

# ANALYSIS: EMERGING TECHNOLOGIES & TRENDS

## CAPSTONE PROJECT

## IBM DATA ANALYST PROFESSIONAL CERTIFICATE



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# OUTLINE



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

# EXECUTIVE SUMMARY

The analysis provides insights into current and projected technological trends, as well as demographic information of technology professionals

- The data collected from StackOverflow, Github, and IBM was subjected to
  - Data Wrangling
  - Exploratory Analysis
  - Visualization
  - Dashboard Creation
- Key findings indicate
  - JavaScript is the most popular programming language
  - MySQL has the highest database usage
  - While JavaScript continues to be the most desired programming language for next year, PostgreSQL is set to beat MySQL
  - Majority of survey respondents are Male
  - The highest number of respondents originate from USA
  - The age group 24-32 has the highest number of survey respondents





# INTRODUCTION

With the rapidly evolving technology sector, it is crucial for stakeholders across the industry to understand the dynamic trends highlighted across various technologies of today and tomorrow

- This report aims to provide insightful answers to the following questions:
  - What are the top programming languages in demand?
  - What are the top database skills in demand?
  - What are the popular IDEs or Web Frames?
  - What are the skill requirements for the future?



# METHODOLOGY

- Sources utilized for data collection:
  - Github
  - IBM
  - StackOverflow
- Methods:
  - Descriptive statistics
  - Data cleaning
  - Data aggregation and grouping
  - Data visualization



# RESULTS

- The 'requests' module of Python was used to access the job APIs along with BeautifulSoup for web scraping
- Pandas dataframes were used to explore the data set, identify and remove duplicates/missing values, and normalize the data
- The distribution of the data was identified, outliers removed, and correlation established using Pandas along with Matplotlib and Seaborn for various visualizations
- Further visualization was carried out for the distribution of data, relationship between features, composition, and comparison
- Lastly, relevant dashboards were created using IBM Cognos

Let's review the findings in the following slides

# PROGRAMMING LANGUAGE TRENDS

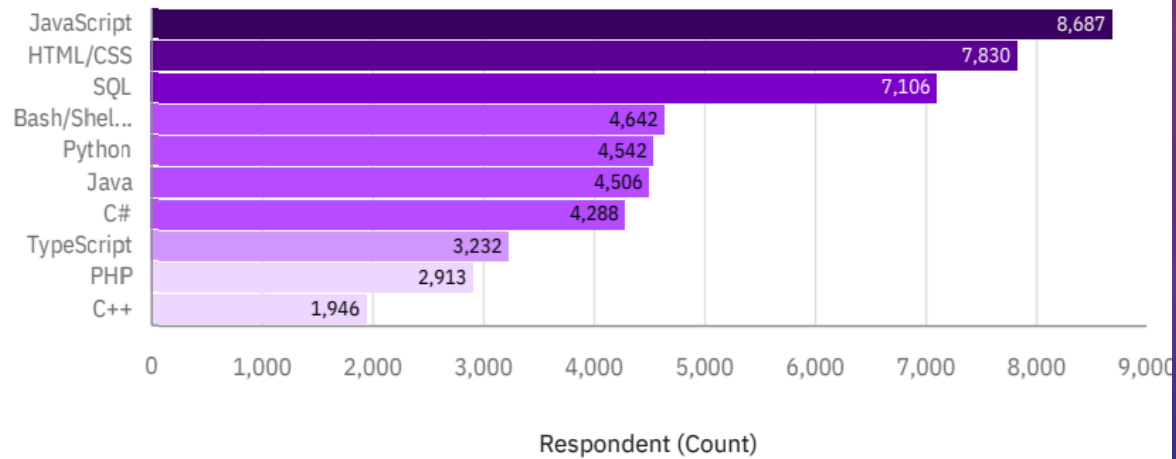
## Current Year

### Top 10 Languages Worked With

Respondent (Count)



LanguageWorkedWith



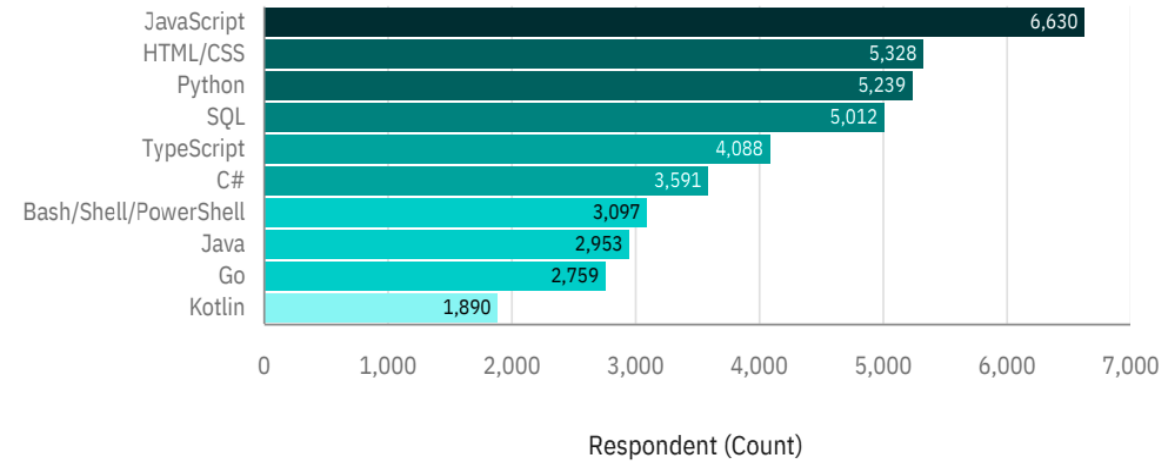
## Next Year

### Top 10 Languages Desired for Next Year

Respondent (Count)



LanguageDesireNextYear





# PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

## Findings

- JavaScript, HTML/CSS, and SQL top three current programming languages
- Python will catch up to SQL to become the third most popular programming language

## Implications

- Both JavaScript and HTML/CSS are premier languages for web development, indicating that web development as a skill is in high demand
- ML and AI are rapidly growing fields, hence pushing Python up the ladder

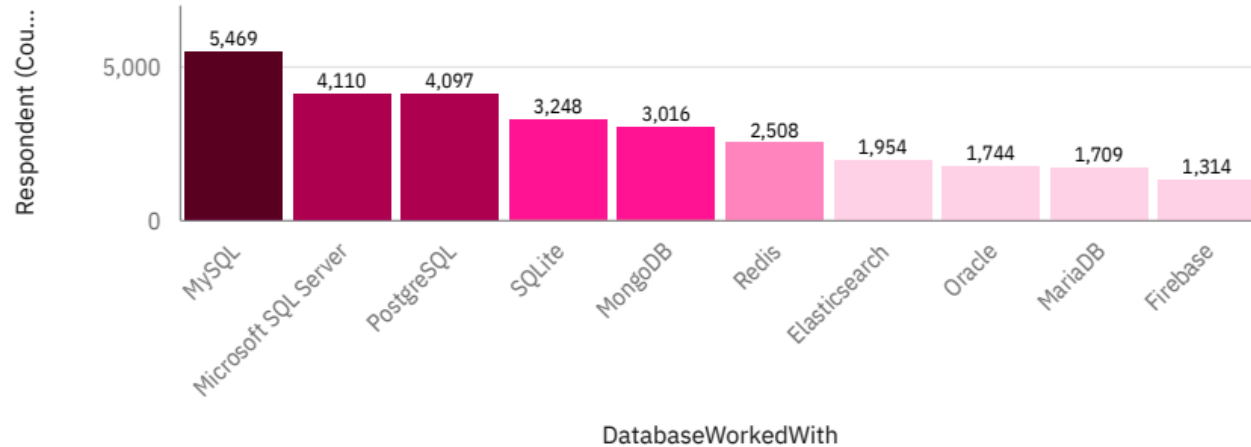


# DATABASE TRENDS

## Current Year

Top 10 Databases Worked With

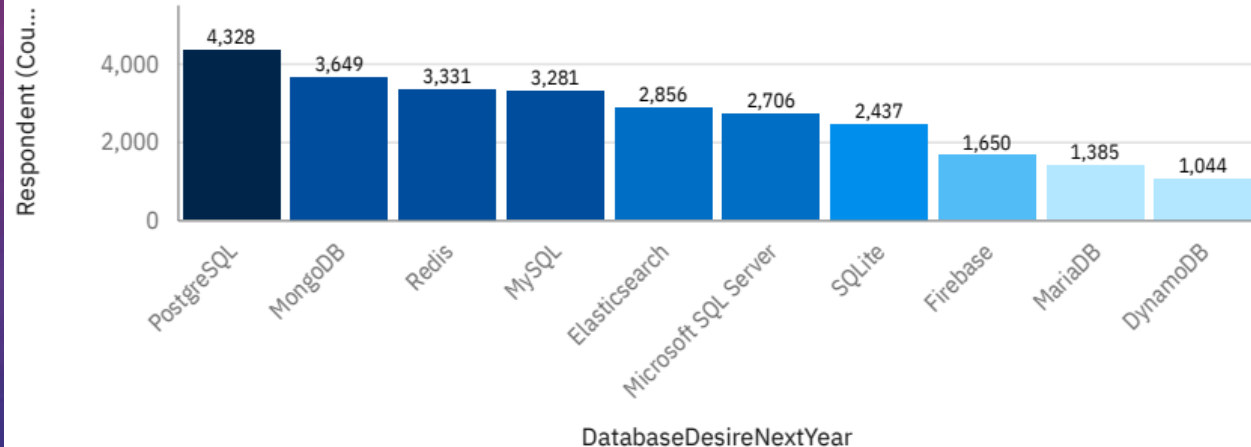
Respondent (Count)



## Next Year

Top 10 Databases Desired for Next Year

Respondent (Count)



# DATABASE TRENDS - FINDINGS & IMPLICATIONS

## Findings

- MySQL, MS SQL Server, PostgreSQL top three databases currently
- PostgreSQL, MongoDB, Redis to overtake the current top DBs in the next year

## Implications

- Open source DBs still preferred by organizations
- As important as SQL DBs are, NoSQL to have a significant impact for non-relational data needs

# DASHBOARD



The Cognos dashboard report can be found [here](#)

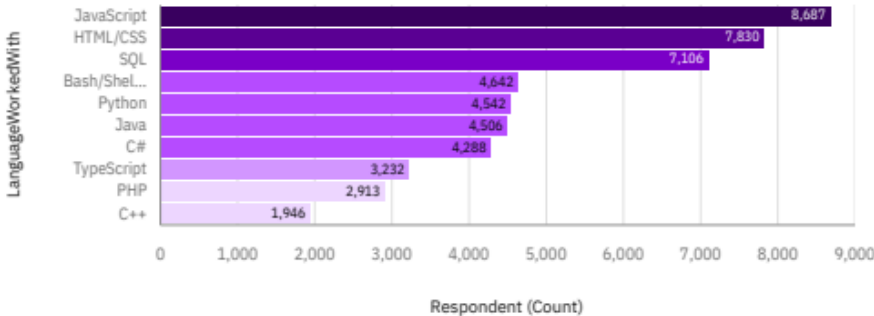


# DASHBOARD TAB 1

## Current Technology Usage

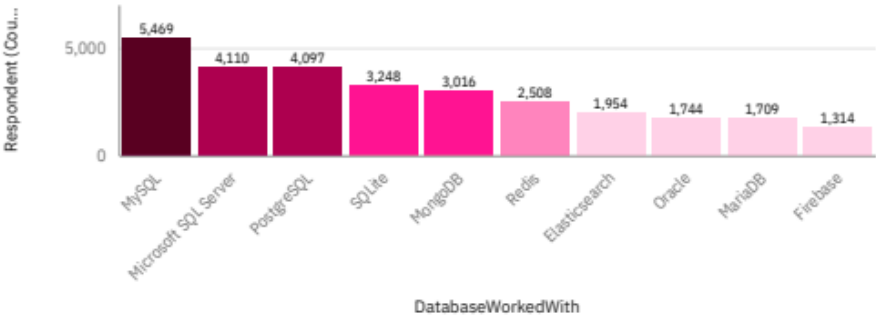
### Top 10 Languages Worked With

Respondent (Count)



### Top 10 Databases Worked With

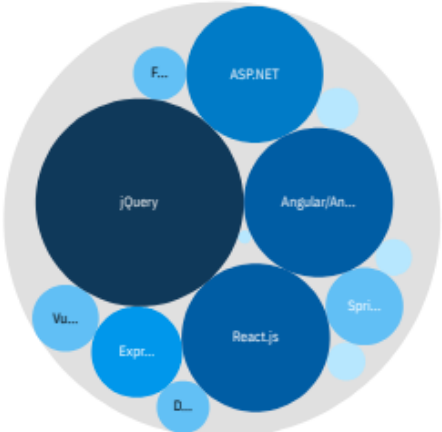
Respondent (Count)



### Top Platforms Worked With



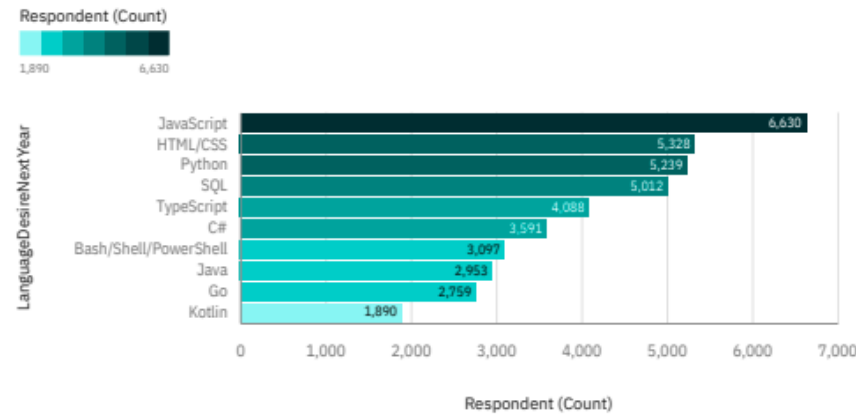
### Top 10 Web Frames Worked With



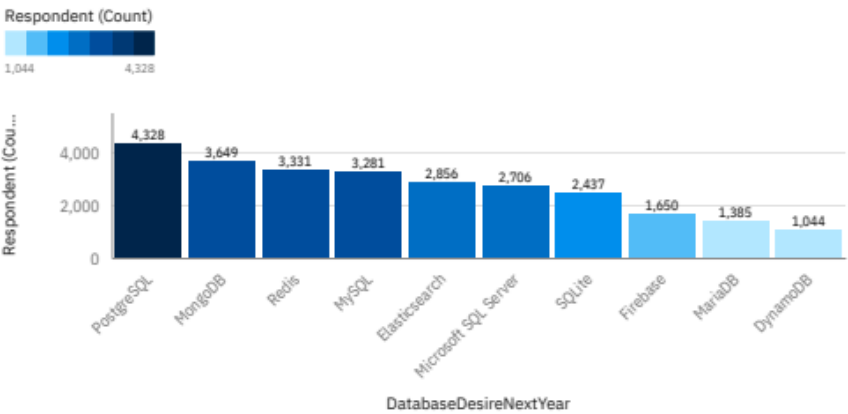
# DASHBOARD TAB 2

## Future Technology Trends

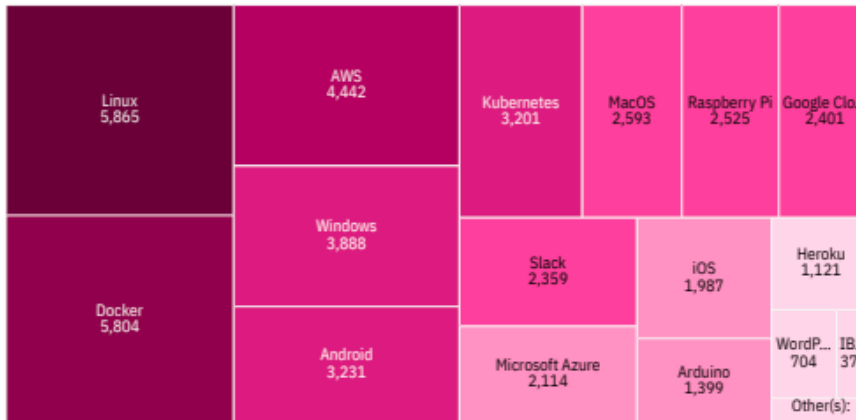
### Top 10 Languages Desired for Next Year



### Top 10 Databases Desired for Next Year



### Top Platforms Desired for Next Year



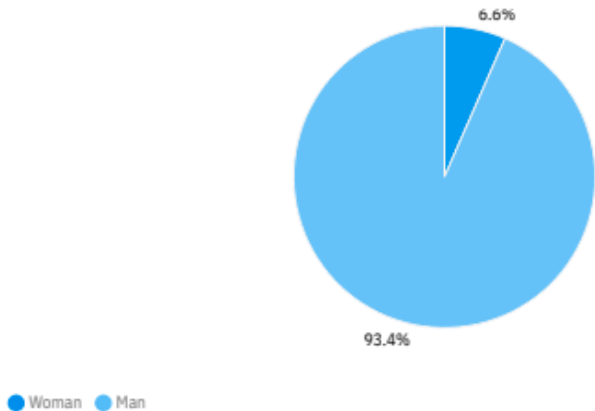
### Top 10 Web Frames Desired for Next Year



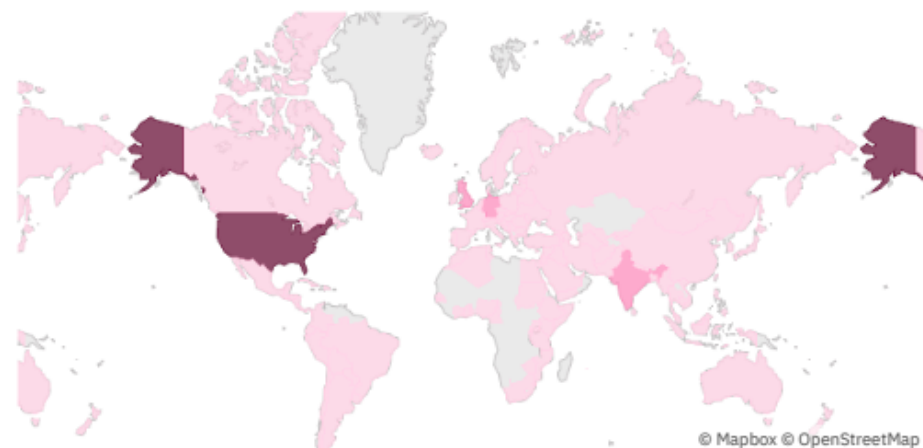
# DASHBOARD TAB 3

## Demographics

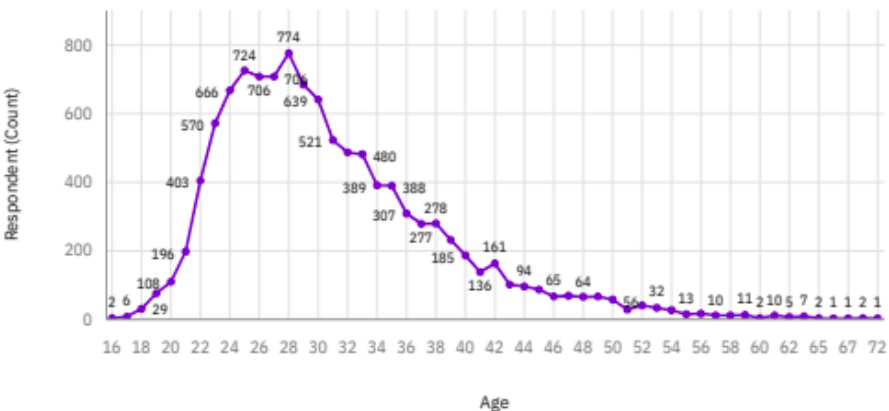
Respondents by Gender



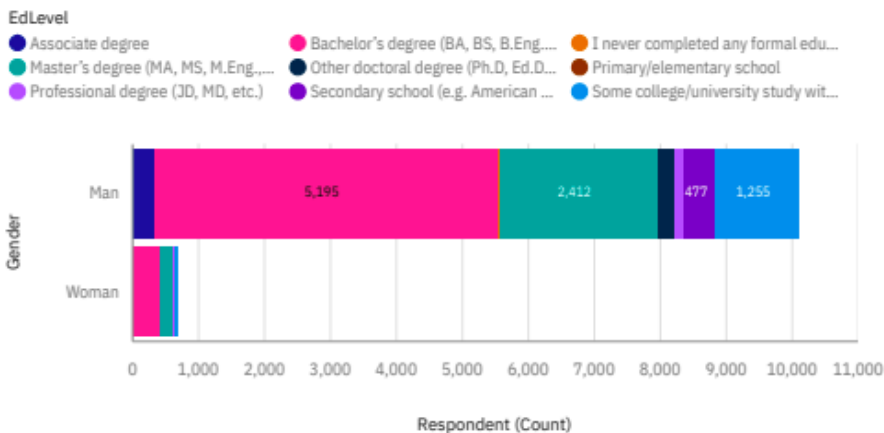
Respondents by Country



Respondents by Age



Respondents by Gender Classified by Formal Education





# DISCUSSION



- Current and projected technological trends
- Wide gender gap in the sector
- The (in)significance of formal education in tech roles
- Increased technology access and development in India in contrast to neighboring countries
- Majority of developers in the age range of 22-34 years old

# OVERALL FINDINGS & IMPLICATIONS

## Findings

- Web Development languages on top of the programming languages ladder for current and future years
- The technology sector majorly comprises of young males under 40
- It is a rapidly evolving sector with new technologies and platforms on the rise amongst tech professionals and organizations alike

## Implications

- Companies need to be adaptable to rapid changes
- Data professionals need to become proficient in NoSQL in addition to relational databases
- Young professionals with less conventional formal education on the rise

# CONCLUSION



- It is crucial to stay up-to-date with new technological trends for jobseekers and employers alike
- Creative and innovative ways to encourage women's participation in the STEM fields need to be brainstormed in order to bridge the massive gender gap in the sector
- There is a need to increase accessibility of new technologies to developing countries which are lagging behind in order to get a richer talent pool
- NoSQL DBs gaining rank at a fast pace



# APPENDIX



	Language	Avg Annual Salary
1	Python	\$114,383
2	Java	\$101,013
3	R	\$92,037
4	Javascript	\$110,981
5	Swift	\$130,801
6	C++	\$113,865
7	C#	\$88,726
8	PHP	\$84,727
9	SQL	\$84,793
10	Go	\$94,082

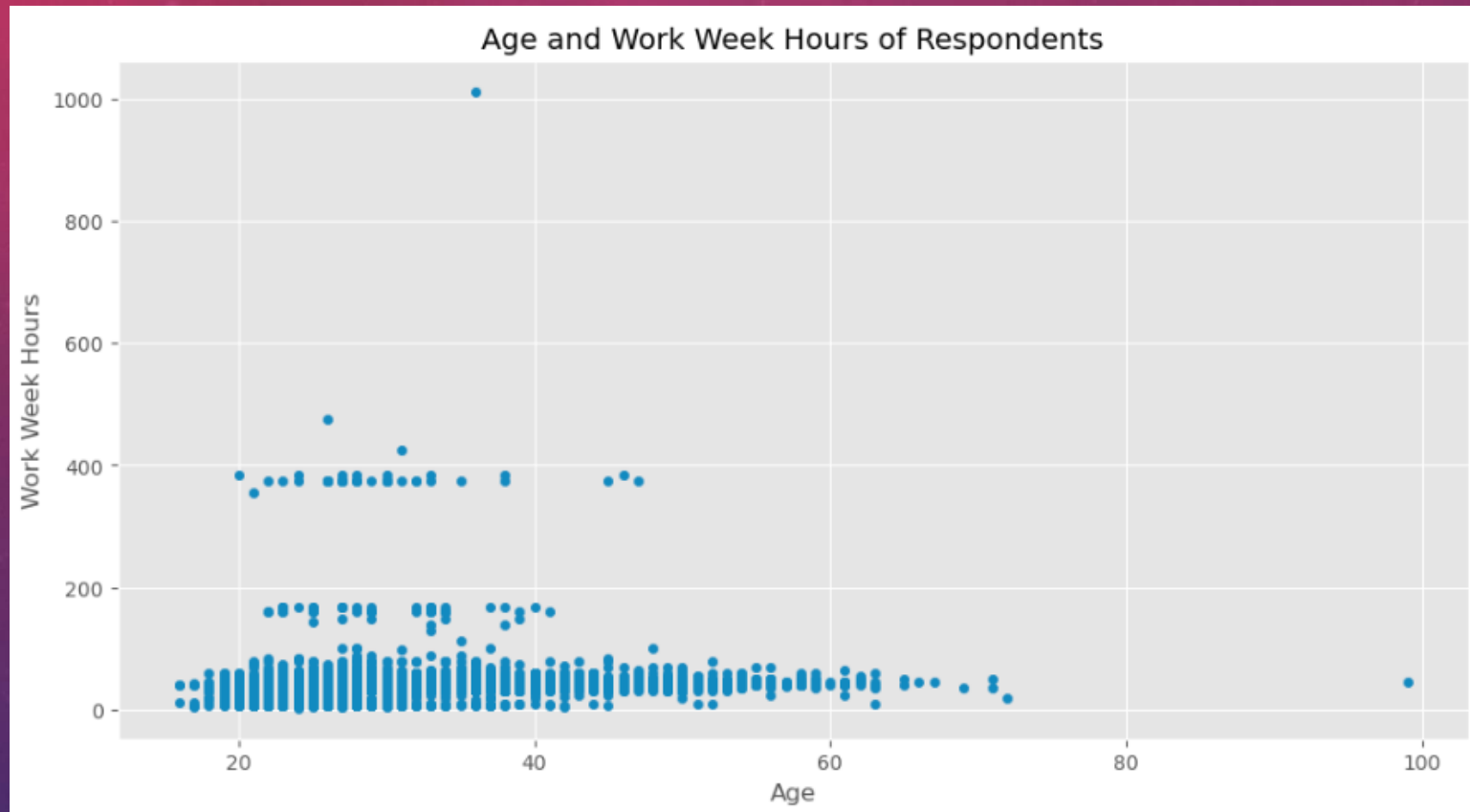
Swift, Python, C++ are  
the top three highest  
paid language skills

Despite remote work on the rise, the  
majority of tech professionals are  
working from office

```
df['WorkLoc'].value_counts()
```

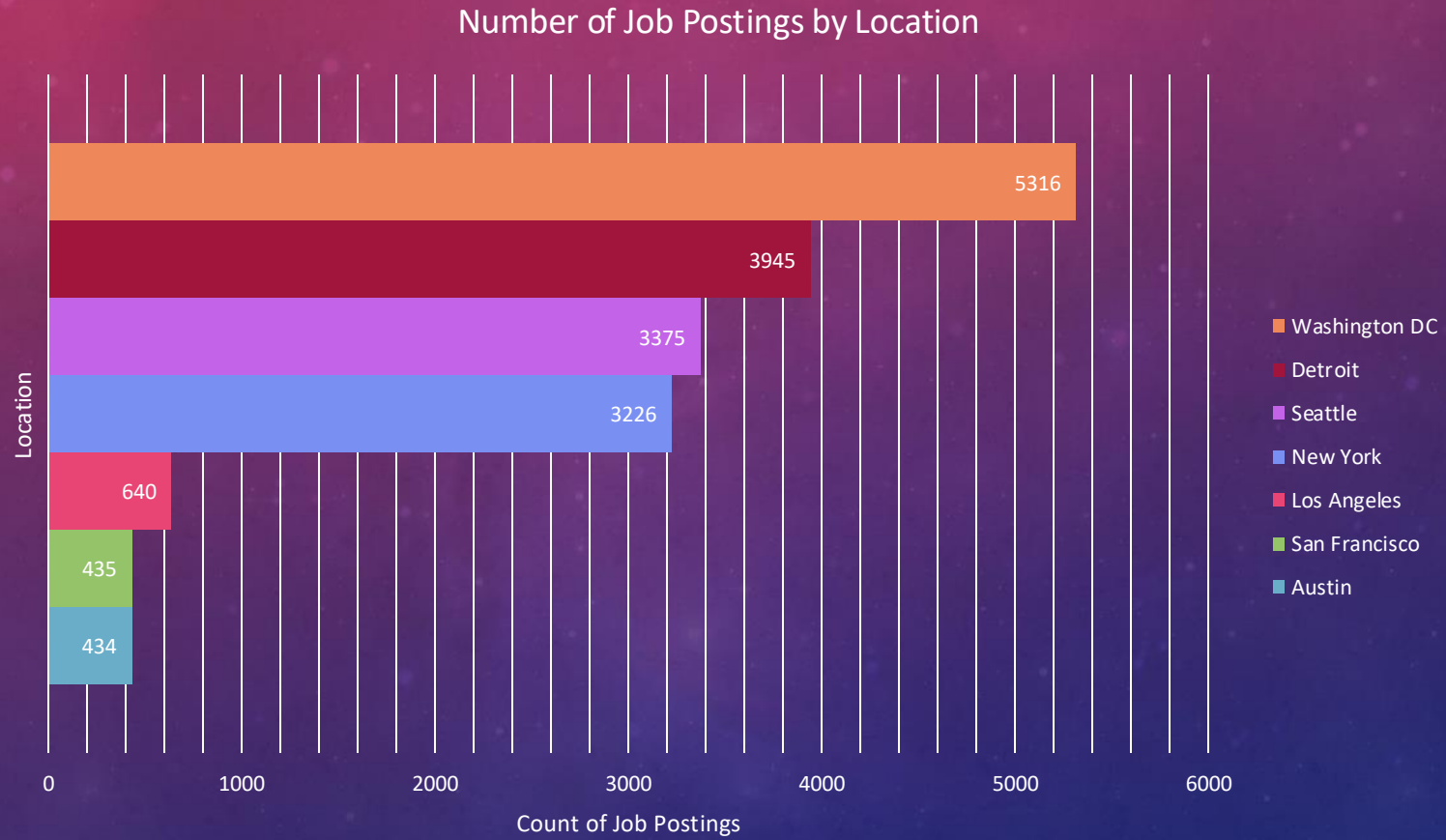
```
Office      6806  
Home        3589  
Other place, such as a coworking space or cafe    971  
Name: WorkLoc, dtype: int64
```

# APPENDIX



The correlation between respondents' age and work week hours is difficult to clearly identify

# JOB POSTINGS





# POPULAR LANGUAGES

