

UNVEILING DEVELOPER TRENDS: KEY INSIGHTS FROM THE 2019 STACK OVERFLOW SURVEY

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OUTLINE



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EXECUTIVE SUMMARY



- **Top Programming Languages used by developers:**
 - **JavaScript, HTML/CSS, Python, SQL, and TypeScript**
- **Top Databases used by developers:**
 - **PostgreSQL, MySQL, SQLite, Microsoft SQL Server, and MongoDB**
- **Top Platforms in use for the current year:**
 - **AWS, Microsoft Azure, Google Cloud, Cloudflare, and Firebase**
- **Top Web Frameworks in use for the current year:**
 - **Node.js, React, jQuery, Next.js, and Express**
- **Future Technology Trends:**
 - **Python, JavaScript, and SQL** are the top 3 most desired programming languages.
 - **Redis** enters the fifth place as the fifth preferred database for the next year, replacing **Microsoft SQL Server**.
 - The list of top 5 platforms remains unchanged for the next year.
 - **Vue.js** and **ASP.NET CORE** join the list of top desired web frameworks as the fourth and fifth places respectively, replacing **jQuery** and **Express**.

INTRODUCTION



- Recent years have brought major changes to the **tech landscape**, reshaping **tools**, **languages**, and **developer roles**.
- Key trends are emerging in **programming languages**, **web frameworks**, and **developer demographics**.
- **Stack Overflow** conducts a **global, annual survey** targeting a wide range of **coding professionals**.
- The **2019 Developer Survey** marked its **9th consecutive edition**.
- Nearly **90,000 developers** participated in the **20-minute survey**, making it one of the **largest** of its kind.
- Covering topics from **technology preferences** to **career goals**—this presentation highlights the most notable **insights**.

METHODOLOGY



- Dataset sourced from **Stack Overflow Developer Survey (Jan 23–Feb 14, 2019)** with **88,883 participants** across **179 countries**.
- Skills in **data collection** using **APIs** and **web scraping**, **data wrangling**, **exploratory data analysis**, **data visualization**, and **dashboard building** were acquired through **IBM Skills Network Labs** environment in **Coursera**.
- Key **data wrangling** steps:
 - **Addressed missing values** and **corrected data inconsistencies**.
 - **Standardized entries** in the **country** and **technology** fields.
 - **Consolidated responses** to enable **comparative analysis**.
- **Data analysis** was conducted in **Jupyter Notebook** using **Python** while **data visualization** was performed using **IBM Cognos Analytics**.



RESULTS



- **Python** overtakes JavaScript as the most preferred programming language, showing the fastest growth among major languages.
- The **top 3 databases remain unchanged**, but **Redis** rises to fifth place, signaling its versatility across various developer roles.
- Developer **platform preferences stayed steady**, with no new entries in the top 5 platforms compared to the previous year.
- **React surpasses Node.js** as the most desired web framework, while **Vue.js** and **ASP.NET Core** break into the top 5 for the upcoming year.
- **Developers aged 25–34** make up nearly half of the global survey population, with the highest concentration of professionals in the **USA, Germany, India, UK, and Ukraine**.
- About **50% of professional developers** hold at least a **Bachelor's degree**, consistent with previous years' trends.
- A notable correlation exists between **age and education**—developers **under 45** tend to have higher educational attainment than those **45 and older**.



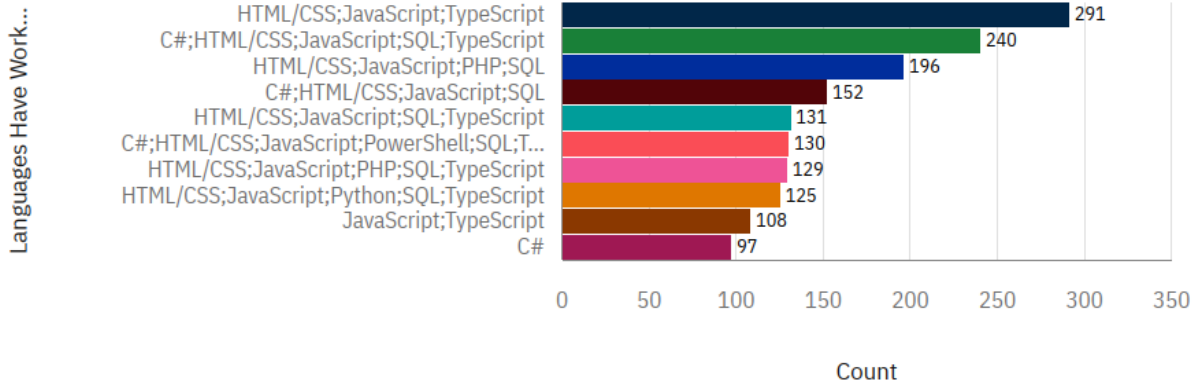
PROGRAMMING LANGUAGE TRENDS

Current Year

Top 10 Languages Respondents Have Worked With

LanguageHaveWorkedWith

- C#
- C#;HTML/CSS;JavaScript;SQL;Ty...
- HTML/CSS;JavaScript;Python;SQ...
- JavaScript;TypeScript
- C#;HTML/CSS;JavaScript;PowerS...
- HTML/CSS;JavaScript;PHP;SQL
- HTML/CSS;JavaScript;SQL;TypeS...
- C#;HTML/CSS;JavaScript;SQL
- HTML/CSS;JavaScript;PHP;SQL;T...
- HTML/CSS;JavaScript;TypeScript

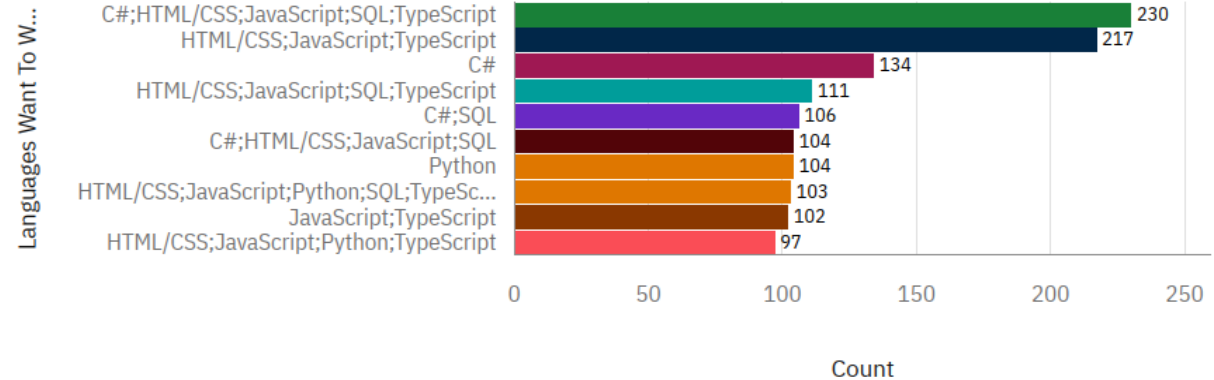


Next Year

Top 10 Languages Respondents Want To Work With

LanguageWantToWorkWith

- C#
- C#;SQL
- HTML/CSS;JavaScript;SQL;TypeS...
- Python
- C#;HTML/CSS;JavaScript;SQL
- HTML/CSS;JavaScript;Python;SQ...
- HTML/CSS;JavaScript;TypeScript
- C#;HTML/CSS;JavaScript;SQL;Ty...
- HTML/CSS;JavaScript;Python;Typ...
- JavaScript;TypeScript



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

- **Rust is gaining traction** among developers, recognized for its performance, safety, and system-level capabilities, indicating a rising trend in its adoption and relevance.
- **JavaScript, HTML/CSS, SQL, and TypeScript** retain their strong, consistent presence, remaining core to everyday development tasks.
- **Python's surge in popularity** signals its growing influence across multiple sectors of technology.

Implications

- **Web-centric languages** like JavaScript, HTML/CSS, and TypeScript remain vital—mastery is essential for any aspiring or current web developer.
- **SQL's continued usage** underlines the central role of databases and data querying across modern application development.
- **Python's expanding reach** showcases its power as a versatile, beginner-friendly language, now essential in areas like AI, automation, and analytics.

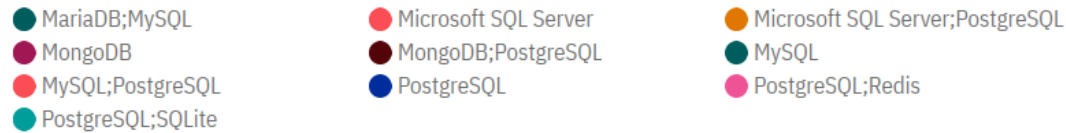


DATABASE TRENDS

Current Year

Top 10 Databases Respondents Have Worked With

DatabaseHaveWorkedWith



Databases Have Worked With

Next Year

Top 10 Databases Respondents Want To Work With

DatabaseWantToWorkWith



Databases Want To Work With



DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- **PostgreSQL** leads as the **most used** and **preferred DBMS** across all respondents.
- **MySQL** and **SQLite** remain strong contenders, showing sustained **current use** and projected **future adoption**.
- **MongoDB** tops the **NoSQL** category, maintaining a consistent position in the overall **top five**.

Implications

- The popularity of **relational databases** (**PostgreSQL, MySQL, SQLite**) underscores their importance for **structured** and **transactional applications**.
- **MongoDB's** traction highlights the growing demand for **flexible, scalable NoSQL solutions** in modern app development.
- **Developer choices** reflect a **pragmatic approach**—selecting databases based on **data structure, scalability, and performance needs**.



DASHBOARD



GitHub link to access the dashboard:

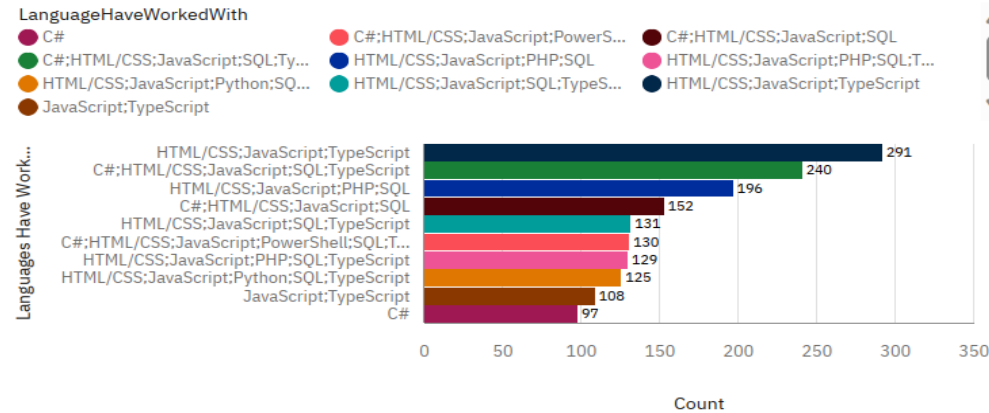
<https://github.com/alexfung88/Capstone-Project-Final-Assignment/blob/main/Stack%20Overflow%20Developer%20Survey%20Data%20Dashboard%20-%20Cognos%20Analytics.pdf>



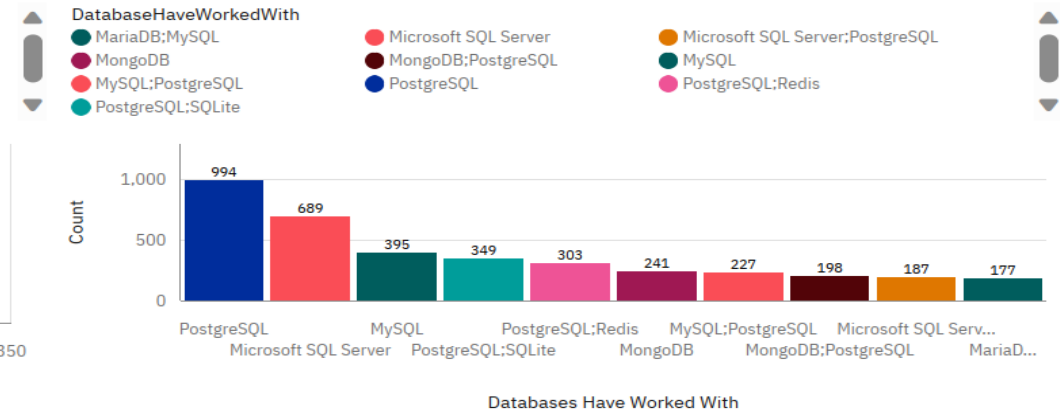
CURRENT TECHNOLOGY USAGE

Current Technology Usage

Top 10 Languages Respondents Have Worked With



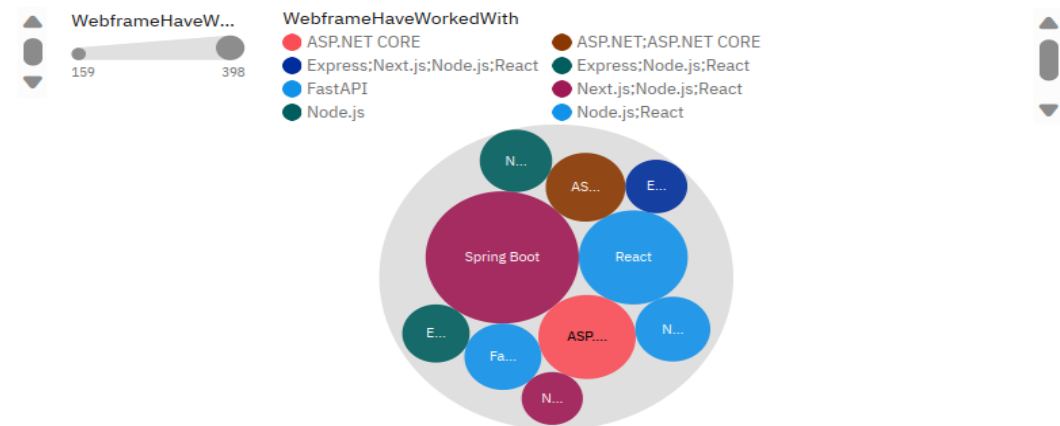
Top 10 Databases Respondents Have Worked With



Top 10 Platforms Respondents Have Worked With



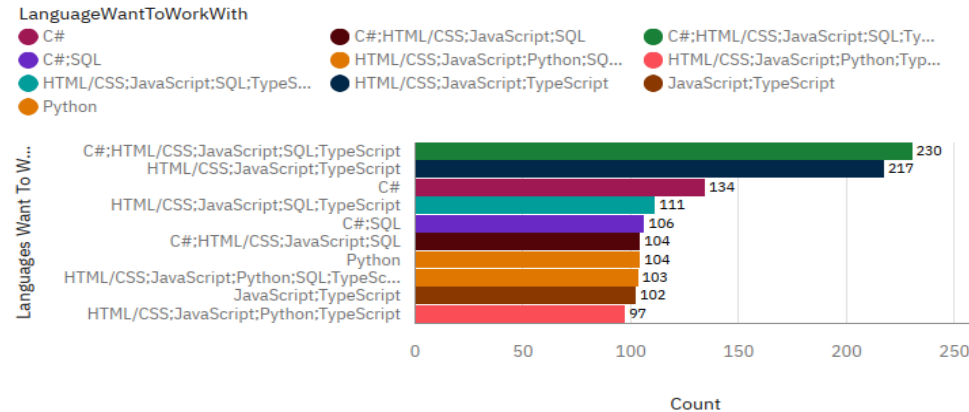
Top 10 Web Frameworks Respondents Have Worked With



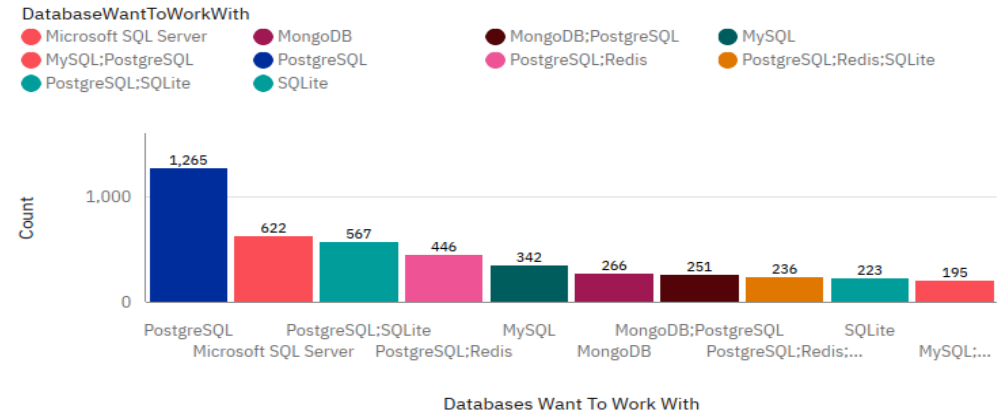
FUTURE TECHNOLOGY TRENDS

Future Technology Trends

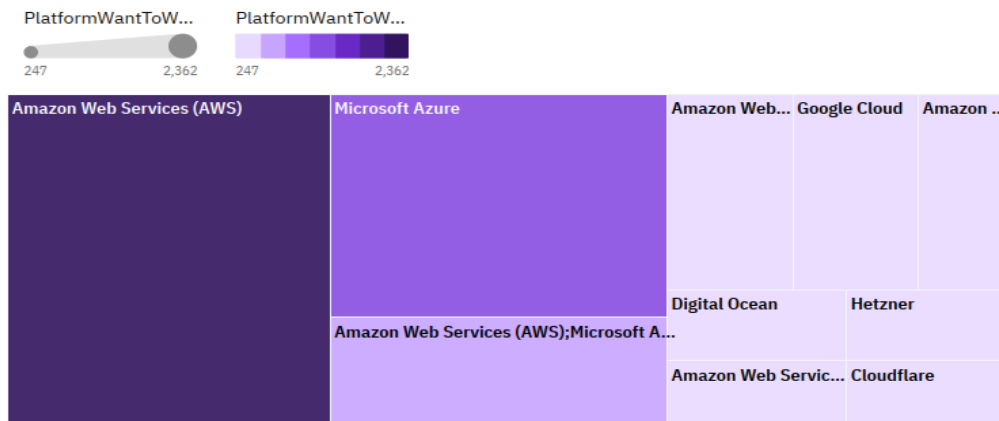
Top 10 Languages Respondents Want To Work With



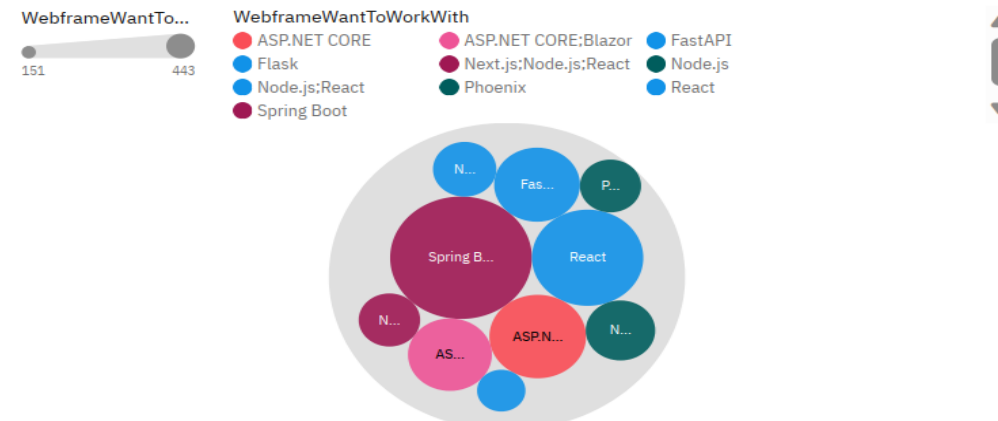
Top 10 Databases Respondents Want To Work With



Top 10 Platforms Respondents Want To Work With



Top 10 Web Frameworks Respondents Want To Work With



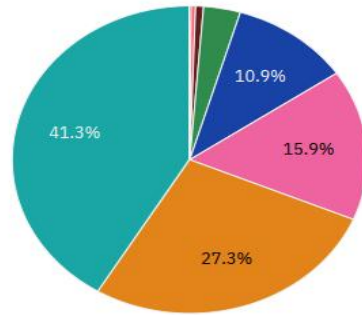
DEMOGRAPHICS

Demographics

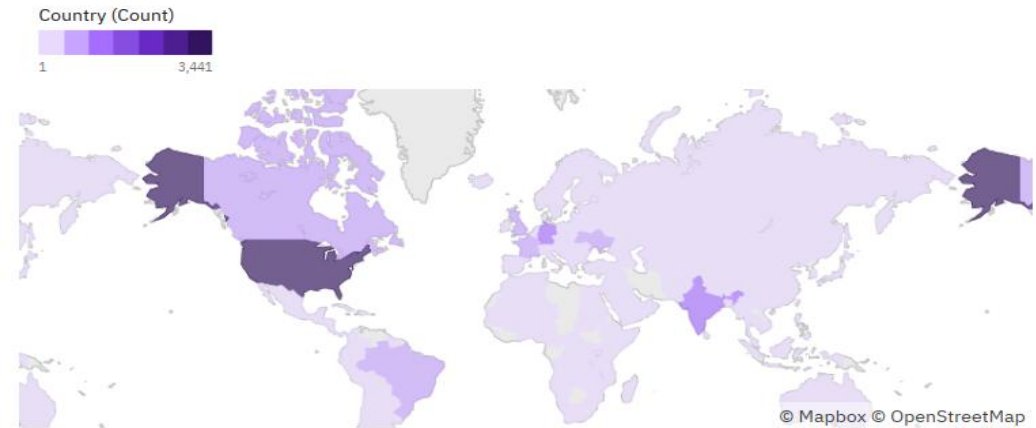
Respondent Distribution By Age

Age

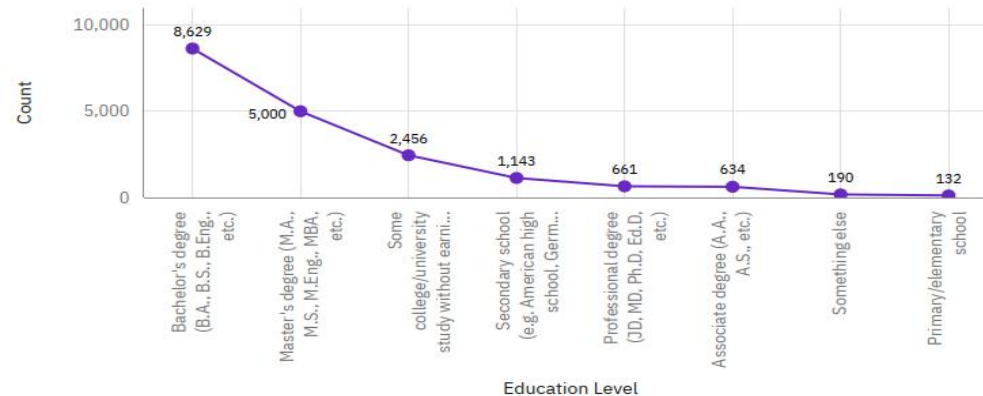
- Prefer not to say
- 18-24 years old
- 65 years or older
- 35-44 years old
- Under 18 years old
- 25-34 years old
- 55-64 years old
- 45-54 years old



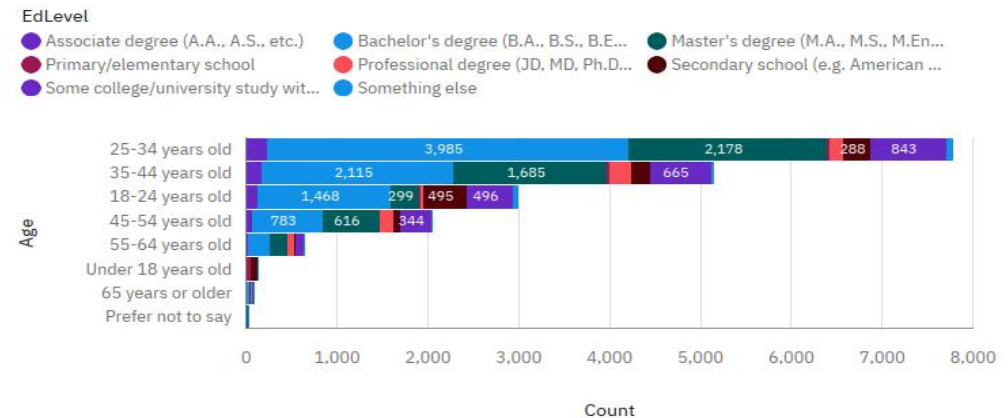
Respondent Count By Country



Respondent Distribution By Education Level



Respondent Distribution By Age And Education Level



DISCUSSION



- The ongoing popularity of **JavaScript** and **Python**, along with the dominance of **PostgreSQL** and **MySQL**, highlights their foundational roles in the development ecosystem.
- Developer preferences lean toward languages offering **versatility**, **ease of use**, and **cross-domain utility**, reinforcing the value of adaptable, readable syntax.
- The persistent use of **relational databases** reflects the continued need for **structured data models** and **transactional reliability** in application design.
- These trends invite deeper discussion on **client-side scripting**, **styling technologies**, and the **rapid evolution of web development frameworks**.

OVERALL FINDINGS & IMPLICATIONS

Findings

- **Language Leadership:** **JavaScript** and **Python** dominate across domains, emphasizing their importance in both **web development** and **emerging tech fields** like AI and automation.
- **Data Management Focus:** **PostgreSQL**, **MySQL**, and **SQLite** remain top choices, highlighting the essential role of **robust data management**.
- **Tool Diversity:** The wide adoption of **diverse technologies** shows the importance of understanding a **broad spectrum of tools** to address varying development needs.

Implications

- **Web-Centric Development:** The strength of **web technologies** like JavaScript and HTML/CSS confirms the **continued rise of web development** across industries.
- **Scalable Solutions:** Varied use of **database systems** signals the growing demand for **scalable and adaptable data solutions**.
- **Standardization Trends:** The recurring popularity of specific tools suggests a move toward **industry standardization**, aiding **collaboration** and **development efficiency**.

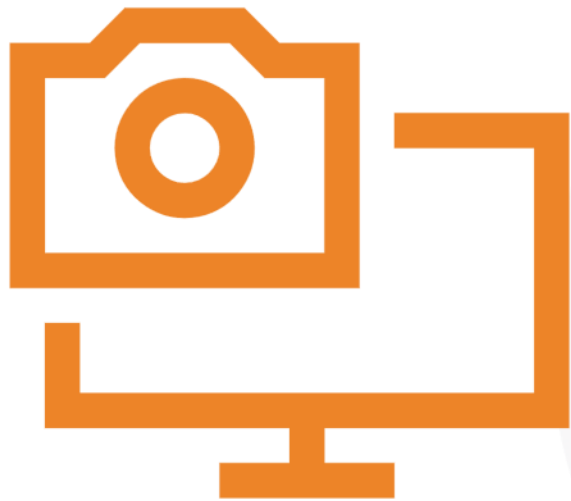
CONCLUSION



The survey underscores the **dynamic evolution of the programming landscape** and the **crucial role of technology in driving innovation** across industries. To succeed in this environment:

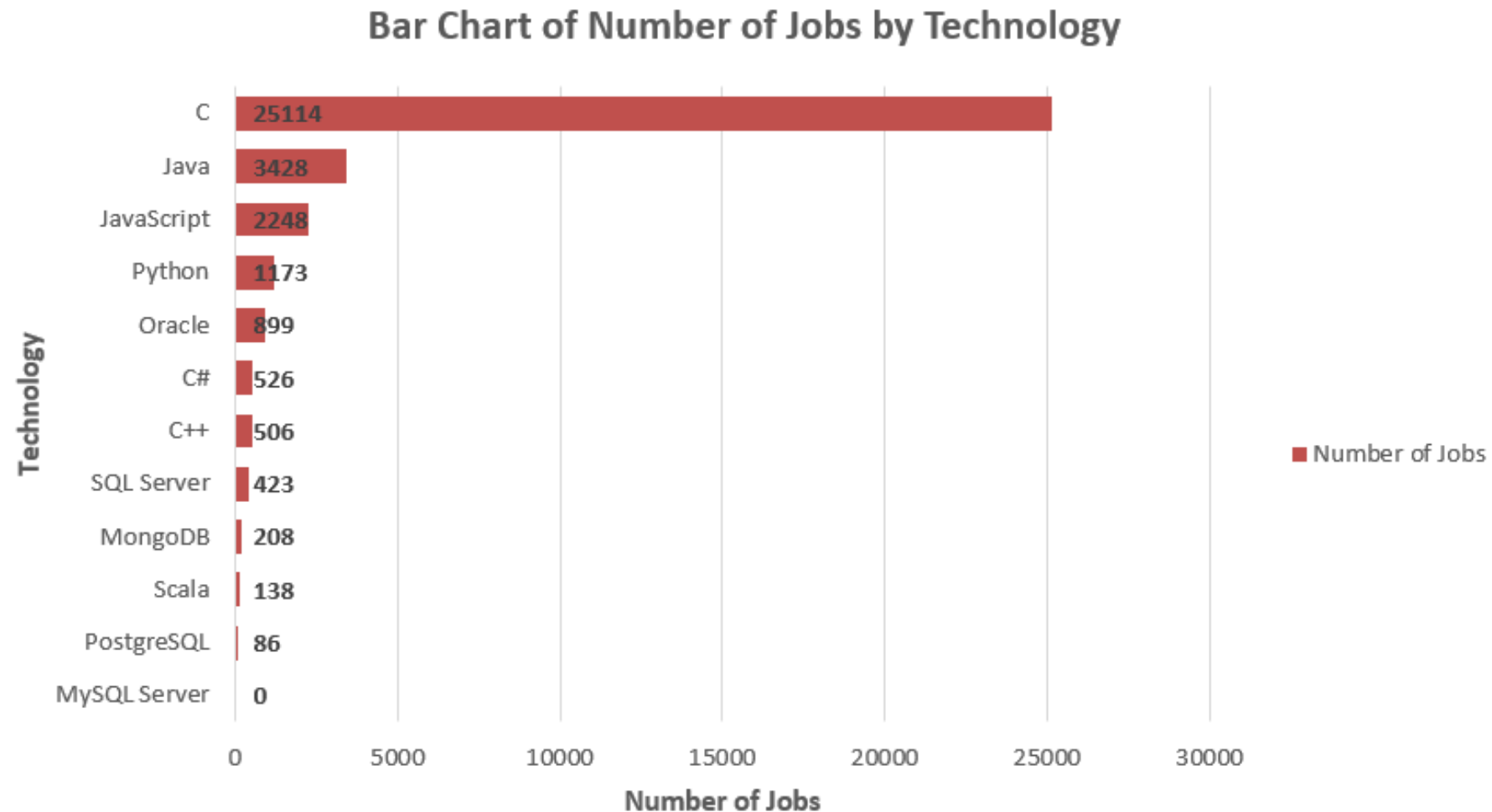
- Developers need a **strong, versatile understanding of programming languages** to stay adaptable and relevant.
- Choosing the right **database systems** is vital for meeting the **performance and scalability** demands of modern applications.
- Leveraging the **right tools and practices** ensures **efficient workflows** and **successful software project outcomes**.

APPENDIX



- A – Job Postings Chart
- B – Popular Languages Chart

A – JOB POSTINGS CHART



B – POPULAR LANGUAGES CHART

