Total Participants

89.18K

Median Salary (all)

10.51K

Countries Represented

186

Developers Type

34

Developers Education

EdLevel	Count of EdLevel
Bachelor's degree (B.A., B.S., B.Eng., etc.)	36706
Master's degree (M.A., M.S., M.Eng., MBA, etc.)	20543
Some college/university study without earning a degree	11753
Secondary school (e.g. American high school, German Realschule or Gymnasium, etc.)	8897
Professional degree (JD, MD, Ph.D, Ed.D, etc.)	3887
Associate degree (A.A., A.S., etc.)	2807
Primary/elementary school	1905

Overview

Welcome to the 2023 Stack Overflow Yearly Survey results! Dive in to discover the latest trends in the tech world, explore the most popular tools used by developers, and get a glimpse into the vibrant and diverse Stack Overflow community. We've broken down the survey into three exciting sections—Developer's profile, Technology Used and AI sentiment.

Note: This project is intended to refresh my Power BI skills, and I decided to use the Stack Overflow survey because I found interesting trends/overviews that are useful to me. I have adopted their theme, incorporating some of their analyses along with my own new analyses. I have learned a lot in the process, and I hope you find this analysis useful.

Developer's profile

In the developer's profile, we will explore the demographic and geographic profiles of professional coders, people learning to code, and a third category, "other coders," which encompasses other professions where coding is used, such as scientists and academic researchers. We will conduct a specific deep dive into how people are learning to code and the resources they prefer to use. Additionally, we will dedicate a section to examine where professional developers live and, based on their geographical location, years of professional experience, and developer role, how their compensation varies.

Click here to view insights

Technology Used

In this section, we will explore which programming languages, databases, cloud technologies, and libraries professionals are using. We will also investigate which AI tools people use for search and as developer tools. Additionally, we will examine the current technologies professionals use and those they desire to use in the future. Furthermore, we will analyze how professionals' compensation changes with different technologies and years of experience.

Click here to view insights

AI Sentiment

In this section, we will explore the sentiment towards AI and its future usage among Stack Overflow users. We will address various questions such as how much people trust AI responses, whether they are using AI tools in their development process, the benefits of using AI, and the specific purposes for which they are currently using AI. Additionally, we will investigate the purposes for which they are interested or not interested in using AI.

Click here to view insights

Developers Profile Summary

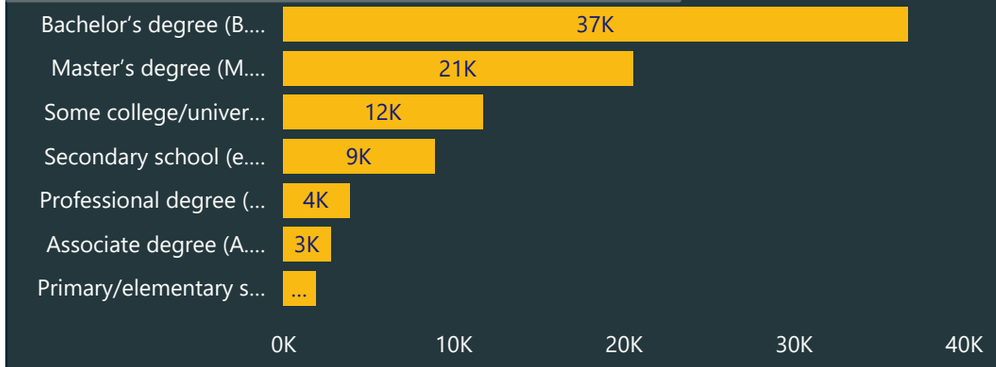
Basic information about the developer profile. Categorize people into three categories: "professional coders", "people learning to code", and "others" (retired or former coders, etc.). Please select one/all to see their education status, average age, current employment status, and mode of work.

Select all | Learning to Code | Other coders | Professional Developers

89.18K
respondents

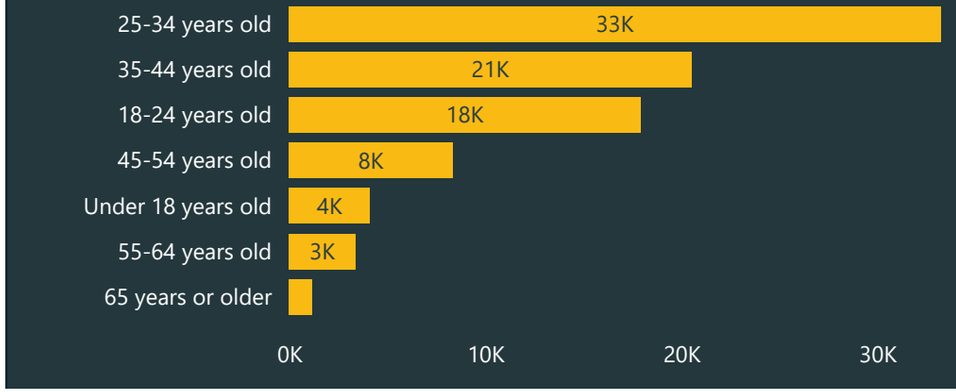
Education

Most of the professional developer has some sort of formal college education. About 32% of people learning to code are still in school or yet to receive college education.



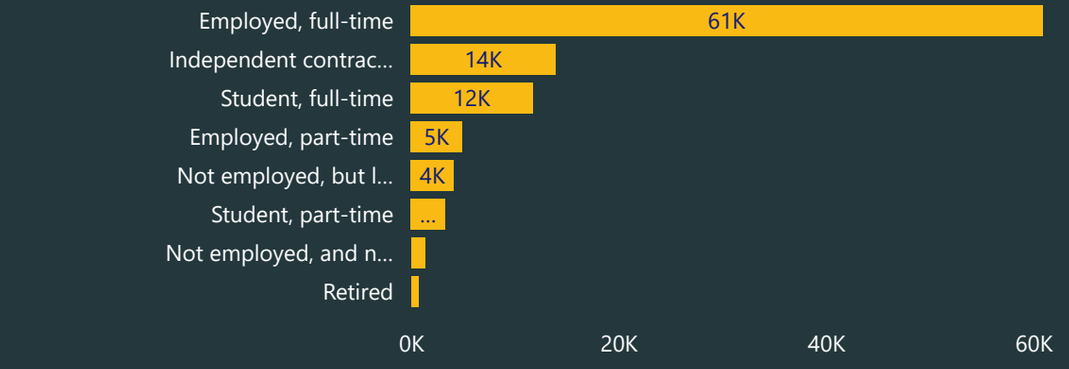
Age

Most of the professional developer are under 44 years old, indicating to a young-dynamic workforce. 72% of the people learning to code are less than 24 years old. This make sense as most of them are in college and school. 65+ age group consist of mostly retired people.



Employment

Most of the Stack Overflow survey respondents are employed full-time or work as independent contractors. Since these individuals are more likely to contribute to Stack Overflow's discussion section, this explains the high-quality content available on the Stack Overflow website.



Mode of work

The most popular mode of work in 2023 is still remote (partially or fully). Interestingly most of independent contractor are working fully remote -- benefit of being a independent contractor!

Learning to Code

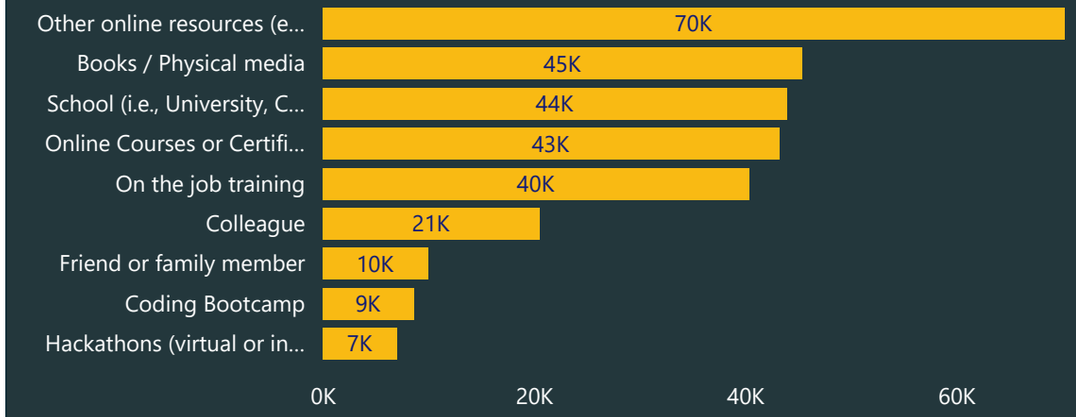
Let's see how "professionals" and "people who are learning coding" use different online resources.

Select all | Learning to Code | Other coders | Professional Developers

89.18K
respondents

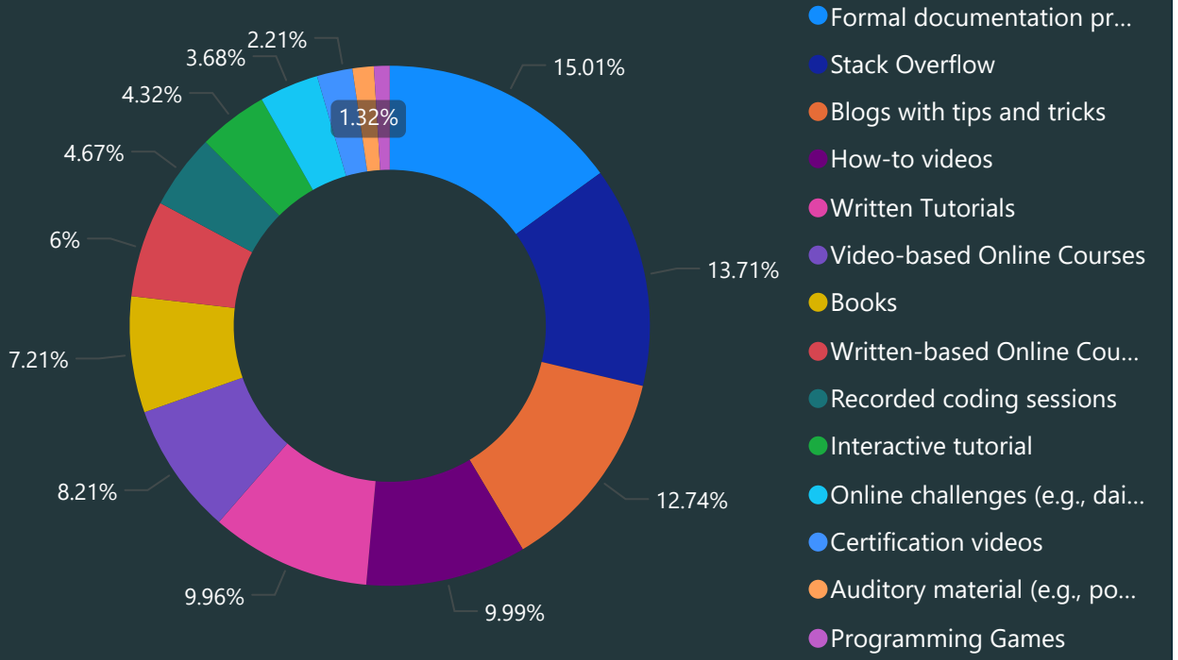
Mode of Learning

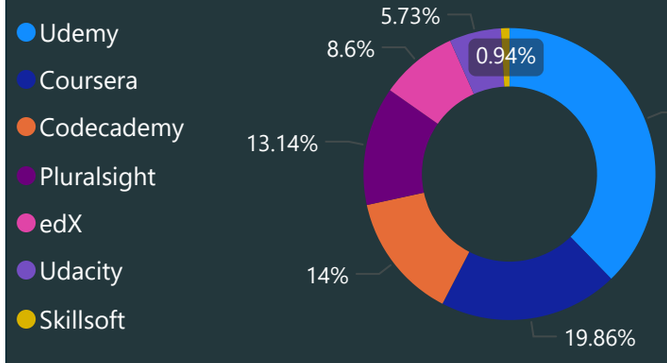
For the professional developer and people learn that are learning to code, online resources (blogs, forums video) are main source to learn. Books/physical, and on job training are other top choice for professionals while online course/school are other top choices for newly coder.



Online resources to learn

Formal documentation and stack-overflow are top two online resources to learn. This indicate-- right good documentation, and stack-overflow must feel proud. Blog with tips and trick attract lot of people along with online certifications. Books and other physical materials are becoming less and less popular, especially among new coders.





Certification platforms

Udemy and Coursera account for almost 59% for online certification platform. This choice are agreeable for both professional and new coder. Codecademy is emerging as a popular platform among new coders.

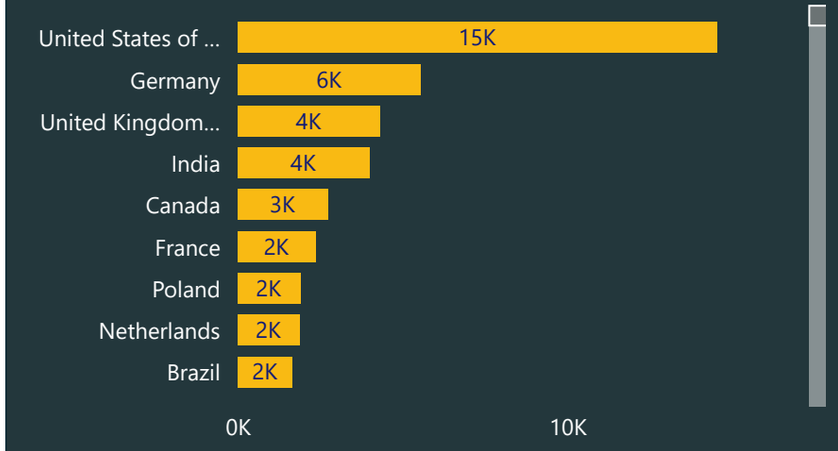
Professional Developers Experience

Let's examine the roles that professional developers occupy, their average compensation, and their average years of experience. We will also explore how these factors vary across different countries.

Professional Developers

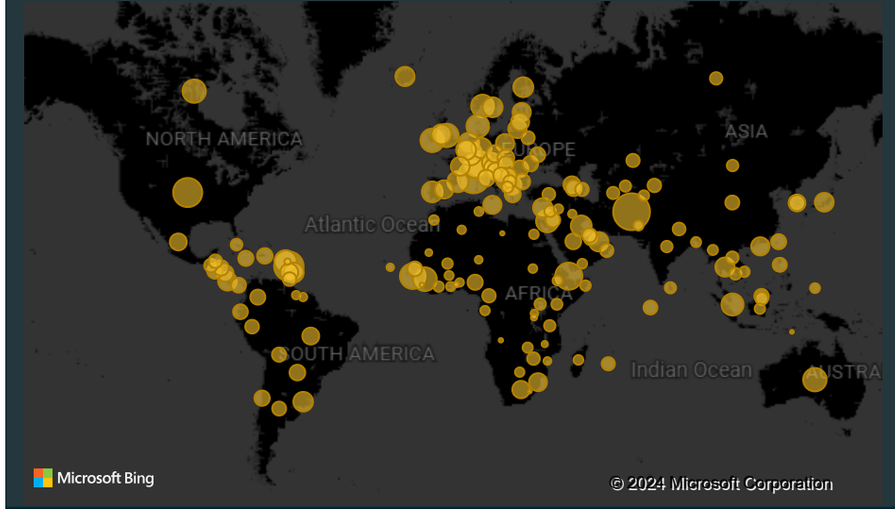
Geography

Most of the participants in the survey were from Developed world.



Average compensation by geography

Check out Afghanistan - One bad data point can completely alter the story.



- Full-stack, back-end and front end are the most popular dev roles.

- Site reliability engineer/Blockchain developer on an average make more money (sample size is small).

- People in managerial/Executive position on average make more money, and are more experienced people.

- Blockchain/DS/ML specialist is still a new role, with average experience less than 7 years.

- Most of the academic researcher are from American and European continent, and one of the lowest earning group.

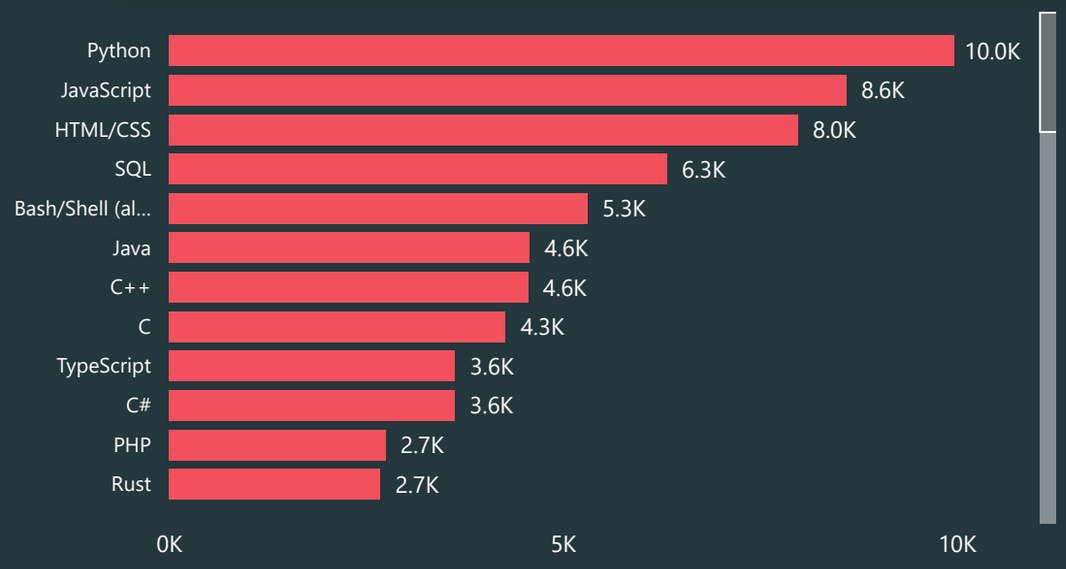
DevType	Count	Avg. Comp (USD)	Avg. Exp (years)
System administrator	152	31,357.85	11.46
Student	619	637.29	0.14
Senior Executive (C-Suite, VP, etc.)	920	109,297.37	16.67
Security professional	194	81,933.53	9.93
Scientist	144	71,401.58	11.13
Research & Development role	1050	75,645.89	13.05
Project manager	264	51,817.33	13.82
Product manager	171	84,897.40	16.65
Marketing or sales professional	14	77,418.97	9.93
Hardware Engineer	144	84,885.37	9.78
Engineering manager	1511	109,674.88	14.52
Engineer, site reliability	314	113,004.66	10.45
Engineer, data	1075	77,320.59	8.51
Educator	111	42,072.87	15.42
DevOps specialist	1061	76,583.80	9.84
Developer, QA or test	392	53,945.66	7.55
Developer, mobile	2493	57,246.38	8.55
Developer, game or graphics	738	62,627.27	9.16
Developer, full-stack	24720	60,049.24	9.61
Developer, front-end	4698	54,199.63	6.90
Developer, embedded applications or devices	1766	69,149.06	11.11
Developer, desktop or enterprise applications	3687	57,757.06	15.18
Developer, back-end	13420	68,709.41	9.72
Developer Experience	298	93,298.32	11.59
Developer Advocate	138	79,042.78	14.93
Designer	97	46,621.79	16.52
Database administrator	99	67,443.24	14.53
Data scientist or machine learning specialist	1282	78,025.65	6.30
Data or business analyst	320	46,752.52	8.91
Cloud infrastructure engineer	790	107,429.64	10.10
Blockchain	281	109,974.65	7.85
Academic researcher	537	34,093.96	6.24
Total	**63500**	**65,013.03**	**9.91**

Technology

Let's see the most in-demand language/database/tools/library professional as well people learning to code are using. Most of the question had multiple acceptable answer.

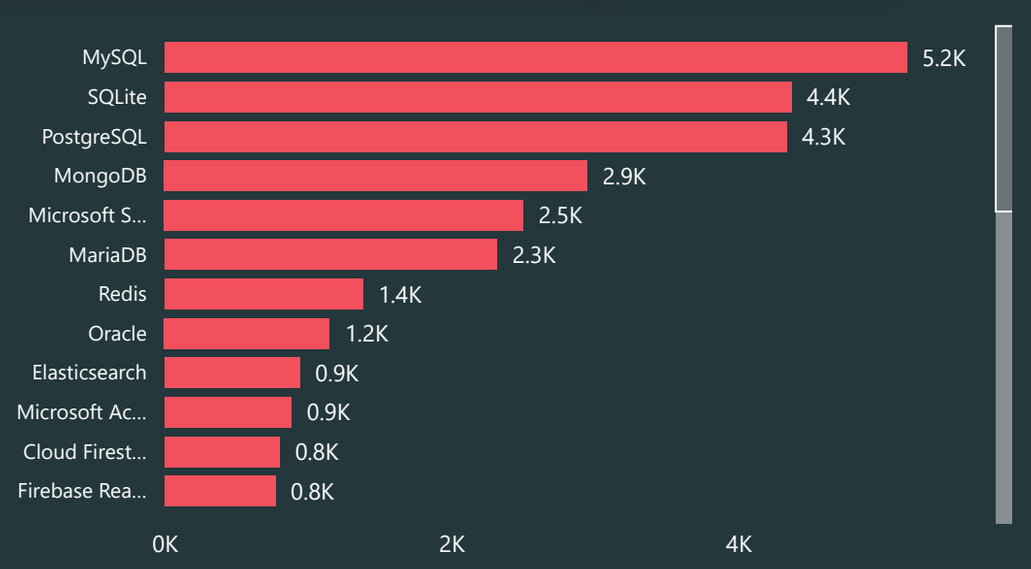
Select all | Learning to Code | Other coders | Professional Developers

16.99K respondents



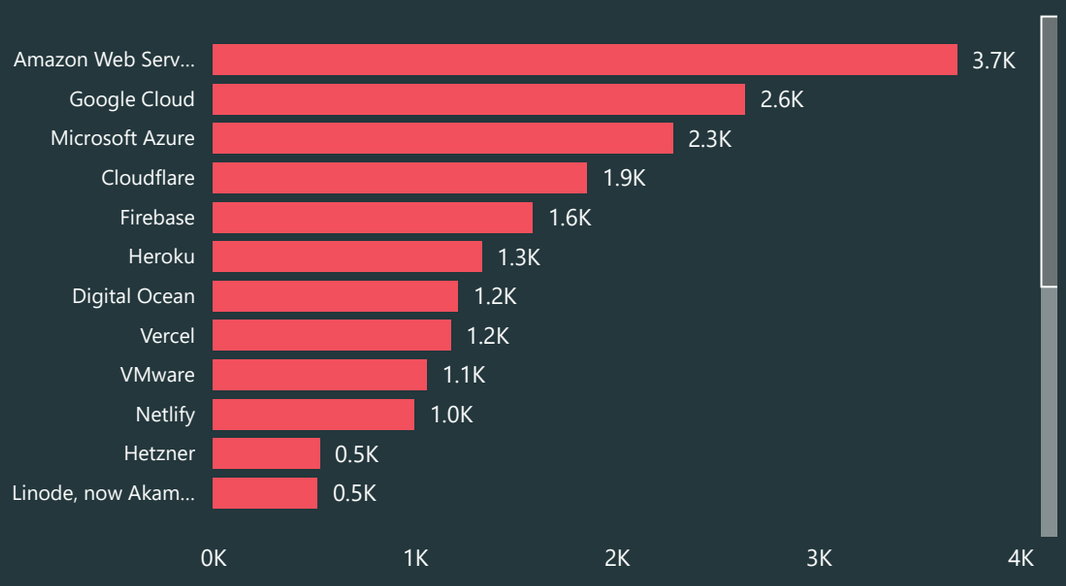
Programing, Scripting and Markup language

Java, HTML/CSS and SQL are top choice among professionals.
HTML/CSS, JavaScript, and SQL are top choice among people learning to code..
Python, JavaScript, and HTML/CSS are top choice among other coders.
The first 10 popular languages cover over 72% user base.



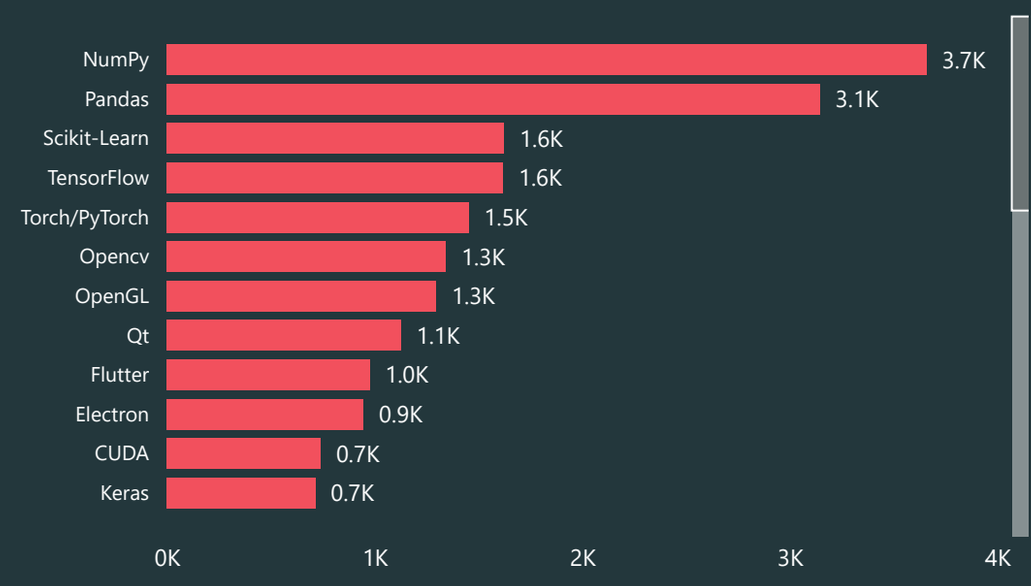
Database

MySQL is the most popular choice for coder in "learning to code" and "other coders" category, and 2nd most choice for professional. For professionals their top choice is PostgreSQL. MongoDB is the top non-relational database choice for all category.



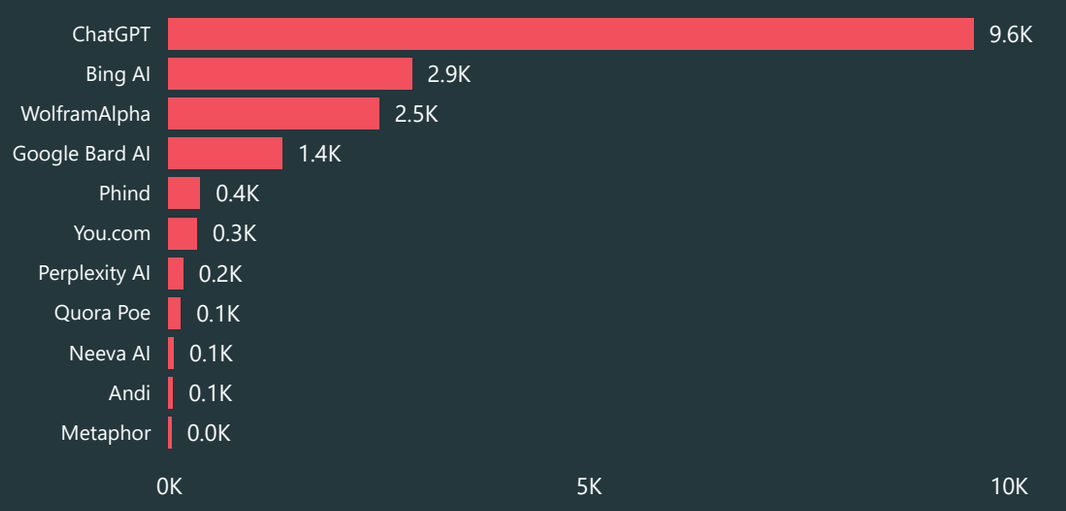
Cloud

AWS is the clear winner for all three category, particularly in professional world 43% of people use AWS, while the second best choice Azure is used by 22% of people. AWS popularity hold for other coders. For people learning to code AWS is still popular but market share is evenly distributed. Interestingly, Heroku which offer a better free tier (personal opinion) is a popular choice for people learning to code.



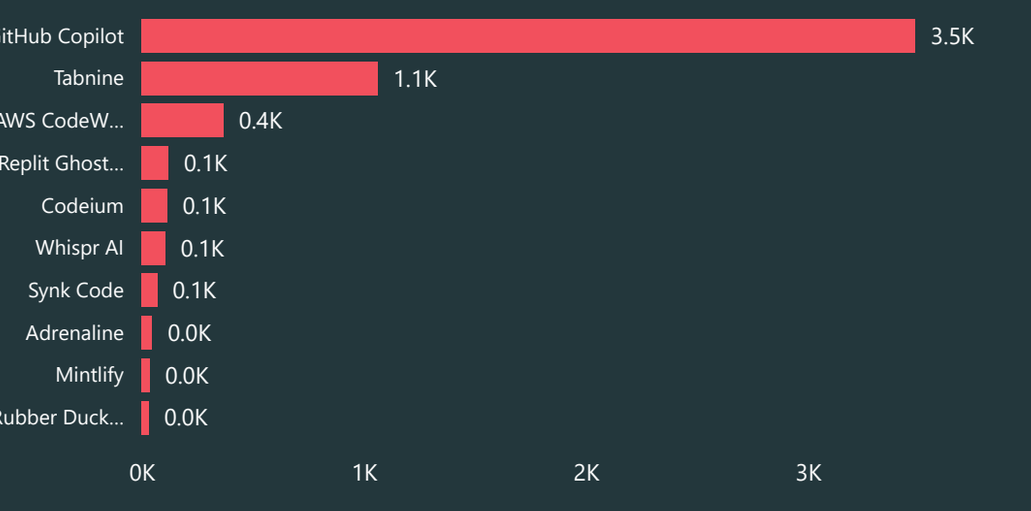
Library/Framework

Python library show a total domination, top 4 out of 5 library is Python. TensorFlow is popular than PyTorch. Python library is more popular among "other coders" as well as people "learning to code" as compared to professionals.



AI-powered search tool

ChatGPT is the most popular search tool by a mile. 59% of the people have used chatGPT as compared to Bing AI which is second best and is used by only 15% of people. This trend holds for all three category of coders. WolframAlpha and Google Bard are competing for 3rd and 4th position.

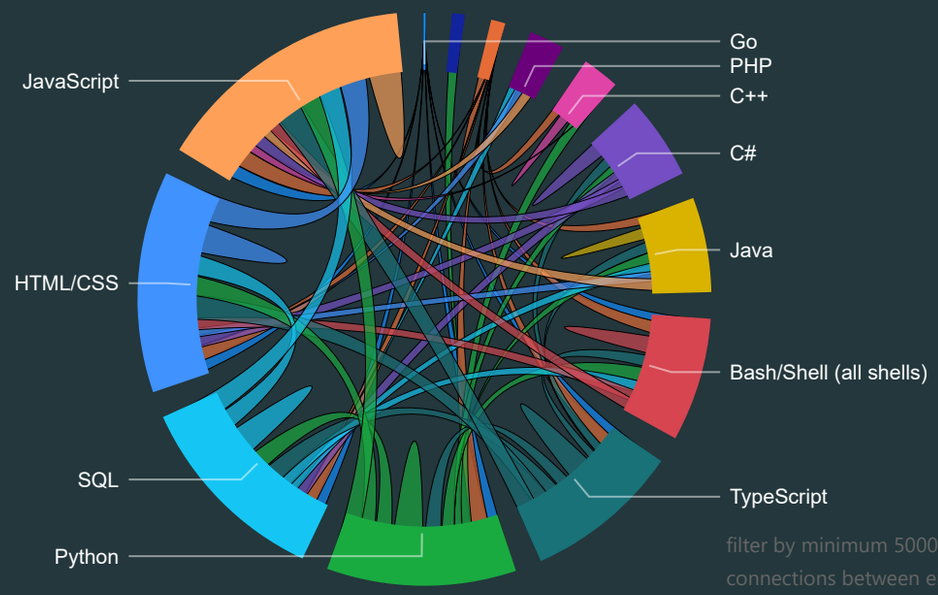


AI-powered Developer tool

GitHub Copilot is the most popular AI-powered dev tool. Perhaps various plugin that allow Copilot to work directly in IDE helps. Also GitHub is the one of the most used tools, so that helps. Learned something new that something called Tabnine existed.

Technology worked with vs. want to work with

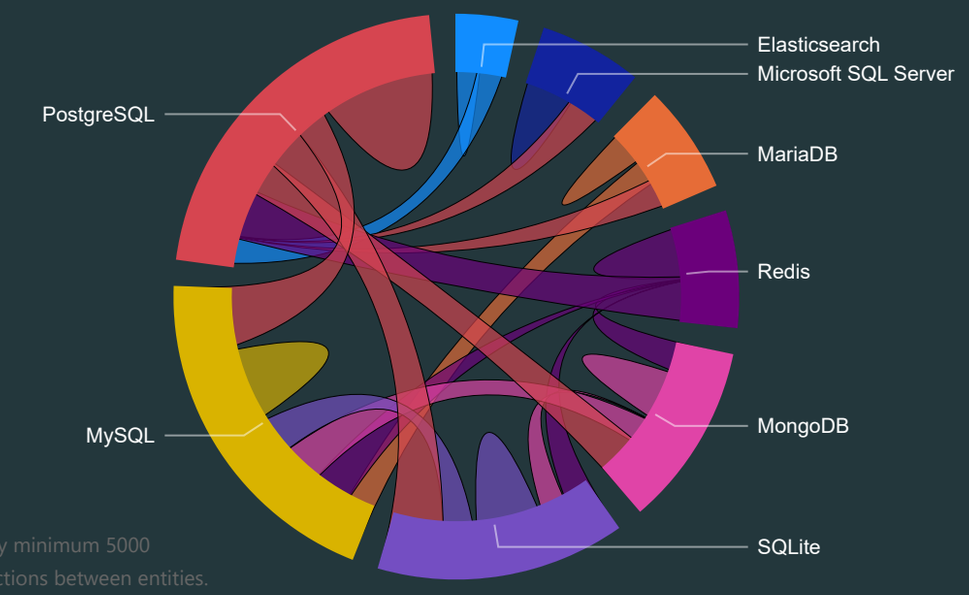
Let's see the trend in of which tech/tools all respondent are using, and want to work in future. This is a chord diagram, which represents relation between entities. The direction of arrow represent direction of currently work with to want to work with in future.



filter by minimum 5000
connections between entities.

Programing, Scripting and Markup language

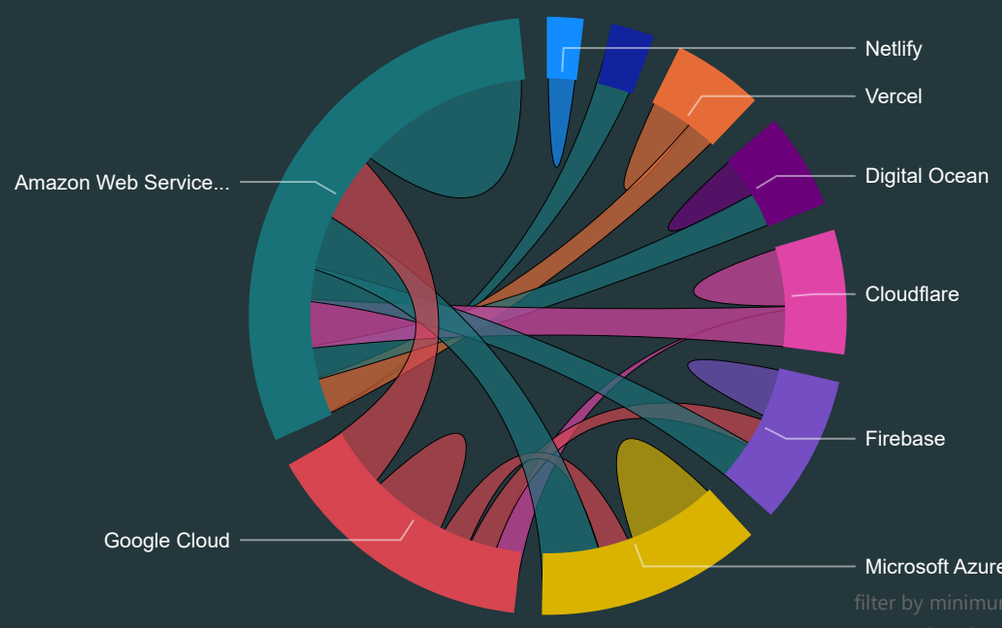
For many of the popular programming languages, a significant portion of respondents expressed a desire to continue working with the same language. Among these popular languages, many people indicated a willingness to explore languages within the same set, such as JavaScript, TypeScript, Python, HTML/CSS, and SQL in the future.



filter by minimum 5000
connections between entities.

Database

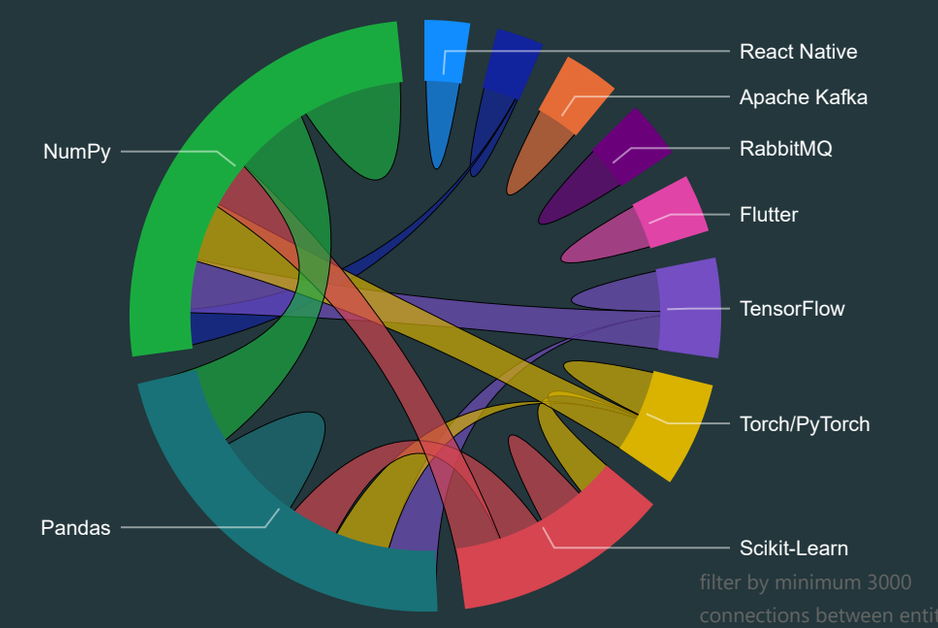
We see the same trend as programming, good portion of the user like to stick with what they are currently using. In particular, PostgreSQL user like to keep using PostgreSQL.



filter by minimum 3000
connections between entities.

Cloud

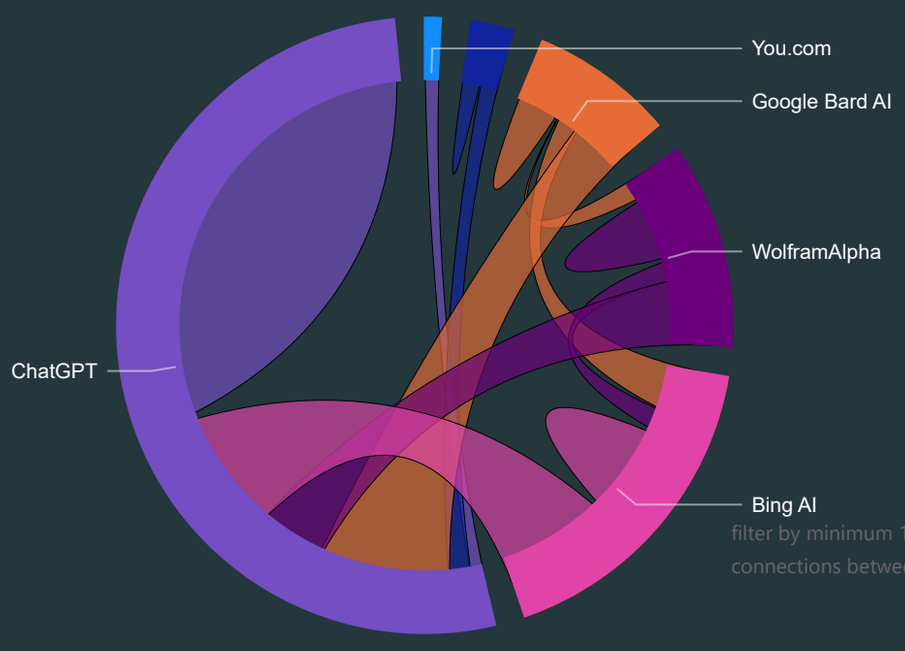
AWS, GCP and Azure see a lot of interest in each other platforms.



filter by minimum 3000
connections between entities.

Library/Framework

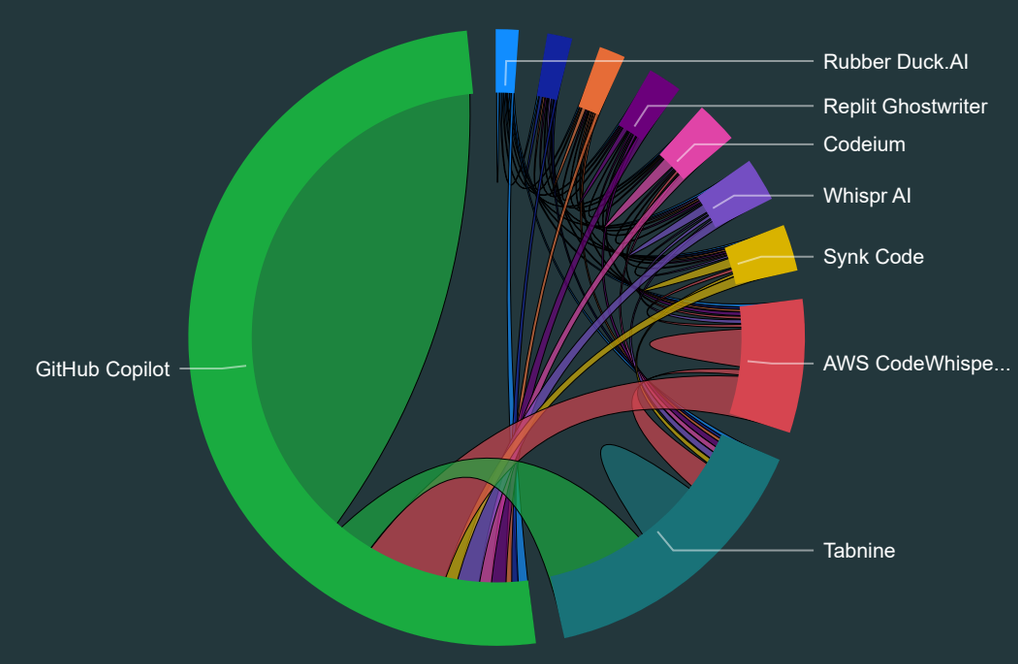
A lot of people in Python ecosystem expressed to explore other popular tools available in Python. Interestingly, we don't see any interest b/w TensorFlow and PyTorch, the most two popular deep learning tool.



filter by minimum 1000
connections between entities.

AI-powered search tool

ChatGPT likely to retain its user base. Half of the user base of ChatGPT, would like to explore other AI search.



AI-powered Developer tool

GitHub Copilot is the most popular AI-powered dev tool, and will continue to be so.

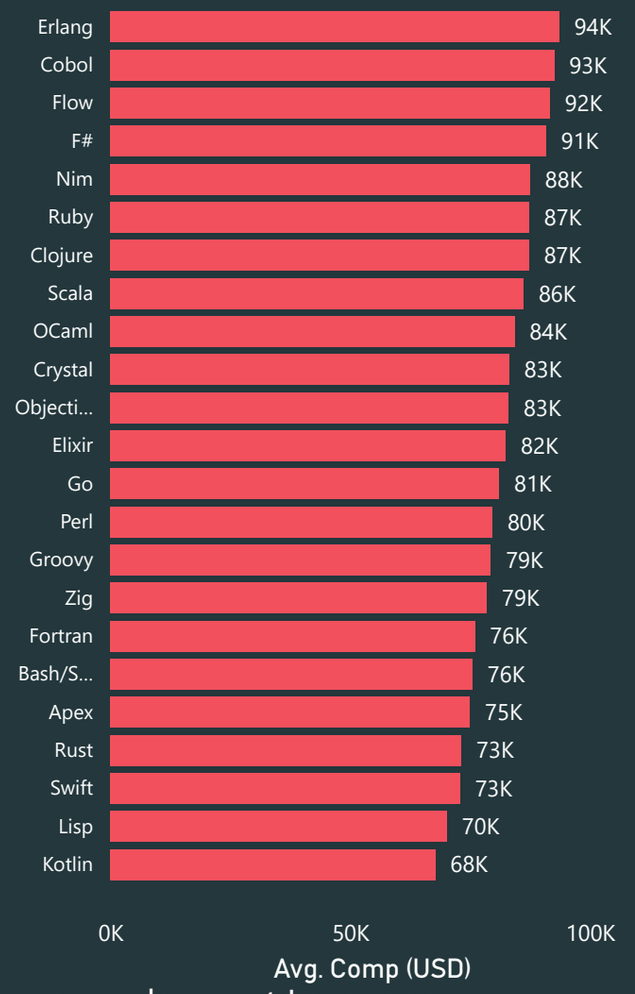
Top Paying Technology

Let's see which tech fetches good compensation.

Country: All

Other coders | Professional Developers

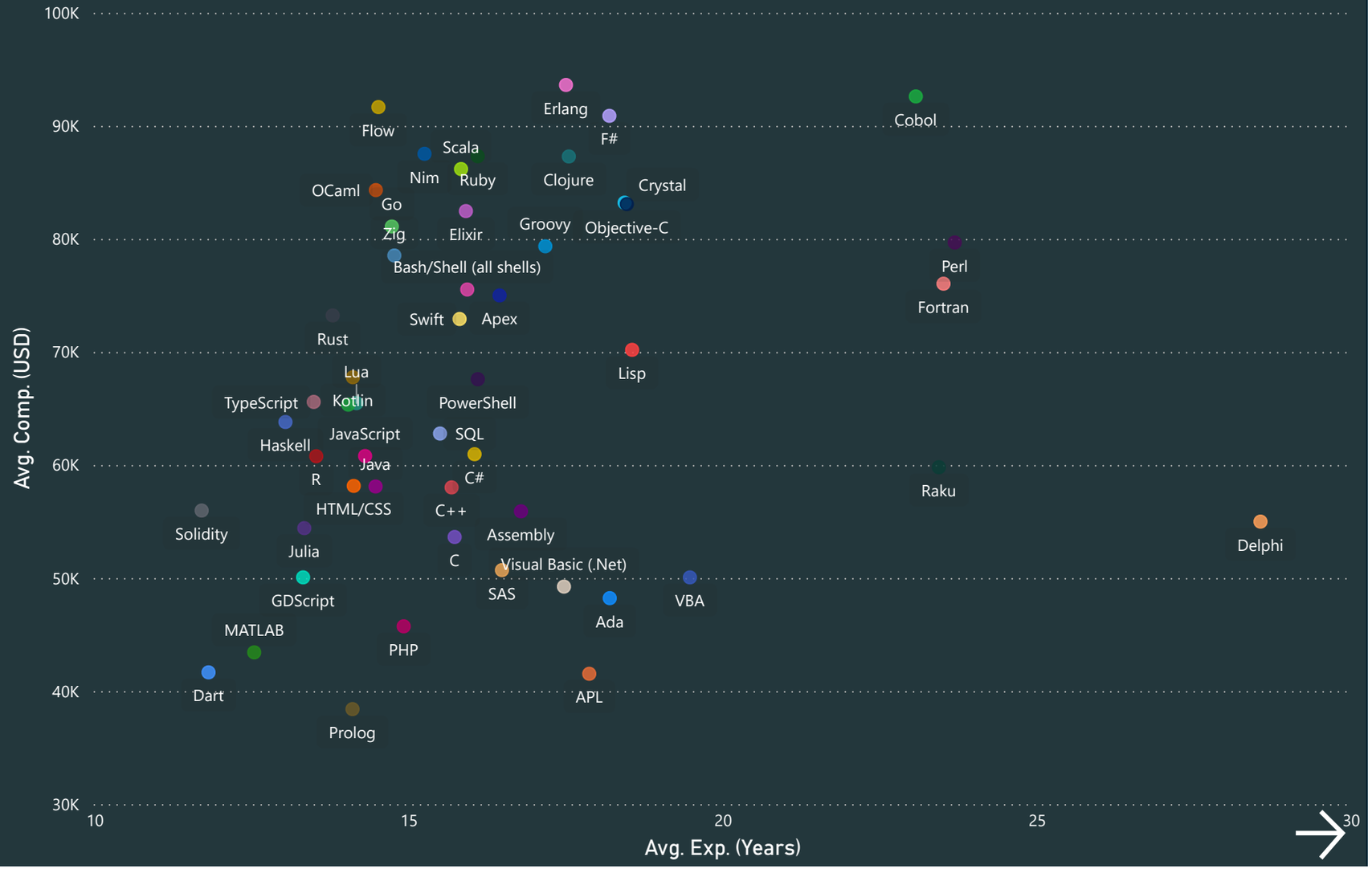
67.24K respondents



Average salary w.r.t Language

Erlang is highest paying salary for professional developers (730 respondents). Among other coders, Apex is the highest paying language (124 respondents).

By DevType | By Language



AI: Sentiment and Future usage

Let us see how respondent think the future of AI is! How they are planning to use it, and understand their overall perception about future of AI in tech.

Select all | Learning to Code | Other coders | Professional Developers

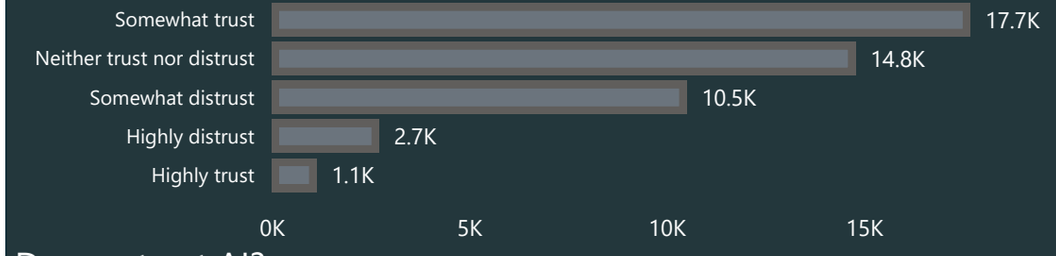
67.24K respondents

AI tool in Development process

Majority of people are using AI, and planning to do so. People "learning to code", are using AI more (% wise) as compared to professional developers, and other coders.

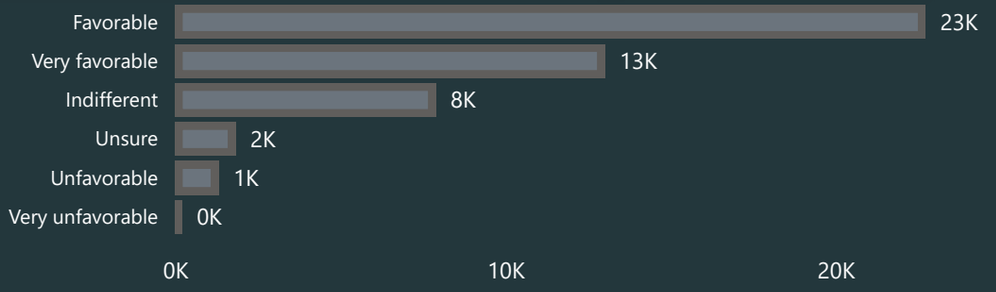
Benefits of using AI

People who use AI, majority of the people found AI useful, be it increasing productivity, efficiency etc.



Do you trust AI?

People are still skeptical about AI. All category of coders is yet to blindly trust AI, which is a good trait! This will improve with time as AI will get better, and is still at an early stage.

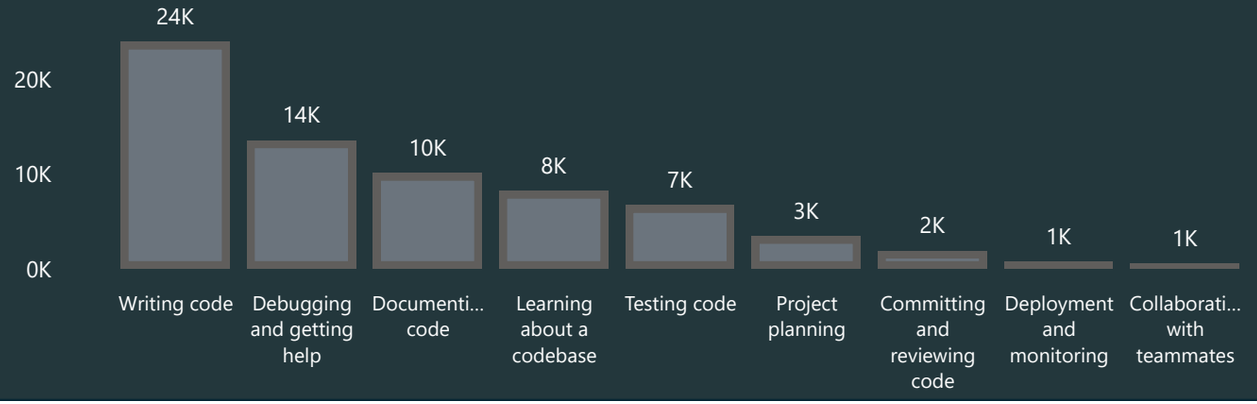


AI sentiment among coders

People would prefer including AI in their development work. A lot of people show strong sentiment to adopt AI in development workflow.

For which part of development workflow, people are using AI or interested/not-interested in using AI

Currently Using | Interested In Using | Not Interested In Using



Stack-Overflow Survey 2023 Analysis in PowerBI

Pankaj Chouhan

July 2024

1 Introduction

This project is intended to refresh my Power BI skills, and I decided to use the Stack Overflow survey because I found its trends and overviews interesting and useful. I have adopted their theme, incorporating some of their analyses along with my own new analyses. I have learned a lot in the process, and I hope you find this analysis useful. **Please find the interactive visualization at: Link**

This project provides insight into the Stack Overflow yearly survey, focusing on the latest data for the year 2023. The survey is divided into seven sections:

1. Basic Information
2. Education, Work, and Career
3. Technology and Tech Culture
4. Stack Overflow Usage + Community
5. Artificial Intelligence
6. Professional Developer Series (Optional)
7. Final Questions

I have summarized this survey into three exciting sections: Developer's Profile, Technology Used, and AI Sentiment.

- **Developer's Profile** — We will explore the demographic and geographic profiles of professional coders, people learning to code, and a third category, "other coders", which encompasses other professions where coding is used, such as scientists and academic researchers. We will conduct a deep dive into how people are learning to code and the resources they prefer to use. Additionally, we will dedicate a section to examine where professional developers live and, based on their geographical location, years of professional experience, and developer role, how their compensation varies.

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- **AI Sentiment** — We will explore the sentiment towards AI and its future usage among Stack Overflow users. We will address various questions such as how much people trust AI responses, whether they are using AI tools in their development process, the benefits of using AI, and the specific purposes for which they are currently using AI. Additionally, we will investigate the purposes for which they are interested or not interested in using AI.

These three sections consist of a mix and match of questions from the seven survey sections, with some questions deliberately left out by choice. Insights have been presented in the dashboard report itself.

Table 1: Few Summary Statistics of the Survey

Total Participants	Countries Represented	Median Salary	Developer Types
89.18K	186	$10.51K (USD)	34

2 Learning from the Process

- Add an index column, starting from number $1, \cdots, n$.

- Compensation is reported in local currencies, so I need to convert local compensation to USD equivalent. I gathered the country, currency symbol, and the conversion rate as of January 1, 2024. I also had to clean some outliers, such as someone in Romania mentioning 10 trillion USD as their salary.

- Many people haven't reported their salary, so averages and medians don't give a complete picture. I have removed any salary more than 10 million USD, as those are outliers.

- To set the canvas background, create the theme in PowerPoint and export the slides as PNG. Upload those PNG files to set via the canvas background option. If you want a long format page, use custom settings and change the shape of the page to a long view, so you can scroll it like a webpage.

- If you want to filter or disable chart interaction, you can do so in the "Edit Interactions" section in the "Format" tab.
- I have assumed people with less than 1 year of experience have zero years, and people with more than 50 years of experience have 50 years.
- You can use buttons to see the interactive visualization of figures. See the video here.
- To handle multiple select-type responses, first separate the column (run them as a new query). Add the index column. Convert the wide format to long format (split the column by delimiter), and then unpivot every column except the index column. Link
- Look into hierarchical slicers for drill-down or deeper-level analysis of data.
- You can use buttons to navigate pages, back and forth.
- A chord diagram is a graphical method of displaying the relationships between data in a matrix format. It is particularly useful for showing connections between different entities, where the entities are arranged in a circle, and the relationships (or chords) between them are drawn as arcs connecting the entities. This type of diagram is often used in fields such as genomics, social networks, and any other domain where it's important to visualize complex interconnections between multiple elements.
- Converted the year column into bins since it's a continuous variable.
- If you want to operate on more than one column, duplicate the original data, pick the column that you want, and delete the rest.
- Categorized the Devtype in three categories by the formula: MainBranch-Categorized = SWITCH(TRUE(), surveyresultspublic[MainBranch] = "I am a developer by profession", "Professional Developers", surveyresultspublic[MainBranch] = "I am learning to code", "Learning to Code", "Other Coders")