

FEBRUARY 15, 2022

DATADRIVENDEVELOPERS PRESENTS

STACK OVERFLOW SURVEY RESULTS 2021

What is the most popular language and a breakdown of
the users demographics

PRESENTATION HIGHLIGHTS

FOCUS AREAS

- Project Narrative
- What is the most popular language?
- Does age affect the programming language used?
- Is there a preference amongst the genders?
- Around the world, are there language preferences based on country?
- Specifically in the US, are there language preferences in the different states?

THE STACK OVERFLOW SURVEY 2021

In May 2021 over 80,000 developers answered over 40 questions and told Stack Overflow how they learn, what they want to learn, which tools they're using, and basic personal information. Based on those results, we wanted to see what the most popular programming language was and who was using it. We hypothesized that JavaScript would be the most popular language used based on last year's results.

THIS IS THE RAW CSV FILE WE STARTED WITH

```

1 ResponseId,MainBranch,Employment,Country,US_State,UK_Country,EdLevel,Age1stCode,LearnCode,YearsCodePro,DevType,OrgSize,Curre
2 1,I am a developer by profession,"Independent contractor, freelancer, or self-employed",Slovakia,NA,NA,"Secondary school (e.g. American
3 2,I am a student who is learning to code,"Student, full-time",Netherlands,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng., etc.)",11 - 17
4 3,"I am not primarily a developer, but I write code sometimes as part of my work","Student, full-time",Russian Federation,NA,NA,"Bache
5 4,I am a developer by profession,Employed full-time,Austria,NA,NA,"Master's degree (M.A., M.S., M.Eng., MBA, etc.)",11 - 17 years,NA,M
6 5,I am a developer by profession,"Independent contractor, freelancer, or self-employed",United Kingdom of Great Britain and Northern I
7 6,I am a student who is learning to code,"Student, part-time",United States of America,Georgia,NA,"Bachelor's degree (B.A., B.S., B.Eng
8 7,I code primarily as a hobby,I prefer not to say,United States of America,New Hampshire,NA,"Secondary school (e.g. American high scho
9 8,I am a student who is learning to code,"Student, full-time",Malaysia,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng., etc.)",11 - 17 ye
10 9,I am a developer by profession,Employed part-time,India,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng., etc.)",18 - 24 years,Coding Bo
11 10,I am a developer by profession,Employed full-time,Sweden,NA,NA,"Master's degree (M.A., M.S., M.Eng., MBA, etc.)",11 - 17 years,Schc
12 11,I am a developer by profession,Employed full-time,United Kingdom of Great Britain and Northern Ireland,NA,England,"Bachelor's degre
13 12,I am a developer by profession,Employed full-time,Spain,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng., etc.)",11 - 17 years,"Other c
14 13,I am a developer by profession,Employed full-time,Germany,NA,NA,"Master's degree (M.A., M.S., M.Eng., MBA, etc.)",11 - 17 years,Oth
15 14,I am a student who is learning to code,Employed full-time,Peru,NA,NA,"Master's degree (M.A., M.S., M.Eng., MBA, etc.)",5 - 10 years
16 15,"I used to be a developer by profession, but no longer am","Not employed, but looking for work",United Kingdom of Great Britain and
17 16,I am a student who is learning to code,"Student, full-time",United States of America,Missouri,NA,"Secondary school (e.g. American h
18 17,I am a developer by profession,Employed full-time,Turkey,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng., etc.)",5 - 10 years,School,6
19 18,I am a developer by profession,Employed full-time,Canada,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng., etc.)",11 - 17 years,School,
20 19,"I am not primarily a developer, but I write code sometimes as part of my work",I prefer not to say,Singapore,NA,NA,"Other doctoral
21 20,"I used to be a developer by profession, but no longer am",Employed full-time,Brazil,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng.,
22 21,I am a developer by profession,"Student, full-time",Germany,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng., etc.)",11 - 17 years,Schc
23 22,I am a student who is learning to code,"Student, full-time",Sweden,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng., etc.)",11 - 17 yea
24 23,I am a student who is learning to code,"Student, full-time",India,NA,NA,Some college/university study without earning a degree,5 -
25 24,I am a developer by profession,Employed full-time,France,NA,NA,"Master's degree (M.A., M.S., M.Eng., MBA, etc.)",11 - 17 years,Schc
26 25,I am a developer by profession,Employed full-time,Germany,NA,NA,"Master's degree (M.A., M.S., M.Eng., MBA, etc.)",11 - 17 years,Sch
27 26,"I am not primarily a developer, but I write code sometimes as part of my work",Employed full-time,Germany,NA,NA,"Other doctoral de
28 27,"I am not primarily a developer, but I write code sometimes as part of my work",Employed full-time,Switzerland,NA,NA,"Master's degr
29 28,I am a developer by profession,Employed full-time,United Kingdom of Great Britain and Northern Ireland,NA,England,"Bachelor's degre
30 29,I am a developer by profession,"Independent contractor, freelancer, or self-employed",United Kingdom of Great Britain and Northern
31 30,I am a developer by profession,Employed full-time,Russian Federation,NA,NA,"Master's degree (M.A., M.S., M.Eng., MBA, etc.)",11 - 1
32 31,I code primarily as a hobby,I prefer not to say,Malawi,NA,NA,Something else,11 - 17 years,"Other online resources (ex: videos, blog
33 32,I am a developer by profession,Employed full-time,Israel,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng., etc.)",25 - 34 years,School;
34 33,I am a developer by profession,"Not employed, but looking for work",Poland,NA,NA,"Master's degree (M.A., M.S., M.Eng., MBA, etc.)",
35 34,I am a developer by profession,Employed full-time,Turkey,NA,NA,"Bachelor's degree (B.A., B.S., B.Eng., etc.)",18 - 24 years,School,
36 35,I am a developer by profession,Employed full-time,Ukraine,NA,NA,"Master's degree (M.A., M.S., M.Eng., MBA, etc.)",11 - 17 years,Sch
37 36,I am a developer by profession,Employed full-time,Germany,NA,NA,"Master's degree (M.A., M.S., M.Eng., MBA, etc.)",11 - 17 years,Sch
38 37,I am a developer by profession,Employed full-time,United States of America,District of Columbia,NA,"Bachelor's degree (B.A., B.S.,

```


How we cleaned up the data

DATADRIVENDEVELOPERS 02/15/22



1. REMOVED UNNECESSARY
COLUMNS AND DATA



2. FILTERED DOWN TO THE TOP
LANGUAGES



3. ONCE THE TOP LANGUAGE
WAS DETERMINED
(JAVASCRIPT), WE USED
VARIOUS TOOLS TO LEARN
ABOUT THE USERS

This is how we cleaned up the columns to narrow down to only see the information that we needed.

```
# Working to split language up so we can count how many people use which language  
df.dropna(axis='index', how='all', subset=['LanguageHaveWorkedWith'])  
df.rename(columns={'MainBranch': 'Main Branch', 'LanguageHaveWorkedWith':  
  'Languages Learned', 'LanguageWantToWorkWith': 'Future Goal Language'}, inplace=True)
```

✓ 0.5s

Python

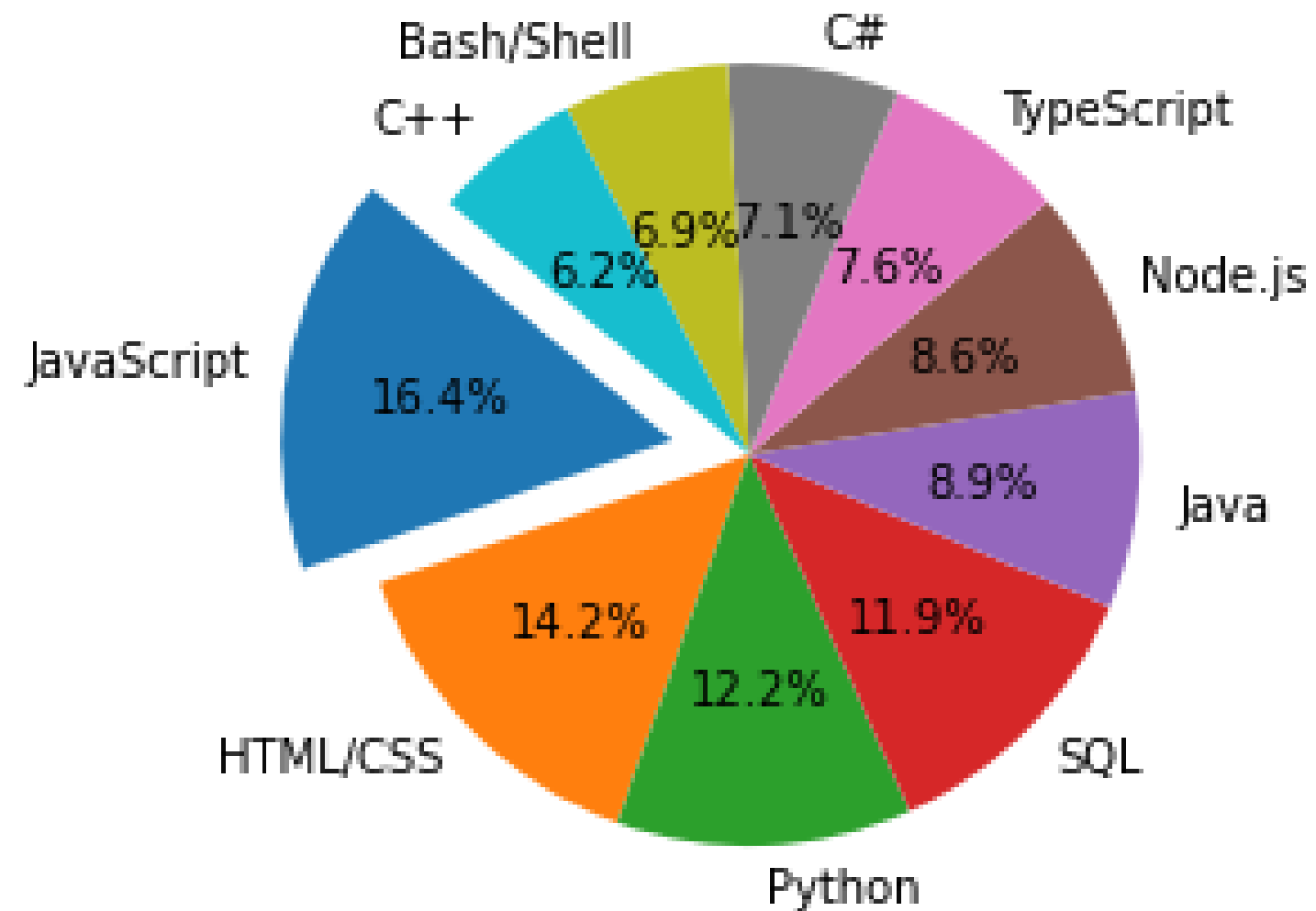


THIS IS THE CLEANED UP DATAFRAME

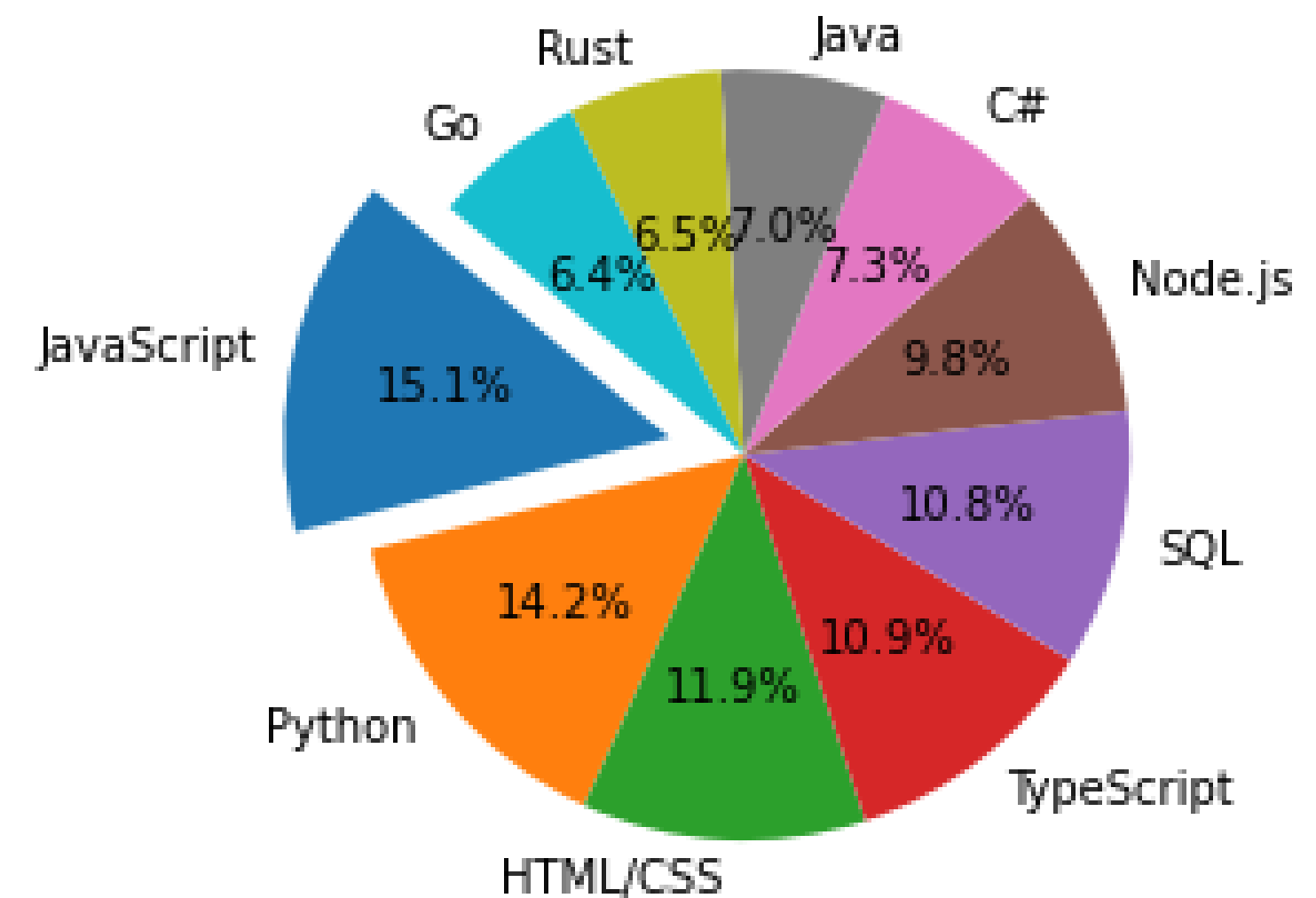
	Main_Branch	Country	US_State	UK_Country	Age	Gender	Langs	Lang_Goal
0	I am a developer by profession	Slovakia	Not Applicable	Not Applicable	25-34	Man	C++;HTML/CSS;JavaScript;Objective-C;PHP;Swift	Swift
1	I am a student who is learning to code	Netherlands	Not Applicable	Not Applicable	18-24	Man	JavaScript;Python	Not Applicable
2	I am not primarily a developer, but I write co...	Russian Federation	Not Applicable	Not Applicable	18-24	Man	Assembly;C;Python;R;Rust	Julia;Python;Rust
3	I am a developer by profession	Austria	Not Applicable	Not Applicable	35-44	Man	JavaScript;TypeScript	JavaScript;TypeScript
4	I am a developer by profession	UK & Northern Ireland	Not Applicable	England	25-34	Man	Bash/Shell;HTML/CSS;Python;SQL	Bash/Shell;HTML/CSS;Python;SQL
5	I am a student who is learning to code	United States of America	Georgia	Not Applicable	18-24	Prefer not to say	C;C#;C++;HTML/CSS;Java;JavaScript;Node.js;Powe...	C#;C++;Go;HTML/CSS;Java;JavaScript;Node.js;Obj...
7	I am a student who is learning to code	Malaysia	Not Applicable	Not Applicable	18-24	Woman	HTML/CSS;JavaScript;PHP;Ruby;SQL;TypeScript	Ruby
8	I am a developer by profession	India	Not Applicable	Not Applicable	25-34	Man	HTML/CSS;JavaScript	HTML/CSS;JavaScript
9	I am a developer by profession	Sweden	Not Applicable	Not Applicable	25-34	Man	C++;Python	Haskell;Python
10	I am a developer by profession	UK & Northern Ireland	Not Applicable	England	25-34	Man	C#;TypeScript	C#
11	I am a developer by profession	Spain	Not Applicable	Not Applicable	25-34	Man	Bash/Shell;HTML/CSS;JavaScript;Node.js;SQL;Typ...	C++;Clojure;JavaScript;Node.js;Rust;SQL;TypeSc...
12	I am a developer by profession	Germany	Not Applicable	Not Applicable	25-34	Man	C;C++;Java;Perl;Ruby	Rust
14	I used to be a developer by profession, but no...	UK & Northern Ireland	Not Applicable	England	45-54	Man	JavaScript;SQL	JavaScript;PHP;SQL
15	I am a student who is learning to code	United States of America	Missouri	Not Applicable	Under 18	Man	Bash/Shell;Python	Bash/Shell;Python

We have a clear winner!

Top 10 languages developers currently work with



Top 10 languages developers want to work with



TOP 10 CURRENT LANGUAGES

```
# Run the method based off of languages Learned column  
top10current = find_top_langs(full_df['LanguageHaveWorkedWith']).sort_values(ascending=False)  
top10current
```

	0	1
0	JavaScript	53587
1	HTML/CSS	46259
2	Python	39792
3	SQL	38835
4	Java	29162
5	Node.js	27975
6	TypeScript	24909
7	C#	22984

TOP 10 WANTED LANGUAGES

```
# Run the method based off of languages Learned column  
top10future = find_top_langs(full_df['LanguageWantToWorkWith']).sort_values(ascending=False)  
top10future
```

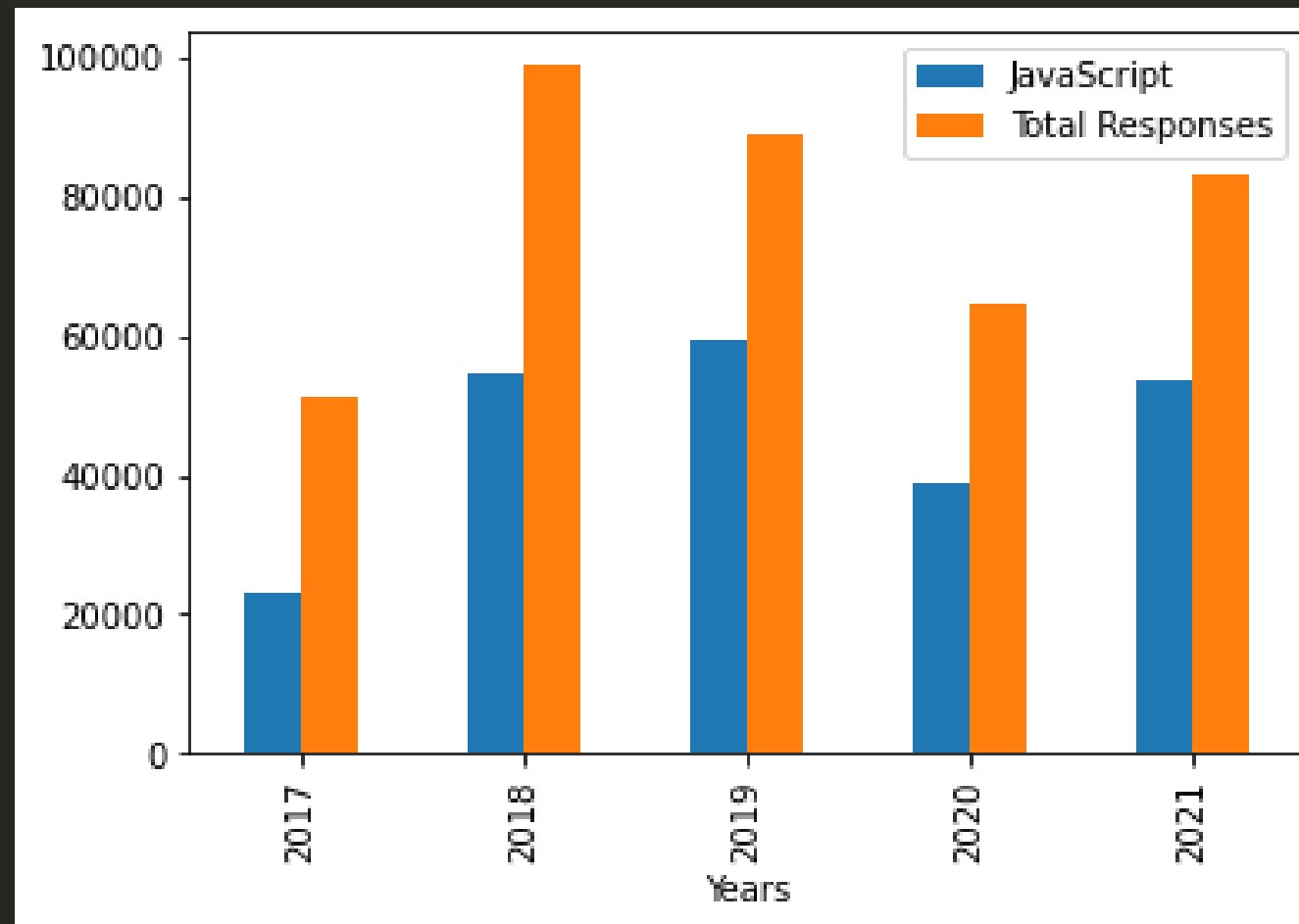
	0	1
0	JavaScript	37008
1	Python	34929
2	HTML/CSS	29353
3	TypeScript	26905
4	SQL	26631
5	Node.js	24100
6	C#	17999
7	Java	17222

JAVASCRIPT OVER THE YEARS

```
1 years_df.plot(x="Years", y=["JavaScript", "Total Responses"], kind="bar")
```

```
✓ 0.1s
```

```
.. <matplotlib.axes._subplots.AxesSubplot at 0x129ceb28780>
```



	Years	JavaScript	Total Responses	Percent
0	2017	22875	51392	44.51%
1	2018	54686	98855	55.32%
2	2019	59219	88883	66.63%
3	2020	38822	64461	60.23%
4	2021	53587	83439	64.22%

Fun Facts about JavaScript

1. Along with HTML and CSS, JavaScript is one of the three main things of the www (World Wide Web).
2. Many programming languages use semi-colon at the end of a statement. Javascript does so but you can also use semi-colon at the beginning of a statement.
3. JavaScript was invented by Brendan Eich in 1995 and became an ECMA standard in 1997.
4. You can add strings with numbers.
5. Over 97% of websites use JavaScript on the client-side for web page behavior, often incorporating third-party libraries.

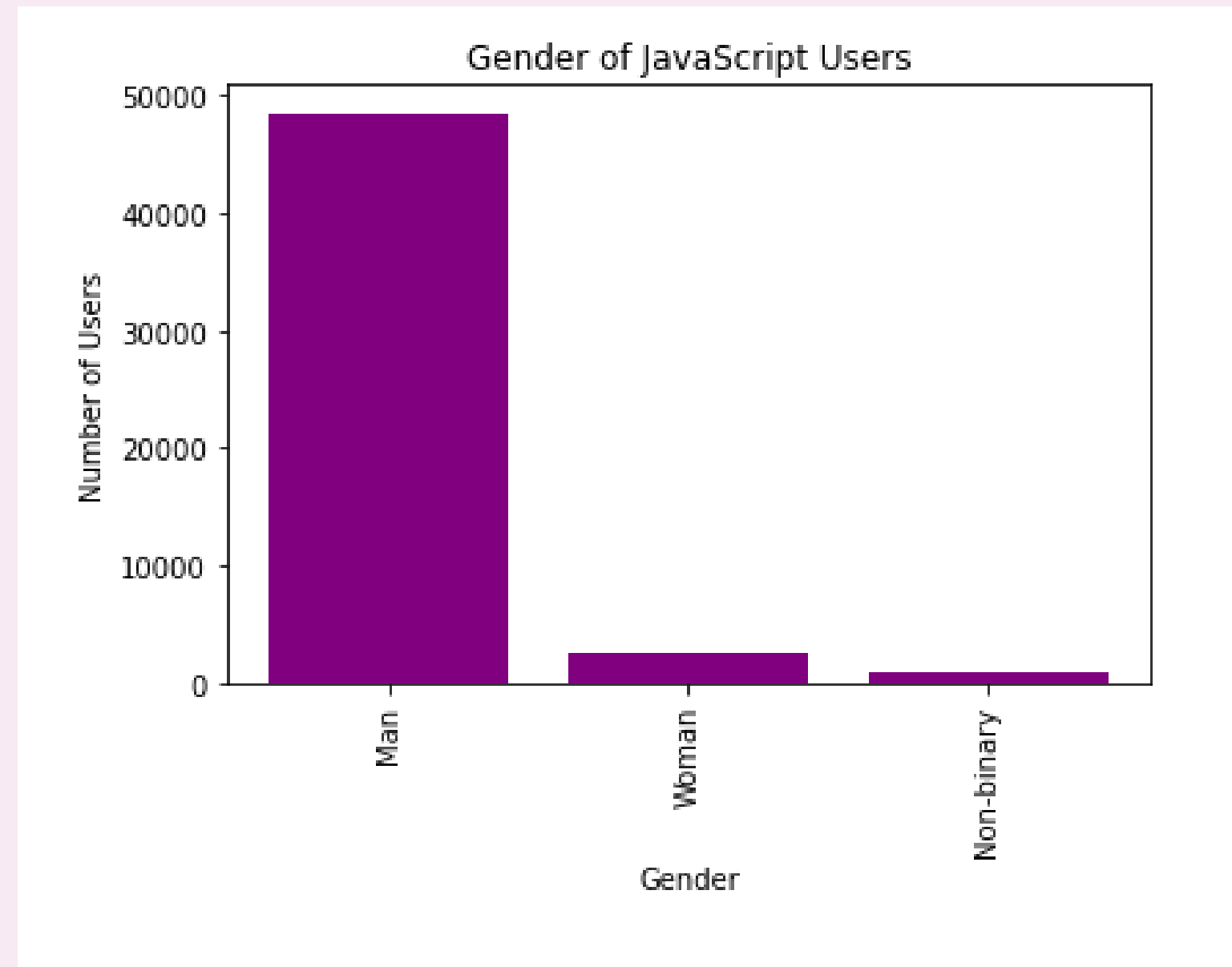


NOW THAT WE HAVE THE TOP LANGUAGE...

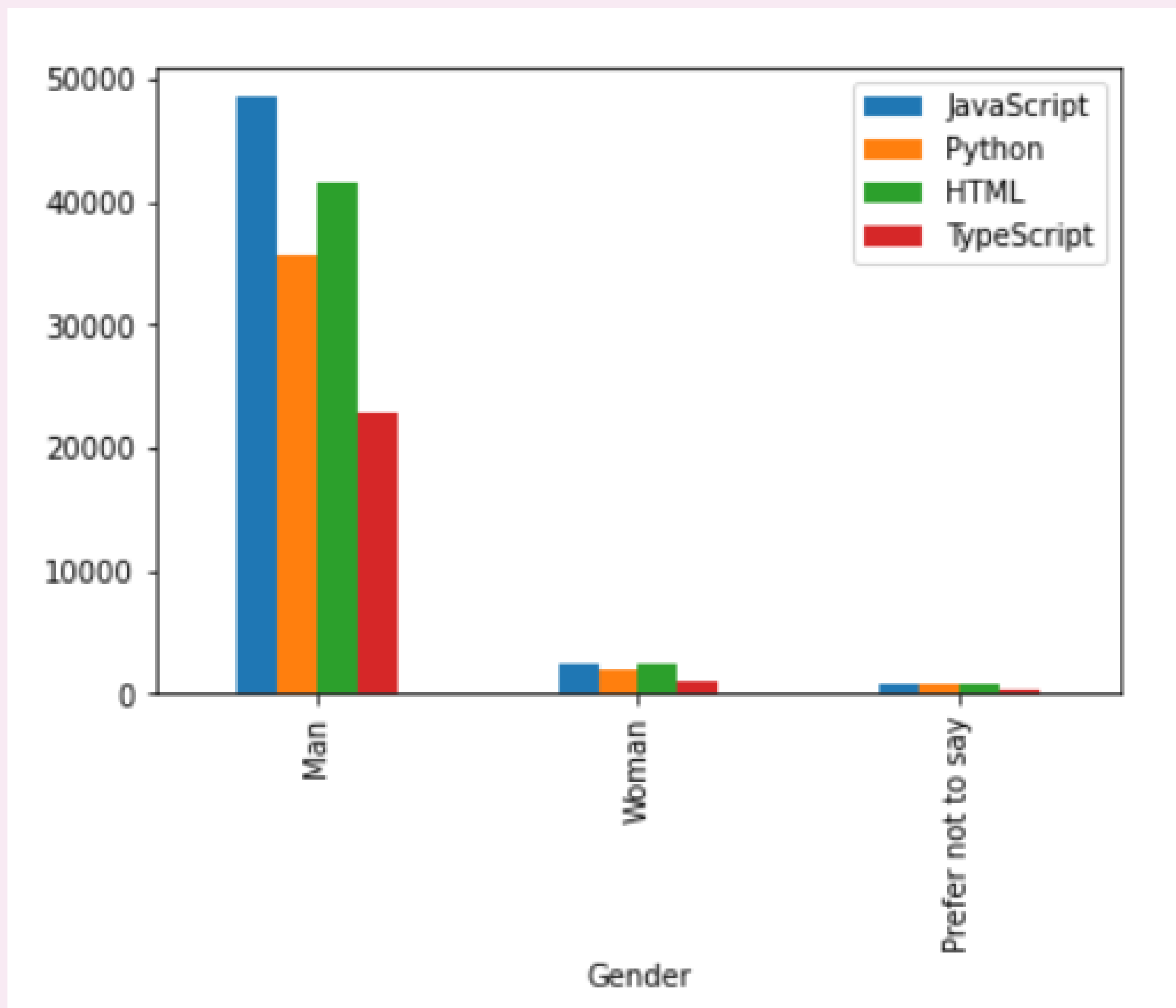
Let's take a closer look at JavaScript's users

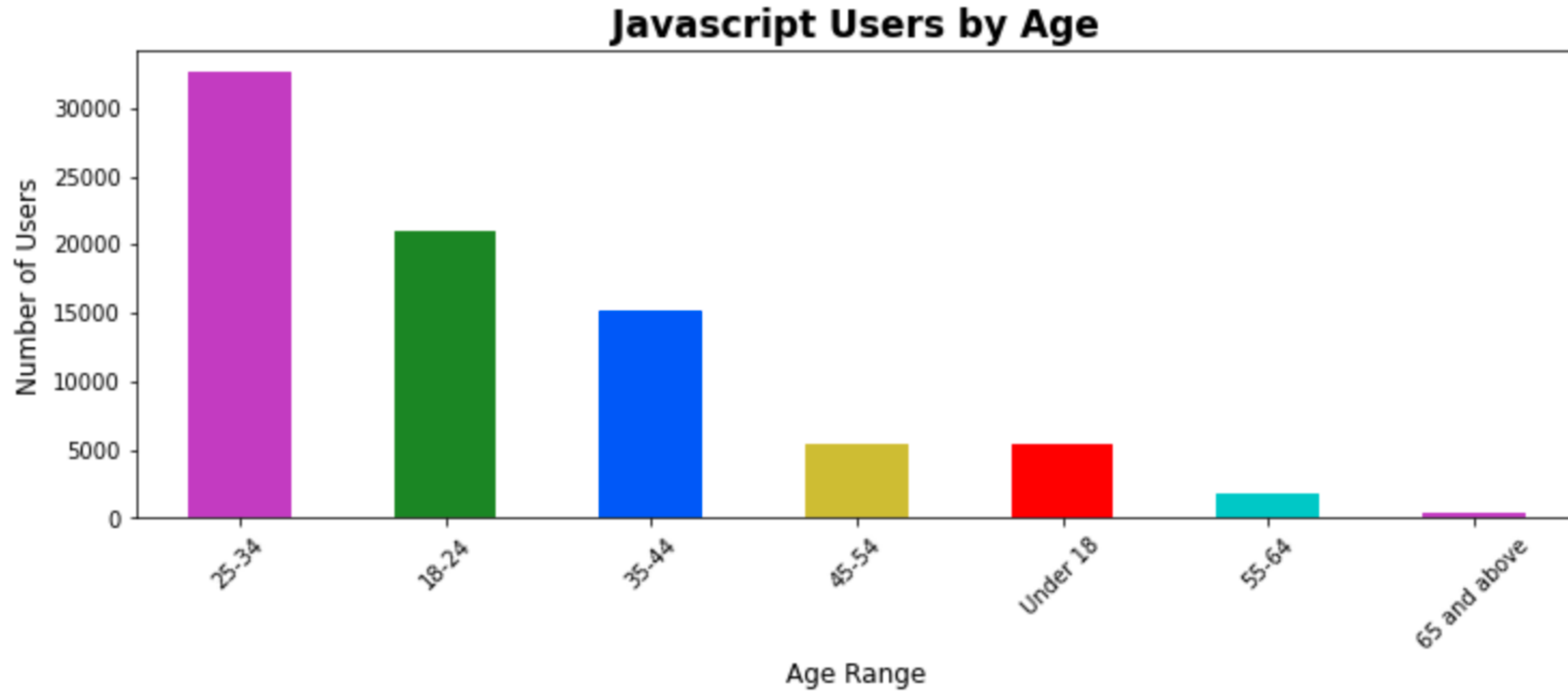
HERE IS A BREAKDOWN BY GENDER

While we anticipated that men were going to be the top gender based on the current tech field, it was still surprising to see that 90.5% of JavaScript users were men! The other two categories that were included were Women and Non-Binary/Non-Gender Conforming.



GENDER BREAKDOWN FOR THE OTHER LANGUAGES



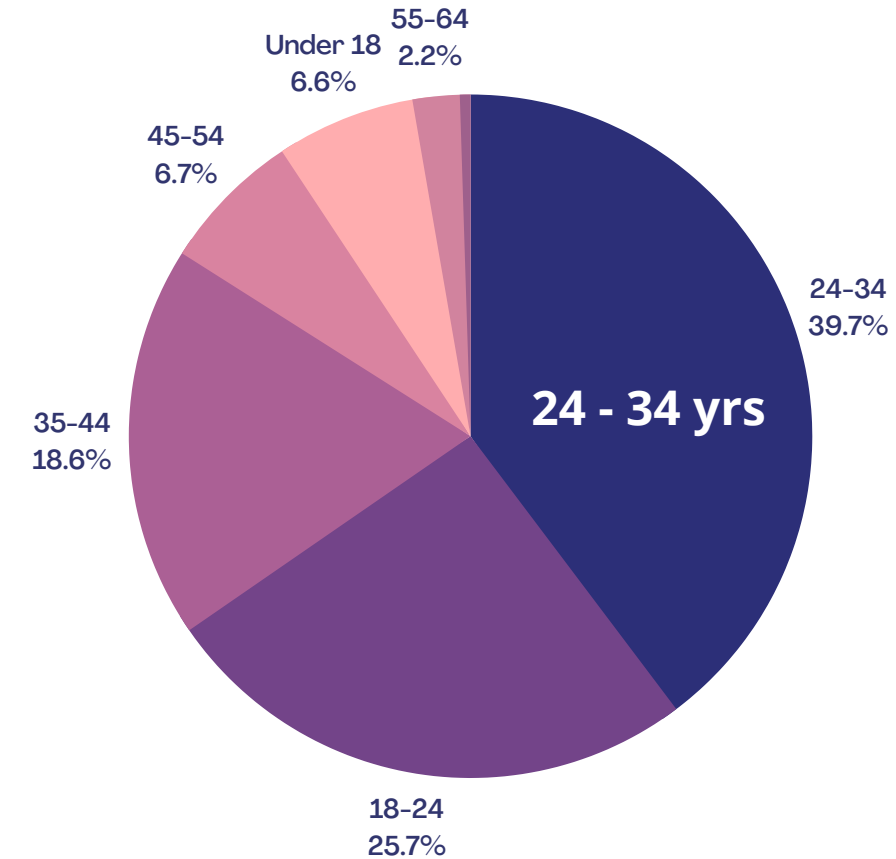


Now let's take a look at age:

Javascript users by age.

39% OF JAVASCRIPT USERS FALL BETWEEN THE AGE RANGE OF 25-34.

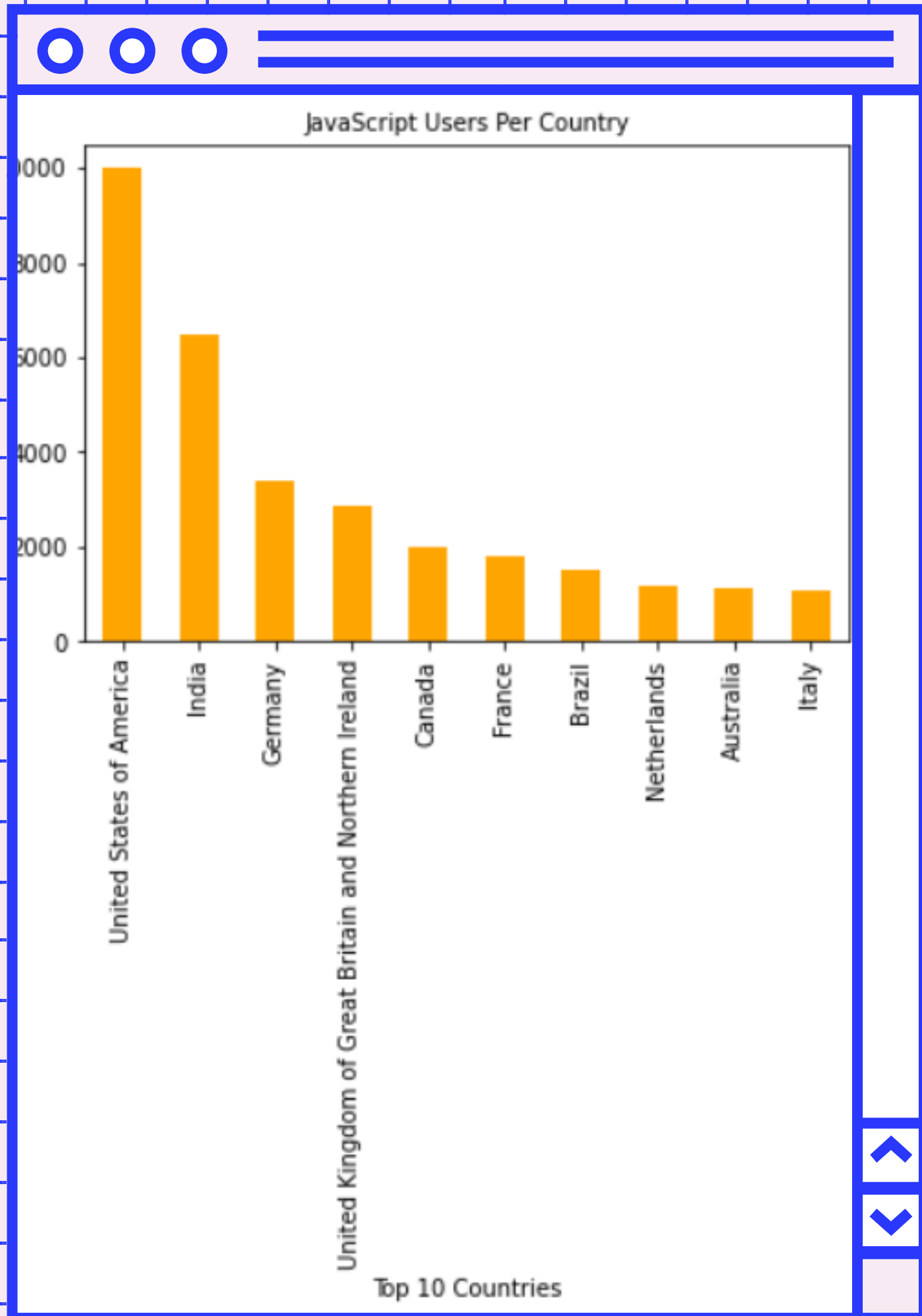
LESS THAN 1% OF JAVASCRIPT USERS ARE OVER THE AGE OF 65.



	Number of Respondants	NumKnowsJava\$	PercentJava\$
United States of America	15288	9987	65.33%
India	10511	6460	61.46%
Germany	5625	3389	60.25%
United Kingdom of Great Britain and Northern Ireland	4475	2850	63.69%
Canada	3012	1981	65.77%
France	2708	1802	66.54%
Brazil	2254	1533	68.01%
Poland	1805	1081	59.89%
Netherlands	1772	1183	66.76%
Italy	1666	1096	65.79%

COUNTRY DEVELOPERS

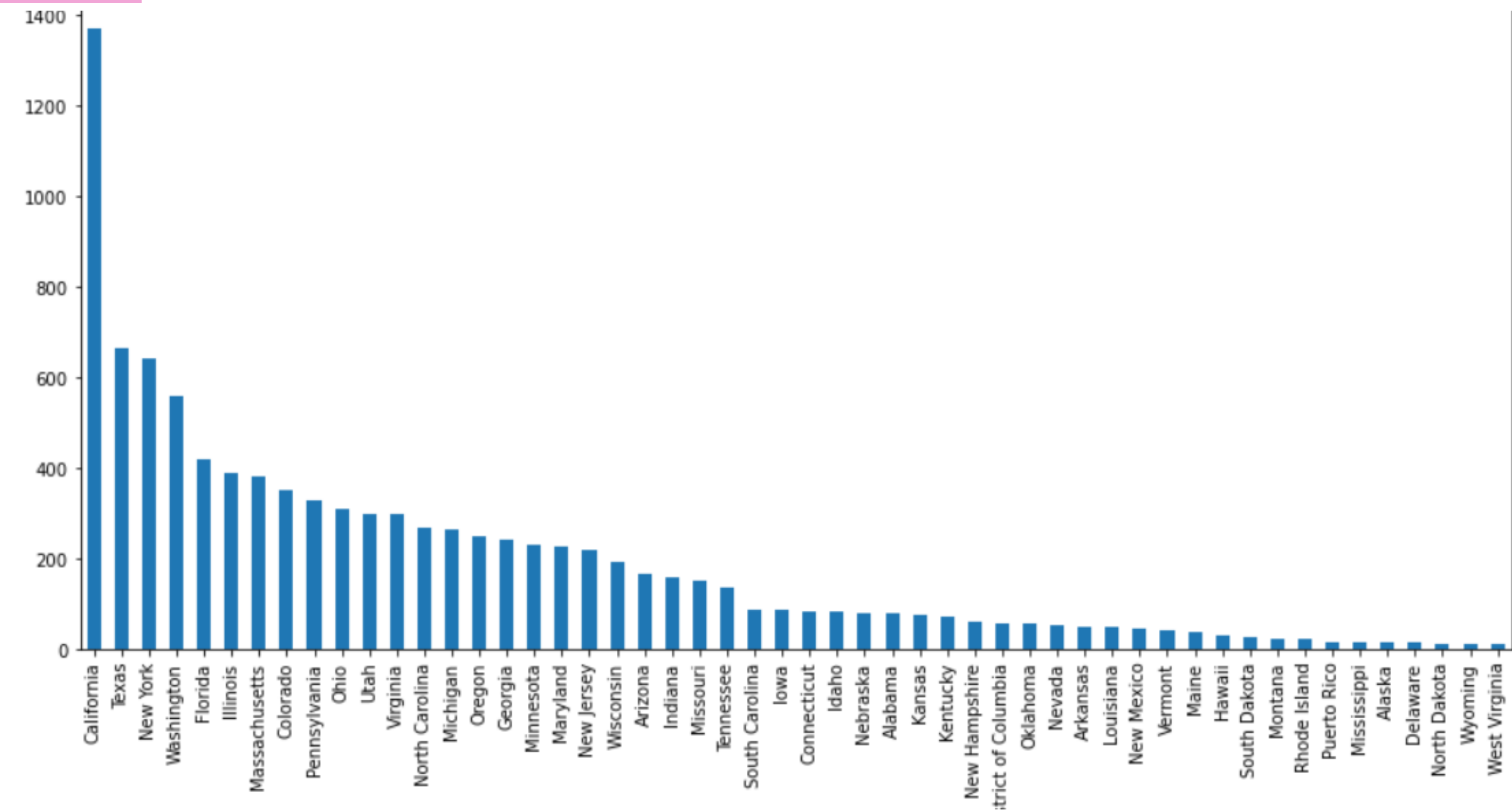
	PercentJavaS	PercentHTML/CSS	PercentPython
United States of America	65.33%	55.55%	52.17%
India	61.46%	55.60%	49.79%
Germany	60.25%	53.87%	48.23%
United Kingdom of Great Britain and Northern Ireland	63.69%	54.75%	48.02%
Canada	65.77%	56.11%	52.89%
France	66.54%	58.79%	52.55%
Brazil	68.01%	54.13%	42.19%
Poland	59.89%	50.08%	44.99%
Netherlands	66.76%	57.56%	46.90%
Italy	65.79%	57.68%	44.12%
Australia	67.44%	56.32%	50.49%
Spain	64.58%	54.48%	45.52%
Russian Federation	53.46%	42.27%	45.12%
Sweden	61.04%	50.00%	43.90%
China	40.85%	31.28%	46.92%



TOP 3 COUNTRIES USING JAVASCRIPT



STATES WITH THE MOST JAVASCRIPT DEVELOPERS



FINAL OBSERVATIONS

Of the 80,00 respondents who answered the survey on Slack, JavaScript was the most widely used programming language.

The United States and India were the two countries that used JavaScript the most and California was the state with the greatest JavaScript usage.

Our data showed that men were more likely to use JavaScript compared to women.