IBM Capstone Project

Jon-Paul Fitzgerald

12/01/2025

IBM Developer

SKILLS NETWORK

OUTLINE

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

EXECUTIVE SUMMARY

1. **Aim**

   This capstone project explores current and future trends in programming and database languages, providing insights into their popularity, desirability, and potential applications. The analysis aims to assist students, hiring managers, and beginner programmers in aligning their goals and expectations with market realities.

2. **Programming Language Trends**:
   1. **SQL, JavaScript, and Python** rank as the top three languages in current usage and desirability for learning.
   2. While SQL drops to fourth place in future desirability, it remains highly relevant and widely applicable.
   3. Web scripting languages are increasingly desired, signalling opportunities in web technology and design-related markets.

3. **Database Language Trends:**
   1. **PostgreSQL** leads in both usage and desirability for the future, reflecting its strong user experience and growing relevance.
   2. **MySQL** exhibits a higher retention rate compared to **SQLite**, which shows a steeper decline in desirability.
   3. The desirability of database languages ranked 2nd through 4th is closely clustered, suggesting similar relevance for users.

4. **Implications:**
   1. **For Learners**:
      - Python, SQL, and JavaScript provide strong foundational knowledge and access to large, supportive communities.
      - Beginners may benefit from focusing on web scripting and database skills to align with future market demands.
   2. **For Hiring Managers**:
      - Understanding trends in language popularity helps adjust hiring criteria and identify in-demand skills.
      - SQL and PostgreSQL expertise may offer a competitive edge, given their high relevance.
   3. **For Industry Trends**:
      - The shift toward web-based programming languages highlights potential growth in web development markets.
      - PostgreSQL's leadership in desirability points to its effectiveness in meeting user needs, setting it apart from competitors like SQLite and MySQL.

5. **Summary**

   The findings underscore the dynamic nature of programming and database language trends. Python, SQL, and JavaScript emerge as indispensable for learners and professionals, while PostgreSQL leads the database landscape. These trends emphasize the importance of aligning learning and hiring strategies with evolving industry demands to remain competitive in the technology sector.

INTRODUCTION

- This Capstone project aims to process and analyze the current and future trends of programming languages and database languages of the programming community.
- Current trends analyze the usage of programming / database languages being used currently by respondents and the desirability of future trends is measured by respondent interest looking forward.
- Users being able to identify which languages are commonly used can be of great desire to inexperienced users who need a larger community to assist them or greater support from other users and experiences.
- Knowing which languages are popular now and into the future can be an asset to students and hiring staff.
  - Users navigating the learning environment can use this data to align their learning goals with current trends and expectations.
  - Hiring staff can adjust their expectations of new recruits and potential hires against their business demands using these trends as a standard such as how niche or in demand a certain candidates' skills would be.

METHODOLOGY

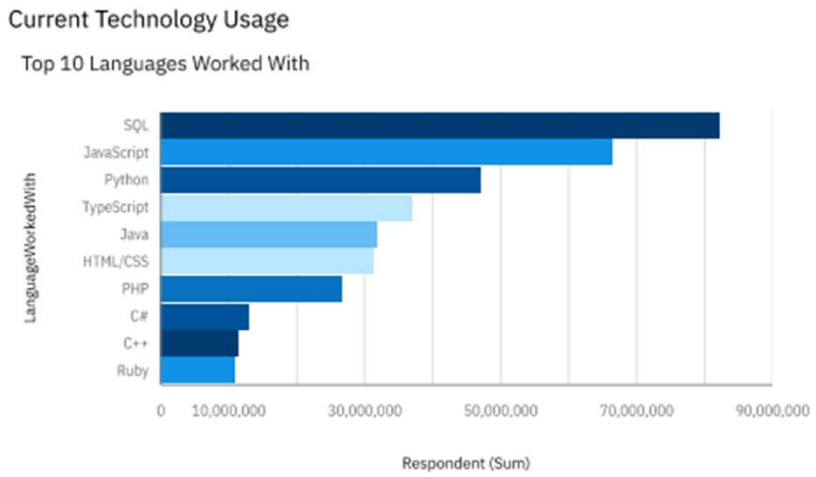
- Size of Dataset is 30,000 in the version being used and the original is 484,879 records.
- The data is from the following date range Date Range : 01st Jul 2019 - 30th Aug 2019
- Authors of the project are PromtCloud based on data from Naukri.com. Main contributors are kdnishanth (Nishanth), arindambaruah (Arindam Baruah), sayar1106 (Sayar Banerjee)

- Collecting Data (Python / SQL / JSON / REQUESTS)
  - Web scraping
- Cleaning Data (Pandas / SQL / REQUESTS)
  - Find duplicate values
  - Find missing values
  - impute missing values
  - normalizing data
- Data Analysis (Pandas / Python / MatplotLib)
  - Data Distribution
  - Outliers
  - Correlation
- Data Visualization (Seaborn / Flask / Pandas)
  - Distribution
  - Relationship
  - Composition
  - Comparison
- Dashboarding (IBM Cognos Analytics)

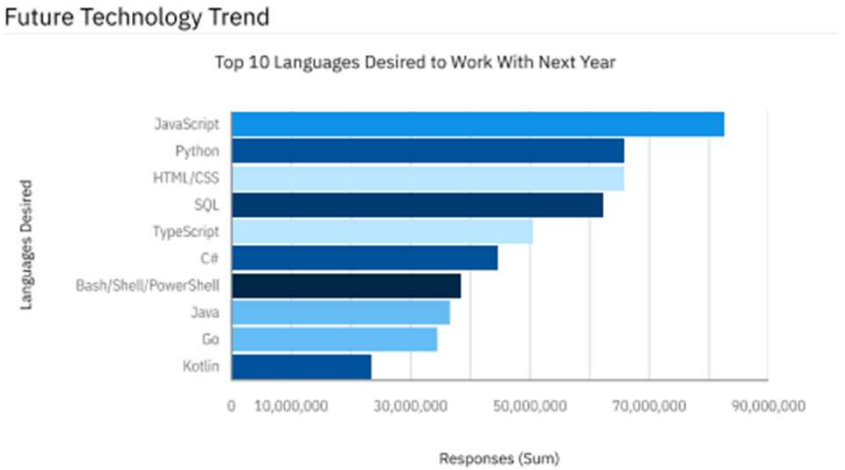
RESULTS

PROGRAMMING LANGUAGE TRENDS

Current Year



Next Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

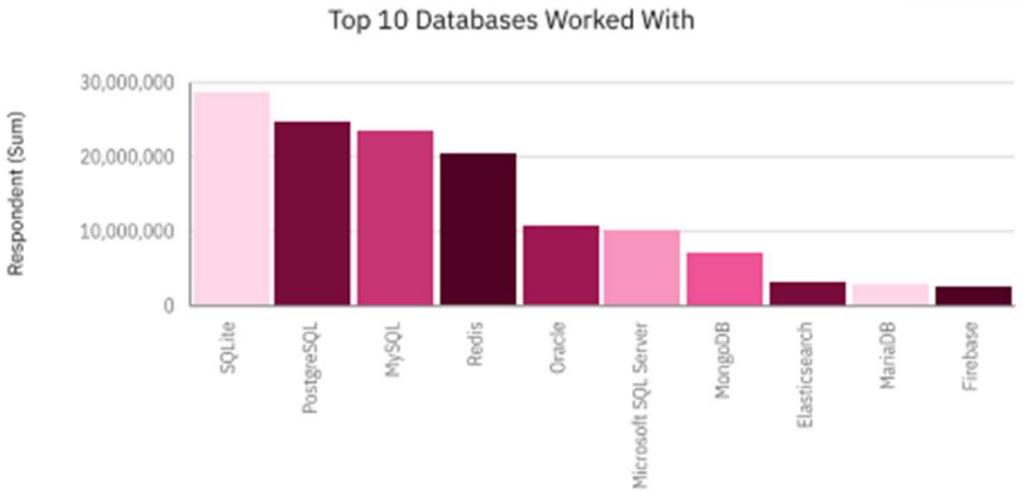
- SQL, JavaScript and Python are extremely popular as languages being learnt and desired to be learnt.
- While SQL drops below the top three languages desired in the next year it goes to fourth position making it still highly relevant.
- The trend for languages around Web Technology seem to be higher in desire than languages being used.

Implications

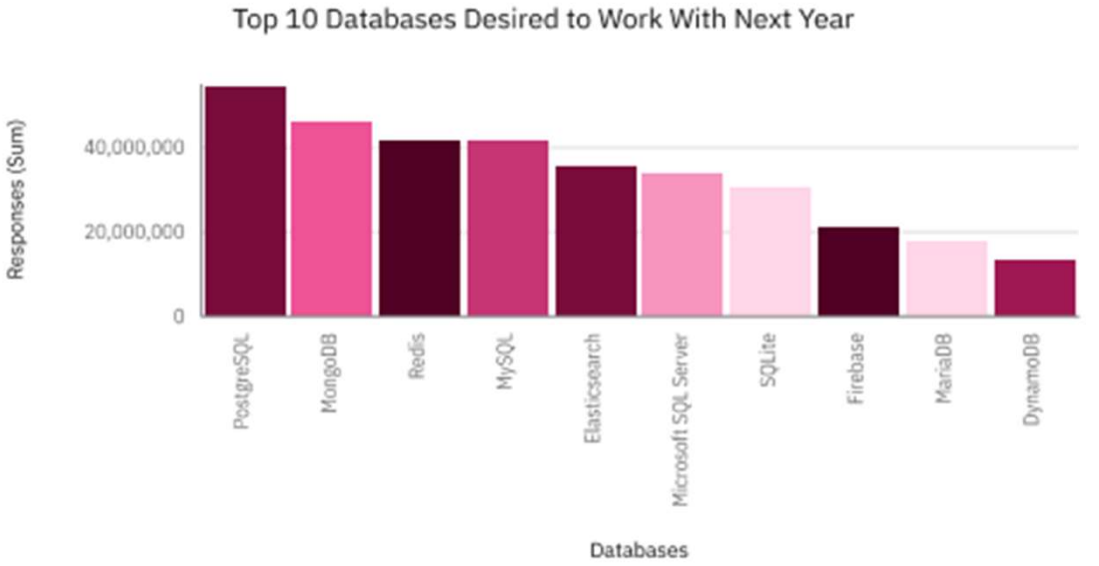
- The communities and assistance to learning these top languages will be greater than less desired or infrequently used languages.
- Languages such as SQL look to be fairly mainstream remaining in top 5 positions for users to learn and use. This language is effective in many contexts.
- There is a positive trend towards web scripting languages which could indicate potential job opportunities in those markets.

DATABASE TRENDS

Current Year



Next Year



IBM Developer

SKILLS NETWORK

DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- PostgreSQL is 2nd largest in use and also largest desired next year.
- The difference between languages desired is minimal with the next languages desired having a difference of 10,000,000 responses.
- SQLite drops 6 places from being used to desired and MySQL drops 3 places.

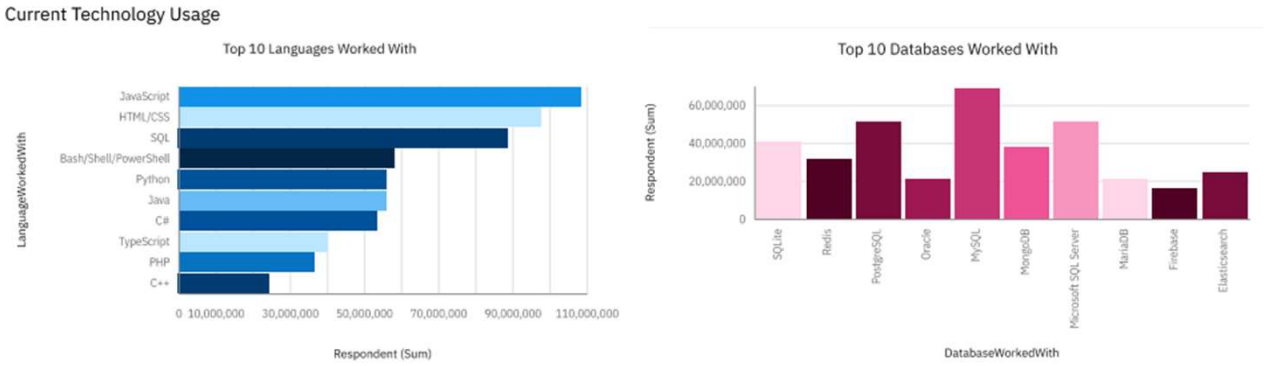
Implications

- This is the most popular language for databasing across being used and desired.
- The usage and interest in the next four languages is fairly similar making them about as relevant as one another for selection.
- MySQL looks to have a higher retention rate as it drops less places as compared to the 3 additional places SQLite descends.

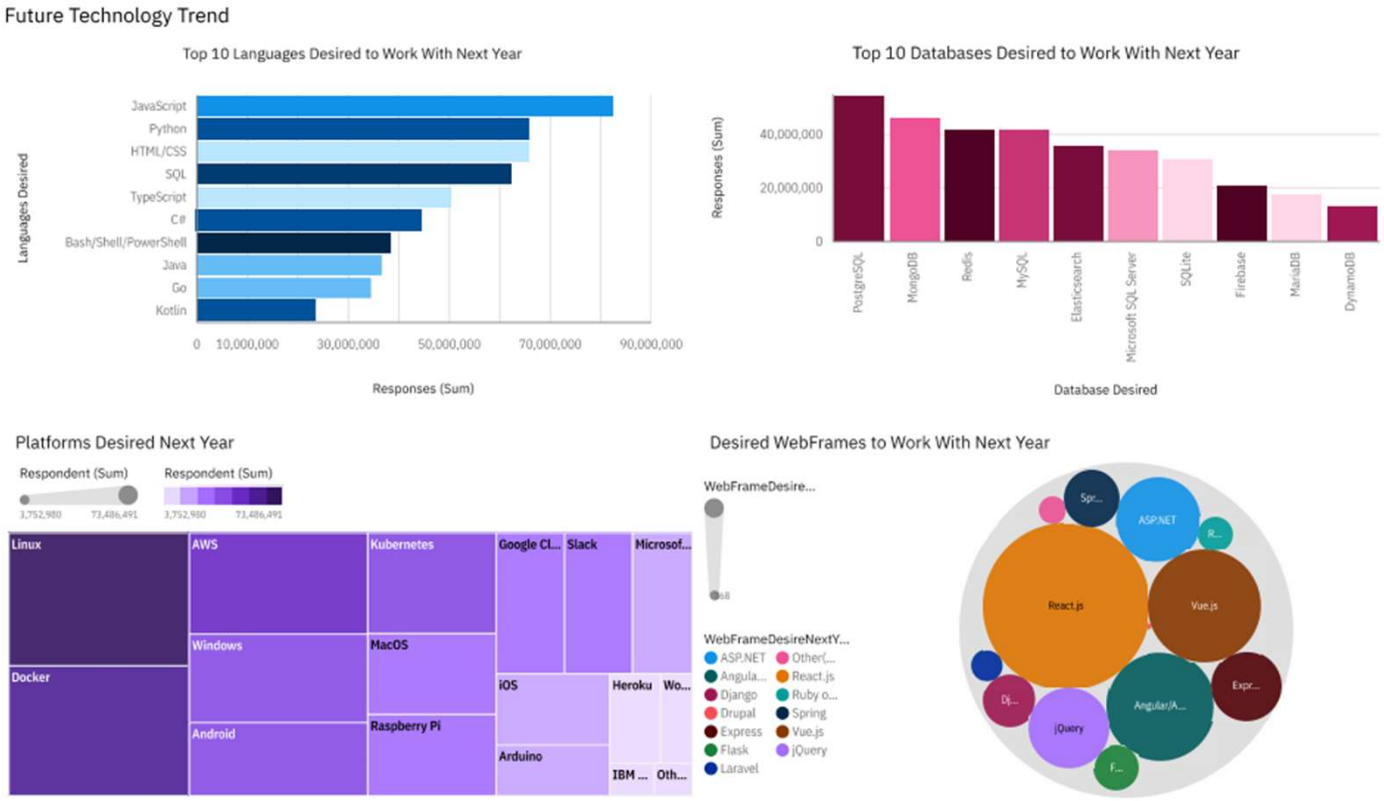
DASHBOARD

https://github.com/Jon-PaulFitzgerald/IBM-Capstone-Project.git

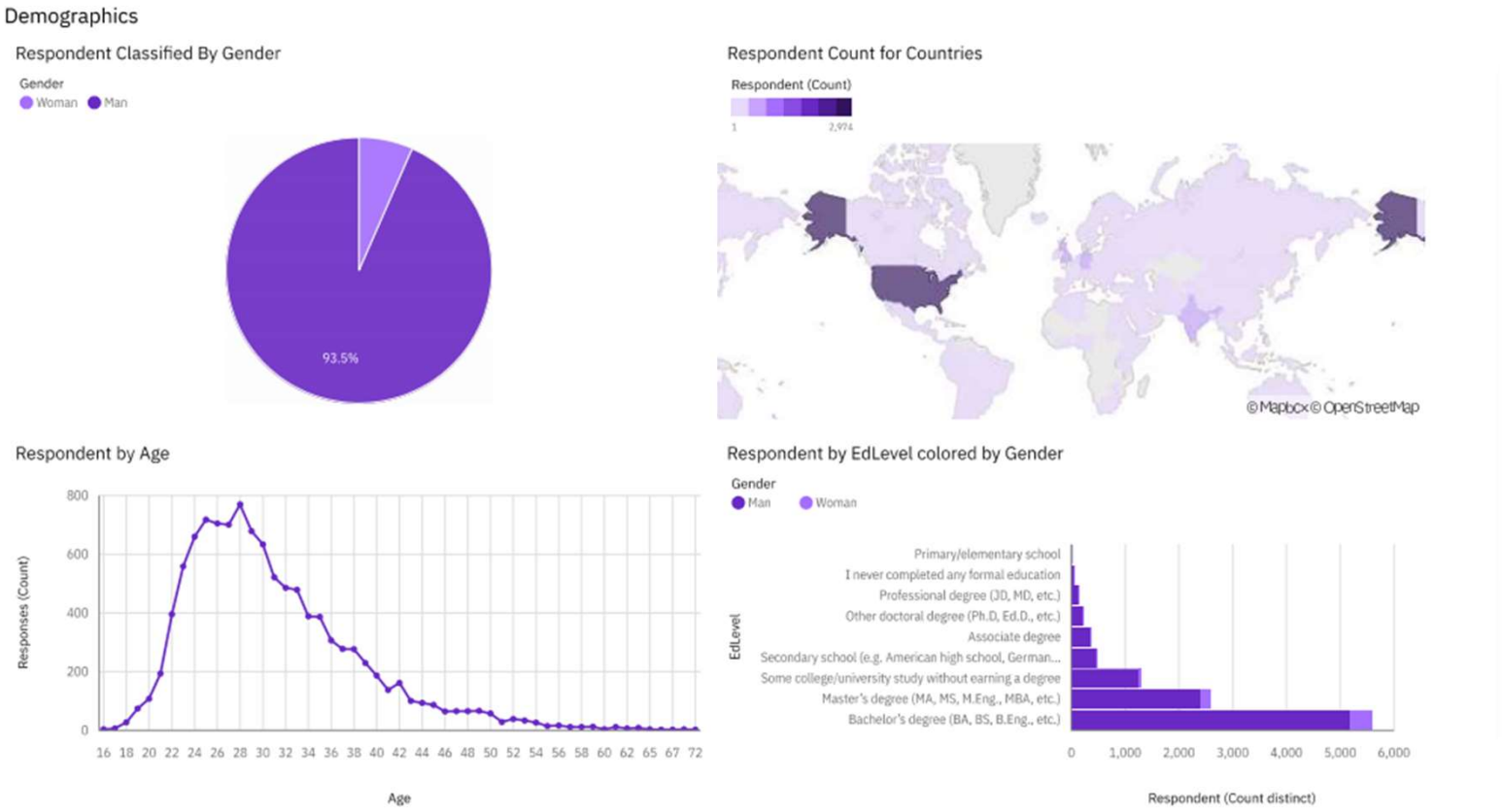
DASHBOARD TAB 1



DASHBOARD TAB 2



DASHBOARD TAB 3



DISCUSSION

- The results of this project show trends for programming languages and databases continue to change with SQL JavaScript and Python all being highly popular and potentially having large communities of support. There is a focus towards web design for desired languages which could be a potential to specialize in that topic for beginner learners.

- Database trends show more varied changes that remain, but SQLite and MySQL remain highly in demand for the foreseeable future. PostgreSQL is the lead Database language across the two time periods. There is little difference in databases desired in positions 2-4 as they are very similar in appeal. This could make deciding less clear in this grouping of Database languages to select.

OVERALL FINDINGS & IMPLICATIONS

Findings

- SQL(1st), JavaScript(2nd), Python (3rd) ranked the top three languages known.
- There is a positive trend towards web scripting languages which could indicate potential job opportunities in those markets.
- PostgreSQL is the leader for popularity in database languages both in usage and desirability for the future.
- SQLite drops 6 places from being used to desired and MySQL drops 3 places.

Implications

- The following languages Python, JavaScript and SQL would be good bases for learning with high popularity and future interest.
- The trend for languages around Web Technology seem to be higher in desire than languages being used.
- There appears to be significant interest in PostgreSQL compared to other languages possibly indicative of a better experience for users.
- MySQL looks to have a higher retention rate as it drops less places as compared to the 3 additional places SQLite descends.

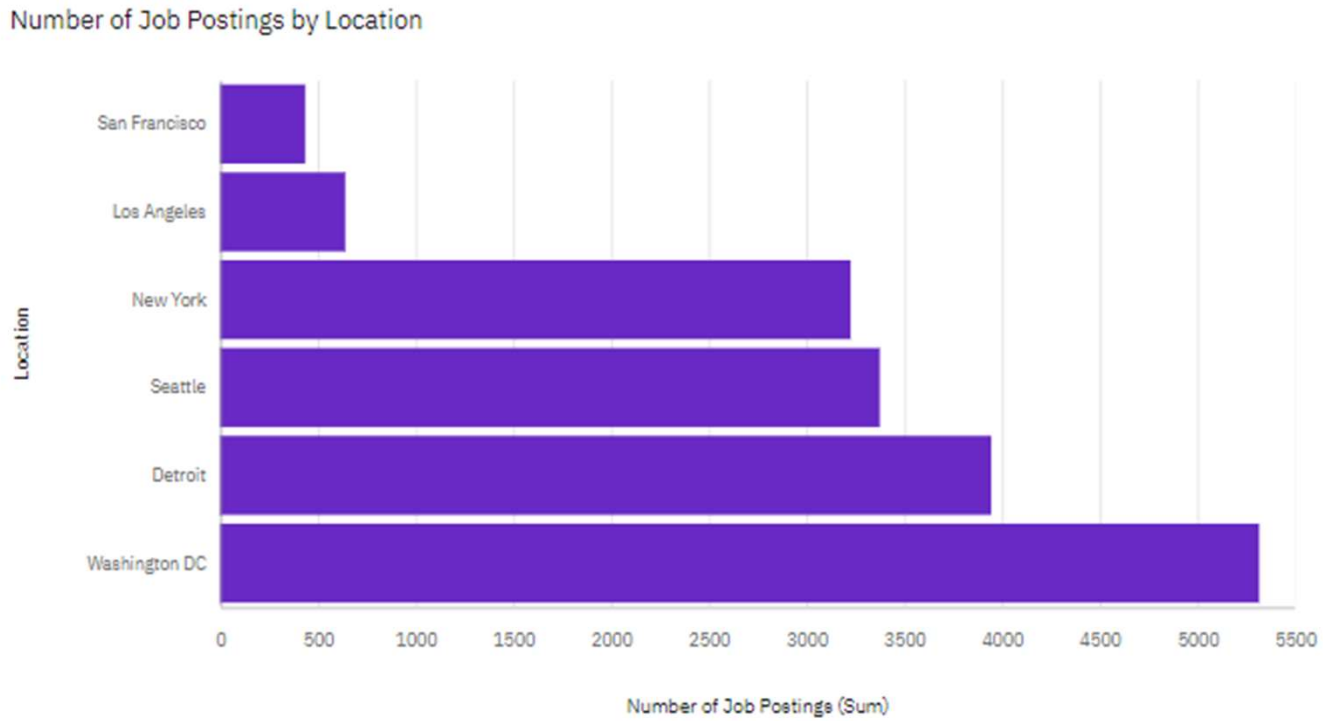
CONCLUSION

- In a large and competitive environment for programming languages we can see through statistical analysis python, SQL JavaScript are the largest groups by popularity and by conclusion have the largest support by fellow users.
- Web based programming languages are most popular in future trends for interest. This could indicate potential job leads or market need for these languages.
- MySQL holds the highest position in both known and future trends indicating a desired use compared to other database languages such as SQLite
- PostgreSQL is the most popular database language by the metrics of users and respondents wishing to use a database language in the future. There is an indication that the popularity is based on an enhanced user experience or expectation compared to other database languages.

APPENDIX

- Job Postings graph 1.
- Popular Languages graph 2.

JOB POSTINGS



POPULAR LANGUAGES