```
from google.colab import files


uploaded = files.upload()
```

Choose Files No file chosen Upload widget is only available when the cell has been executed in

```
Saving survey.csv to survey.csv
```

```
import pandas as pd
import io

survey = pd.read_csv(io.BytesIO(uploaded['survey.csv']))


survey
```

	ResponseId	YearsCode	Age	LanguageHaveWorkedWith
0	1	NaN	25-34 years old	C++;HTML/CSS;JavaScript;Objective-C;PHP;Swift
1	2	7	18-24 years old	JavaScript;Python
2	3	NaN	18-24 years old	Assembly;C;Python;R;Rust
3	4	NaN	35-44 years old	JavaScript;TypeScript
4	5	17	25-34 years old	Bash/Shell;HTML/CSS;Python;SQL
...	...	...	...	...
83434	83435	6	25-34 years old	Clojure;Kotlin;SQL
83435	83436	4	18-24 years old	NaN
83436	83437	10	25-34 years old	Groovy;Java;Python
83437	83438	5	25-34 years old	Bash/Shell;JavaScript;Node.js;Python
83438	83439	14	18-24 years old	Delphi;Elixir;HTML/CSS;Java;JavaScript

83439 rows × 5 columns

The dataset contains over 83,000 entries along with 5 columns.

```
survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 83439 entries, 0 to 83438
Data columns (total 5 columns):
 #   Column                 Non-Null Count  Dtype
---  ------                 --------------  -----
 0   ResponseId             83439 non-null  int64
```

```
 1   YearsCode               81641 non-null  object
 2   Age                     82407 non-null  object
 3   LanguageHaveWorkedWith  82357 non-null  object
 4   Gender                  82286 non-null  object
dtypes: int64(1), object(4)
memory usage: 3.2+ MB
```

As seen there are some null values in every column except Response ID. It appears that every column contains some empty values since the Non-Null count for every column is lower than the total number of rows (83439)

Gender

```
import matplotlib.pyplot as plt
survey_gender = survey[['Gender']]

survey_gender.groupby('Gender').size().reset_index(name='counts').sort_values(by="counts")
```

	Gender	counts
7	Man;Woman;Or, in your own words:	1
14	Woman;Non-binary, genderqueer, or gender non-c...	9
2	Man;Non-binary, genderqueer, or gender non-con...	11
15	Woman;Or, in your own words:	16
6	Man;Woman;Non-binary, genderqueer, or gender n...	17
5	Man;Woman;Non-binary, genderqueer, or gender n...	21
9	Non-binary, genderqueer, or gender non-conform...	21
4	Man;Woman	41
13	Woman;Non-binary, genderqueer, or gender non-c...	147
1	Man;Non-binary, genderqueer, or gender non-con...	252
3	Man;Or, in your own words:	268
10	Or, in your own words:	413
8	Non-binary, genderqueer, or gender non-conforming	690
11	Prefer not to say	1442
12	Woman	4120
0	Man	74817

As shown above, the gender column contains multiple picks. So we can omit it for simplicity.

```
survey.where(~(survey.Gender.str.contains(';', na=False)), np.nan, inplace=True)
```

```
survey_gender = survey[['Gender']]
```

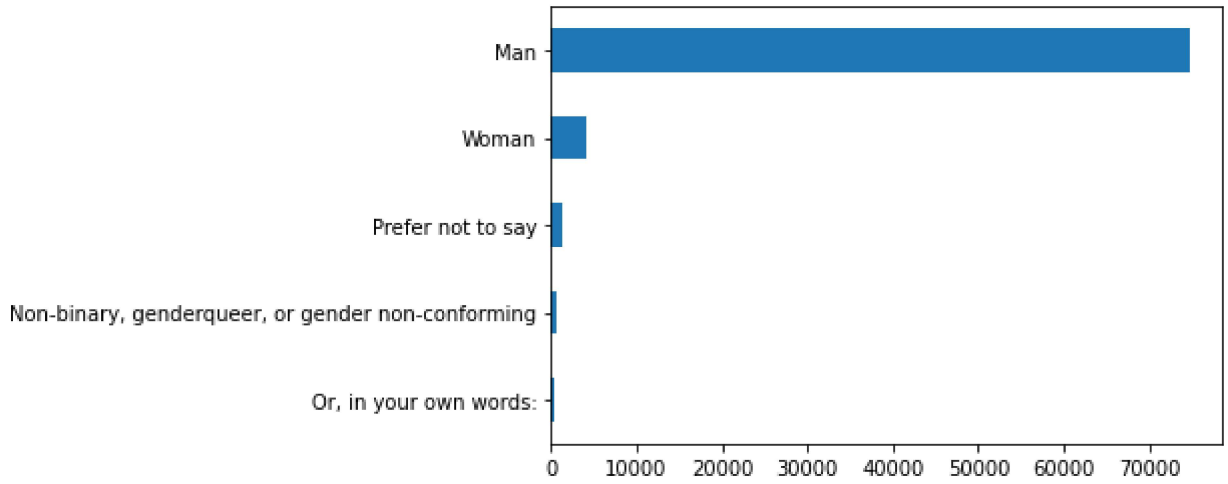
```
survey_gender.groupby('Gender').size().reset_index(name='counts').sort_values(by="counts")
```

	Gender	counts
2	Or, in your own words:	413
1	Non-binary, genderqueer, or gender non-conforming	690
3	Prefer not to say	1442
4	Woman	4120
0	Man	74817

Question 1 :- Show the Graphical Representation of Gender Division

```
survey_gender['Gender'].value_counts().sort_values().plot(kind='barh')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f66aa258550>
```



Answer:- It is clearly visible that men dominate this survey and women and other genders are underrepresented in the programming community.

Age

Question 2 :- Which age group are more involve in the programming community?

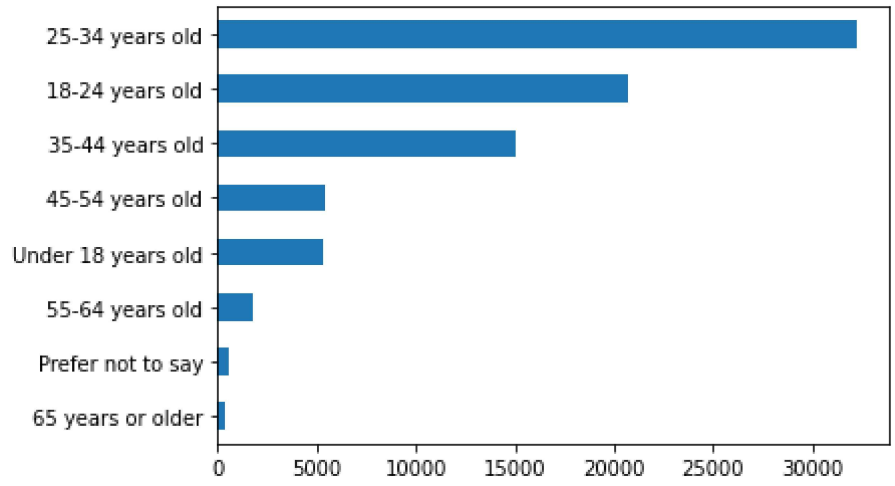
```
survey_age = survey[['Age']]
```

```
survey_age.groupby('Age').size().reset_index(name='counts').sort_values(by="counts")
```

	Age	counts
5	65 years or older	414
6	Prefer not to say	564
4	55-64 years old	1800
7	Under 18 years old	5283
3	45-54 years old	5433
2	35-44 years old	15081
0	18-24 years old	20761
1	25-34 years old	32269

```
survey_age['Age'].value_counts().sort_values().plot(kind='barh')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f66aa0847d0>
```



Answer 2:- As seen from the bar graph, age group 25-34 and group 18-24 contribute the most in the programming community. The reason is many young people have taken up computer science as their field of study in last 2 decades.

LanguageHaveWorkedWith

Question 3: - Which programming languages were in demand in 2021?

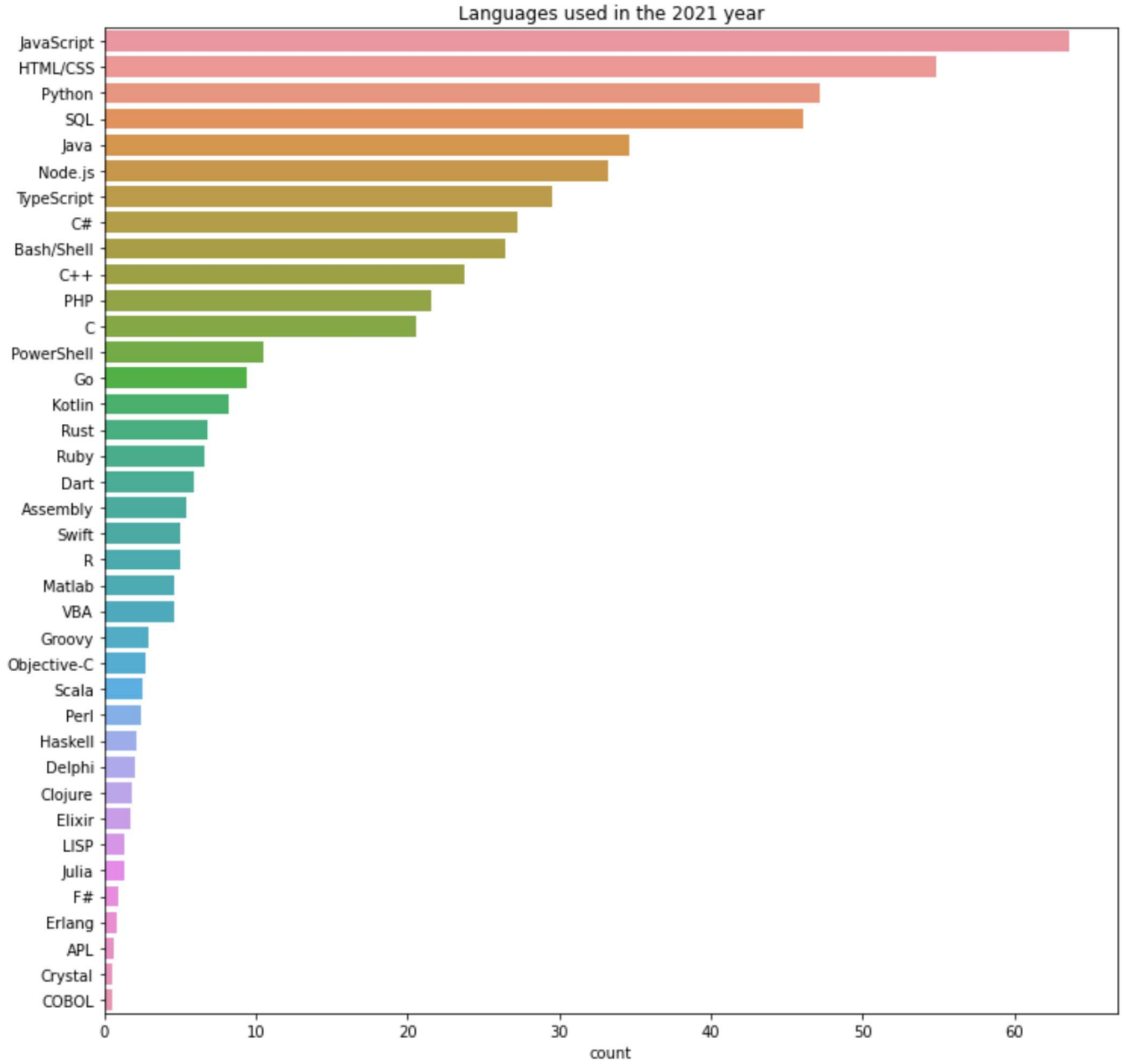
```
def split_multicolumn(col_series):
    result_df = col_series.to_frame()
    options = []
    # Iterate over the column
    for idx, value  in col_series[col_series.notnull()].iteritems():
        # Break each value into list of options
        for option in value.split(';'):
            # Add the option as a column to result
            if not option in result_df.columns:
                options.append(option)
                result_df[option] = False
            # Mark the value in the option column as True
            result_df.at[idx, option] = True
    return result_df[options]
languages_worked_df = split_multicolumn(survey.LanguageHaveWorkedWith)


languages_worked_percentages = languages_worked_df.mean().sort_values(ascending=False) * 100
languages_worked_percentages
```

```
JavaScript     63.603351
HTML/CSS       54.864032
Python         47.172186
SQL            46.100744
Java           34.618104
Node.js        33.183523
TypeScript     29.554525
C#             27.251046
Bash/Shell     26.438476
C++            23.738300
PHP            21.518714
C              20.508395
PowerShell     10.473520
Go              9.339757
Kotlin          8.143674
Rust            6.813361
Ruby            6.586848
Dart            5.908508
Assembly        5.430314
Swift           4.982083
R               4.954518
Matlab          4.559019
VBA             4.559019
Groovy          2.937475
Objective-C     2.731337
Scala           2.543175
Perl            2.387373
Haskell         2.050600
Delphi          2.049401
Clojure         1.836072
Elixir          1.694651
LISP            1.276382
Julia           1.256007
```

```
F#              0.937212
Erlang          0.761035
APL             0.617217
Crystal         0.550102
COBOL           0.512950
dtype: float64
```

```
import seaborn as sns
plt.figure(figsize=(12, 12))
sns.barplot(x=languages_worked_percentages, y=languages_worked_percentages.index)
plt.title("Languages used in the 2021 year");
plt.xlabel('count');
```



Answer 3:- JavaScript and HTML/CSS were in most demand in 2021. As both are

frontend languages and easy to learn and apply it is natural to see such trend. Pytrhon and SQL were also in demand in the year 2021.

Years in Coding

As the yearscode is in object I have converted it into numeric for better analysis.

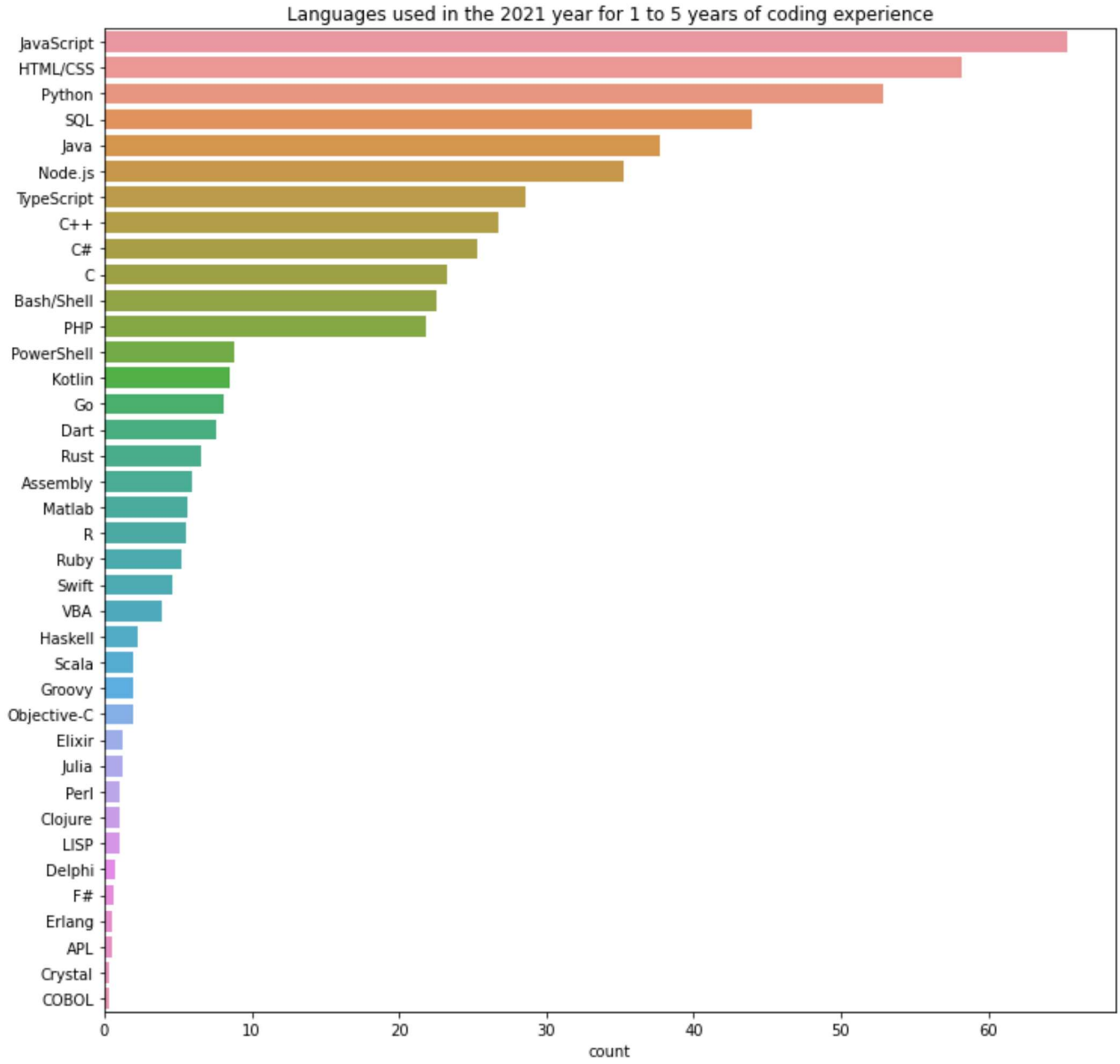
```
survey['YearsCode'] = pd.to_numeric(survey.YearsCode, errors='coerce')
```

```
survey.describe()
```

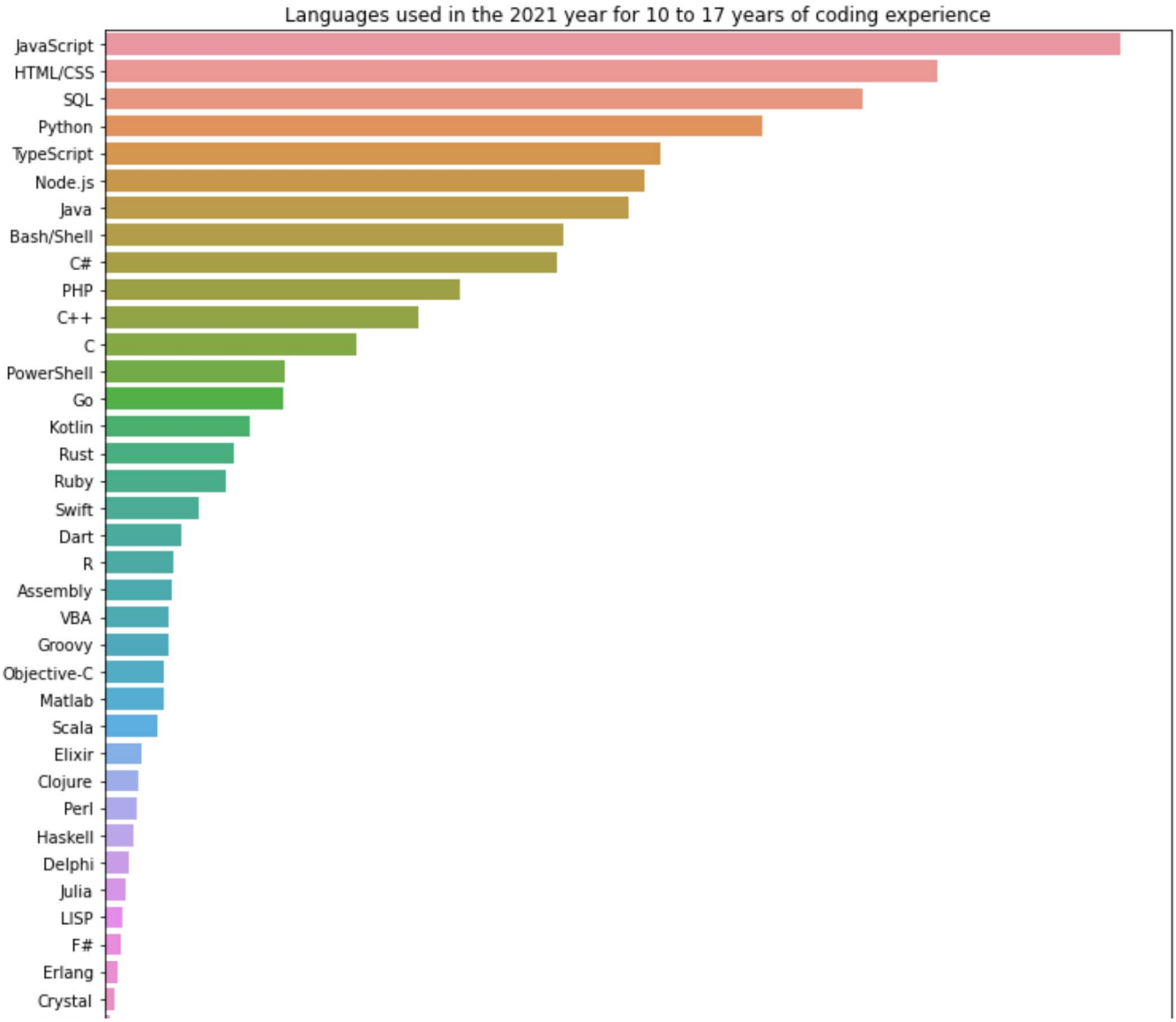
	ResponseId	YearsCode
count	82635.00000	79224.000000
mean	41729.18825	12.489296
std	24079.61954	9.625972
min	1.00000	1.000000
25%	20893.50000	5.000000
50%	41728.00000	10.000000
75%	62573.50000	17.000000
max	83439.00000	50.000000

Question4:- Which programming language do people with different years of coding use?

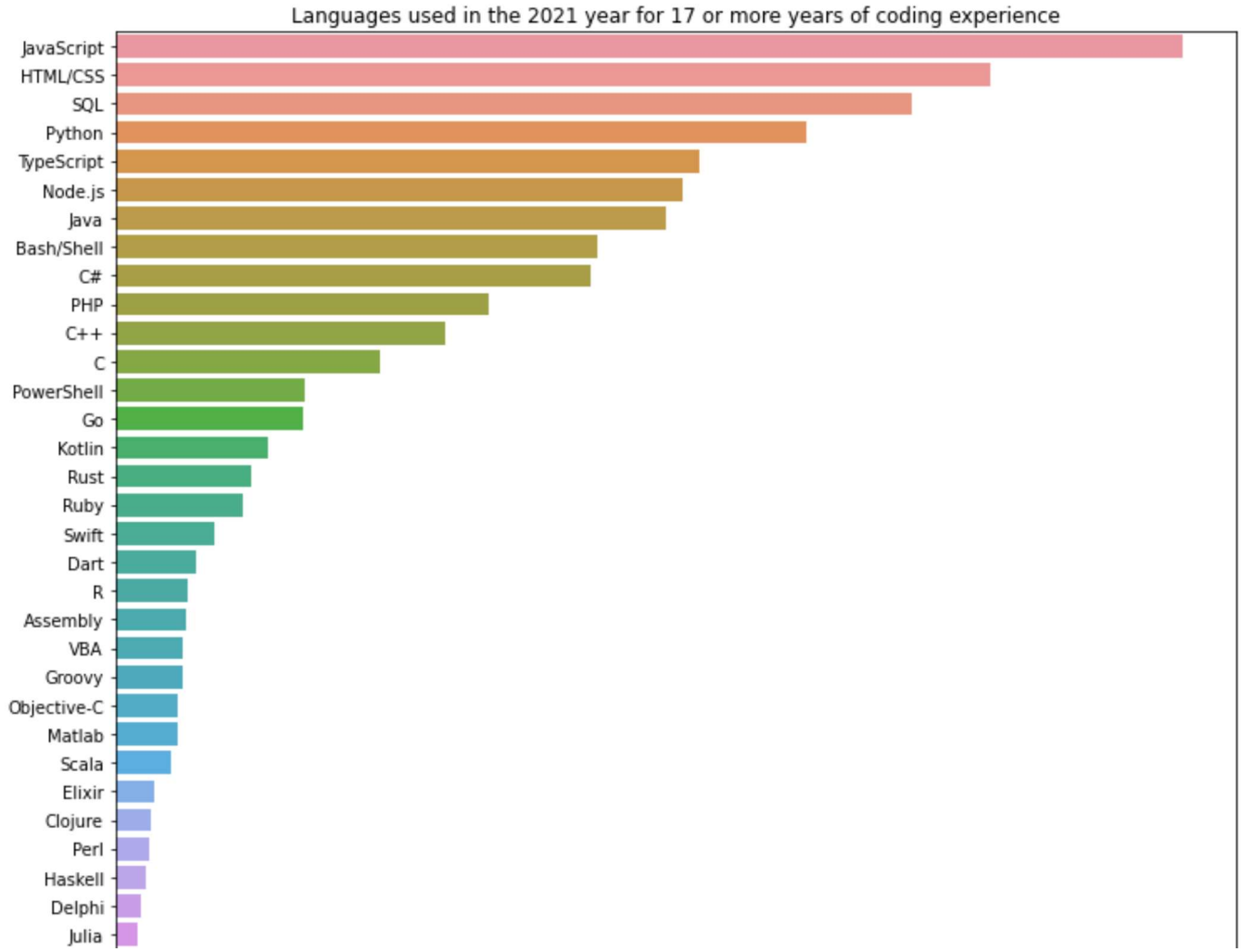
```
data_1 = survey.loc[(survey['YearsCode'] >= 1) & (survey['YearsCode'] <= 10)]
languages_worked_df = split_multicolumn(data_1.LanguageHaveWorkedWith)
languages_worked_percentages = languages_worked_df.mean().sort_values(ascending=False) * 100
import seaborn as sns
plt.figure(figsize=(12, 12))
sns.barplot(x=languages_worked_percentages, y=languages_worked_percentages.index)
plt.title("Languages used in the 2021 year for 1 to 10 years of coding experience");
plt.xlabel('count');
```




```
data_2 = survey.loc[(survey['YearsCode'] >10) & (survey['YearsCode'] <= 17)]
languages_worked_df = split_multicolumn(data_2.LanguageHaveWorkedWith)
languages_worked_percentages = languages_worked_df.mean().sort_values(ascending=False) * 100
import seaborn as sns
plt.figure(figsize=(12, 12))
sns.barplot(x=languages_worked_percentages, y=languages_worked_percentages.index)
plt.title("Languages used in the 2021 year for 10 to 17 years of coding experience");
plt.xlabel('count');
```




```
data_3 = survey.loc[(survey['YearsCode'] >17) & (survey['YearsCode'] <= 50)]
languages_worked_df = split_multicolumn(data_2.LanguageHaveWorkedWith)
languages_worked_percentages = languages_worked_df.mean().sort_values(ascending=False) * 100
import seaborn as sns
plt.figure(figsize=(12, 12))
sns.barplot(x=languages_worked_percentages, y=languages_worked_percentages.index)
plt.title("Languages used in the 2021 year for 17 or more years of coding experience");
plt.xlabel('count');
```



Answer 4: It is clearly visible that frontend languages are more in demand for all groups. But the noticable change is TypeScript's demand increases as the experience in coding increases.

COBOL

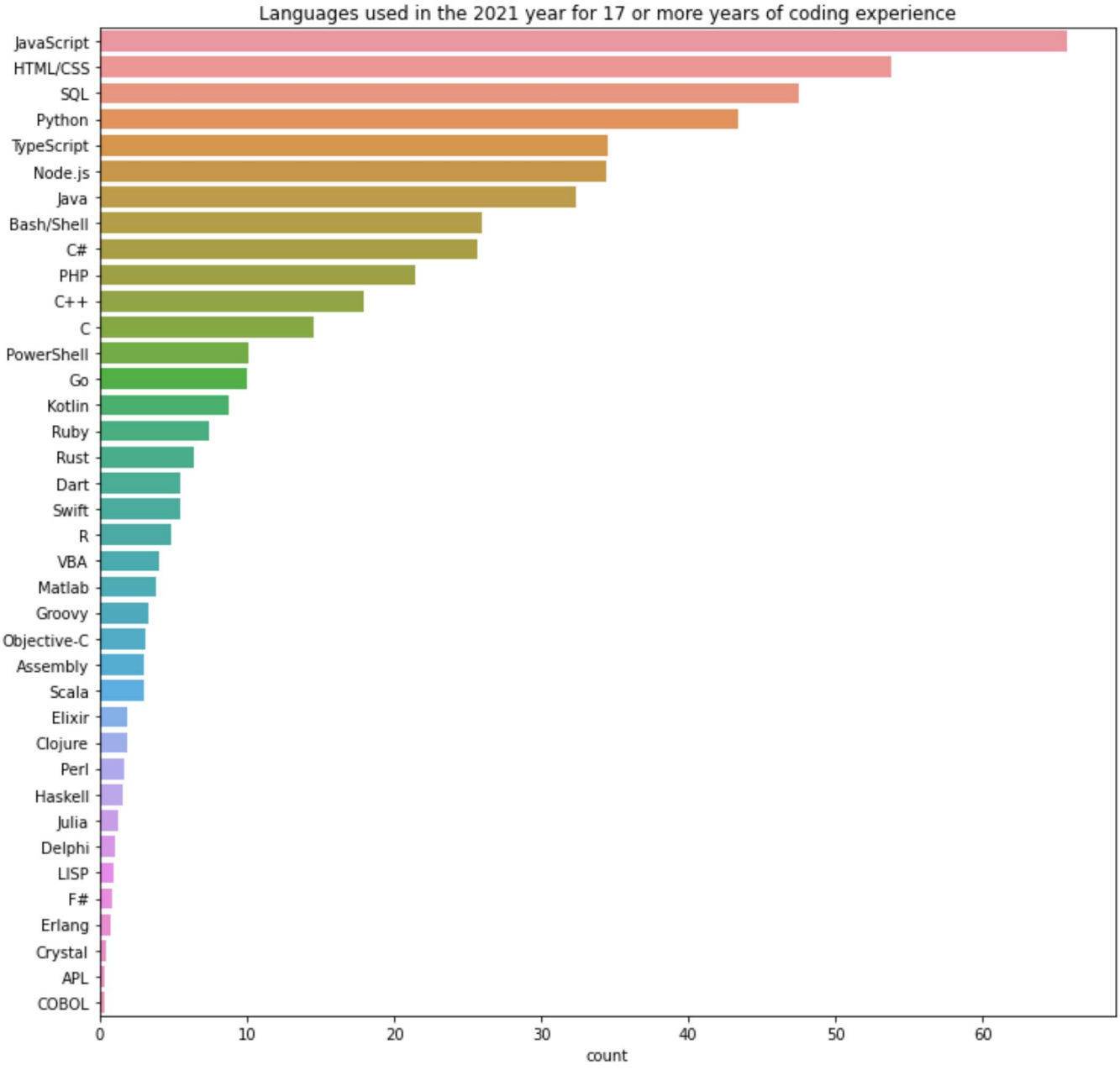
Question 5: Which languages are more popular among different age groups

```
survey['Age'].astype(str)
```

```
0        25-34 years old
1        18-24 years old
2        18-24 years old
3        35-44 years old
4        25-34 years old
              ...
83434    25-34 years old
83435    18-24 years old
83436    25-34 years old
83437    25-34 years old
83438    18-24 years old
Name: Age, Length: 83439, dtype: object
```

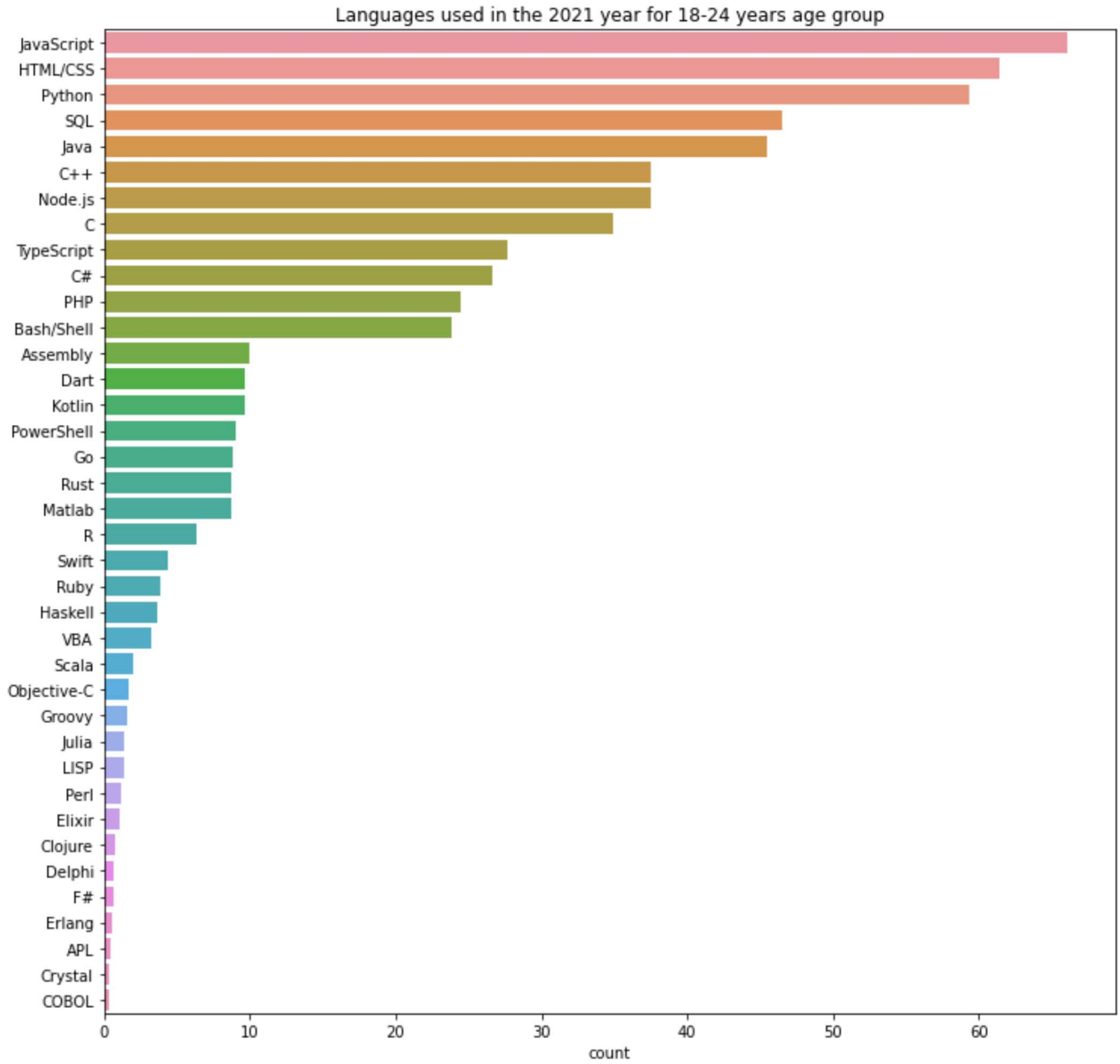
```
data_4 = survey[survey['Age']=='25-34 years old']
```

```
languages_worked_df = split_multicolumn(data_4.LanguageHaveWorkedWith)
languages_worked_percentages = languages_worked_df.mean().sort_values(ascending=False) * 100
import seaborn as sns
plt.figure(figsize=(12, 12))
sns.barplot(x=languages_worked_percentages, y=languages_worked_percentages.index)
plt.title("Languages used in the 2021 year for 25-34 years age group");
plt.xlabel('count');
```




```
data_5 = survey[survey['Age']=='18-24 years old']
languages_worked_df = split_multicolumn(data_5.LanguageHaveWorkedWith)
languages_worked_percentages = languages_worked_df.mean().sort_values(ascending=False) * 100
import seaborn as sns
```

```
plt.figure(figsize=(12, 12))
sns.barplot(x=languages_worked_percentages, y=languages_worked_percentages.index)
plt.title("Languages used in the 2021 year for 18-24 years age group");
plt.xlabel('count');
```



Answer 5:- It is clearly visible that frontend languages are more in demand for all groups. But the noticable change is TypeScript is used more by the older groups as compare to Java whereas youngsters use more Java as they are taught Java in their universities.

SUMMARY

Question 1 :- Show the Graphical Representation of Gender Division

Conclusion :- It is clearly visible that men dominate this survey and women and other genders are underrepresented in the programming community.

Question 2 :- Which age group are more involve in the programming community?

Conclusion :- As seen from the bar graph, age group 25-34 and group 18-24 contribute the most in the programming community. The reason is many young people have taken up computer science as their field of study in last 2 decades.

Question 3: - Which programming languages were in demand in 2021?

Conclusion :- Answer 3:- JavaScript and HTML/CSS were in most demand in 2021. As both are

frontend languages and easy to learn and apply it is natural to see such trend. Pytrhon and SQL were also in demand in the year 2021.

Question4:- Which programming language do people with different years of coding use?

Conclusion:- It is clearly visible that frontend languages are more in demand for all groups. But the noticable change is TypeScript's demand increases as the experience in coding increases.

Question 5: Which languages are more popular among different age groups

Conclusion :- It is clearly visible that frontend languages are more in demand for all groups. But the noticable change is TypeScript is used more by the older groups as compare to Java whereas youngsters use more Java as they are taught Java in their universities.