IBM Data Analyst Capstone Project:
Emerging Trends in Data Analytics

Matthew C. 11/06/2025

OUTLINE

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- Discussion
  - Findings & Implications
- Conclusion
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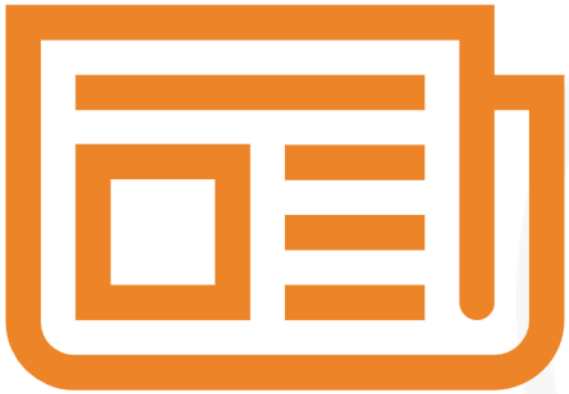
EXECUTIVE SUMMARY

- Important to shift to understanding the more dynamic languages such as Supabase, Swift and Rust
  - Traditional programming languages and databases are slowly phasing out
- Technology products are becoming more personalized and creative based on the languages used i.e. App design
- "Friendly" languages like Python and SQL are still currently popular
  - High-level languages that are allow for more creativity and Object Oriented Programming
- Inflation of technology market likely contributing to shift in fewer coders
  - While the US is still a global superpower in the global technology market, younger generation opting for more creative work

INTRODUCTION

- New trends in data analytics are helping businesses enhance efficiency, improve decision-making, and gain a competitive edge
- As a Global IT and Business Consulting Firm, it is imperative we remain competitive in the rapidly evolving technology landscape
- Utilized Developer Surveys, a comprehensive dataset to identify trends for this year's on in-demand skills.
- Key Questions:
  - Which programming languages are most in demand?
  - Which database technologies are currently most sought after?

METHODOLOGY



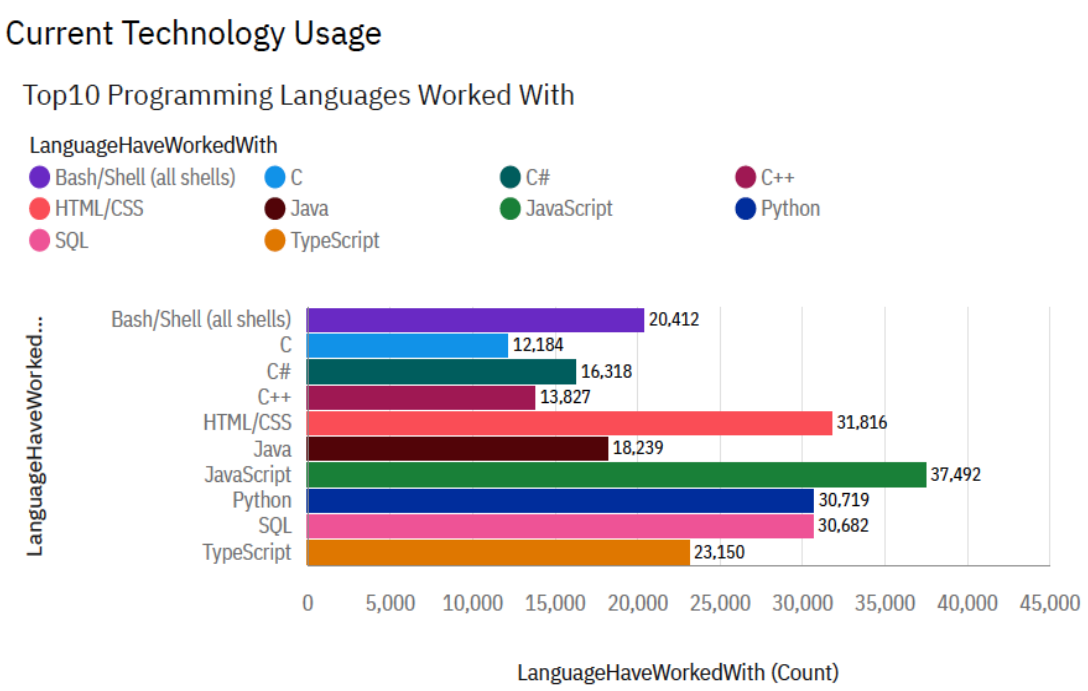
- **Data source:** Surveys including Stack Overflow Developer Survey, a comprehensive dataset offering insights into the global developer community
- Employ statistical techniques to analyze the data, identifying key trends and insights
- Accessed data source through scraping internet website's and accessing API's
- Data wrangled to remove duplicates, missing data (nan's)
  - If partial data missing, used most common answer in column to fill missing values. Applied to columns where there was a large discrepancy from most common value and second most common value
- Synthesized findings using IBM Cognos Analytics to create a dashboard that visualizes the results.

RESULTS

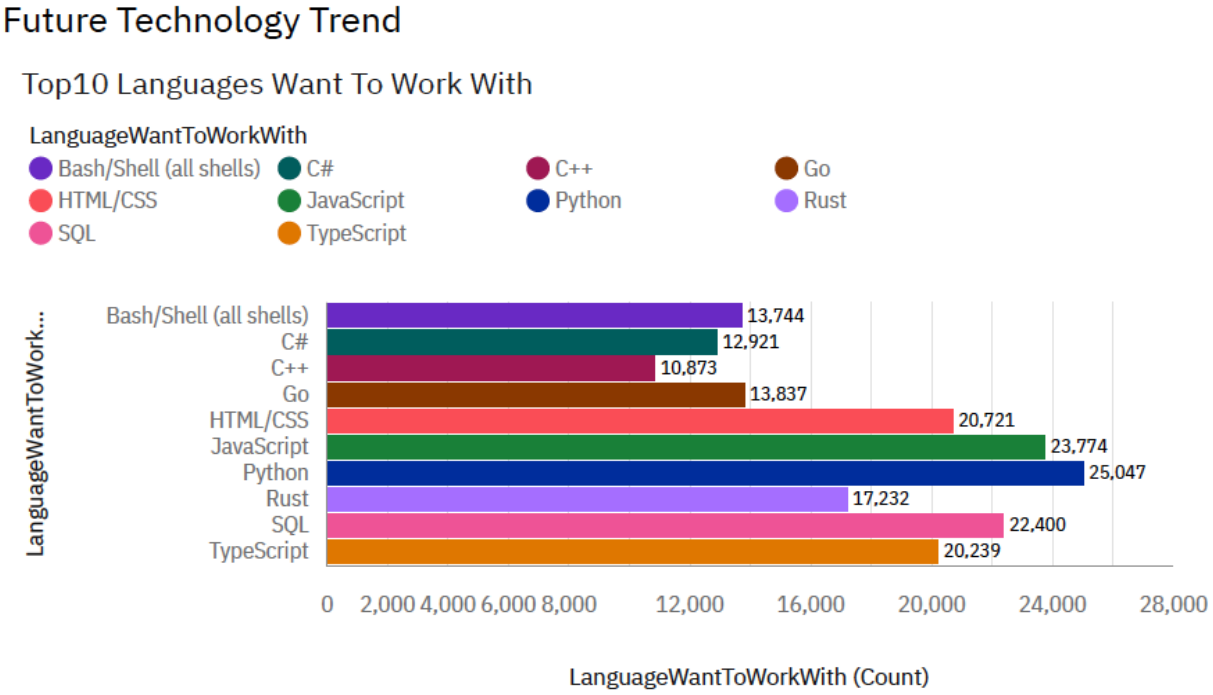
- With many large businesses having C as their backend language, demand in job listing is to know how to program in C
- Constrasted by trend for more efficient, automated and versatile languages becoming popular such as Swift
  - Utilizing AI for writing code – useful for backend code (see Appendix)
- More people are opting for full-stack work but focusing more so on frontend
- Shift could be result from doing more freelance, independent work
- Overall, young workforce majority earning a Bachelor's Degree
- United States still the global superpower in technology (see Appendix)

PROGRAMMING LANGUAGE TRENDS

Current Year



Next Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

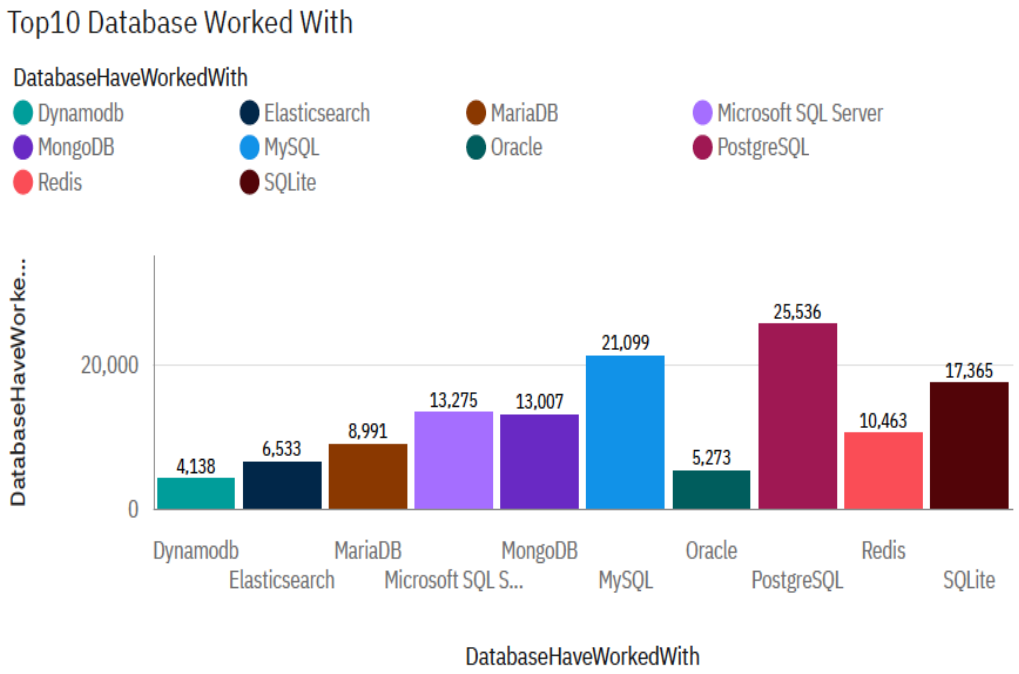
- New programming languages becoming popular i.e. Rust and Swift (see slide 20 – Popular Languages)
- Traditional languages are slowly phasing out
- Overall drop in programming population

Implications

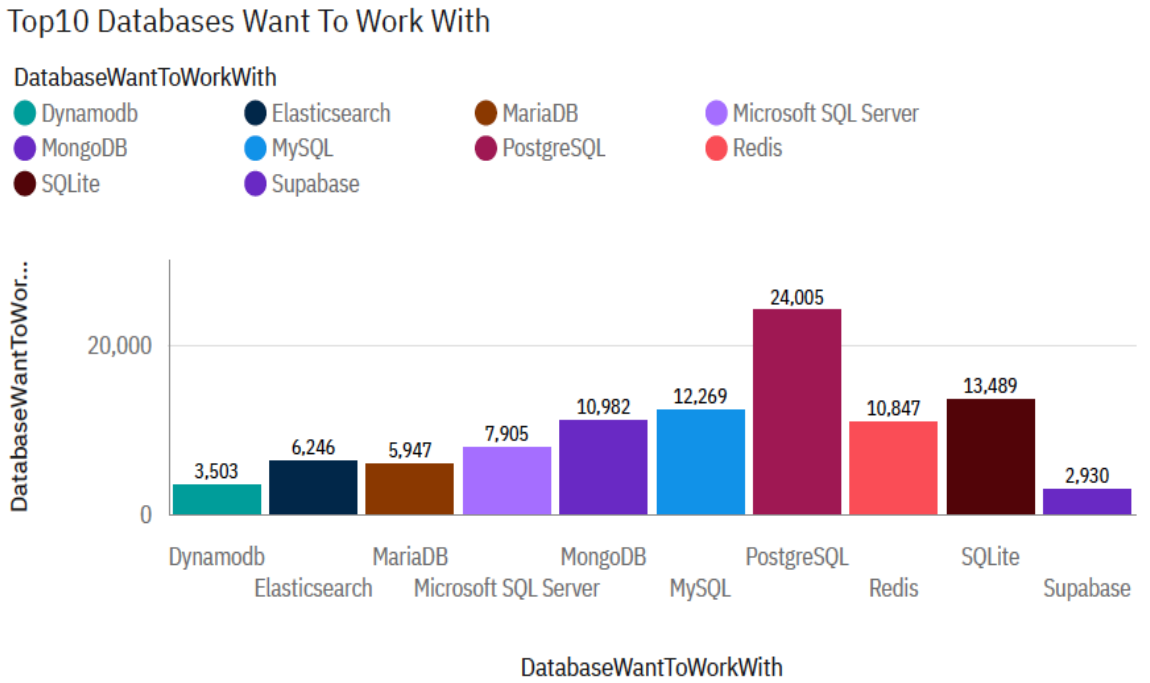
- There is a trend for modern languages that are more efficient (concurrency), safe and versatile (both low-level and high-level programming capabilities)
- While Python for the short-term remains a popular entry language, low-level languages like C is much less sought after
- Steep rise of technological innovation and an inflated market suggests trend for more human-to-human related products/businesses

DATABASE TRENDS

Current Year



Next Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- Fewer people are utilizing databases in their work
- SQL remains king
- Desire for convenience when handling backend work with the rise of Supabase

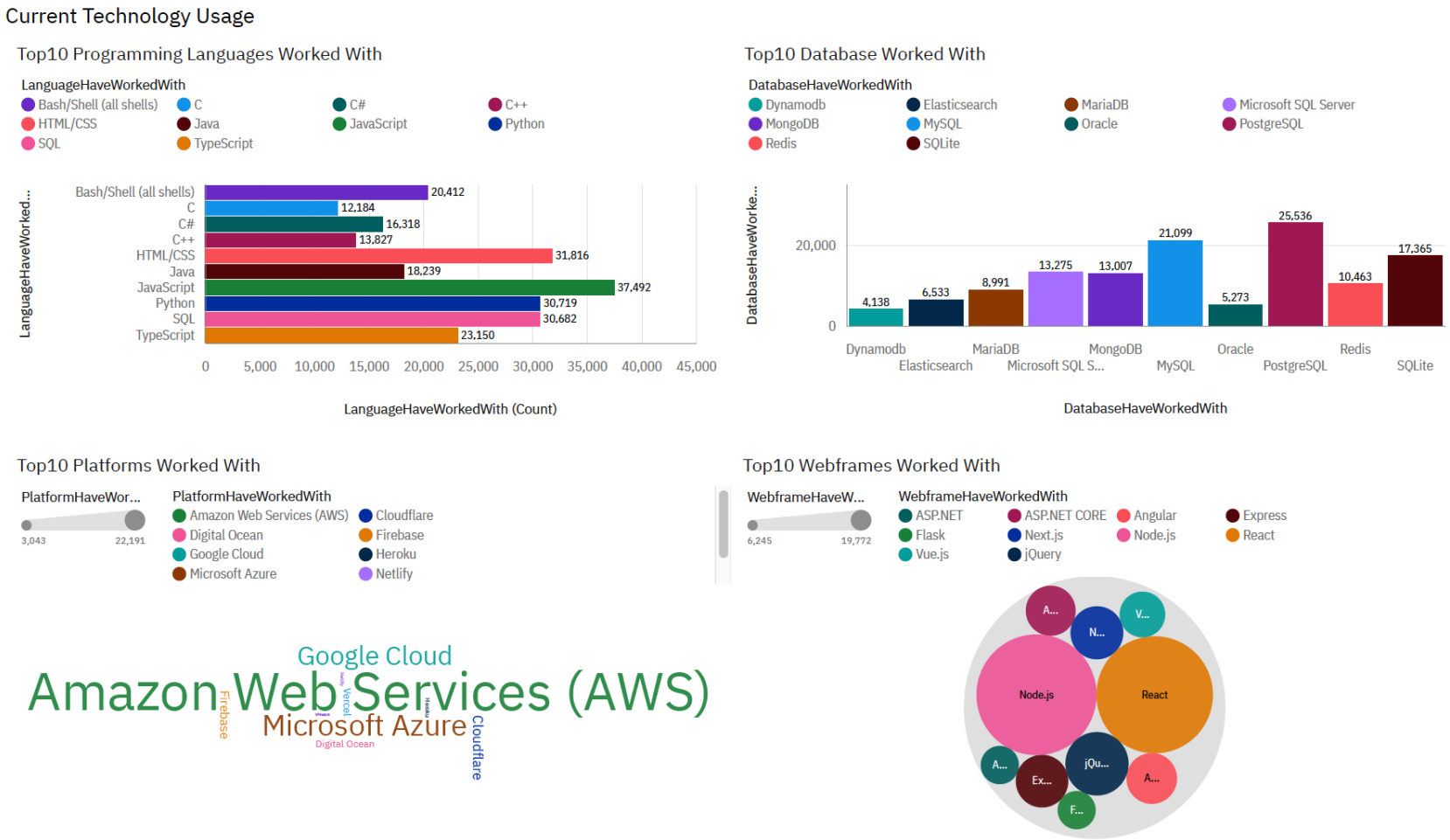
Implications

- Overall drop in those who use databases. Likely to do with trend of inflated technology market but also type of technology products
- Despite downward trend, SQL continues to be the language most used when handling databases as most are satisfied with the language
- Developers are becoming more frontend focused and opting for languages that can automate the backend for them

DASHBOARD LINK

https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&id=i248770A890814504A40DC245D31CD7FD&options%5BdisableGlassPrefetch%5D=true&options%5Bcollections%5D%5BcanvasExtension%5D%5Bid%25%E2%80%A6

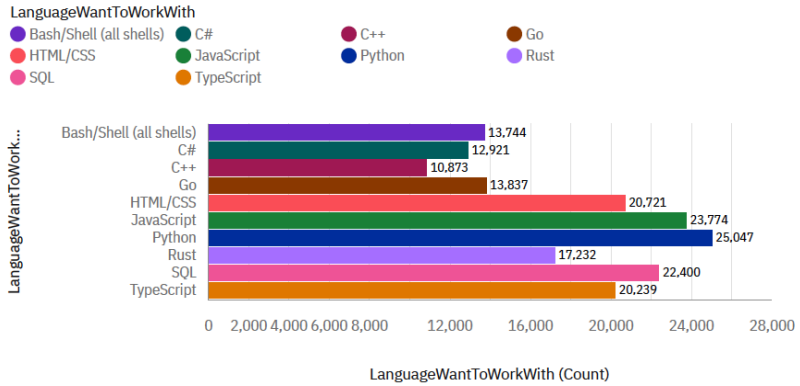
DASHBOARD TAB 1



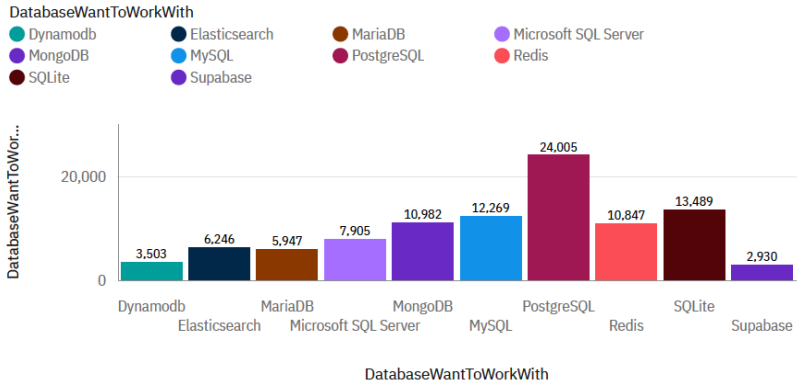
DASHBOARD TAB 2

Future Technology Trend

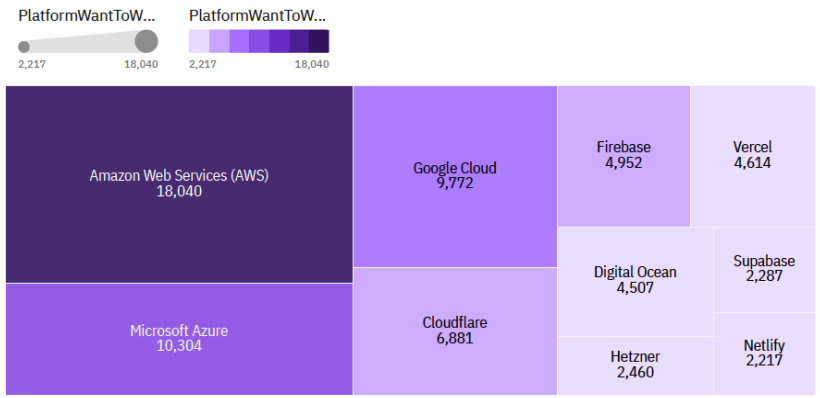
Top10 Languages Want To Work With



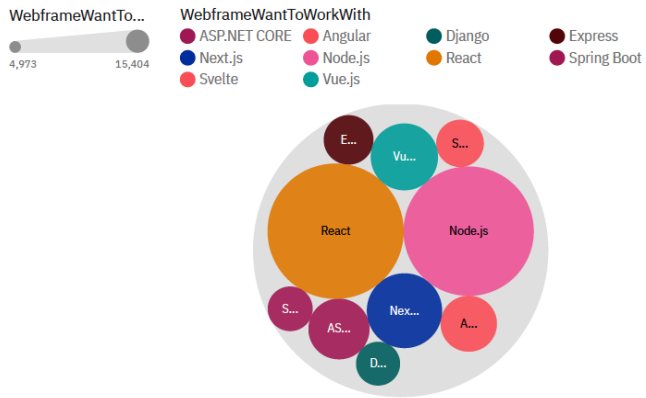
Top10 Databases Want To Work With



Top10 Platforms Want To Work With



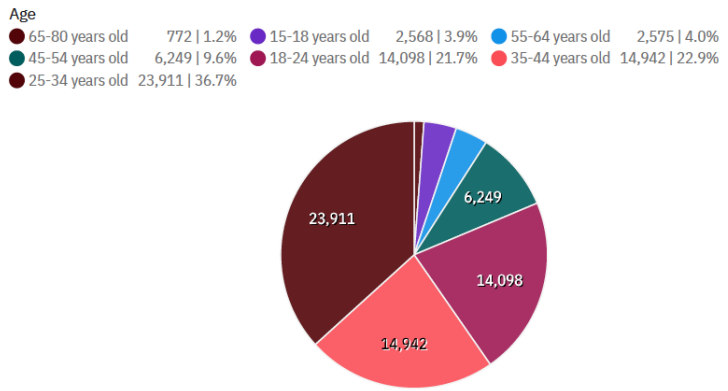
Top10 Webframes Want To Work With



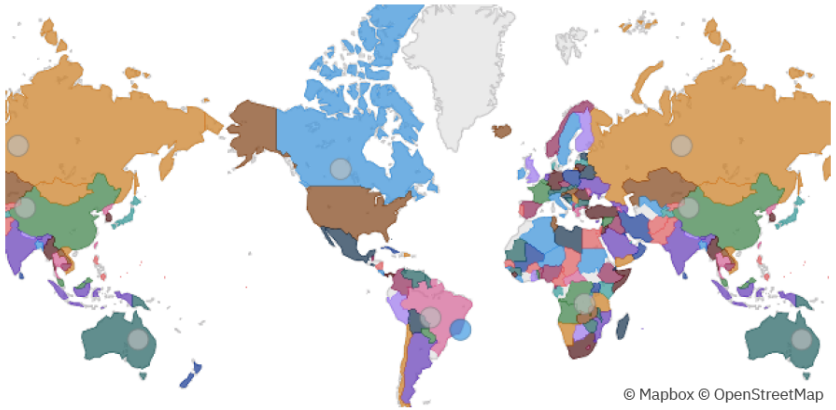
DASHBOARD TAB 3

Demographics

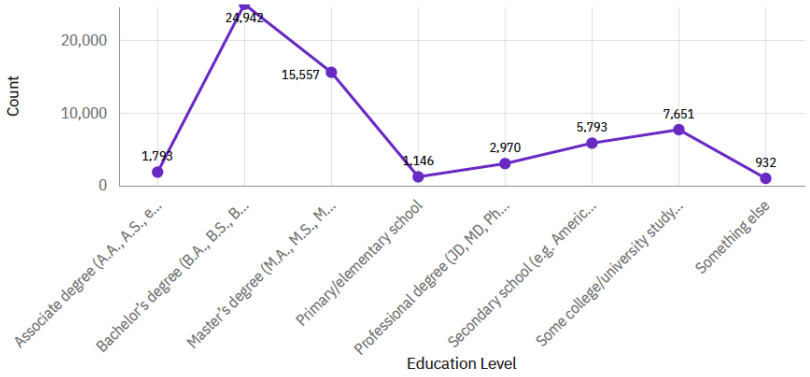
Age Distribution



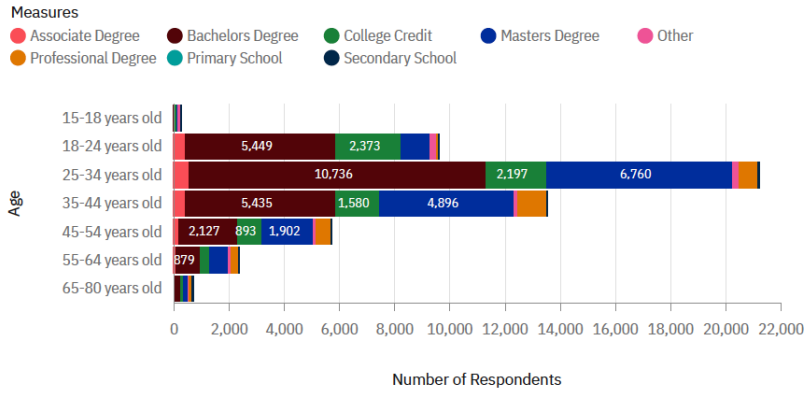
Count by Country



Education Level Count



Respondent Count by Age Group and Education Level



DISCUSSION

- More creativity and more reliance on AI tools for assistance
- Traditional job environment is less desired
- Independent work becoming popular vs. Corporate work

OVERALL FINDINGS & IMPLICATIONS

Findings

- As AI becomes more powerful, people are utilizing it for coding
- Trend for ideal job: Freelance/Independent, remote or hybrid work
- Creativity and personalization

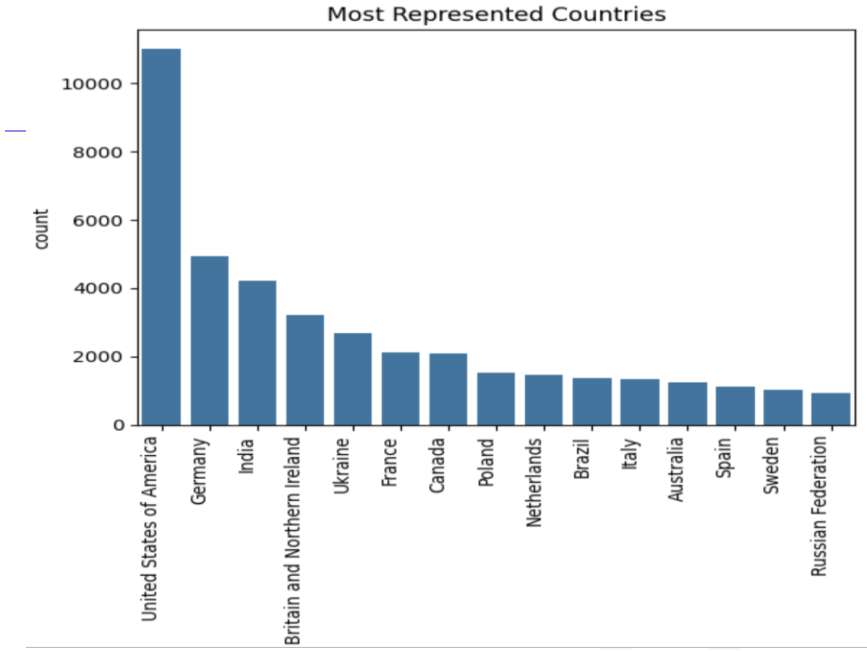
Implications

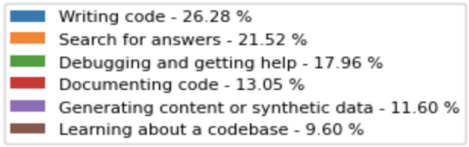
- Fewer actually knowing how to code and more so how to tell AI what to code
- People are getting more satisfaction from pursuing their own work
- The trend in languages and databases suggests the type of output is more app/creative focused

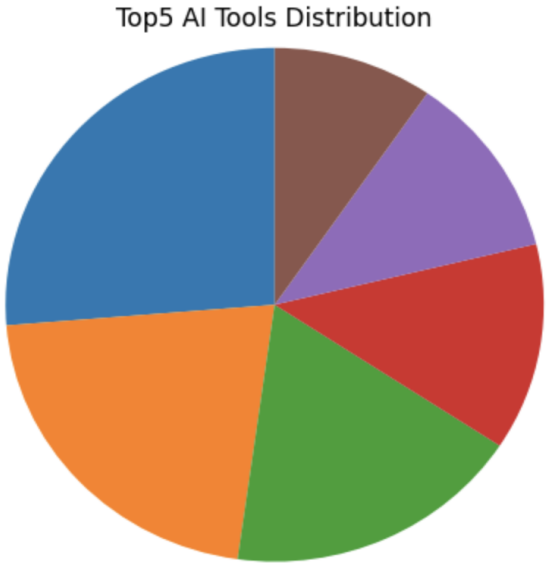
CONCLUSION

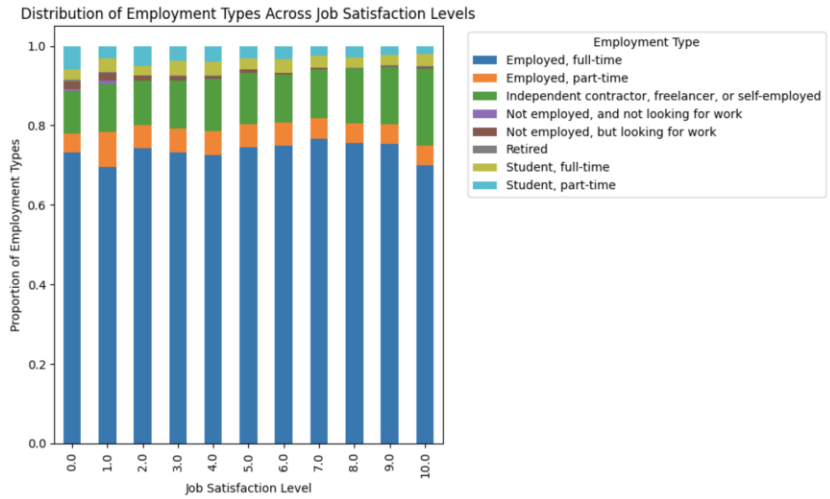
- Important to shift to understanding the more dynamic languages such as Supabase, Swift and Rust
- Technology products are becoming more personalized and creative based on the languages used
- "Friendly" languages like Python and SQL are still currently popular
- Inflation of technology market likely contributing to shift in fewer coders

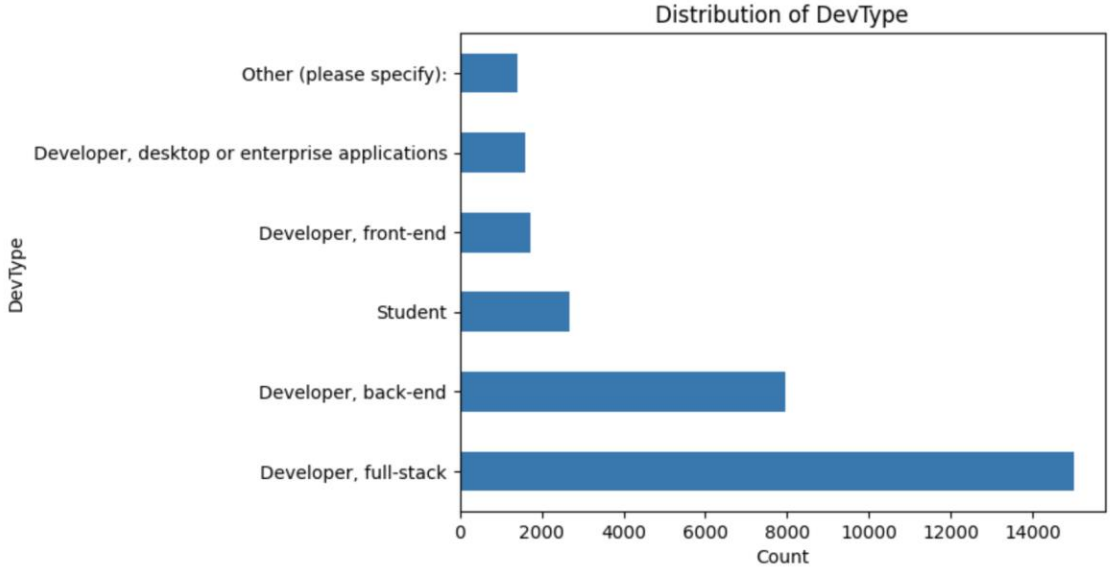
APPENDIX


Most Represented Countries
count
10000
8000
6000
4000
2000
0
United States of America
Germany
India
Britain and Northern Ireland
Ukraine
France
Canada
Poland
Netherlands
Brazil
Italy
Australia
Spain
Sweden
Russian Federation


Writing code - 26.28 %
Search for answers - 21.52 %
Debugging and getting help - 17.96 %
Documenting code - 13.05 %
Generating content or synthetic data - 11.60 %
Learning about a codebase - 9.60 %


Top5 AI Tools Distribution

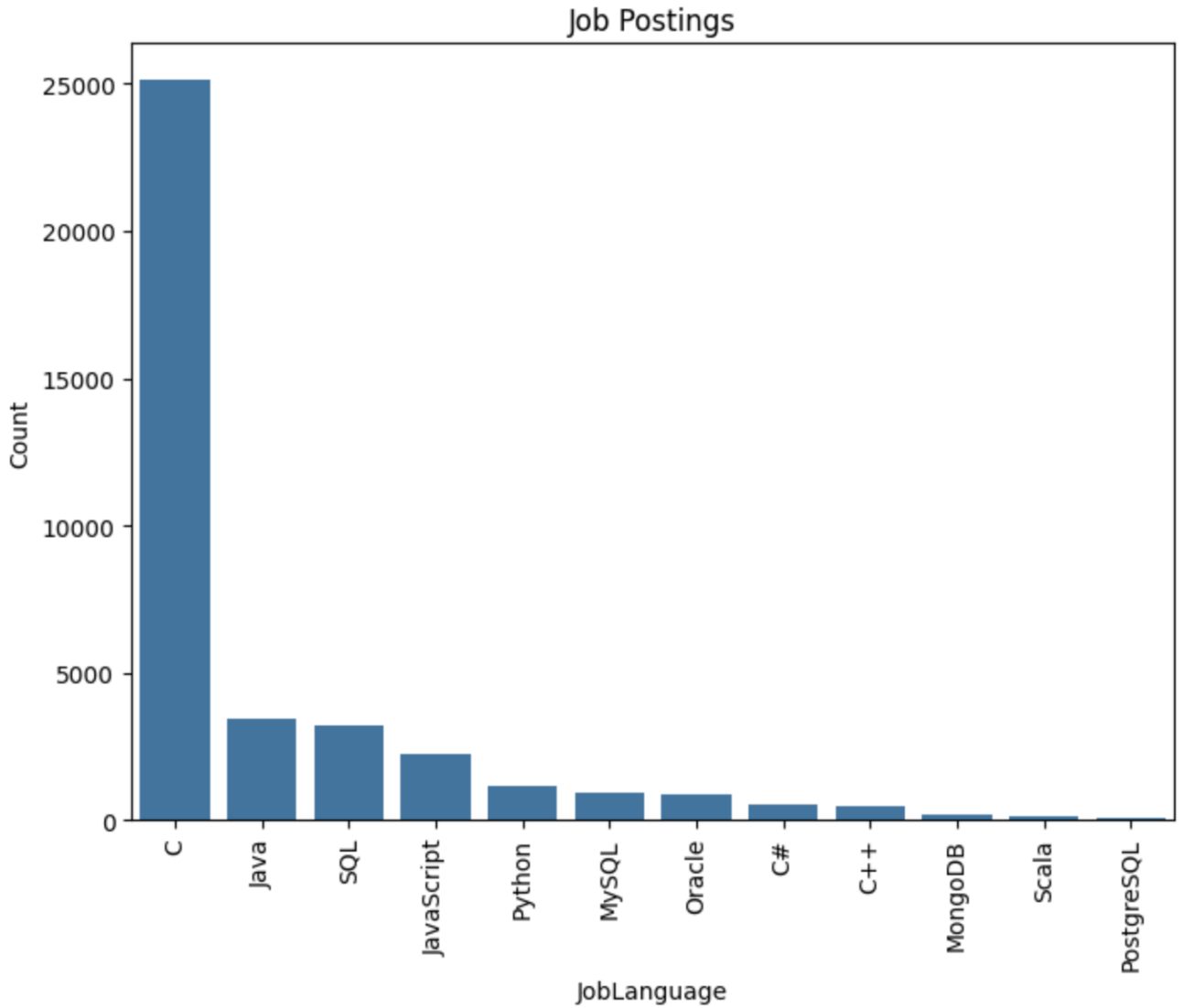

Distribution of Employment Types Across Job Satisfaction Levels
Proportion of Employment Types
1.0
0.8
0.6
0.4
0.2
0.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
Job Satisfaction Level
Employment Type
Employed, full-time
Employed, part-time
Independent contractor, freelancer, or self-employed
Not employed, and not looking for work
Not employed, but looking for work
Retired
Student, full-time
Student, part-time


Distribution of DevType
DevType
Other (please specify):
Developer, desktop or enterprise applications
Developer, front-end
Student
Developer, back-end
Developer, full-stack
0
2000
4000
6000
8000
10000
12000
14000
Count

JOB POSTINGS

Descending order of Job Posting Programming Languages

Bar chart reveals that C is a highly demanded language



POPULAR LANGUAGES

Descending order of Average Salary per Programming Language

Bar chart reveals that Swift on average pays the highest followed by Python

Overall, all languages will pay a good salary