



Technology Trend Analysis

Osamudiamen Uwadiae

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OUTLINE



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EXECUTIVE SUMMARY



The following slides summarize key findings from an analysis of data collected as part of the 2019 Stack Overflow Developer Survey.

The analysis yielded insights regarding the following:

- Most popular languages, databases, and other technologies (at the time of data collection)
- Attitudes reflecting which technologies will become most popular in the future
- Demographics (e.g., the gender gap among developers)

These findings are relevant particularly to current and aspiring developers, recruiters, educators and Policy makers.

INTRODUCTION



- Since 2011, the online programming knowledge sharing platform, Stack Overflow, has been conducting the Stack Overflow Annual Developer Survey.
- The primary objective of the annual surveys is to gather data regarding technology usage and trends among developers.
- In this analysis, a subset of the 2019 dataset was examined (present dataset: $N = 11,398$; original dataset $N \approx 90,000$).
- Audience: Developers (current and aspiring), HR professionals, educators, policy makers.

METHODOLOGY



- **Data Source:** 2019 Stack Overflow Developer Survey
- **Data Wrangling:** A portion of the dataset (provided by IBM) was loaded and cleaned using SQL and Python's pandas library.
- **Cleaning procedure:** Duplicates removal, data imputation, data normalization
- **Analysis & Visualization:** EDA and data visualization were conducted using various Python libraries and Cognos. Specifically, the following measures were examined:
 1. Technologies (i.e., languages, databases, platforms, and web frames) used in 2019
 2. Technologies most desired for the next year
 3. Demographics (i.e., gender, country, age, and education).

RESULTS:

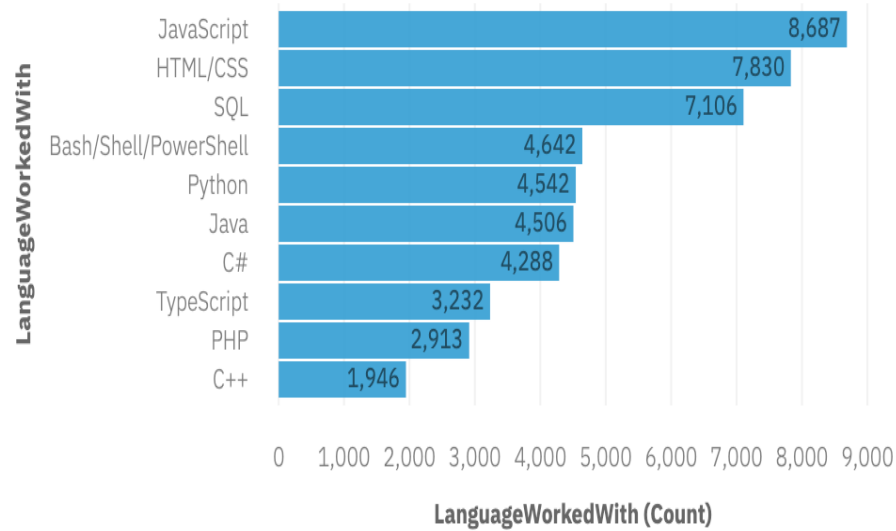
- First, descriptive statistics regarding demographics and total annual compensation were computed.
- Sample size after compensation outlier removal: $N = 10,519$ (vs. before removal: $N = 11,398$).
- The respondents had a median age of 29, and were predominantly male (i.e., 93.5% male vs. 6.5% female).
- Median compensation: \$52,704 USD per year.
- Compensation and Age were positively correlated: $r = .40$.
- Median compensation was higher for women: \$54,956 than men: \$52,339.

PROGRAMMING LANGUAGE TRENDS

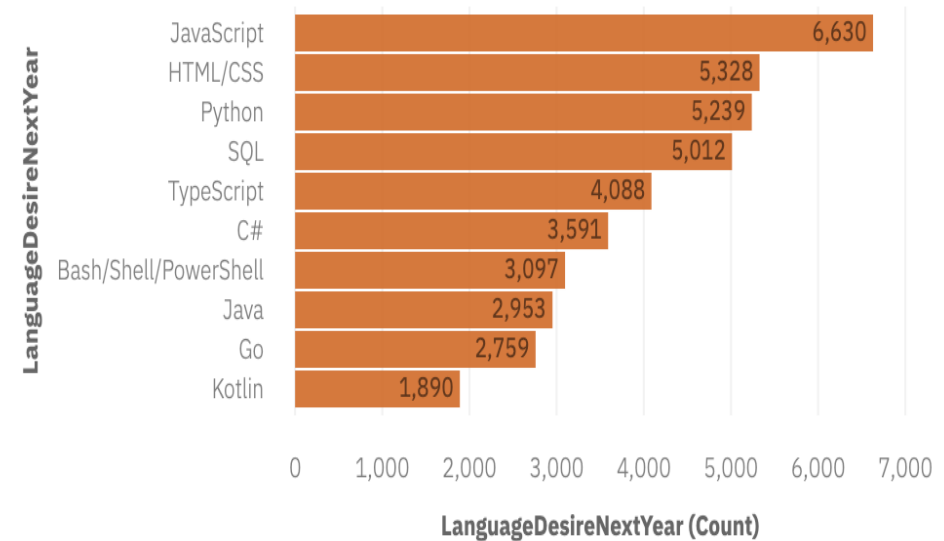
Current Year

Next Year

Top 10 Language Worked With



Top 10 Language Desire Next Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

- Javascript and HTML/CSS were the most popular in 2019 and will likely remain so the following year.
- SQL was popular in 2019 and will likely remain so.
- Increasing interests in Python and TypeScript.
- Decreasing interest in PowerShell/Bash.

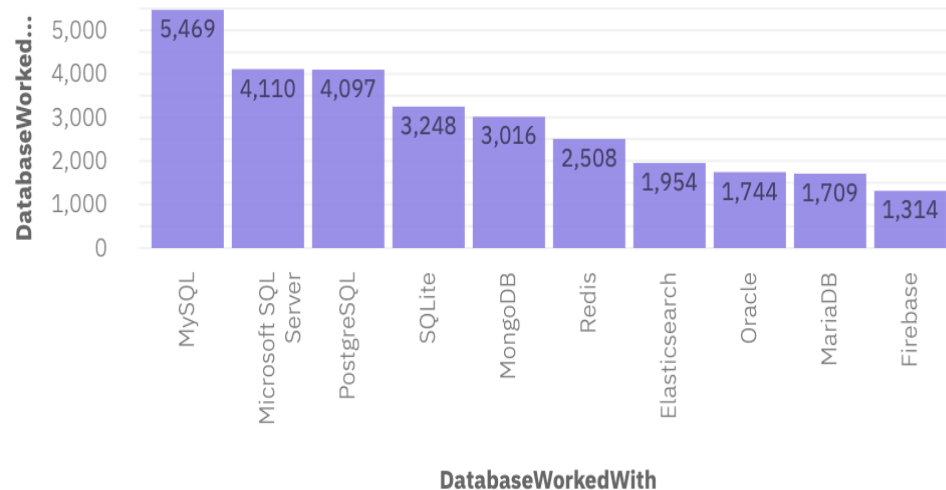
Implications

- Web development is still in high demand, and Javascript and HTML/CSS remain the dominant languages—however, TypeScript may catch up in the future.
- SQL remains the preferred language for big data storage and querying—it's not likely to go away anytime soon.
- Python's rising popularity likely reflects the growth of AI and ML work.

DATABASE TRENDS

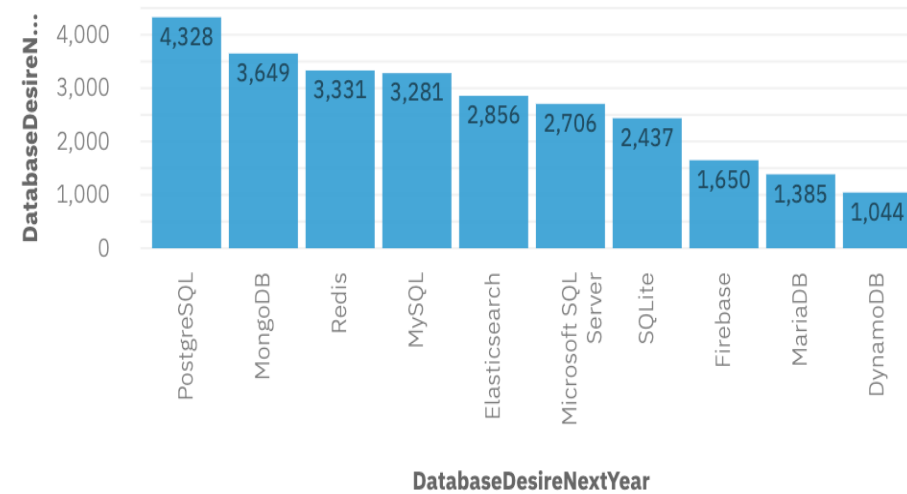
Current Year

Top 10 Database Worked With



Next Year

Top 10 Database Desired Next Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- SQL database programs were the most popular in 2019, with MySQL in the lead.
- PostgreSQL is gaining popularity over other SQL database programs, and it was the overall most desired database for the next year.
- MongoDB was popular in 2019 and gaining interest.
- Increasing interest in Elasticsearch.

Implications

- There appears to be increasing developer preference toward open-source database programs.
- NoSQL database programs are gaining popularity, which likely reflects a growing need to handle nonrelational and unstructured data.
- Current and aspiring data analysts should develop competence in NoSQL in addition to SQL database programs.

DASHBOARD



My Cognos dash board can be found [here \(Ctrl + Click\)](#)

DASHBOARD TAB 1



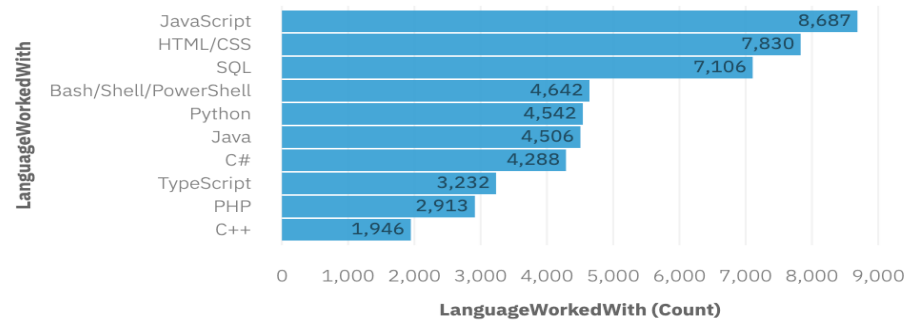
Current Technology Usage

Future Technology Trend

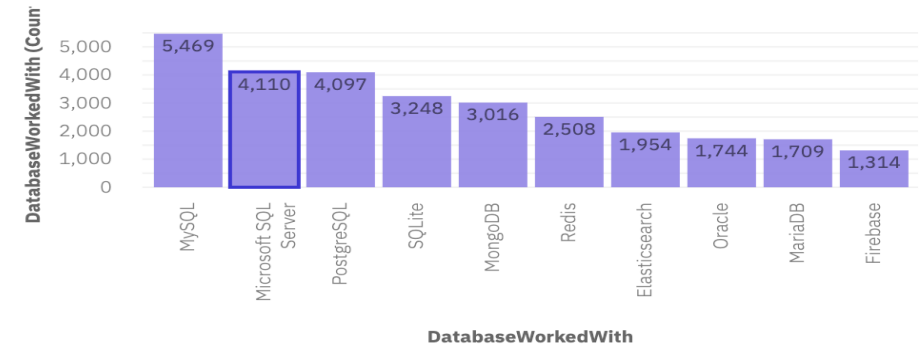
Demographics



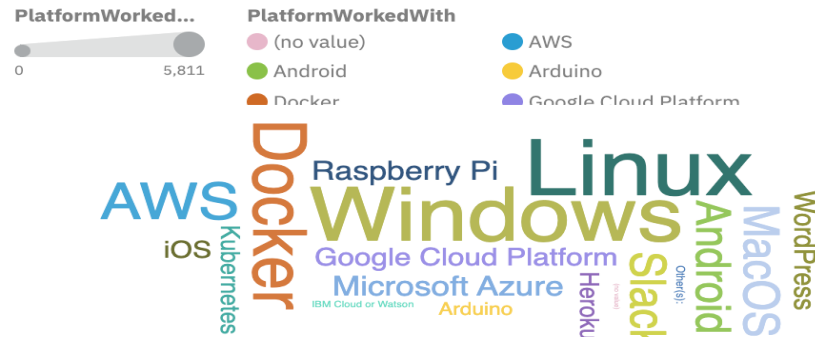
Top 10 Language Worked With



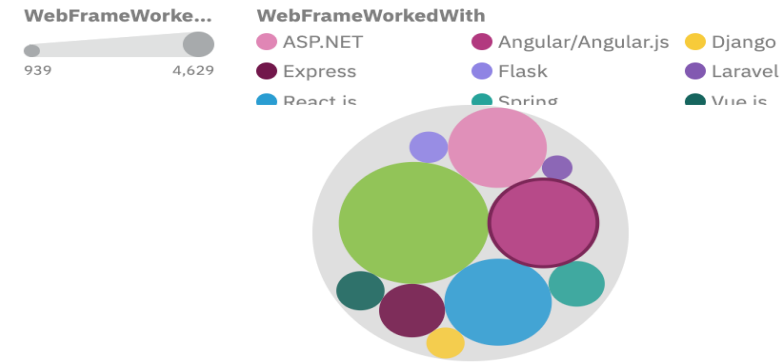
Top 10 Database Worked With



Platform Worked With



Top 10 WebFrame Worked With



DASHBOARD TAB 2

Projects / Capstone Project / CapstoneProject_Dashboard



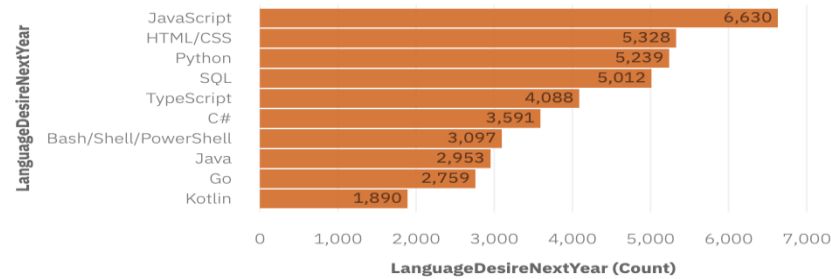
Current Technology Usage

Future Technology Trend

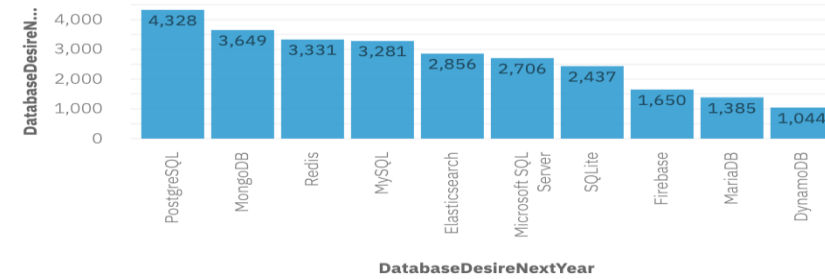
Demographics



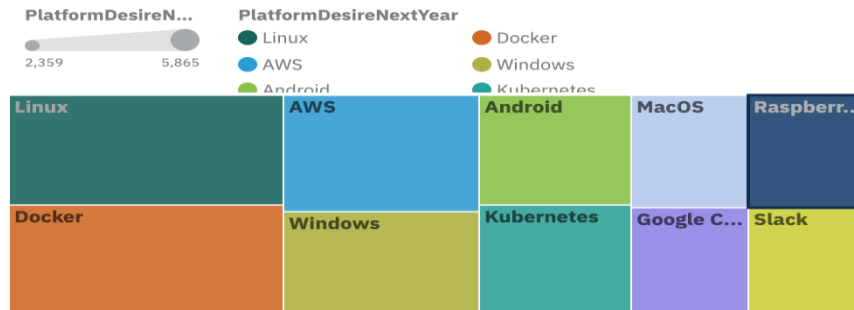
Top 10 Language Desire Next Year



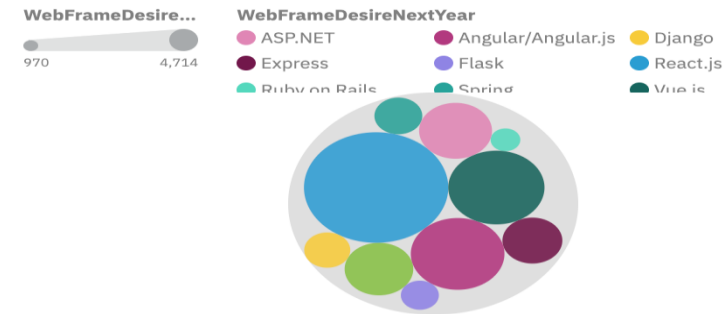
Top 10 Database Desired Next Year



Platform Desire Next Year



Top 10 WebFrame Desired Next Year



DASHBOARD TAB 3

Projects / Capstone Project / CapstoneProject_Dashboard



Current Technology Usage

Future Technology Trend

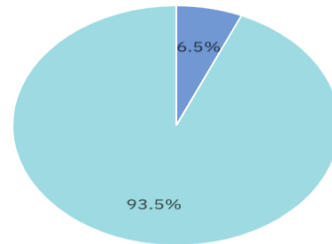
Demographics



Respondent classified by Gender

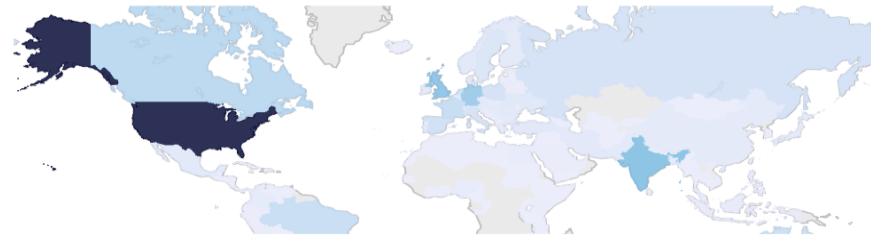
Gender

Woman Man

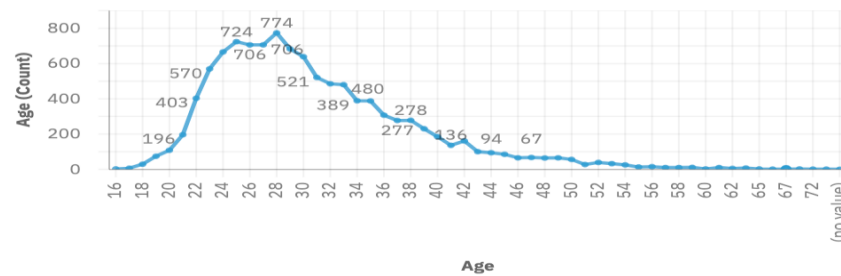


Respondent Count for Countries

Country (Count)
1 3,058



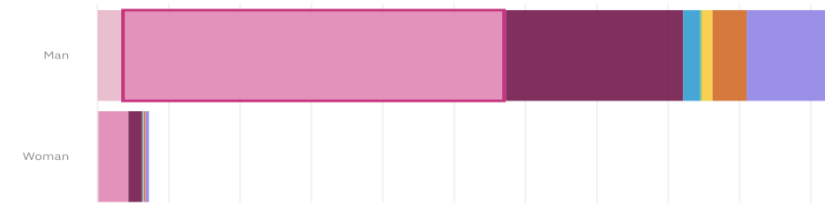
Respondent Count by Age



Respondent Count by Gender, classified by Formal Education Level

EdLevel

(no value) Associate degree
Bachelor's degree (BA, BS, B.E...) I never completed any formal ...
Master's degree (MA, MS, M.F.) Other doctoral degree (Ph.D., F.D.)



DISCUSSION



- Taken together, the findings yield insights into the following questions:
- What kinds of developer technologies are in top demand?
- Which technologies should prospective developers and data professionals be learning?
- Which technologies should educators place more emphasis on teaching in upcoming years?
- What does the distribution of annual compensation for developers look like?
- What is the developer demographic like? Is there a gender representation gap?

OVERALL FINDINGS & IMPLICATIONS

Findings

- High usage and interest in Javascript and HTML/CSS remain high usage. There's also increasing interest in Typescript.
- Increasing interest in Python.
- High usage and interest in SQL. MySQL had the highest usage in 2019, but PostgreSQL is gaining interest and was the overall most desired database program for the next year.
- NoSQL database programs gaining interest, of which MongoDB was the most used in 2019 and desired for the next year.
- A severe gender representation gap (in favor of men), despite median compensation being slightly higher for women.
- Technology divide between countries.

Implications

- Web development is still in high demand. Current and prospective developers may consider picking up Typescript in addition to Javascript and HTML/CSS.
- With the growing need to handle big data and perform AI and ML work, data professionals should continue to enhance SQL competence but also enhance competence with NoSQL database programs and Python.
- Businesses need to adapt to changing technology preferences, especially in terms of talent acquisition and development.
- Policy makers, educators, and organizations should work to minimize the gender representation gap in addition to the technology divide between countries.

CONCLUSION

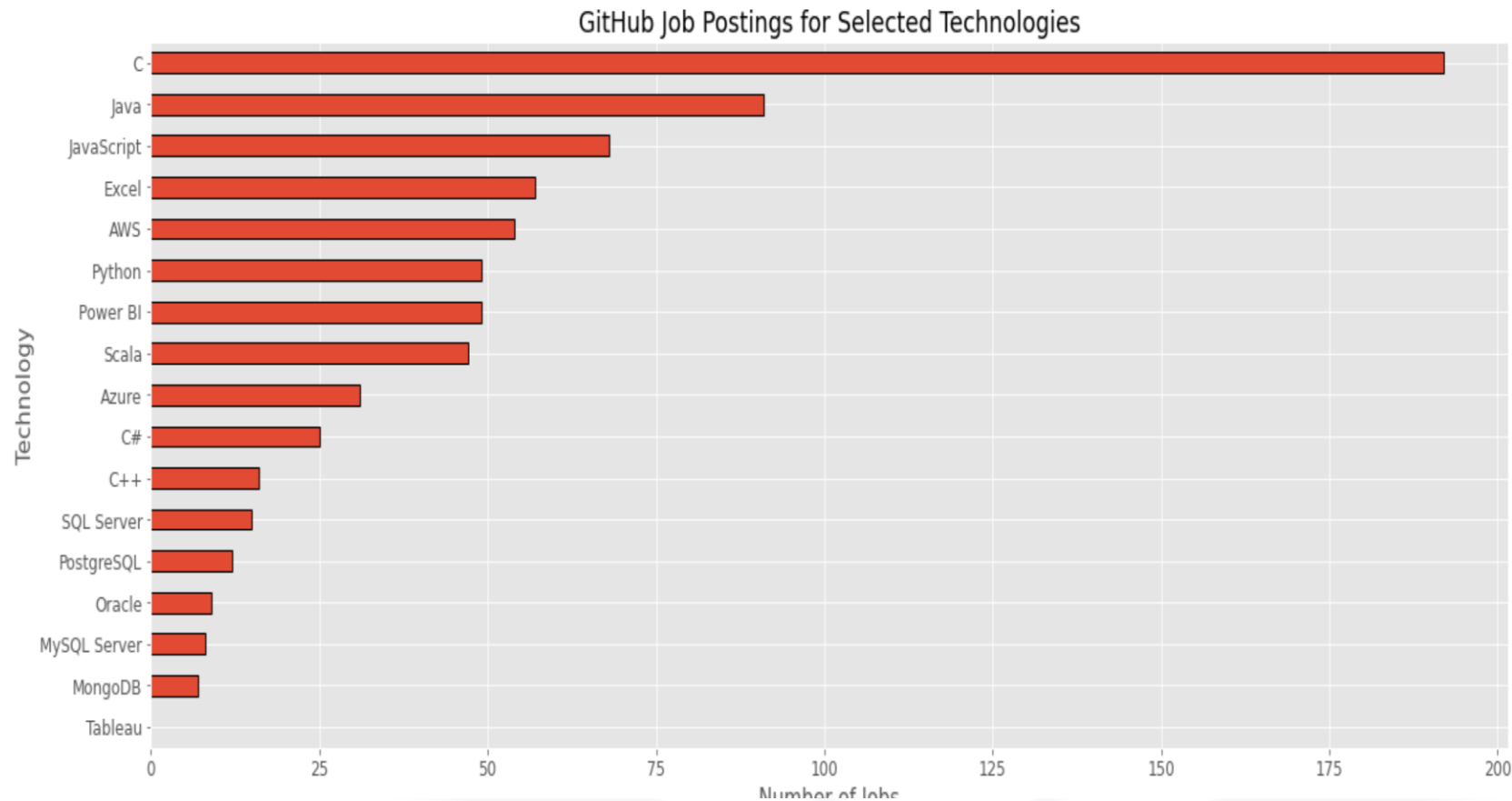


A subset of data collected as part of the 2019 Stack Overflow Developer Survey was examined.

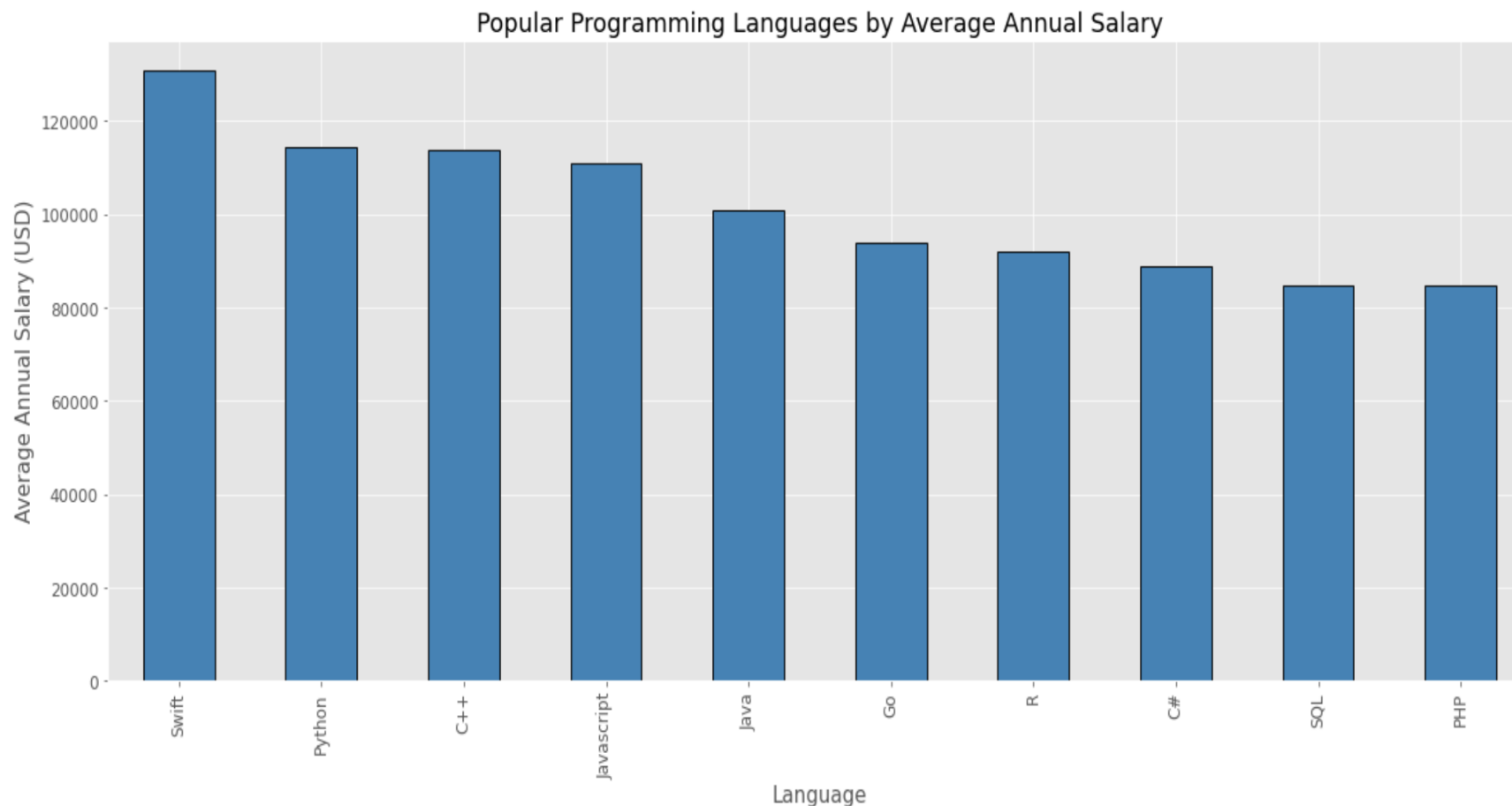
The findings yielded numerous insights into the technologies most used and desired by developers in addition to the developer demographic.

These insights should be particularly relevant for current and prospective developers aiming to remain competitive, businesses aiming to upskill their talent, educators in the field, and policy makers aiming to address gender and economic issues.

Appendix A: JOB POSTINGS

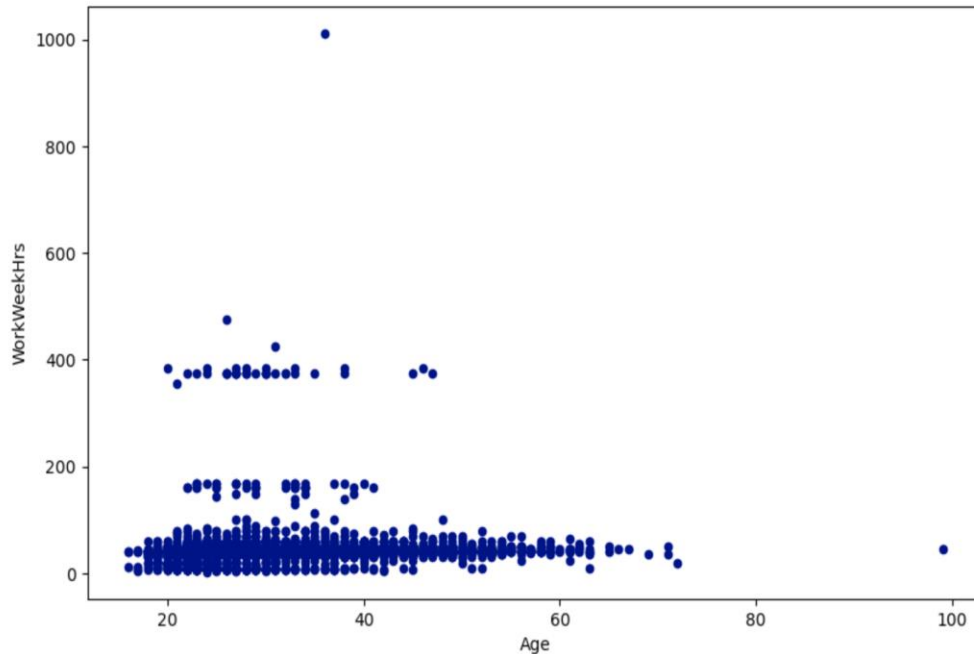


Appendix B: POPULAR LANGUAGES



Appendix C: Additional Visuals

- [ScatterPlot of Age and Workhours](#)



- [Box Plot of Age of Survey Respondent](#)

