# OUTLINE

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Methodology

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    Visualization – Charts

    Dashboard

Discussion

    Overall Findings

    Overall Implications

Conclusion

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# EXECUTIVE SUMMARY

This presentation explores the Stack Overflow Developer Survey data, providing insights into technology trends, demographic distributions, and job market dynamics among developers globally.

The methodology encompasses data collection, preprocessing, exploratory analysis, dashboard design, data collection beyond the dataset, analysis, interpretation, and documentation.

Current technology usage reveals JavaScript, HTML/CSS, and SQL dominance, with MySQL, Microsoft SQL Server, and PostgreSQL leading databases.

Future trends indicate sustained demand for JavaScript, Python, and PostgreSQL.

A gender imbalance exists within the developer community, with key job markets in cities like Washington DC and Seattle.

Implications include the need for skill development in key languages, investment in scalable databases, and promotion of diversity initiatives.
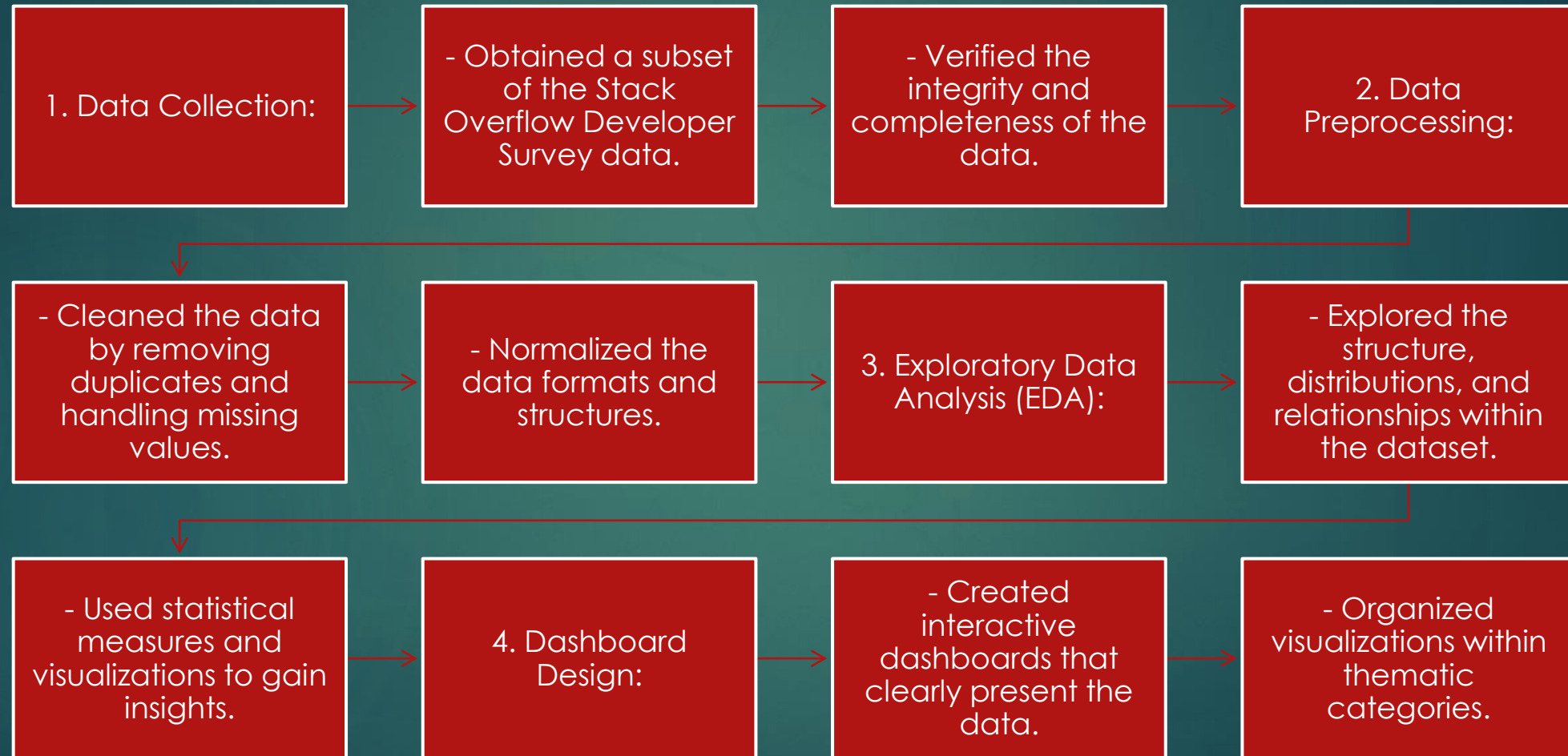
Further research could explore specific demographic or regional trends, while targeted investments in education and diversity initiatives are recommended for a resilient developer ecosystem.

# INTRODUCTION

- In this presentation, we will take a deep dive into the Stack Overflow Developer Survey data, exploring, analyzing, and visualizing it. This dataset is a collection of responses from software professionals all over the world, providing a comprehensive view of their careers, experiences, and preferences. By carefully examining the data, we intend to uncover insights that reveal trends, patterns, and correlations, helping us gain a better understanding of the global developer landscape.

# METHODOLOGY

| | | | |
|---|---|---|---|
| 1. Data Collection: | - Obtained a subset of the Stack Overflow Developer Survey data. | - Verified the integrity and completeness of the data. | 2. Data Preprocessing: |
| - Cleaned the data by removing duplicates and handling missing values. | - Normalized the data formats and structures. | 3. Exploratory Data Analysis (EDA): | - Explored the structure, distributions, and relationships within the dataset. |
| - Used statistical measures and visualizations to gain insights. | 4. Dashboard Design: | - Created interactive dashboards that clearly present the data. | - Organized visualizations within thematic categories. |

# METHODOLOGY CONTINUED

5. Data Collection Beyond the Dataset: → - Utilized the GitHub Jobs API for job openings data. → - Performed web scraping for language popularity and salaries. → 6. Analysis and Interpretation:

- Analyzed the data for trends, correlations, and insights. → - Interpreted the findings in the context of the developer community and tech landscape. → - Provided actionable recommendations. → 7. Documentation and Reporting:

- Documented the methodology, analysis, and findings. → - Prepared a concise report for a diverse audience.

# FINDINGS

1. **Current Technology Usage**:

• The top 10 programming languages worked with are JavaScript, HTML/CSS, SQL, Bash/Shell/PowerShell, Python, Java, C#, TypeScript, PHP, and C++.

• The top 10 databases worked with are MySQL, Microsoft SQL Server, PostgreSQL, SQLite, MongoDB, Redis, Elasticsearch, Oracle, MariaDB, and Firebase.

• The platforms worked with include Linux, Windows, Docker, AWS, Slack, MacOS, Android, Microsoft Azure, Raspberry Pi, WordPress, and more.

• The top 10 web frameworks worked with are jQuery, Angular/Angular.js, React.js, ASP.NET, Express, Spring, Vue.js, Flask, Django, and Laravel.

# FINDINGS CONTINUED

**2. Future Technology Trend:**

• The top 10 programming languages desired for the next year are JavaScript, HTML/CSS, Python, SQL, TypeScript, C#, Bash/Shell/PowerShell, Java, Go, and Kotlin.

• The top 10 databases desired for the next year are PostgreSQL, MongoDB, Redis, MySQL, Elasticsearch, Microsoft SQL Server, SQLite, Firebase, MariaDB, and Dynamo.

• The platforms desired for the next year include Linux, Docker, AWS, Windows, Android, Kubernetes, MacOS, Raspberry Pi, Google Cloud Platform, Slack, and more.

• The top 10 web frameworks desired for the next year are React.js, Vue.js, Angular/Angular.js, ASP.NET, jQuery, Express, Spring, Django, Flask, and Ruby on Rails.

# FINDINGS CONTINUED

3. **Demographics:**

• The gender distribution of survey respondents is 93.5% men and 6.5% women.

• The countries with the highest number of respondents are the USA, India, the United Kingdom, Germany, and Canada.

• The age group with the highest number of respondents is 28.

• The highest number of respondents hold a Bachelor's degree, followed by Master's degree holders.
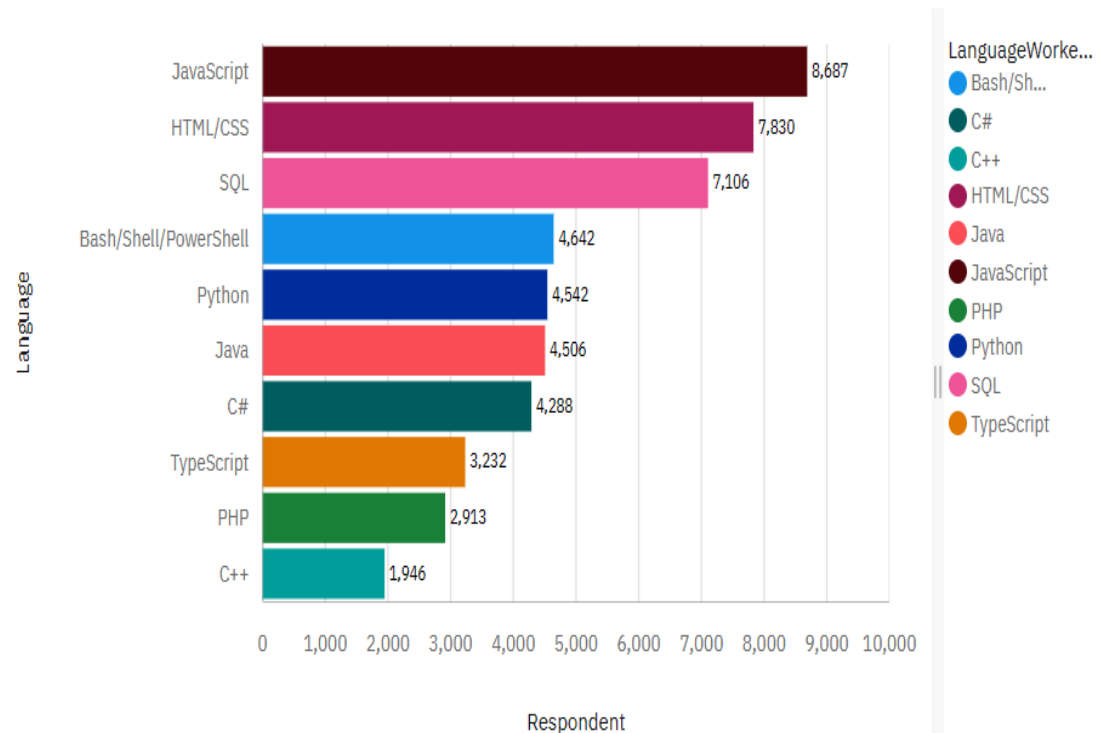
# FINDINGS CONTINUED

4. Data Collection Beyond the Dataset:

• The cities with the most job openings for key technologies are Washington DC, Detroit, Seattle, New York, and Los Angeles.

• The top 5 languages with the highest salaries are Swift ($130,801), Python ($114,383), C++ ($113,865), JavaScript ($110,981), and Java ($101,013).

These results provide valuable insights into the current technology landscape and future trends among software professionals. They also shed light on demographic distributions and job market dynamics, empowering stakeholders to make informed decisions within the evolving tech ecosystem.
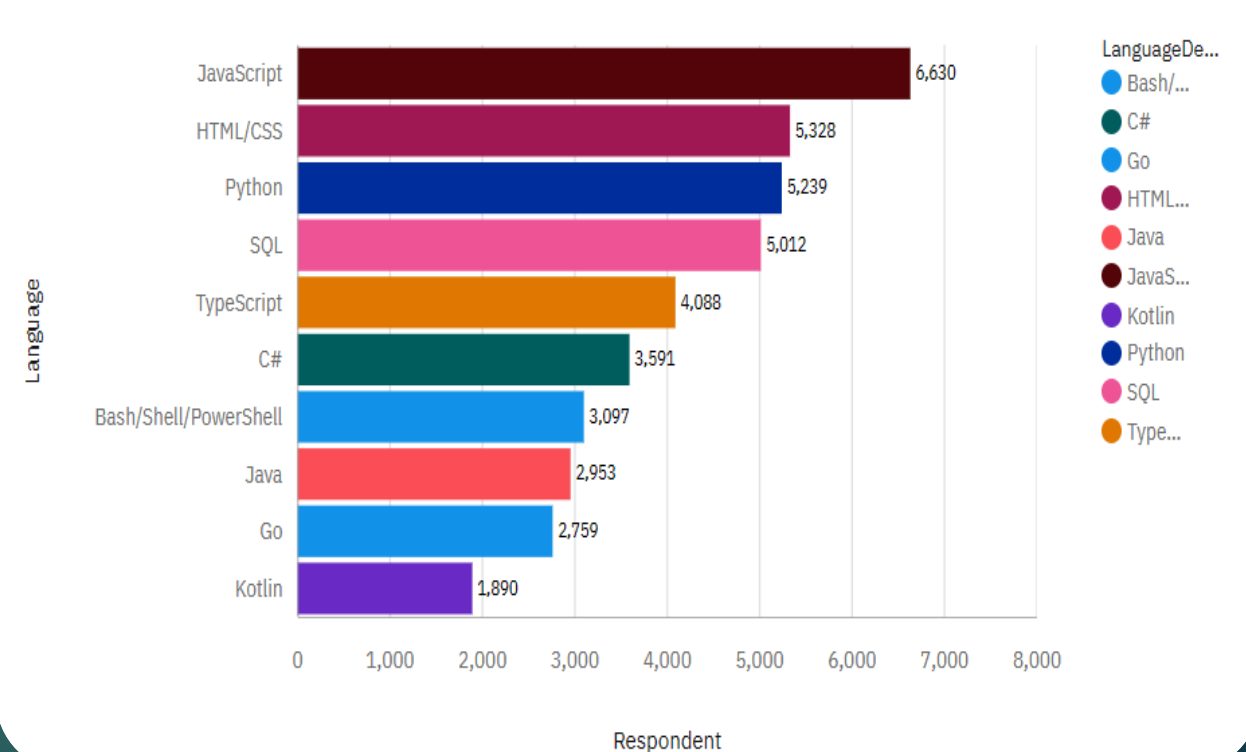
# PROGRAMMING LANGUAGE TRENDS

## Current Year

### Top 10 Languages Worked With.

| Language | Respondent |
|---|---|
| JavaScript | 8,687 |
| HTML/CSS | 7,830 |
| SQL | 7,106 |
| Bash/Shell/PowerShell | 4,642 |
| Python | 4,542 |
| Java | 4,506 |
| C# | 4,288 |
| TypeScript | 3,232 |
| PHP | 2,913 |
| C++ | 1,946 |

LanguageWorke...
- Bash/Sh...
- C#
- C++
- HTML/CSS
- Java
- JavaScript
- PHP
- Python
- SQL
- TypeScript

## Next Year

### Top 10 Languages Desired Next Year.

| Language | Respondent |
|---|---|
| JavaScript | 6,630 |
| HTML/CSS | 5,328 |
| Python | 5,239 |
| SQL | 5,012 |
| TypeScript | 4,088 |
| C# | 3,591 |
| Bash/Shell/PowerShell | 3,097 |
| Java | 2,953 |
| Go | 2,759 |
| Kotlin | 1,890 |

LanguageDe...
- Bash/...
- C#
- Go
- HTML...
- Java
- JavaS...
- Kotlin
- Python
- SQL
- Type...

IBM Developer

SKILLS NETWORK

# PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

## Findings

• JavaScript, HTML/CSS, and SQL are the most commonly used languages.

• Python and Java are also widely used, reflecting their versatility and popularity in diverse domains.

• JavaScript, HTML/CSS, and Python are the top desired languages for the future.

• TypeScript, a superset of JavaScript, is also highly desired, suggesting a growing preference for statically typed languages.
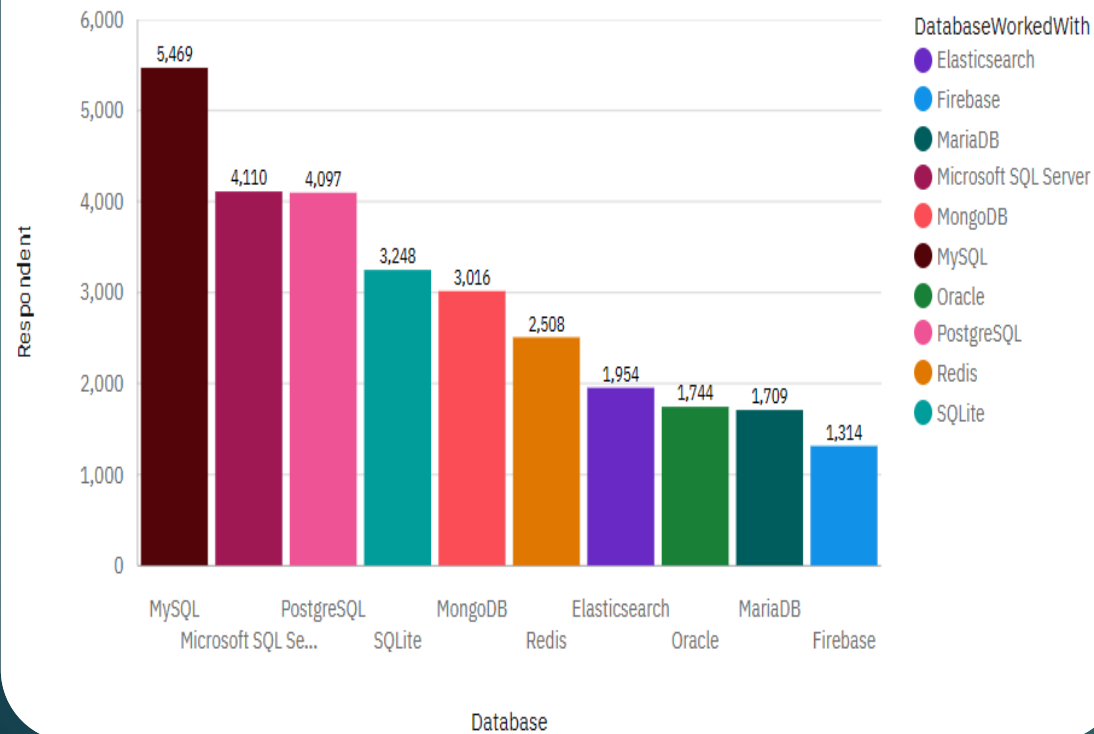
## Implications

• These languages are still essential skills for developers, indicating their continued relevance in the industry.

• There is an increased emphasis on web development languages, indicating a sustained demand for front-end and back-end development skills. Furthermore, the rise of TypeScript underscores the importance of type safety and code maintainability in modern development projects.

• Continuous learning and upskilling in JavaScript, HTML/CSS, Python, and Java are crucial for developers to stay competitive in the job market.

• The emergence of TypeScript highlights the importance of staying updated with evolving language trends to meet industry demands effectively.
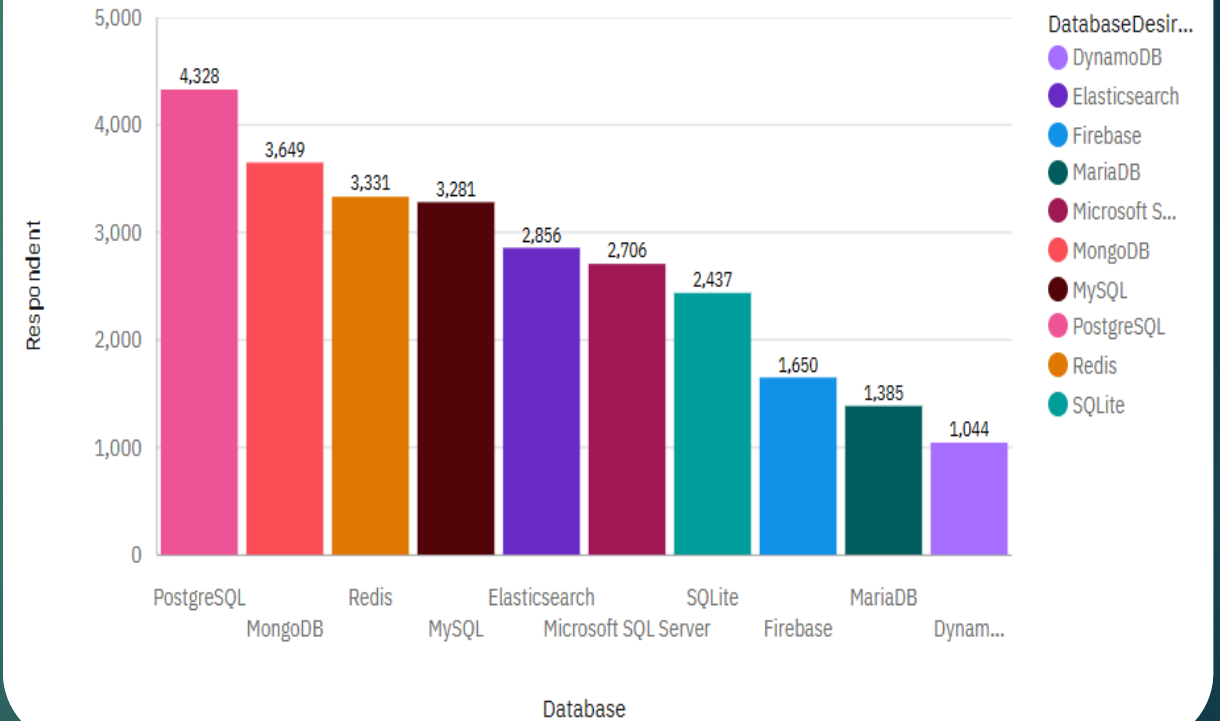
# DATABASE TRENDS

**Current Year**

**Next Year**



Top 10 Databases Worked With.

DatabaseWorkedWith
- Elasticsearch
- Firebase
- MariaDB
- Microsoft SQL Server
- MongoDB
- MySQL
- Oracle
- PostgreSQL
- Redis
- SQLite

MySQL: 5,469
Microsoft SQL Se...: 4,110
PostgreSQL: 4,097
SQLite: 3,248
MongoDB: 3,016
Redis: 2,508
Elasticsearch: 1,954
Oracle: 1,744
MariaDB: 1,709
Firebase: 1,314



Top 10 Databases Desired Next Year.

DatabaseDesir...
- DynamoDB
- Elasticsearch
- Firebase
- MariaDB
- Microsoft S...
- MongoDB
- MySQL
- PostgreSQL
- Redis
- SQLite

PostgreSQL: 4,328
MongoDB: 3,649
Redis: 3,331
MySQL: 3,281
Elasticsearch: 2,856
Microsoft SQL Server: 2,706
SQLite: 2,437
Firebase: 1,650
MariaDB: 1,385
Dynam...: 1,044

# DATABASE TRENDS – FINDINGS & IMPLICATIONS

## Findings

• MySQL, Microsoft SQL Server, and PostgreSQL are the most widely used databases.

• SQLite and MongoDB are also significantly used, indicating diverse data storage needs.

• PostgreSQL, MongoDB, and Redis top the list of desired databases for the future.

• MySQL and Elasticsearch also feature prominently in developers' desired database landscape.

## Implications

• Although MySQL and Microsoft SQL Server remain dominant, NoSQL databases like MongoDB are increasingly being adopted, indicating a shift towards more flexible data storage solutions.

• There is a growing preference for open-source and scalable database solutions, with PostgreSQL and MongoDB leading the pack. The popularity of Redis suggests a focus on high-performance caching and data manipulation capabilities, while Elasticsearch's inclusion reflects the importance of search functionality in modern applications.
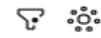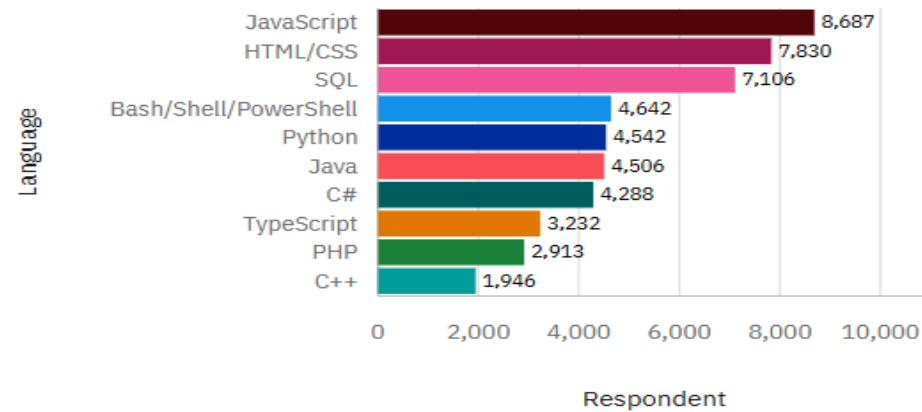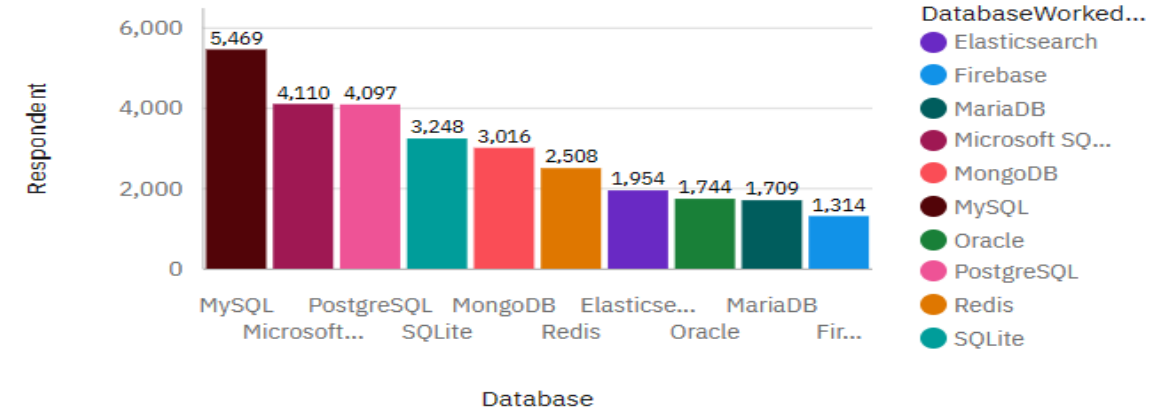
# DASHBOARD

# CURRENT TECHNOLOGY USAGE

## Top 10 Languages Worked With.

| Language | Respondent |
|---|---|
| JavaScript | 8,687 |
| HTML/CSS | 7,830 |
| SQL | 7,106 |
| Bash/Shell/PowerShell | 4,642 |
| Python | 4,542 |
| Java | 4,506 |
| C# | 4,288 |
| TypeScript | 3,232 |
| PHP | 2,913 |
| C++ | 1,946 |

Language...
- Bash...
- C#
- C++
- HTM...
- Java
- Java...
- PHP
- Python
- SQL
- Type...

## Top 10 Databases Worked With.

| Database | Respondent |
|---|---|
| MySQL | 5,469 |
| PostgreSQL | 4,110 |
| Microsoft... | 4,097 |
| MongoDB | 3,248 |
| SQLite | 3,016 |
| Redis | 2,508 |
| Elasticse... | 1,954 |
| Oracle | 1,744 |
| MariaDB | 1,709 |
| Fir... | 1,314 |

DatabaseWorked...
- Elasticsearch
- Firebase
- MariaDB
- Microsoft SQ...
- MongoDB
- MySQL
- Oracle
- PostgreSQL
- Redis
- SQLite

## Platforms Worked With.

Respondent (Count)
215 — 5,811

PlatformWorkedWith
- AWS
- Android
- Arduino
- Docker
- Google Cloud ...
- Heroku
- IBM Cloud or ...
- Kubernetes
- Linux

## Top 10 Web Frames Worked With.

Respondent (Cou...
4,629 ... 939

WebFrameWorke...
- ASP.NET
- Angular/Angular.js
- Django
- Express
- Flask
- Laravel
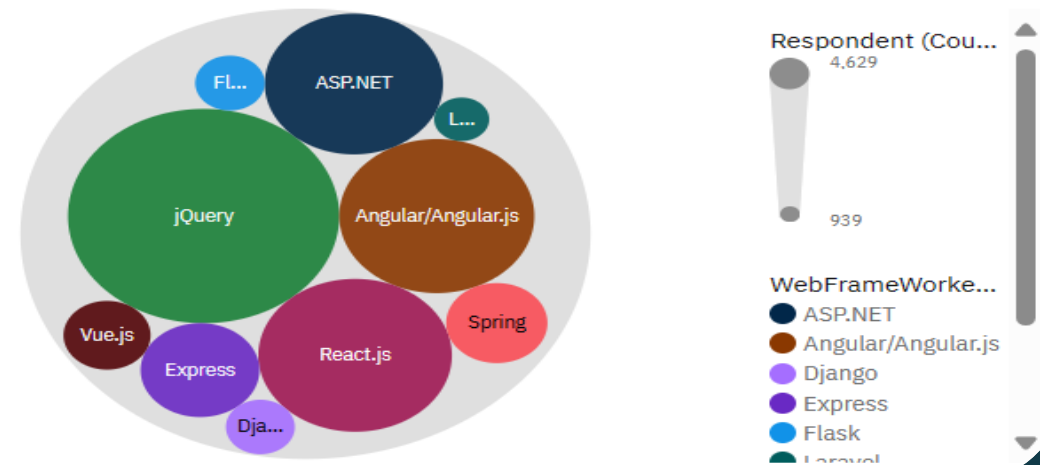
# TECHNOLOGY TREND

## Top 10 Languages Desired Next Year.

| Language | Respondent |
|----------|-----------|
| JavaScript | 6,630 |
| HTML/CSS | 5,328 |
| Python | 5,239 |
| SQL | 5,012 |
| TypeScript | 4,088 |
| C# | 3,591 |
| Bash/Shell/PowerShell | 3,097 |
| Java | 2,953 |
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| Kotlin | 1,890 |

Languag...
- Bash...
- C#
- Go
- HTM...
- Java
- Java...
- Kotlin
- Python
- SQL
- Type...

## Top 10 Databases Desired Next Year.

| Database | Respondent |
|----------|-----------|
| Postgr... | 4,328 |
| MongoDB | 3,649 |
| Redis | 3,331 |
| MySQL | 3,281 |
| Elasticsearch | 2,856 |
| Microsoft S... | 2,706 |
| SQLite | 2,437 |
| Firebase | 1,650 |
| MariaDB | 1,385 |
| Dy... | 1,044 |

Database...
- Dynamo...
- Elastics...
- Firebase
- MariaDB
- Microsof...
- MongoDB
- MySQL
- Postgre...
- Redis
- SQLite

## Platforms Desired Next Year.

Respondent (Count)   307 — 5,865

PlatformDesireNe...   307 — 5,865

Linux | AWS | Kubernetes | Google ... | Slack | Micros...
Docker | Windows | MacOS | iOS | Hero... | W...
 | Android | Raspberry Pi | Arduino | IBM... | Ot...
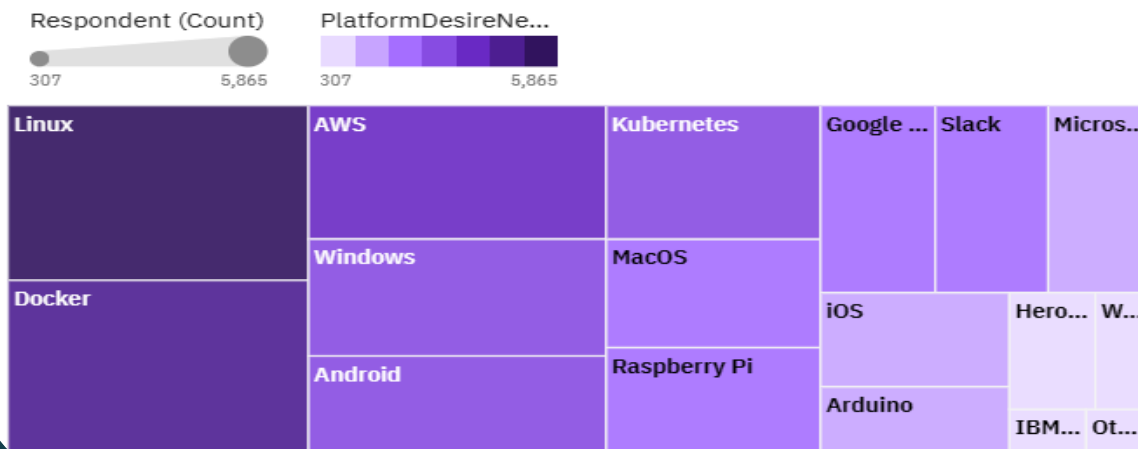
## Top 10 Web Frames Desired Next Year.
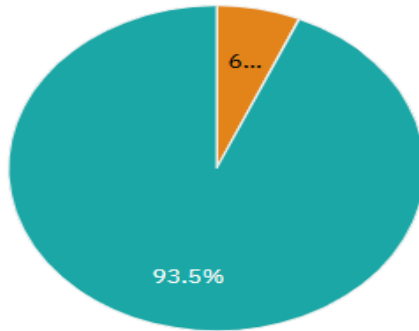
Respondent (Cou...   4,714 — 970

S... | ASP... | React.js | Vue.js | D... | jQu... | Angul... | Ex...

WebFrameDesire...
- ASP.NET
- Angular/Angular.js
- Django
- Express
- Flask
- React.js

# DEMOGRAPHICS
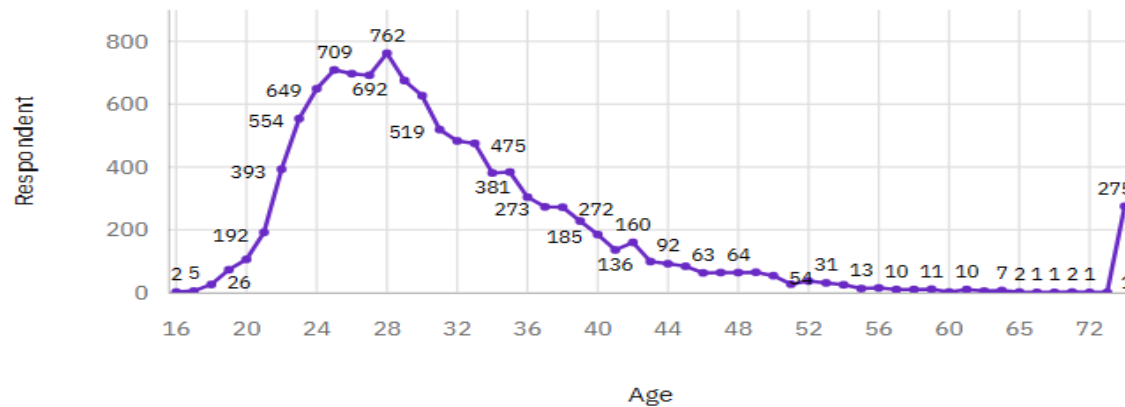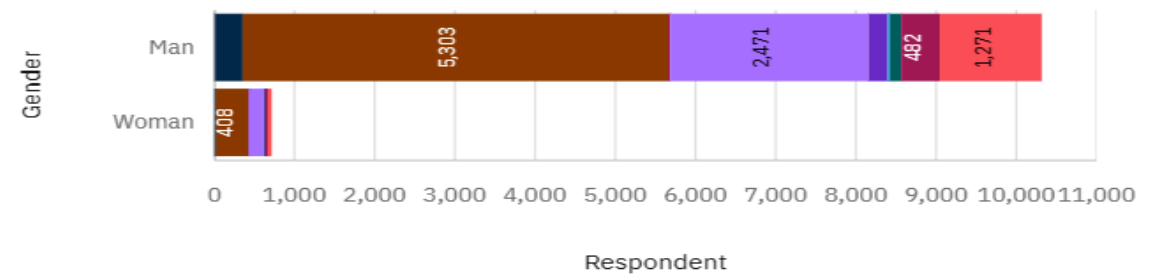
# DISCUSSION

The exploratory data analysis of the Stack Overflow Developer Survey data has provided valuable insights into current technology trends, demographic distributions, and job market dynamics within the developer community. These findings have significant implications for developers, organizations, and policymakers.
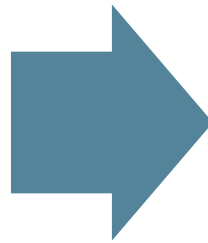
For developers, the analysis serves as a guide for skill development and career decisions, highlighting the importance of staying updated with in-demand technologies. Organizations can use the insights to optimize their technology stacks and talent acquisition strategies. Policymakers can leverage the findings to inform education and workforce development initiatives, promoting inclusivity and innovation in the tech sector.

# OVERALL FINDINGS

**Findings**

**Current Technology Usage:**

• The prevalent use of JavaScript, HTML/CSS, and SQL indicates their continued importance in software development.

• MySQL, Microsoft SQL Server, and PostgreSQL are widely used databases, with a growing adoption of NoSQL solutions like MongoDB.

**Future Technology Trend:**

• JavaScript, HTML/CSS, Python, and TypeScript are expected to remain dominant languages, emphasizing the importance of web development and code maintainability.

• PostgreSQL, MongoDB, and Redis are the favored databases for the future, highlighting a shift towards open-source and scalable data storage solutions.

**Findings**

**Demographics:**

• The majority of respondents were men, indicating a gender imbalance within the developer community.

• The USA, India, and the UK are key hubs for software professionals, reflecting global distribution patterns in the tech industry.

**Data Collection Beyond the Dataset:**

• Job openings are concentrated in tech-centric cities like Washington DC and Seattle, highlighting regional disparities in the job market.

• Language salaries vary, with Swift, Python, and C++ commanding high average salaries, suggesting the value placed on specific language proficiencies.

# OVERALL IMPLICATIONS

**Implications**

• Continuous learning and upskilling in JavaScript, Python, and SQL are essential for developers to remain competitive.

• Organizations should invest in open-source databases like PostgreSQL and MongoDB to ensure scalable and cost-effective data solutions.

• Addressing gender disparities and promoting diversity initiatives are crucial for fostering an inclusive developer community.

**Implications**

• Regional job market dynamics should inform career decisions, with opportunities concentrated in tech hubs.

• Strategic language selection can impact earning potential, emphasizing the importance of aligning skills with market demand for higher salaries.

# CONCLUSION

The exploratory data analysis of the Stack Overflow Developer Survey data offers valuable insights into current technology trends, demographic distributions, and job market dynamics among developers. These insights have significant implications for developers, organizations, and policymakers alike.
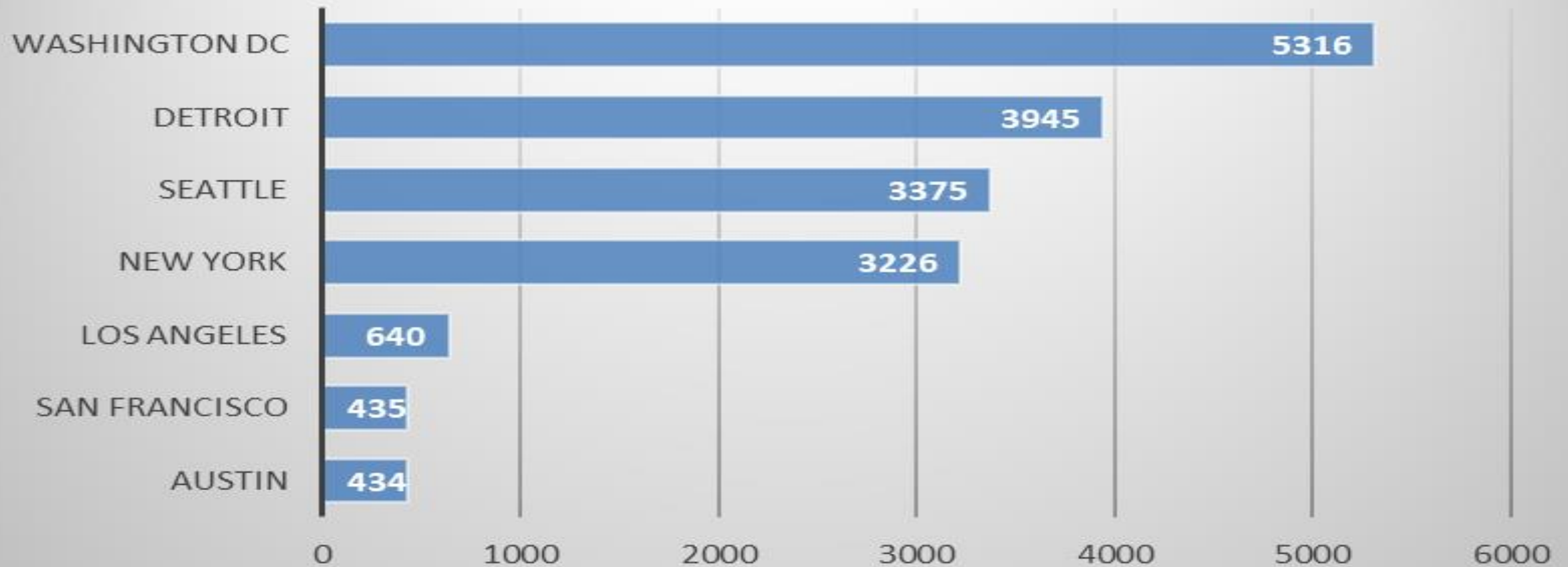
For developers, the analysis serves as a roadmap for skill development and career decisions, emphasizing the importance of staying abreast of in-demand technologies. Organizations can leverage these insights to optimize their technology stacks and refine talent acquisition strategies. Policymakers, meanwhile, can utilize the findings to shape education and workforce development initiatives, fostering inclusivity and innovation in the tech sector.

Moving forward, further research could delve into specific demographic or regional trends, while actionable steps may involve targeted investments in education and diversity initiatives to cultivate a more resilient and dynamic developer ecosystem.

# APPENDIX (JOB POSTINGS)



Job Postings by City

| City | Job Postings |
|------|--------------|
| WASHINGTON DC | 5316 |
| DETROIT | 3945 |
| SEATTLE | 3375 |
| NEW YORK | 3226 |
| LOS ANGELES | 640 |
| SAN FRANCISCO | 435 |
| AUSTIN | 434 |

# APPENDIX(POPULAR LANGUAGES)



Popular Languages by Salary

| Language | Salary |
|----------|--------|
| SWIFT | $130,801 |
| PYTHON | $114,383 |
| C++ | $113,865 |
| JAVASCRIPT | $110,981 |
| JAVA | $101,013 |
| GO | $94,082 |
| R | $92,037 |
| C# | $88,726 |
| SQL | $84,793 |
| PHP | $84,727 |