

STACK OVERFLOW SURVEY

-Our Crystal Ball into the Future

Part 1

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OUTLINE



[Slide 3] **EXECUTIVE SUMMARY**

[Slide 4] **A. INTRODUCTION** - *Context, purpose of the report, target audience and value*

[Slide 5] **B. METHODOLOGY** - Data sources, collection methods and keys wrangling steps

[Slide 6-7, 8-9, 11-13] **C. RESULTS** - Visualization – Bar charts, Column charts, Dashboard, etc.

[Slide 14] **D. DISCUSSION** –

[Slide 15] **E. CONCLUSION**

[Slide 16] **F. APPENDIX**



EXECUTIVE SUMMARY – key findings from the analysis

Programming Languages	Databases	Frameworks and Platforms
<ul style="list-style-type: none">Python, JavaScript, SQL: <i>most used</i>TypeScript, Go, Rust: <i>growing demand</i>	<ul style="list-style-type: none">MySQL, PostgreSQL: <i>dominating</i>MongoDB, Firebase(NoSQL/cloud): <i>rising</i>	<ul style="list-style-type: none">React, Node.js: <i>widely used</i>AWS, Azure strong; GCP: <i>gaining ground</i>

AI Tools	Demographic and Work Practices
<ul style="list-style-type: none">Benefits: <i>productivity, automation</i>Challenges: <i>trust, integration, skills gap</i>	<ul style="list-style-type: none">Diverse <i>age & education backgrounds</i><i>Remote/hybrid</i> work is mainstream

→ Business implications

1. *Prioritise* training for *Python, Cloud, AI*
2. *Anticipate* demand for *emerging skills*
3. *Upskill* workforce to close *talent gaps*



A. INTRODUCTION

Stack Overflow Developer Survey

- conducted by Stack Overflow platform
- captures users' professional experience, coding activities, tools and technologies used, and work practices on a **global scale**
- highlights preferences to
 - **Programming Languages,**
 - **Databases,**
 - **Frameworks and Platforms**
- provides insights into current usage and future trend.



**Our Crystal Ball
into the future**

- Purpose of Analysis

- Identify current technology usage (**Programming Languages, Databases, Frameworks and Platforms**)
- Explore future trends developers want to learn
- Understand demographics & work practices

- Target audience 🎯 👤

- *Business & technology* stakeholders
- *HR / Talent teams* planning workforce skills
- Training & learning managers

- Value 📈

- Data-driven insights for hiring & upskilling
- Guide technology adoption strategies
- Anticipate emerging developer skills

B. METHODOLOGY



- **Data Source**

- **Subset** of *Stack Overflow Developer Survey* (global dataset), supplemented by **job postings & training portals**



- **Collection Methods:** **API** access & **web scraping**, **Import** of **.csv** survey file , **SQL** queries for structured extraction



- **Data Wrangling**

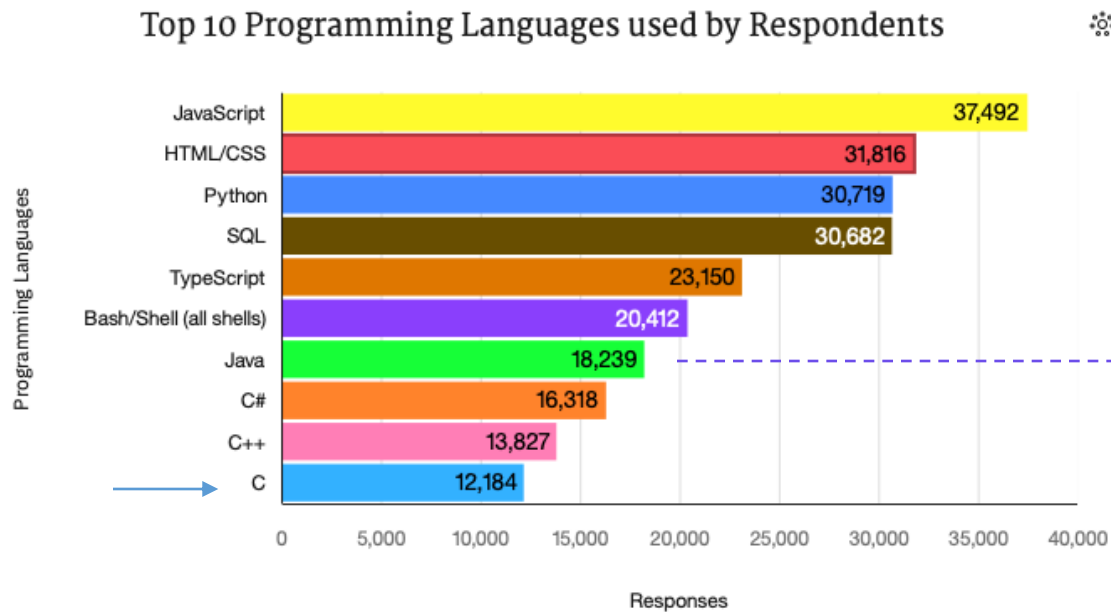
- Maintained the **data integrity** and **completeness** by
 - removing of duplicate rows
 - handling missing values
- **Standardised categories** (languages, databases, frameworks)
- Cleaned **inconsistent responses** for comparability



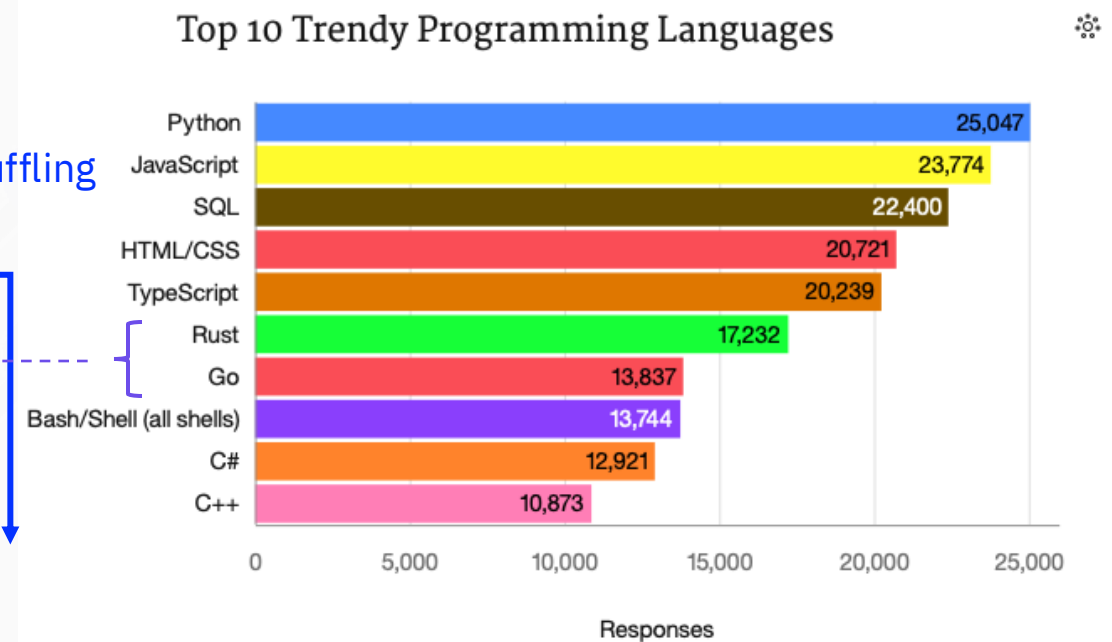
C. RESULTS - *Programming language trend*

Current trending found
for this year

Predicted trending
for next year



Shuffling



C. RESULTS – *Databases: findings and implications*

Findings

- **Python**, **JavaScript**, and **SQL** are the most popular languages used for programming and they remain the most in-demand.
- **TypeScript** gaining momentum among web developers and continues to grow in popularity
- **Rust** and **Go** emerge as rising languages with strong developer interest.
- **Java** and **C#** remain strong in enterprise settings. **C# together with Bash/Shell**, and **C++** remain relevant for specific use cases

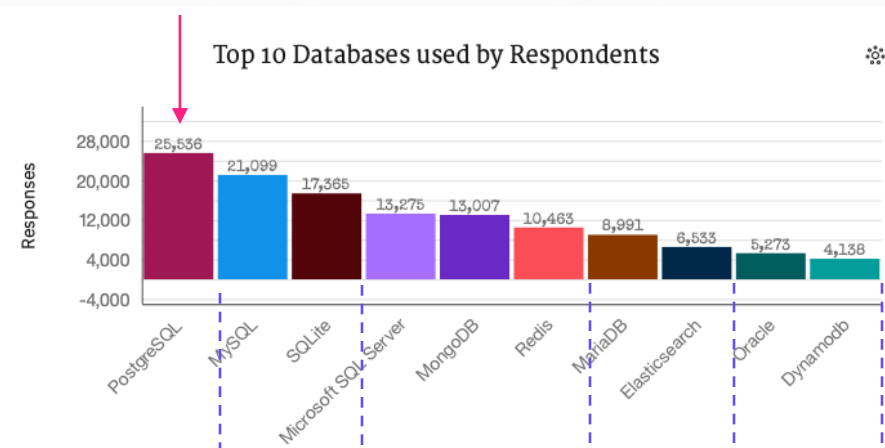
Implications

- The core and essential languages skills are **Python**, **JavaScript**, and **SQL**.
 - **Python**, **JavaScript** will stay central for data, web, and general development.
- **TypeScript** adoption suggests need for modern front-end skills
- **Rust** and **Go** represent future-oriented skills (performance, scalability, modern architectures)
- Legacy languages (**Java** and **C#**) still relevant for large-scale systems
- Early talent advantage if companies invested earlier
- Workforce planning should balance established core skills with emerging demand.

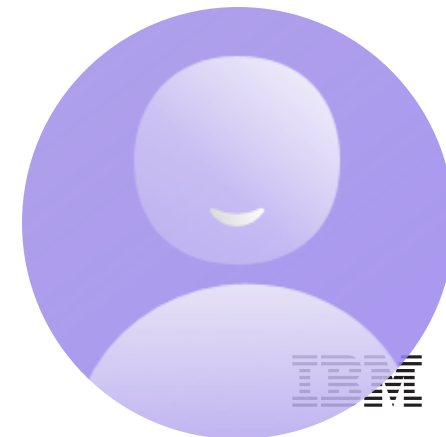
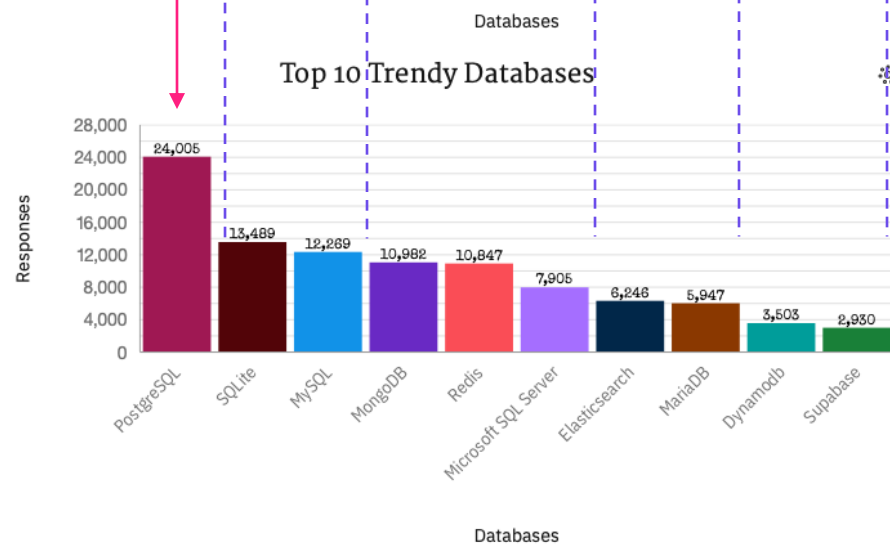
C. RESULTS – *Databases*

Current trend

Ranked by the % of each database



Predicted trend



C. RESULTS - Programming language trends: findings & implications

Findings

- **Top 3: PostgreSQL, MySQL, and SQLite**
 - **PostgreSQL** leads strongly in future preference.
 - **SQLite** and **MySQL** remain in demand for lightweight and flexible use.
- **Microsoft SQL Server** and **MongoDB** also popular.
 - **MongoDB** shows a solid growth, reflecting interest in cloud-native and NoSQL solutions.
 - Likewise, **Redis** displays a similar trend.
 - **Redis** is also very popular for specialised use cases as seen with **MariaDB** and **Elasticsearch**
- Emerging: **Supabase** gaining attention among modern developers.

Implications

- **Relational DBs** remain the backbone of enterprise systems.
- **SQL** expertise continues to be essential.
- Organisations should maintain support for both **traditional** and **NoSQL** databases.
- **PostgreSQL** expertise will remain highly valuable.
- Developers increasingly value **open-source & cloud-ready databases**.
- Upskilling in **MongoDB**, **Redis**, and newer platforms such as **Supabase** can future-proof teams.

DASHBOARD

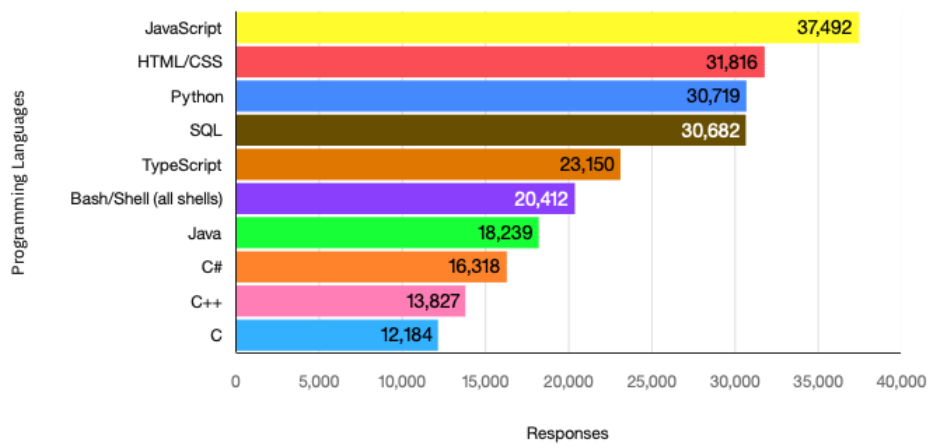


The dashboard has 3 tabs:

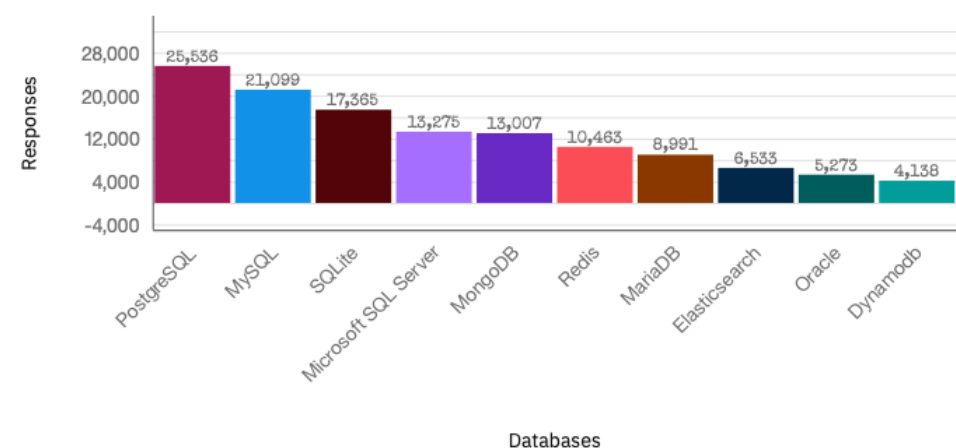
1. Current Technology Usage
2. Future Technology Trend
3. Demographic

DASHBOARD TAB 1

Top 10 Programming Languages used by Respondents



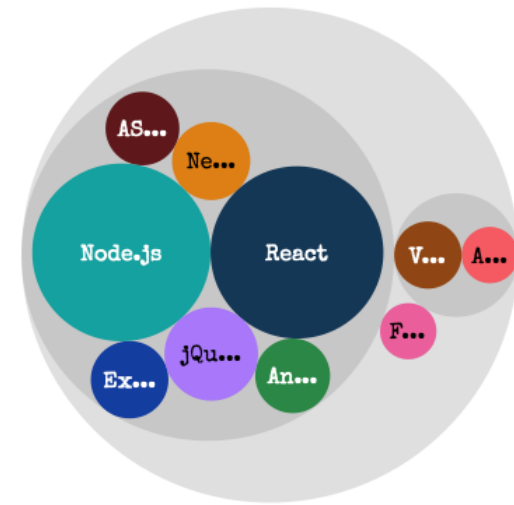
Top 10 Databases used by Respondents



Top 10 favourite Platforms from the survey



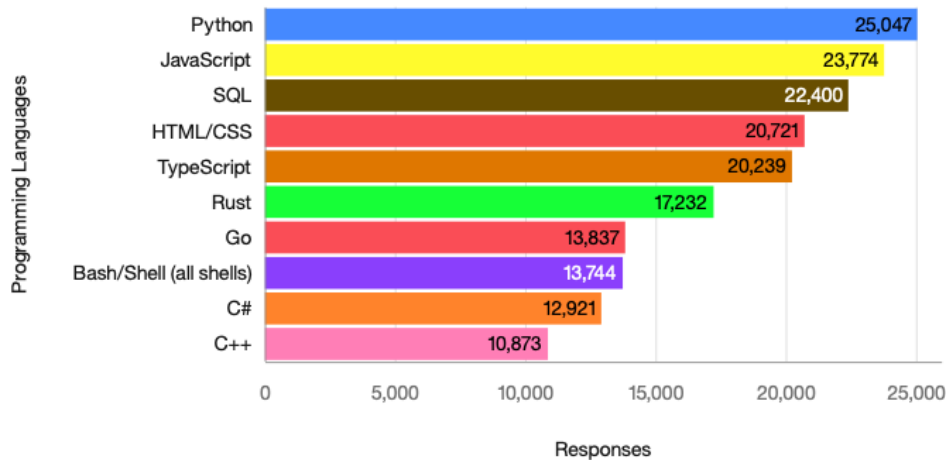
Top 10 Webframes in Trend



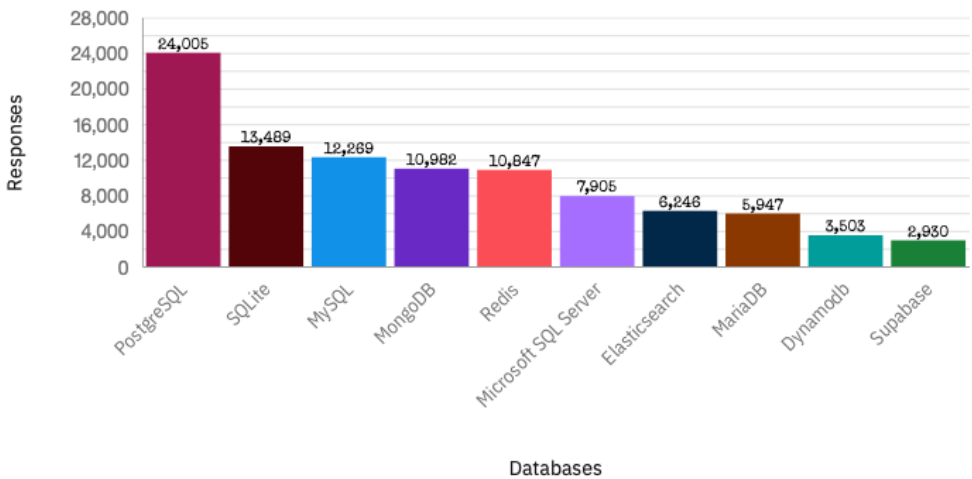
DASHBOARD TAB 2

Current Technology Usage **Future Technology Trend** Demographic

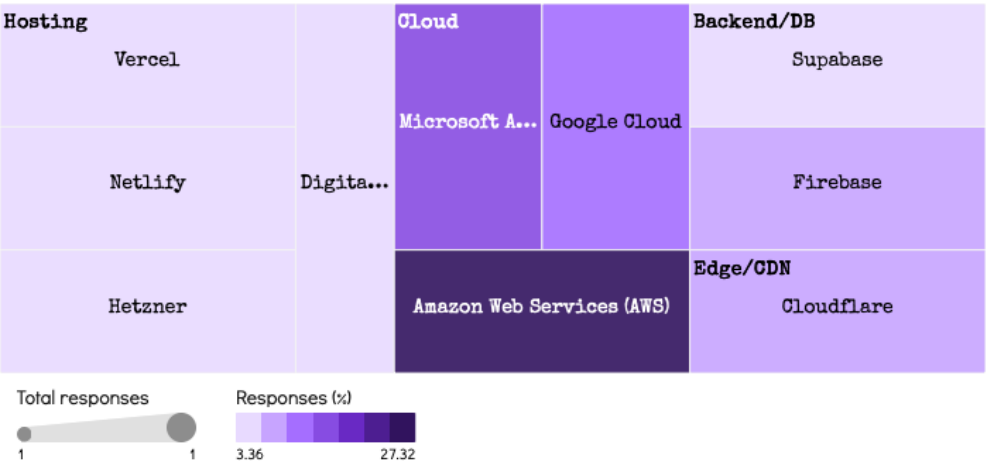
Top 10 Trendy Programming Languages



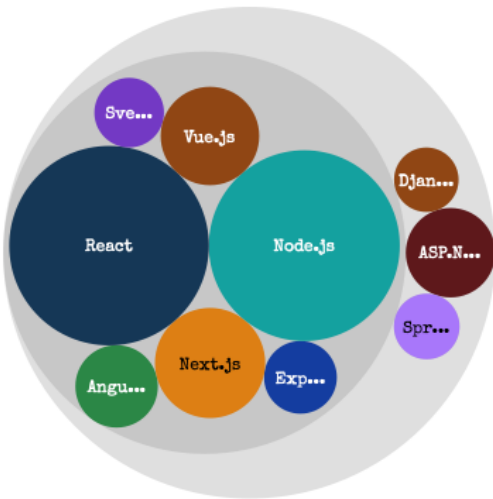
Top 10 Trendy Databases



Top 10 Trendy Platforms belonged to Cloud, Hosting, Edge/CDN and Backend/DB



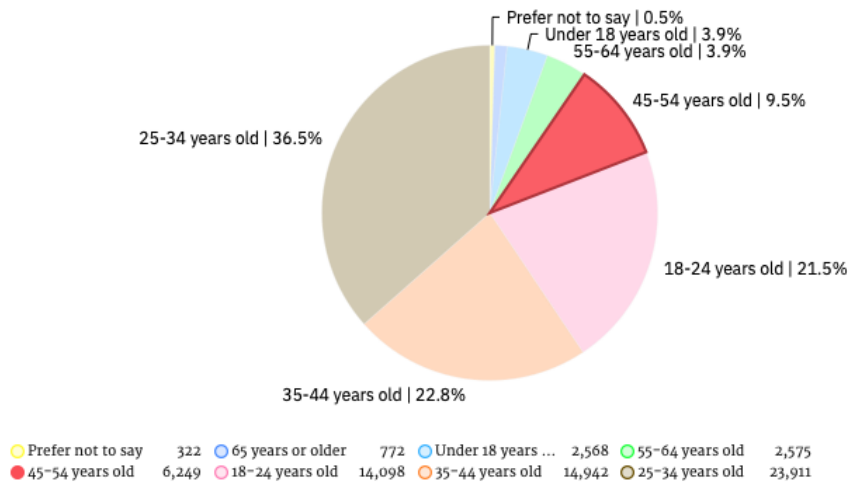
Top 10 Trendy Web-frames



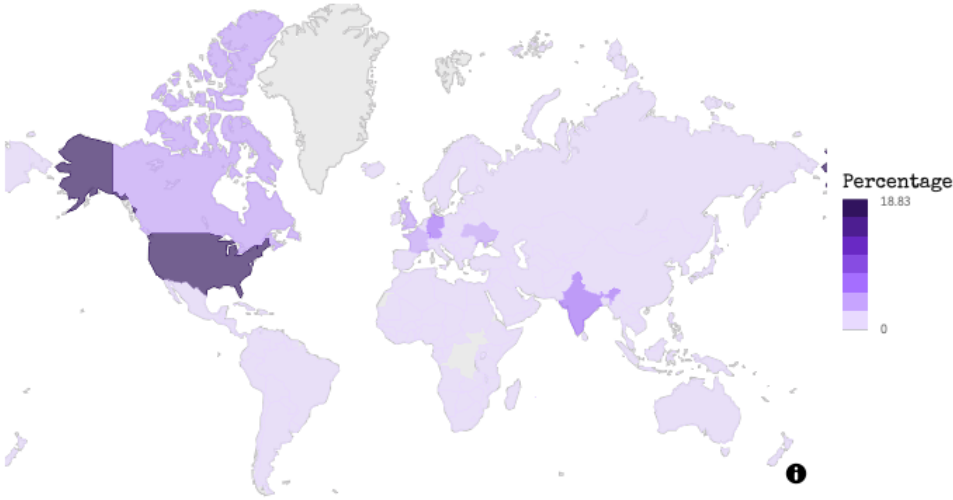
DASHBOARD TAB 3

Current Technology Usage Future Technology Trend **Demographic**

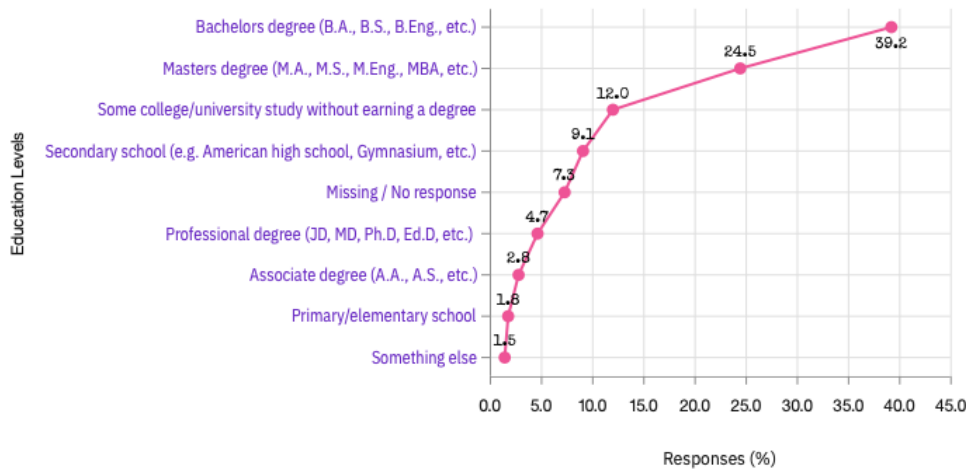
Age Group Share of Total Entries (N = 65,437)



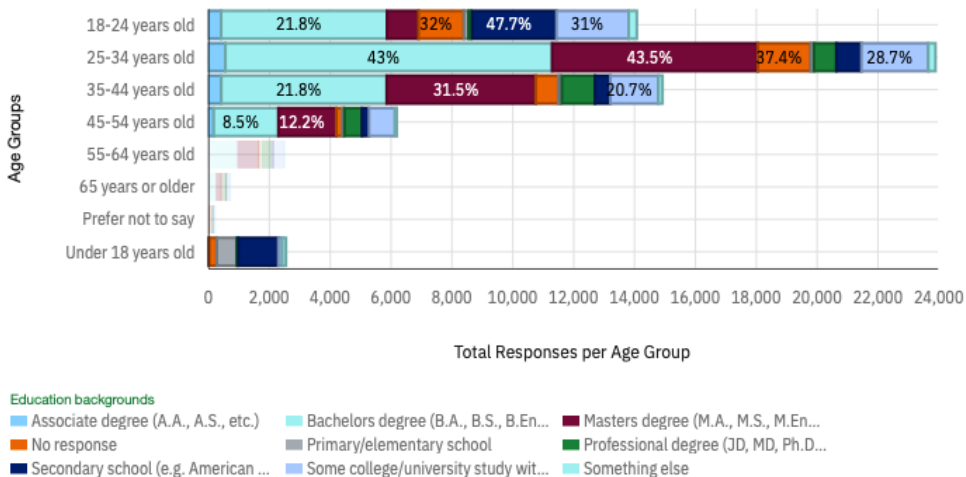
Worldwide Distribution of Respondents (%)



Respondents across Education Backgrounds (%)



Education Distribution within Each Age Group (%)



DISCUSSION – *Insights from dashboard*

Programming Languages

- **Python**, **JavaScript**, and **SQL** dominate current usage.
- Strong future demand for **Go**, **Rust**, **TypeScript**.

Databases

- **Relational DBs** (**PostgreSQL**, **MySQL**, **SQLite**) remain core.
- **MongoDB**, **Redis**, **Supabase** gaining traction.

Frameworks and Platforms

- **React** **Node.js** lead in web frameworks.
- Cloud platforms (**Amazon Web Services**, **Azure**, **Google Cloud Platforms**) central to enterprise strategies.

AI Tools

- Boost productivity and automation.
- Key challenges: **trust, integration, and skill gaps**.

Demographic and Work Practices

- **Respondent Demographics (N = 65,437)**
- Majority aged **25–34 (36.5%)**, followed by **35–44 (22.8%)** and **18–24 (21.5%)**
- Strong educational background: **39% Bachelor's** and **25% Master's** degrees
- Respondents represent a **global distribution**, ensuring diverse insight



Overall Findings & Broader Implications

Programming Languages

- **Python** dominance
- Emerging challengers (**Rust** and **Go**)
- Continuous learning required

Databases

- **SQL** still core
- Growth in **NoSQL** (**MongoDB**, **Elasticsearch**)
- Early adoption = edge

Frameworks and Platforms

- Cloud-native priority (**AWS**, **Azure**, **GCP**)
- Web & mobile frameworks evolving
- Remote/hybrid collaboration tools

AI Tools

- Expanding adoption of **AI/ML libraries**
- Increasing demand for **automation**
- Strategic investment in **AI skills**

- ➔ • **Upskilling is critical** → Continuous training in **Python**, **cloud**, and **AI** remains essential for long-term competitiveness.
- ➔ • **Tech adoption drives advantage** → Early adoption of emerging programming languages and databases can secure a competitive edge.
- ➔ • **Flexible work is the norm** → Workforce strategies must integrate remote and hybrid collaboration.
- ➔ • **Strategic alignment matters** → Hiring, training, and tech investments should track with shifting developer trends

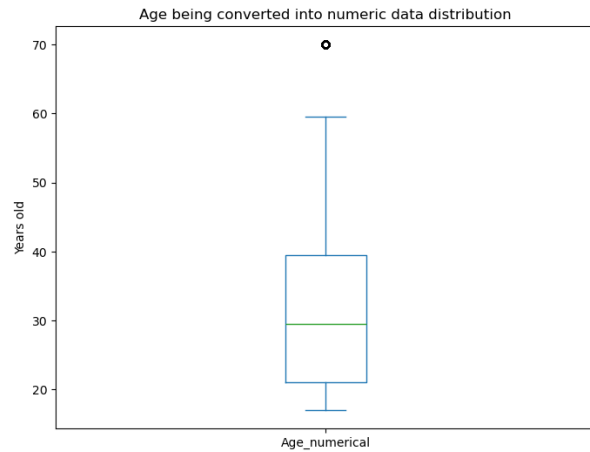
CONCLUSION

- The Stack Overflow survey reaffirms that the **tech landscape** is *evolving faster than ever*
- The dataset offers *a glimpse into the future of*
 - **Programming Languages, Databases, Frameworks and Platforms**
- Rapid advances will create **technical and talent gaps**.
- These gaps can only be bridged through:
 - *continuous upskilling*
 - *early adoption of emerging technologies*
 - *and flexible workforce strategies*
- Success depends on how well organizations
 - **align hiring, training, and investment with shifting trends.**

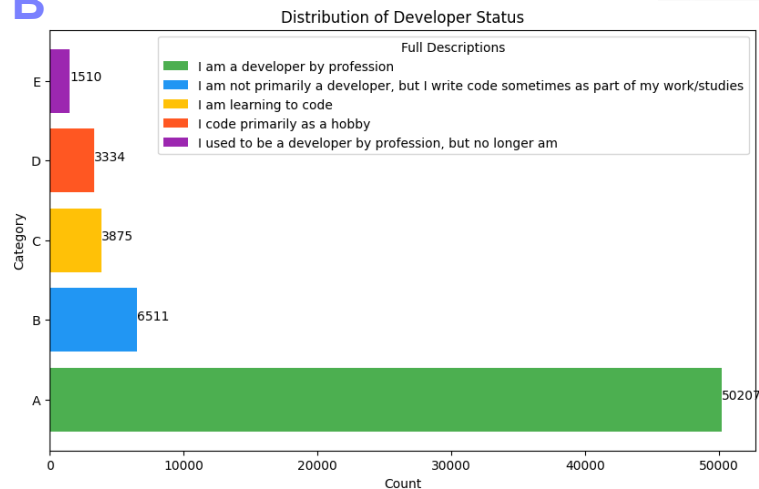


APPENDIX

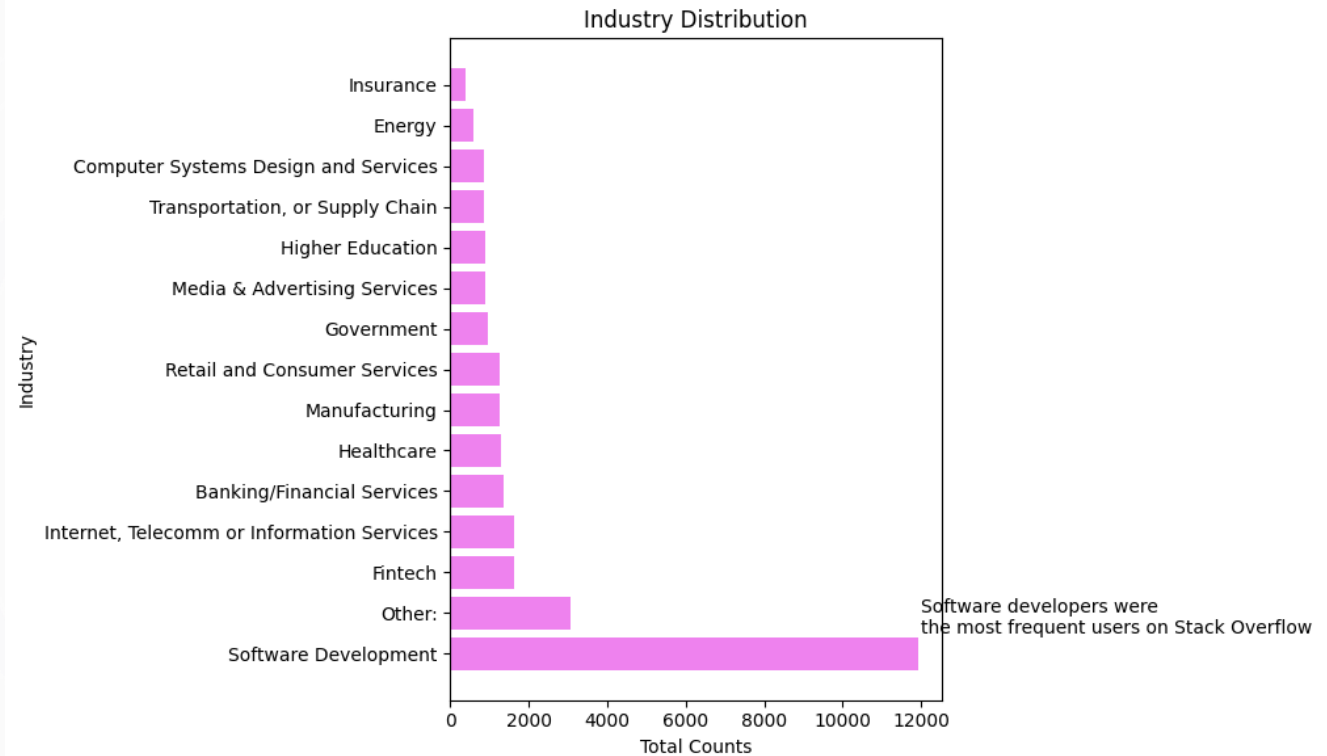
A



B



C

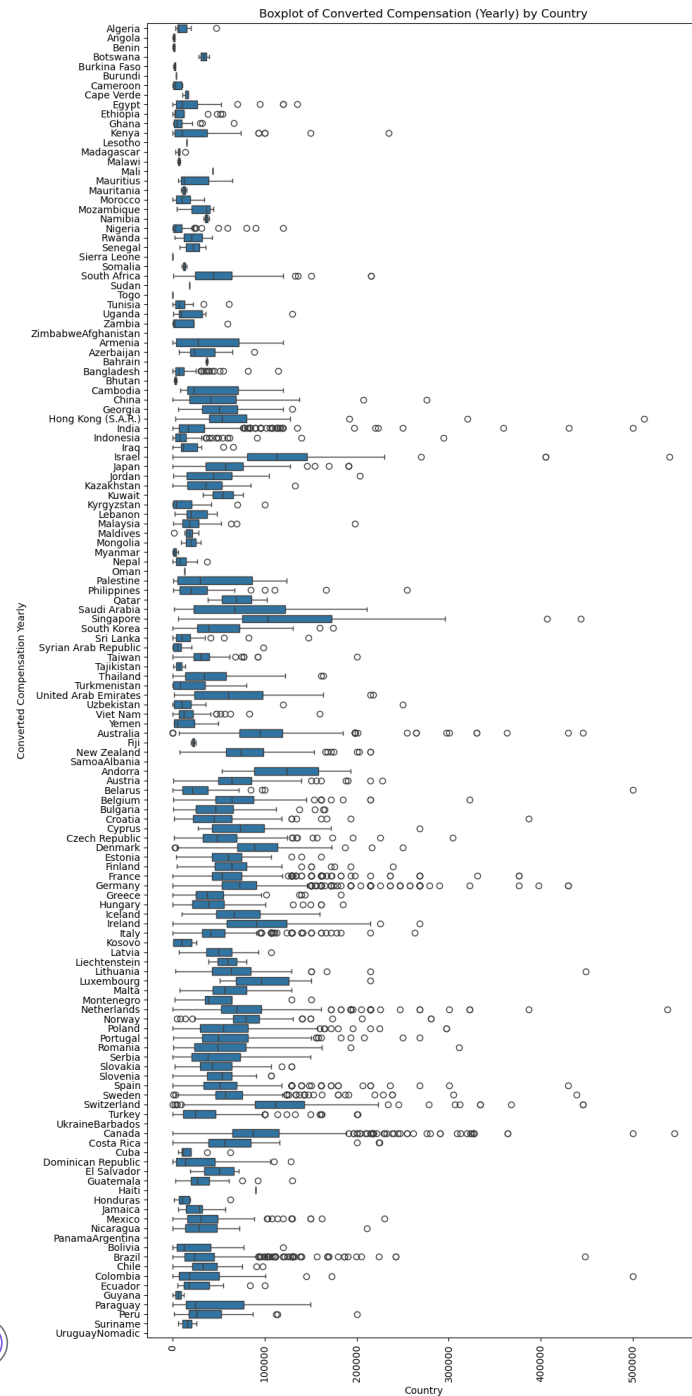


Supplementary charts present

- Age distribution (A), Developer status categories (B) and Industry (C)

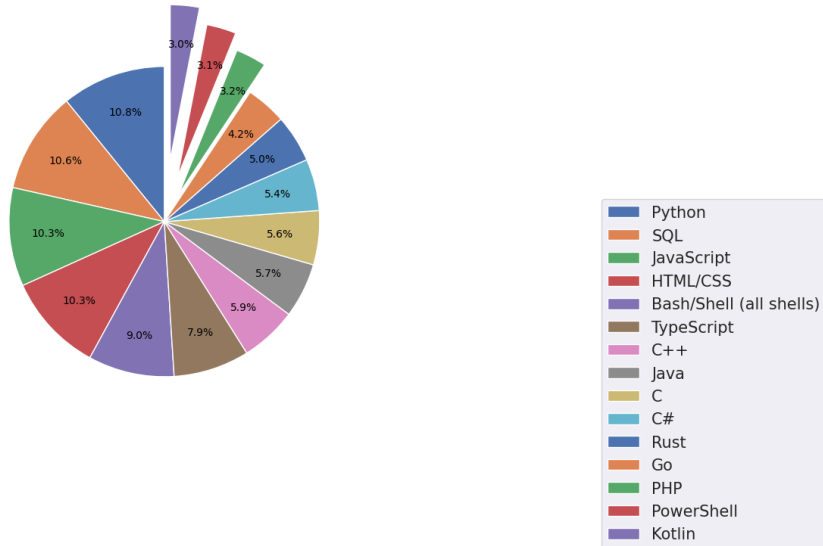


D



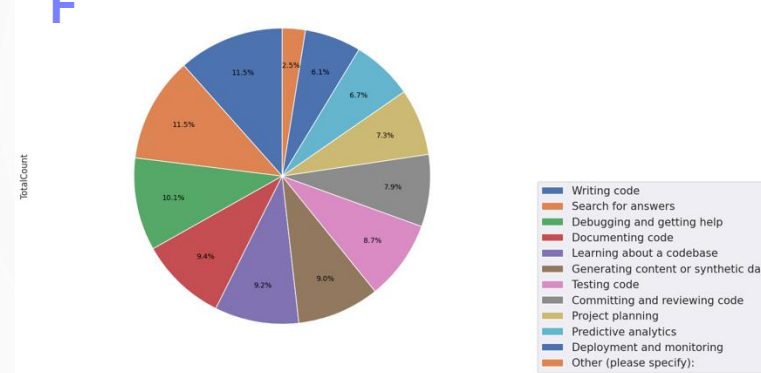
E

Top 15 Admired Languages



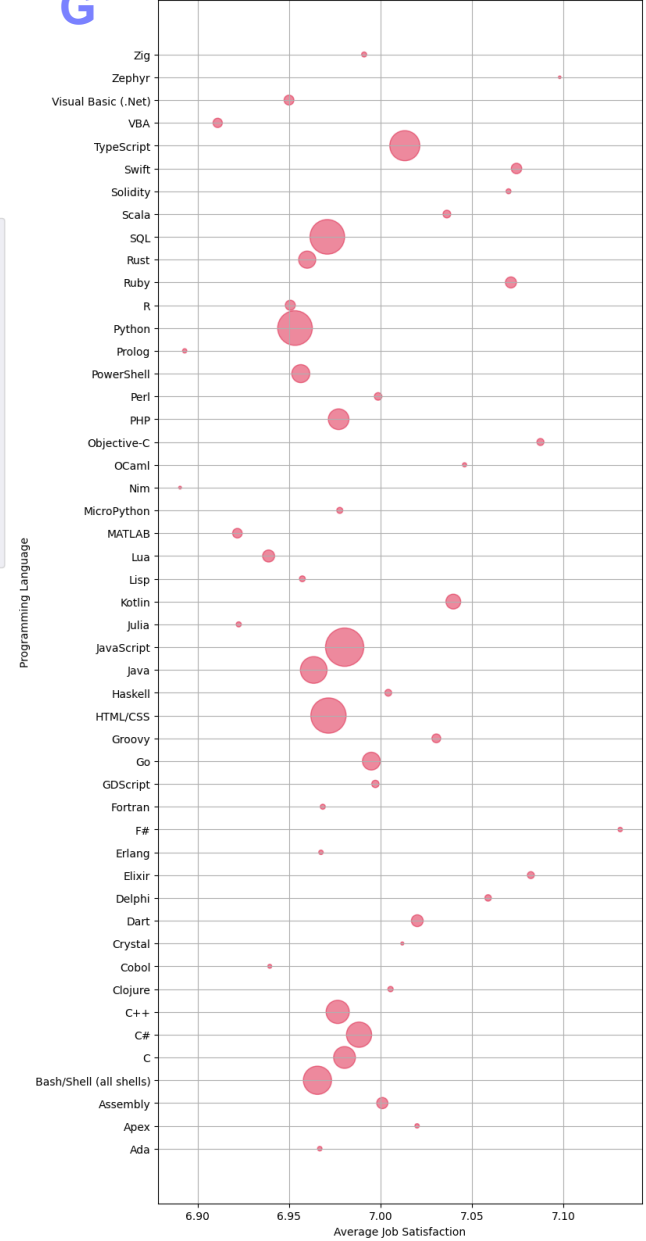
F

Top AI tools



G

Job Satisfaction by Programming Language with Popularity



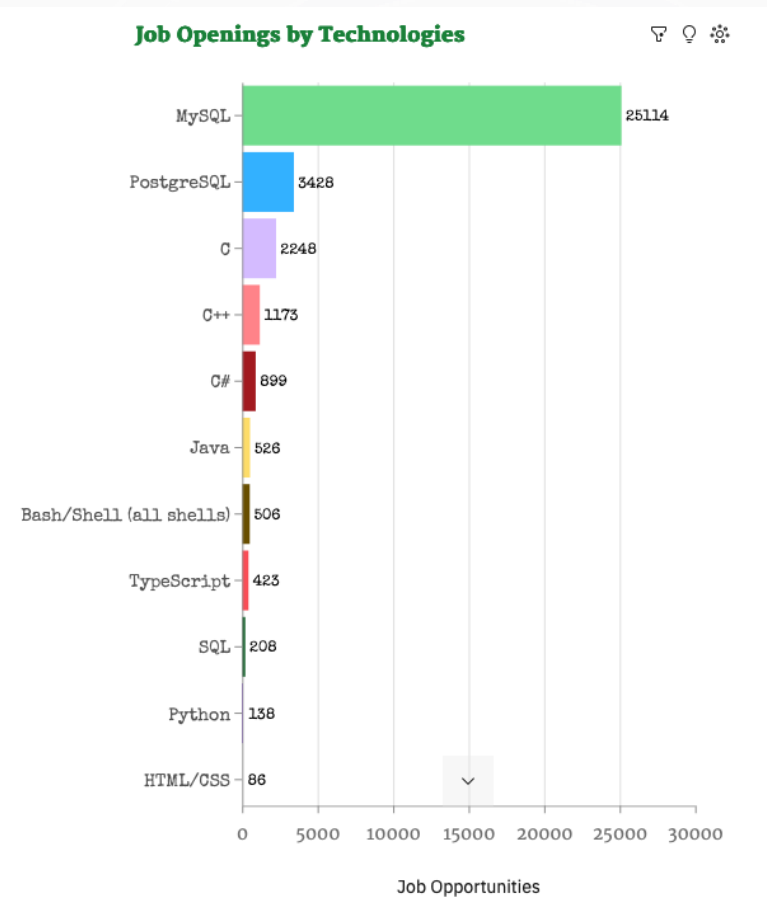
Supplementary charts show

- Responses per country in terms of their Compensation (D)
- Top 15 languages that are admired (E)
- Top AI tools (F)
- Satisfaction for each programming language, the size of bubbles shows the popularity (G)



JOB POSTINGS

In Module 1 you have collected the job posting data using Job API in a file named “job-postings.xlsx”. Present that data using a bar chart here. Order the bar chart in the descending order of the number of job postings.



POPULAR LANGUAGES

In Module 1 you have collected the job postings data using web scraping in a file named “popular-languages.csv”. Present that data using a bar chart here. Order the bar chart in the descending order of salary.

