InsightByte

Navigating Future IT Landscapes

BERKE CELIKEL / 18.03.2024

OUTLINE

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EXECUTIVE SUMMARY

As part of our ongoing commitment to staying abreast of technological advancements and ensuring competitiveness, our esteemed IT and business consulting firm has undertaken a comprehensive project.

This initiative aims to delve into the **evolving landscape of tech**nology and discern **emerging skill requirements** critical for **organizational success**.

Through rigorous data analysis, our **primary objective** is to identify prevailing trends in programming skills demanded by the contemporary market, thereby equipping our clients with invaluable insights to navigate the **dynamic IT ecosystem** effectively.

INTRODUCTION

In the ever-evolving realm of technology, staying abreast of **emerging trends** is **vital** for organizations to maintain their competitive edge.

Our journey begins by addressing the **fundamental challenge**: understanding the evolving skill requirements within the IT sector. By delving into existing research, we aim to shed light on the prevailing trends and identify potential gaps in our understanding. Through this exploration, we will formulate research questions and hypotheses that drive our investigation forward.

- **Main Research Question:** What are the prevailing trends in programming skills demanded by the contemporary market?

METHODOLOGY

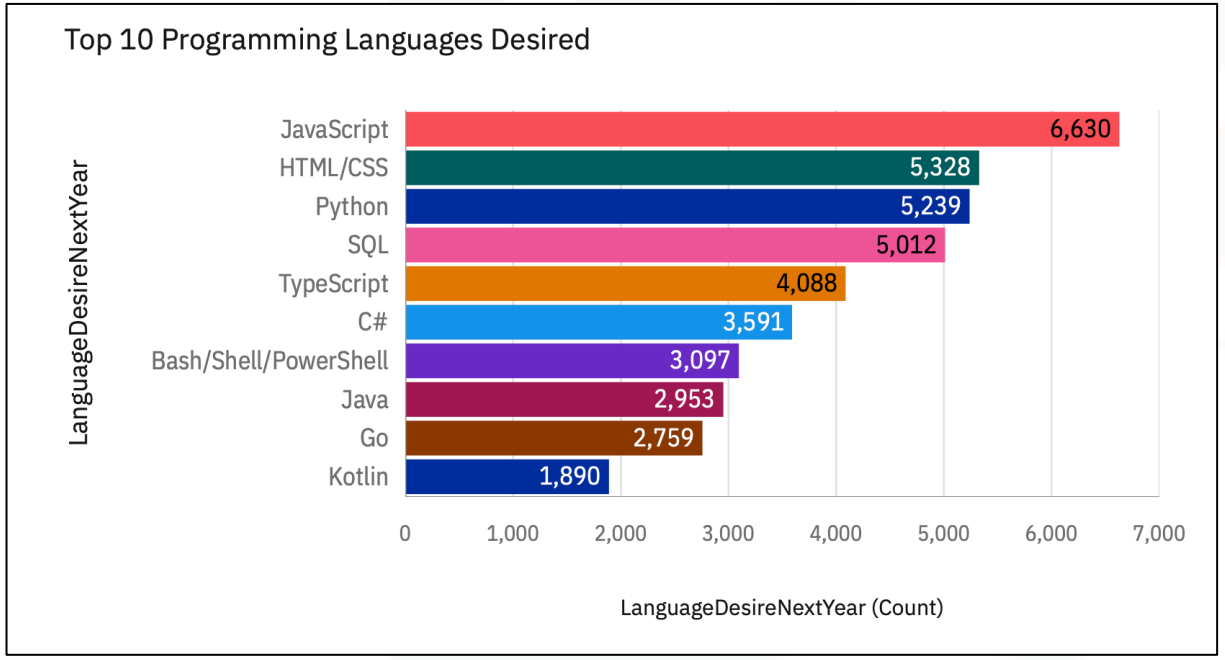
1. **Data Collection:**
    1. **Web Scraping:** Utilized Python libraries like BeautifulSoup and Scrapy to extract data from job postings and training portals.
    2. **API Access:** Accessed APIs of relevant platforms such as LinkedIn and Indeed to gather real-time data on programming trends.
    3. **Surveys:** Conducted surveys targeting professional software developers aged 20-60 to gather qualitative insights into emerging skills.
2. **Data Preparation:**
    1. **Data Cleaning:** Removed duplicates, inconsistencies, and irrelevant data to ensure data quality.
    2. **Data Transformation:** Converted raw data into standardized formats like .csv files, Excel sheets, and databases for compatibility and ease of analysis.
3. **Analysis Techniques:**
    1. **Statistical Analysis:** Applied statistical methods such as regression analysis and hypothesis testing to identify significant trends and correlations.
4. **Visualization:**
    1. **Dashboard Creation:** Leveraged IBM Cognos Analytics to develop interactive dashboards for visualizing insights and trends.
    2. **Visualization Tools:** Used charts, graphs, and heatmaps to present findings effectively and engage stakeholders.
5. **Quality Assurance:**
    1. **Data Validation:** Cross-referenced findings with multiple sources and conducted validation checks to ensure accuracy and reliability.
    2. **Peer Review:** Engaged in peer review processes to validate analysis methodologies and enhance credibility.
6. **Ethical Considerations:**
    1. **Data Privacy:** Ensured compliance with data privacy regulations such as GDPR and CCPA by anonymizing personal information and safeguarding sensitive data.
    2. **Transparency:** Maintained transparency by documenting data collection methods, sources, and analysis techniques to foster trust and credibility.

RESULTS

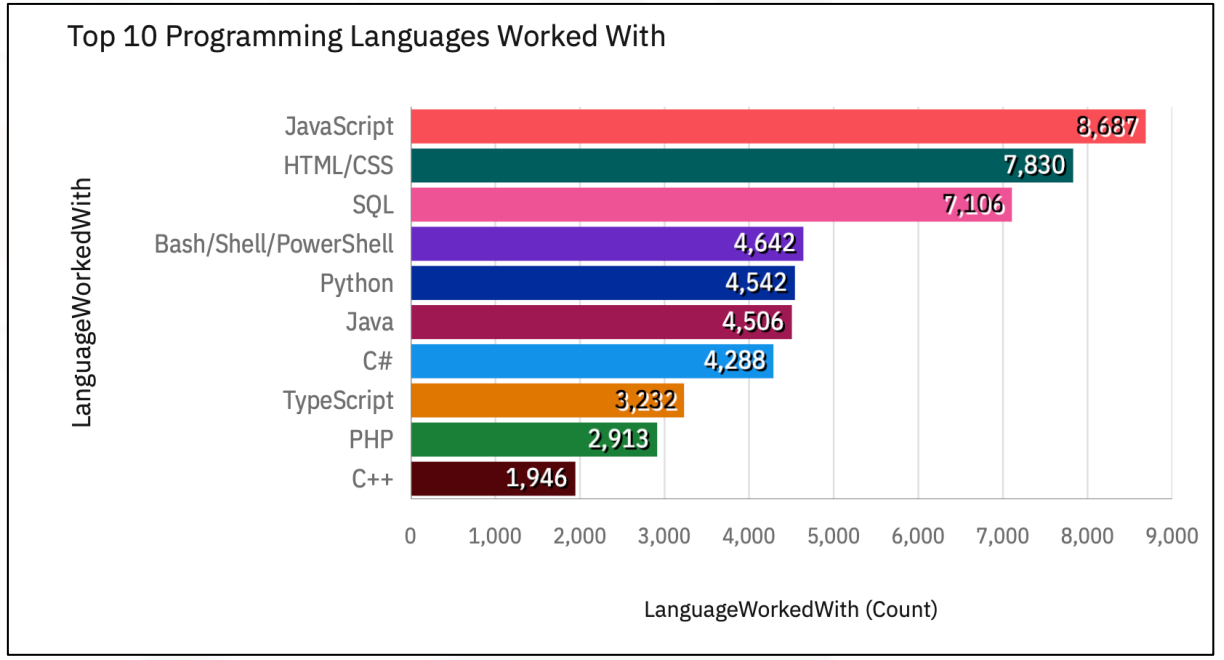
- **Programming Language Trends:** While the overall programming language landscape is expected to remain relatively stable next year, with **JavaScript** retaining its dominance, emerging languages such as **Kotlin and Go** are gaining traction.
- **Database Trends:** Forecasts suggest a **decline in the popularity of MySQL**, with PostgreSQL poised to ascend as a preferred database solution in the coming year.
- **Platform Preferences:** Windows is anticipated to experience a decline in popularity, while **Docker and Linux** are projected to witness increased adoption.
- **Web Frameworks:** jQuery is expected to undergo a **notable decrease** in popularity, while React.js is primed for rapid ascent.

PROGRAMMING LANGUAGE TRENDS

CURRENT YEAR



NEXT YEAR



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

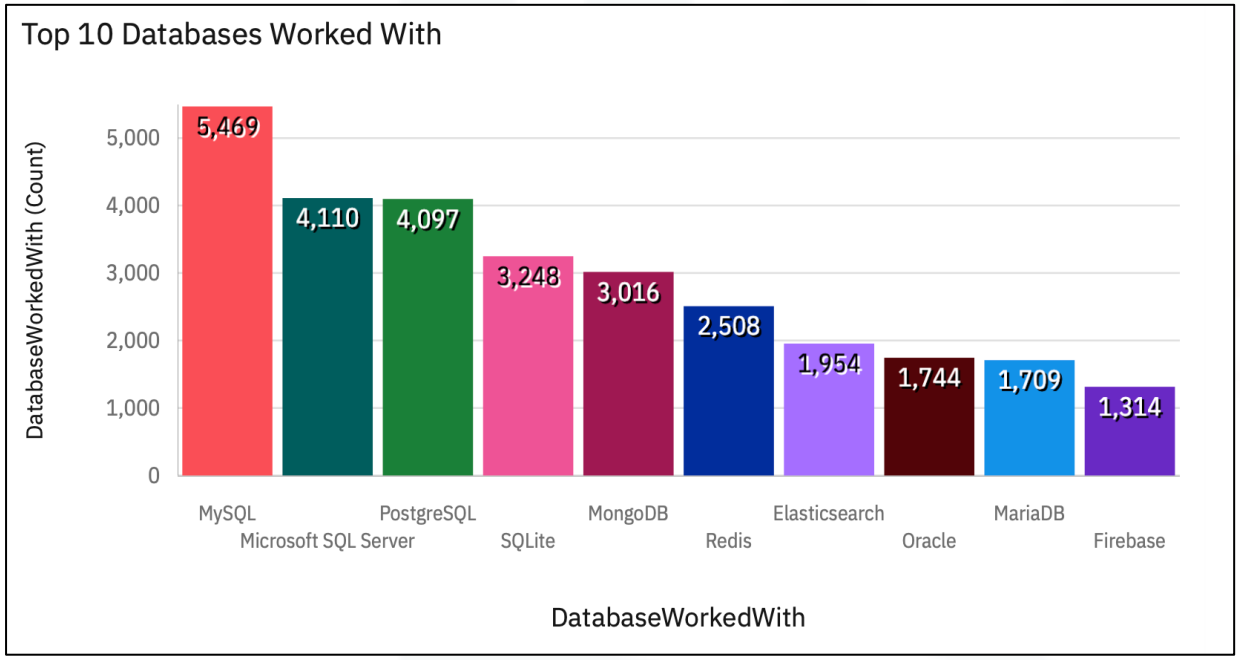
1. **Most Popular Currently**:
    1. **JavaScript** is the most used programming language this year, with a count of **8,687**.
    2. **HTML/CSS** and **SQL** follow as the second and third most used languages, with counts of **7,830 and 7,106** respectively.

2. **Most Desired for Learning Next Year**:
    1. **JavaScript** remains the most desired language for next year as well, with a count of **6,630**.
    2. **HTML/CSS** and **Python** are next, with close counts of **5,328 and 5,239** respectively, suggesting strong continued interest.

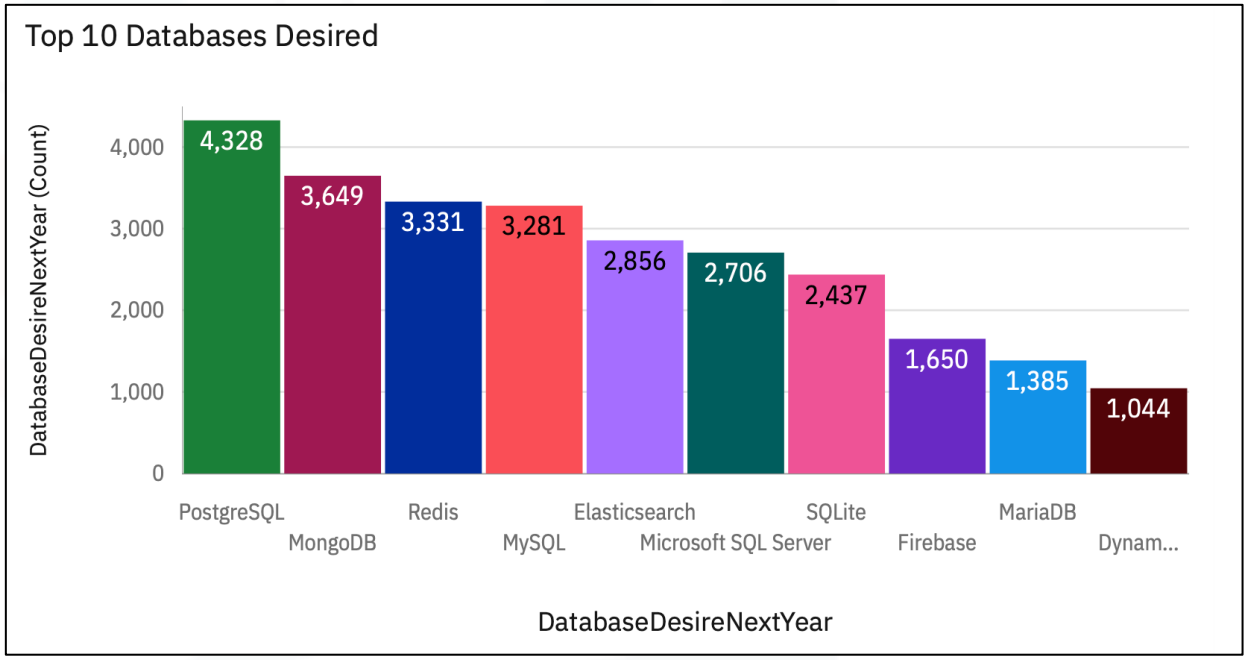
3. **Shifts and Trends**:
    1. **Python** sees a notable increase in interest when looking towards next year. It moves from the **fifth to the third** place in desirability, which indicates that it is **gaining popularity** and more developers want to work with it.
    2. **TypeScript** also shows an increase in desirability, moving up one rank compared to its current usage. This suggests a **growing trend** in the adoption of statically typed languages over their dynamic counterparts for web development.
    3. **SQL** remains consistently high in both charts, but it has a slightly lower count for the desired language next year, which might suggest a **stabilization or slight decrease** in interest.
    4. **C#** and **Java** show a **reduction in interest** for the next year, dropping a few places in the desirability chart.
    5. **New entrants** into the desired list for next year include **Go** and **Kotlin**, which do not appear on the current top 10 worked with list. This indicates a **growing interest** in these languages among developers for future projects or skill development.

DATABASE TRENDS

CURRENT YEAR



NEXT YEAR



DATABASE TRENDS - FINDINGS & IMPLICATIONS

1. **Most Popular Currently**:
    1. **MySQL** is the most used database currently, with a count of 5,469. **PostgreSQL and Microsoft SQL** Server follow as the second and third most used databases, with counts of 4,110 and 4,097 respectively.
2. **Most Desired for Learning Next Year**:
    1. **PostgreSQL** is the most desired database for next year, with a count of 4,328. **Redis and MongoDB** are next, with counts of 3,649 and 3,331 respectively, suggesting strong continued interest.
3. **Shifts and Trends**:
    1. **PostgreSQL** shows a significant increase in interest when looking towards next year, moving from second to first place in desirability. **TypeScript** also shows an increase in desirability, moving up one rank compared to its current usage. This suggests a growing trend in the adoption of statically typed languages over their dynamic counterparts for web development.
    2. **Redis** is expected to become more popular as well, as it jumps from the sixth place this year to the second place in the desired list for the next year. **C#** and **Java** show a reduction in interest for the next year, dropping a few places in the desirability chart.
    3. **Elasticsearch** is projected to have increased interest, moving up one rank in the desired list compared to its current use.
    4. **MySQL**, while currently the most used, is expected to see a decrease in interest, falling to fourth place in desirability for the next year.
    5. **There's a notable rise** in interest for non-relational databases such as **MongoDB and Elasticsearc**h, which may indicate a trend towards flexible data models and search-optimized databases.
    6. **Microsoft SQL** Server sees a drop in interest, suggesting a shift in preferences may be occurring within the industry towards other database systems.
    7. **New entrants** into the desired list for the next year include **SQLLite and DynamoDB**, which are not as prominent in the current usage list. This could reflect a growing interest in lighter or more specialized database solutions.

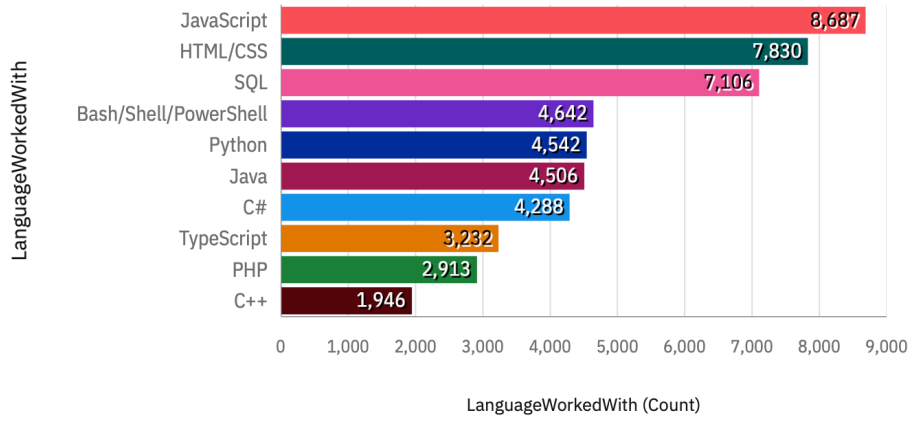
DASHBOARD

IBM Cognos Analytics Dashboard

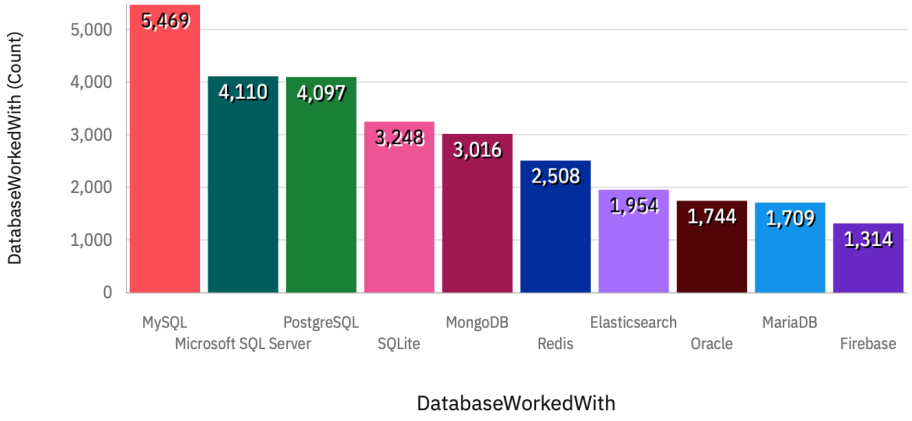
DASHBOARD TAB 1

Current Technology Usage

Top 10 Programming Languages Worked With

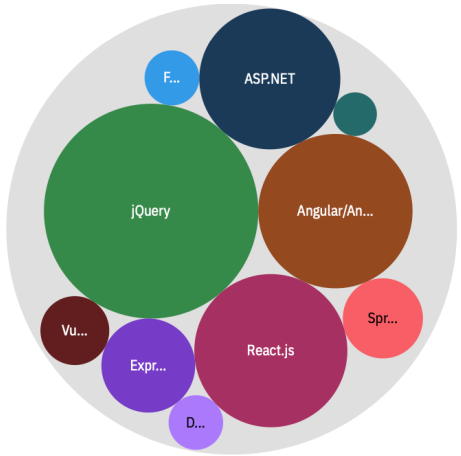


Top 10 Databases Worked With



Platforms Worked With

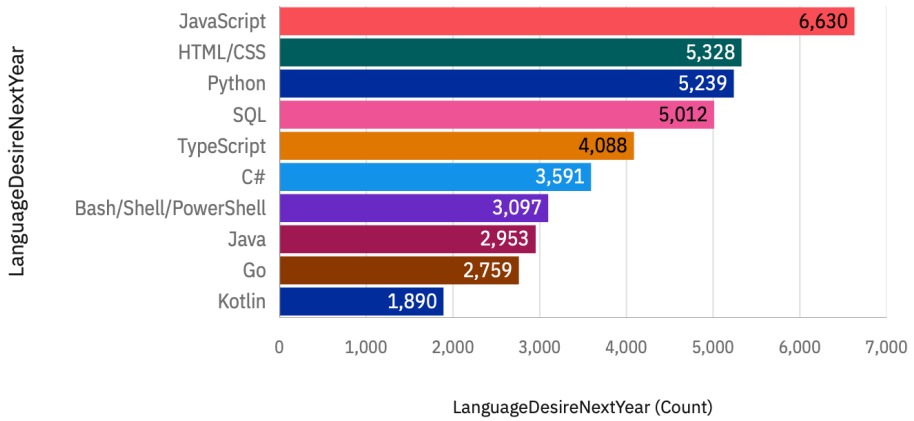
Top 10 Web Frames Worked With



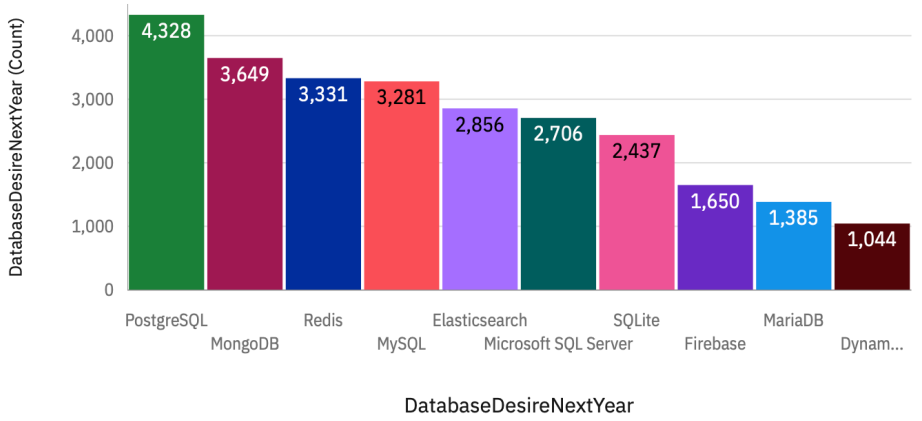
DASHBOARD TAB 2

Future Technology Trend

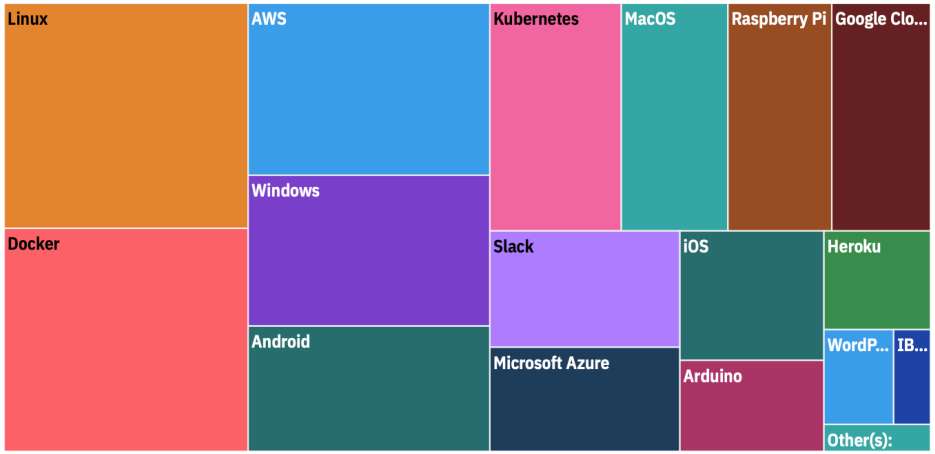
Top 10 Programming Languages Desired



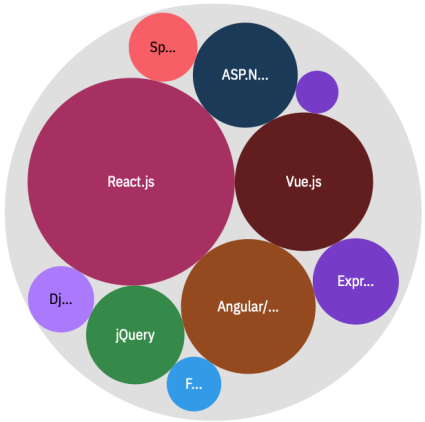
Top 10 Databases Desired



Platforms Desired



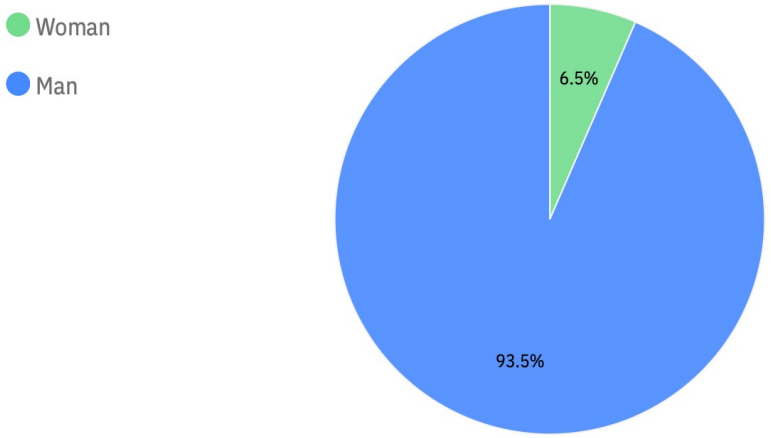
Top 10 Web Frames Desired



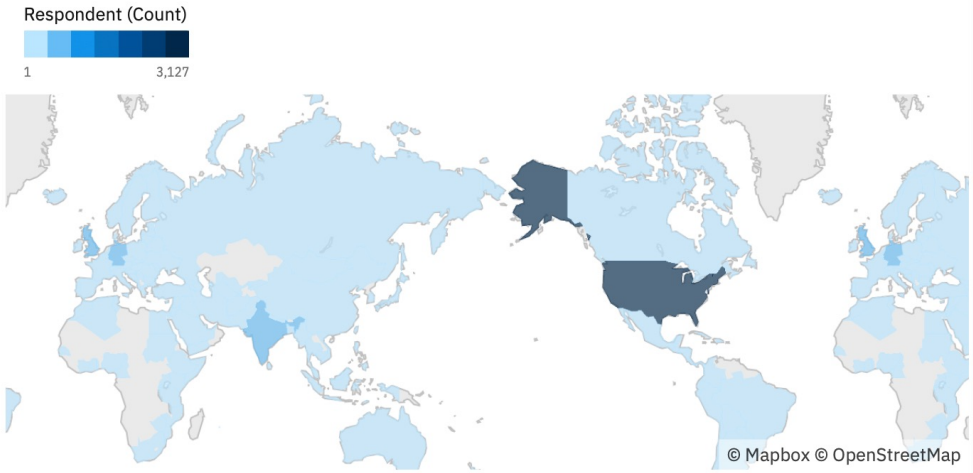
DASHBOARD TAB 3

Demographics

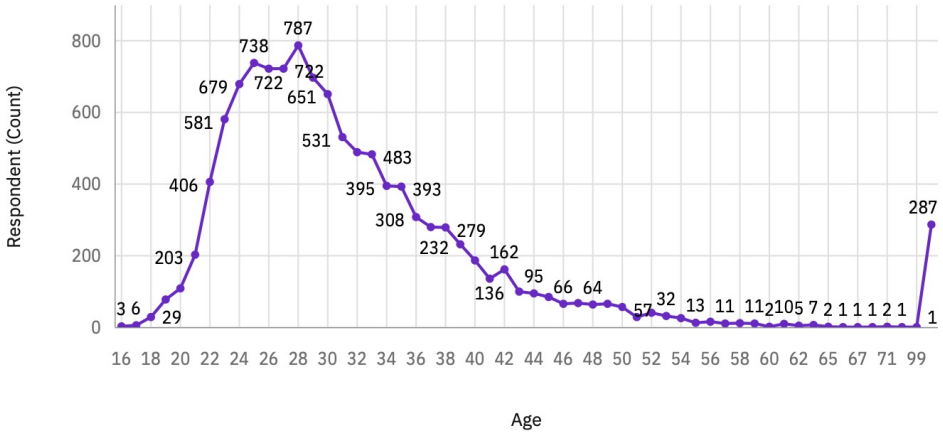
Respondent by Gender



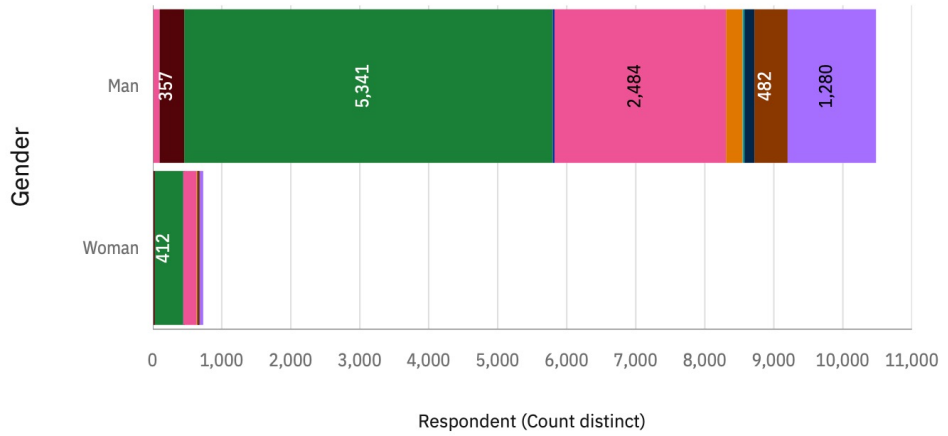
Respondent Count by Country



Respondent Count by Age



Respondent Count by Gender classified by Education Level



DISCUSSION

- In the discussion of our findings on the shifting landscape of database technologies, we can clearly see that there is a **paradigm shift** among developers' preferences and future interests. While **MySQL** holds the crown as the most utilized database in the current year, its reign appears to be challenged as we look towards the next year, with **PostgreSQL** taking the lead in desirability. **This change signals** a broader acceptance and eagerness to adopt databases that offer advanced features, such as comprehensive **support for different data types** and **compatibility** with various programming languages.
- **The ascension of Redis and MongoDB** on the desirability chart underscores a pivot towards databases that prioritize **performance and flexibility**. This aligns with the industry's lean towards big data applications, where the ability to handle large volumes of unstructured data efficiently is crucial.
- Meanwhile, the presence of **SQLLite and DynamoDB** in the desired technologies for the next year illustrates a growing appetite for lightweight and specialized databases, possibly driven by the **surge of mobile and web applications** that require **fast and scalable storage** solutions.
- These trends do not just answer our primary research question regarding current and future database preferences but also bridge a critical knowledge gap by signaling an impending **shift in the industry**. Developers are gearing up for a future that values versatility, performance, and specificity in database solutions, providing the final piece to the puzzle of understanding the trajectory of **database technology adoption.**

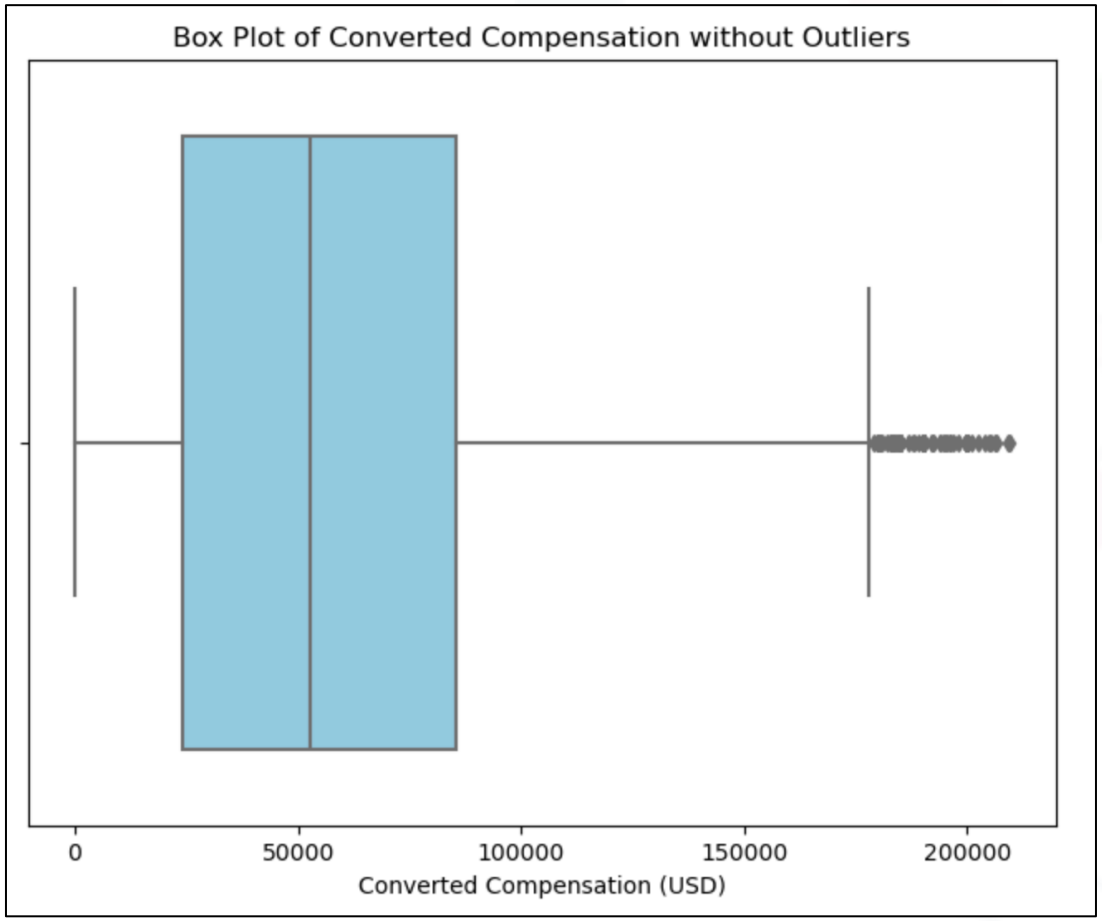
OVERALL FINDINGS & IMPLICATIONS

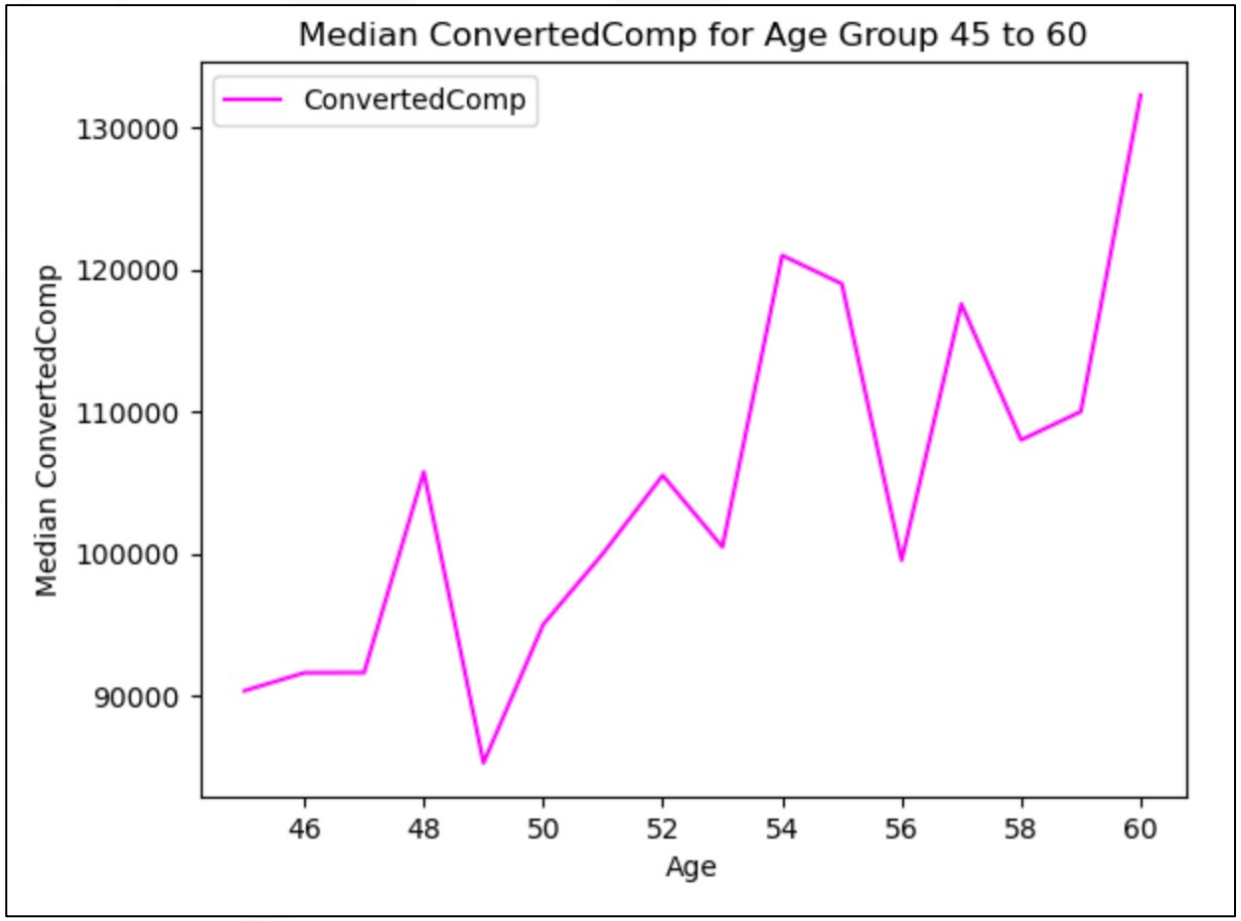
- ## Overall Findings
  - The data reveals a significant trend in the current use and future interest in programming languages and databases. **JavaScript, HTML/CSS, and SQL** top the charts as the most utilized technologies currently, indicating their entrenched position in the development ecosystem. Similarly, **MySQL** is the most used database, followed closely by **PostgreSQL and Microsoft SQL** Server, showing a **strong preference** for established SQL-based systems.
  - However, a **noteworthy shift** is observed when it comes to the technologies desired for the next year. While **JavaScript remains the leading programming language**, the **interest in Python** has surged, placing it in a close contest with HTML/CSS for the second spot. In the realm of databases, PostgreSQL is projected to overtake MySQL as the most desired database, indicating a potential shift in market dominance.
- ## Implications
  - These findings suggest that while the foundation of development remains steady with JavaScript and SQL-based databases, there is an underlying current that is gravitating towards more versatile and performance-oriented technologies like Python and PostgreSQL. The increased interest in Redis and MongoDB also points towards a **broader acceptance of NoSQL databases**.
  - For practitioners and decision-makers in the tech industry, these trends could dictate strategic investments in training resources and the adoption of certain technologies. For **educators and learners**, they underscore the importance of **skill development** in these growing areas.
  - The rise of new, desired technologies hints at the industry's readiness to embrace **change and innovation**, opening avenues for further research in database optimization and the integration of these technologies in next-generation applications. The data thus not only captures the current state of technology usage but also sets a trajectory for **future technological evolution and research** directions.

CONCLUSION

- The insights garnered from our research paint a compelling picture of the evolving database landscape—a narrative where adaptability and innovation are paramount. The projected preference for **PostgreSQL** and the rising interest in **Redis and MongoDB** signify a market that values **robustness and scalability**, catering to an era where data is not just voluminous but also varied in structure.
- These findings not only illuminate current trends but also serve as a beacon for future research and development. We can anticipate a surge in studies focused on optimizing PostgreSQL for diverse applications, as well as an increase in innovation around **in-memory and NoSQL databases** like Redis and MongoDB to further enhance their **performance and flexibility**.
- Moreover, the growing curiosity around **lighter databases** such as **SQLLite** and the emergence of **DynamoDB** suggest potential advancements in mobile and **web-centric storage solutions**. We can foresee a wave of development geared towards integrating these databases seamlessly into various platforms, thereby elevating the efficiency and user experience of **mobile and web applications**.

APPENDIX


Box Plot of Converted Compensation without Outliers
0
50000
100000
150000
200000
Converted Compensation (USD)


Median ConvertedComp for Age Group 45 to 60
ConvertedComp
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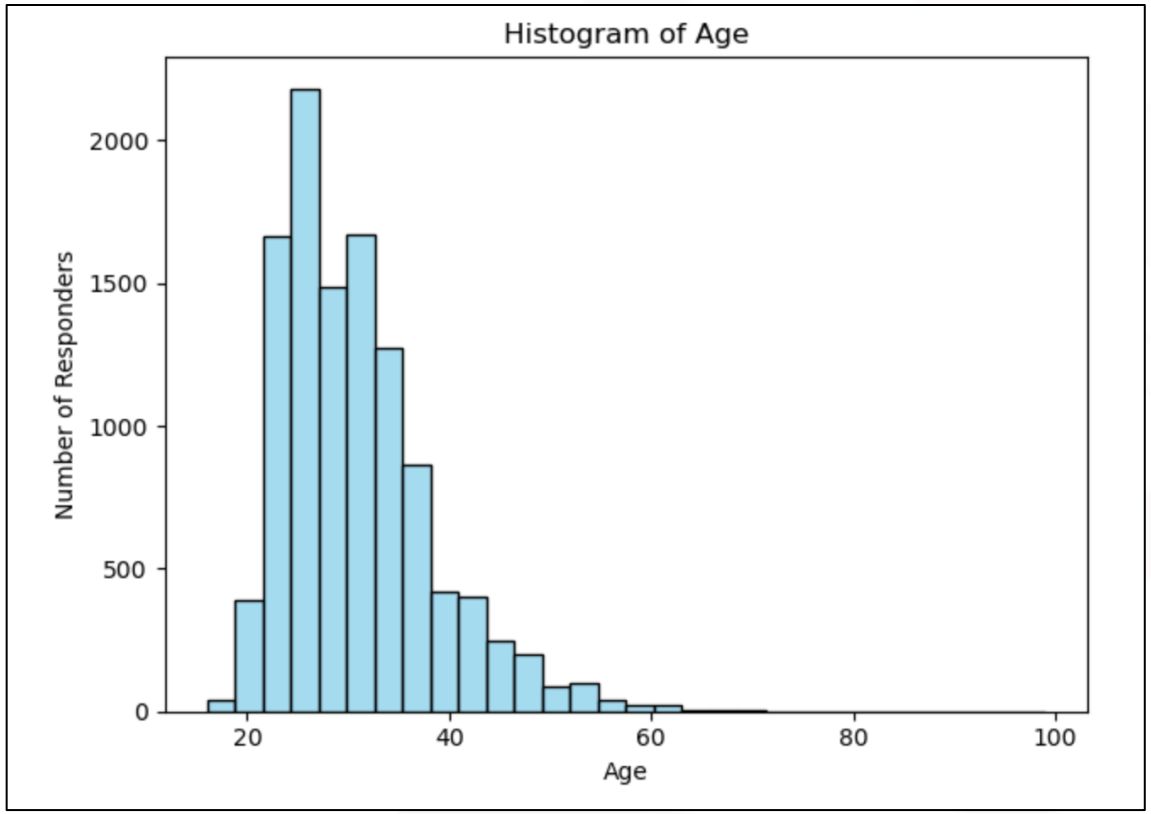
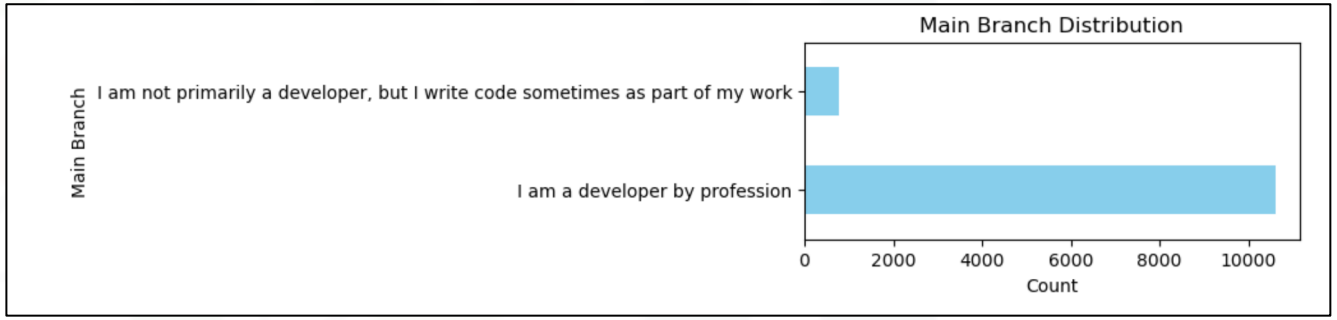
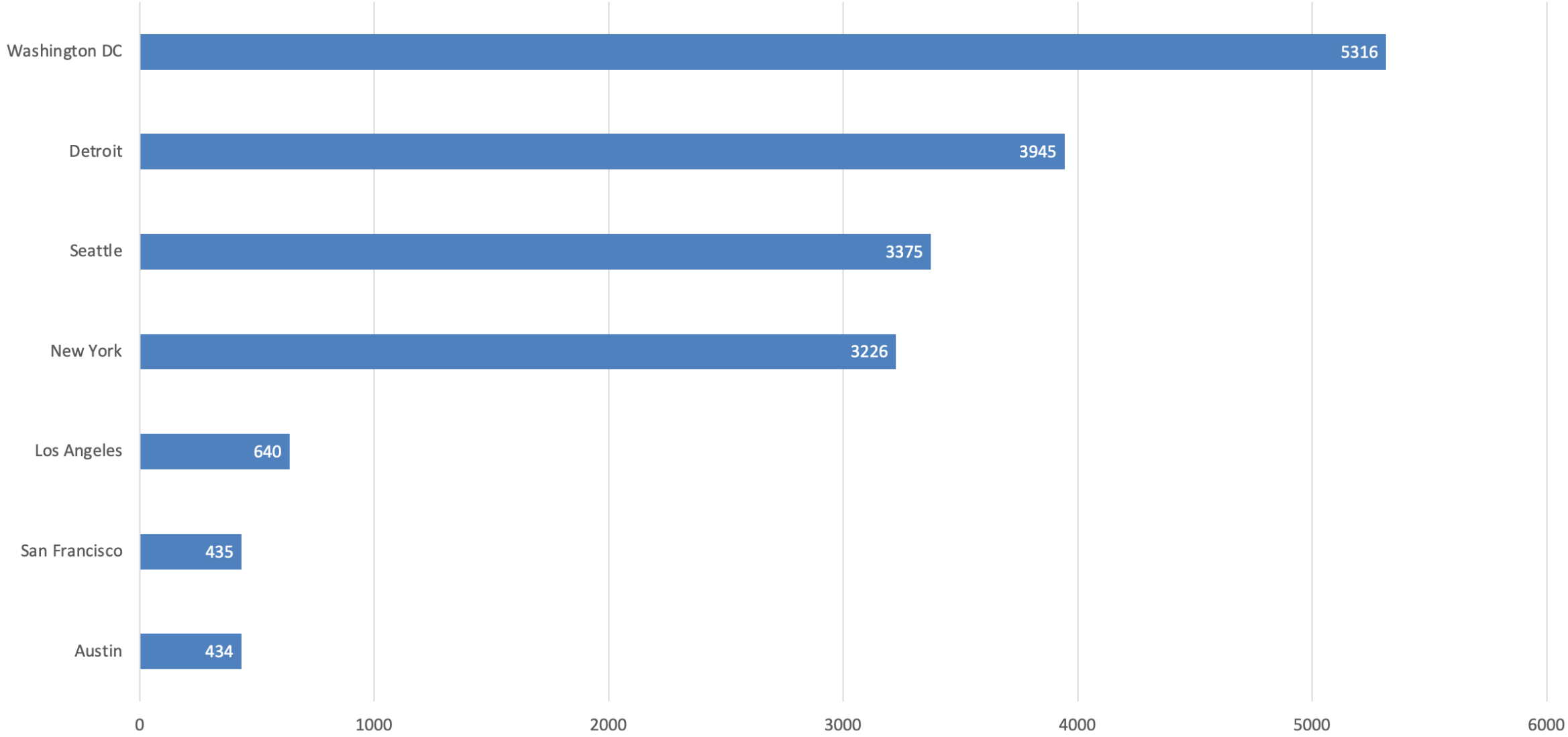
120000
110000
100000
90000
Median ConvertedComp
46
48
50
52
54
56
58
60
Age

APPENDIX


Histogram of Age
Number of Responders
2000
1500
1000
500
0
20
40
60
80
100
Age


Main Branch Distribution
Main Branch
I am not primarily a developer, but I write code sometimes as part of my work
I am a developer by profession
0
2000
4000
6000
8000
10000
Count

JOB POSTINGS



POPULAR LANGUAGES