Stack Overflow User Survey 2019 - Report

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EXECUTIVE SUMMARY

► This report analyzes the 2019 Stack Overflow survey, highlighting key trends within the developer community. It examines insights related to job roles, salaries, and programming language preferences, offering an overview of the current tech landscape.

► The findings reveal important patterns regarding in-demand technologies and skills, providing valuable guidance for developers looking to advance their careers and for employers seeking to attract talent.

► Overall, this analysis presents a clearer understanding of where the industry stands and where it may be heading.

INTRODUCTION

- **Survey Overview:**
- In 2019, Stack Overflow conducted a survey of its members.
- Collected data on job roles, salaries, demographics, and work locations.
- **Key Audience:**
- Companies and businesses in the tech field.
- Developers and data management professionals.
- **Key Insights:**
- Programming languages currently in use by developers.
- Technologies respondents wish to learn in the upcoming year.
- **What You Will Learn:**
- Key trends and preferences within the developer community.
- Insights into the skills and technologies shaping the industry.
- The demographic landscape of the developer workforce.

METHODOLOGY

▶ I've performed a multivariate analysis of the data using an API, web scraping, and utilizing Pandas, a powerful Python library for data analysis, to explore the data and gain a foundational understanding of the tasks ahead, This initial exploration helped identify necessary steps for the analysis and guided the approach to derive meaningful insights. I've also used Numpy, Seaborn, and Matplotlib and other Python libraries to aid with the process.

▶ Data sources:

- Dataset 1 - Job postings

- Popular Languages and Salaries - Web scraping

- Stack Overflow Survey Dataset (ODbl Open-Source License)

▶ The data wrangling process involved several key steps:

- Cleaning the Data: I addressed inconsistencies and ensured data integrity.

- Handling Missing Values: I identified and imputed missing data to maintain a robust dataset.

 -Normalizing the Data: I standardized the data in order to make accurate comparisons and analyses.

▶ Conducted exploratory data analysis to uncover trends and patterns within the dataset. This included visualizing key findings to enhance comprehension and communication of results.

▶ Visualized the data using IBM Cognos Analytics, a versatile platform that allows for analysis and a plethora of visualization options.
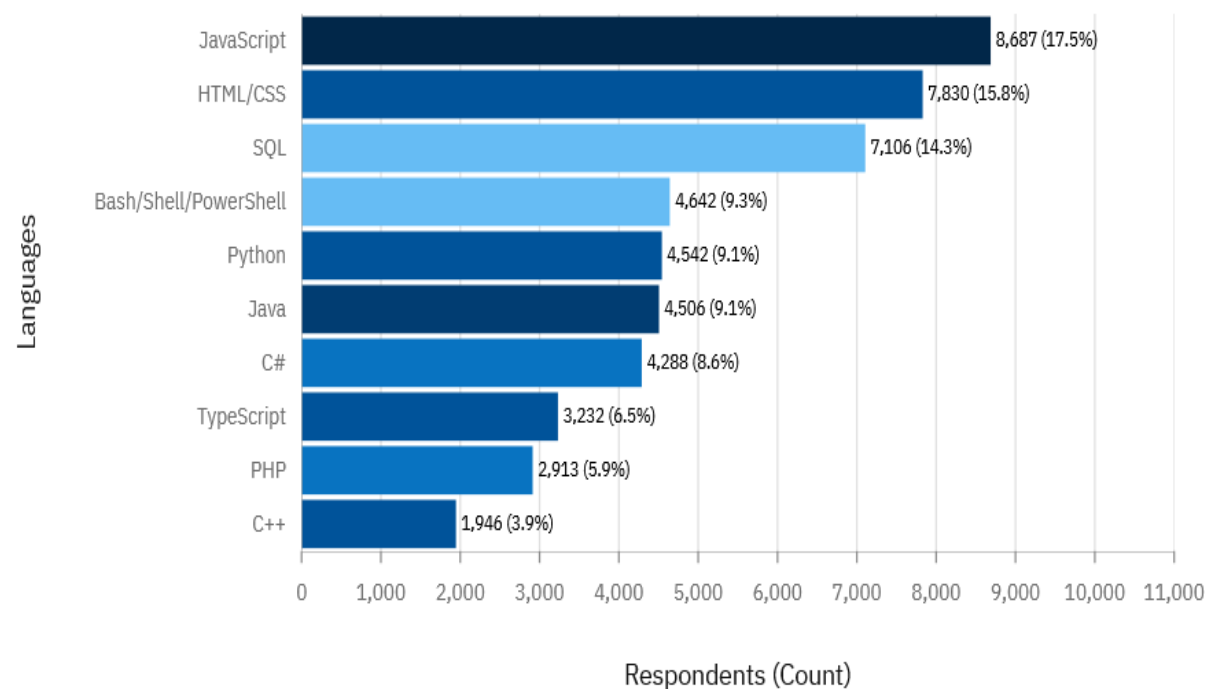
RESULTS

In the following slides, we will present charts and graphs that provide valuable insights into the collected data, as well as the findings and implications drawn from them.
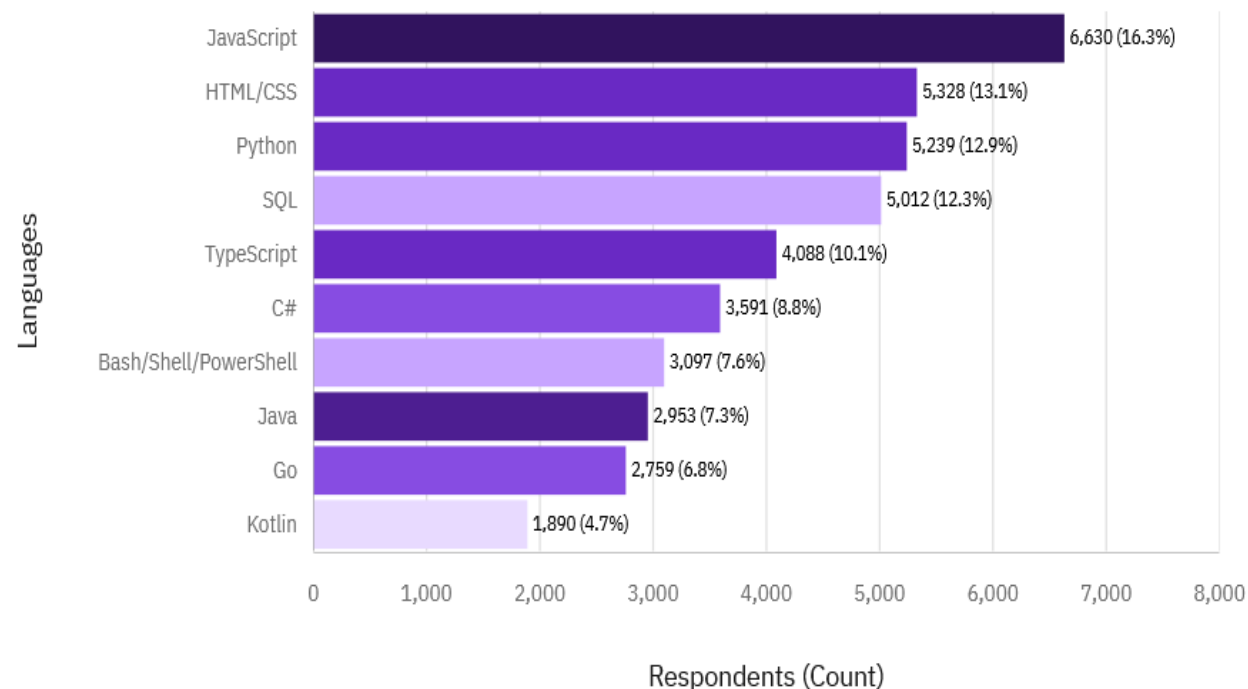
PROGRAMMING LANGUAGE TRENDS – FINDINGS & IMPLICATIONS

Findings

▶ JavaScript reigns as the most in-use and desired language by developers.

▶ Python, HTML/CSS and SQL have made the top 5 in both lists.

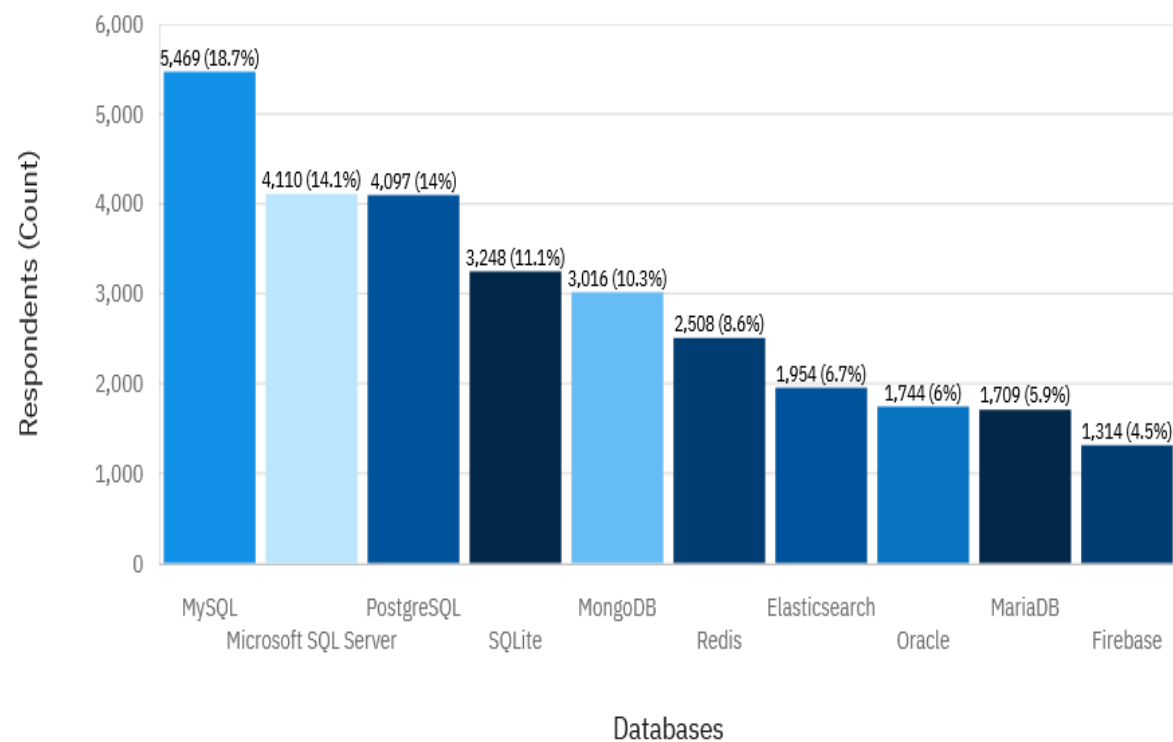▶ Most developers are keen to learn new technologies.

Implications

▶ Understanding the languages developers are currently using can help employers refine their hiring strategies, ensuring they attract candidates with the right skill sets for their needs.

▶ Companies should consider providing resources and training opportunities for employees in those areas to keep their skills relevant.

▶ Promoting language-focused study groups or workshops can enhance team collaboration and knowledge sharing, leading to a more skilled and cohesive workforce.
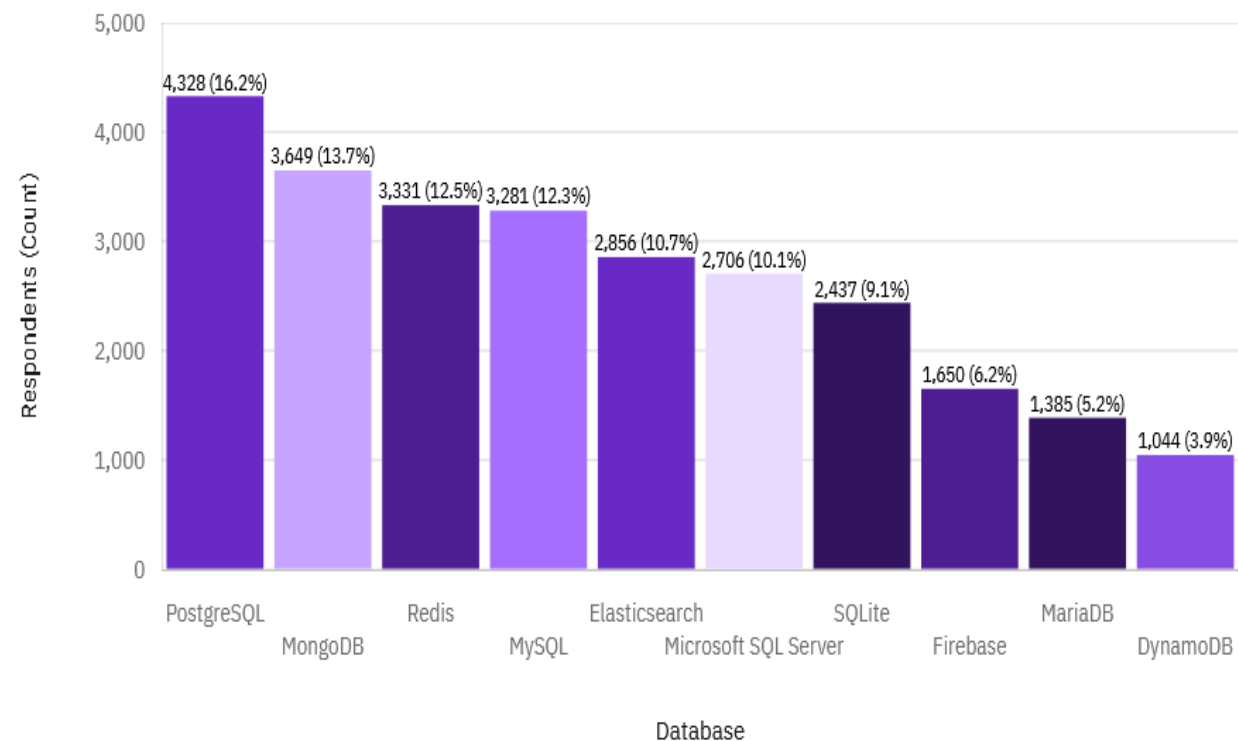
DATABASE TRENDS

Current Year

Next Year

DATABASE TRENDS – FINDINGS & IMPLICATIONS

Findings

- MySQL, PostgreSQL, and Microsoft SQL Server are among the most widely used databases, indicating their strong foothold in the industry.

- Databases like MongoDB, Redis, and Elasticsearch are both in both current use and desired for learning, suggesting they are becoming essential tools for developers.

- There is a blend of relational (e.g., PostgreSQL, MySQL) and NoSQL databases (e.g., MongoDB, Redis) in both lists, reflecting a diverse skill set among developers.

Implications

- Companies and educational institutions should emphasize training in both widely used and emerging databases. Offering courses on MongoDB, Redis, and Elasticsearch could meet growing developer interest and market demand.

- The interest in a variety of databases suggests that developers are looking to diversify their skill sets. Organizations should encourage this pursuit.

- Employers may want to prioritize candidates with skills in the databases that are not only currently used but also in demand for learning, such as PostgreSQL and MongoDB. This approach can help build a more future-ready workforce.
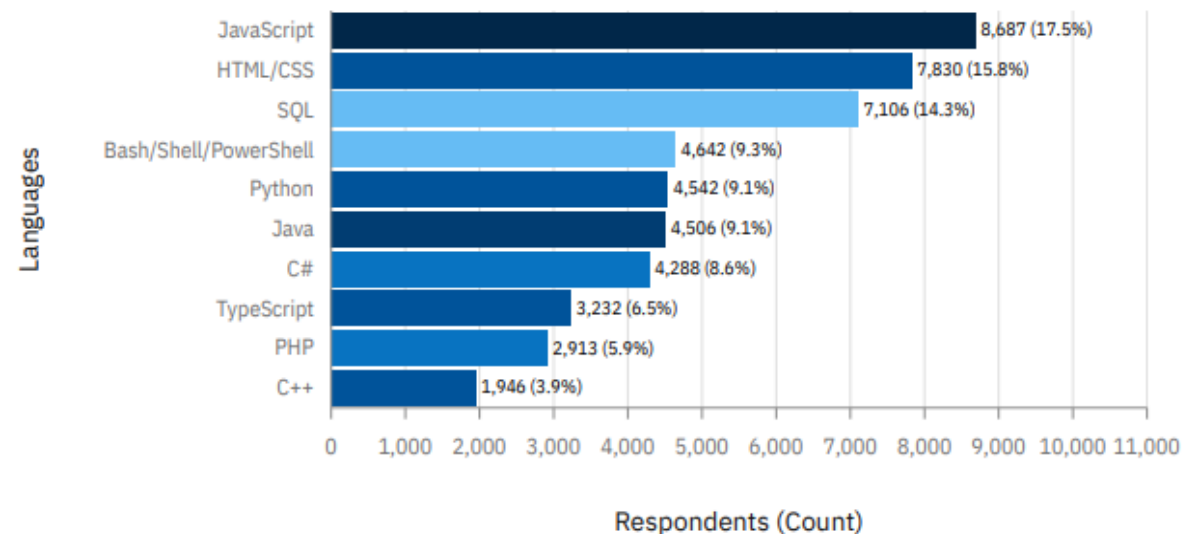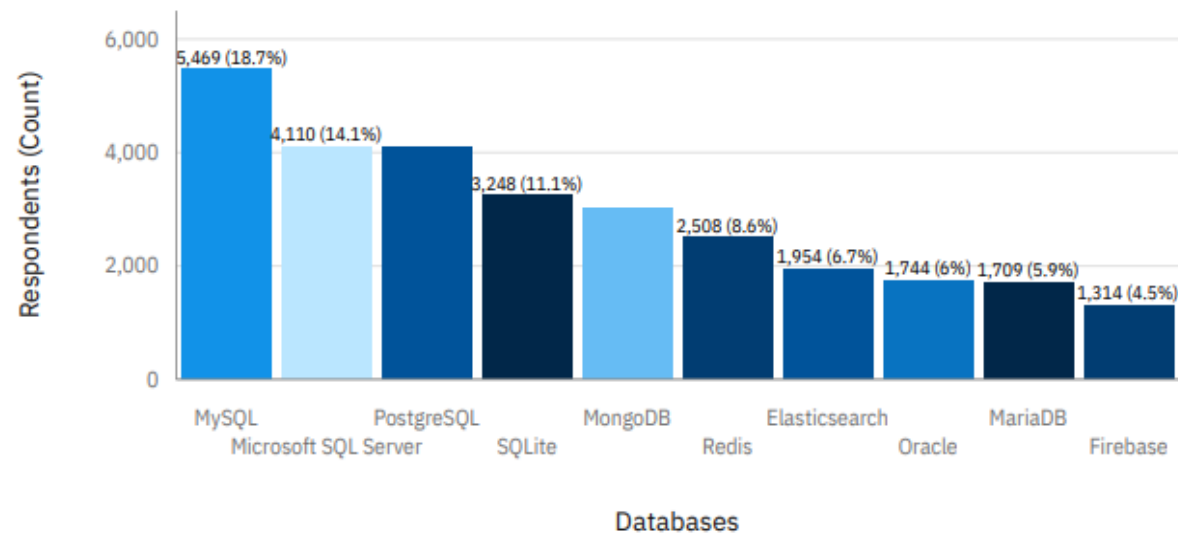
DASHBOARD
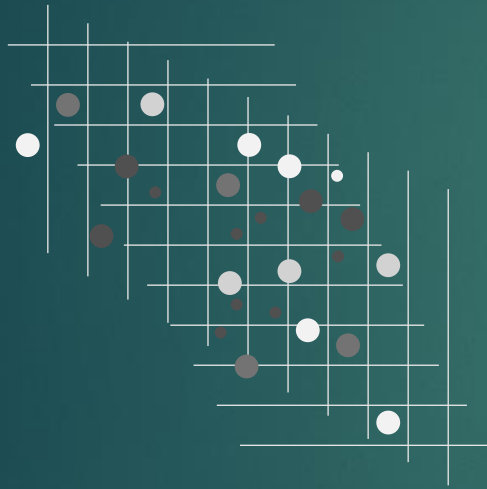
Multi-tabbed Dashboard of Current and Future Technology Trends and Demographic Distribution
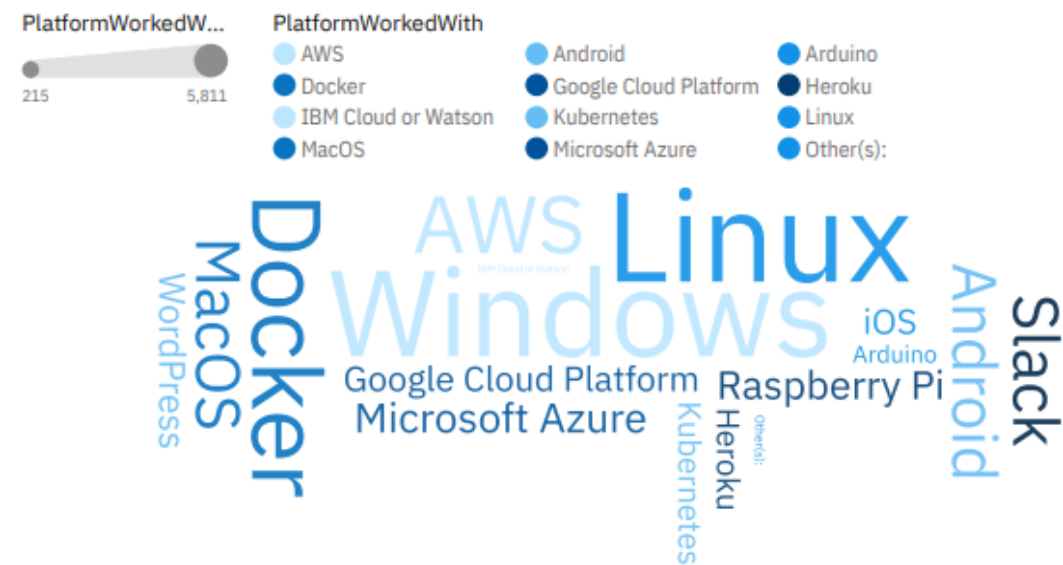
Current Technology Usage

Top 10 Languages Respondents Work with

Language	Respondents (Count)
JavaScript	8,687 (17.5%)
HTML/CSS	7,830 (15.8%)
SQL	7,106 (14.3%)
Bash/Shell/PowerShell	4,642 (9.3%)
Python	4,542 (9.1%)
Java	4,506 (9.1%)
C#	4,288 (8.6%)
TypeScript	3,232 (6.5%)
PHP	2,913 (5.9%)
C++	1,946 (3.9%)

Languages (y-axis) — Respondents (Count) (x-axis: 0 to 11,000)

Top 10 Databases Used by Respondents

Database	Respondents (Count)
MySQL	5,469 (18.7%)
Microsoft SQL Server	4,110 (14.1%)
PostgreSQL	4,110
SQLite	3,248 (11.1%)
MongoDB	
Redis	2,508 (8.6%)
Elasticsearch	1,954 (6.7%)
Oracle	1,744 (6%)
MariaDB	1,709 (5.9%)
Firebase	1,314 (4.5%)

Respondents (Count) (y-axis: 0 to 6,000) — Databases (x-axis)

Platforms Respondents Worked with

PlatformWorkedW...
215 — 5,811

PlatformWorkedWith
- AWS
- Docker
- IBM Cloud or Watson
- MacOS
- Android
- Google Cloud Platform
- Kubernetes
- Microsoft Azure
- Arduino
- Heroku
- Linux
- Other(s):

Top 10 Web Frames Respondents Use

Count (Count)
939 — 4,629

Top 10
- ASP.NET
- Flask
- Vue.js
- Angular/Angular.js
- Laravel
- jQuery
- Django
- React.js
- Spring
- Express

jQuery | 4,629
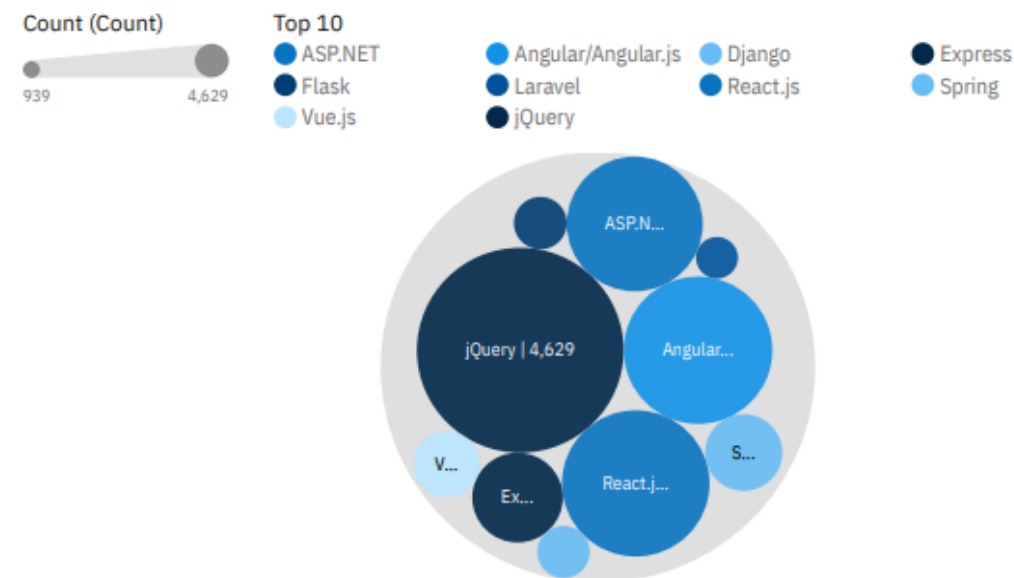
Future Technology Trend

Top 10 Programming Languages Respondents Want to Learn

Languages	Respondents (Count)
JavaScript	6,630 (16.3%)
HTML/CSS	5,328 (13.1%)
Python	5,239 (12.9%)
SQL	5,012 (12.3%)
TypeScript	4,088 (10.1%)
C#	3,591 (8.8%)
Bash/Shell/PowerShell	3,097 (7.6%)
Java	2,953 (7.3%)
Go	2,759 (6.8%)
Kotlin	1,890 (4.7%)
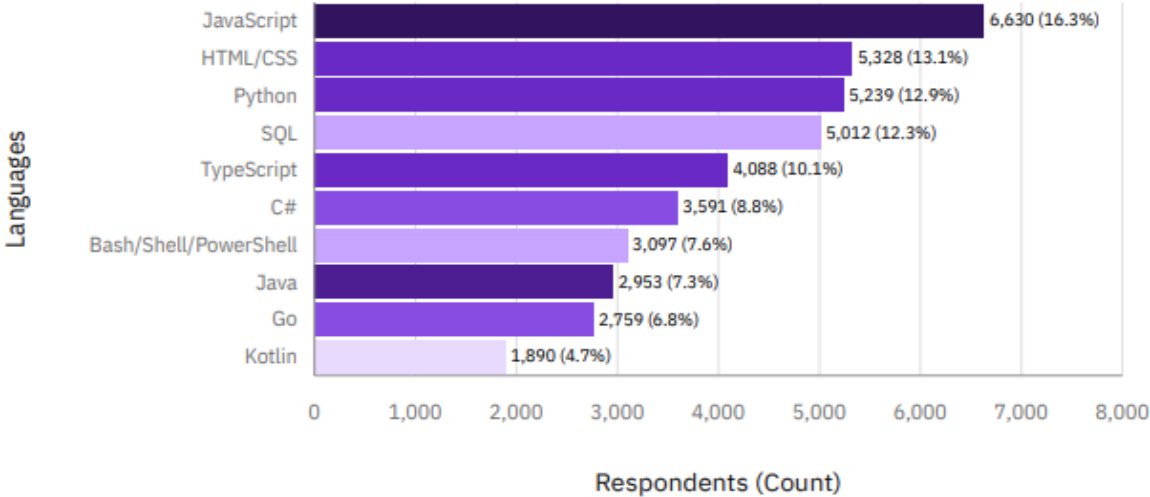
Top 10 Databases Respondents Want to Learn

Database	Respondents (Count)
PostgreSQL	4,328 (16.2%)
MongoDB	3,649 (13.7%)
Redis	3,331 (12.5%)
MySQL	2,856 (10.7%)
Elasticsearch	2,437 (9.1%)
Microsoft SQL Server	
SQLite	
Firebase	1,650 (6.2%)
MariaDB	1,385 (5.2%)
Dynam...	1,044 (3.9%)
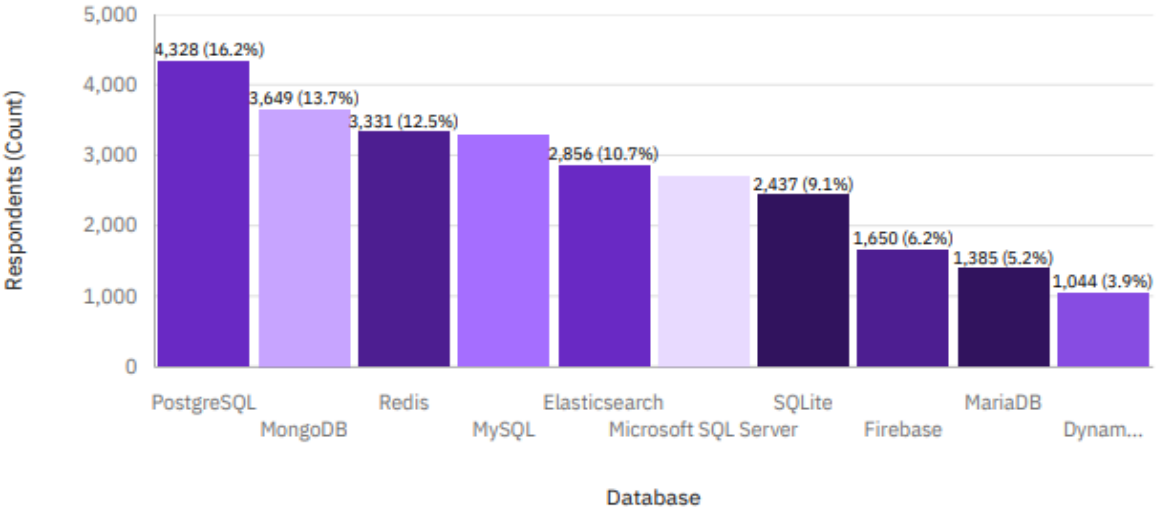
Top 10 Platforms Respondents Want to learn

- Linux 5,865
- Docker 5,804
- AWS 4,442
- Windows 3,888
- Android 3,231
- Kubernetes 3,201
- Raspberry Pi 2,525
- Google Cloud Platform 2,401
- MacOS 2,593
- Slack 2,359

Top 10 Web Frames Respondents Want to Learn

WebFrameDesire... 970 — 4,714

WebFrameDesireNextYear
- ASP.NET
- Angular/Angular.js
- Django
- Express
- Flask
- React.js
- Ruby on Rails
- Spring
- Vue.js
- jQuery

- React.js | 4,71...
- Vue.js | ...
- ASP.N...
- Angula...
- S...
- D...
- jQu...
- Ex...
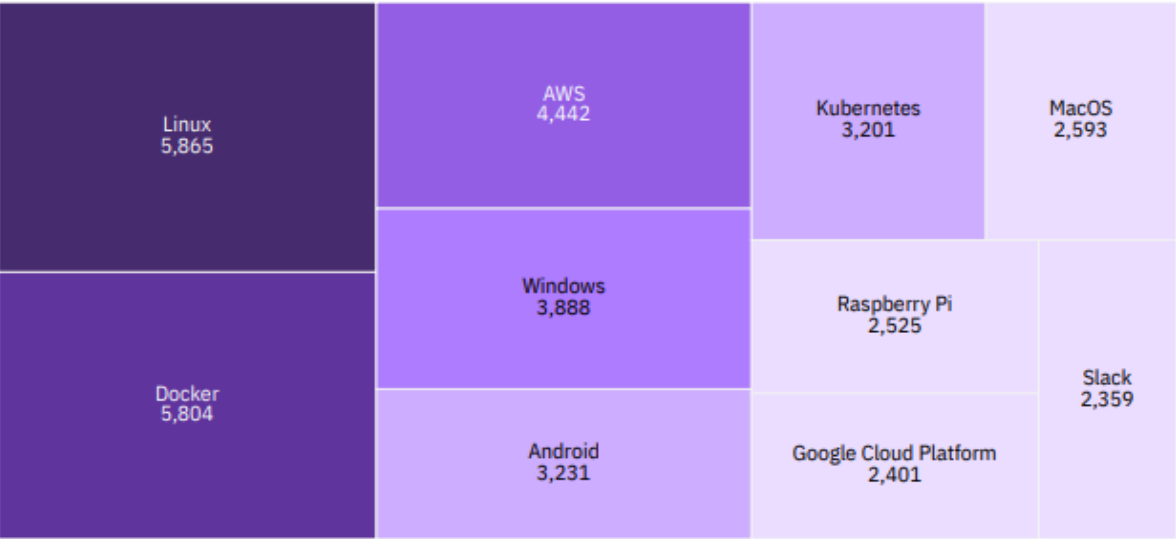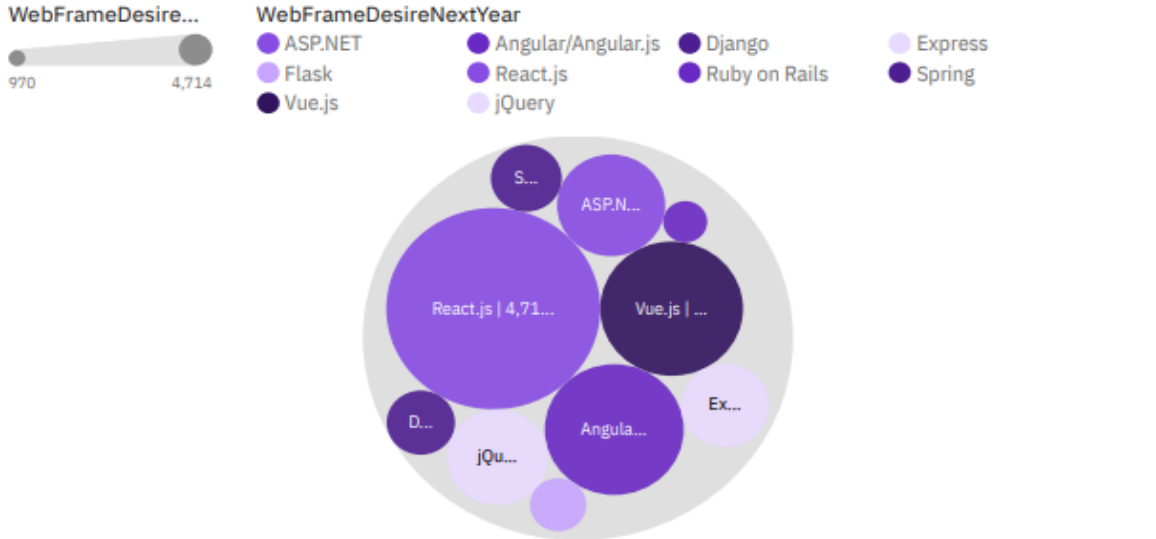
Demographics

Respondent Gender Distribution

Gender
● Woman ● Man

73…

10,480 | 93.5%
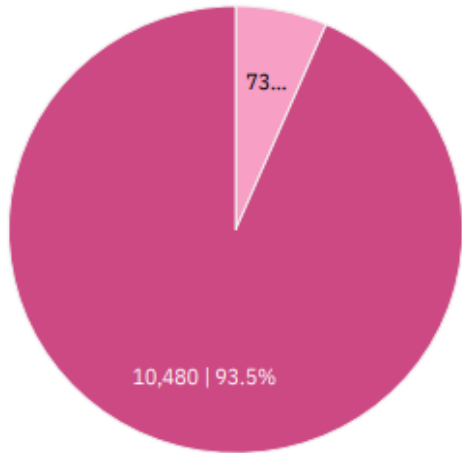
Respondent Distribution by Country

© Mapbox © OpenStreetMap

Respondents Age Distribution

Respondents (Count) vs Age

2, 6, 29, 108, 196, 403, 570, 666, 724, 706, 774, 706, 639, 521, 389, 480, 307, 388, 277, 278, 185, 136, 161, 94, 65, 64, 56, 32, 13, 10, 11, 2, 10, 5, 7, 2, 1, 1, 2, 1, 1, 0
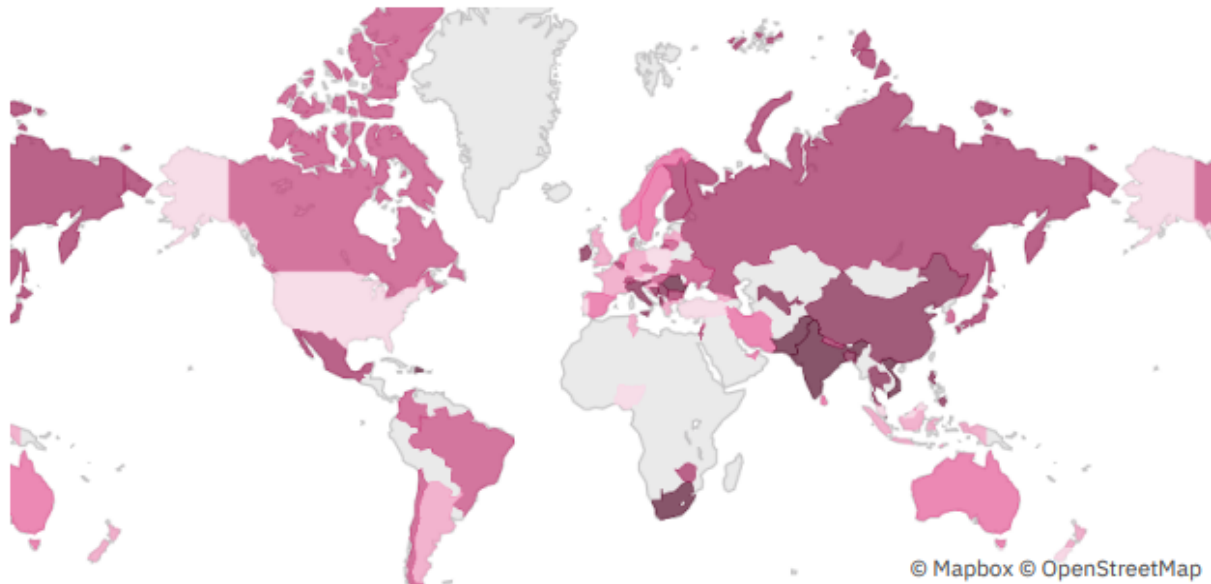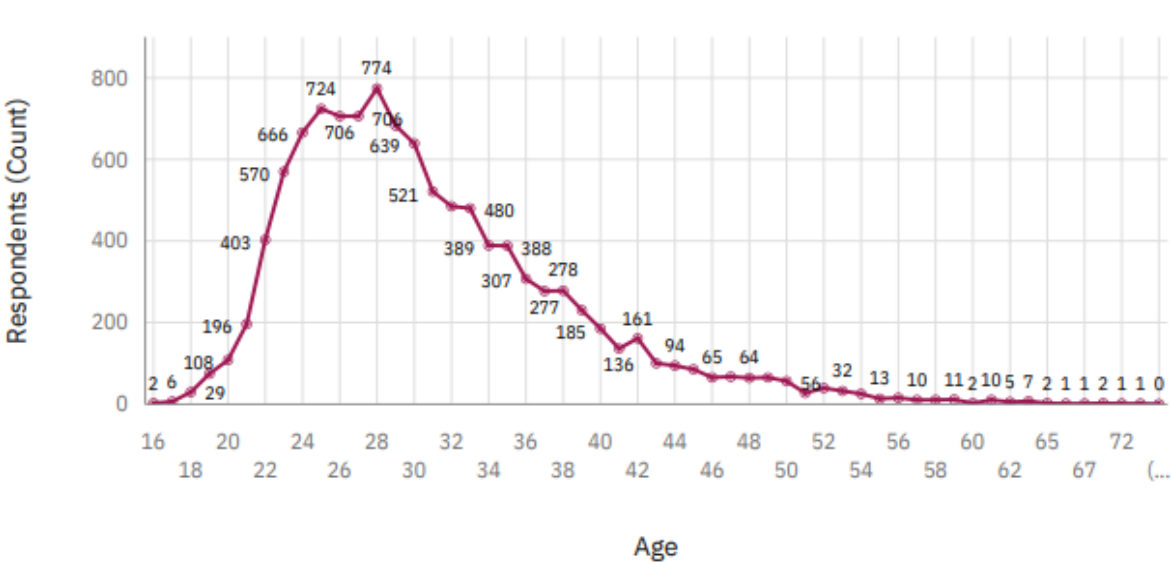
Education Level by Gender

Gender
● Man ● Woman

Education Levels	Respondents (Count)
(no value)	109 (1%)
Associate degree	377 (3.4%)
Bachelor's degree (BA, BS, B.Eng., etc.)	5,341 / 5,753 (51.3%)
I never completed any formal education	27 (0.2%)
Master's degree (MA, MS, M.Eng., MBA, etc.)	2,484 / 2,675 (23.9%)
Other doctoral degree (Ph.D, Ed.D., etc.)	256 (2.3%)
Primary/elementary school	26 (0.2%)
Professional degree (JD, MD, etc.)	152 (1.4%)
Secondary school (e.g. American high school, German…	506 (4.5%)
Some college/university study without earning a degree	1,280 / 1,330 (11.9%)

DISCUSSION

•**Discussion:** The strong interest among developers in learning new technologies underscores the need for continuous professional development.
•**Questions:**
  •How can companies effectively identify the training needs of their teams?
  •What types of training programs are most beneficial for keeping skills up-to-date?
  •How can organizations encourage a culture of continuous learning among their employees?

•**Discussion:** The significant gender disparity, with men making up 93.5% of respondents, highlights the urgent need for initiatives that promote diversity in tech.
•**Questions:**
  •What specific initiatives can organizations implement to foster inclusivity in tech?
  •How can mentorship programs be designed to effectively support women in tech?
  •What role do male allies play in promoting gender diversity within the industry?

▶ Balancing these points can enhance both workforce skills and diversity, driving innovation in the tech community.

OVERALL FINDINGS & IMPLICATIONS

Findings

► JavaScript is the most used and desired language among developers, with strong interest in Python, HTML/CSS, and SQL.

► MySQL, PostgreSQL, and Microsoft SQL Server are the most widely used databases, while developers are also keen to learn emerging databases like MongoDB, Redis, and Elasticsearch.

► The developer community shows a significant gender disparity, with men making up 93.5% of respondents, alongside a diverse representation of education levels and a concentration of respondents from India, China, and Russia.

Implications

► Employers should tailor their hiring and training strategies around the most sought-after languages to attract and retain skilled talent in JavaScript, Python, HTML/CSS, and SQL.

► Companies and educational institutions should focus on providing training for both widely used and emerging databases to meet developers' interests and market demand.

► The significant gender disparity highlights the need for initiatives aimed at increasing diversity in tech, alongside strategies that consider the global distribution of talent, particularly from countries like India, China, and Russia.
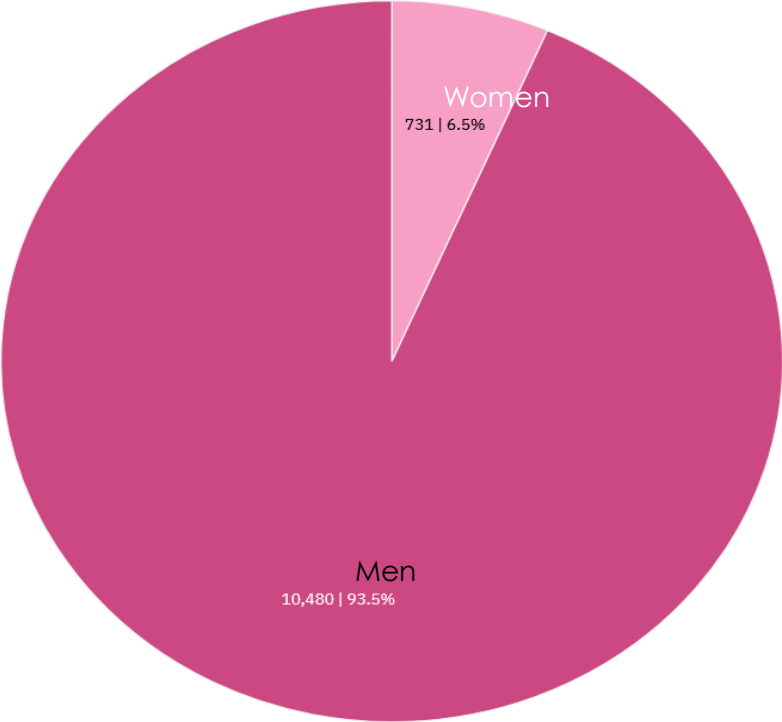
CONCLUSION

▶JavaScript leads as the most popular and desired language, while MySQL, PostgreSQL, and Microsoft SQL Server dominate databases.

▶A significant gender gap exists, with men comprising 93.5% of respondents.

▶Companies should refine hiring practices and invest in training for in-demand skills.

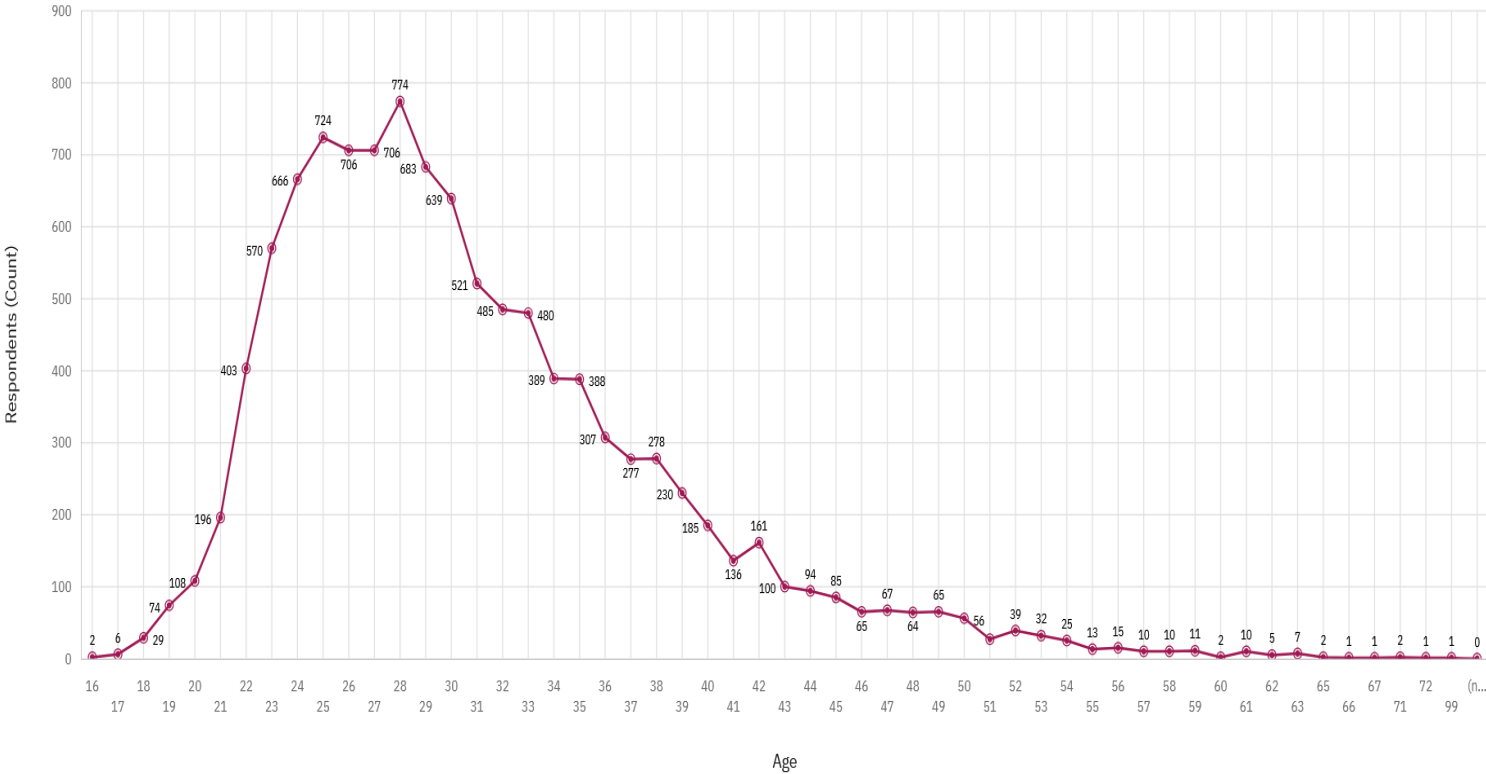▶Encouraging ongoing professional development can foster a more diverse and skilled workforce, driving innovation.

Additional Notes:

- The interest in learning databases like MongoDB, Redis, and Elasticsearch indicates a shift toward more modern data management solutions.

- Companies should consider how to effectively tap into the global talent pool while addressing challenges such as cultural differences and remote collaboration.

- Providing remote work options can enhance employee retention by catering to the work-life balance that many developers seek.
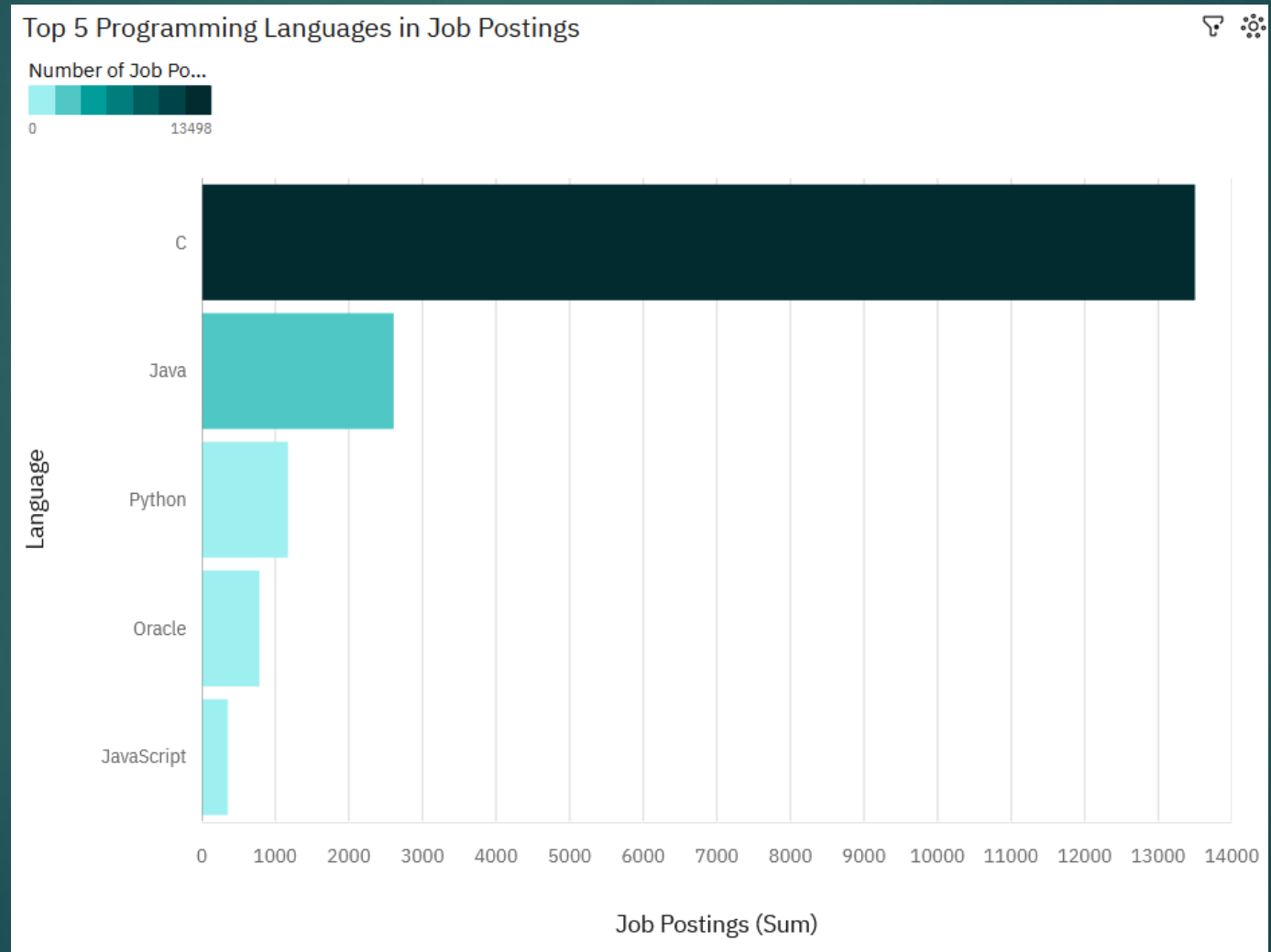
APPENDIX

Respondents Age Distribution

JOB POSTINGS

Top 5 Programming Languages in Job Postings

POPULAR LANGUAGES

Most Popular Programming Languages by AVG Annual Salary