



IBM DATA ANALYST CAPSTONE PROJECT: ANALYSIS ON EMERGING TECHNOLOGY SKILLS AND TRENDS

**By Calista Pereira
7th November 2024**

OUTLINE

- Executive Summary
- Introduction
- Methodology
- Result
 - Visualization – Charts
 - Dashboard
- Discussions
 - Findings & Implications
- Conclusions
- Appendix



EXECUTIVE SUMMARY

- Trends in programming languages and databases to keep updated with the skills and change in technology over time
- Demographics of professionals in the IT sector
- Technology gap in country due to infrastructural facilities etc.
- Gender and age gaps in jobs
- Education level of the respondents

INTRODUCTION

About:

Analyzing the trends in software development to highlight current and projected trends in the need for skills related to programming languages, databases, platforms and web frames.

Purpose:

- Identify skill requirements for future
- What are the top programming languages in demand?
- What are the top database skills in demand?
- What are the popular IDEs

Audience: Human Resource and IT Professionals

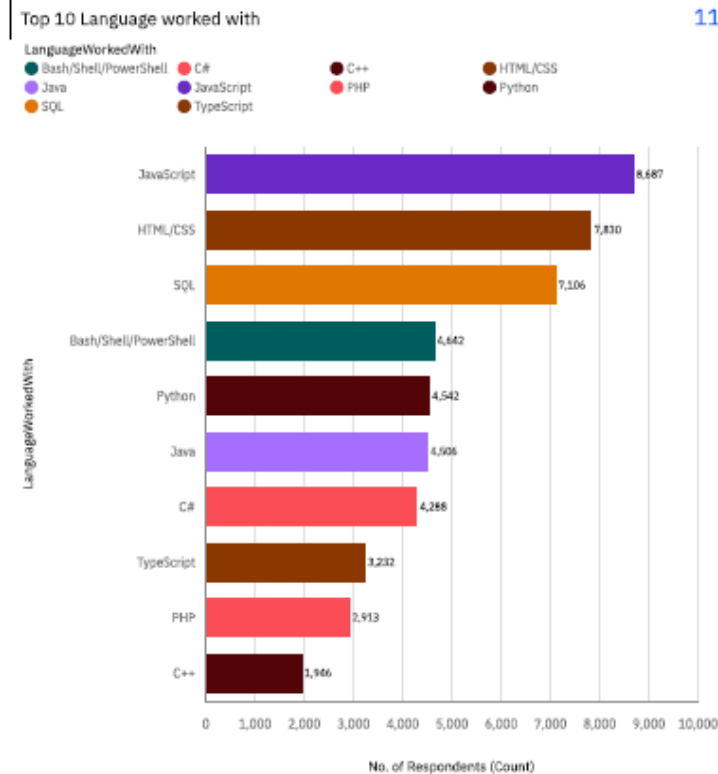
METHODOLOGY

Data Collection Sources

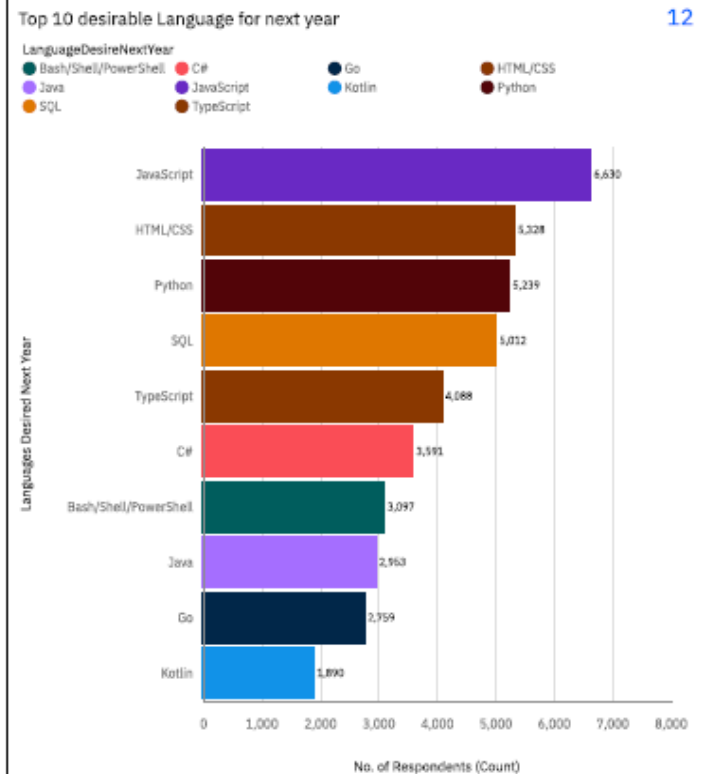
- Stack Overflow Developer 2019 Survey
- GitHub Job Postings
- Programming Languages Annual Salary
- **Data Exploration**
- **Data Cleaning**
- **Data Visualization**
- **Presentation**

RESULTS – PROG. LANGUAGE TREND

Tab 1



11



12

FINDINGS & IMPLICATIONS

Findings

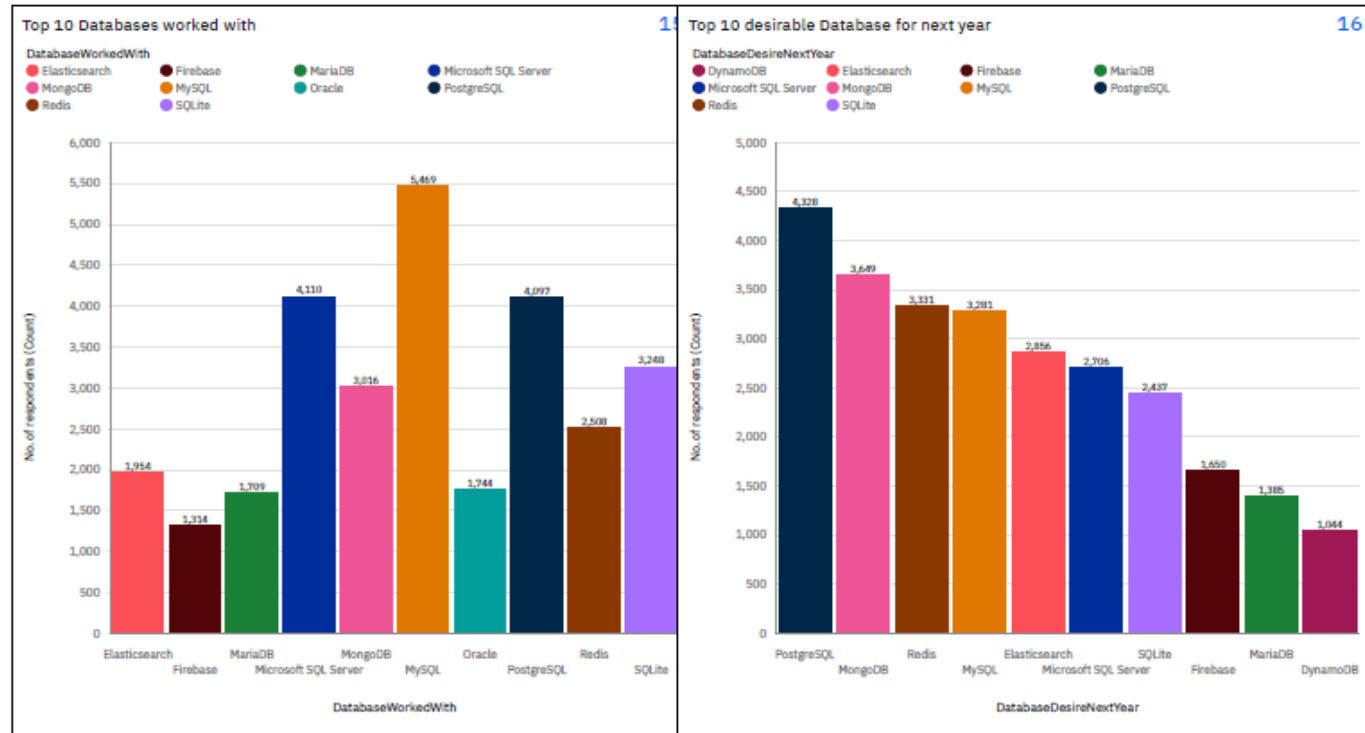
- ❑ Javascript, HTML/CSS, SQL, Shell languages and Python are in the top 3 and are currently used
- ❑ Javascript, HTML/CSS, Python, SQL, and Typescript will be the most used languages next year.
- ❑ PowerShell edged out in the next year
- ❑ Elasticsearch shall also gain popularity by next year

Implications

- ❑ Web development has the highest demand (Javascript, HTML, Typescript getting viral)
- ❑ Companies in the IT sector still requires SQL, so having SQL skills is a necessity
- ❑ With ML & AI rising in demand, Python is the best choice.

RESULTS – DATABASE TRENDS

Tab 2



FINDINGS & IMPLICATIONS

Findings

- ❑ MySQL is the most popular followed by Microsoft SQL
- ❑ MongoDB and Redis are upcoming and popular skills for the future
- ❑ New kid on the block: ElasticSearch, set to gain more grip into the IT sector.

Implications

- ❑ Open source databases are still preferable in companies
- ❑ NoSQL databases will make an impact for storing non-relational data
- ❑ Oracle SQL was not among the top 5 since its losing relevance with time
- ❑ Redis supports abstract data types, Pre tuned search to website, app, or ecommerce store

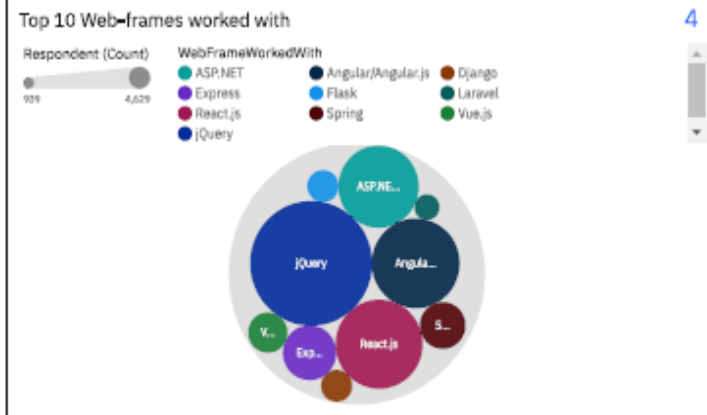
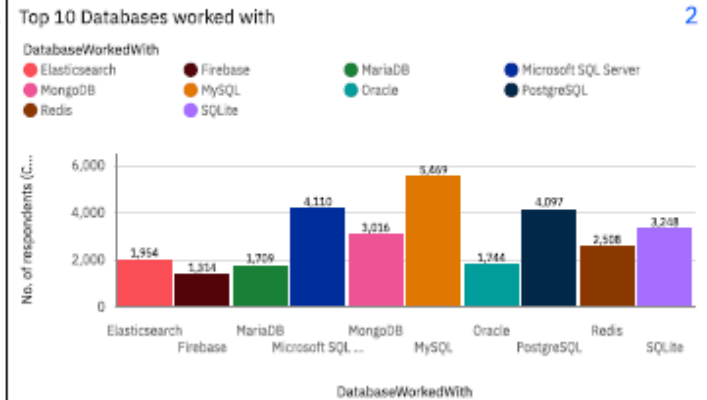
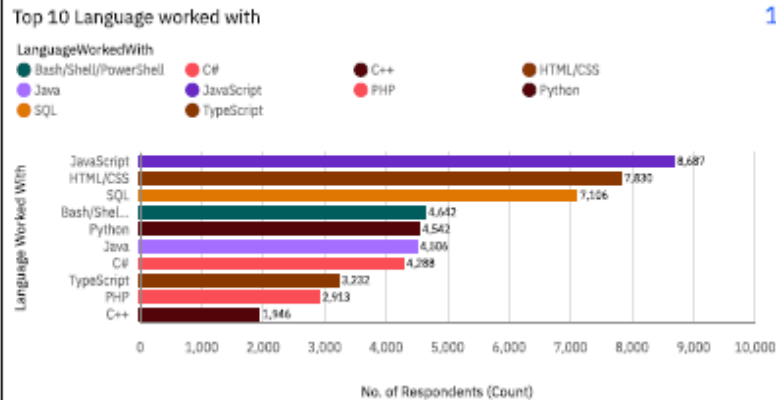


DASHBOARD

https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FDashboard%2B1&action=view&mode=dashboard&subView=model000001930517b35e_00000002

DASHBOARD TAB-I

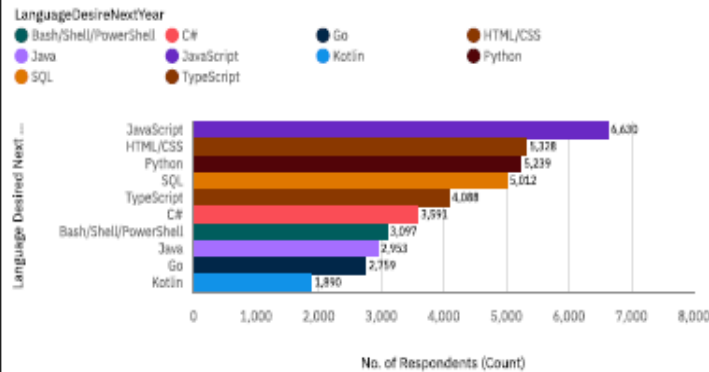
Current Usage Technology



DASHBOARD TAB-2

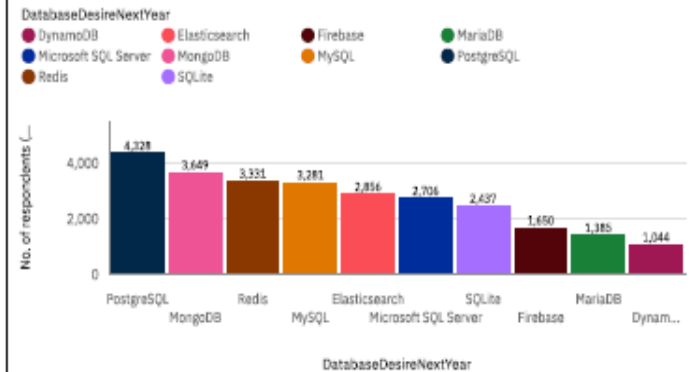
Future Technology Trend

Top 10 desirable Language for next year



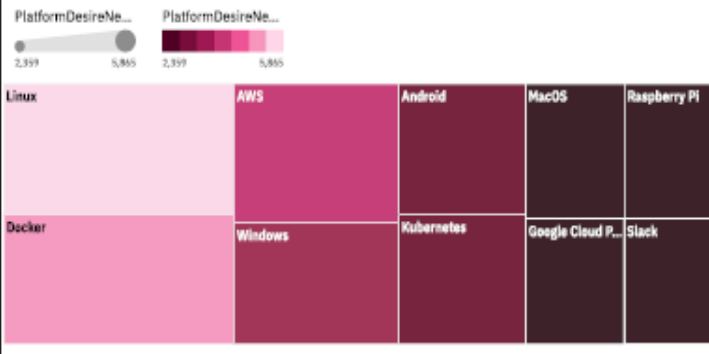
5

Top 10 desirable Database for next year



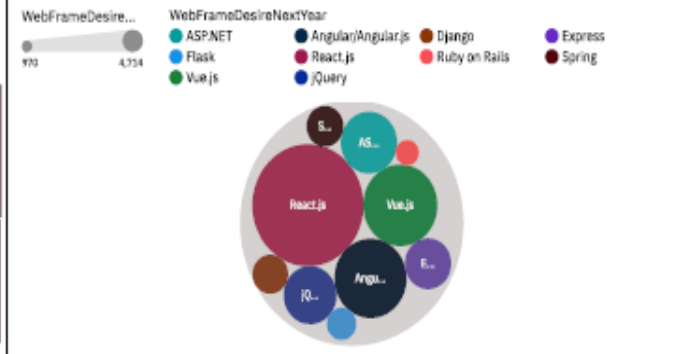
6

Desirable Platform by Respondent for next year



7

Top 10 Web Frame Desire for next year



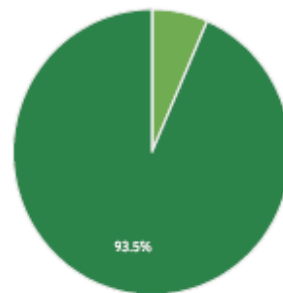
8

DASHBOARD TAB-3

Demographics

Respondents classified by gender

Gender
● Woman ● Man



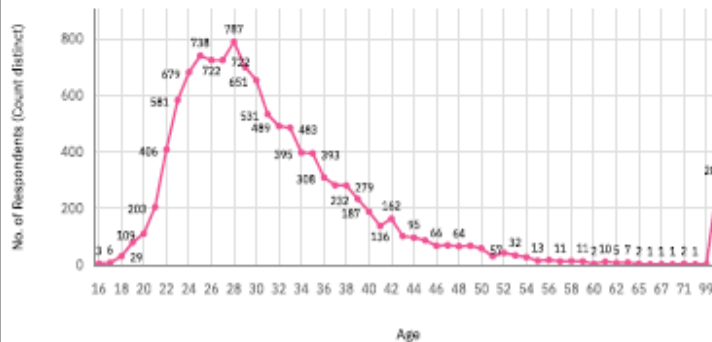
9

Respondents by country

Respondent (Count)
 1 2,127



Respondent count by age

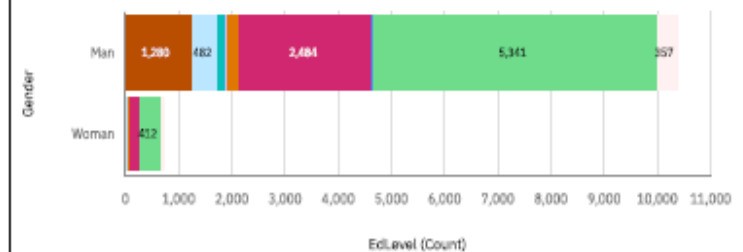


Click to edit title

10

EdLevel

● Some college/university study wit... ● Secondary school (e.g. American ... ● Professional degree (JD, MD, etc.)
● Primary/elementary school ● Other doctoral degree (Ph.D, Ed.D... ● Master's degree (MA, MS, M.Eng,...
● I never completed any formal edu... ● Bachelor's degree (BA, BS, B.Eng... ● Associate degree



DISCUSSION

- ❑ Technology trends now and future
- ❑ Training and reskilling workers
- ❑ Females participation in technology field
- ❑ Bridge divide of technology gaps in developing countries
- ❑ Eliminate age and education discrimination
- ❑ discrimination in employment

OVERALL FINDINGS & IMPLICATIONS

Findings

- ❑ Fast changing technology every year
- ❑ Majority people under 40 years of age are in the IT field and are undergraduates with bachelor's degree
- ❑ Concentration on several countries like USA & India
- ❑ Gender gaps in job technology
- ❑ Web development languages are popular and in demand in IT field
- ❑ The rise of Artificial Intelligence (AI)

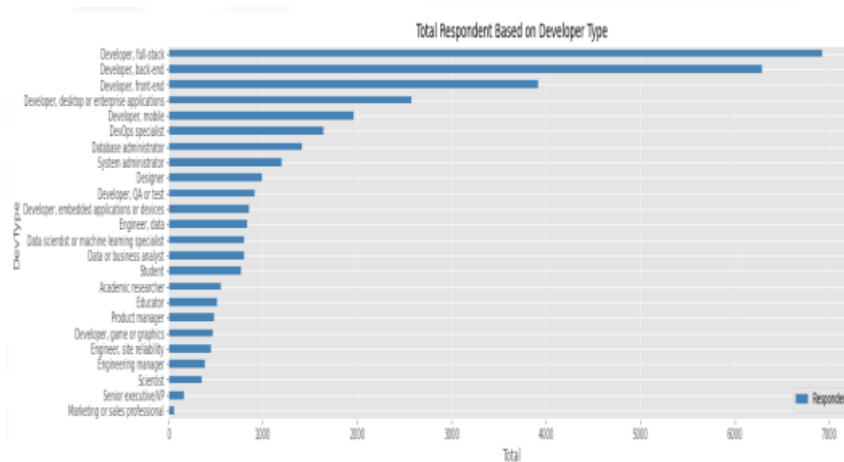
Implications

- ❑ Companies need to be flexible and adjust to rapid changes
- ❑ Underdeveloped countries & developing countries need more access to tech infrastructure, training and education
- ❑ Companies need to be flexible and adjust to rapid changes
- ❑ Impact of job hiring
- ❑ Shift to cloud services in future

CONCLUSION

- ❑ Technology Trends for current and next year
- ❑ Programming Languages, Database and Platform overview – Importance of proficiency in database languages for data professional
- ❑ Demographics overview
- ❑ Action to be taken
- ❑ In future, incorporate Machine Learning to predict trends and salaries
- ❑ Keeping up-to-date with the technological trends and skills changing over time in the IT sector.

APPENDIX

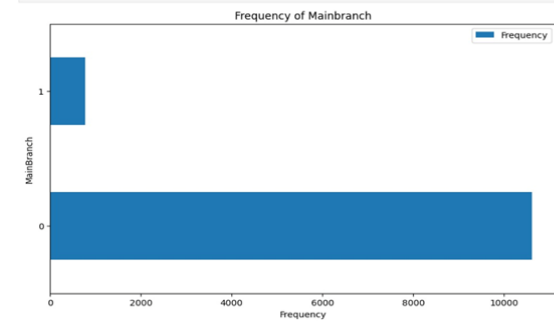


MainBranch	Frequency
0	I am a developer by profession 10618
1	I am not primarily a developer, but I write co... 780

```

bar_df.plot(kind='barh', figsize=(10,6))
plt.xlabel('Frequency')
plt.ylabel('MainBranch')
plt.title('Frequency of Mainbranch')
plt.show()

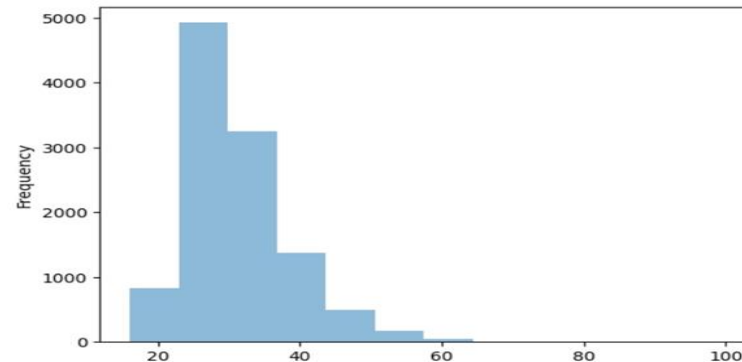
```



Plot a histogram of the column `Age`.

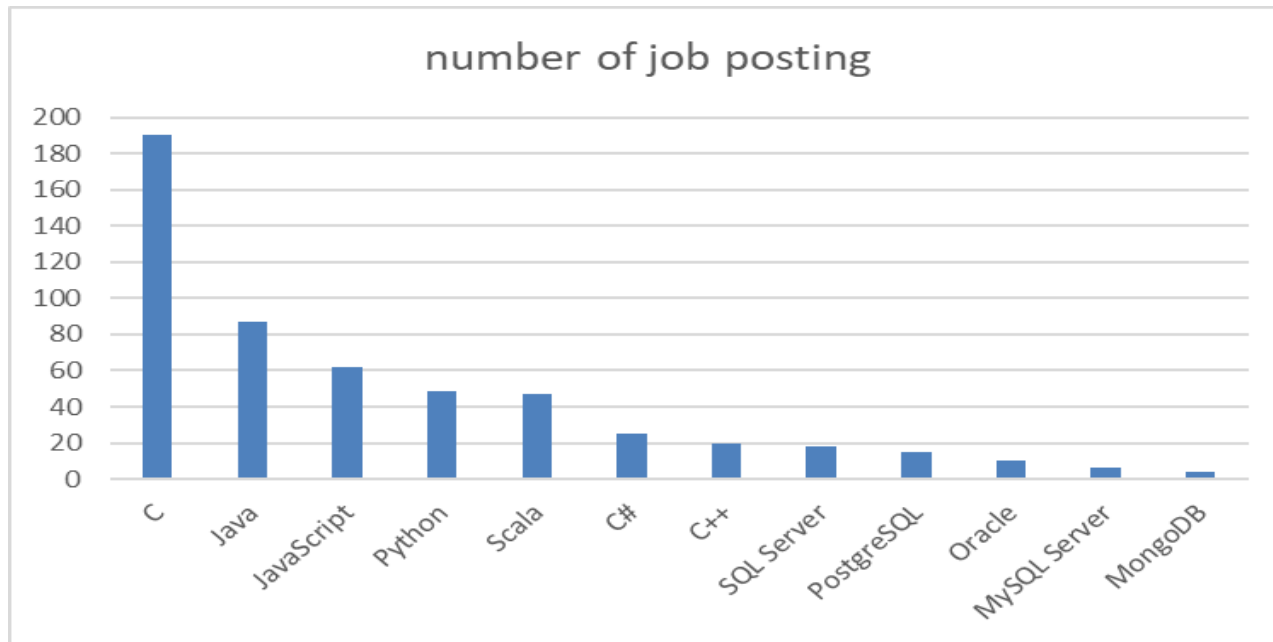
```
df['Age'].plot.hist(bins=12, alpha=0.5) #
```

<AxesSubplot: ylabel='Frequency'>



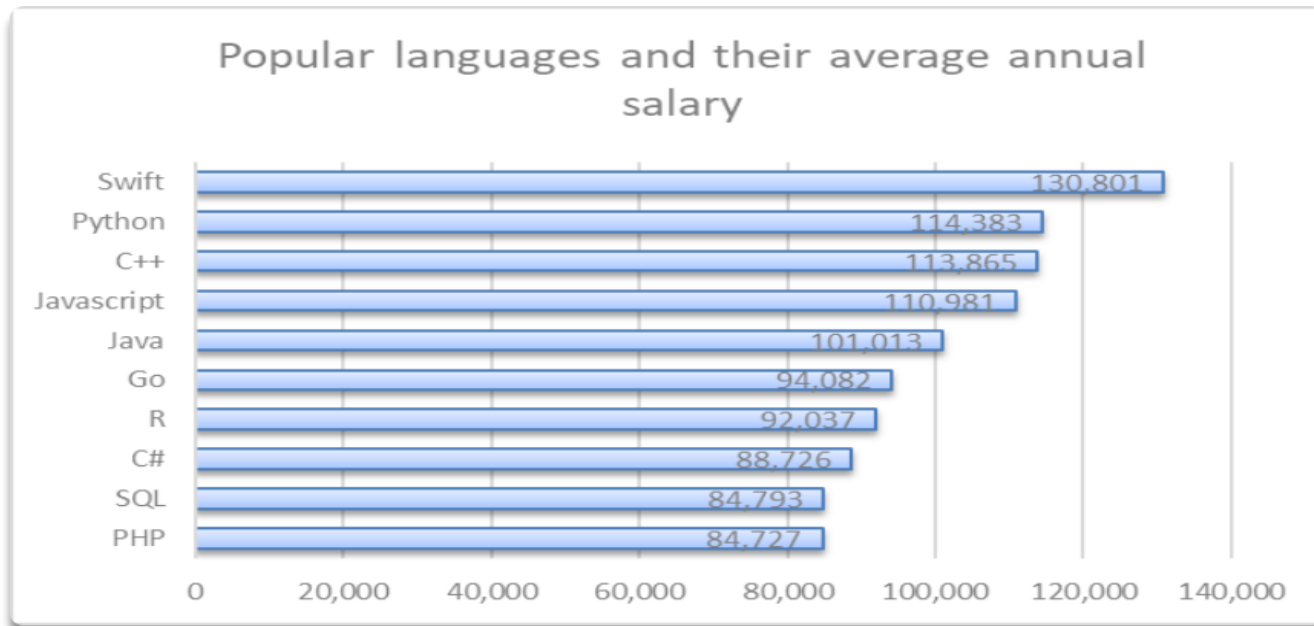
Respondent	0.004041
CompTotal	0.006970
ConvertedComp	0.105386
WorkWeekHrs	0.036518
CodeRevHrs	-0.020469
Age	1.000000
Name: Age, dtype: float64	

GITHUB JOB POSTINGS



- ❑ Highest no. of job postings for those proficient in C, followed by Javascript
- ❑ Python and Scala proficient have equal nos.of postings

POUPLAR LANGUAGES



- ❑ Bar chart displaying popular languages and their average annual salary. The data was collected through web scraping the Github jobs
- ❑ Swift being the most popular language that has the highest annual average pay scale followed by Python, C++, Javascript which also offers an IT proficient in these language a good pay-scale