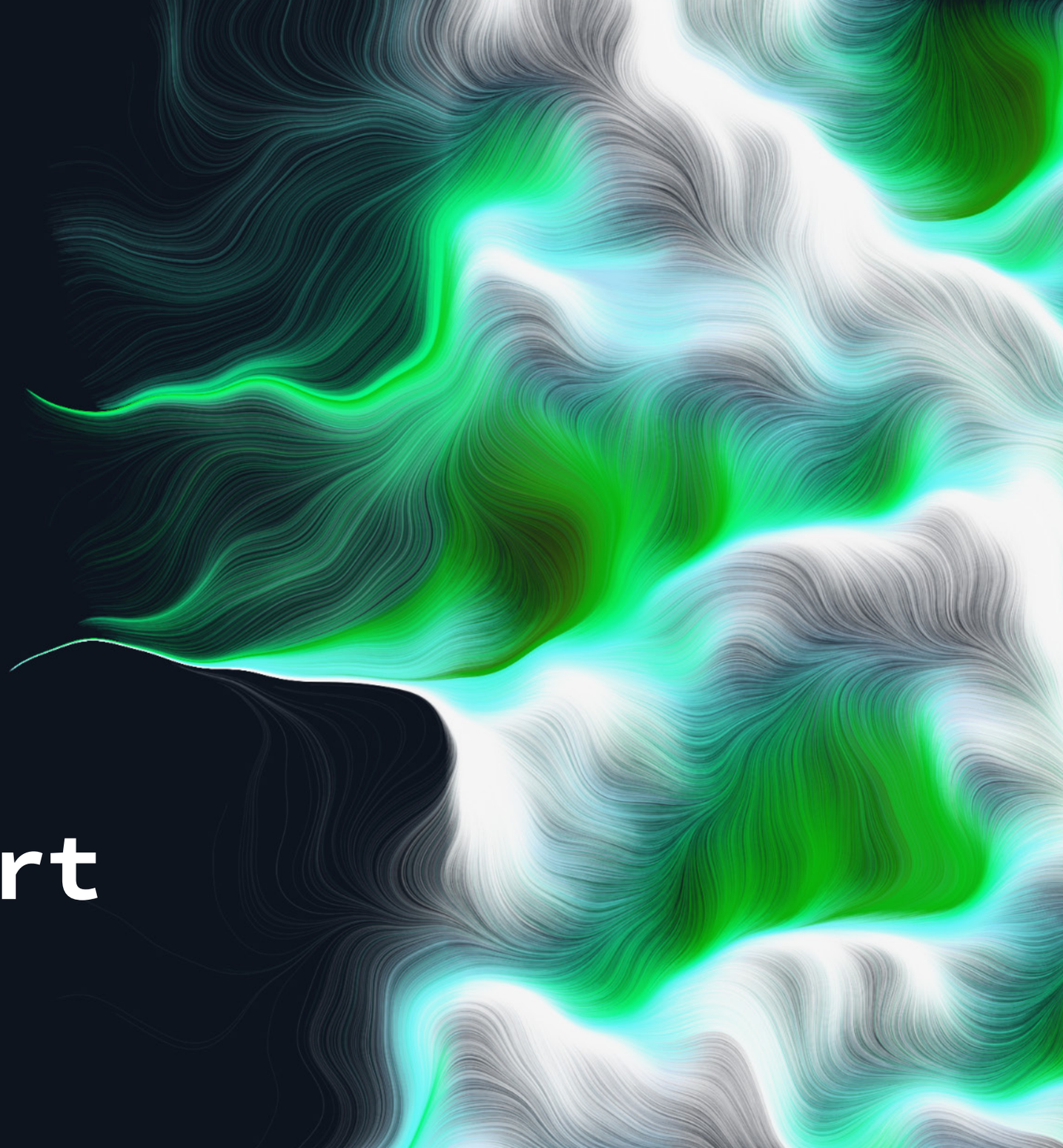
HackerRank

2019 Developer Skills Report

research.hackerrank.com



Intro

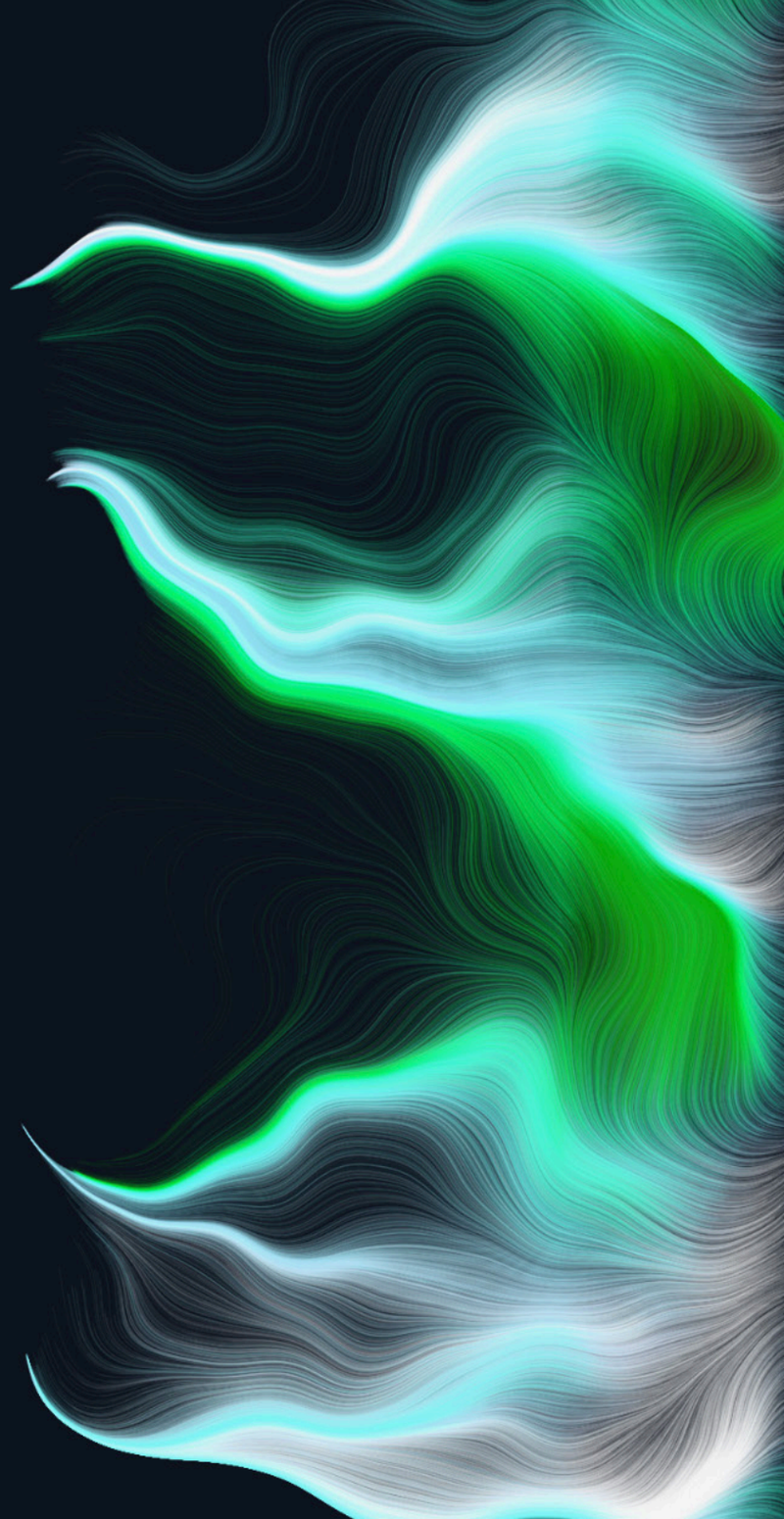
Programming is like art—both the process of writing code and the code in itself. Converting an idea that only existed in your head into reality is an unparalleled feeling. It's a kind of mindfulness that keeps you in a state of flow when you love the work you do. And, when your product impacts millions of developers and helps them find the right place to work—it's both exciting and scary!

At HackerRank we have had the opportunity to build a product that's used by a community of more than 5 million developers (more than 20% of the world's developer population) and more than 1,200 customers to match every developer to the right job based on skill. The underlying infrastructure of the hiring process is going through a dramatic shift. Candidates are now being evaluated based on their skills and not their pedigree. This opens up a lot more opportunities for developers and smart companies worldwide are recognizing this and making the shift.

We surveyed our community with questions ranging from which technology they find the most promising to what they look for in a job and during the interview process. More than 70,000 developers participated in the survey (that's right!) and enclosed is a treasure trove of insight on what's happening in the land of developers.

Enjoy the report and as always feel free to tweet @hackerrank or email us research@hackerrank.com your comments.
Let's build an even playing field!

Vivek Ravisankar
Co-founder & CEO
HackerRank



Calculators are the new games

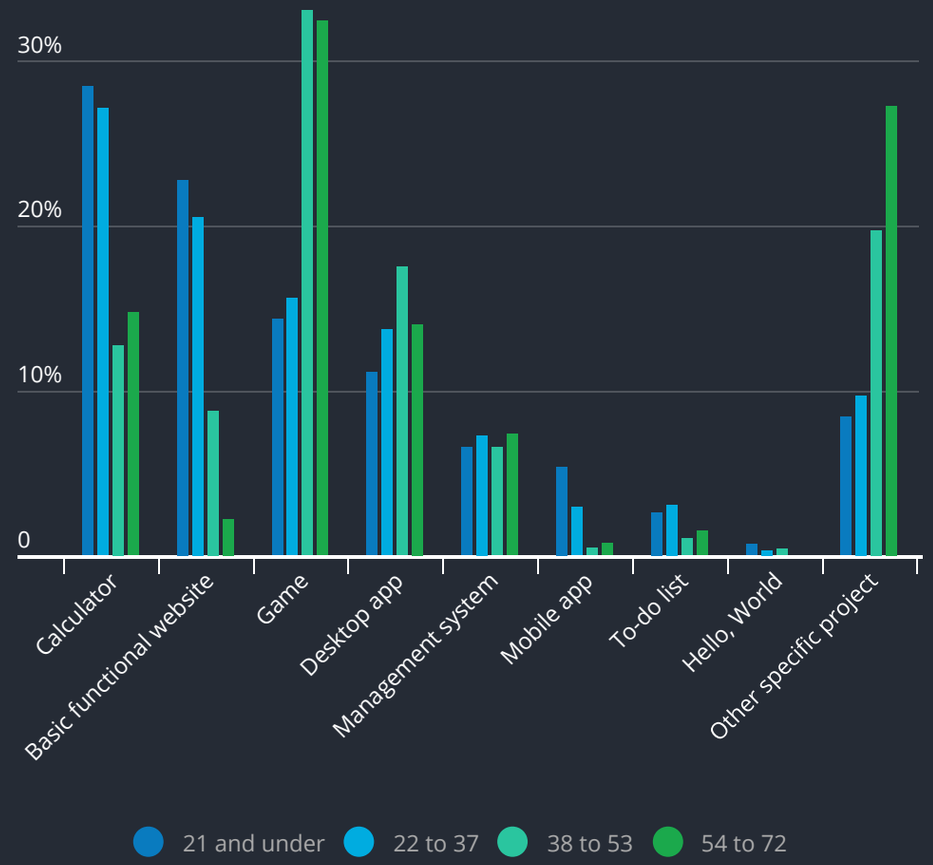
Developers' first coding projects have evolved over the course of two generations.

More specifically, if you're a developer over the age of 38, chances are your first project was a game. Meanwhile, younger generations were most likely to build a calculator as their very first project.

Some developers had unique first projects. Here are a few of our favorites:

- I created a program that contained all the math and physics rules to help me solve my homework assignments.
- "Hacked" a flash game to give me infinite health and ammunition.
- I built a "What college should I go to?" randomizer.

First coding project by age



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

India:
+91-888-081-1222

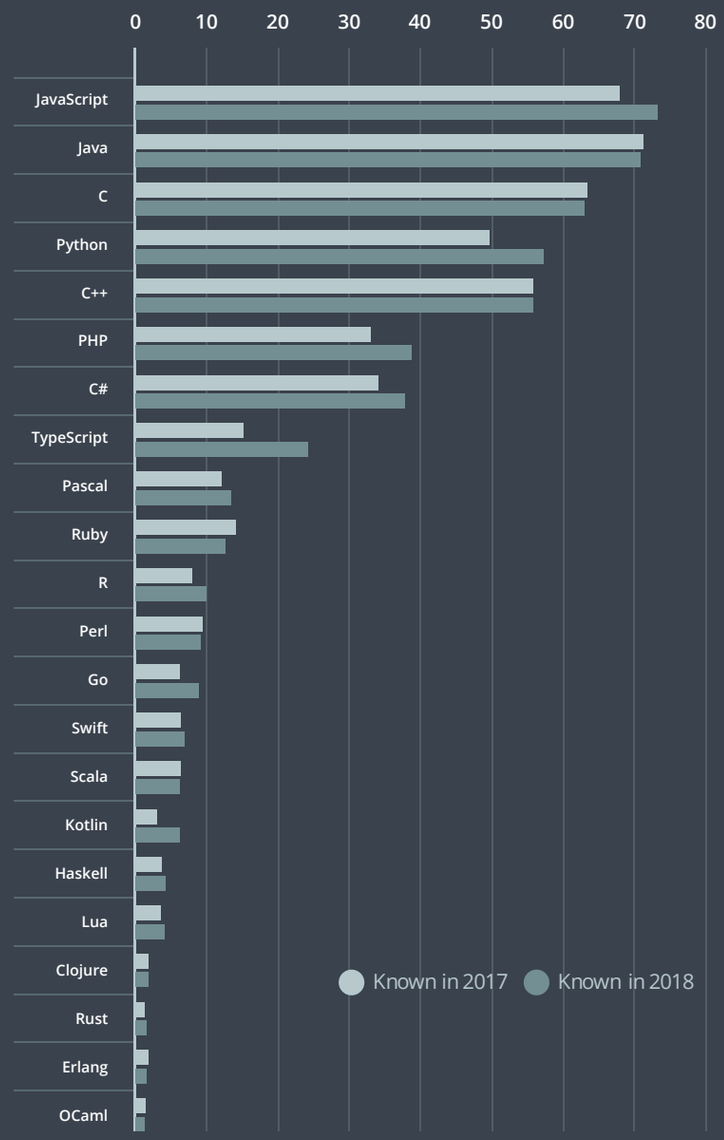
UK:
+44-208-004-0258

JavaScript: 2018's most popular language

When comparing the most popular languages that developers were learning year over year, we found that developers were learning JavaScript at the most rapid rate. In 2018, 73% of developers said they knew JavaScript, up from 66% in 2017. This also makes JavaScript 2018's most well-known language, compared to Java in 2017.

Student developers are the exception. Only 42% of student developers in 2018 said they knew JavaScript. This could be because JavaScript isn't taught in most university computer science programs, so more developers learn JavaScript once they're out of school and creating applications for work.

Languages known in 2017 vs. 2018



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

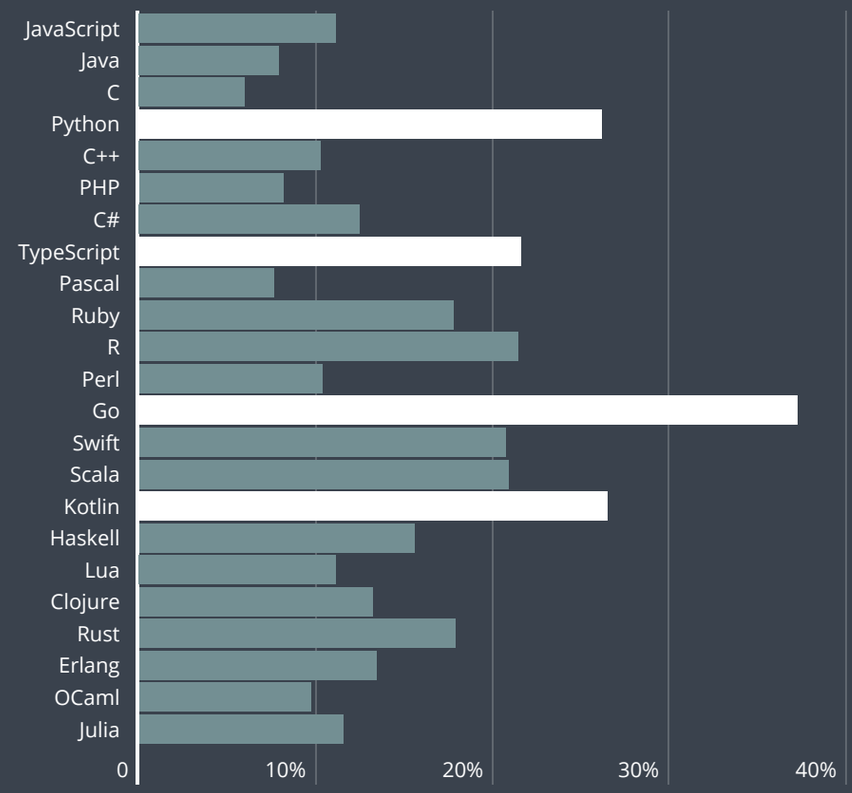
India:
+91-888-081-1222

UK:
+44-208-004-0258

Developers are as eager as they were last year to learn Go, Kotlin, and Python in 2019. Interestingly, developers' interest in Scala has dropped, whereas their interest in TypeScript has increased. Scala was the 3rd most popular language that developers planned to learn in 2018 but dropped to 6th place in 2019.

TypeScript went from being the 5th most popular language to learn to #4. The language's rising popularity is most likely because of the ubiquity of JavaScript and the fact that many major JavaScript frameworks use TypeScript. In fact, almost a quarter of developers know Typescript this year, up from 15% last year.

Languages developers want to learn in 2019



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

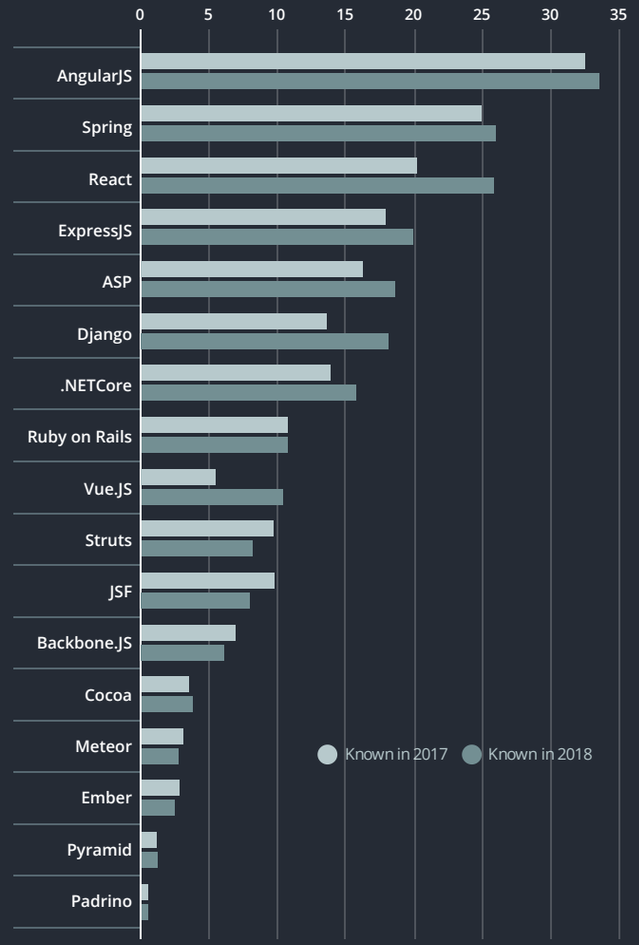
India:
+91-888-081-1222

UK:
+44-208-004-0258

React poised to overtake AngularJS in 2019

AngularJS continues to be the most popular framework that developers know. However, more and more developers have begun to learn React. The percentage of developers who know React jumped from 20% in 2017 to 26% in 2018.

Frameworks known in 2017 vs. 2018



research@hackerrank.com
www.hackerrank.com

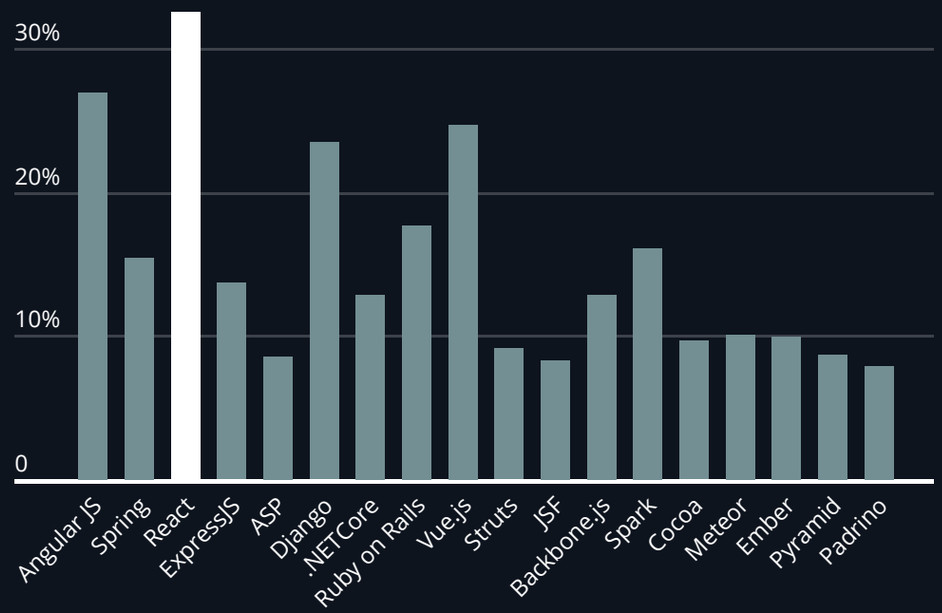
USA:
+1-415-900-4023

India:
+91-888-081-1222

UK:
+44-208-004-0258

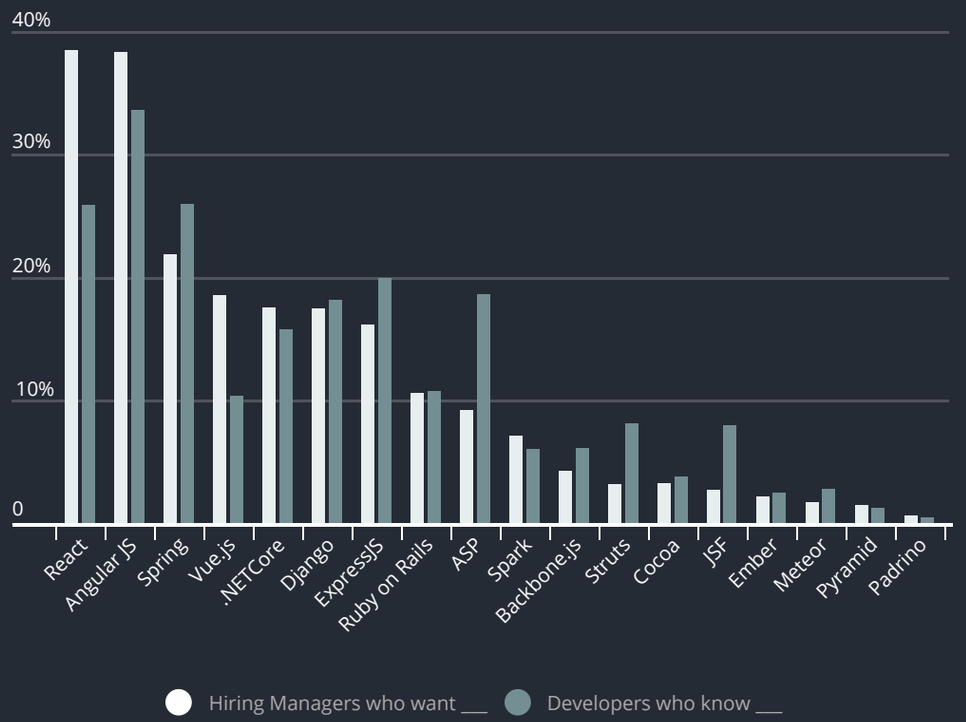
The number of developers who know React is likely to keep increasing. It's the #1 framework that developers want to learn in 2019. The transition from Angular 1 to Angular 2 did not allow for backwards compatibility, which could explain why developers are moving towards a different framework. React is also considered to be simpler and more flexible than AngularJS, making it poised to overtake AngularJS.

Frameworks developers want to learn in 2019



Despite developers taking a stronger interest in React, companies' appetite for this front-end framework outpaced the number of developers who knew React in 2018. The JavaScript ecosystem is constantly evolving and often difficult to keep up with, but it's obvious that learning React is a worthwhile investment for developers.

Frameworks hiring managers want vs. frameworks developers know



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

India:
+91-888-081-1222

UK:
+44-208-004-0258

IoT is the most realistic new tech

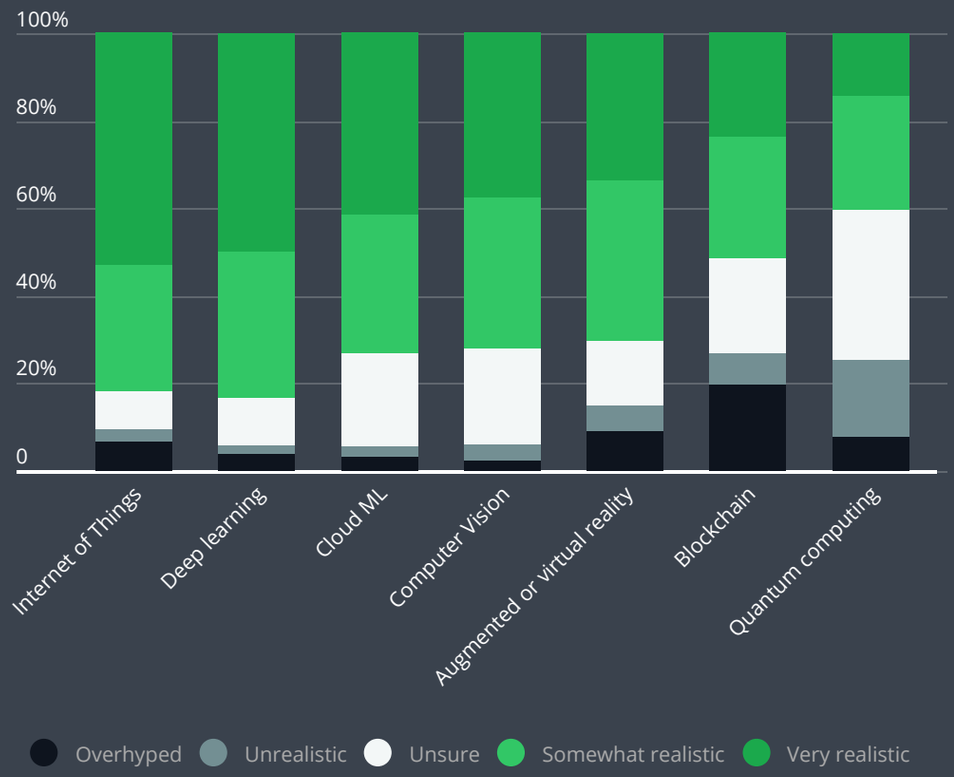
Internet of Things (53%), just above Deep Learning (50%), is predicted to be the most adopted new technology in the next two years. The increasing connectivity of homes, cars, and even cities is evidence of this technology having the best chance of real-world application by 2020.

Application of Deep Learning is expanding from mobile speech recognition software to places like the healthcare sector and automotive industry, which could explain why developers consider it a realistic technology.

As IoT and Deep Learning continue gaining momentum, it's clear that picking up the skills needed to work on these technologies will be valuable for developers.

On the other end of the spectrum, with a fluctuating cryptocurrency market but also the support of many of the biggest companies in the world, blockchain is an unpredictable technology. ~20% of developers said the real-world application of blockchain in the next two years is overhyped.

The real world application of technologies by 2020



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

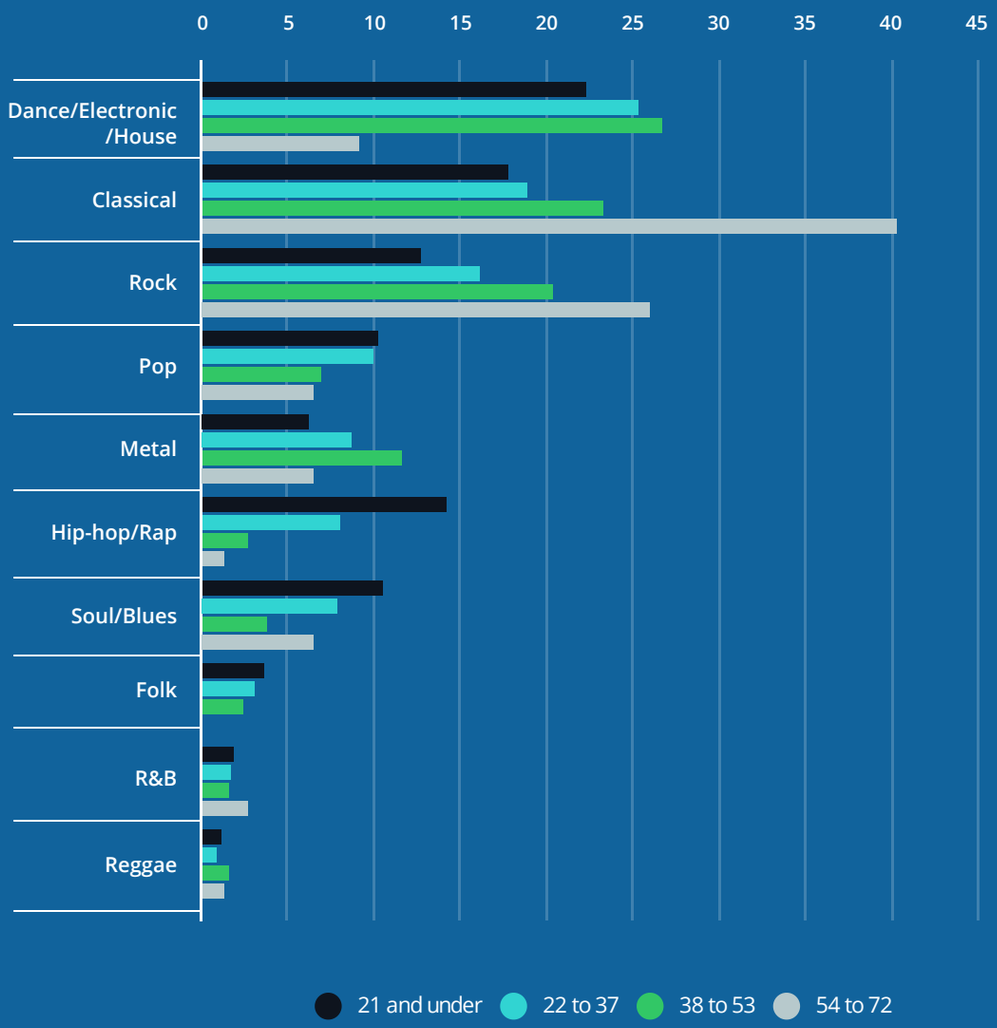
India:
+91-888-081-1222

UK:
+44-208-004-0258

Dance and electronic music fuel coding sessions

Developers who listen to music while working were most likely to turn to dance and electronic music to help them get into the flow of coding. Developers who are 21 years old or younger were more likely than any other age group to listen to hip-hop and rap while working.

Best music to listen to while coding



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

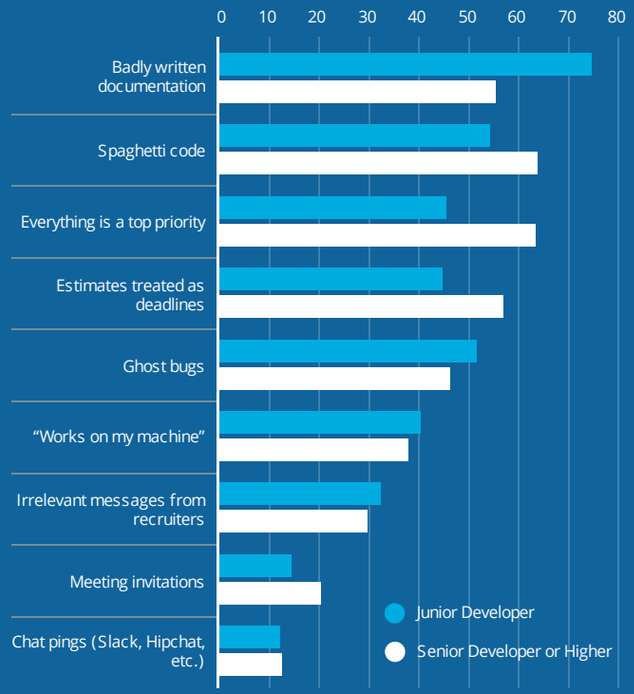
India:
+91-888-081-1222

UK:
+44-208-004-0258

The #1 pet peeve: Badly written documentation

Developers' struggles are real...and we wanted to find out what frustrated them the most. Junior developers particularly despised badly written documentation while senior developers thought spaghetti code was the worst.

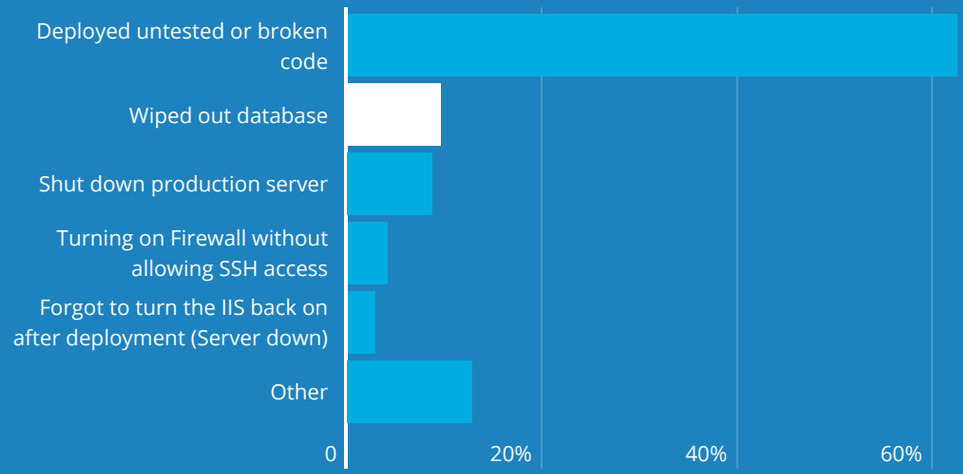
The #1 pet peeve at work



One of the biggest bugs: 'Wiped out database'

When asked about their biggest bug in production, deploying untested or broken code was the most common response. We also found that ~10% of developers admitted to wiping out the entire database.

The biggest bug in production



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

India:
+91-888-081-1222

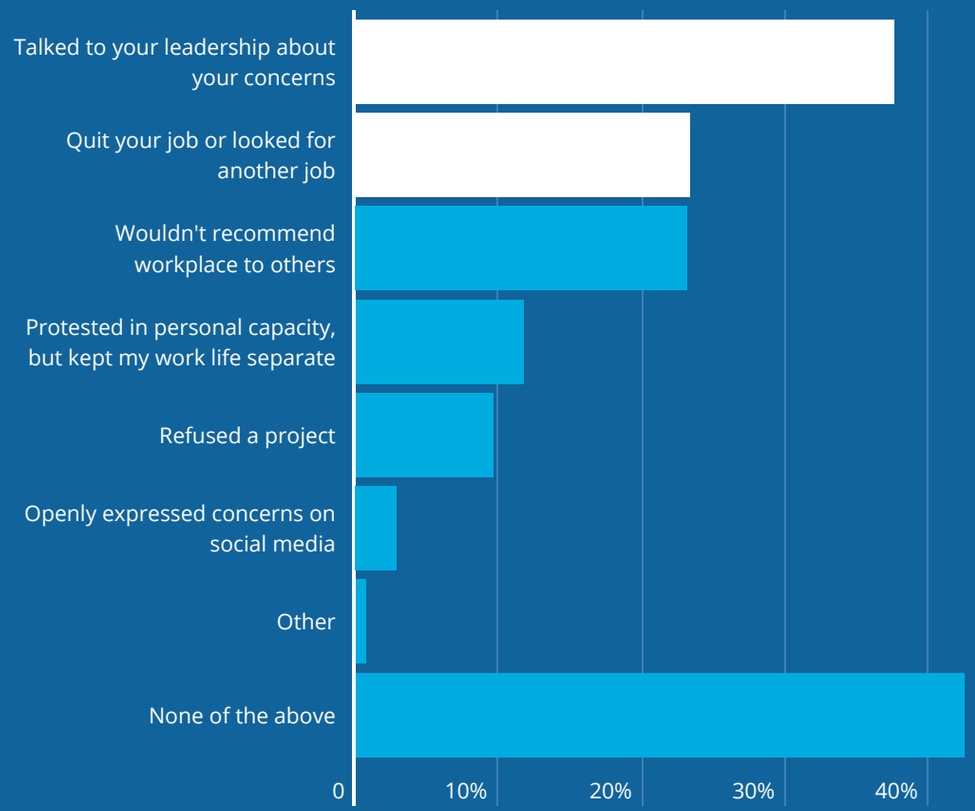
UK:
+44-208-004-0258

58% of developers took action in response to concerns about employers

2018 was the year of taking action — from employee walkouts to company boycotts.

In fact, 58% of developers polled took action in response to concerns about their company. Examples of concerns included affiliations with privacy misuse and censorship. Close to 40% of developers approached their leadership about their concerns regarding their company. 23% quit their job or began looking for another position in response to misgivings.

Actions taken in response to concerns about employers



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

India:
+91-888-081-1222

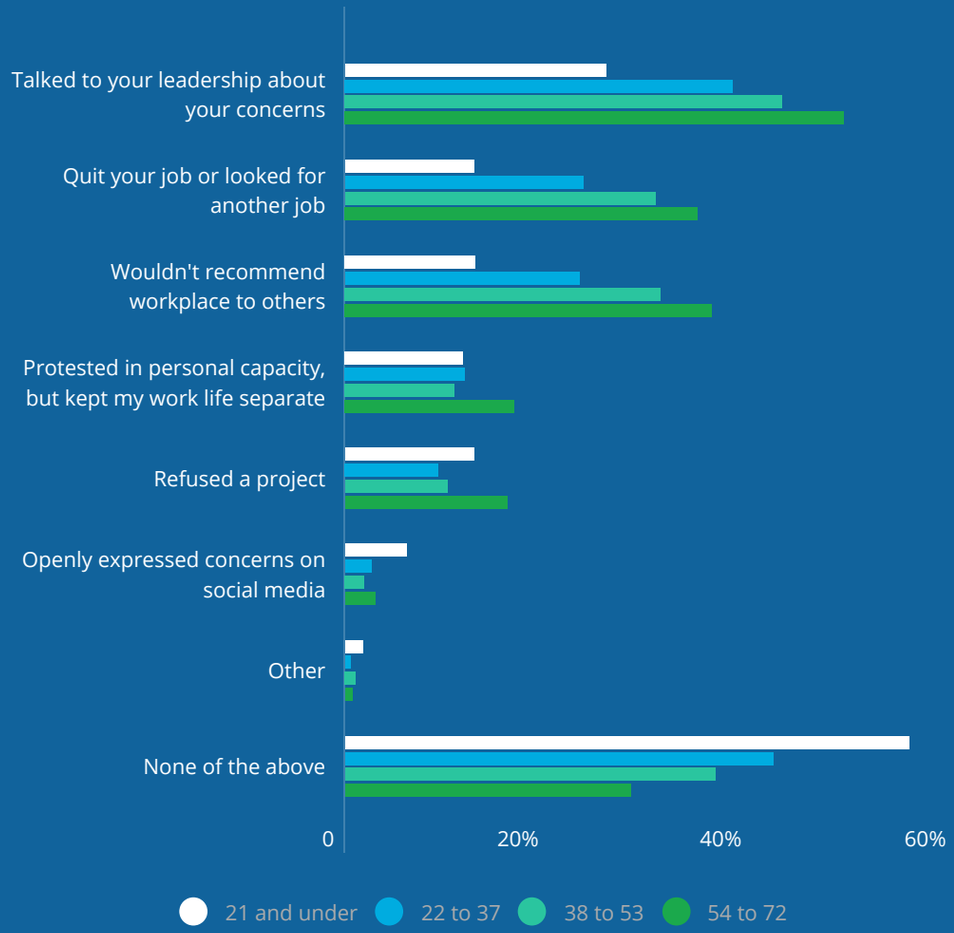
UK:
+44-208-004-0258

Conventional wisdom dictates that younger generations are more likely to take action and older generations are more content with the status quo. That's not what the data tells us.

Across the board, the older the developers, the more likely they were to refuse to work on projects, protest, discourage others from joining companies, quit their jobs, look for new jobs or speak to management in response to concerns about their company.

The only exception to this is when it comes to social media. Developers who are 21 years old or younger were the most likely to openly express concerns on social media.

Actions taken in response to concerns about employers according to age



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

India:
+91-888-081-1222

UK:
+44-208-004-0258

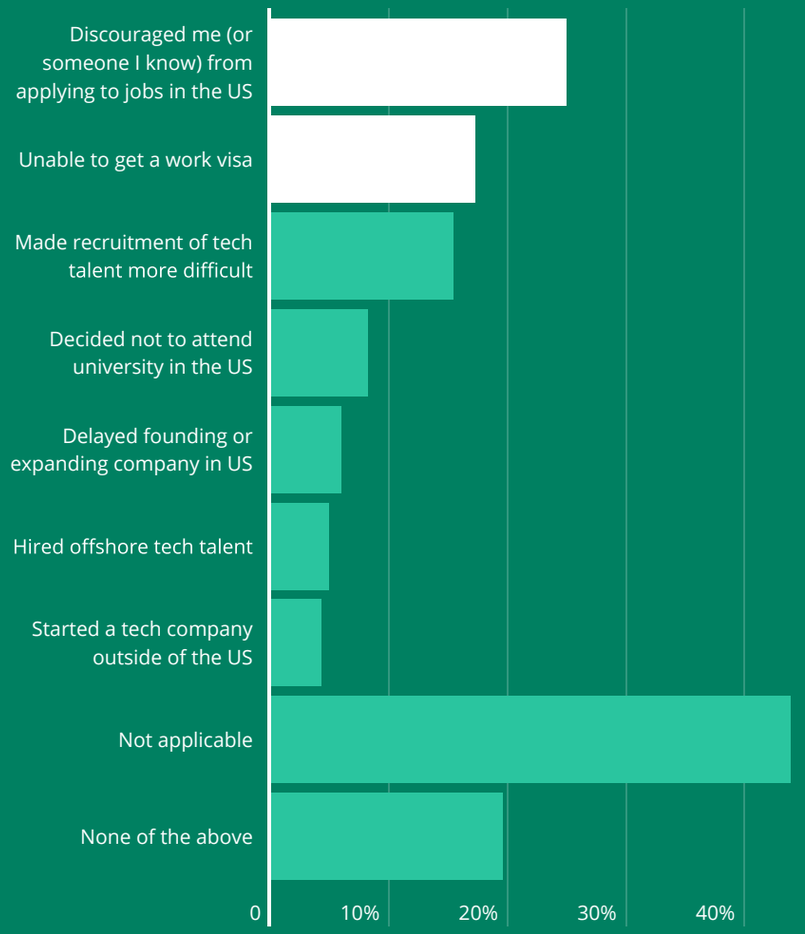
Immigration policies impact access to tech talent

Silicon Valley has largely been composed of immigrants, with 57% of its technical workforce born outside of the United States. But, our survey found that 4 in 10 developers were negatively impacted by immigration policies in 2018.

Nearly 1 in 5 developers who applied for a US work visa were denied. In fact, many developers were discouraged from even applying. Almost 25% of developers stated that US immigration policies discouraged them or others they knew from applying to jobs in the country.

4 in 10 developers have been negatively impacted by immigration policies in 2018

Impact of US immigration policies on all developers surveyed



research@hackerrank.com
www.hackerrank.com

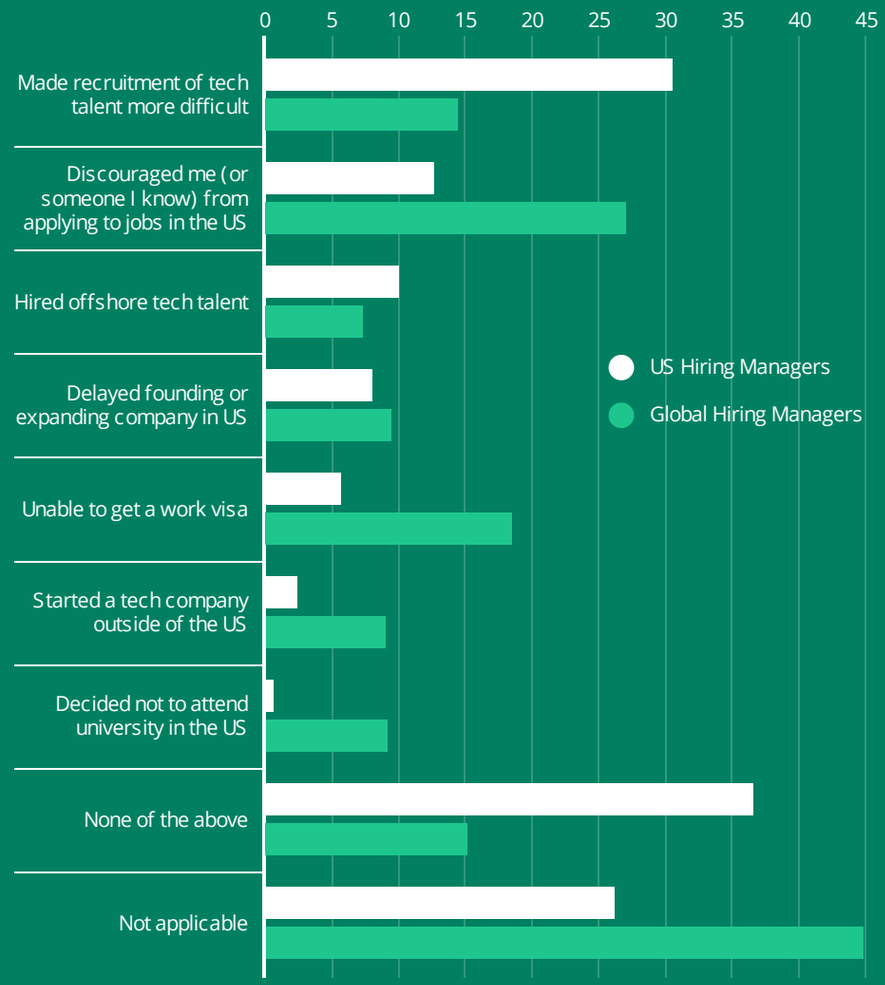
USA:
+1-415-900-4023

India:
+91-888-081-1222

UK:
+44-208-004-0258

The demand for developers in the United States is expected to grow much faster than average in the next 5 years. However, US employers are starting to have difficulty finding the developers they need. 30% of US hiring managers said immigration policies made recruitment of tech talent difficult in 2018.

Impact of US immigration policies on US hiring managers vs. global hiring managers



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

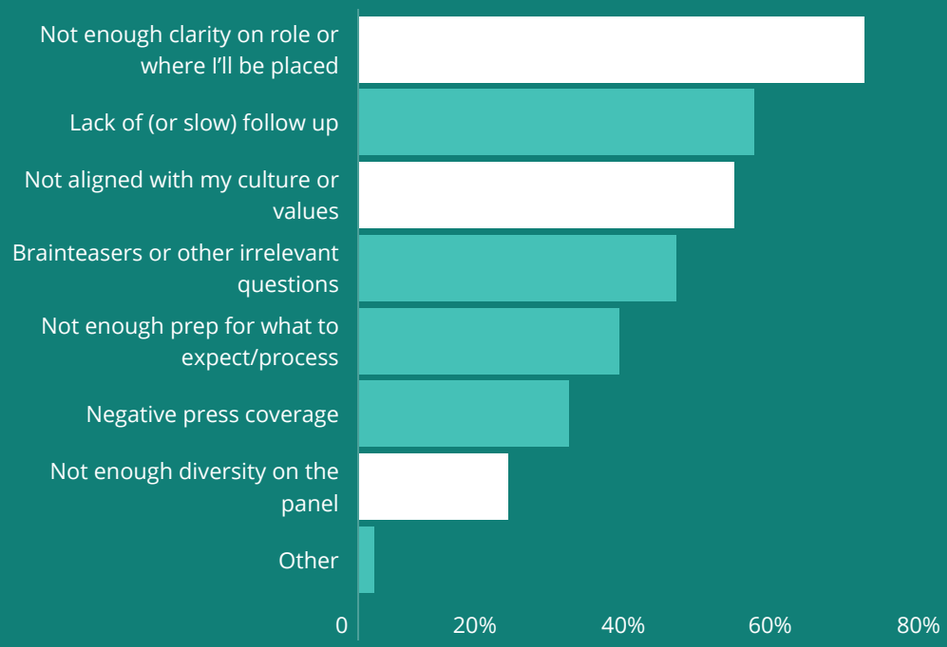
India:
+91-888-081-1222

UK:
+44-208-004-0258

The #1 way to lose developer candidates: Unclear roles

A poor interview experience is a surefire way to lose top candidates in today's competitive tech talent market. Developers were most likely to be turned off by employers who don't provide enough clarity around roles or where they'll be placed. 49% said lack of values alignment was a turn-off and 14% reported not enough diversity on the panel was a deal-breaker.

What turns developers off from employers



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

India:
+91-888-081-1222

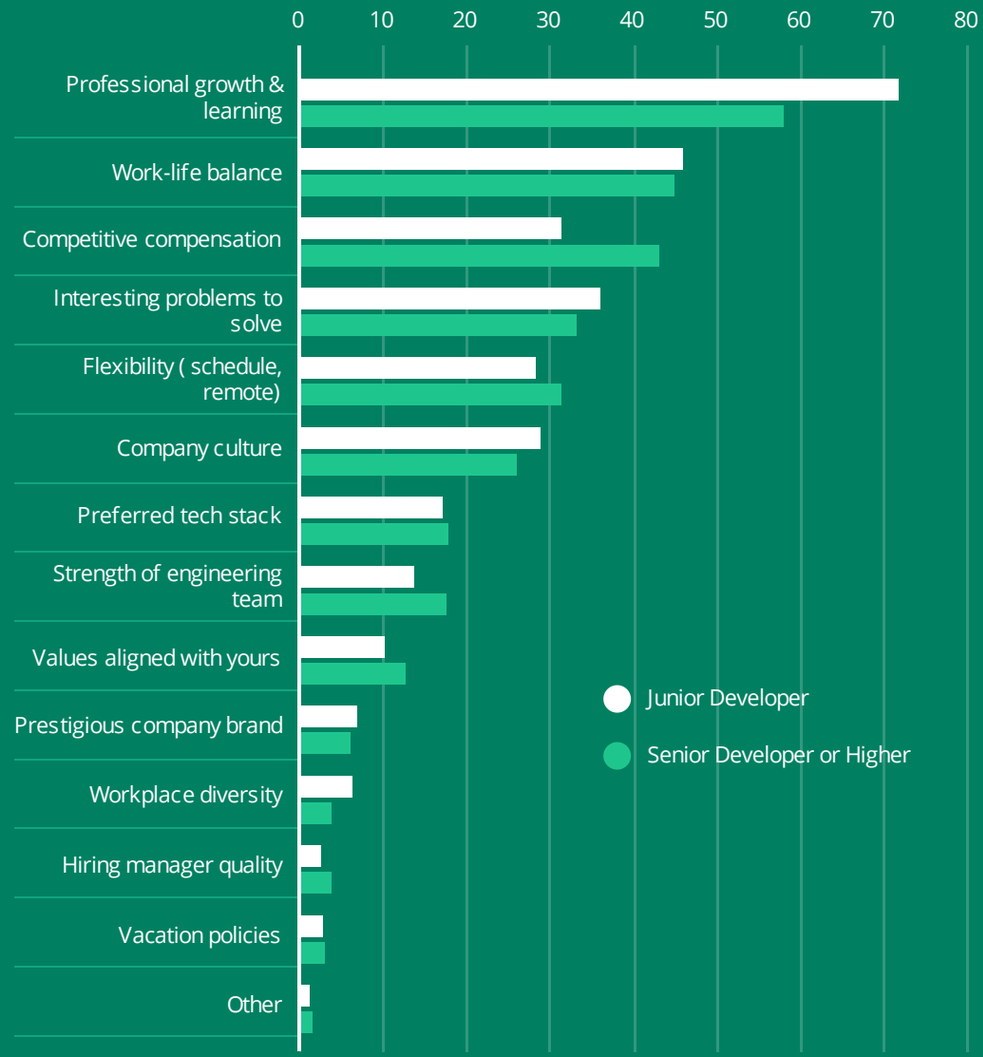
UK:
+44-208-004-0258

Professional growth and work-life balance matters most

The most important factors for developers, across all job levels and functions, was the opportunity for professional growth and work-life balance.

Developers are voracious learners by nature and necessity, given tech's rapidly changing pace. The importance of work-life balance for both senior and junior is aligned with studies which have found that employees who do significant amounts of overtime are at a large risk of burnout, leading to a decrease in productivity, high turnover, and even health concerns.

What developers look for in a job



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

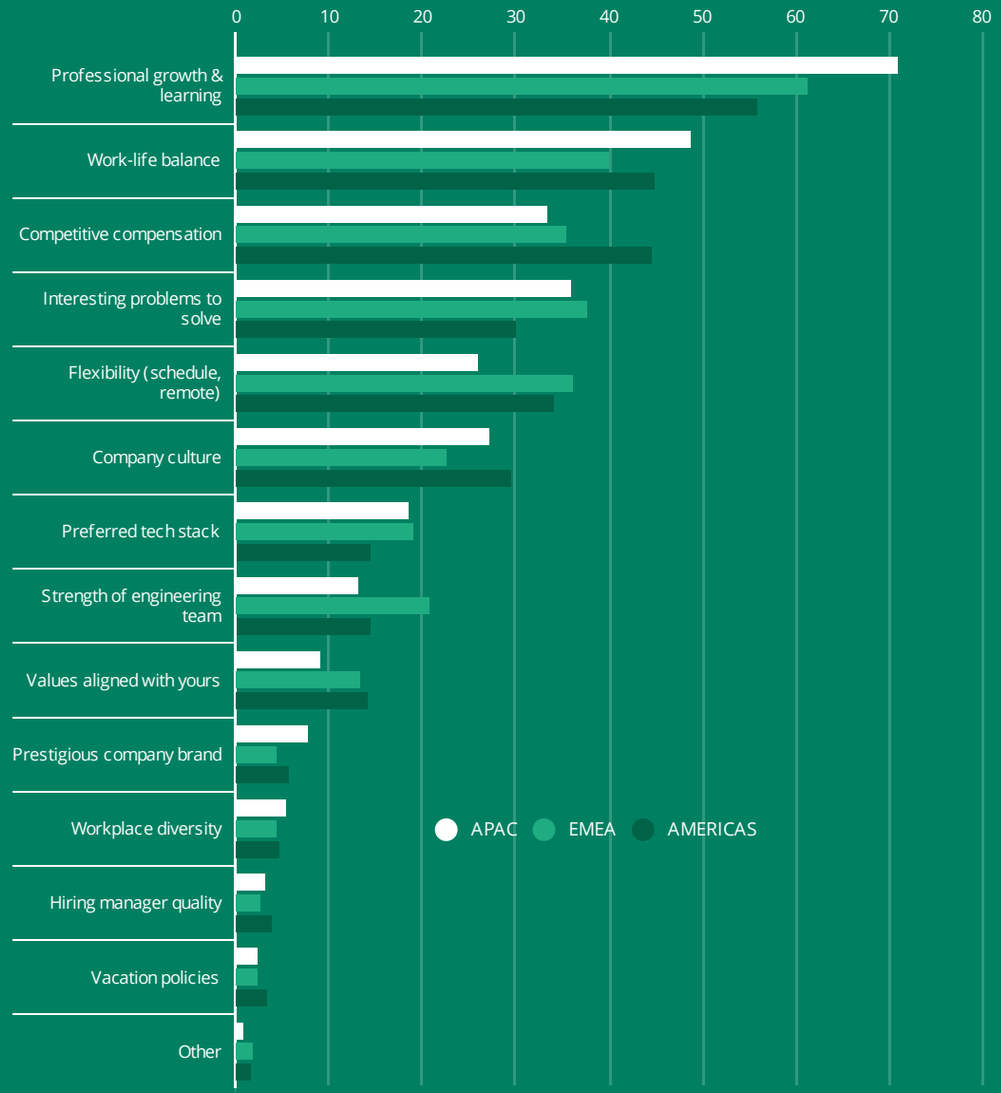
India:
+91-888-081-1222

UK:
+44-208-004-0258

For developers working in North and South America, compensation was the third most important aspect of a role.

Even though Asian-Pacific, European, Middle Eastern, and African developers ranked having interesting problems to solve at work higher than salaries, compensation was still one of their top 5 priorities.

What developers look for in a job in different regions



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

India:
+91-888-081-1222

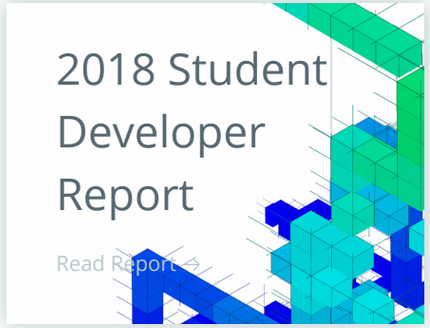
UK:
+44-208-004-0258

Methodology

HackerRank conducted a study of developers to identify trends in developer skills, work, and employment opportunities. A total of 71,281 professional and student developers from more than 100 countries took the online survey from November 5 to November 27, 2018. The survey was hosted by SurveyMonkey and HackerRank recruited respondents via email from their community of over 5 million members and through social media sites.

Tests of significant differences were conducted at the .01 level (99% probability that the difference is real, not by chance). Percentages may not always add to 100% due to rounding.

More Research



research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

India:
+91-888-081-1222

UK:
+44-208-004-0258

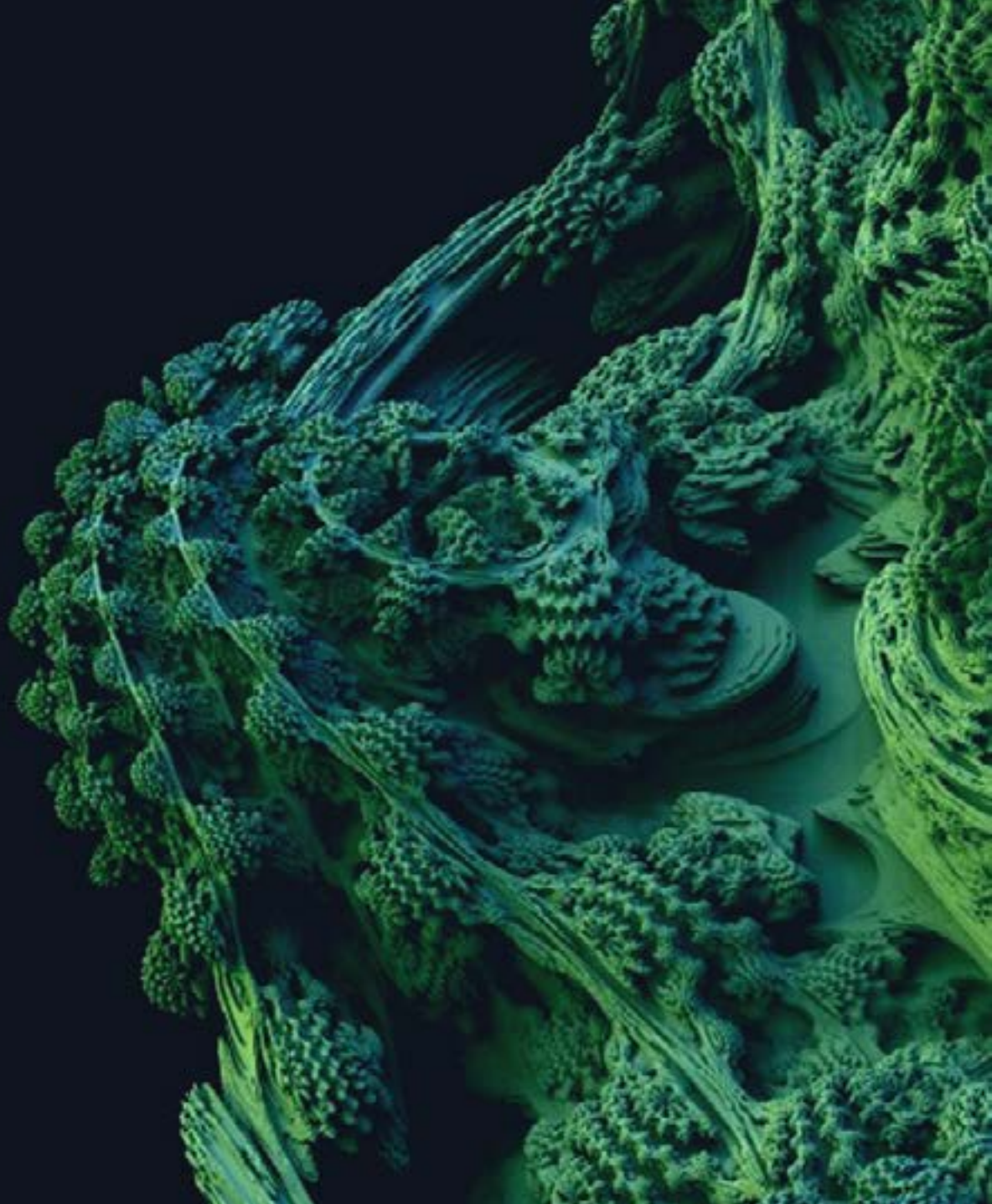
HackerRank

2018 Developer Skills Report

research.hackerrank.com

39,441 developers

took the survey



Hello World

The future of work will be very different. Irrespective of your job, it will become important for everyone to learn how to code. Coding helps enrich your computational thinking, which is powerful in making decisions. The traditional resume will go away and hiring will happen based on your skills first.

We launched HackerRank in late 2012 with the goal of matching every developer to the right job. And the growth has been amazing — we reached 3.2M developers in the community and powered 2% of all developer hires last year.

For the first time, we surveyed the HackerRank community to get a pulse on developer skills (when did they push code for the first time, how do they learn coding, what are the favorite languages and frameworks, what do they want in a job, what hiring managers want in a candidate, and more). There are some great insights, from 39,441 responses, that we are happy to share with you today. Did you know that 1 in 4 developers learned to code before they could drive?

We hope you find the 2018 Developer Skills Report insightful and would love to discuss the findings with you. E-mail us at research@hackerrank.com

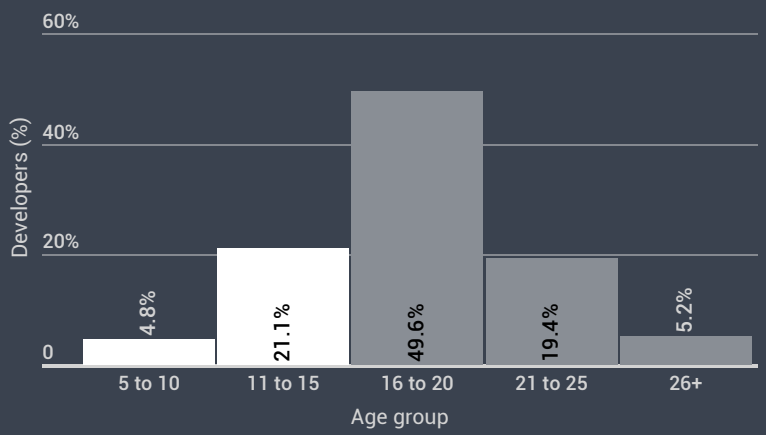
Vivek Ravisankar
Co-founder & CEO

1 in 4 developers started coding before they could drive

It's never too early — or too late! — to start coding. Of the roughly 39,000 developers surveyed across all professional levels, more than a quarter of developers wrote their first piece of code before they were 16 years old.

Meanwhile, of all the developers who started coding after the age of 26, 36% are now senior or even higher-level developers, growing quickly in their careers.

When did you start coding?



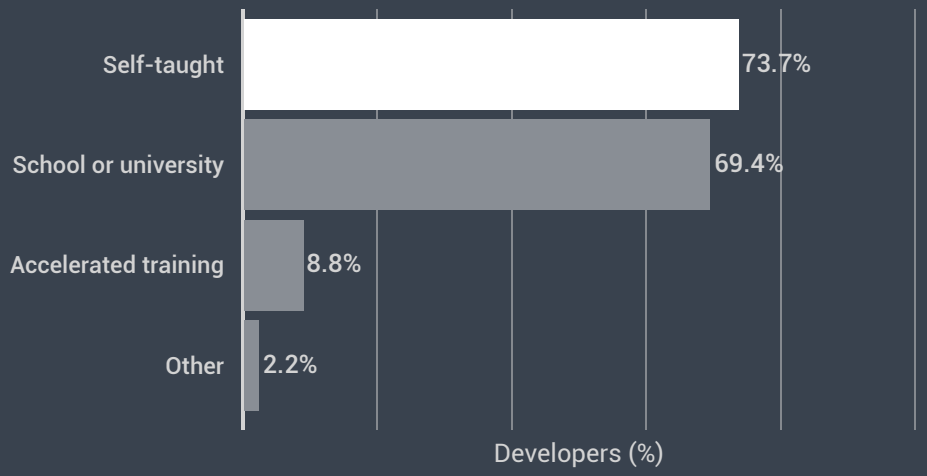
Nearly all developers have an insatiable thirst for learning

It seems like every year there's a new hallmark programming language, framework or library that proliferates across developer blogs. First, it was all about Backbone.js. Now, everyone is raving about AngularJS and React. Self teaching is the norm for developers of all ages. Even though 67% of developers have CS degrees, roughly 74% said they were at least partially self-taught.

On average, developers know 4 languages, and they want to learn 4 more. The degree of thirst for learning varies by generations — young developers between 18 and 24 plan to learn 6 languages, whereas folks older than 35 only plan to learn 3.

Since programming is centered on independent research aimed at solving new challenges, self-teaching is a major part of being a successful developer. In choosing what to learn next, the best guiding principle is to plant yourself in one discipline and learn tools as a means to grow. Tools will always change. Ultimately, it's curiosity and genuine interest in programs that should fuel the drive to learn new tools and adapt to tech's evolving landscape.

How did you learn to code?



Almost all employers prioritize problem-solving skills first

Problem-solving skills are almost unanimously the most important qualification that employers look for....more than programming languages proficiency, debugging, and system design. Demonstrating computational thinking or the ability to break down large, complex problems is just as valuable (if not more so) than the baseline technical skills required for a job.

There are, however, some nuances between what small companies care about most versus what large companies care about. For instance, smaller companies look for framework proficiency in candidates more than medium-sized to large companies.

The difference may exist because having the right knowledge of frameworks is more important for startups since they need to launch code quickly, and frameworks help developers push code faster.

Which core competencies do employers look for?

	1 to 100 employees	101 to 1,000 employees	1,001+ employees	Average
Problem-solving	94.2%	94.7%	95.9%	94.9%
Programming language proficiency	55.2%	55.2%	59.0%	56.6%
Debugging	47.1%	45.0%	48.5%	47.1%
System design	37.0%	39.8%	44.1%	40.3%
Performance optimization	34.0%	35.0%	37.0%	36.0%
Code review capability	36.3%	36.3%	35.0%	35.8%
Testing	35.9%	34.4%	34.1%	34.8%
Frameworks proficiency	26.1%	23.3%	22.8%	24.2%
Database design	23.2%	20.5%	18.8%	20.9%
Codebase navigation	17.6%	14.2%	13.2%	15.1%

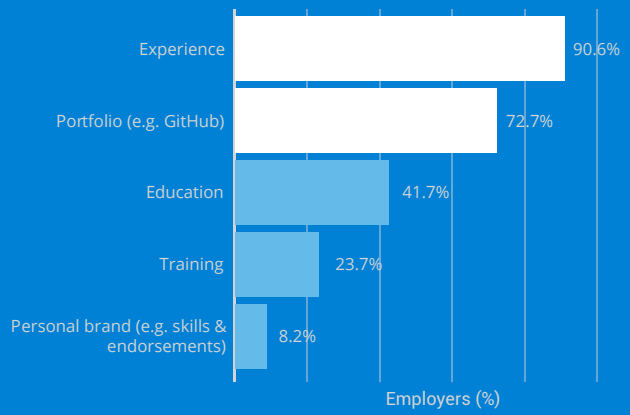
What you do matters more than what's on your resume

There's a popular belief that recruiters favor candidates with CS degrees from prestigious universities. But it turns out that they actually care about what you've done — not where you went to school. An overwhelming majority of hiring managers said they look for proven skill, such as previous work, years of experience, and projects/Github. Regardless of company size, 9 out of 10 hiring managers say previous experience and years of experience — both indicators of skill — are among the most popular qualifications.

What you do matters more than anything else. Small companies place the higher value on the portfolio: 80% versus 66% of large companies.

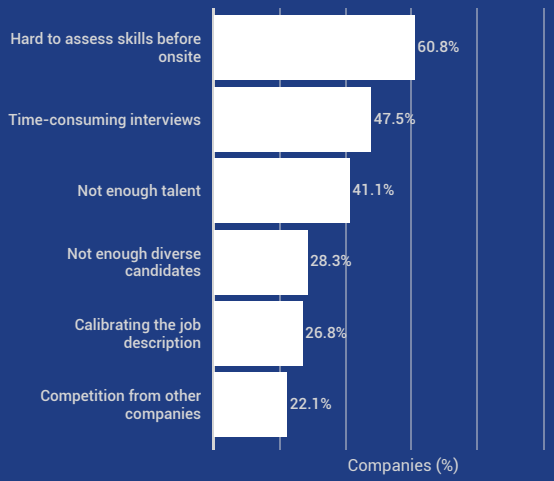
Qualifications that generally bolster the resume (prestige of degree, education level, skill endorsements or certificates) rank the lowest among what companies care about the most. These factors are not indicative of proven skill. The only top-ranked qualification that's easily screenable from a resume is "years of experience" since work experience and portfolio are sometimes correlated with this qualifier. Since it's more difficult to review individual portfolios at scale, years of experience is an alternative, resume-based signal for proven skill — although this completely neglects high performers who grew quickly in their roles.

What qualifications do employers look for by company size?



Assessing skills proves to be the biggest hiring challenge, more than talent shortage

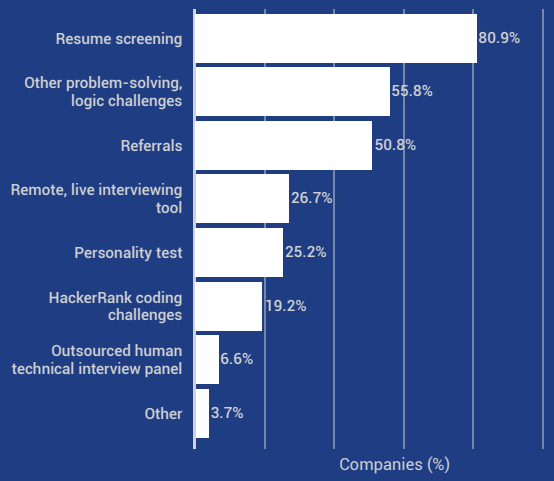
What's the biggest challenge when hiring talent?



According to 7,000+ employers, resumes are still by far the most common way developers are assessed today, according to our survey — 81% of hiring managers say they use resumes as the first step in the applicant screening process.

When asked what the biggest hiring challenge is, the same hiring managers said assessing skill is their number one problem — as opposed to lack of talent. Meanwhile, only 55% of developers said resumes were a good reflection of their abilities.

Which assessment tools do employers use most?



While technical hiring managers still primarily rely on the resume to evaluate software developers as the first step of the interview, almost all agree that assessing skill is one of the hardest challenges when filling technical roles — there's a mismatch in what they're looking for and the tools they're using to evaluate it. Screening with resumes is a barrier for hiring managers to find the proven skill because the factors that hiring managers care most about (proven skills) are not screenable from resumes.

Work-life balance beats perks

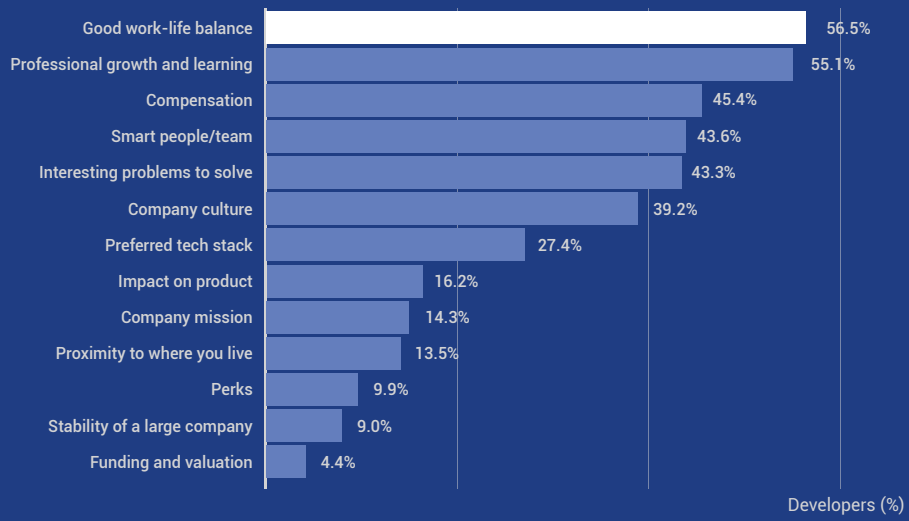
If you look at any typical career page for technology job descriptions, hiring managers commonly highlight tech stack, mission statement, and perks to entice developers to apply. This is not what hiring managers should be focusing on when competing for talent.

Instead, the number one thing that developers want most above all is a strong work-life balance. Developers ranked work-life balance as the most desired trait, slightly more than professional growth and learning, which came in second. More specifically, the Americans crave work-life balance more than developers in other regions like Asia and Europe.

Though it was ranked slightly less important to people working at smaller companies, it was still in the top three. Work-life balance is most important to developers 25 years and older, and — unsurprisingly — ranked less important to developers between 18 and 24.

Geographically, the distinctions aren't too major, with a few exceptions. Canadians care most about compensation, while Australians cite company culture as the #1 thing they care about in a job.

What do developer candidates want most when job searching?



In some ways, we've discovered a slight contradiction here. Developers want work-life balance but they also have an insatiable thirst and need for learning. In fact, the number of new tools to learn can sometimes feel overwhelming for developers. But the best fuel for learning is curiosity and genuine interest in technologies that develop in your domain. Focusing on doing what you enjoy (as opposed to trying to learn everything) can help strike a better work-life balance.

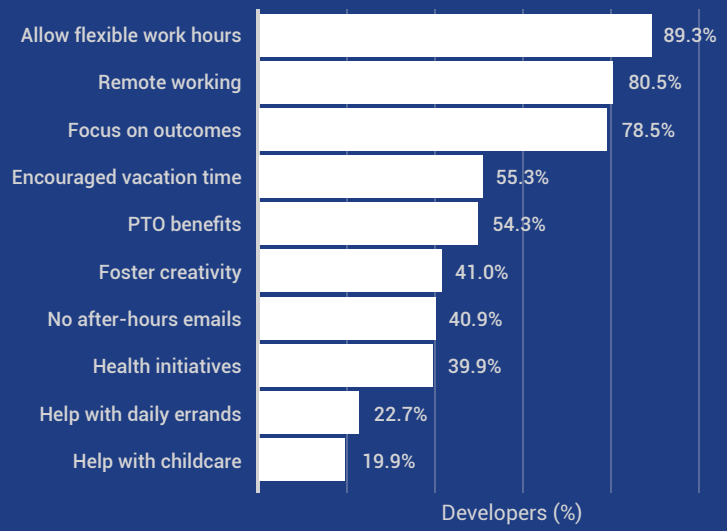
Flexible work schedules are huge

We realize work-life balance could mean a lot of things to different people. So, we dug a bit deeper into what developers really want.

By and large, work-life balance can be supported with flexible hours — 10 am to 8 pm schedules are commonplace.

Developers want to work for managers that focus on output, not time spent in the office chair. And telecommuting options are helpful as well. Remote working is a particularly strong desire for developers 25 and older, and folks between 25 - 44 are the strongest proponents of shutting down email after hours.

How can employers improve work-life balance?



Learn More About HackerRank

HACKERRANK COMMUNITY

Code & Get Hired

Join over 5 million programmers, improve your coding skills and find the best job.

Sign Up & Code

HACKERRANK FOR WORK

Hire Talent BUSINESS

HackerRank for Work is the leading end-to-end technical recruiting platform for hiring engineers.

Get Free Trial

Request Demo

research@hackerrank.com
www.hackerrank.com

USA:
+1-415-900-4023

India:
+91-888-081-1222

UK:
+44-208-004-0258

research.hackerrank.com

Match Every Developer to the Right Job

USA:
+1-415-900-4023

India:
+91-888-081-1222

UK:
+44-208-004-0258

research@hackerrank.com
www.hackerrank.com