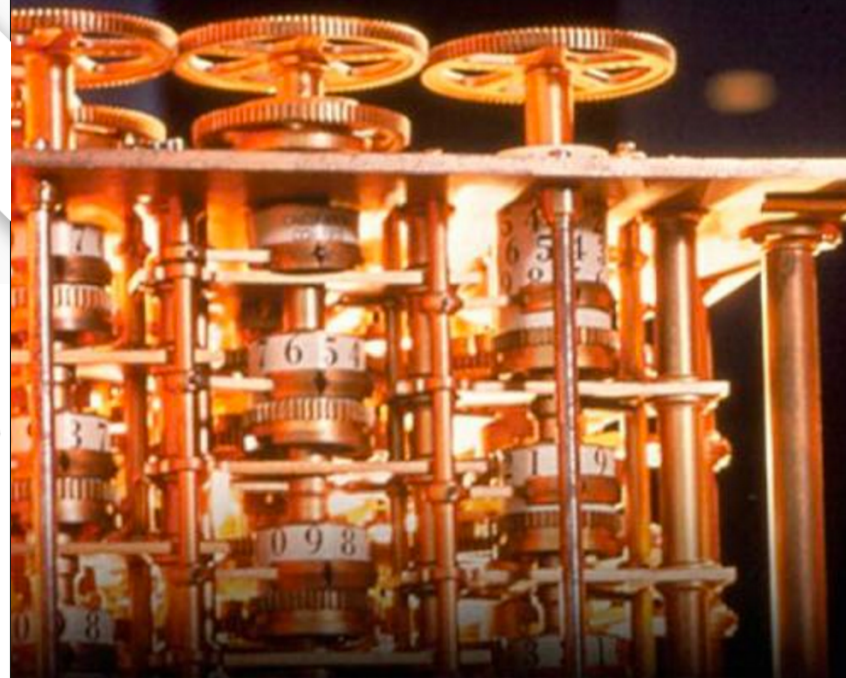
# Building Maintainable Software

TEN GUIDELINES FOR FUTURE-PROOF CODE

**PREVIEW EDITION**

Joost Visser

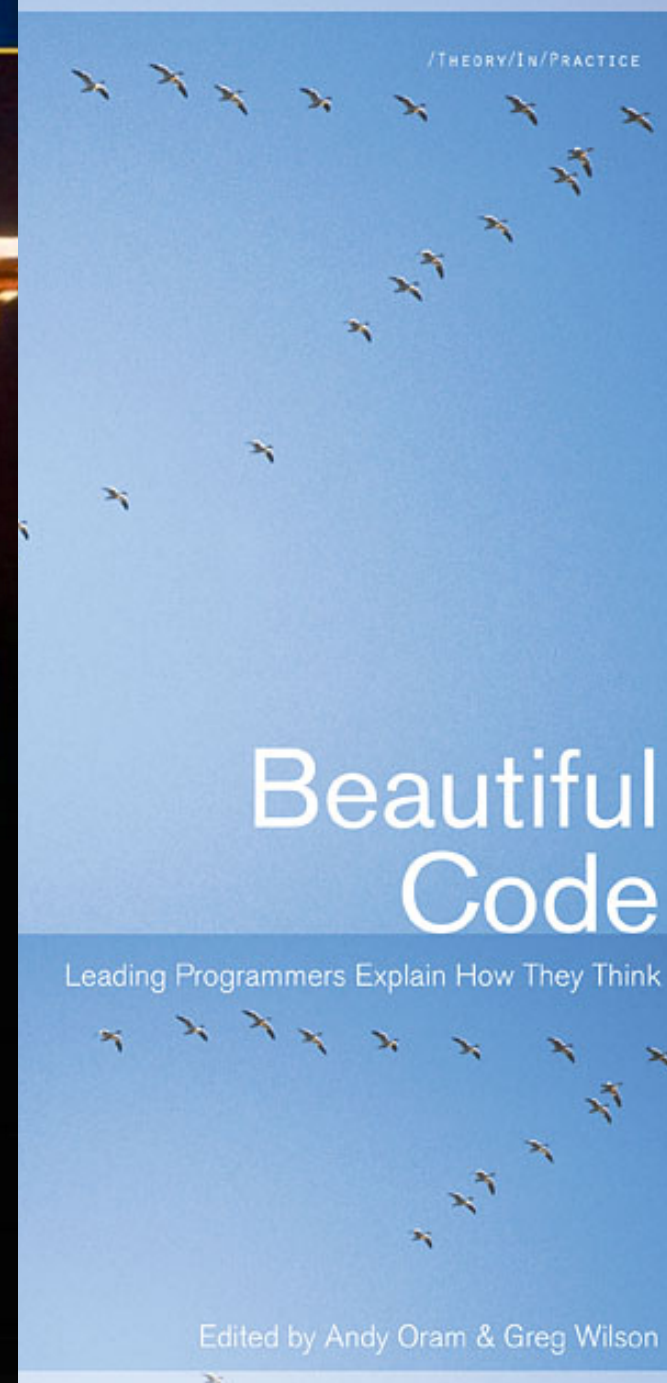
Robert C. Martin Series



# WORKING EFFECTIVELY WITH LEGACY CODE

Michael C. Feathers

/THEORY/IN/PRACTICE



# Beautiful Code

Leading Programmers Explain How They Think

Edited by Andy Oram & Greg Wilson

Urheberrechtlich geschütztes Material

Tom Mens  
Serge Demeyer (Eds.)

# Software Evolution

 Springer

Urheberrechtlich geschütztes Material

Urheberrechtlich geschütztes Material

Tom Mens  
Alexander Serebrenik  
Anthony Cleve  
*Editors*

# Evolving Software Systems

 Spr

Urheberrechtlich geschütztes Material

Ralf Reussner · Michael Goedicke  
Wilhelm Hasselbring · Birgit Vogel-Heuser  
Jan Keim · Lukas Martin *Editors*

# Managed Software Evolution

 Springer Open

# Conclusion

- Evolution is about studying **existing software**
- There is **a lot** of software, much of it is legacy
  - this software matters!
- All software **evolves** and becomes harder to **maintain**
- In **practice**, you work more with existing software
- Q&A Sessions @ Canvas
  - ⇒ [v.zaytsev@utwente.nl](mailto:v.zaytsev@utwente.nl)
  - ⇒ <https://discord.gg/n7VQAPNBPD>