



Why are software engineers
so hard to replace?

John Pavan, Heather Crawford

Why are Software Engineers so hard to replace?

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CppNorth 2025

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John Pavan, Team Lead

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Intro

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Motivation

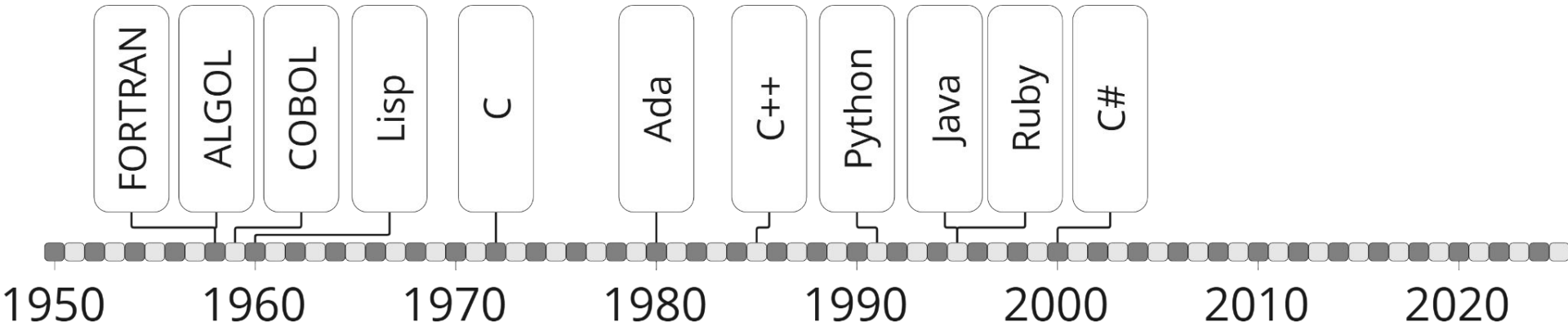
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Timelines



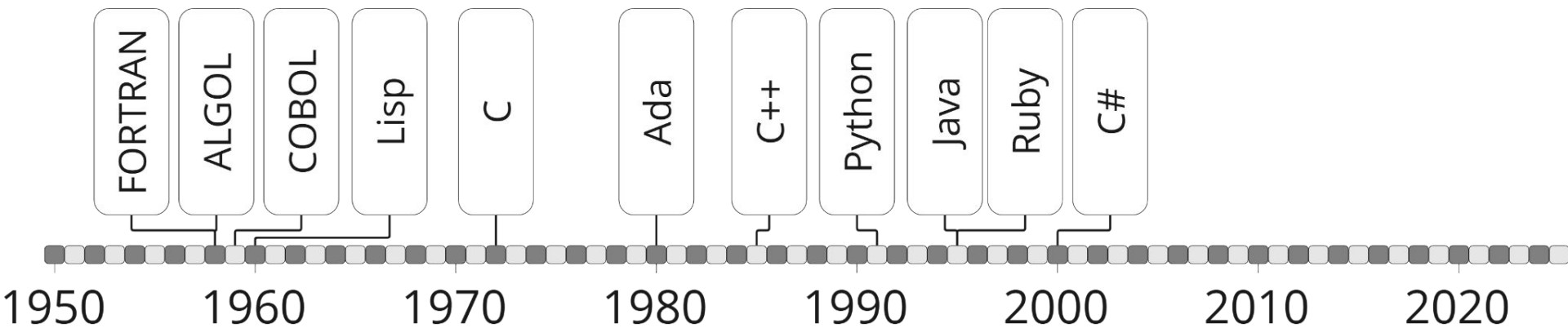
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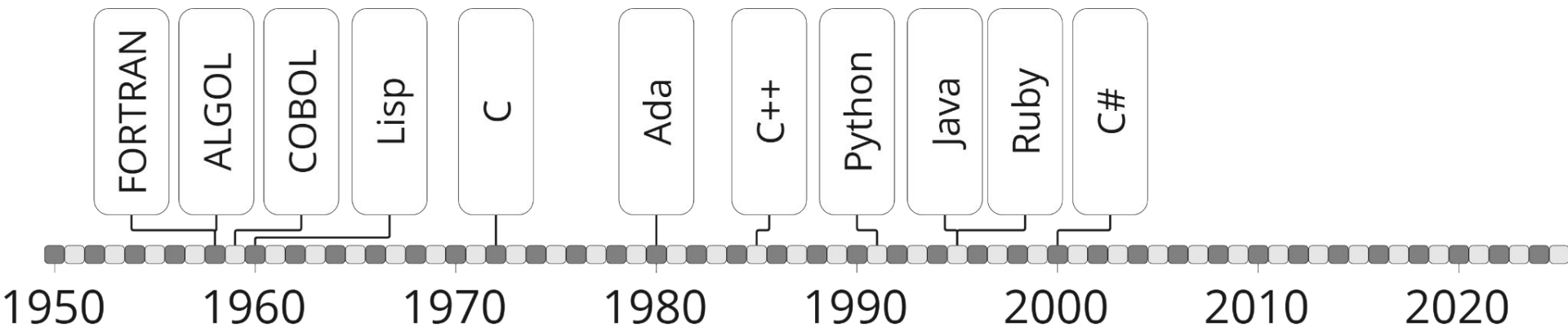
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Programming Language Generations



Third-Gen Languages

FORTRAN & COBOL



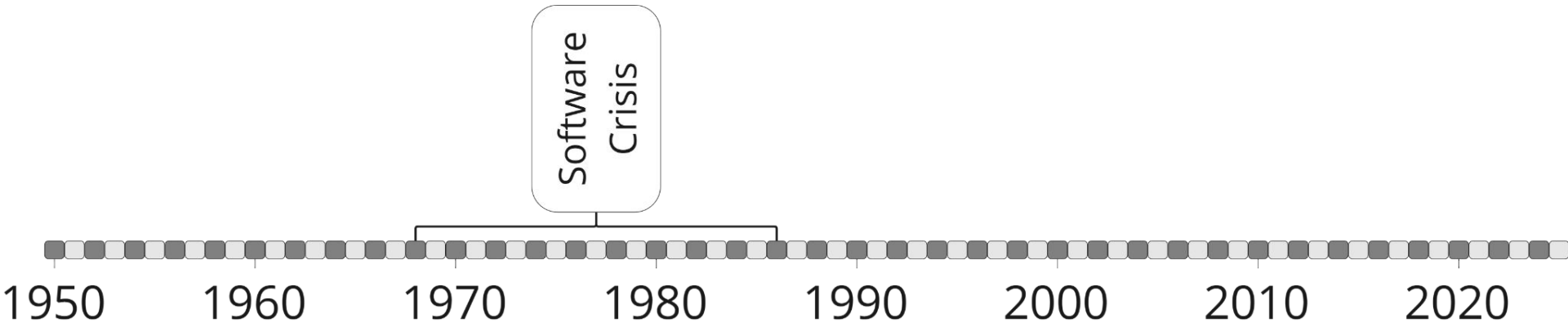
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Software Crisis



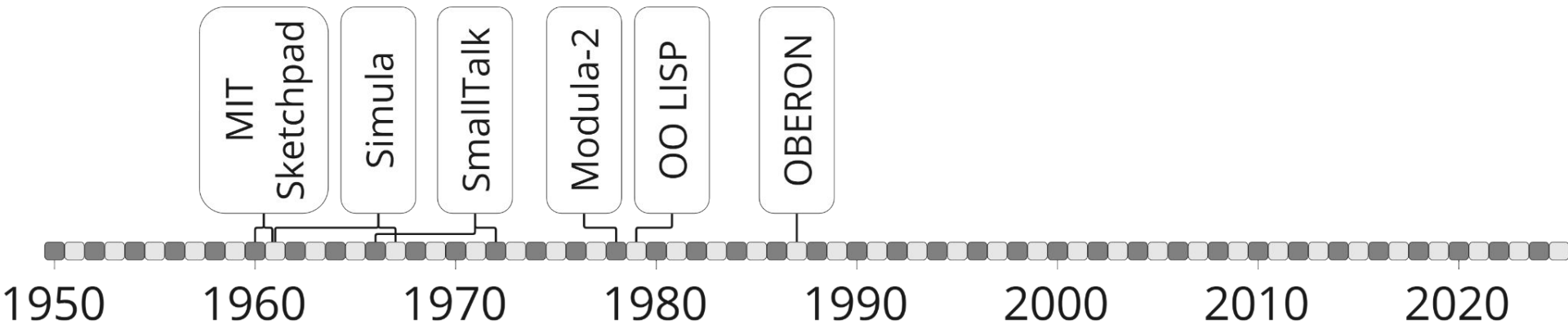
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Paradigm: Object Orientation



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Engineering

Reducing Errors: Computer Aided Software Engineering (CASE)



by Henry Fersko-Weiss

The PC CASE market is growing and maturing.

Today's second-generation design and analysis tools

will help you create

better programs that are easier to maintain.



PC software has automated countless business processes and tasks over the past decade, but it's only in the last few years that PC packages have been developed to automate the software development cycle itself. Using software to develop software is what CASE (computer-aided software engineering) is all about. CASE tools prove that the software industry can practice what it preaches.

CASE tools for the PC are very young. *Accelerator*, one of the earliest CASE tools and now the best-seller, was introduced in 1984 by Index Technology. Even the concept of CASE is only about 15 years old. The information systems (IS) world has been somewhat slow to accept CASE. Unlike hard engineering disciplines—such as electrical or mechanical engineering—software engineering has long been considered an art as well as a science. IS departments have been reluctant to give up the power of their mysterious art to automation. And until recently, PCs weren't powerful enough to handle CASE. But as PCs

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Methodologies: Waterfall and Agile

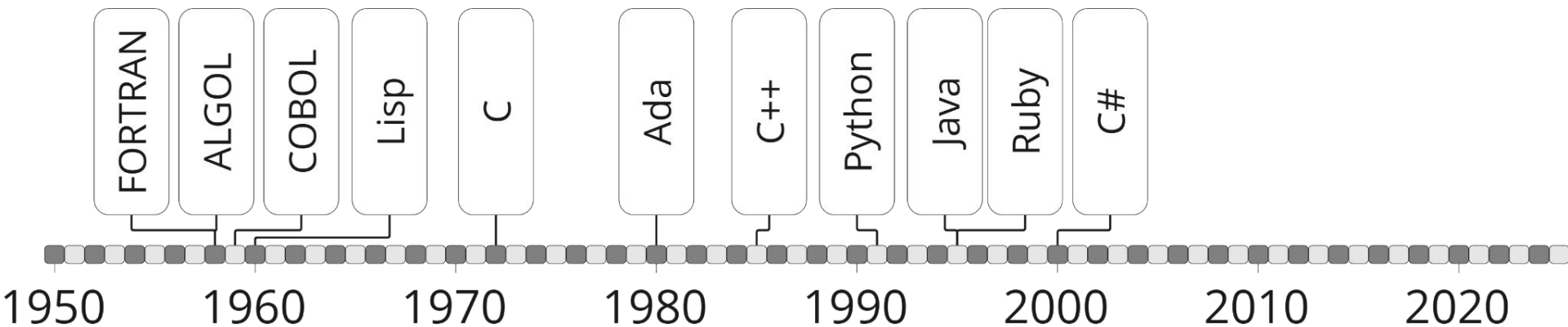
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New Language: Ada



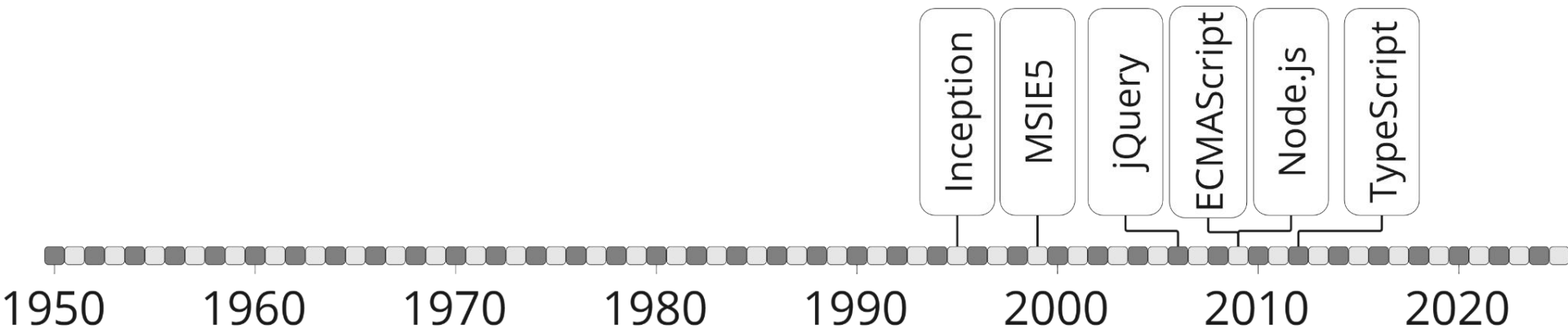
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New Language: JavaScript



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Silver Bullets

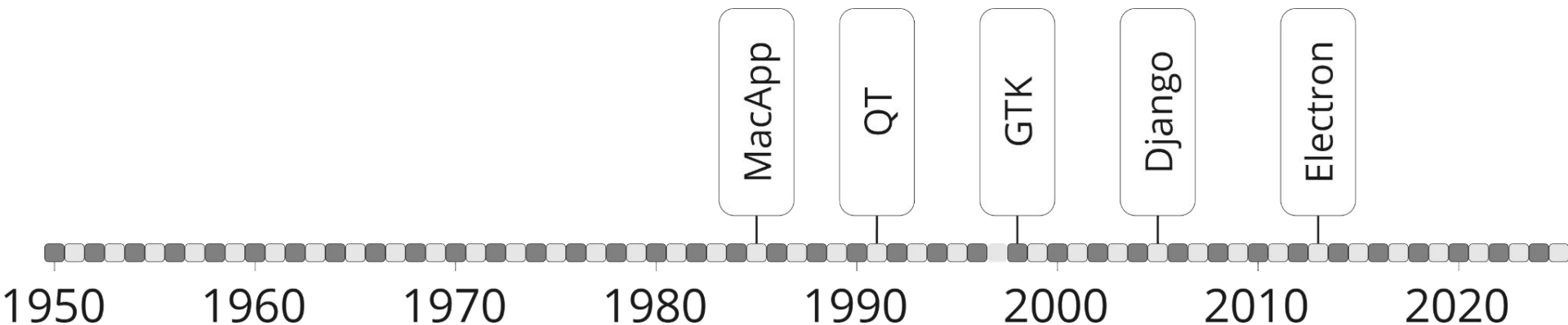
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Silver Bullet: Software Frameworks



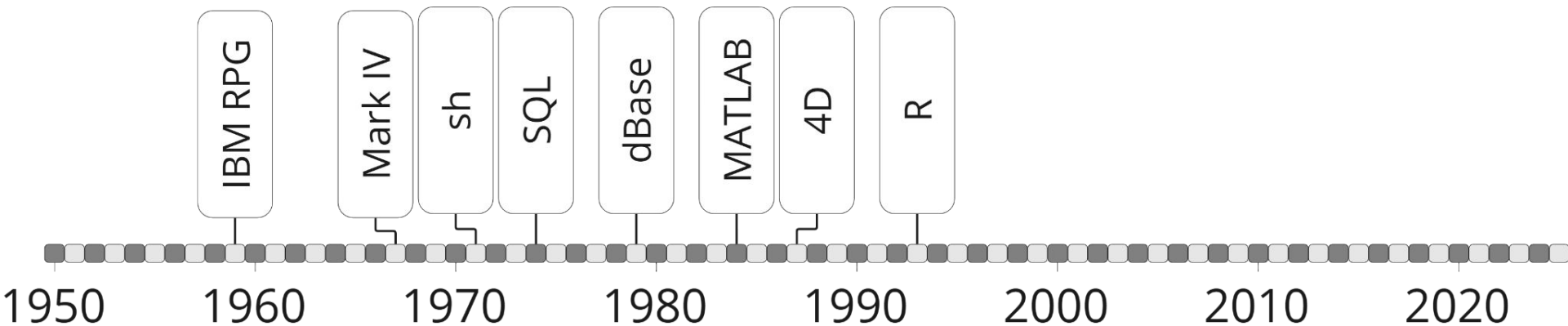
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Silver Bullet: Fourth-Gen Languages



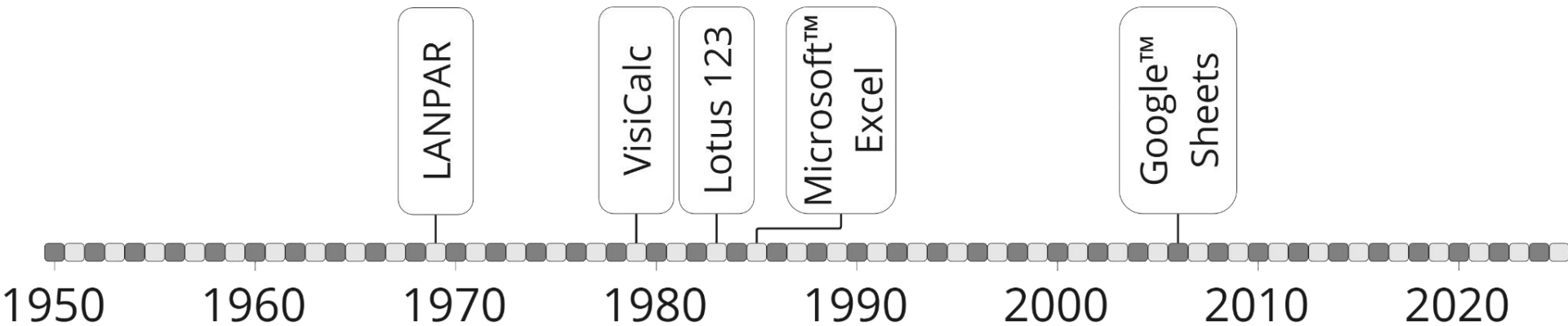
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SQL and Spreadsheets



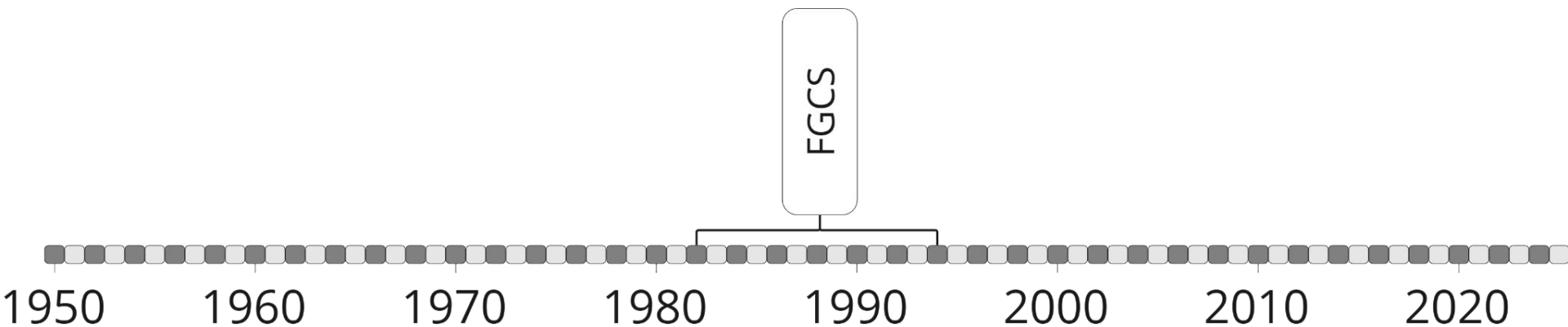
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Fifth-Gen Languages: Artificial Intelligence



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Modern AI

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Why are developers irreplaceable?

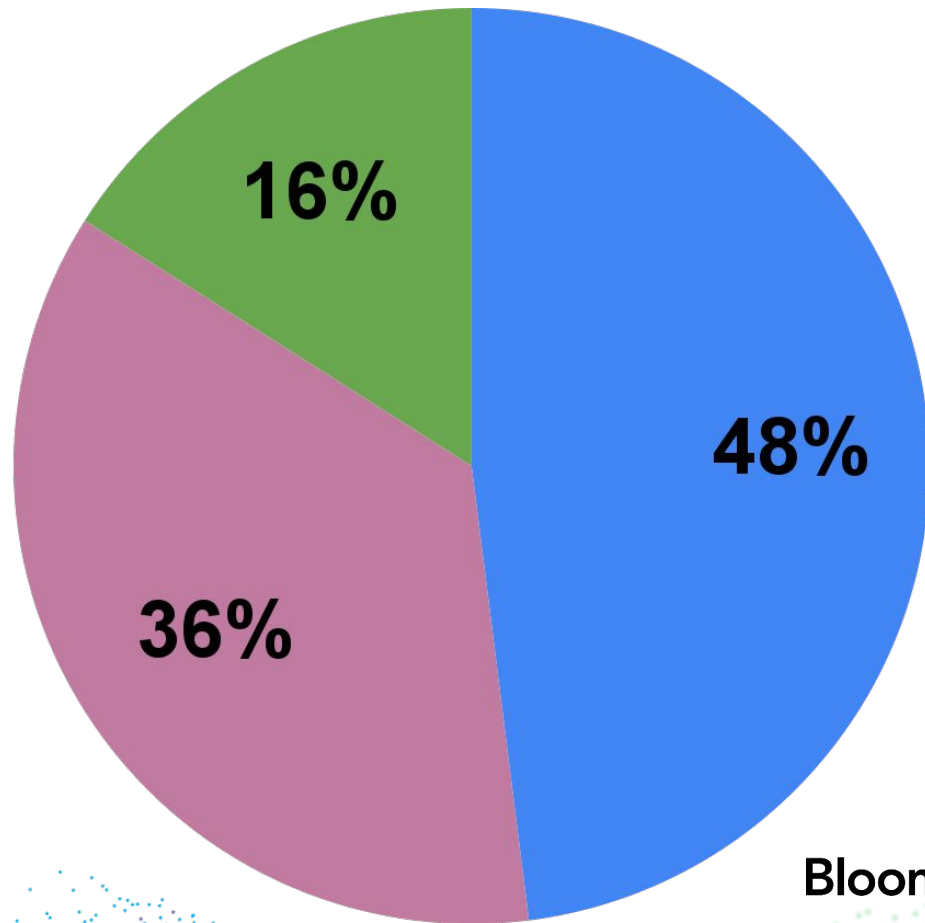
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- Development
- Collaboration
- Other



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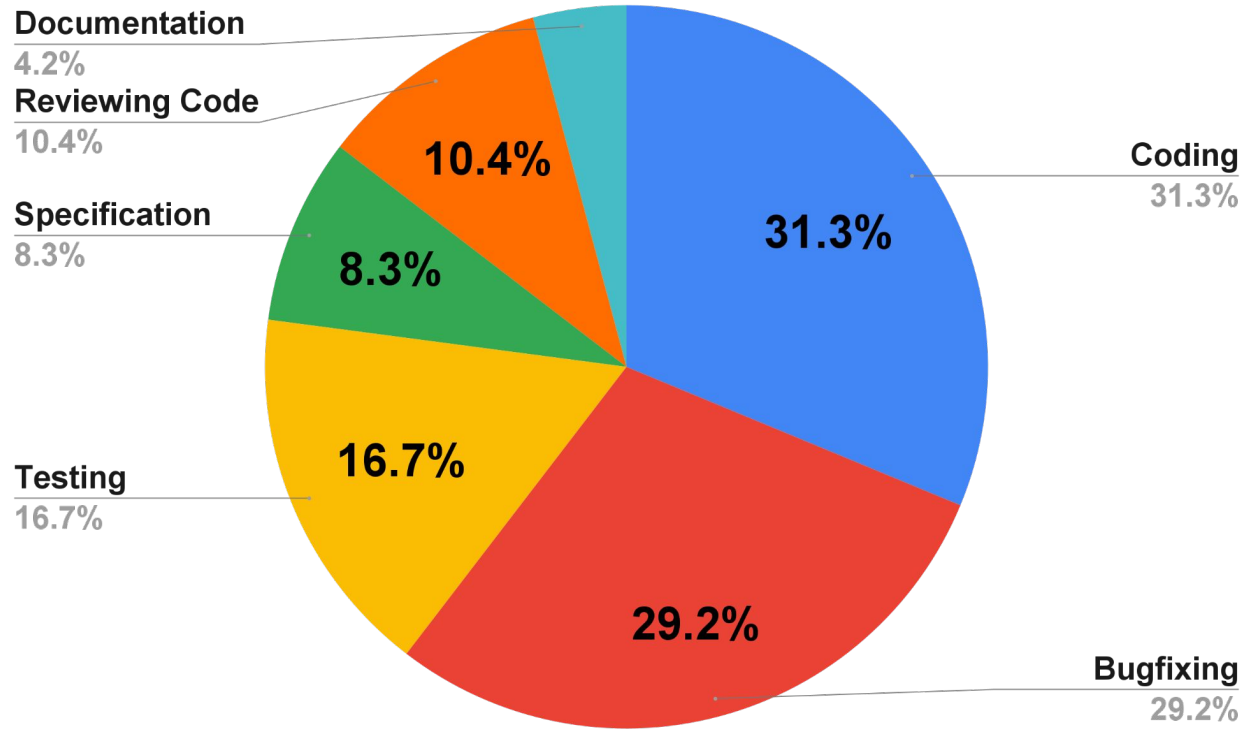
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A. N. Meyer, E. T. Barr, C. Bird and T. Zimmermann, "Today Was a Good Day: The Daily Life of Software Developers," in IEEE Transactions on Software Engineering, vol. 47, no. 5, pp. 863-880

Development



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A. N. Meyer, E. T. Barr, C. Bird and T. Zimmermann, "Today Was a Good Day: The Daily Life of Software Developers," in IEEE Transactions on Software Engineering, vol. 47, no. 5, pp. 863-880

Technology is Transformative

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Disruption is Inevitable

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Evolution is necessary

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Complexity is what we do

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Abstract Thinking

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Advanced problem solving

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Adaptability

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Optimization

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Interdisciplinary work

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Innovation



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Writing code is the easy part

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**But you can't write the
hard stuff without first
learning the easy stuff**

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Program Synthesis

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$P \neq NP?$

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Advice for the Future

Don't Panic.

Learn your craft. This is not wasted time.

Embrace the new tech.


Teach the next generation.

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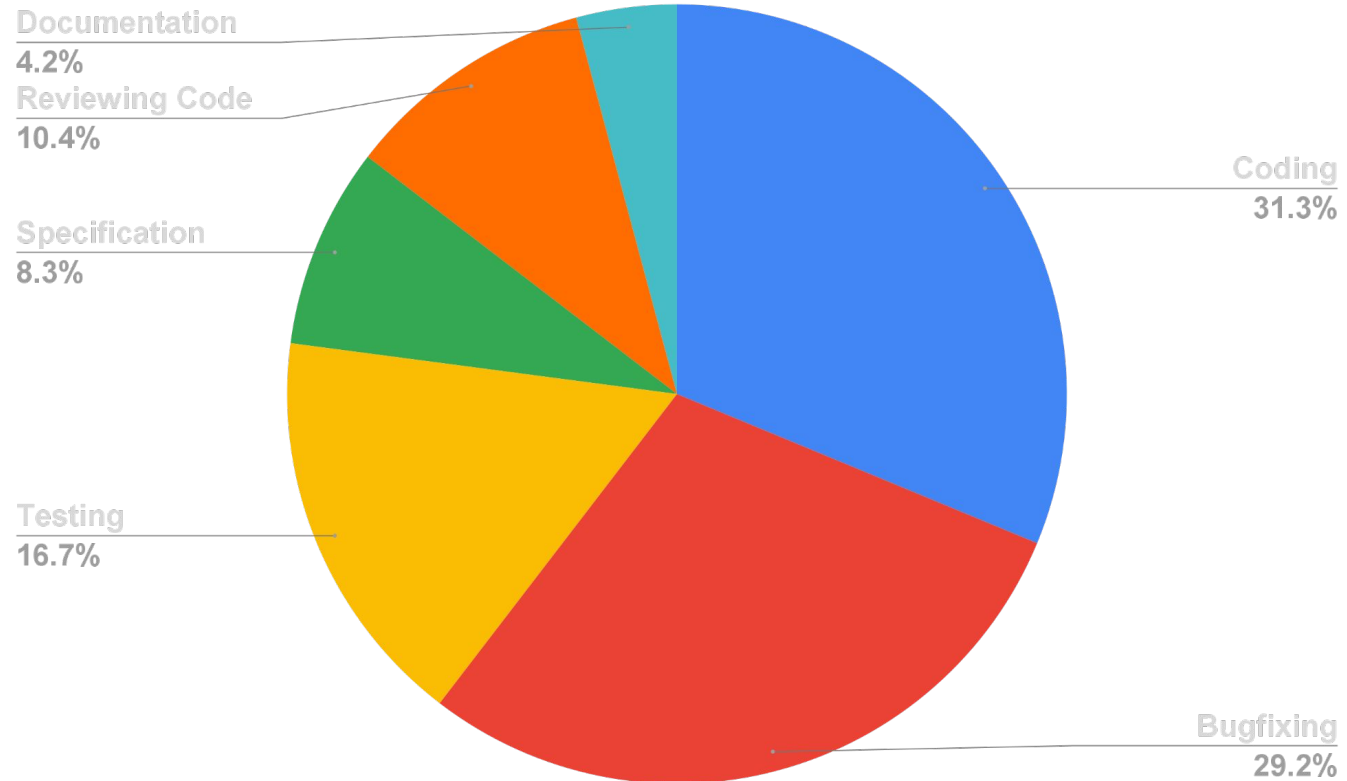
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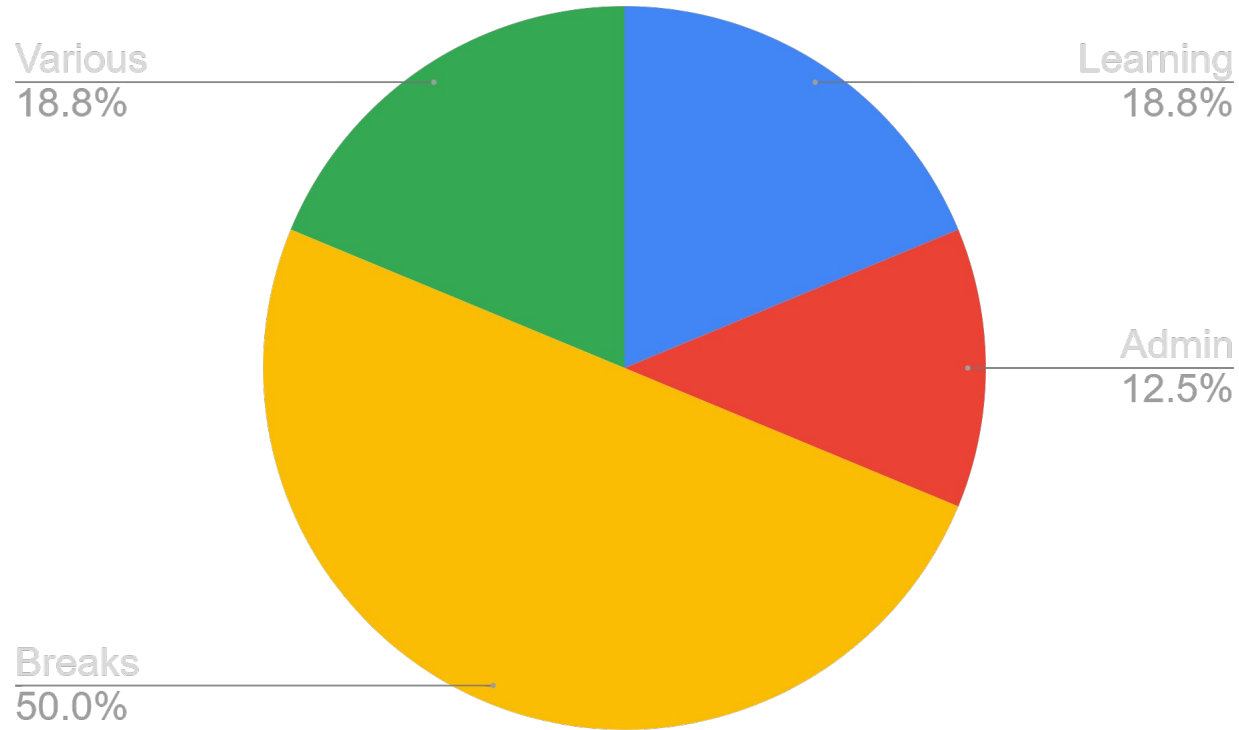
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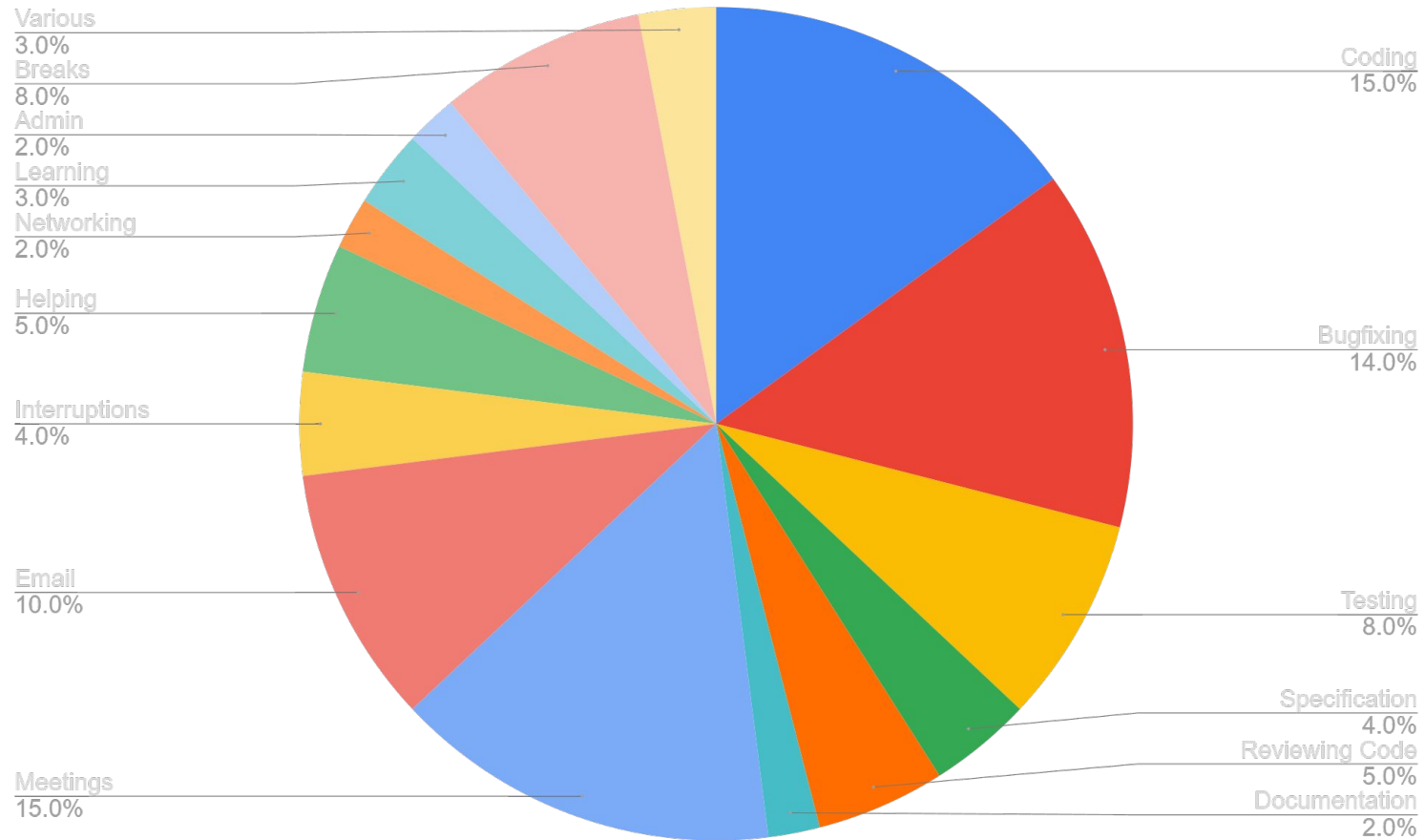
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Collaboration



Other





Thank you!

We are hiring: bloomberg.com/engineering

Contact us

Heather: hcrawford14@bloomberg.net | John: jpavan@bloomberg.net

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