

IBM CAPSTONE PROJECT

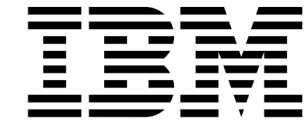
**ANALYSIS OF DEVELOPER USAGE
PATTERN & SKILL DEMAND**

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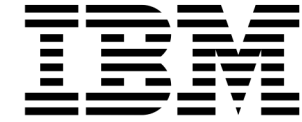
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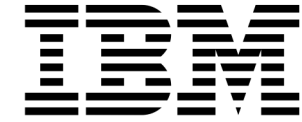
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EXECUTIVE SUMMARY



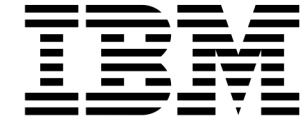
- **Programming Language Trends:** Current data indicates JavaScript and HTML/CSS as the most utilized programming languages this year, with future projections showing JavaScript maintaining its lead. Interestingly, TypeScript is expected to rise in popularity next year, reflecting its growing adoption in the development community.
- **Database Trends:** MySQL and Microsoft SQL Server are the most popular databases this year, demonstrating their strong foothold in the industry. Projections for next year, however, show a shift with PostgreSQL expected to surpass these traditional databases in popularity, signifying a trend towards more robust and scalable database solutions.
- **Shift in Technology Preferences:** The data highlights a noticeable shift in both programming and database preferences, indicating an industry trend towards technologies that offer more flexibility and support for modern application development.
- **Implication for businesses and developers:** These trends suggest that businesses and developers should consider adapting to emerging technologies like TypeScript and PostgreSQL to remain competitive. Additionally, educational institutions may need to update curricula to reflect these changing preferences in the tech landscape.

INTRODUCTION



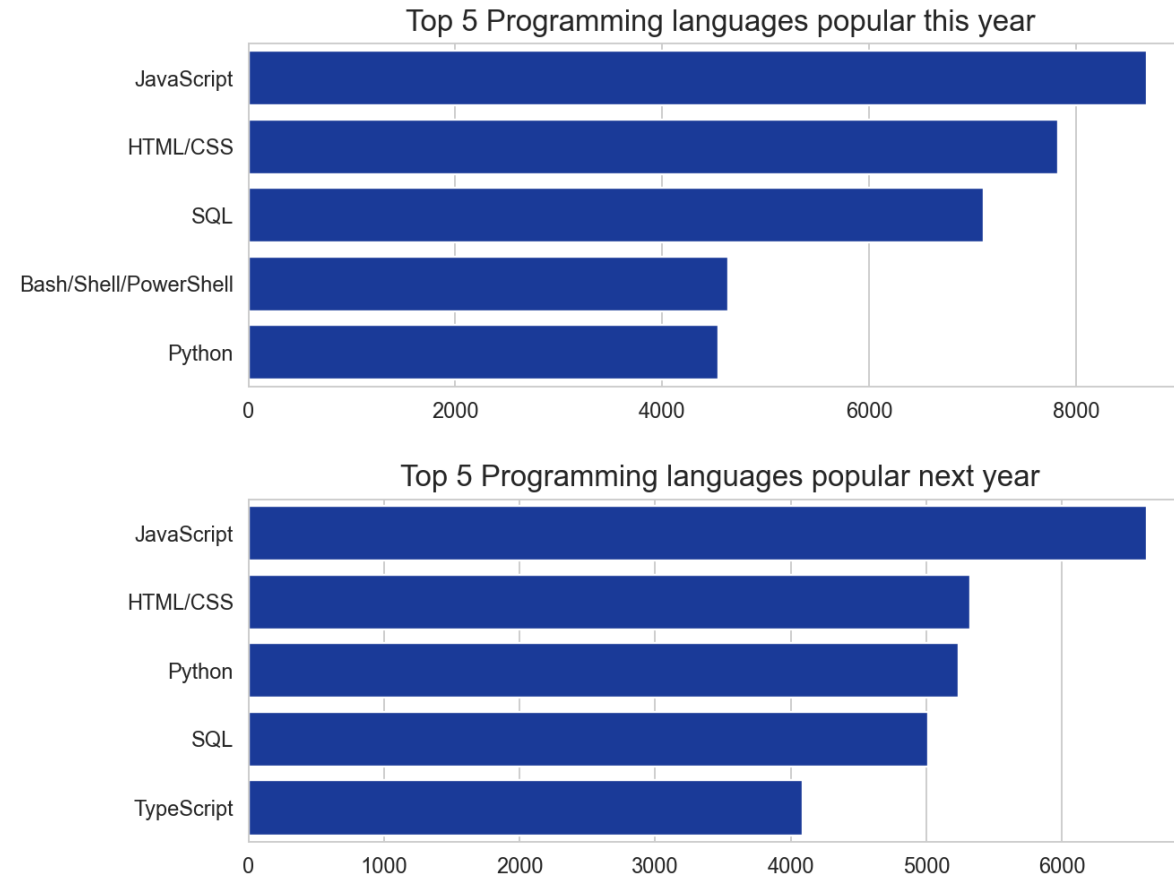
- **Scope of Analysis :** This report examines current trends and future projections within the technology sector, focusing specifically on programming languages and databases as reflected in the latest data.
- **Data Sources:** The insights presented are drawn from a range of dashboards that capture usage patterns, popularity rankings, and future predictions for various programming languages and databases.
- **Objective:** The insights presented are drawn from a range of dashboards that capture usage patterns, popularity rankings, and future predictions for various programming languages and databases.

METHODOLOGY



- **Data Collection:** The data was sourced from Stack Overflow survey results, GitHub Jobs Portal API, and through web scraping IBM's publicly available data, providing a robust foundation for analyzing technology usage and trends
- **Trend Analysis:** We employed statistical tools and analysis techniques to identify current popularity and future trends of technologies.
- **Comparative Analysis:** The report includes a comparative study of various technologies to understand their relative positions and shifts in popularity over time.
- **Analysis Tools Utilization:** For dashboarding, we utilized IBM Cognos Analytics which offered advanced visualization capabilities. Detailed data analysis and visualizations were further performed using Jupyter Labs, leveraging Python's extensive libraries to dissect and interpret the technology trends effectively.

PROGRAMMING LANGUAGE TREND



Findings & Implications:

The data illustrate a significant trend in programming language popularity and interest projections between this year and the next.

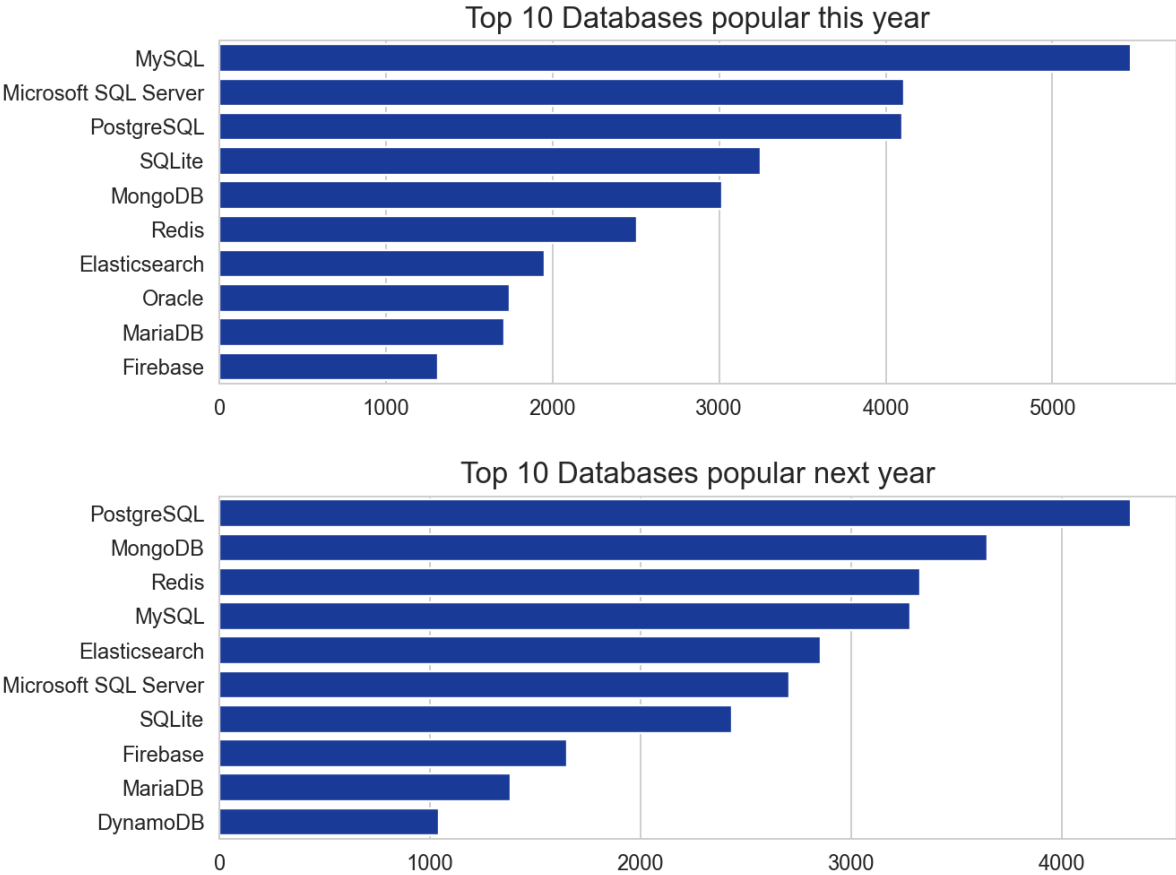
JavaScript remains the most popular language, although its dominance slightly decreases from 14.5% to 11.9%. HTML/CSS and Python also show a slight decline in projected interest, suggesting a potential plateau in their growth.

Notably, TypeScript emerges as a language of growing interest, entering the top five with a desire rate of 7.3% for next year, reflecting its increasing importance in web development ecosystems.

This shift could indicate a broader adaptation of newer technologies and frameworks that leverage TypeScript, signaling a potential shift in skill set requirements for developers.



DATABASE TREND



Findings & Implications:

The current database landscape, as depicted by the data, shows MySQL as the leader with a usage rate of 17.4% this year.

However, projections for next year suggest a shift in preferences, with PostgreSQL expected to lead at 14.6%, overtaking MySQL which is anticipated to have a slight decrease in interest to 11.1%.

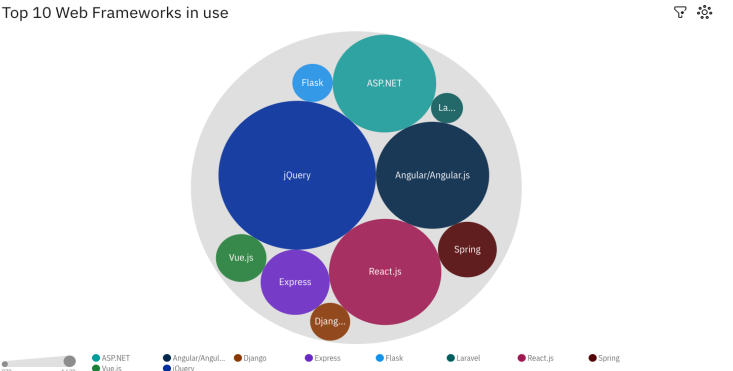
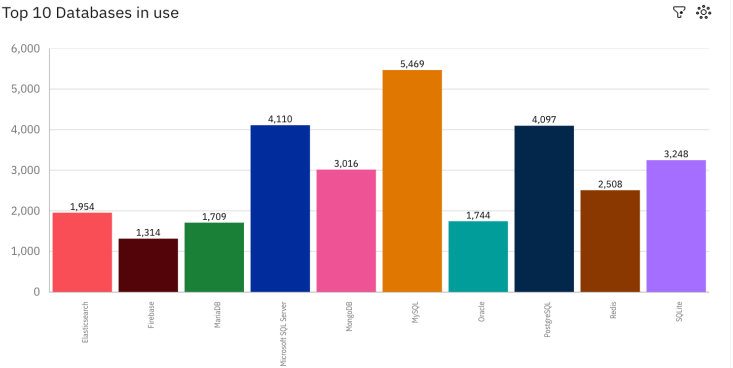
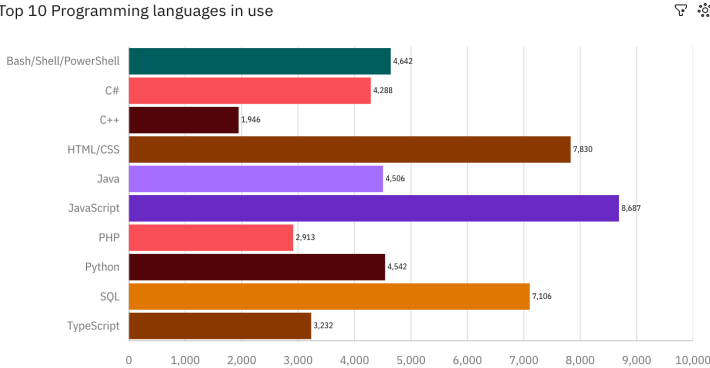
Redis and MongoDB are also gaining traction, with projected interest rates of 11.3% and 12.3% respectively, underscoring their utility in environments demanding high performance and scalability.

This evolving database preference landscape suggests that organizations need to pivot towards these emerging technologies to harness enhanced performance and cost efficiencies in their data management strategies.



COGNOS DASHBOARD 1

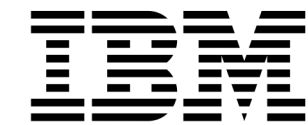
CURRENT TECHNOLOGY TREND



Findings & Implications:

This dashboard provides a comprehensive overview of current technology usage across programming languages, databases, platforms, and web frameworks. JavaScript, SQL, and Python are highlighted as the top programming languages, with significant usage counts, indicating their widespread adoption in the development community.

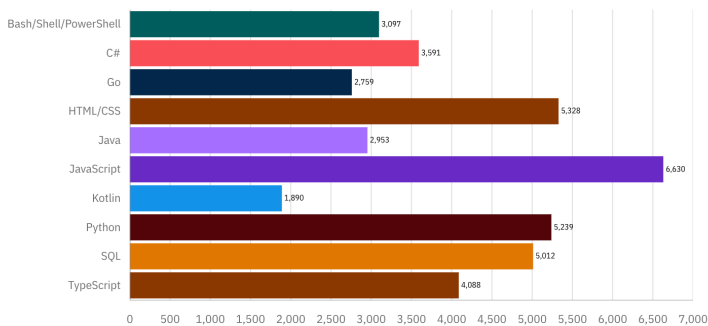
The database segment shows MySQL and PostgreSQL leading, emphasizing their role as primary data management solutions for many developers. The word cloud representing platform popularity prominently features AWS and Linux, suggesting their dominance in the deployment environments, while the web framework section shows a strong preference for React.js among developers for building interactive user interfaces.



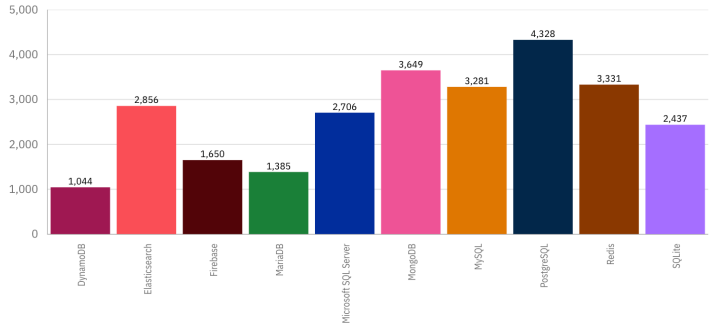
COGNOS DASHBOARD 2

FUTURE TECHNOLOGY TREND

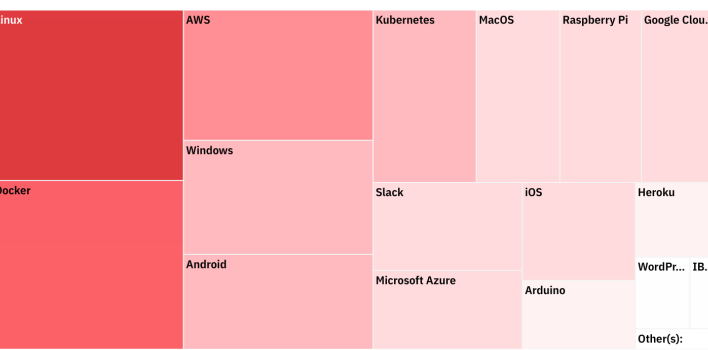
Top 10 Programming languages



Top 10 Databases



Platforms by popularity



Top 10 Web Frameworks



Findings & Implications:

This dashboard presents projected trends in technology for the coming year, focusing on programming languages, databases, platforms, and web frameworks.

Python and JavaScript lead the future interest among programming languages, suggesting their continued dominance in software development. The database forecast highlights PostgreSQL and MongoDB as the top contenders, reflecting a growing preference for open-source and flexible data management solutions.

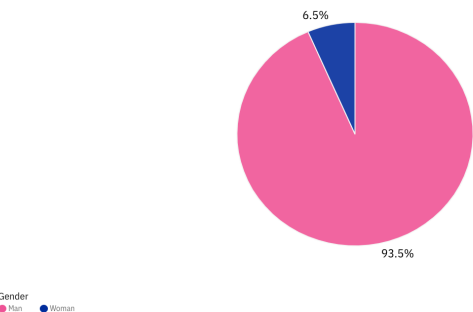
On the platform front, Linux and AWS dominate, indicating their robustness and popularity in hosting environments, while React.js appears to be the most favored web framework, emphasizing its appeal for building dynamic web applications.

COGNOS DASHBOARD 3

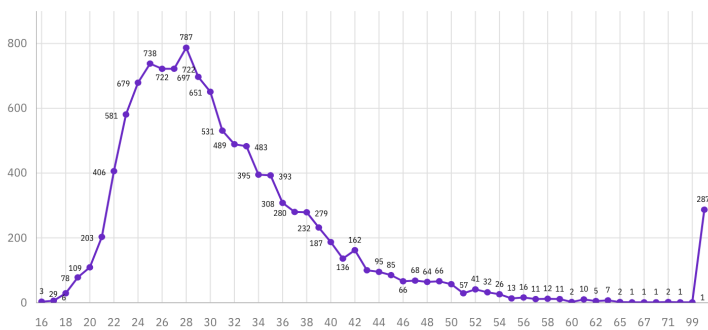


DEMOGRAPHICS

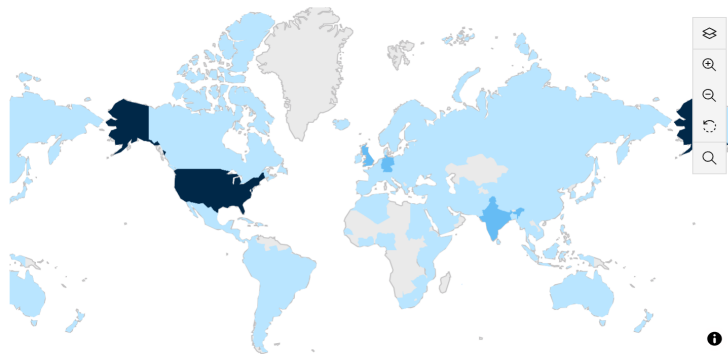
Gender distribution of respondents



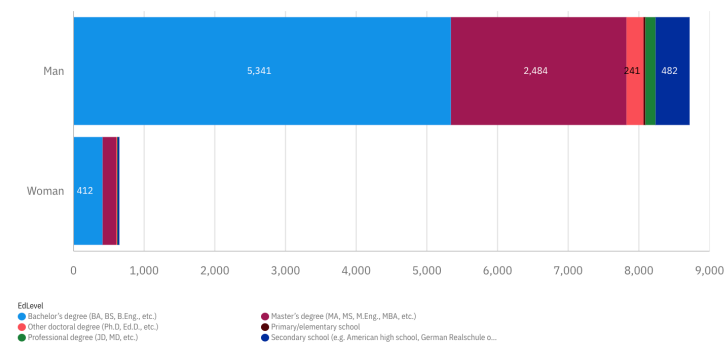
Age of survey respondents



Countries represented in the survey



Education of Respondents by Gender



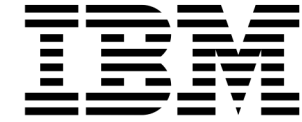
Findings & Implications:

This dashboard provides a comprehensive demographic and educational overview of survey respondents.

The gender distribution pie chart shows a significant majority of respondents are men, making up 93.5%, with women representing only 6.5%. The age distribution histogram indicates a strong concentration of respondents in their early twenties, with numbers rapidly decreasing as age increases.

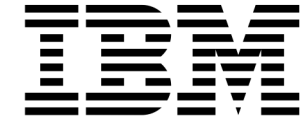
The map highlights the global participation in the survey, with notable concentrations in North America and parts of Europe, while the bar chart on educational attainment reveals a higher number of men with master's degrees compared to women, who also show a significant representation at this educational level.

CONCLUSION



- **Key Findings:** The tech industry continues to evolve with a significant demand for programming languages like C and Java, while newer technologies like PostgreSQL and MongoDB are gaining traction in database management.
- **Implications for Tech Professionals:** Professionals need to adapt by developing skills in both established and emerging technologies to stay competitive in a dynamic job market.
- **Recommendations for Education Providers:** Educational programs should update curricula to include training in high-demand and emerging technologies, ensuring that students are well-prepared for current and future job markets.
- **Future Outlook:** The technology sector is likely to see further geographic diversification of job opportunities and a continued shift towards cloud-based and open-source technologies, which will shape the future of tech employment and development practices.

APPENDINX CONTENT

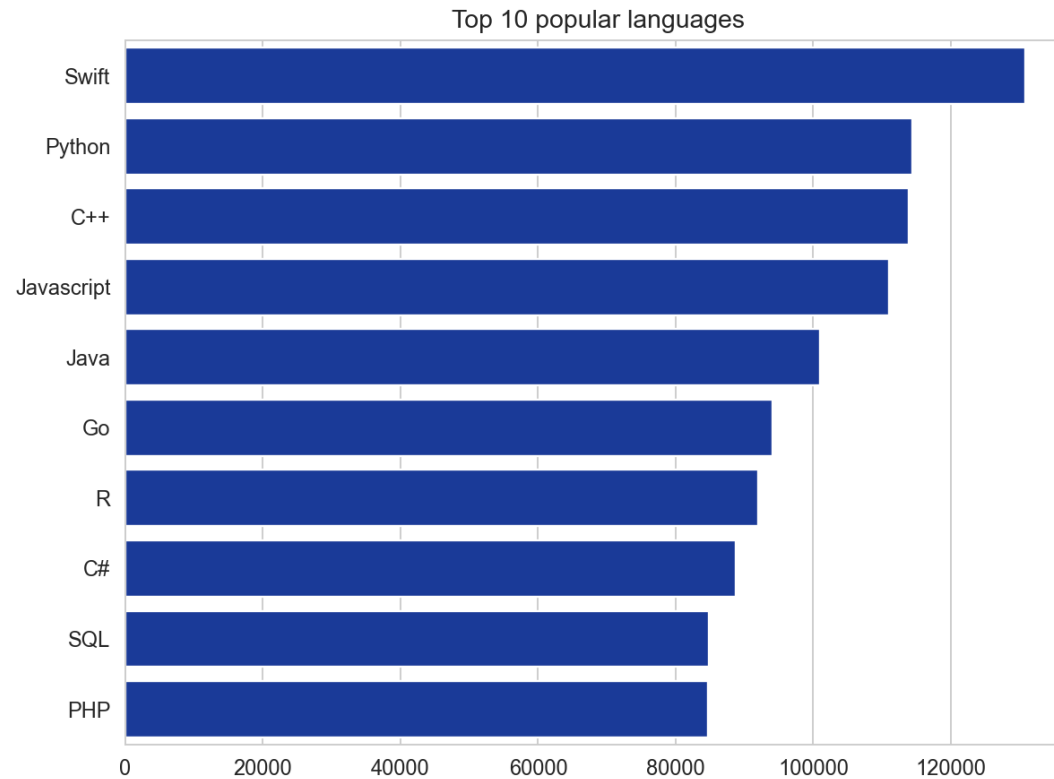


IBM POPULAR LANGUAGES WEBSRAPE

GITHUB JOB POSTING BY LOCATION

GITHUB JOBS - LANGUAGE DEMAND

IBM POPULAR LANGUAGES



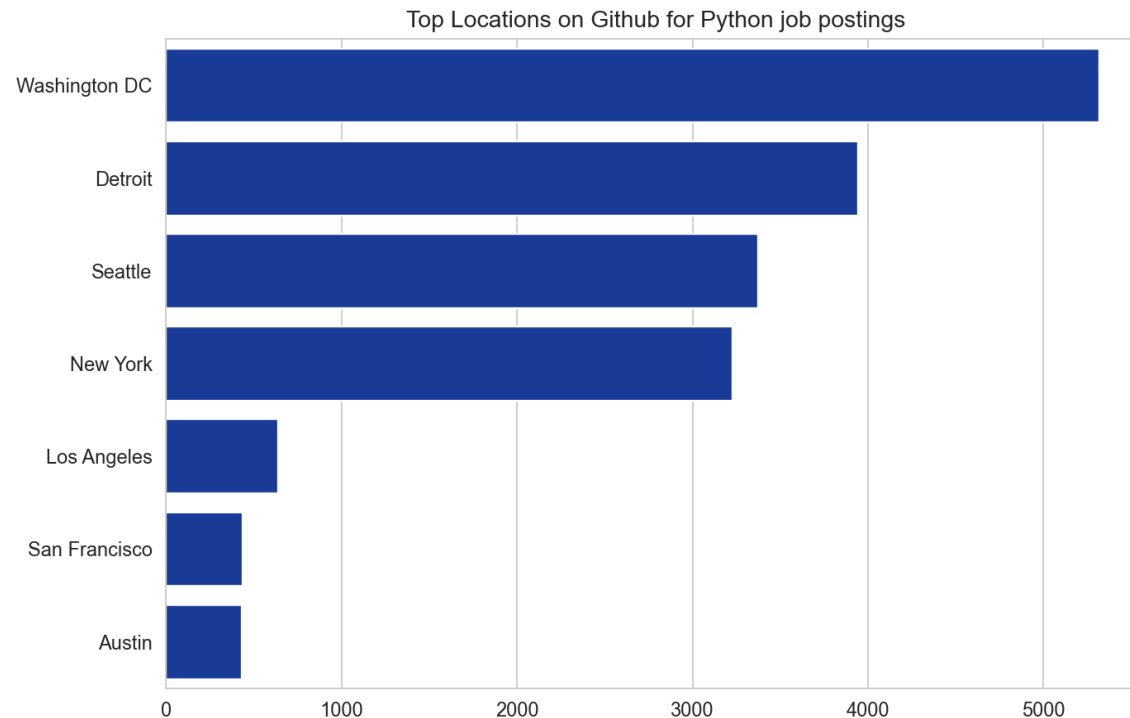
Findings & Implications:

The bar chart and accompanying salary data provide a detailed view of the current landscape of programming languages by popularity and their corresponding average annual salaries.

Swift, although not the most popular language, commands the highest average salary at \$130,801, reflecting its strong demand in the development of Apple's iOS and macOS applications. On the other hand, languages like Python and JavaScript, while highly popular, offer slightly lower average salaries of \$114,383 and \$110,981 respectively, suggesting a broad utility and supply of professionals skilled in these languages.

The data implies that niche languages like Swift may offer higher earning potential due to specialized demand, whereas more universal languages such as Java and SQL, despite their ubiquity, present lower average salaries, highlighting a saturated market with a vast pool of developers.

GITHUB JOB POSTING BY LOCATION

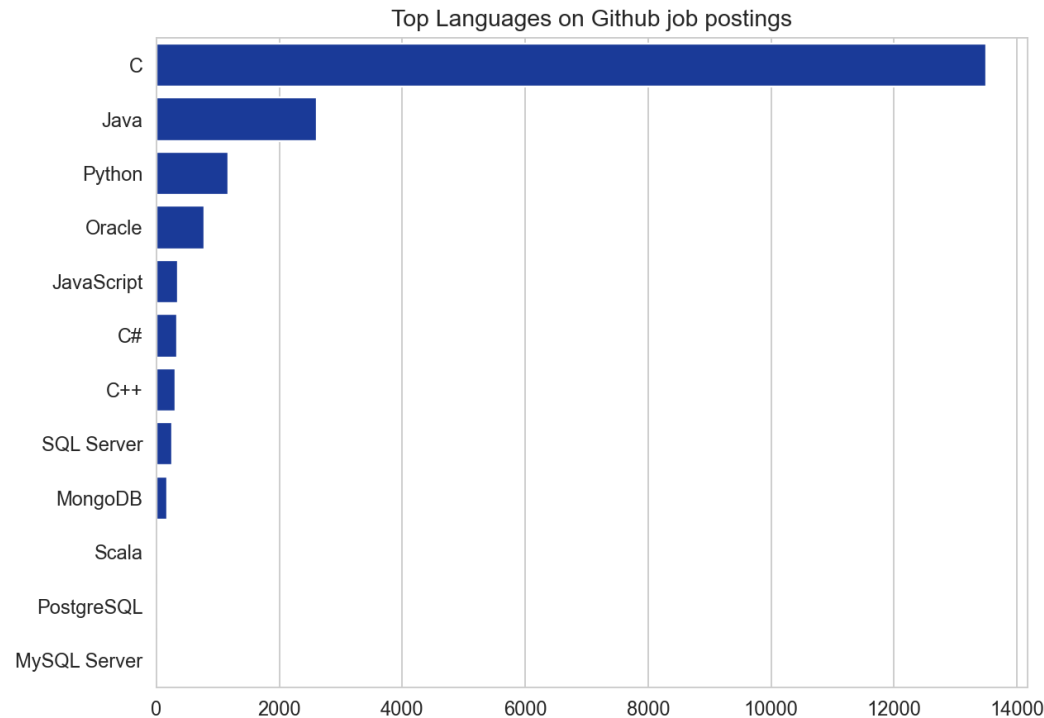


Findings & Implications:

The Github Jobs API data highlights varying concentrations of tech opportunities across U.S. cities. Washington DC emerges as the leader with 5,316 jobs, making up 28.7% of the total listed positions, underscoring its robust tech sector possibly driven by government and tech enterprises.

In contrast, traditional tech hubs like San Francisco and Austin show notably fewer opportunities, with each city offering around 2.3% of the total jobs. This suggests a potential saturation in these markets or a geographical redistribution of tech roles, which could influence relocation and business strategies within the tech industry.

GITHUB JOBS – LANGUAGE DEMAND



Findings & Implications:

The Github Jobs API data for programming languages reveals a significant skew towards C, which dominates with 13,498 job listings, constituting 57.9% of the total positions.

Java is the next most in-demand language, with 2,609 jobs, making up 11.2%. Python follows, representing 5% with 1,173 job listings. Oracle-related skills also show substantial demand at 3.4% (784 jobs).

In stark contrast, popular web development languages like JavaScript and database-related skills such as SQL Server have much smaller footprints, with 355 (1.5%) and 250 (1.1%) job openings respectively. The minimal demand for PostgreSQL (0.04%, 10 jobs) and the absence of listings for MySQL Server highlight niche or integrated roles for these technologies.

This disparity underscores the need for tech professionals to focus on high-demand languages like C and Java.