Stack Overflow Developer Survey 2019: Key Findings

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OUTLINE

- Executive Summary
- Introduction
- Methodology
- Results
  - Visualization – Charts
  - Dashboard
- Discussion
  - Findings & Implications
- Conclusion
- Appendix

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EXECUTIVE SUMMARY

- Following is the report which summarize the key findings from the analysis of data to help identifying the future skill requirements in the field of IT.

- The analysis yielded insights regarding the following:

  - Current Technology Usage (in Popular Programming Languages, Databases, Platforms and Web Frames)

  - Future Technology Trends (in Popular Programming Languages, Databases, Platforms and Web Frames)

  - Demographics Survey (e.g. Gender and Age Gap between developers)

- These findings from this analysis are relevant to current and aspiring developers, help the firm make more informed data-driven hiring and budgetary decisions.

INTRODUCTION

- Analysis: The primary objective of the annual surveys is to gather data regarding technology usage and trends among developers in the global IT sector necessary for the firm to keep pace with changing technologies and remain competitive

- Purpose behind the presentation is:
  - Identify future skill requirements
  - What are the top programming languages in demand?
  - What are the top database skills in demand?
  - What are the popular IDE's?

- Audience: Stakeholders, Business decision makers, IT Head, Developers (current and aspiring), HR professionals

METHODOLOGY

- Using a modified subset of the Stack Overflow Dataset, the data was wrangled in order to remove duplicates, impute missing values, normalize data.

- Next, the data underwent exploratory analysis in order to find the distribution of data, presence of outliers, and determine correlation between different columns in dataset.

- Analysis & Visualization: EDA and data visualization were conducted using various Python libraries and Cognos Dashboard Embedded (CDE). Specifically, the following measures were examined:
  - Technologies (i.e., languages, databases, platforms, and web frames) used in 2019
  - Technologies most desired for the next year
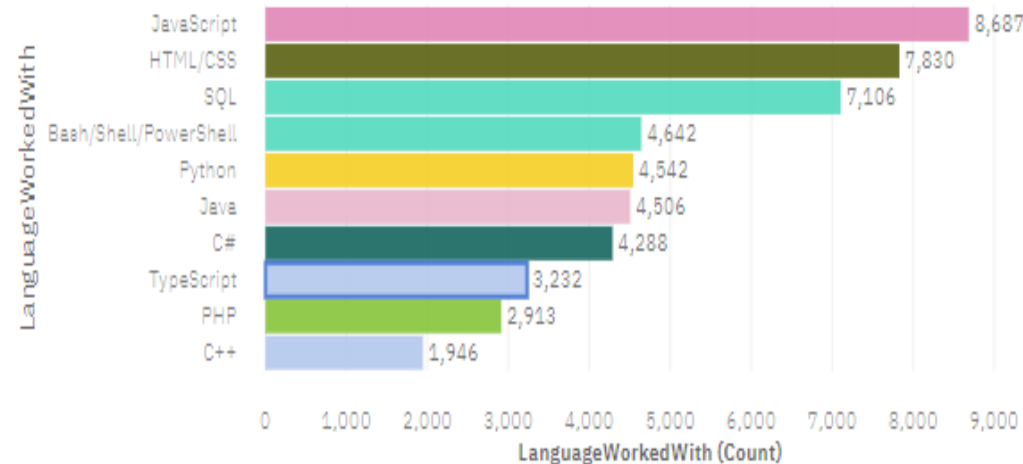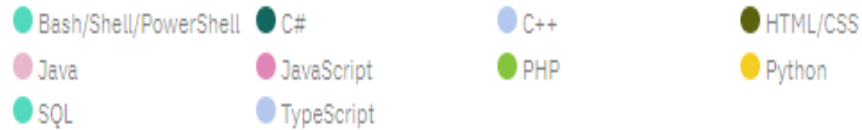 - Demographics (i.e., gender, country, age, and education)

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., 93.7% male vs. 6.3% female).
- Median compensation: $52,704 USD per year.
- Compensation and Age were positively correlated: r = .40.
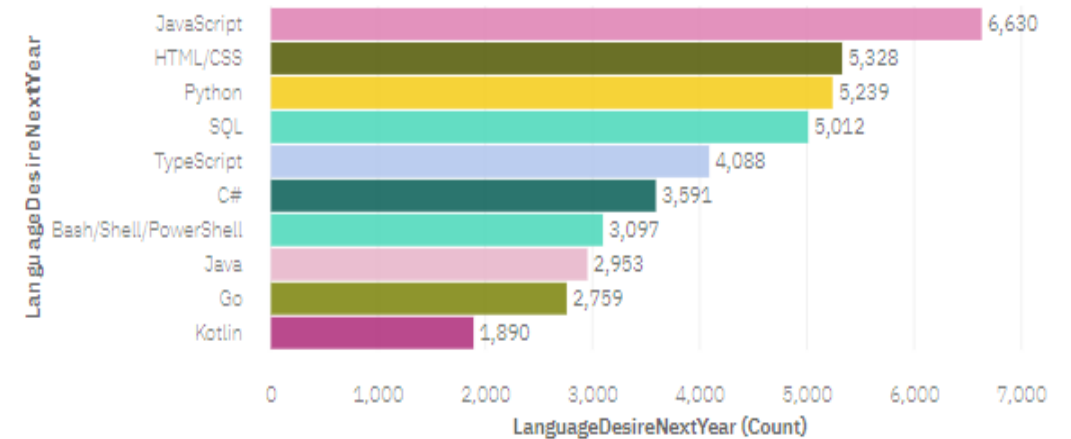- Median compensation was higher for women: $54,956 than men: $52,339.

Histogram of Total Annual Compensation (USD)
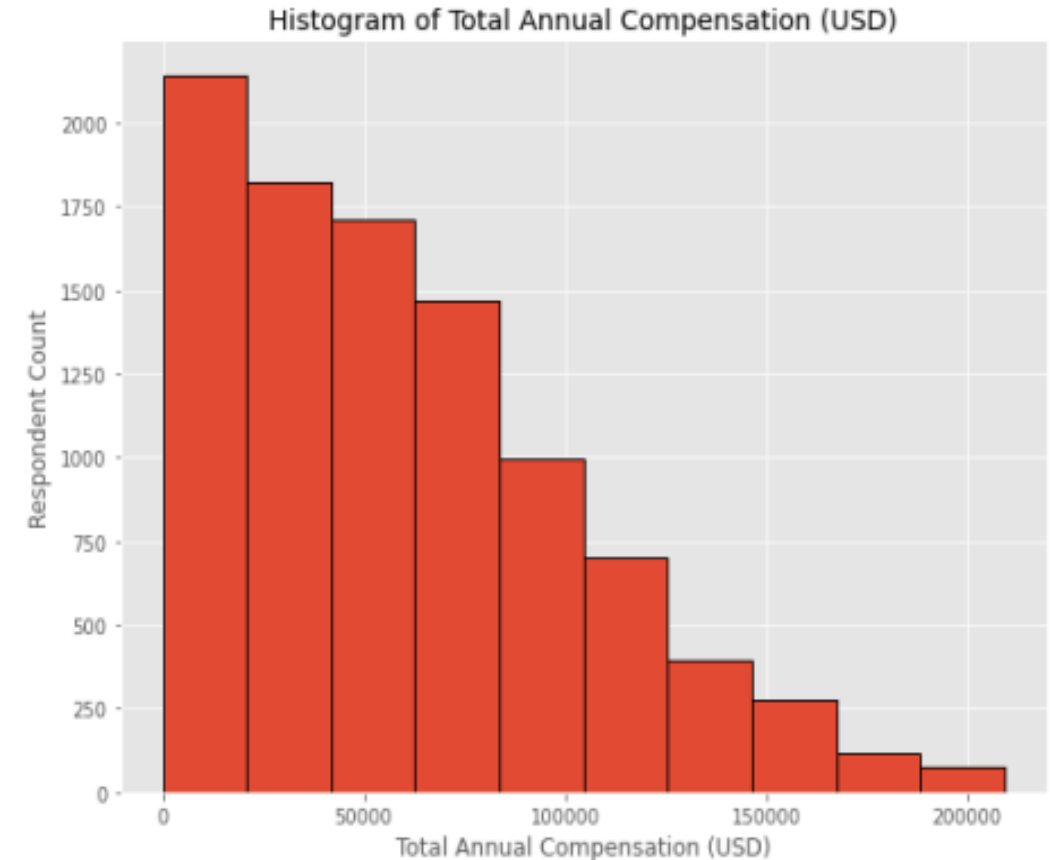
PROGRAMMING LANGUAGE TRENDS

Top 10 Languages Worked With

LanguageWorkedWith
- ● Bash/Shell/PowerShell ● C# ● C++ ● HTML/CSS
- ● Java ● JavaScript ● PHP ● Python
- ● SQL ● TypeScript

Language	Count
JavaScript	8,687
HTML/CSS	7,830
SQL	7,106
Bash/Shell/PowerShell	4,642
Python	4,542
Java	4,506
C#	4,288
TypeScript	3,232
PHP	2,913
C++	1,946

Top 10 Language Desire Next Year

LanguageDesireNextYear
- ● Bash/Shell/PowerShell ● C# ● Go ● HTML/CSS
- ● Java ● JavaScript ● Kotlin ● Python
- ● SQL ● TypeScript

Language	Count
JavaScript	6,630
HTML/CSS	5,328
Python	5,239
SQL	5,012
TypeScript	4,088
C#	3,591
Bash/Shell/PowerShell	3,097
Java	2,953
Go	2,759
Kotlin	1,890

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PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS
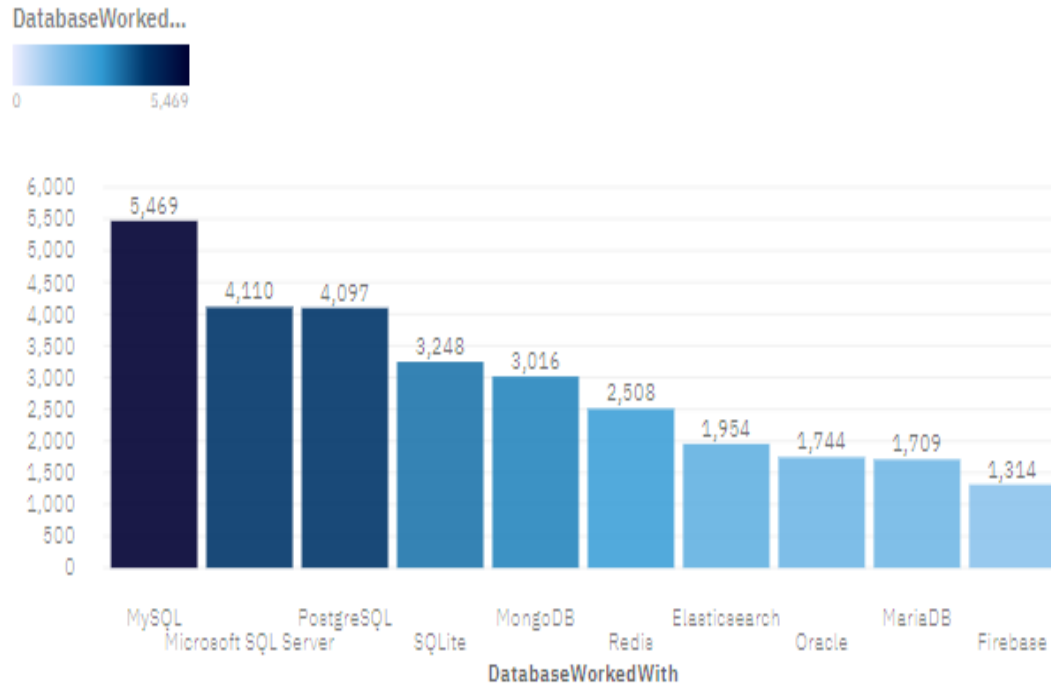
Findings

- 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

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DATABASE TRENDS

Top 10 Databases Worked With

Top 10 Database Desire Next Year
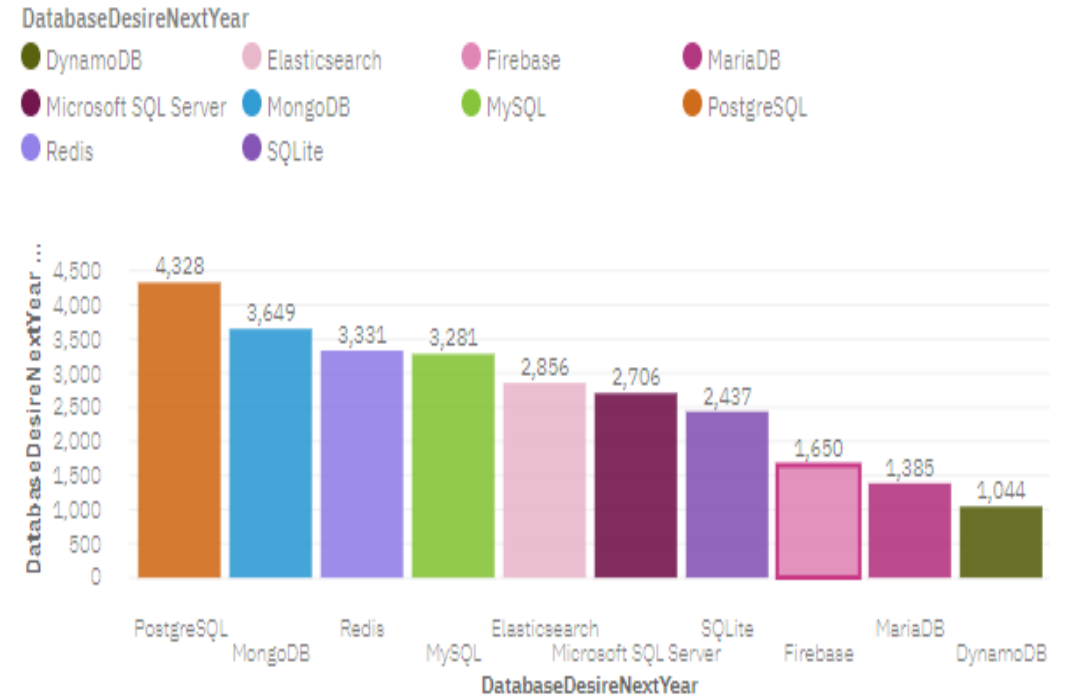
DATABASE TRENDS - FINDINGS & IMPLICATIONS

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.
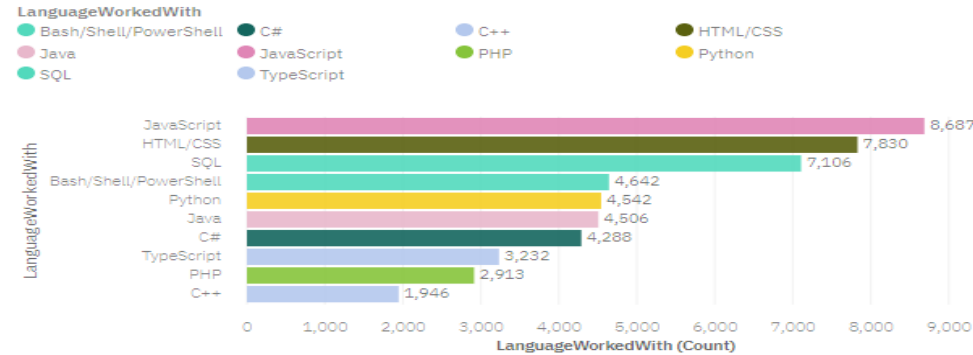
DASHBOARD

The following link contains the full, interactive Cognos dashboard summarizing (a) current technology use, (b) future technology trend, and (c) demographics of the survey respondents:

<https://dataplatform.cloud.ibm.com/dashboards/a671d5db-1e3b-4362-8608-74f2fc40aec3/view/663ca71d2fac319268cfc0e407c878557e34240ee6bbd10a82d17b490b362597a93b4596c87c190edb195731a5ea135c9f>
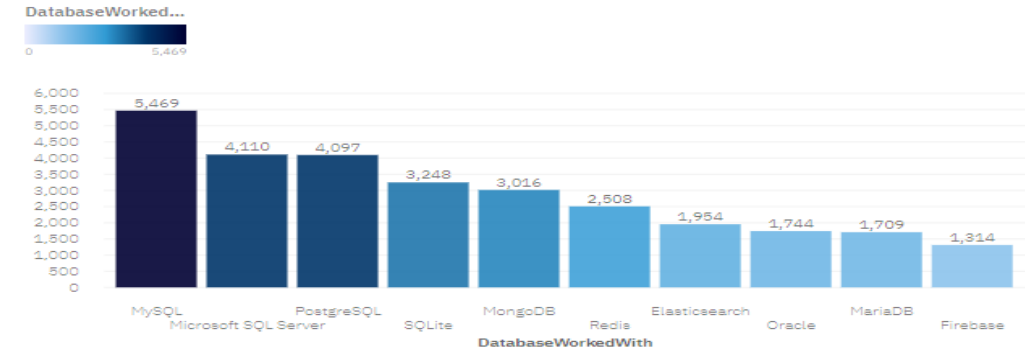
Static screenshots of the dashboard are shown in the next three slides.

DASHBOARD TAB 1

DASHBOARD TAB 2

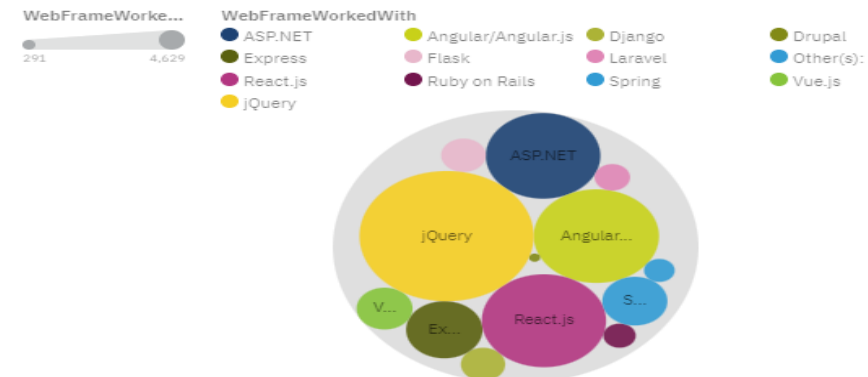## Top 10 Language Desire Next Year

LanguageDesireNextYear
- Bash/Shell/PowerShell
- C#
- Go
- HTML/CSS
- Java
- JavaScript
- Kotlin
- Python
- SQL
- TypeScript

Language	Count
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TypeScript	4,088
C#	3,591
Bash/Shell/PowerShell	3,097
Java	2,953
Go	2,759
Kotlin	1,890

LanguageDesireNextYear (Count)

Top 10 Database Desire Next Year

DatabaseDesireNextYear
- DynamoDB
- Elasticsearch
- Firebase
- MariaDB
- Microsoft SQL Server
- MongoDB
- MySQL
- PostgreSQL
- Redis
- SQLite

Database	Count
PostgreSQL	4,328
MongoDB	3,649
Redis	3,331
MySQL	3,281
Elasticsearch	2,856
Microsoft SQL Server	2,706
SQLite	2,437
Firebase	1,650
MariaDB	1,385
DynamoDB	1,044

DatabaseDesireNextYear

Platform Desire Next Year
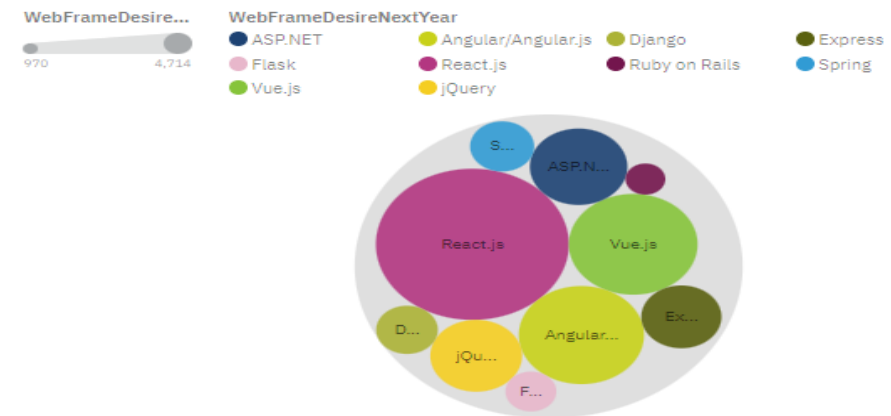
PlatformDesireN... 0 — 5,865

PlatformDesireN... 0 — 5,865

Linux, Docker, AWS, Windows, Android, Kubernetes, MacOS, Raspberry Pi, Google ..., Slack, iOS, Arduino, Micros..., Heroku, W..., IBM ..., Oth.

Top 10 Web Frame Desire Next Year

WebFrameDesire... 970 — 4,714

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

S..., ASP.N..., React.js, Vue.js, D..., jQu..., Angular..., Ex..., F...

DASHBOARD TAB 3
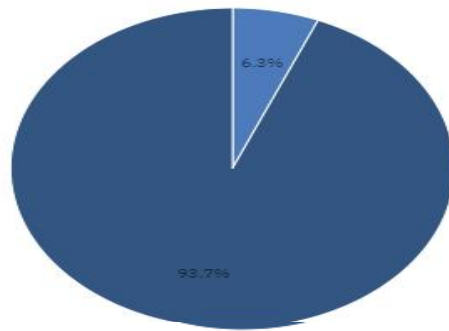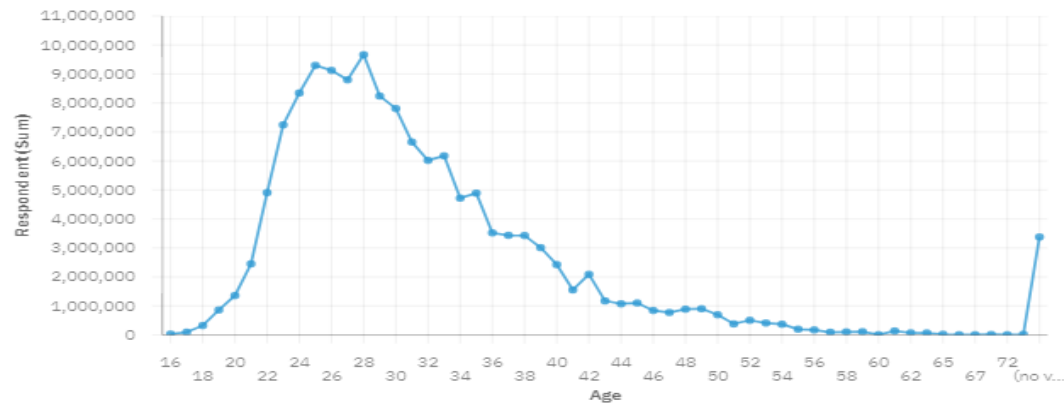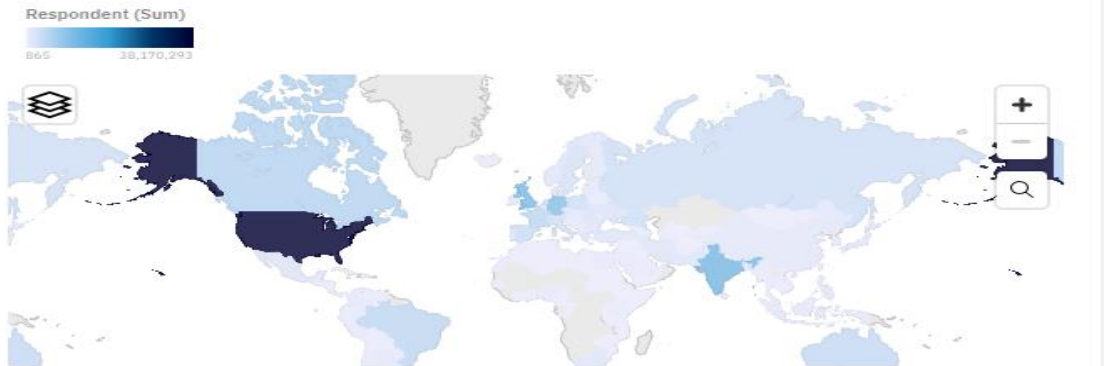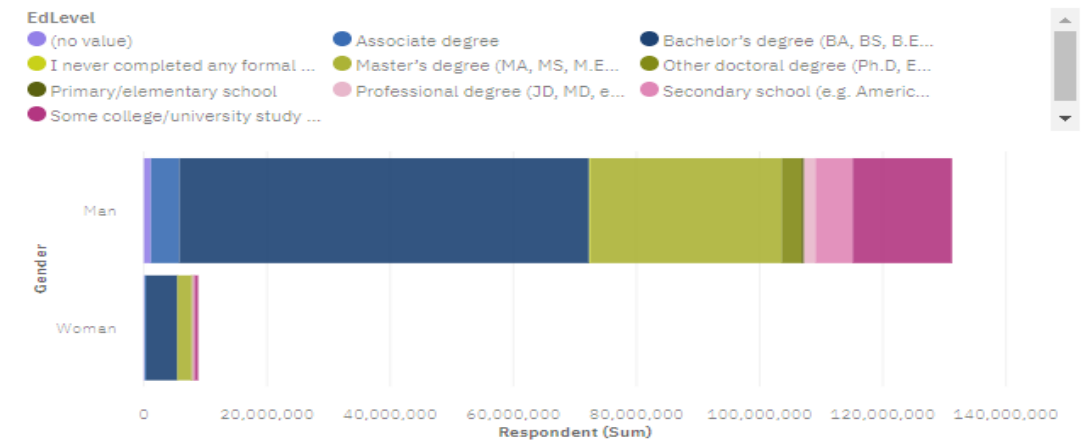
DISCUSSION

- 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?

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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

- 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.

- Make adjustments in staff for those skills no longer in demand.
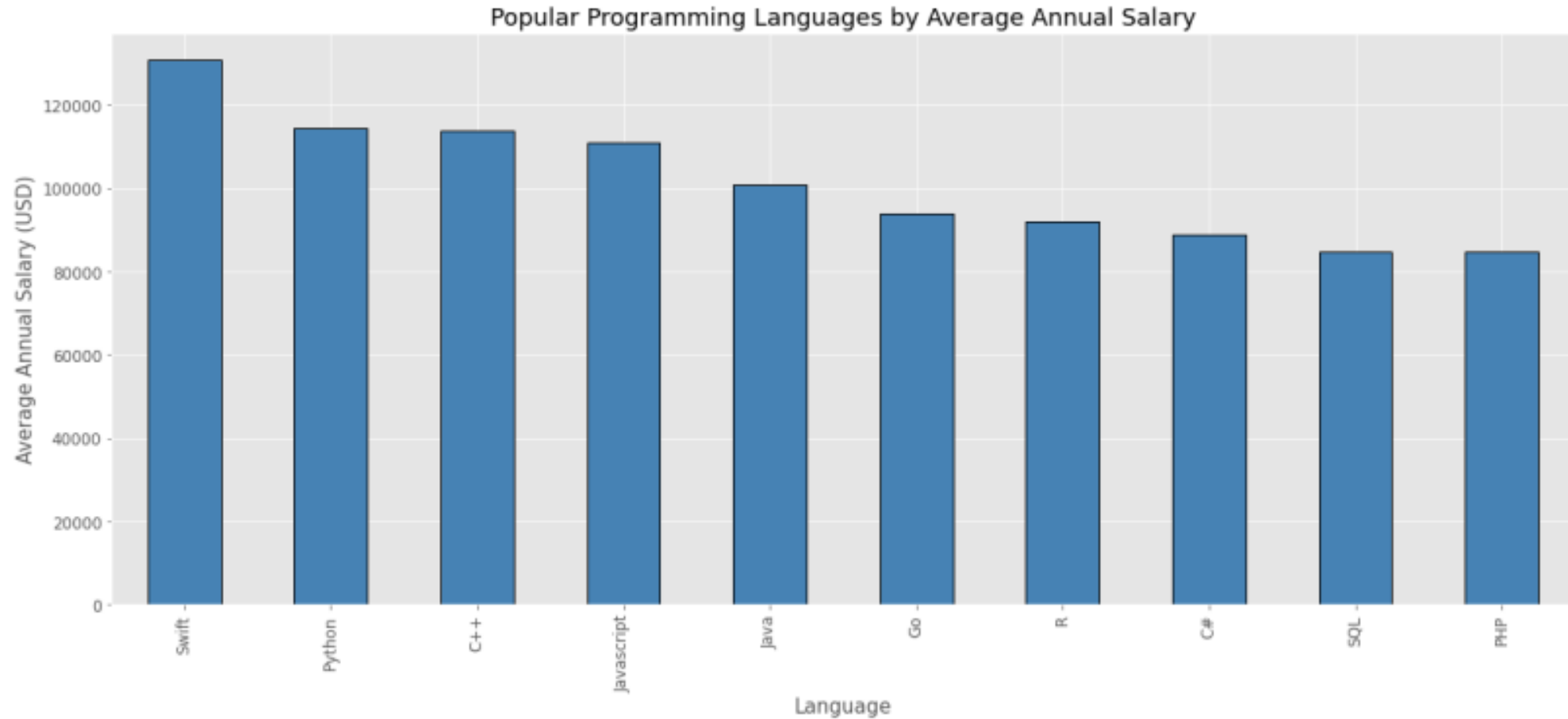
APPENDIX

Stacked Chart of Median WorkWeekHrs and CodeRevHrs For The Age Group 30 to 35
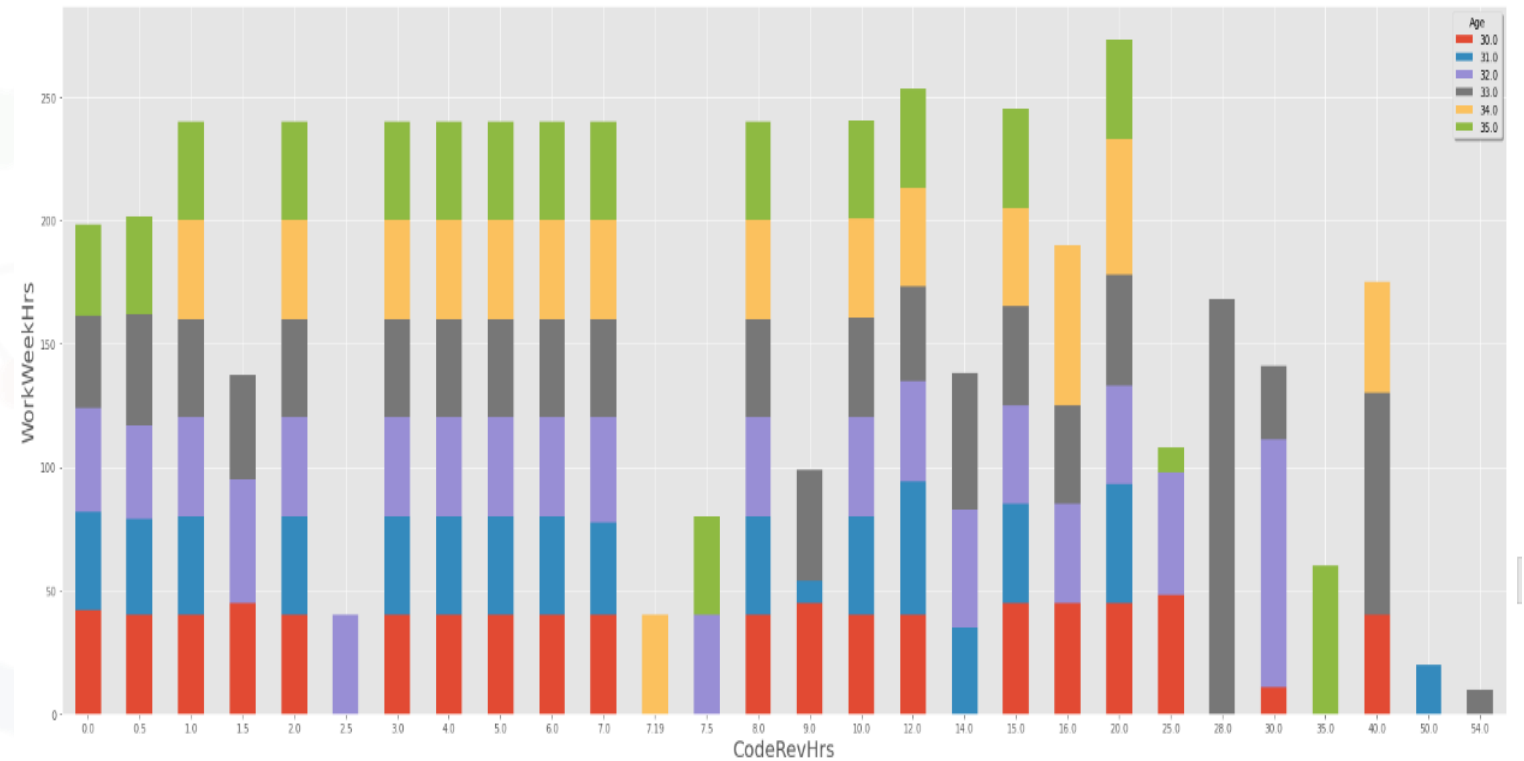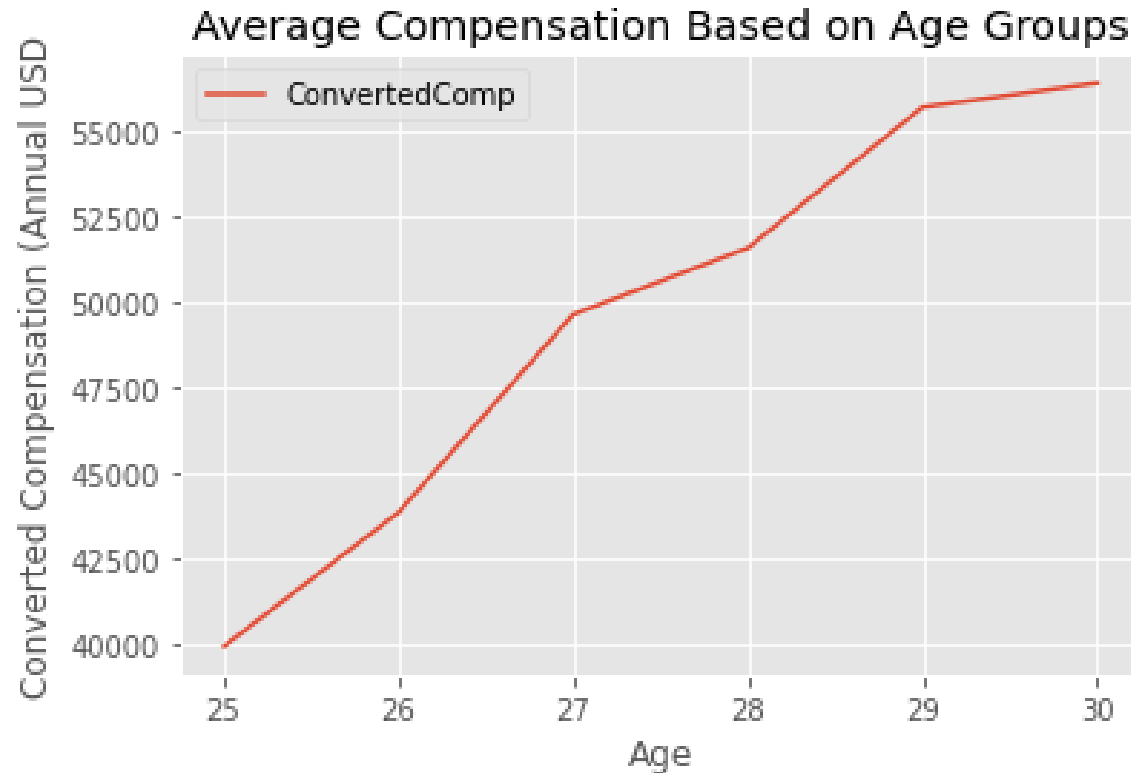
JOB POSTINGS

POPULAR LANGUAGES

Popular Programming Languages by Average Annual Salary
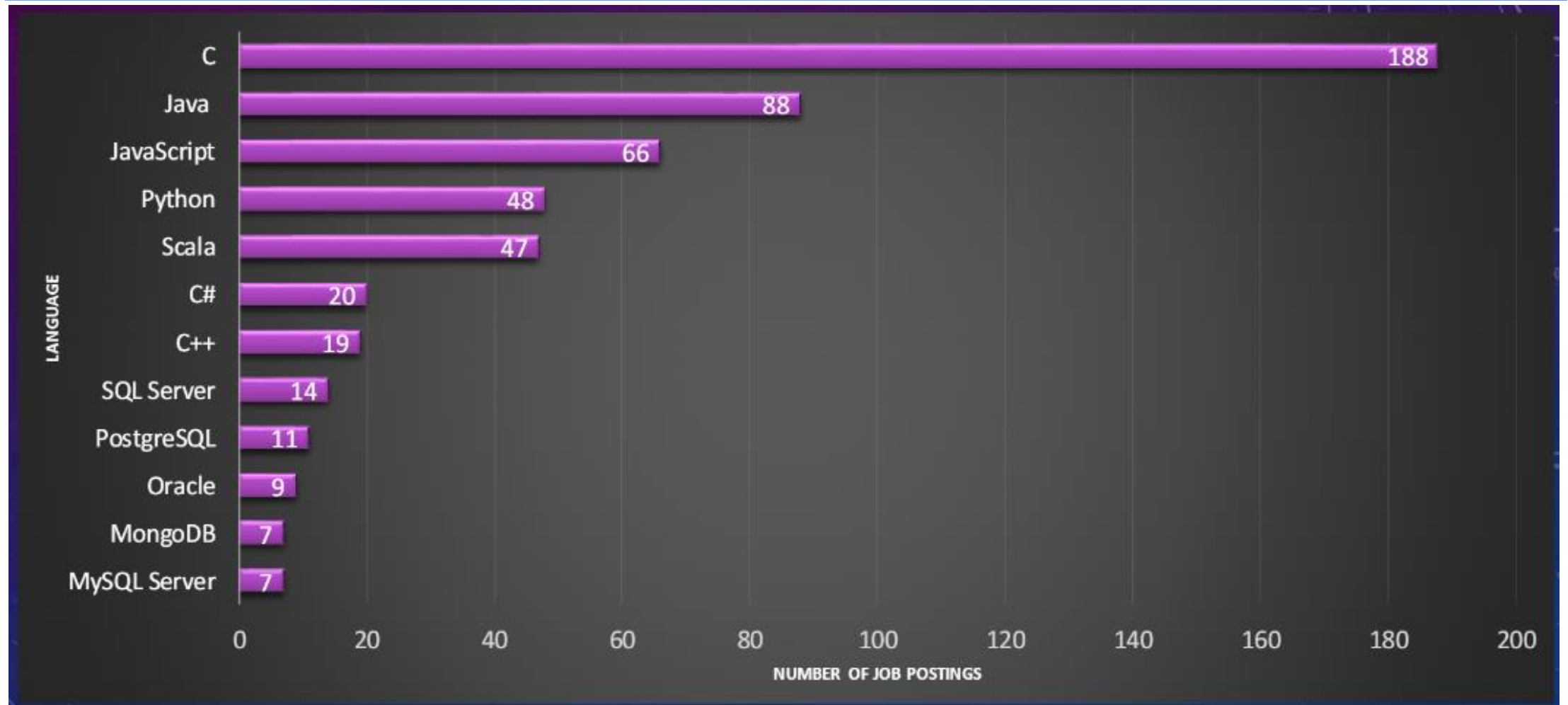
RESOURCES

- **m5_survey_data_demographics.csv**

- **m5_survey_data_technologies_normalised.csv**

- **Job-postings.xlsx**

- **Popular-languages.csv**

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ADDITIONAL VISUALS

Average Compensation Based on Age Groups

Top 5 Languages that Respondents Wish to Learn Next Year