

HIRED

# 2019 State of Software Engineers

Data reveals which software engineers earn the most, the most popular programming languages and the work factors that matter most to the developers building our digital world



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# Overview

The future will be built through lines of code. The past decade has been a testament to the incredible speed at which innovation can evolve and change the way we lead our lives. Looking toward the future, technologies like machine learning and blockchain have begun the next chapter of innovation. With developers sitting at the forefront of progress and the backbone of this evolution, it's no wonder [c-suite executives](#) say developer talent is more valuable than money.

At Hired, we know that great people are the foundation of successful businesses, and we sit on the frontlines of helping innovative companies build great teams. For the first time, we are releasing an in-depth data report that double clicks into the developer community, including top skills by market, leading programming languages and workplace preferences. Hired is in a unique position to share this data since we have unprecedented visibility into the hiring process for tech workers. From the beginning of their job search, to their final offer, our marketplace reveals company demand, talent supply and salary offers for software engineers. Beyond our data, we tapped into our ecosystem of developers and surveyed over 700 skilled developers across the country to gain insight into which programming languages they prefer, how they learn, and what they do and don't like about their jobs. Here's what we found.

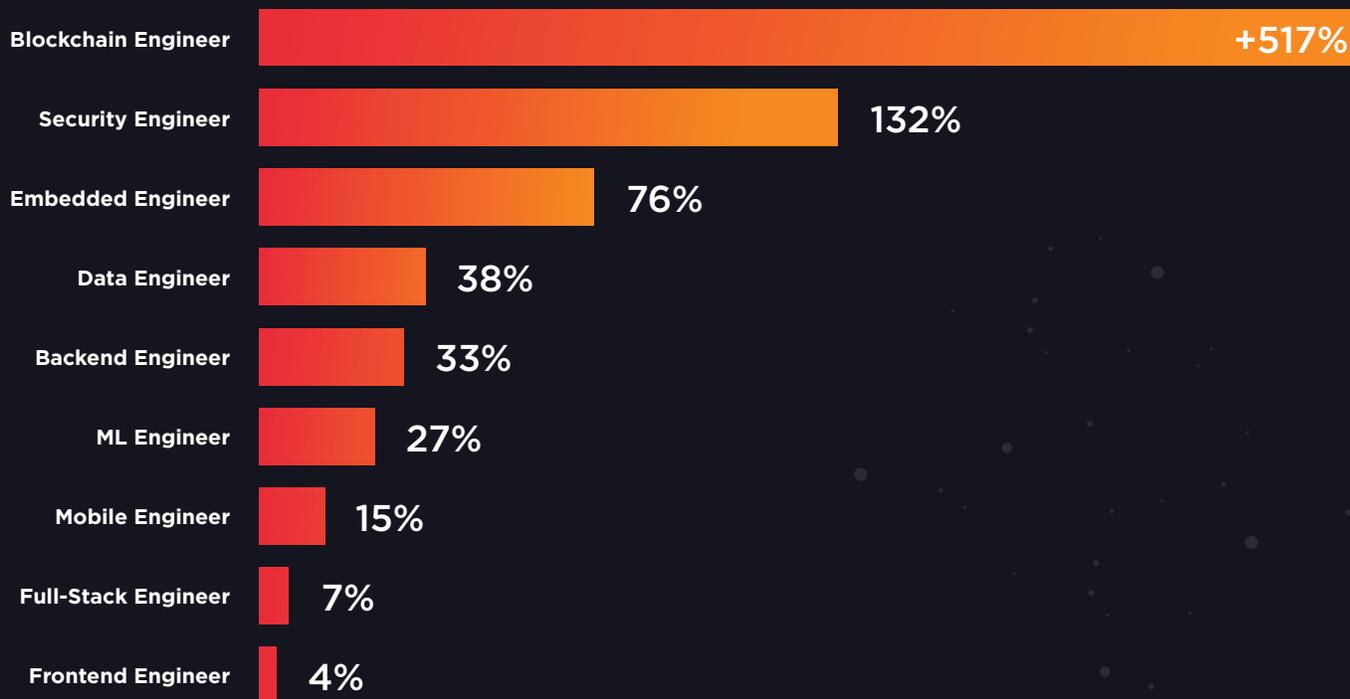
## The Hottest Jobs in Software Engineering

Hiring developer talent is a business priority, but not all roles are created equally. As startups introduce new ways to apply technologies and large enterprises continue their quest to digitally transform, hiring needs to evolve for all companies looking to hire top tech talent.

Data from Hired's marketplace reveals that global demand for blockchain engineers is through the roof, at a 517% increase year over year. For developers interested in blockchain roles, don't let the titles fool you. For engineers with an expertise in blockchain, they typically hold titles such as backend engineer, systems engineer or solutions architect, with blockchain being listed as a desired skill for the role. There was an explosion of demand in the past 12 months for developers with blockchain skills and we expect demand to continue growing as businesses begin implementing their countless use cases, from digital identity and smart contracts to workforce management and distributed data storage.

Engineers with security expertise are also highly sought-after, likely due to the ever-increasing number of data breaches and mounting consumer privacy concerns. Over the past 12 months, company demand for security engineers has increased by 132%. As companies double down on their investment to drive business results through data, and are laser focused on creating personalized and predictive customer experiences, the need for talent specializing in data analytics and machine learning is on the rise. Demand for engineers with those skills has increased by 38% and 27%, respectively.

## Demand Growth for Engineering Roles



As demand increases, so do salaries. In large tech hubs we analyzed, blockchain engineers make the top three for highest paid. In the San Francisco Bay Area, they're bringing in \$155K on average and in London they're earning an average of \$89K. It is important to note that tech salaries outside of the US are typically much lower due to different compensation standards and the competitive landscape. But we're seeing positive trends: In London, for example, our [2018 State of Salaries](#) report found that salaries for tech workers as a whole are on the rise; and data specifically on London for blockchain engineers shows they are still earning much more than their peers with different specialties. Outside of New York, security and machine learning engineers are among the highest paid as well.

When you zoom into salary data for software engineers in key tech hubs, it speaks to how much talent needs fluctuate from city to city. For example, gaming engineers are the highest paid group in New York, earning \$147K on average, while they're on the lower end of the compensation spectrum elsewhere. In Toronto, salaries for natural language processing engineers are soaring, at an average of \$83K.

## Salaries for Top Software Engineering Roles in New York

ROLE	SALARIES
Gaming Engineer	\$147K
Blockchain Engineer	\$137K
Backend Engineer	\$136K
Full-Stack Engineer	\$133K
Mobile Engineer	\$133K
Data Engineer	\$132K
Search Engineer	\$129K
Frontend Engineer	\$128K
Embedded Engineer	\$124K
Machine Learning Engineer	\$122K
Security Engineer	\$117K
Natural Language Processing Engineer	\$114K

## Salaries for Top Software Engineering Roles in San Francisco Bay Area

ROLE	SALARIES
Search Engineer	\$157K
Security Engineer	\$156K
Blockchain Engineer	\$155K
Natural Language Processing Engineer	\$155K
Machine Learning Engineer	\$153K
Data Engineer	\$151K
Embedded Engineer	\$150K
Backend Engineer	\$149K
Mobile Engineer	\$147K
Gaming Engineer	\$145K
Full-Stack Engineer	\$143K
Frontend Engineer	\$140K

## Salaries for Top Software Engineering Roles in Toronto

ROLE	SALARIES
Natural Language Processing Engineer	\$83K   \$112K CAD
Machine Learning Engineer	\$80K   \$108K CAD
Blockchain Engineer	\$79K   \$107K CAD
Security Engineer	\$75K   \$102K CAD
Embedded Engineer	\$74K   \$101K CAD
Backend Engineer	\$74K   \$101K CAD
Gaming Engineer	\$73K   \$99K CAD
Full-Stack Engineer	\$72K   \$98K CAD
Frontend Engineer	\$70K   \$95K CAD
Data Engineer	\$70K   \$95K CAD
Mobile Engineer	\$69K   \$94K CAD
Search Engineer	\$64K   \$87K CAD

## Salaries for Top Software Engineering Roles in London

ROLE	SALARIES
Embedded Engineer	\$90K   £71K
Blockchain Engineer	\$89K   £69K
Data Engineer	\$87K   £68K
Machine Learning Engineer	\$87K   £68K
Search Engineer	\$86K   £67K
Security Engineer	\$86K   £67K
Natural Language Processing Engineer	\$84K   £66K
Gaming Engineer	\$81K   £64K
Backend Engineer	\$80K   £63K
Full-Stack Engineer	\$77K   £61K
Mobile Engineer	\$75K   £58K
Frontend Engineer	\$73K   £57K

## Salaries for Top Software Engineering Roles in Paris

ROLE	SALARIES
Blockchain Engineer	\$67K   €58K
Machine Learning Engineer	\$65K   €56K
Data Engineer	\$62K   €54K
Gaming Engineer	\$61K   €53K
Security Engineer	\$61K   €53K
Search Engineer	\$61K   €53K
Backend Engineer	\$59K   €51K
Natural Language Processing Engineer	\$59K   €51K
Embedded Engineer	\$58K   €51K
Full-Stack Engineer	\$57K   €50K
Frontend Engineer	\$57K   €50K
Mobile Engineer	\$57K   €50K

## The Hottest Coding Languages

It's no secret that developers have an opinion about their most loved and hated programming languages. What might be a secret to some, however, is that companies have their preferences, too.

Our data shows that candidates with experience in Go are the most in-demand. But when we surveyed developers to see which languages they actually use, Go was nowhere near the top — only 7% said they primarily work with it. Scala, Ruby, Typescript and Kotlin follow a similar trend, ranking in the top five, but with lower levels of familiarity among developers. The scarcity is likely driving up demand, and that trend could continue until these become common programming languages within the developer community.

JavaScript leads the pack as the top language developers use, at 62%, which makes TypeScript particularly interesting: it's a superset of JavaScript (and simpler for JavaScript programmers to learn), but only 12% use TypeScript — despite it being the fourth most in-demand coding language across the globe. This presents an opportunity for the developers already familiar with JavaScript to learn TypeScript and become more attractive to companies looking to hire developers.

The data below analyzes the correlation between a candidate's experience with given programming language and a company's interest in interviewing them for a position. It specifically looks at the number of interview requests a software engineer on Hired received during their time on the marketplace (an average of 2–6 weeks).

### Which programming languages do you primarily work with?

Go is only used by 7% of developers, but candidates with experience in Go are the number 1 most likely to earn an interview request (see "Global" bar graph)

JavaScript	<b>62%</b>	C#	<b>17%</b>	Ruby	<b>10%</b>	Objective-C	<b>3%</b>
Java	<b>42%</b>	C++	<b>14%</b>	C	<b>9%</b>	Scala	<b>3%</b>
Python	<b>42%</b>	PHP	<b>12%</b>	GO	<b>7%</b>	Kotlin	<b>2%</b>
HTML	<b>36%</b>	TypeScript	<b>12%</b>	Swift	<b>6%</b>	R	<b>2%</b>

## Most In-Demand Coding Languages Across the Globe

PROGRAMMING LANGUAGE	NUMBER OF IVR'S ON HIRED IN 2018
Go	9.0
Scala	8.4
Ruby	8.2
TypeScript	7.7
Kotlin	7.2
JavaScript	6.8
Objective-C	6.6
PHP	6.5
Java	6.5
HTML	6.4
Swift	6.3
Python	6.2
C++	5.6
C	5.4
C#	5.4
R	3.3

*During the time a candidate's profile was live on the marketplace (an average of 2-6 weeks).*

In the San Francisco Bay Area, Toronto, and London the data shows another story: TypeScript inches ahead of Go, Scala, and Ruby to earn a spot as the top in-demand programming language in those markets. New York employers favor Ruby above all the rest. R, however, is consistently the least in-demand across all markets.

## Most In-Demand Coding Languages in SF Bay Area

PROGRAMMING LANGUAGE	NUMBER OF IVR'S ON HIRED IN 2018
TypeScript	7.8
Ruby	7.7
Go	7.6
Scala	7.5
Kotlin	6.6
JavaScript	6.2
PHP	6.1
HTML	6.0
Java	6.0
Objective-C	6.0
Swift	5.7
Python	5.7
C++	5.2
C	4.9
C#	4.9
R	3.1

*During the time a candidate's profile was live on the marketplace (an average of 2–6 weeks).*

## Most In-Demand Coding Languages in New York

PROGRAMMING LANGUAGE	NUMBER OF IVR'S ON HIRED IN 2018
Ruby	4.7
Go	4.6
Objective-C	4.3
JavaScript	4.2
TypeScript	4.2
PHP	4.1
Scala	4.1
Swift	3.9
HTML	3.7
Kotlin	3.7
Python	3.7
Java	3.6
C#	3.3
C++	3.2
C	3.2
R	2.0

*During the time a candidate's profile was live on the marketplace (an average of 2–6 weeks).*

## Most In-Demand Coding Languages in Toronto

PROGRAMMING LANGUAGE	NUMBER OF IVR'S ON HIRED IN 2018
TypeScript	3.3
Ruby	2.8
JavaScript	2.7
C#	2.6
HTML	2.6
PHP	2.6
Python	2.6
Go	2.5
Java	2.5
Objective-C	2.5
C	2.4
Kotlin	2.3
Scala	2.3
Swift	2.3
C++	2.3
R	1.6

*During the time a candidate's profile was live on the marketplace (an average of 2–6 weeks).*

## Most In-Demand Coding Languages in Paris

PROGRAMMING LANGUAGE	NUMBER OF IVR'S ON HIRED IN 2018
Go	6.8
TypeScript	6.7
PHP	6.0
JavaScript	5.8
C	5.1
HTML	5.0
Java	5.0
Kotlin	5.0
C#	4.8
C++	4.8
Objective-C	4.7
Swift	4.7
Python	4.6
Scala	4.3
Ruby	4.3
R	2.8

*During the time a candidate's profile was live on the marketplace (an average of 2–6 weeks).*

## Most In-Demand Coding Languages in London

PROGRAMMING LANGUAGE	NUMBER OF IVR'S ON HIRED IN 2018
TypeScript	8.6
Scala	8.6
Go	8.3
Ruby	7.1
JavaScript	6.9
HTML	6.7
Java	6.6
PHP	6.5
Kotlin	6.0
Python	5.6
C#	5.5
C	5.2
Objective-C	5.1
C++	5.0
Swift	4.8
R	3.7

*During the time a candidate's profile was live on the marketplace (an average of 2-6 weeks).*

## Top Programming Languages by Years of Experience

To take our analysis of demand for programming languages a step further, we looked at how demand is impacted based on years of career experience. We found that among those with a few years of experience under their belt, Ruby is in especially high demand — candidates that know Ruby and have 6+ years of job experience receive nearly twice as many interview requests in the current hiring landscape as the market average for others with 6+ years of experience. Among candidates with 4 years of job experience or less, those that know TypeScript and Go (designed by Google) are in the highest demand.

### 4–5 Years of Experience

PROGRAMMING LANGUAGE	NUMBER OF IVR'S ON HIRED
Go	11.0
Ruby	11.0
Scala	10.7
JavaScript	8.6
TypeScript	8.4
Kotlin	8.3
Swift	8.2
HTML	8.1
Objective-C	8.0
PHP	7.9
Java	7.9
Python	7.7
C++	6.9
C#	6.9
C	6.8
R	3.9

## 6-10 Years of Experience

PROGRAMMING LANGUAGE	NUMBER OF IVR'S ON HIRED
Ruby	11.7
Go	10.5
Scala	9.9
TypeScript	8.7
Kotlin	8.2
JavaScript	8.1
Java	7.8
Python	7.8
Objective-C	7.6
HTML	7.5
PHP	7.4
Swift	7.0
C++	6.9
C#	6.3
C	6.0
R	3.6

## 10+ Years of Experience

PROGRAMMING LANGUAGE	NUMBER OF IVR'S ON HIRED
Ruby	11.7
Go	10.5
Scala	9.9
TypeScript	8.7
Kotlin	8.2
JavaScript	8.1
Java	7.8
Python	7.8
Objective-C	7.6
HTML	7.5
PHP	7.4
Swift	7.0
C++	6.9
C#	6.3
C	6.0
R	3.6

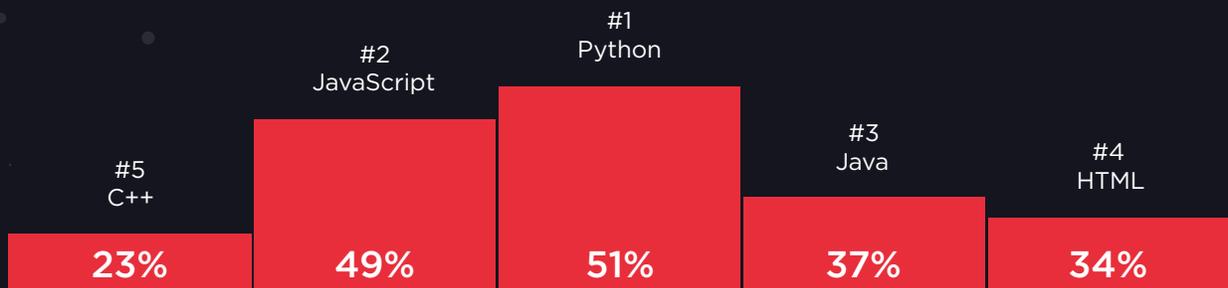
## Developers' Most Loved (and Hated) Coding Languages

It's clear that employer demand is stronger for certain skills over others, but that's only part of the equation. Demand or not, there are some languages that developers simply enjoy more than others. To uncover how the developer community feels about working in these languages, we asked them to weigh in on which languages they actually like and dislike, and most importantly, why.

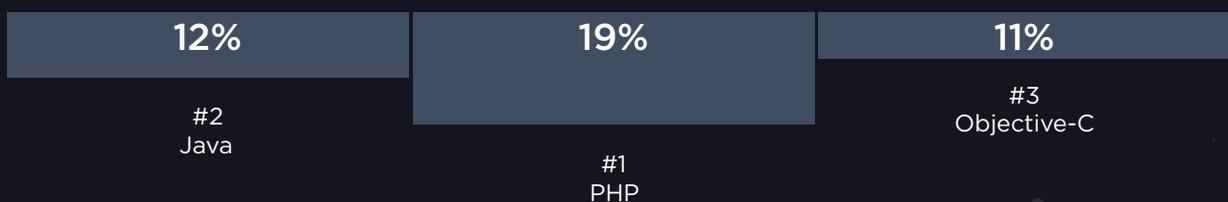
We learned that Python and JavaScript run away with the show — 51% name Python as one of their most-liked languages, and JavaScript comes in a close second at 49%. We also found that with Java, you either love it or hate it: it's both the third-most loved programming language and the second-most hated. PHP earned a spot as the number one most-hated, at 20%.

What keeps developers coming back to a given programming language? The nature of the developer community: 74% cite resources for development as one of the top reasons they love their programming language, and 58% cite community tone and willingness to welcome newcomers.

### Most Loved Programming Languages



### Most Hated Programming Languages



## Coding Likes and Dislikes

What's the biggest reason you don't like using a given programming language?

**49%**

it's not fun to program

Which do you prefer?

**56%** vs. **24%**

tabs

space

What's the biggest reason you love use a given programming language?

**74%**

resources for learning & development

Which do you prefer?

**37%** vs. **23%**

dynamically-typed languages

statically-typed languages

## Bootcamps: Where Developers Learn to Code

If the tech world has taught us anything, it's that the need for software engineers [won't be slowing down](#) anytime soon. As people from all walks of life weigh their options for a lucrative career that will be in demand and enable them to work on problems that they feel passionate about, being a software engineer is top of mind. As a result, in the last decade coding bootcamps such as Lambda School, Galvanize/Hack Reactor and App Academy have grown in popularity, and have started to become a valuable substitute for earning a traditional college degree. In 2016 alone, one estimate put the number of bootcamp graduates at [18,000](#), with dozens of programs popping up in the classroom and online.

As innovative companies become more open to alternative forms of education, coding bootcamps are earning their stripes as a legitimate alternative to a college degree. The tide is slowly shifting as coding bootcamps are getting the workforce job-ready, with 13% of survey respondents saying they have participated in a bootcamp, and 76% of those saying it helped prepare them for a software engineering job. While some employers are hesitant to hire developers with bootcamp-only coding experience, 57% of employers say they would hire a bootcamp grad for an open role, suggesting there's room to grow and an opportunity for bootcamp grads to gain full-time employment.

### Do you think your bootcamp helped you prepare to get an engineering job?



### Would you hire a bootcamp grad for an open role?



### Experience is King

Concern over lack of experience is the #1 reason employers wouldn't hire a bootcamp grad.

## Decoding the Interview Process

Long before a job offer is even put on the table, developers have to successfully navigate a string of coding exams, whiteboarding sessions, and behavioral interviews. What do they actually think about these interviewing methods? In short, only about half (54%) of developers strongly agree and agree that coding exams effectively test their aptitude, and more than half (63%) admitted that they're irrelevant to the work they actually do.

Among the range of possible tests, they're not breaking a sweat for behavioral interviews — barely 21% say it's the most stressful part of the process. Coding exams and whiteboarding sessions, however, are another story. We found that 63% of developers think coding exams are the most stressful part of the interview process, and 59% say whiteboarding induces the most stress.

### Which type of interview is the most stressful?



### What do you think about coding exams?

**63%**

they are irrelevant to the daily job

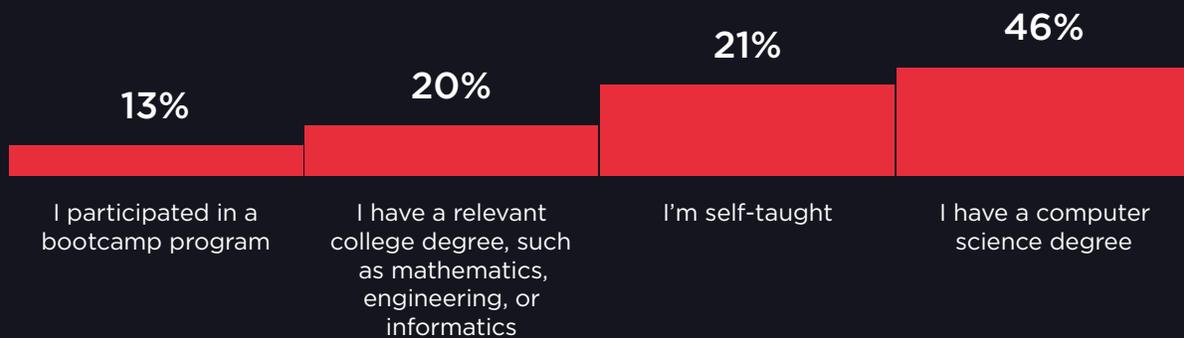
**54%**

they are an effective way to test a candidate's aptitude

## Continual Developer Education

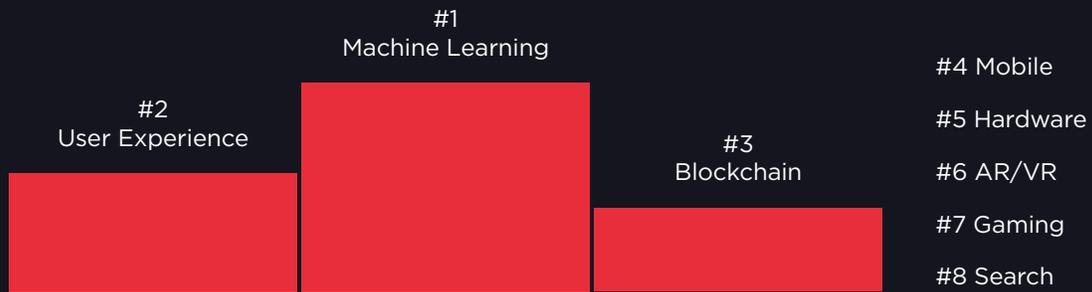
Learning how to code is no easy feat and most often takes years to master, which is one main reason developers are such a hot commodity. While many software engineers still take the expected route of earning a computer science degree (46%), one in five survey respondents told us they are self-taught.

### How did you learn to program?



So what types of tech are developers most interested in learning? Our survey revealed that company demand and developer interests don't always match. For example, blockchain engineering is the most in-demand skill on the Hired marketplace, yet only 12% of survey respondents identified blockchain as the top technology they want to learn about, while 19% said the opposite. For machine learning, interests and demand are in sync: 61% said machine learning is the number one or two technology they're interested in learning about.

## What technology or skill are you most interested in learning about?



## What's your 10 year goal?

**37%**

Just want to continue building cool things

**23%**

Want to become a technology leader (SVP, CTO)

**19%**

Want to start their own company

**15%**

Want to be a product leader

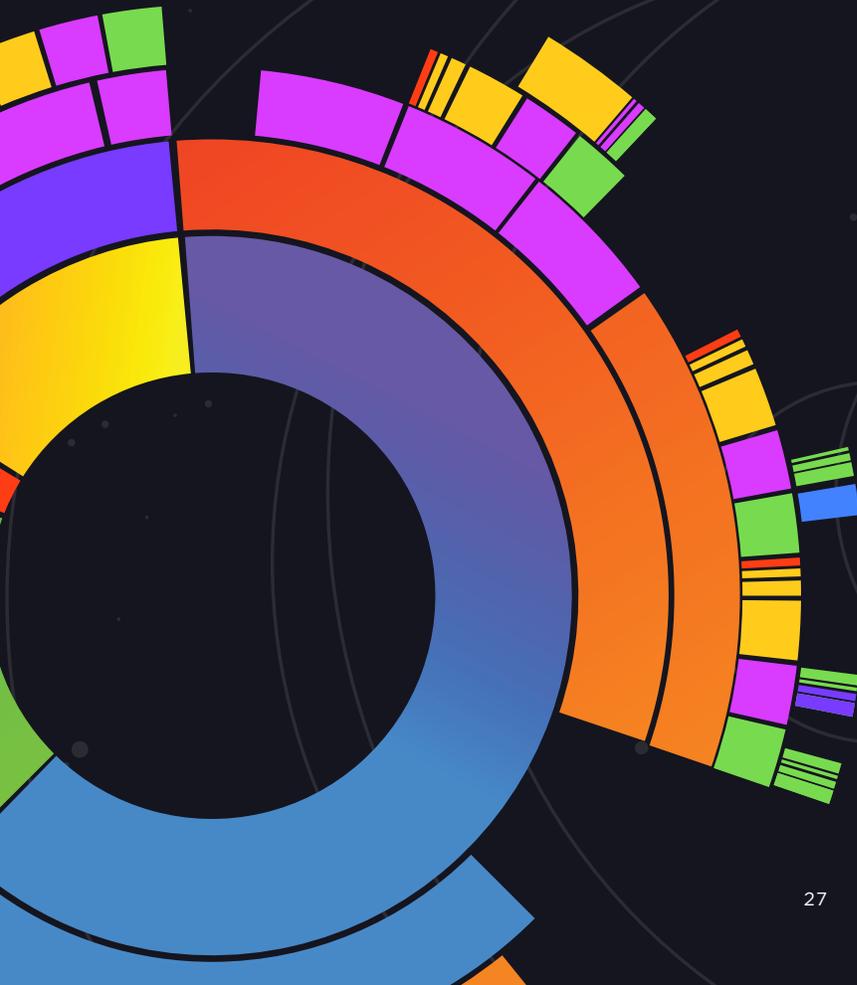
**8%**

Want to be able to retire

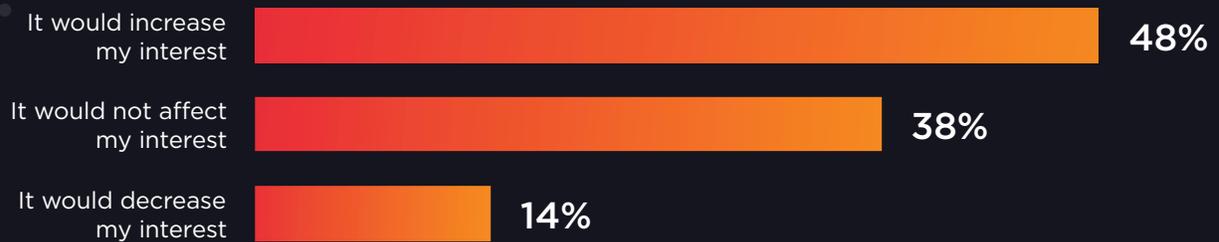
## Uncovering Developer Working Styles

Teamwork makes the dream work, at least according to developers. Survey data reveals that software engineers are interested in pair programming, a development approach in which two programmers work together at one workstation. In fact, 48% said it would increase their interest in working at a company if they offered pair programming.

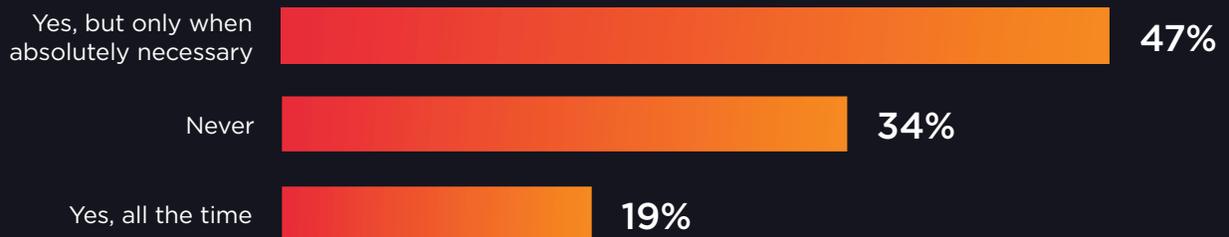
Developers see clear benefits to pair programming, too. Nearly half of developers believe pair programming is more efficient because it helps to catch bugs along the way. It is especially useful for junior team members: 42% believe pair programming is good for junior engineers, but doesn't make sense for people with more experience. While 40% of respondents think more companies should implement it, companies are still working out the kinks. One in five believe that pair programming can leave one person doing all the work, and 14% believe it enables sub-par developers to slip through as they ride on the coattails of their partner.



## If pair programming was a common practice at a company, would it affect your interest in working there?



## Do you or your teammates ever shell into production?



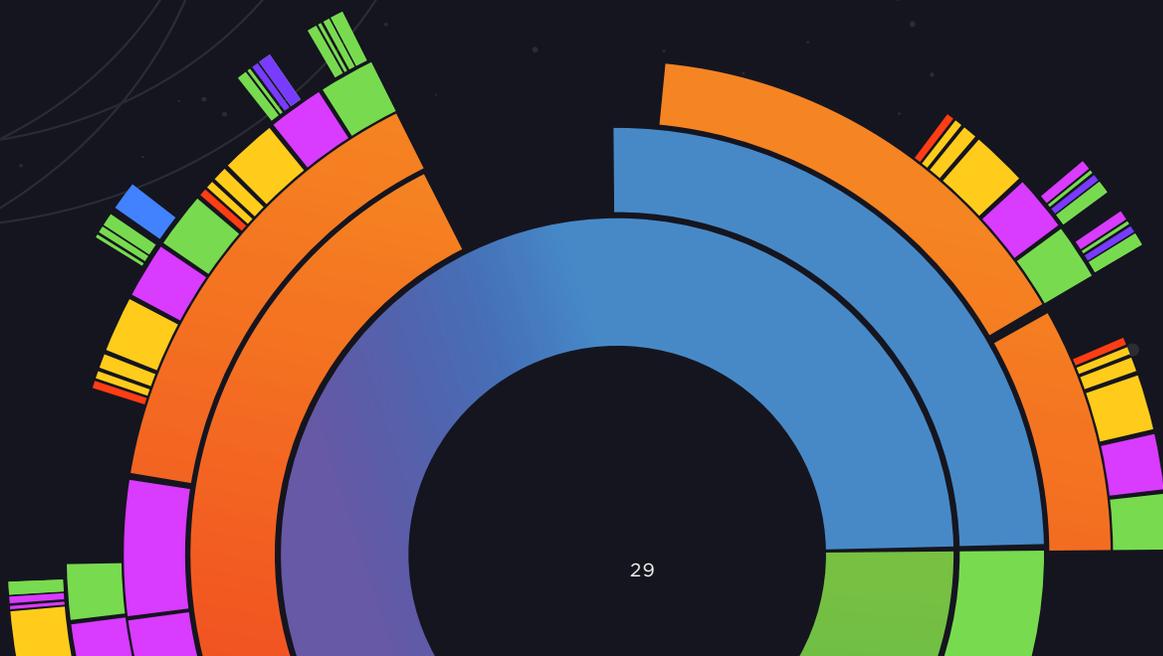
While engineers don't mind joining forces with each other, collaborating with cross-functional groups is not their favorite. One in four (26%) said sales is the most challenging, followed by marketing (23%), HR (20%), finance (15%), product (11%) and design (9%).

## Collaboration Counts: Views on Open Source

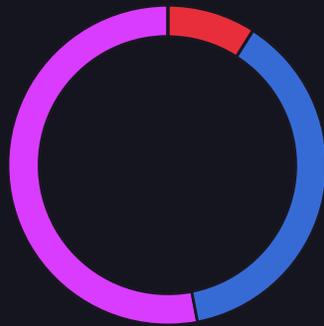
The open source community is known for being loyal, but the group of frequent contributors is smaller than you'd expect. Survey data reveals that only 9% of respondents frequently contribute to open source, and 53% have never contributed to open source before.

The lack of open source engagement may be due to the key driver behind contributing to open source: 30% of developers say they contribute to open source because it is fun. Given the demanding work schedules they have, developers may not have the luxury of time to engage in something just "for fun" when it doesn't necessarily contribute to their day job.

A company's level of participation in open source isn't affecting developers' interest in working for those companies either, with 50% citing it wouldn't impact their decision at all. With that being said, 43% of developers stated that they do prefer to work for companies that contribute to open source projects although it's not a deal breaker. As companies look to differentiate themselves in today's competitive hiring landscape, their involvement in open source projects may be an opportunity to attract top talent that values an organization that prioritizes time for their teams to participate in a way that adds value to the developer community.



## Have you ever contributed to open source software?



- 9% Yes, frequently
- 38% Yes, a few times
- 53% No

## What is your primary motivation behind contributing to open source software?



- 24% I want to put it on my resume
- 25% I feel responsibility to contribute to open source
- 5% It is required by my employer
- 30% It is fun
- 15% Other

## Developers Likes and Dislikes

**63%**

would rather get up early and finish work early than sleep in and work late

**38%**

say their biggest pet peeve is unrealistic deadlines

# Conclusion

Developers are not one-size-fits-all. Skill sets and language demands vary by region, and for every bootcamp advocate or open source cheerleader, there's someone screaming the opposite. But we do know that continual learning is table-stakes for every successful engineer. Whether it be mastering Go because demand is so high, or giving pair programming a try because so many other engineers seem to love it, the decisions engineers make have a long-term impact on their career success and satisfaction. Hired is on a mission to get everyone a job they love, so our hope is that developers will use the findings in this report to make more informed career decisions.

# Methodology

This report is based on proprietary information gathered and analyzed by Hired's data science team. For the purpose of this report, we focused on software engineers in 13 cities. The data included reflects more than 170,000 interview requests and job offers from the past year facilitated through our marketplace of more than 10,000 participating companies and 98,000 job seekers. Age data was collected through an optional demographics survey given to Hired candidates that is used only for aggregated research purposes and not shared with Hired clients.

In addition to our proprietary data, we collected survey responses from more than 700 software engineers on the Hired platform to inform our understanding of developers' working preferences.

# About Hired

[Hired](#) is a career marketplace that intelligently matches tech talent with the world's most innovative companies. We combine cutting-edge technology with unbiased career coaching so both talent and employers can find the right fit, faster.

Through Hired, job candidates and companies have transparency into salary offers, competing opportunities and job details. This level of insight is unmatched, making the recruiting process quicker and more efficient than ever before.

Hired was founded in 2012 and is headquartered in San Francisco, with offices in the United States, Canada, France, and the UK. For more information, news, and tips for job candidates and employers, visit [Hired's blog](#).

