ck-overflow-developers-survey-2023

February 1, 2024

```
[55]: import matplotlib.pyplot as plt
      import pandas as pd
      import numpy as np
```

```
[2]: na_vals=['Na','Missing']
     df=pd.read_csv('data/survey_results_public.csv', index_col='ResponseId',␣
       ↪na_values=na_vals)
```

```
[3]: df.head(10)
```

```
[3]:                Q120                                     MainBranch  \
     ResponseId
     1           I agree                               None of these
     2           I agree                  I am a developer by profession
     3           I agree                  I am a developer by profession
     4           I agree                  I am a developer by profession
     5           I agree                  I am a developer by profession
     6           I agree                  I am a developer by profession
     7           I agree                  I am a developer by profession
     8           I agree                  I am a developer by profession
     9           I agree  I am not primarily a developer, but I write co…
     10          I agree                  I am a developer by profession

                            Age  \
     ResponseId
     1           18-24 years old
     2           25-34 years old
     3           45-54 years old
     4           25-34 years old
     5           25-34 years old
     6           35-44 years old
     7           35-44 years old
     8           25-34 years old
     9           45-54 years old
     10          25-34 years old

                                                         Employment  \
     ResponseId
```

```
                                               Employment  \
ResponseId
1                                                     NaN
2                                        Employed, full-time
3                                        Employed, full-time
4                                        Employed, full-time
5            Employed, full-time;Independent contractor, fr…
6                                        Employed, full-time
7                                        Employed, full-time
8                                        Employed, full-time
9                                        Employed, full-time
10                        Not employed, but looking for work


                                           RemoteWork  \
ResponseId
1                                                 NaN
2                                              Remote
3                  Hybrid (some remote, some in-person)
4                  Hybrid (some remote, some in-person)
5                                              Remote
6                                              Remote
7                                              Remote
8                                              Remote
9                  Hybrid (some remote, some in-person)
10                                                NaN


                                        CodingActivities  \
ResponseId
1                                                     NaN
2            Hobby;Contribute to open-source projects;Boots…
3            Hobby;Professional development or self-paced l…
4                                                   Hobby
5            Hobby;Contribute to open-source projects;Profe…
6            Hobby;Professional development or self-paced l…
7            Hobby;Contribute to open-source projects;Profe…
8                                                   Hobby
9                    Hobby;Contribute to open-source projects
10                                                    NaN


                                              EdLevel  \
ResponseId
1                                                  NaN
2                 Bachelor's degree (B.A., B.S., B.Eng., etc.)
3                 Bachelor's degree (B.A., B.S., B.Eng., etc.)
4                 Bachelor's degree (B.A., B.S., B.Eng., etc.)
5                 Bachelor's degree (B.A., B.S., B.Eng., etc.)
6            Some college/university study without earning …
7            Some college/university study without earning …
```

```
8             Bachelor's degree (B.A., B.S., B.Eng., etc.)
9          Master's degree (M.A., M.S., M.Eng., MBA, etc.)
10            Bachelor's degree (B.A., B.S., B.Eng., etc.)

                                                  LearnCode  \
ResponseId
1                                                       NaN
2           Books / Physical media;Colleague;Friend or fam…
3           Books / Physical media;Colleague;On the job tr…
4           Colleague;Friend or family member;Other online…
5           Books / Physical media;Online Courses or Certi…
6           Books / Physical media;Colleague;Online Course…
7           Friend or family member;Online Courses or Cert…
8           Books / Physical media;Online Courses or Certi…
9           Online Courses or Certification;On the job tra…
10          Books / Physical media;Online Courses or Certi…

                                             LearnCodeOnline  \
ResponseId
1                                                       NaN
2           Formal documentation provided by the owner of …
3           Formal documentation provided by the owner of …
4           Formal documentation provided by the owner of …
5           Formal documentation provided by the owner of …
6           Formal documentation provided by the owner of …
7                                                       NaN
8           Formal documentation provided by the owner of …
9           Formal documentation provided by the owner of …
10          Formal documentation provided by the owner of …

                              LearnCodeCoursesCert  …         Frequency_1  \
ResponseId                                          …
1                                              NaN  …                 NaN
2                                            Other  …   1-2 times a week
3                                              NaN  …   6-10 times a week
4                                              NaN  …   1-2 times a week
5                               Other;Codecademy;edX  …   1-2 times a week
6                                            Other  …   1-2 times a week
7                                            Udemy  …   1-2 times a week
8                                    Codecademy;edX  …                 NaN
9                                 Udemy;Pluralsight  …                 NaN
10          edX;Udemy;Pluralsight;Coursera;Udacity  …                 NaN

                Frequency_2       Frequency_3              TimeSearching  \
ResponseId
1                       NaN              NaN                        NaN
2           10+ times a week            Never       15-30 minutes a day
```

```
3      6-10 times a week  3-5 times a week          30-60 minutes a day
4       10+ times a week  1-2 times a week          15-30 minutes a day
5       1-2 times a week  3-5 times a week         60-120 minutes a day
6       1-2 times a week  3-5 times a week          30-60 minutes a day
7       3-5 times a week  1-2 times a week  Less than 15 minutes a day
8                    NaN               NaN         60-120 minutes a day
9                    NaN               NaN                          NaN
10                   NaN               NaN                          NaN

                    TimeAnswering  \
ResponseId
1                             NaN
2             15-30 minutes a day
3             30-60 minutes a day
4             30-60 minutes a day
5             30-60 minutes a day
6             15-30 minutes a day
7             15-30 minutes a day
8             30-60 minutes a day
9                             NaN
10                            NaN


                                      ProfessionalTech  \
ResponseId
1                                                  NaN
2             DevOps function;Microservices;Automated testin…
3             DevOps function;Microservices;Automated testin…
4             Automated testing;Continuous integration (CI) …
5             Microservices;Automated testing;Observability …
6             DevOps function;Microservices;Observability to…
7             Microservices;Automated testing;Continuous int…
8                                          None of these
9                                                    NaN
10                                                   NaN


                                                Industry  \
ResponseId
1                                                    NaN
2             Information Services, IT, Software Development…
3             Information Services, IT, Software Development…
4                                                    NaN
5                                                  Other
6                                                  Other
7             Information Services, IT, Software Development…
8                                     Financial Services
9                                                    NaN
10                                                   NaN
```

```
              SurveyLength                    SurveyEase  \
ResponseId
1                        NaN                          NaN
2          Appropriate in length                      Easy
3          Appropriate in length                      Easy
4          Appropriate in length                      Easy
5          Appropriate in length  Neither easy nor difficult
6          Appropriate in length  Neither easy nor difficult
7          Appropriate in length                      Easy
8                        NaN                          NaN
9          Appropriate in length  Neither easy nor difficult
10         Appropriate in length  Neither easy nor difficult

            ConvertedCompYearly
ResponseId
1                        NaN
2                    285000.0
3                    250000.0
4                    156000.0
5                     23456.0
6                     96828.0
7                    135000.0
8                     80000.0
9                     64254.0
10                       NaN

[10 rows x 83 columns]
```

[4]: `df.shape`

[4]: (89184, 83)

[5]:
```python
pd.set_option('display.max_columns',84)
pd.set_option('display.max_rows',84)
```

[6]:
```python
schema_df=pd.read_csv('data/survey_results_schema.csv',index_col='qname')
```

But we need just two colums Question name and Question

[7]:
```python
df['Age'].value_counts()
```

[7]:
```
Age
25-34 years old        33247
35-44 years old        20532
18-24 years old        17931
45-54 years old         8334
```

```
Under 18 years old      4128
55-64 years old         3392
65 years or older       1171
Prefer not to say        449
Name: count, dtype: int64
```

you can analyse all values like this

```
[8]: df.reset_index(inplace=True)
```

```
[9]: df.set_index('ResponseId',inplace=True)
```

1   Access question from schema.csv

```
[10]: schema_df.loc['Employment','question']
```

```
[10]: 'Which of the following best describes your current employment status? Select
      all that apply.'
```

```
[11]: schema_df.sort_index(inplace=True)
```

```
[12]: high_salary=(df['ConvertedCompYearly'] > 300000)
```

```
[13]: df.
       ↪loc[high_salary,['ProfessionalTech','RemoteWork','LanguageHaveWorkedWith','ConvertedCompYea
```

```
[13]:                                    ProfessionalTech  \
      ResponseId
      342                                             NaN
      406                                 DevOps function
      771        Automated testing;Continuous integration (CI) …
      873        DevOps function;Microservices;Automated testin…
      1001                                            NaN
      …                                                 …
      88928                                           NaN
      89073      Microservices;Automated testing;Developer port…
      89124      DevOps function;Microservices;Automated testin…
      89134      DevOps function;Microservices;Automated testin…
      89158      Automated testing;Observability tools;Continuo…

                                    RemoteWork  \
      ResponseId
      342                               Remote
      406                               Remote
      771        Hybrid (some remote, some in-person)
      873                               Remote
```

```
1001                                    Remote
…                                           …
88928                                   Remote
89073      Hybrid (some remote, some in-person)
89124      Hybrid (some remote, some in-person)
89134      Hybrid (some remote, some in-person)
89158                                   Remote


                                 LanguageHaveWorkedWith  \
ResponseId
342                    HTML/CSS;JavaScript;TypeScript
406                             C#;JavaScript;Swift
771        Bash/Shell (all shells);C;C++;JavaScript;Power…
873                    Bash/Shell (all shells);Java
1001       Assembly;Bash/Shell (all shells);C++;HTML/CSS;…
…                                               …
88928                           C++;Java;TypeScript
89073      Assembly;Bash/Shell (all shells);HTML/CSS;Java…
89124      Bash/Shell (all shells);C++;HTML/CSS;JavaScrip…
89134                      C#;JavaScript;SQL;TypeScript
89158                                   Java;Kotlin


           ConvertedCompYearly
ResponseId
342                  350000.0
406                  400000.0
771                 9000000.0
873                  350000.0
1001                 372415.0
…                         …
88928                353000.0
89073                350000.0
89124                330520.0
89134                500000.0
89158                319711.0

[975 rows x 4 columns]
```

[14]: `df.sort_values(by='ResponseId')`

```
[14]:              Q120                 MainBranch               Age  \
      ResponseId
      1          I agree                None of these     18-24 years old
      2          I agree  I am a developer by profession     25-34 years old
      3          I agree  I am a developer by profession     45-54 years old
      4          I agree  I am a developer by profession     25-34 years old
      5          I agree  I am a developer by profession     25-34 years old
```

```
...           ...                                    ...               ...
89180      I agree  I am a developer by profession     25-34 years old
89181      I agree  I am a developer by profession     18-24 years old
89182      I agree    I code primarily as a hobby   Prefer not to say
89183      I agree  I am a developer by profession  Under 18 years old
89184      I agree  I am a developer by profession     35-44 years old

                                              Employment  \
ResponseId
1                                                    NaN
2                                      Employed, full-time
3                                      Employed, full-time
4                                      Employed, full-time
5          Employed, full-time;Independent contractor, fr…
...                                                    …
89180      Employed, full-time;Independent contractor, fr…
89181                Student, full-time;Employed, part-time
89182                               I prefer not to say
89183              Employed, part-time;Student, part-time
89184                                 Employed, full-time


                                   RemoteWork  \
ResponseId
1                                         NaN
2                                      Remote
3          Hybrid (some remote, some in-person)
4          Hybrid (some remote, some in-person)
5                                      Remote
...                                         …
89180                                  Remote
89181      Hybrid (some remote, some in-person)
89182                                     NaN
89183      Hybrid (some remote, some in-person)
89184      Hybrid (some remote, some in-person)


                                        CodingActivities  \
ResponseId
1                                                    NaN
2          Hobby;Contribute to open-source projects;Boots…
3          Hobby;Professional development or self-paced l…
4                                                  Hobby
5          Hobby;Contribute to open-source projects;Profe…
...                                                    …
89180      Hobby;Bootstrapping a business;Freelance/contr…
89181                           School or academic work
89182                                               NaN
89183                      Hobby;School or academic work
```

8

```
89184       Hobby;Professional development or self-paced l…

                                                    EdLevel  \
ResponseId
1                                                      NaN
2                Bachelor's degree (B.A., B.S., B.Eng., etc.)
3                Bachelor's degree (B.A., B.S., B.Eng., etc.)
4                Bachelor's degree (B.A., B.S., B.Eng., etc.)
5                Bachelor's degree (B.A., B.S., B.Eng., etc.)
…                                                        …
89180                 Associate degree (A.A., A.S., etc.)
89181            Bachelor's degree (B.A., B.S., B.Eng., etc.)
89182                                      Something else
89183        Secondary school (e.g. American high school, G…
89184            Bachelor's degree (B.A., B.S., B.Eng., etc.)


                                                 LearnCode  \
ResponseId
1                                                      NaN
2            Books / Physical media;Colleague;Friend or fam…
3            Books / Physical media;Colleague;On the job tr…
4            Colleague;Friend or family member;Other online…
5            Books / Physical media;Online Courses or Certi…
…                                                        …
89180        Online Courses or Certification;Other online r…
89181        Colleague;Online Courses or Certification;Othe…
89182        Books / Physical media;Hackathons (virtual or …
89183        Online Courses or Certification;Other online r…
89184        Colleague;Online Courses or Certification;Othe…


                                            LearnCodeOnline  \
ResponseId
1                                                      NaN
2            Formal documentation provided by the owner of …
3            Formal documentation provided by the owner of …
4            Formal documentation provided by the owner of …
5            Formal documentation provided by the owner of …
…                                                        …
89180        Formal documentation provided by the owner of …
89181        Formal documentation provided by the owner of …
89182                                                  NaN
89183        Formal documentation provided by the owner of …
89184        Formal documentation provided by the owner of …


                        LearnCodeCoursesCert YearsCode YearsCodePro  \
ResponseId
1                                        NaN       NaN          NaN
```

```
2                            Other       18        9
3                              NaN       27       23
4                              NaN       12        7
5              Other;Codecademy;edX        6        4
…                               …        …         …
89180                          Udemy       20        5
89181                            NaN        5      NaN
89182            Codecademy;Coursera       10      NaN
89183                          Udemy        3      NaN
89184  Codecademy;Pluralsight;Coursera    17       12


                            DevType                    OrgSize  \
ResponseId
1                               NaN                        NaN
2       Senior Executive (C-Suite, VP, etc.)      2 to 9 employees
3                    Developer, back-end  5,000 to 9,999 employees
4                   Developer, front-end     100 to 499 employees
5                   Developer, full-stack      20 to 99 employees
…                                 …                          …
89180                 Developer, front-end    100 to 499 employees
89181                  Developer, back-end                     NaN
89182                                 NaN                     NaN
89183                  System administrator                    NaN
89184                 Developer, full-stack    100 to 499 employees


                      PurchaseInfluence      TechList  \
ResponseId
1                                   NaN           NaN
2         I have a great deal of influence    Investigate
3                 I have some influence   Given a list
4                 I have some influence     Investigate
5                 I have some influence     Investigate
…                                   …             …
89180             I have some influence     Investigate
89181                             NaN     Investigate
89182                             NaN           NaN
89183                             NaN     Investigate
89184             I have some influence           NaN


                                       BuyNewTool  \
ResponseId
1                                             NaN
2         Start a free trial;Ask developers I know/work …
3         Start a free trial;Ask developers I know/work …
4         Start a free trial;Ask developers I know/work …
5         Start a free trial;Ask developers I know/work …
…                                               …
```

```
89180                                                          NaN
89181      Start a free trial;Ask developers I know/work …
89182                                                          NaN
89183      Ask developers I know/work with;Visit develope…
89184      Start a free trial;Ask developers I know/work …


                              Country                Currency  \
ResponseId
1                                 NaN                     NaN
2            United States of America  USD\tUnited States dollar
3            United States of America  USD\tUnited States dollar
4            United States of America  USD\tUnited States dollar
5                         Philippines       PHP\tPhilippine peso
…                                 …                       …
89180                          Brazil       BRL\tBrazilian real
89181                         Romania                     NaN
89182                          Israel                     NaN
89183                     Switzerland                     NaN
89184      Iran, Islamic Republic of…       IRR\tIranian rial


             CompTotal                       LanguageHaveWorkedWith  \
ResponseId
1                  NaN                                          NaN
2          2.850000e+05                 HTML/CSS;JavaScript;Python
3          2.500000e+05                 Bash/Shell (all shells);Go
4          1.560000e+05  Bash/Shell (all shells);HTML/CSS;JavaScript;PH…
5          1.320000e+06              HTML/CSS;JavaScript;TypeScript
…                  …                                            …
89180      2.000000e+05        HTML/CSS;Java;JavaScript;SQL;TypeScript
89181              NaN                        Dart;Java;Python;SQL
89182              NaN  Assembly;Bash/Shell (all shells);C;C#;Python;R…
89183              NaN  Bash/Shell (all shells);C#;HTML/CSS;Java;JavaS…
89184      3.300000e+09               C#;Go;JavaScript;SQL;TypeScript


                             LanguageWantToWorkWith  \
ResponseId
1                                               NaN
2          Bash/Shell (all shells);C#;Dart;Elixir;GDScrip…
3                                 Haskell;OCaml;Rust
4          Bash/Shell (all shells);HTML/CSS;JavaScript;Ru…
5                 HTML/CSS;JavaScript;Python;Rust;TypeScript
…                                               …
89180      Bash/Shell (all shells);C;Go;HTML/CSS;JavaScri…
89181              Java;JavaScript;Python;SQL;TypeScript
89182                                      Python;Rust
89183      Bash/Shell (all shells);HTML/CSS;JavaScript;Po…
89184                 C#;Go;JavaScript;SQL;TypeScript
```

```
                                       DatabaseHaveWorkedWith  \
ResponseId
1                                                        NaN
2                                                   Supabase
3                                                        NaN
4                                            PostgreSQL;Redis
5                     BigQuery;Elasticsearch;MongoDB;PostgreSQL
…                                                          …
89180                        MongoDB;MySQL;PostgreSQL;SQLite
89181                                             PostgreSQL
89182                                                  SQLite
89183        MariaDB;Microsoft SQL Server;MongoDB;MySQL;Red…
89184                      Microsoft SQL Server;Redis;SQLite


                                       DatabaseWantToWorkWith  \
ResponseId
1                                                        NaN
2                        Firebase Realtime Database;Supabase
3                                                        NaN
4                                            PostgreSQL;Redis
5                  Elasticsearch;MongoDB;PostgreSQL;Redis;Supabase
…                                                          …
89180                                      PostgreSQL;SQLite
89181                                             PostgreSQL
89182                                                    NaN
89183        Cassandra;Cosmos DB;Dynamodb;MariaDB;Microsoft…
89184                      Microsoft SQL Server;Redis;SQLite


                                       PlatformHaveWorkedWith  \
ResponseId
1                                                        NaN
2                     Amazon Web Services (AWS);Netlify;Vercel
3            Amazon Web Services (AWS);Google Cloud;OpenSta…
4                                            Cloudflare;Heroku
5            Amazon Web Services (AWS);Firebase;Heroku;Netl…
…                                                          …
89180        Digital Ocean;Firebase;Google Cloud;Heroku;Vercel
89181                                                    NaN
89182                              Amazon Web Services (AWS)
89183        Amazon Web Services (AWS);Cloudflare;Google Cl…
89184                                                  Hetzner


                                       PlatformWantToWorkWith  \
ResponseId
1                                                        NaN
2                                    Fly.io;Netlify;Render
```

12

```
3                                                         NaN
4                                          Cloudflare;Heroku
5           Amazon Web Services (AWS);Cloudflare;Digital O…
…                                                           …
89180        Amazon Web Services (AWS);Heroku;Netlify;Vercel
89181                                                     NaN
89182                 Amazon Web Services (AWS);Microsoft Azure
89183       Amazon Web Services (AWS);Cloudflare;Digital O…
89184                                  Hetzner;Microsoft Azure


                                    WebframeHaveWorkedWith  \
ResponseId
1                                                      NaN
2                                Next.js;React;Remix;Vue.js
3                                                      NaN
4                  Node.js;React;Ruby on Rails;Vue.js;WordPress
5                   Express;Gatsby;NestJS;Next.js;Node.js;React
…                                                          …
89180           Angular;AngularJS;Express;jQuery;Node.js;Nuxt…
89181                                              Spring Boot
89182                                                     NaN
89183               Express;Next.js;Node.js;React;WordPress
89184             Angular;ASP.NET;ASP.NET CORE;Blazor;Node.js


                                    WebframeWantToWorkWith  \
ResponseId
1                                                      NaN
2                      Deno;Elm;Nuxt.js;React;Svelte;Vue.js
3                                                      NaN
4                           Node.js;Ruby on Rails;Vue.js
5            Express;NestJS;Next.js;Node.js;React;Remix;Vue.js
…                                                          …
89180                   Express;Node.js;Nuxt.js;Svelte;Vue.js
89181                                              Spring Boot
89182                                                     NaN
89183            Angular;AngularJS;Express;Next.js;Node.js;Reac…
89184            Angular;ASP.NET;ASP.NET CORE;Blazor;Deno;Node…


                                    MiscTechHaveWorkedWith  \
ResponseId
1                                                      NaN
2                              Electron;React Native;Tauri
3                                                      NaN
4                                                      NaN
5                                                      NaN
…                                                          …
89180                                                 Flutter


                                      13
```

```
89181             Flutter;Opencv;RabbitMQ;Spring Framework;Torch…
89182                             NumPy;Pandas;TensorFlow
89183                             CUDA;NumPy;Torch/PyTorch
89184                 .NET (5+) ;.NET Framework (1.0 - 4.8)


                                MiscTechWantToWorkWith  \
ResponseId
1                                               NaN
2           Capacitor;Electron;Tauri;Uno Platform;Xamarin
3                                               NaN
4                                               NaN
5                                               NaN
…                                                …
89180                                           NaN
89181           RabbitMQ;Spring Framework;Torch/PyTorch
89182                     NumPy;Pandas;Torch/PyTorch
89183       CUDA;Flutter;NumPy;TensorFlow;Torch/PyTorch
89184             .NET (5+) ;Apache Kafka;RabbitMQ;Tauri


                                ToolsTechHaveWorkedWith  \
ResponseId
1                                               NaN
2               Docker;Kubernetes;npm;Pip;Vite;Webpack;Yarn
3                         Cargo;Docker;Kubernetes;Make;Nix
4                     Homebrew;npm;Vite;Webpack;Yarn
5                             Docker;npm;Webpack;Yarn
…                                                …
89180     Chocolatey;CMake;Docker;Maven (build tool);npm…
89181                         Maven (build tool);Pip
89182                                         Cargo
89183               Docker;Kubernetes;npm;Podman;Vite
89184             Docker;npm;NuGet;pnpm;Vite;Webpack;Yarn


                                ToolsTechWantToWorkWith  \
ResponseId
1                                               NaN
2           Godot;npm;pnpm;Unity 3D;Unreal Engine;Vite;Web…
3                             Cargo;Kubernetes;Nix
4                               Homebrew;npm;Vite
5                                 Docker;npm;Yarn
…                                                …
89180                     Docker;npm;Pip;Vite;Yarn
89181                         Maven (build tool);Pip
89182                 Cargo;Docker;Kubernetes;Terraform
89183     Ansible;APT;Docker;Kubernetes;npm;Pip;Podman;T…
89184                 Bun;Docker;npm;NuGet;pnpm;Vite;Yarn
```

```
                             NEWCollabToolsHaveWorkedWith  \
ResponseId
1                                                     NaN
2                                    Vim;Visual Studio Code
3                                              Emacs;Helix
4                  IntelliJ IDEA;Vim;Visual Studio Code;WebStorm
5                                    Vim;Visual Studio Code
…                                                        …
89180     Android Studio;Atom;Eclipse;IntelliJ IDEA;Netb…
89181                 Android Studio;IntelliJ IDEA;PyCharm
89182     Jupyter Notebook/JupyterLab;Neovim;Visual Stud…
89183     Eclipse;IntelliJ IDEA;Nano;Notepad++;PyCharm;V…
89184                      Visual Studio;Visual Studio Code


                             NEWCollabToolsWantToWorkWith  \
ResponseId
1                                                     NaN
2                                    Vim;Visual Studio Code
3                                              Emacs;Helix
4                            IntelliJ IDEA;Vim;WebStorm
5                                    Vim;Visual Studio Code
…                                                        …
89180                                   Visual Studio Code
89181                                 IntelliJ IDEA;PyCharm
89182     Jupyter Notebook/JupyterLab;Neovim;Visual Stud…
89183     Jupyter Notebook/JupyterLab;Notepad++;Visual S…
89184                      Visual Studio;Visual Studio Code


                                        OpSysPersonal use  \
ResponseId
1                                                     NaN
2              iOS;iPadOS;MacOS;Windows;Windows Subsystem for…
3                                   MacOS;Other Linux-based
4                                         iOS;iPadOS;MacOS
5                                   Other (Please Specify):
…                                                        …
89180                                       Android;Windows
89181                                               Windows
89182                                               Windows
89183         Arch;Debian;iOS;iPadOS;MacOS;Ubuntu;Windows;Wi…
89184                                               Windows


                                   OpSysProfessional use  \
ResponseId
1                                                     NaN
2              MacOS;Windows;Windows Subsystem for Linux (WSL)
3                                   MacOS;Other Linux-based
```

```
4                                    iOS;iPadOS;MacOS
5                              Other (Please Specify):
…                                                    …
89180                          Android;Ubuntu;Windows
89181                                          Windows
89182                                              NaN
89183              BSD;Red Hat;Solaris;Ubuntu;Windows
89184                                          Windows


                       OfficeStackAsyncHaveWorkedWith  \
ResponseId
1                                                   NaN
2          Asana;Basecamp;GitHub Discussions;Jira;Linear;…
3                  Markdown File;Stack Overflow for Teams
4                                                  Jira
5                              Confluence;Jira;Notion
…                                                    …
89180      Asana;Confluence;Jira;Markdown File;Miro;Notio…
89181                                               Jira
89182                                                NaN
89183                          Confluence;Jira;Trello
89184                                                NaN


                  OfficeStackAsyncWantToWorkWith  \
ResponseId
1                                             NaN
2          GitHub Discussions;Linear;Notion;Trello
3                                   Markdown File
4                                            Jira
5                          Confluence;Jira;Notion
…                                                …
89180                        Markdown File;Miro;Wikis
89181                                           Jira
89182                                            NaN
89183                   Azure Devops;Confluence;Jira
89184                                            NaN


                       OfficeStackSyncHaveWorkedWith  \
ResponseId
1                                                 NaN
2          Cisco Webex Teams;Discord;Google Chat;Google M…
3                            Microsoft Teams;Slack;Zoom
4            Discord;Google Meet;Microsoft Teams;Slack;Zoom
5                        Discord;Google Meet;Slack;Zoom
…                                                    …
89180      Discord;Google Meet;Jitsi;Microsoft Teams;Slac…
89181                                    Microsoft Teams
```

```
89182                                                          NaN
89183        Cisco Webex Teams;Discord;Microsoft Teams;Sign…
89184                    Google Meet;Skype;Telegram;Whatsapp

                            OfficeStackSyncWantToWorkWith  \
ResponseId
1                                                     NaN
2                            Discord;Signal;Slack;Zoom
3                                          Slack;Zoom
4                       Discord;Google Meet;Slack;Zoom
5                       Discord;Google Meet;Slack;Zoom
…                                                     …
89180        Discord;Google Meet;Jitsi;Microsoft Teams;Tele…
89181                                      Microsoft Teams
89182                                                  NaN
89183                      Discord;Microsoft Teams;Skype
89184                 Google Meet;Skype;Telegram;Whatsapp

                AISearchHaveWorkedWith        AISearchWantToWorkWith  \
ResponseId
1                                NaN                            NaN
2                            ChatGPT              ChatGPT;Neeva AI
3                                NaN                            NaN
4                                NaN                            NaN
5                            ChatGPT                        ChatGPT
…                                  …                              …
89180                        ChatGPT                        ChatGPT
89181                        ChatGPT                        ChatGPT
89182              ChatGPT;Quora Poe              ChatGPT;Quora Poe
89183        Bing AI;ChatGPT;WolframAlpha  Bing AI;ChatGPT;Google Bard AI
89184                        ChatGPT                        ChatGPT

            AIDevHaveWorkedWith AIDevWantToWorkWith  \
ResponseId
1                          NaN                 NaN
2                GitHub Copilot      GitHub Copilot
3                          NaN                 NaN
4                          NaN                 NaN
5                          NaN                 NaN
…                            …                   …
89180              Whispr AI           Whispr AI
89181                      NaN                 NaN
89182                      NaN                 NaN
89183                      NaN                 NaN
89184        GitHub Copilot      GitHub Copilot

                                              NEWSOSites  \
```

```
              ResponseId
1                                                   NaN
2                      Stack Overflow;Stack Exchange
3         Stack Overflow;Stack Exchange;Stack Overflow f…
4                      Stack Overflow;Stack Exchange
5                      Stack Overflow;Stack Exchange
…                                                     …
89180                  Stack Overflow;Stack Exchange
89181                  Stack Overflow;Stack Exchange
89182                  Stack Overflow;Stack Exchange
89183     Stack Overflow;Stack Exchange;Stack Overflow f…
89184                                      Stack Overflow


                         SOVisitFreq SOAccount   \
ResponseId
1                               NaN      NaN
2                Daily or almost daily      Yes
3         A few times per month or weekly      Yes
4                  A few times per week      Yes
5                  A few times per week       No
…                                 …        …
89180          Multiple times per day      Yes
89181          Multiple times per day      Yes
89182                            NaN      NaN
89183     A few times per month or weekly       No
89184            A few times per week      Yes


                                           SOPartFreq   \
ResponseId
1                                                 NaN
2                      A few times per month or weekly
3                 Less than once per month or monthly
4                 Less than once per month or monthly
5                                                 NaN
…                                                   …
89180     I have never participated in Q&A on Stack Over…
89181     I have never participated in Q&A on Stack Over…
89182                                             NaN
89183                                             NaN
89184            Less than once per month or monthly


                    SOComm   \
ResponseId
1                    NaN
2         Yes, definitely
3                 Neutral
4          No, not really
```

```
5                 Neutral
…                     …
89180             Neutral
89181       No, not really
89182                 NaN
89183        Yes, somewhat
89184        Yes, somewhat


                                                    SOAI  \
ResponseId
1                                                    NaN
2            I don't think it's super necessary, but I thin…
3                                                    NaN
4                     I'm wearing of Stack Overflow using AI.
5            Using AI to suggest better answer to my questi…
…                                                      …
89180                                                NaN
89181                                       I'm not sure
89182                                                NaN
89183        Define Parameters more detailed. I believe in …
89184                                                NaN


                      AISelect          AISent  \
ResponseId
1                          NaN             NaN
2                          Yes     Indifferent
3            No, and I don't plan to           NaN
4            No, and I don't plan to           NaN
5                          Yes   Very favorable
…                            …               …
89180                      Yes   Very favorable
89181                      Yes   Very favorable
89182        No, but I plan to soon  Very favorable
89183                      Yes        Favorable
89184                      Yes        Favorable


                                                    AIAcc  \
ResponseId
1                                                    NaN
2                                     Other (please explain)
3                                                    NaN
4                                                    NaN
5            Increase productivity;Greater efficiency;Speed…
…                                                      …
89180        Increase productivity;Greater efficiency;Speed…
89181                                     Speed up learning
89182                                                NaN
```

```
89183        Increase productivity;Greater efficiency;Speed…
89184        Increase productivity;Greater efficiency;Speed…


                               AIBen  \
ResponseId
1                                  NaN
2                      Somewhat distrust
3                                  NaN
4                                  NaN
5                        Somewhat trust
…                                  …
89180                      Somewhat trust
89181                      Somewhat trust
89182                        Highly trust
89183                    Somewhat distrust
89184        Neither trust nor distrust


                                AIToolInterested in Using  \
ResponseId
1                                                  NaN
2            Learning about a codebase;Writing code;Debuggi…
3                                                  NaN
4                                                  NaN
5            Project planning;Testing code;Committing and r…
…                                                  …
89180        Learning about a codebase;Project planning;Wri…
89181             Writing code;Documenting code;Testing code
89182                                              NaN
89183        Learning about a codebase;Project planning;Wri…
89184                 Learning about a codebase;Writing code


                                AIToolCurrently Using  \
ResponseId
1                                                  NaN
2                  Writing code;Committing and reviewing code
3                                                  NaN
4                                                  NaN
5            Learning about a codebase;Writing code;Documen…
…                                                  …
89180        Writing code;Documenting code;Debugging and ge…
89181        Learning about a codebase;Debugging and gettin…
89182                                              NaN
89183        Learning about a codebase;Writing code;Debuggi…
89184                 Learning about a codebase;Writing code


                                AIToolNot interested in Using  \
ResponseId
```

```
1                                                              NaN
2                                                              NaN
3                                                              NaN
4                                                              NaN
5                                                              NaN
…                                                               …
89180                                  Deployment and monitoring
89181      Project planning;Committing and reviewing code…
89182                                                          NaN
89183                           Committing and reviewing code
89184                                                          NaN


              AINextVery different  \
ResponseId
1                            NaN
2                            NaN
3                            NaN
4                            NaN
5                            NaN
…                             …
89180                        NaN
89181                        NaN
89182                        NaN
89183                        NaN
89184      Learning about a codebase


                  AINextNeither different nor similar  \
ResponseId
1                                               NaN
2                                               NaN
3                                               NaN
4                                               NaN
5                                               NaN
…                                                …
89180                                           NaN
89181                                           NaN
89182                                           NaN
89183      Debugging and getting help;Deployment and moni…
89184                                           NaN


          AINextSomewhat similar AINextVery similar  \
ResponseId
1                            NaN                NaN
2                            NaN                NaN
3                            NaN                NaN
4                            NaN                NaN
5                            NaN                NaN
```

```
...                              ...              ...
89180                            NaN              NaN
89181                            NaN              NaN
89182                            NaN              NaN
89183                            NaN              NaN
89184                            NaN              NaN


                              AINextSomewhat different TBranch  \
ResponseId
1                                                 NaN     NaN
2                                                 NaN     Yes
3                                                 NaN     Yes
4                                                 NaN     Yes
5                                                 NaN     Yes
...                                               ...     ...
89180    Writing code;Documenting code;Debugging and ge…      No
89181    Learning about a codebase;Debugging and gettin…     NaN
89182                                             NaN     NaN
89183         Learning about a codebase;Writing code     NaN
89184                                   Writing code     Yes


                        ICorPM  WorkExp     Knowledge_1  \
ResponseId
1                          NaN      NaN             NaN
2               People manager     10.0  Strongly agree
3        Individual contributor     23.0  Strongly agree
4        Individual contributor      7.0  Strongly agree
5        Individual contributor      6.0           Agree
...                        ...      ...             ...
89180                      NaN      NaN             NaN
89181                      NaN      NaN             NaN
89182                      NaN      NaN             NaN
89183                      NaN      NaN             NaN
89184           People manager     14.0           Agree


                      Knowledge_2               Knowledge_3  \
ResponseId
1                            NaN                       NaN
2                          Agree            Strongly agree
3        Neither agree nor disagree                  Agree
4              Strongly disagree            Strongly agree
5                 Strongly agree                      Agree
...                          ...                       ...
89180                        NaN                       NaN
89181                        NaN                       NaN
89182                        NaN                       NaN
89183                        NaN                       NaN
```

```
89184      Neither agree nor disagree  Neither agree nor disagree

                   Knowledge_4              Knowledge_5  \
ResponseId
1                         NaN                      NaN
2                       Agree                    Agree
3                       Agree                    Agree
4              Strongly agree                    Agree
5                       Agree  Neither agree nor disagree
…                         …                        …
89180                     NaN                      NaN
89181                     NaN                      NaN
89182                     NaN                      NaN
89183                     NaN                      NaN
89184          Strongly agree           Strongly agree


                     Knowledge_6              Knowledge_7  \
ResponseId
1                           NaN                      NaN
2                         Agree                    Agree
3                         Agree                    Agree
4      Neither agree nor disagree                  Agree
5                         Agree           Strongly agree
…                           …                        …
89180                       NaN                      NaN
89181                       NaN                      NaN
89182                       NaN                      NaN
89183                       NaN                      NaN
89184                       Agree  Neither agree nor disagree


                       Knowledge_8         Frequency_1          Frequency_2  \
ResponseId
1                             NaN                 NaN                  NaN
2                  Strongly agree   1-2 times a week   10+ times a week
3                         Agree   6-10 times a week   6-10 times a week
4                         Agree   1-2 times a week   10+ times a week
5                         Agree   1-2 times a week   1-2 times a week
…                           …                   …                    …
89180                         NaN                 NaN                  NaN
89181                         NaN                 NaN                  NaN
89182                         NaN                 NaN                  NaN
89183                         NaN                 NaN                  NaN
89184    Neither agree nor disagree               Never   1-2 times a week


                   Frequency_3        TimeSearching        TimeAnswering  \
ResponseId
1                          NaN                  NaN                  NaN
```

```
2                          Never    15-30 minutes a day   15-30 minutes a day
3            3-5 times a week    30-60 minutes a day   30-60 minutes a day
4            1-2 times a week    15-30 minutes a day   30-60 minutes a day
5            3-5 times a week   60-120 minutes a day   30-60 minutes a day
…                          …                      …                     …
89180                      NaN                    NaN                   NaN
89181                      NaN                    NaN                   NaN
89182                      NaN                    NaN                   NaN
89183                      NaN                    NaN                   NaN
89184        1-2 times a week   60-120 minutes a day   30-60 minutes a day


                                             ProfessionalTech  \
ResponseId
1                                                         NaN
2            DevOps function;Microservices;Automated testin…
3            DevOps function;Microservices;Automated testin…
4            Automated testing;Continuous integration (CI) …
5            Microservices;Automated testing;Observability …
…                                                          …
89180                                                     NaN
89181                                                     NaN
89182                                                     NaN
89183                                                     NaN
89184        DevOps function;Developer portal or other cent…


                                                     Industry  \
ResponseId
1                                                         NaN
2            Information Services, IT, Software Development…
3            Information Services, IT, Software Development…
4                                                         NaN
5                                                       Other
…                                                          …
89180                                                     NaN
89181                                                     NaN
89182                                                     NaN
89183                                                     NaN
89184        Information Services, IT, Software Development…


                     SurveyLength                     SurveyEase  \
ResponseId
1                             NaN                            NaN
2            Appropriate in length                          Easy
3            Appropriate in length                          Easy
4            Appropriate in length                          Easy
5            Appropriate in length  Neither easy nor difficult
…                               …                             …
```

```
89180              Too long  Neither easy nor difficult
89181              Too long                        Easy
89182              Too long  Neither easy nor difficult
89183  Appropriate in length  Neither easy nor difficult
89184  Appropriate in length                        Easy


           ConvertedCompYearly
ResponseId
1                          NaN
2                     285000.0
3                     250000.0
4                     156000.0
5                      23456.0
...                        ...
89180                      NaN
89181                      NaN
89182                      NaN
89183                      NaN
89184                      NaN

[89184 rows x 83 columns]
```

2 sorting value & yearly salary of every developer

```python
[15]: df.sort_values(by=['Country', 'ConvertedCompYearly'], ascending=[True, False],
      ↪inplace=True)
```

```python
[16]: df[['Country','ConvertedCompYearly']].head(10)
```

```
[16]:              Country  ConvertedCompYearly
      ResponseId
      88348     Afghanistan            9203683.0
      86039     Afghanistan              68000.0
      1335      Afghanistan               2403.0
      57362     Afghanistan               2288.0
      17873     Afghanistan               1144.0
      36049     Afghanistan                915.0
      53322     Afghanistan                794.0
      41679     Afghanistan                648.0
      39427     Afghanistan                 48.0
      37956     Afghanistan                 41.0
```

3 highest salaries from throughout survey

```
[17]: df.nlargest(5,'ConvertedCompYearly')
```

```
[17]:                    Q120              MainBranch            Age  \
      ResponseId
      53269      I agree  I am a developer by profession  18-24 years old
      77849      I agree  I am a developer by profession  35-44 years old
      66224      I agree  I am a developer by profession  55-64 years old
      28122      I agree  I am a developer by profession  25-34 years old
      19680      I agree  I am a developer by profession  25-34 years old


                                               Employment  \
      ResponseId
      53269      Independent contractor, freelancer, or self-em…
      77849                              I prefer not to say
      66224      Independent contractor, freelancer, or self-em…
      28122                              Employed, full-time
      19680                              Employed, part-time


                                        RemoteWork  \
      ResponseId
      53269      Hybrid (some remote, some in-person)
      77849                                       NaN
      66224                                    Remote
      28122      Hybrid (some remote, some in-person)
      19680                                    Remote


                                        CodingActivities  \
      ResponseId
      53269      Hobby;Contribute to open-source projects;Boots…
      77849                                            NaN
      66224      Hobby;Freelance/contract work;Other (please sp…
      28122      Professional development or self-paced learnin…
      19680      Professional development or self-paced learnin…


                                             EdLevel  \
      ResponseId
      53269      Professional degree (JD, MD, Ph.D, Ed.D, etc.)
      77849      Professional degree (JD, MD, Ph.D, Ed.D, etc.)
      66224         Bachelor's degree (B.A., B.S., B.Eng., etc.)
      28122                       Primary/elementary school
      19680      Professional degree (JD, MD, Ph.D, Ed.D, etc.)


                                            LearnCode  \
      ResponseId
      53269      Friend or family member;Online Courses or Cert…
```

```
77849      Books / Physical media;Colleague;Friend or fam…
66224               School (i.e., University, College, etc)
28122      Books / Physical media;Other online resources …
19680                           Other (please specify):


                                      LearnCodeOnline  \
ResponseId
53269      Formal documentation provided by the owner of …
77849      Formal documentation provided by the owner of …
66224                                           NaN
28122      Recorded coding sessions;Written-based Online …
19680                                           NaN


                                  LearnCodeCoursesCert YearsCode  \
ResponseId
53269                                          NaN        3
77849      Codecademy;edX;Udemy;Pluralsight;Coursera;Udac…       19
66224                                          NaN       45
28122                                          NaN        4
19680                                          NaN        9


            YearsCodePro                                  DevType  \
ResponseId
53269      Less than 1 year                     Developer, full-stack
77849                  25                                       NaN
66224                  40   Developer, desktop or enterprise applications
28122                   7                                       NaN
19680                   3                        Developer Experience


                                          OrgSize  \
ResponseId
53269                          2 to 9 employees
77849                     10,000 or more employees
66224      Just me - I am a freelancer, sole proprietor, …
28122                          20 to 99 employees
19680      Just me - I am a freelancer, sole proprietor, …


                     PurchaseInfluence     TechList  \
ResponseId
53269      I have a great deal of influence  Investigate
77849      I have a great deal of influence  Investigate
66224      I have a great deal of influence  Investigate
28122        I have little or no influence        NaN
19680        I have little or no influence        NaN


                                      BuyNewTool      Country  \
ResponseId
```

```
53269        Start a free trial;Ask developers I know/work …      Canada
77849        Start a free trial;Ask developers I know/work …  South Africa
66224        Start a free trial;Visit developer communities…    Australia
28122        Research companies that have advertised on sit…     Thailand
19680                           Other (please specify):         Mali


                          Currency      CompTotal  \
ResponseId
53269              CAD\tCanadian dollar  1.000000e+08
77849              CAD\tCanadian dollar  9.900000e+07
66224            AUD\tAustralian dollar  1.100000e+08
28122                    THB\tThai baht  2.000000e+09
19680       XOF\tWest African CFA franc  2.239672e+10


                                 LanguageHaveWorkedWith  \
ResponseId
53269        Bash/Shell (all shells);HTML/CSS;JavaScript;Py…
77849        Ada;Apex;APL;Assembly;Bash/Shell (all shells);…
66224        Ada;APL;Assembly;C;C#;C++;Cobol;Delphi;Fortran…
28122                                                    Ada
19680                                                    Ada


                                 LanguageWantToWorkWith  \
ResponseId
53269        Assembly;C;HTML/CSS;JavaScript;PHP;PowerShell;…
77849        Ada;Apex;APL;Assembly;Bash/Shell (all shells);…
66224                                  Assembly;Delphi;SQL
28122                         Nim;Objective-C;OCaml;Perl
19680                                                    Ada


                                 DatabaseHaveWorkedWith  \
ResponseId
53269                                                 NaN
77849        BigQuery;Cassandra;Clickhouse;Cloud Firestore;…
66224        Firebird;IBM DB2;MariaDB;Microsoft Access;Micr…
28122                                                 NaN
19680                                             BigQuery


                                 DatabaseWantToWorkWith  \
ResponseId
53269                                                 NaN
77849        BigQuery;Cassandra;Clickhouse;Cloud Firestore;…
66224                                                 NaN
28122                                                 NaN
19680                                             BigQuery


                                 PlatformHaveWorkedWith  \
```

28

```
ResponseId
53269                                               NaN
77849       Amazon Web Services (AWS);Cloudflare;Colocatio…
66224             Amazon Web Services (AWS);Cloudflare;VMware
28122                                               NaN
19680                         Amazon Web Services (AWS)


                                   PlatformWantToWorkWith  \
ResponseId
53269                                               NaN
77849       Amazon Web Services (AWS);Cloudflare;Colocatio…
66224             Amazon Web Services (AWS);Cloudflare;VMware
28122                                               NaN
19680                         Amazon Web Services (AWS)


                                  WebframeHaveWorkedWith  \
ResponseId
53269                                         WordPress
77849       Angular;AngularJS;ASP.NET;ASP.NET CORE;Blazor;…
66224       Angular;AngularJS;ASP.NET;ASP.NET CORE;Node.js…
28122                                           Angular
19680                                           Angular


                                   WebframeWantToWorkWith  \
ResponseId
53269                                    Node.js;WordPress
77849       Angular;AngularJS;ASP.NET;ASP.NET CORE;Blazor;…
66224                                           WordPress
28122                                               NaN
19680                                           Angular


                                  MiscTechHaveWorkedWith  \
ResponseId
53269                                           SwiftUI
77849         .NET (5+) ;.NET Framework (1.0 - 4.8);Apache K…
66224                                 OpenGL;RabbitMQ
28122                                               NaN
19680                                         .NET (5+)


                                  MiscTechWantToWorkWith  \
ResponseId
53269                                     OpenGL;SwiftUI
77849         .NET (5+) ;.NET Framework (1.0 - 4.8);.NET MAU…
66224                                           OpenGL
28122                                               NaN
19680                                         .NET (5+)
```

29

```
                                 ToolsTechHaveWorkedWith  \
ResponseId
53269                                             NaN
77849      Boost.Test;build2;Bun;Chocolatey;CMake;Compose…
66224                                             NaN
28122                                             NaN
19680                                         Ansible


                                 ToolsTechWantToWorkWith  \
ResponseId
53269                                             NaN
77849      Boost.Test;build2;Bun;Chocolatey;CMake;Compose…
66224                                             NaN
28122                                             NaN
19680                                         Ansible


                              NEWCollabToolsHaveWorkedWith  \
ResponseId
53269                                           Xcode
77849      Android Studio;Atom;BBEdit;CLion;Code::Blocks;…
66224      Android Studio;Atom;Eclipse;IntelliJ IDEA;Note…
28122                                             NaN
19680                                   Android Studio


                              NEWCollabToolsWantToWorkWith  \
ResponseId
53269                                           Xcode
77849      Android Studio;Atom;BBEdit;CLion;Code::Blocks;…
66224      Android Studio;Notepad++;Rad Studio (Delphi, C…
28122                                             NaN
19680                                   Android Studio


                                        OpSysPersonal use  \
ResponseId
53269      Android;ChromeOS;iOS;iPadOS;MacOS;Other Linux-…
77849      AIX;Android;Arch;BSD;ChromeOS;Cygwin;Fedora;Ha…
66224      Android;Arch;Debian;iOS;iPadOS;MacOS;Other Lin…
28122                                         Android
19680                                             AIX


                                    OpSysProfessional use  \
ResponseId
53269      Android;iOS;iPadOS;MacOS;Other Linux-based;Win…
77849      AIX;Android;Arch;BSD;ChromeOS;Cygwin;Fedora;Ha…
66224      Android;Arch;Debian;iOS;iPadOS;MacOS;Other Lin…
28122                                         Android
19680                                             AIX
```

```
                          OfficeStackAsyncHaveWorkedWith  \
ResponseId
53269                                               NaN
77849        Adobe Workfront;Airtable;Asana;Azure Devops;Ba…
66224                                              Jira
28122                                               NaN
19680                                    Adobe Workfront


                          OfficeStackAsyncWantToWorkWith  \
ResponseId
53269                                               NaN
77849        Adobe Workfront;Airtable;Asana;Azure Devops;Ba…
66224                                              Jira
28122                                               NaN
19680                                    Adobe Workfront


                           OfficeStackSyncHaveWorkedWith  \
ResponseId
53269                               Microsoft Teams;Zoom
77849        Cisco Webex Teams;Coolfire Core;Discord;Google…
66224                              Skype;Slack;Telegram;Zoom
28122                                               NaN
19680                                  Cisco Webex Teams


                           OfficeStackSyncWantToWorkWith  \
ResponseId
53269                               Microsoft Teams;Zoom
77849        Cisco Webex Teams;Coolfire Core;Discord;Google…
66224                                    Skype;Telegram;Zoom
28122                                               NaN
19680                                  Cisco Webex Teams


                                   AISearchHaveWorkedWith  \
ResponseId
53269                                               NaN
77849        Andi;Bing AI;ChatGPT;Google Bard AI;Metaphor;N…
66224                                            ChatGPT
28122                                               NaN
19680                                               Andi


                                   AISearchWantToWorkWith  \
ResponseId
53269                                               NaN
77849        Andi;Bing AI;ChatGPT;Google Bard AI;Metaphor;N…
66224                                            ChatGPT
28122                                               NaN
```

```
19680                                                    Andi

                                    AIDevHaveWorkedWith  \
ResponseId
53269                                            NaN
77849       Adrenaline;AWS CodeWhisperer;Codeium;GitHub Co…
66224                                            NaN
28122                                            NaN
19680                                      Adrenaline

                                    AIDevWantToWorkWith  \
ResponseId
53269                                            NaN
77849       Adrenaline;AWS CodeWhisperer;Codeium;GitHub Co…
66224                                            NaN
28122                                            NaN
19680                                      Adrenaline

                                          NEWSOSites  \
ResponseId
53269                     Stack Overflow;Stack Exchange
77849       Stack Overflow;Stack Exchange;Stack Overflow f…
66224                     Stack Overflow;Stack Exchange
28122       Stack Overflow for Teams (private knowledge sh…
19680                     Collectives on Stack Overflow

                                 SOVisitFreq                SOAccount  \
ResponseId
53269                    Daily or almost daily                      No
77849                    Multiple times per day                    Yes
66224          A few times per month or weekly                     Yes
28122                    Daily or almost daily  Not sure/can't remember
19680       Less than once per month or monthly                     Yes

                                        SOPartFreq  \
ResponseId
53269                                          NaN
77849              Less than once per month or monthly
66224              Less than once per month or monthly
28122                                          NaN
19680       I have never participated in Q&A on Stack Over…

                  SOComm  \
ResponseId
53269       No, not really
77849       Yes, definitely
66224        Yes, somewhat
```

```
28122              Neutral
19680              Neutral


                                                        SOAI  \
ResponseId
53269      OK,I guess. Maybe DeepAI or ChatGPT. Probably …
77849        Integration with seemless fundaments on security
66224                                                   Good
28122                                                Freedom
19680                                            Profossionnal


                    AISelect          AISent  \
ResponseId
53269      No, but I plan to soon      Favorable
77849                     Yes          Unsure
66224                     Yes  Very favorable
28122      No, and I don't plan to             NaN
19680                     Yes  Very favorable


                                                 AIAcc          AIBen  \
ResponseId
53269                                              NaN  Somewhat trust
77849      Increase productivity;Greater efficiency;Speed…  Somewhat trust
66224      Increase productivity;Greater efficiency;Speed…    Highly trust
28122                                              NaN             NaN
19680                          Other (please explain)    Highly trust


                          AIToolInterested in Using  \
ResponseId
53269                                            NaN
77849      Learning about a codebase;Project planning;Wri…
66224                                            NaN
28122                                            NaN
19680                                            NaN


                          AIToolCurrently Using  \
ResponseId
53269                                        NaN
77849      Learning about a codebase;Project planning;Wri…
66224      Learning about a codebase;Project planning;Wri…
28122                                        NaN
19680                                        NaN


           AIToolNot interested in Using  \
ResponseId
53269                              NaN
77849                              NaN
```

```
66224                                 NaN
28122                                 NaN
19680                                 NaN

                                    AINextVery different  \
ResponseId
53269                                                NaN
77849                                                NaN
66224       Learning about a codebase;Project planning;Wri…
28122                                                NaN
19680                                                NaN


          AINextNeither different nor similar     AINextSomewhat similar  \
ResponseId
53269                                     NaN                        NaN
77849          Writing code;Documenting code   Learning about a codebase
66224                                     NaN                        NaN
28122                                     NaN                        NaN
19680                                     NaN                        NaN


          AINextVery similar  \
ResponseId
53269                    NaN
77849                    NaN
66224                    NaN
28122                    NaN
19680                    NaN


                                    AINextSomewhat different TBranch  \
ResponseId
53269                                                 NaN     Yes
77849       Project planning;Writing code;Debugging and ge…     Yes
66224                                                 NaN     NaN
28122                                                 NaN     Yes
19680                                                 NaN     NaN


                            ICorPM  WorkExp     Knowledge_1 Knowledge_2  \
ResponseId
53269               People manager      7.0           Agree    Disagree
77849               People manager     27.0  Strongly agree       Agree
66224                          NaN      NaN             NaN         NaN
28122        Individual contributor     25.0           Agree       Agree
19680                          NaN      NaN             NaN         NaN


              Knowledge_3                 Knowledge_4     Knowledge_5  \
ResponseId
53269               Agree   Neither agree nor disagree           Agree
```

```
77849        Strongly agree                 Strongly agree   Strongly agree
66224                   NaN                            NaN              NaN
28122                 Agree                          Agree            Agree
19680                   NaN                            NaN              NaN


                        Knowledge_6                   Knowledge_7  \
ResponseId
53269      Neither agree nor disagree  Neither agree nor disagree
77849                  Strongly agree              Strongly agree
66224                             NaN                         NaN
28122                           Agree                       Agree
19680                             NaN                         NaN


              Knowledge_8       Frequency_1        Frequency_2  \
ResponseId
53269      Strongly agree  1-2 times a week  10+ times a week
77849      Strongly agree  10+ times a week  10+ times a week
66224                 NaN               NaN               NaN
28122               Agree  1-2 times a week  1-2 times a week
19680                 NaN               NaN               NaN


               Frequency_3         TimeSearching          TimeAnswering  \
ResponseId
53269                Never     15-30 minutes a day  15-30 minutes a day
77849     10+ times a week  Over 120 minutes a day                  NaN
66224                  NaN                     NaN                  NaN
28122     1-2 times a week     15-30 minutes a day  15-30 minutes a day
19680                  NaN                     NaN                  NaN


                                       ProfessionalTech  \
ResponseId
53269      Developer portal or other central places to fi…
77849      DevOps function;Microservices;Automated testin…
66224                                                  NaN
28122      Continuous integration (CI) and (more often) c…
19680                                                  NaN


                                              Industry  \
ResponseId
53269      Information Services, IT, Software Development…
77849                                             Other
66224                                               NaN
28122                                Financial Services
19680                                               NaN


                 SurveyLength                 SurveyEase  \
ResponseId
```

```
53269       Appropriate in length  Neither easy nor difficult
77849                    Too long  Neither easy nor difficult
66224       Appropriate in length                        Easy
28122       Appropriate in length                   Difficult
19680                   Too short                        Easy

            ConvertedCompYearly
ResponseId
53269               74351432.0
77849               73607918.0
66224               72714292.0
28122               57513831.0
19680               36573181.0
```

4 Avg developer salary

```
[18]: df['ConvertedCompYearly'].median()
```

```
[18]: 74963.0
```

5 Avg Work Expereince of developer

```
[19]: df['WorkExp'].median()
```

```
[19]: 9.0
```

```
[20]: df.describe()
```

```
[20]:           CompTotal        WorkExp  ConvertedCompYearly
      count  4.822500e+04  43579.000000         4.801900e+04
      mean   1.036807e+42     11.405126         1.031101e+05
      std    2.276847e+44      9.051989         6.814188e+05
      min    0.000000e+00      0.000000         1.000000e+00
      25%    6.300000e+04      5.000000         4.390700e+04
      50%    1.150000e+05      9.000000         7.496300e+04
      75%    2.300000e+05     16.000000         1.216410e+05
      max    5.000000e+46     50.000000         7.435143e+07
```

```
[21]: df['Country'].value_counts()
```

```
[21]: Country
      United States of America                              18647
      Germany                                                7328
      India                                                  5625
      United Kingdom of Great Britain and Northern Ireland   5552
```

```
Canada                                                              3507
                                                                     …
Grenada                                                                 1
Guinea-Bissau                                                           1
Liechtenstein                                                          1
Marshall Islands                                                       1
Saint Kitts and Nevis                                                  1
Name: count, Length: 185, dtype: int64
```

6 Percentage dev from the world

```
[22]: print(df['Country'].value_counts(normalize=True).apply(lambda x: "{:.2%}".
      ↪format(x)))
```

```
Country
United States of America                               21.20%
Germany                                                 8.33%
India                                                   6.39%
United Kingdom of Great Britain and Northern Ireland    6.31%
Canada                                                  3.99%
                                                           …
Grenada                                                 0.00%
Guinea-Bissau                                           0.00%
Liechtenstein                                           0.00%
Marshall Islands                                        0.00%
Saint Kitts and Nevis                                   0.00%
Name: proportion, Length: 185, dtype: object
```

```python
[23]: top_five_countries = {
          'United States of America': 21.20,
          'Germany': 8.33,
          'India': 6.39,
          'United Kingdom of Great Britain and Northern Ireland': 6.31,
          'Canada': 3.99
      }
      other_countries_percentage = 100 - sum(top_five_countries.values())
      top_five_countries['Other countries'] = other_countries_percentage
      plt.figure(figsize=(8, 8))
      plt.pie(top_five_countries.values(), labels=top_five_countries.keys(),␣
        ↪autopct='%1.2f%%', startangle=140)
      plt.title('Top Five Countries with Percentage of Developers and Other␣
        ↪Countries')
      plt.axis('equal')
      plt.tight_layout()
      plt.show()
```

Top Five Countries with Percentage of Developers and Other Countries

6.1 Analysis on INDIA

```
[24]: country_grp=df.groupby('Country')
```

```
[25]: country_grp.get_group('India')
```

```
[25]:              Q120                                        MainBranch  \
      ResponseId
      72666      I agree                      I am a developer by profession
      46338      I agree                      I am a developer by profession
      86269      I agree  I am not primarily a developer, but I write co…
      85854      I agree                      I am a developer by profession
      10000      I agree                      I am a developer by profession
      …              …                                                   …
      89069      I agree  I am not primarily a developer, but I write co…
```

```
89120       I agree                         I am a developer by profession
89122       I agree   I am not primarily a developer, but I write co…
89165       I agree                         I am a developer by profession
89166       I agree                         I am a developer by profession


                          Age                         Employment   \
ResponseId
72666       25-34 years old                     Employed, full-time
46338       18-24 years old                     Employed, full-time
86269       25-34 years old                     Employed, full-time
85854       18-24 years old                     Employed, full-time
10000       25-34 years old                     Employed, full-time
…                  …                                      …
89069       18-24 years old                     Employed, full-time
89120       18-24 years old   Student, full-time;Employed, part-time
89122       18-24 years old   Employed, full-time;Student, part-time
89165       18-24 years old                     Employed, full-time
89166       25-34 years old                     Employed, full-time


                                     RemoteWork   \
ResponseId
72666                                 In-person
46338                                 In-person
86269       Hybrid (some remote, some in-person)
85854       Hybrid (some remote, some in-person)
10000       Hybrid (some remote, some in-person)
…                                        …
89069       Hybrid (some remote, some in-person)
89120                                    Remote
89122       Hybrid (some remote, some in-person)
89165                                    Remote
89166                                 In-person


                                      CodingActivities   \
ResponseId
72666                                             Hobby
46338        Bootstrapping a business;Freelance/contract work
86269       Hobby;Professional development or self-paced l…
85854       Hobby;Contribute to open-source projects;Boots…
10000       Hobby;Contribute to open-source projects;Profe…
…                                        …
89069       Professional development or self-paced learnin…
89120       Hobby;Professional development or self-paced l…
89122       Contribute to open-source projects;Professiona…
89165       Professional development or self-paced learnin…
89166       Hobby;Contribute to open-source projects;Profe…
```

```
                                                      EdLevel  \
ResponseId
72666           Bachelor's degree (B.A., B.S., B.Eng., etc.)
46338           Bachelor's degree (B.A., B.S., B.Eng., etc.)
86269           Bachelor's degree (B.A., B.S., B.Eng., etc.)
85854           Bachelor's degree (B.A., B.S., B.Eng., etc.)
10000           Bachelor's degree (B.A., B.S., B.Eng., etc.)
…                                                         …
89069           Bachelor's degree (B.A., B.S., B.Eng., etc.)
89120          Secondary school (e.g. American high school, G…
89122           Bachelor's degree (B.A., B.S., B.Eng., etc.)
89165           Bachelor's degree (B.A., B.S., B.Eng., etc.)
89166           Master's degree (M.A., M.S., M.Eng., MBA, etc.)


                                                    LearnCode  \
ResponseId
72666          On the job training;School (i.e., University, …
46338          Colleague;Online Courses or Certification;On t…
86269          Colleague;Online Courses or Certification;Othe…
85854          On the job training;Other online resources (e…
10000          Books / Physical media;Hackathons (virtual or …
…                                                         …
89069          Online Courses or Certification;Other online r…
89120          Online Courses or Certification;Other online r…
89122          Hackathons (virtual or in-person);Online Cours…
89165          Online Courses or Certification;Other online r…
89166          Online Courses or Certification;Other online r…


                                                LearnCodeOnline  \
ResponseId
72666                                                       NaN
46338                                                       NaN
86269          Blogs with tips and tricks;Recorded coding ses…
85854                             How-to videos;Stack Overflow
10000          Formal documentation provided by the owner of …
…                                                         …
89069          Formal documentation provided by the owner of …
89120          Formal documentation provided by the owner of …
89122          Formal documentation provided by the owner of …
89165          Formal documentation provided by the owner of …
89166          Formal documentation provided by the owner of …


               LearnCodeCoursesCert YearsCode YearsCodePro  \
ResponseId
72666                           NaN         8            7
46338                         Other         1            1
86269                 Udemy;Coursera        8            3
```

```
85854                           NaN         5            1
10000     Other;Pluralsight;Coursera        10            6
…                               …           …            …
89069       Udemy;Coursera;Udacity          5            2
89120                           NaN         3          NaN
89122                      Coursera         4          NaN
89165                    Other;Udemy        6            2
89166                          Udemy        6            3

                                              DevType  \
ResponseId
72666                                  Developer, mobile
46338                               Developer, front-end
86269                                 Hardware Engineer
85854                               Developer, back-end
10000                              Developer, full-stack
…                                                     …
89069                                      Engineer, data
89120                                  Developer, mobile
89122     Data scientist or machine learning specialist
89165                               Developer, back-end
89166                               Developer, back-end

                        OrgSize                  PurchaseInfluence  \
ResponseId
72666           20 to 99 employees              I have some influence
46338           10 to 19 employees   I have a great deal of influence
86269      10,000 or more employees             I have some influence
85854           20 to 99 employees              I have some influence
10000      10,000 or more employees             I have some influence
…                             …                                   …
89069      10,000 or more employees     I have little or no influence
89120                         NaN                                 NaN
89122                         NaN                                 NaN
89165           20 to 99 employees     I have little or no influence
89166      1,000 to 4,999 employees     I have little or no influence

             TechList                                     BuyNewTool  \
ResponseId
72666      Investigate   Start a free trial;Ask developers I know/work …
46338      Investigate   Start a free trial;Ask developers I know/work …
86269      Investigate   Start a free trial;Ask developers I know/work …
85854      Investigate                                 Start a free trial
10000      Investigate   Ask developers I know/work with;Other (please …
…                  …                                                  …
89069             NaN                                                NaN
89120             NaN                                                NaN
```

```
89122        Investigate  Ask developers I know/work with;Visit develope…
89165                NaN  Start a free trial;Ask developers I know/work …
89166                NaN  Start a free trial;Ask developers I know/work …

           Country                   Currency   CompTotal  \
ResponseId
72666        India          INR\tIndian rupee  35000000.0
46338        India           IMP\tManx pound    310000.0
86269        India          INR\tIndian rupee  28000000.0
85854        India  USD\tUnited States dollar    300000.0
10000        India          INR\tIndian rupee  24000000.0
…              …                          …           …
89069        India          INR\tIndian rupee        NaN
89120        India                        NaN        NaN
89122        India                        NaN        NaN
89165        India          INR\tIndian rupee        NaN
89166        India          INR\tIndian rupee        NaN


                                LanguageHaveWorkedWith  \
ResponseId
72666                     Dart;Objective-C;Solidity;Swift
46338                            C;JavaScript;TypeScript
86269                                    C;C++;Python;SQL
85854       Bash/Shell (all shells);C;C#;C++;Go;HTML/CSS;J…
10000       Apex;Assembly;C++;Flow;HTML/CSS;Java;JavaScrip…
…                                                       …
89069         Bash/Shell (all shells);JavaScript;Python;SQL
89120                   Dart;HTML/CSS;JavaScript;Python
89122                                          Python;SQL
89165                 Go;HTML/CSS;Java;JavaScript;Python
89166                 C;C#;C++;Java;JavaScript;TypeScript


                                LanguageWantToWorkWith  \
ResponseId
72666                                               NaN
46338                             JavaScript;TypeScript
86269                                       C;C++;Python
85854       Ada;Apex;APL;Assembly;Clojure;Cobol;Delphi;Eli…
10000                                               NaN
…                                                       …
89069                                  JavaScript;Python
89120       Dart;HTML/CSS;JavaScript;Python;Rust;Solidity;…
89122               Bash/Shell (all shells);Java;Python;SQL
89165                                     Go;Python;Rust
89166       Dart;Elixir;Go;JavaScript;Python;Rust;Solidity…


                                DatabaseHaveWorkedWith  \
```

```
                                          ResponseId
ResponseId
72666                                          SQLite
46338                                   MongoDB;MySQL
86269                                           MySQL
85854                         MySQL;PostgreSQL;SQLite
10000            Firebase Realtime Database;PostgreSQL
...                                              ...
89069                                       Snowflake
89120                         Cloud Firestore;MongoDB
89122            MariaDB;MySQL;PostgreSQL;Snowflake
89165   Dynamodb;Elasticsearch;Firebase Realtime Datab…
89166       Cloud Firestore;MongoDB;PostgreSQL;Redis


                                     DatabaseWantToWorkWith  \
ResponseId
72666                                                   NaN
46338                                         MongoDB;MySQL
86269                                                   NaN
85854                            Dynamodb;Elasticsearch;Solr
10000                                                   NaN
...                                                    ...
89069                                             Snowflake
89120       Cloud Firestore;Firebase Realtime Database;Sup…
89122       BigQuery;Dynamodb;MongoDB;MySQL;PostgreSQL;Sno…
89165                                    MongoDB;PostgreSQL
89166       Dynamodb;Elasticsearch;MongoDB;MySQL;PostgreSQ…


                                      PlatformHaveWorkedWith  \
ResponseId
72666                          Google Cloud;Microsoft Azure
46338                                                   NaN
86269                                                   NaN
85854                             Amazon Web Services (AWS)
10000      Amazon Web Services (AWS);Firebase;Heroku;Micr…
...                                                    ...
89069                             Amazon Web Services (AWS)
89120            Amazon Web Services (AWS);Firebase;Vercel
89122                             Amazon Web Services (AWS)
89165      Amazon Web Services (AWS);Google Cloud;Hetzner
89166            Amazon Web Services (AWS);Firebase;Heroku


                                       PlatformWantToWorkWith  \
ResponseId
72666                                                   NaN
46338                                                   NaN
86269                                                   NaN
85854                                          Google Cloud
```

```
10000                                                    NaN
…                                                          …
89069                        Amazon Web Services (AWS)
89120    Amazon Web Services (AWS);Firebase;Google Clou…
89122    Amazon Web Services (AWS);Google Cloud;Microso…
89165                        Amazon Web Services (AWS)
89166              Amazon Web Services (AWS);Firebase


                        WebframeHaveWorkedWith  \
ResponseId
72666                               WordPress
46338                                   React
86269                                     NaN
85854                    Express;Node.js;React
10000            Django;jQuery;Node.js;Ruby on Rails
…                                             …
89069                    Express;Flask;Node.js
89120                     Flask;Next.js;React
89122                                   Flask
89165      Django;Express;FastAPI;Flask;Node.js;React
89166      Angular;Django;Express;NestJS;Node.js;React


                        WebframeWantToWorkWith  \
ResponseId
72666                               WordPress
46338                    jQuery;React;WordPress
86269                                     NaN
85854                    Remix;Ruby on Rails
10000                                     NaN
…                                             …
89069                                     NaN
89120            Next.js;Remix;Svelte;Vue.js
89122                            FastAPI;Flask
89165                    Django;FastAPI;Flask
89166      Deno;Express;Fastify;NestJS;Next.js;Node.js;Re…


                        MiscTechHaveWorkedWith  \
ResponseId
72666                                 SwiftUI
46338                             React Native
86269                                  Pandas
85854                    Apache Kafka;NumPy;Opencv
10000                                     NaN
…                                             …
89069                                  Pandas
89120            Flutter;NumPy;Pandas;Scikit-Learn
89122            NumPy;Pandas;Scikit-Learn;TensorFlow
```

```
89165          Flutter;NumPy;Opencv;OpenGL;Pandas;RabbitMQ
89166                                                 NaN

                              MiscTechWantToWorkWith  \
ResponseId
72666                                          SwiftUI
46338             React Native;Spring Framework;SwiftUI
86269                                              NaN
85854                                       TensorFlow
10000                                              NaN
…                                                  …
89069                                           Pandas
89120      Flutter;NumPy;Opencv;OpenGL;Pandas;Scikit-Learn
89122      Opencv;Pandas;Scikit-Learn;TensorFlow;Torch/Py…
89165                                NumPy;Opencv;Pandas
89166                                              NaN

                            ToolsTechHaveWorkedWith  \
ResponseId
72666       APT;Gradle;Homebrew;Kubernetes;npm;Pip;Unity 3D
46338                                        Vite;Yarn
86269                                              NaN
85854                                              NaN
10000                                              NaN
…                                                  …
89069                                          npm;Pip
89120                        npm;Pacman;Pip;Vite;Yarn
89122                                              NaN
89165                   Docker;Kubernetes;npm;Pip;Yarn
89166       Docker;Homebrew;npm;Pip;Unity 3D;Webpack;Yarn

                            ToolsTechWantToWorkWith  \
ResponseId
72666       APT;Gradle;Homebrew;Kubernetes;npm;Pip;Unity 3D
46338                       Google Test;npm;Webpack;Yarn
86269                                              NaN
85854                                              NaN
10000                                              NaN
…                                                  …
89069                          Docker;Kubernetes;npm;Pip
89120      Docker;Kubernetes;npm;Pacman;Pip;Unreal Engine…
89122                                              NaN
89165              Ansible;Docker;Kubernetes;Pip;Terraform
89166                       Bun;Docker;Homebrew;npm;Yarn

                          NEWCollabToolsHaveWorkedWith  \
ResponseId
```

```
72666        Android Studio;IntelliJ IDEA;Vim;Visual Studio…
46338                      Android Studio;Visual Studio Code
86269                                                    NaN
85854                                                    NaN
10000        Android Studio;Atom;Eclipse;IntelliJ IDEA;Note…
…                                                          …
89069                                    Visual Studio Code
89120        Android Studio;IntelliJ IDEA;IPython;Jupyter N…
89122            Jupyter Notebook/JupyterLab;Visual Studio Code
89165        Android Studio;Atom;Fleet;Goland;IntelliJ IDEA…
89166        Android Studio;Atom;Code::Blocks;Eclipse;Intel…


                              NEWCollabToolsWantToWorkWith  \
ResponseId
72666        Android Studio;IntelliJ IDEA;Vim;Visual Studio…
46338        Android Studio;Spyder;Visual Studio Code;VSCodium
86269                                                    NaN
85854                                                    NaN
10000                                                    NaN
…                                                          …
89069                                    Visual Studio Code
89120        Android Studio;IPython;Jupyter Notebook/Jupyte…
89122            Jupyter Notebook/JupyterLab;Visual Studio Code
89165                          PyCharm;Visual Studio Code
89166                      Nano;Vim;Visual Studio Code


                                       OpSysPersonal use  \
ResponseId
72666         MacOS;Windows;Windows Subsystem for Linux (WSL)
46338                                        Android;Windows
86269            Windows;Windows Subsystem for Linux (WSL)
85854                                          MacOS;Ubuntu
10000                                               Windows
…                                                          …
89069                                        Ubuntu;Windows
89120                                        Android;Ubuntu
89122             Arch;Debian;Other Linux-based;Windows
89165    Ubuntu;Windows;Windows Subsystem for Linux (WSL)
89166             Android;Debian;MacOS;Ubuntu;Windows


                                   OpSysProfessional use  \
ResponseId
72666                                       MacOS;Windows
46338        Android;iOS;iPadOS;MacOS;Ubuntu;Windows;Window…
86269            Windows;Windows Subsystem for Linux (WSL)
85854                                                   NaN
10000                                                   NaN
```

```
…                                                              …
89069                                                      Windows
89120                                              Android;Ubuntu
89122                    Arch;Debian;Other Linux-based;Ubuntu
89165                                               MacOS;Ubuntu
89166        Android;Arch;ChromeOS;Fedora;MacOS;Other Linux…


                      OfficeStackAsyncHaveWorkedWith  \
ResponseId
72666                               Confluence;Jira
46338          Adobe Workfront;GitHub Discussions
86269                                          Jira
85854        Jira;Notion;Stack Overflow for Teams
10000         Asana;Azure Devops;Confluence;Jira
…                                                 …
89069                                           NaN
89120                 GitHub Discussions;Notion
89122                                           NaN
89165                                          Jira
89166                         Monday.com;Trello


                      OfficeStackAsyncWantToWorkWith  \
ResponseId
72666                                           Jira
46338                 Adobe Workfront;GitHub Discussions
86269                                           Jira
85854                                            NaN
10000                                            NaN
…                                                 …
89069                                            NaN
89120                 GitHub Discussions;Jira;Notion
89122                                            NaN
89165                                           Jira
89166        GitHub Discussions;Monday.com;Stack Overflow f…


                       OfficeStackSyncHaveWorkedWith  \
ResponseId
72666          Google Meet;Microsoft Teams;Whatsapp;Zoom
46338        Google Chat;Google Meet;Telegram;Whatsapp;Zoom
86269                                Microsoft Teams
85854                  Google Chat;Google Meet;Zoom
10000        Cisco Webex Teams;Google Chat;Google Meet;Micr…
…                                                     …
89069                           Microsoft Teams;Whatsapp
89120        Discord;Google Meet;Microsoft Teams;Telegram;W…
89122         Discord;Google Meet;Microsoft Teams;Skype;Slack
89165                            Google Meet;Slack;Zoom
```

```
89166          Discord;Google Meet;Microsoft Teams;Skype;Slac…


                                OfficeStackSyncWantToWorkWith  \
ResponseId
72666                              Google Meet;Microsoft Teams
46338          Google Chat;Google Meet;Skype;Telegram;Whatsap…
86269                                          Microsoft Teams
85854                                                      NaN
10000                                                      NaN
…                                                           …
89069                                                      NaN
89120           Discord;Google Meet;Slack;Telegram;Whatsapp;Zoom
89122                                  Discord;Slack;Telegram
89165                                   Google Meet;Slack;Zoom
89166          Discord;Google Meet;Microsoft Teams;Skype;Slac…


                                      AISearchHaveWorkedWith  \
ResponseId
72666                  Bing AI;ChatGPT;Google Bard AI;Neeva AI
46338                              ChatGPT;Google Bard AI
86269                                              ChatGPT
85854                                      ChatGPT;You.com
10000                                                  NaN
…                                                        …
89069                                              ChatGPT
89120      ChatGPT;Google Bard AI;Perplexity AI;WolframAl…
89122                                              You.com
89165                                              ChatGPT
89166                                      Bing AI;ChatGPT


                                      AISearchWantToWorkWith  \
ResponseId
72666                  Bing AI;ChatGPT;Google Bard AI;Neeva AI
46338                              ChatGPT;Google Bard AI
86269                                              ChatGPT
85854                                                  NaN
10000                                                  NaN
…                                                        …
89069                                              ChatGPT
89120      ChatGPT;Google Bard AI;Perplexity AI;You.com
89122                      ChatGPT;Google Bard AI;You.com
89165                                              ChatGPT
89166                      ChatGPT;Google Bard AI


                              AIDevHaveWorkedWith  \
ResponseId
72666                        GitHub Copilot
```

```
46338                                NaN
86269                      GitHub Copilot
85854                                NaN
10000                                NaN
…                                      …
89069                                NaN
89120      AWS CodeWhisperer;GitHub Copilot
89122                                NaN
89165                      GitHub Copilot
89166                                NaN


                            AIDevWantToWorkWith  \
ResponseId
72666                       GitHub Copilot
46338                                NaN
86269                       GitHub Copilot
85854                                NaN
10000                                NaN

…                                      …
89069                                NaN
89120      AWS CodeWhisperer;GitHub Copilot
89122                                NaN
89165                                NaN
89166                                NaN


                                              NEWSOSites  \
ResponseId
72666                     Stack Overflow;Stack Exchange
46338           Stack Overflow;Collectives on Stack Overflow
86269       Stack Overflow;Stack Exchange;Stack Overflow f…
85854                                       Stack Overflow
10000       Stack Overflow;Stack Exchange;Collectives on S…

…                                                        …
89069                     Stack Overflow;Stack Exchange
89120                     Stack Overflow;Stack Exchange
89122                     Stack Overflow;Stack Exchange
89165                     Stack Overflow;Stack Exchange
89166       Stack Overflow;Stack Exchange;Stack Overflow f…


                             SOVisitFreq SOAccount  \
ResponseId
72666               Multiple times per day       Yes
46338               Daily or almost daily        No
86269               Daily or almost daily        No
85854       A few times per month or weekly      Yes
10000       Less than once per month or monthly  Yes

…                                      …         …
```

49

```
89069                          Daily or almost daily        Yes
89120                          Multiple times per day       Yes
89122                          A few times per week         Yes
89165                          A few times per week         Yes
89166                          Multiple times per day       Yes


                                                      SOPartFreq  \
ResponseId
72666                  Less than once per month or monthly
46338                                                  NaN
86269                                                  NaN
85854                              A few times per week
10000                  Less than once per month or monthly
…                                                       …
89069                        A few times per month or weekly
89120                  Less than once per month or monthly
89122        I have never participated in Q&A on Stack Over…
89165        I have never participated in Q&A on Stack Over…
89166                        A few times per month or weekly


                    SOComm  \
ResponseId
72666         Yes, somewhat
46338        Yes, definitely
86269        Yes, definitely
85854         Yes, somewhat
10000         Yes, somewhat
…                    …
89069         Yes, somewhat
89120        Yes, definitely
89122          Yes, somewhat
89165          Yes, somewhat
89166        Yes, definitely


                                                        SOAI  \
ResponseId
72666      Currently SO is a wiki, providing AI generated…
46338      It is a good Idea to implement the AI tool in …
86269              Innovative, Supportive and open community
85854      AI can be used to give a tailormade answer to …
10000                                                  Good
…                                                       …
89069      AI can increase easy understanding of question…
89120                                                  NaN
89122                                                  NaN
89165                                                  NaN
89166      I think StackOverflow should also use AI to ge…
```

```
                      AISelect          AISent   \
ResponseId
72666                      Yes        Favorable
46338                      Yes   Very favorable
86269      No, but I plan to soon     Indifferent
85854                      Yes        Favorable
10000      No, and I don't plan to          NaN
…                          …                …
89069      No, but I plan to soon        Unsure
89120                      Yes        Favorable
89122      No, but I plan to soon     Indifferent
89165                      Yes        Favorable
89166                      Yes        Favorable


                                                    AIAcc  \
ResponseId
72666                                    Greater efficiency
46338      Increase productivity;Greater efficiency;Speed…
86269                                                   NaN
85854              Greater efficiency;Improve collaboration
10000                                                   NaN
…                                                       …
89069                                                   NaN
89120              Increase productivity;Greater efficiency
89122                                                   NaN
89165      Increase productivity;Greater efficiency;Impro…
89166      Increase productivity;Greater efficiency;Speed…


                              AIBen  \
ResponseId
72666            Somewhat distrust
46338              Somewhat trust
86269            Somewhat distrust
85854      Neither trust nor distrust
10000                           NaN
…                               …
89069              Somewhat trust
89120              Somewhat trust
89122      Neither trust nor distrust
89165              Somewhat trust
89166              Somewhat trust


                          AIToolInterested in Using  \
ResponseId
72666      Learning about a codebase;Project planning;Deb…
46338      Learning about a codebase;Documenting code;Deb…
```

```
86269                                               NaN
85854       Learning about a codebase;Project planning;Wri…
10000                                               NaN
…                                                     …
89069                                               NaN
89120       Learning about a codebase;Project planning;Tes…
89122                                               NaN
89165                        Committing and reviewing code
89166       Learning about a codebase;Project planning;Wri…


                                 AIToolCurrently Using  \
ResponseId
72666                        Writing code;Documenting code
46338       Project planning;Writing code;Deployment and m…
86269                                               NaN
85854       Documenting code;Debugging and getting help;Co…
10000                                               NaN
…                                                     …
89069                                               NaN
89120              Writing code;Debugging and getting help
89122                                               NaN
89165                                               NaN
89166       Learning about a codebase;Project planning;Wri…


                              AIToolNot interested in Using  \
ResponseId
72666                                               NaN
46338       Testing code;Committing and reviewing code
86269                                               NaN
85854                    Collaborating with teammates
10000                                               NaN
…                                                     …
89069                                               NaN
89120                                               NaN
89122                                               NaN
89165                                               NaN
89166                                               NaN


                                 AINextVery different  \
ResponseId
72666                                               NaN
46338                                               NaN
86269                                               NaN
85854       Documenting code;Debugging and getting help;Co…
10000                                               NaN
…                                                     …
89069                                               NaN
```

```
89120                                                    NaN
89122                                                    NaN
89165                                                    NaN
89166          Writing code;Debugging and getting help


            AINextNeither different nor similar  \
ResponseId
72666                                       NaN
46338             Collaborating with teammates
86269                                       NaN
85854                                       NaN
10000                                       NaN
…                                           …
89069                                       NaN
89120             Debugging and getting help
89122                                       NaN
89165                                       NaN
89166                                       NaN


                                 AINextSomewhat similar AINextVery similar  \
ResponseId
72666                                               NaN                NaN
46338          Project planning;Deployment and monitoring       Writing code
86269                                               NaN                NaN
85854                                               NaN                NaN
10000                                               NaN                NaN
…                                                   …                  …
89069                                               NaN                NaN
89120                                               NaN                NaN
89122                                               NaN                NaN
89165                                               NaN                NaN
89166                                               NaN                NaN


                                 AINextSomewhat different TBranch  \
ResponseId
72666                       Writing code;Documenting code     Yes
46338                                               NaN     Yes
86269                                               NaN      No
85854                                               NaN     Yes
10000                                               NaN     Yes
…                                                   …       …
89069                                               NaN     Yes
89120             Writing code;Debugging and getting help     NaN
89122                                               NaN      No
89165                                               NaN     Yes
89166          Learning about a codebase;Project planning;Wri…     Yes
```

```
                       ICorPM  WorkExp      Knowledge_1  \
ResponseId
72666        Individual contributor    8.0              Agree
46338        Individual contributor    1.0  Strongly disagree
86269                           NaN    NaN                NaN
85854        Individual contributor    1.0     Strongly agree
10000        Individual contributor    6.0              Agree
…                                 …      …                  …
89069        Individual contributor    2.0           Disagree
89120                           NaN    NaN                NaN
89122                           NaN    NaN                NaN
89165        Individual contributor    2.0              Agree
89166        Individual contributor    3.0              Agree


                     Knowledge_2                 Knowledge_3  \
ResponseId
72666                   Disagree  Neither agree nor disagree
46338                   Disagree                         NaN
86269                        NaN                         NaN
85854             Strongly agree              Strongly agree
10000     Neither agree nor disagree                   Agree
…                              …                           …
89069                      Agree  Neither agree nor disagree
89120                        NaN                         NaN
89122                        NaN                         NaN
89165                      Agree                       Agree
89166     Neither agree nor disagree         Strongly disagree


                     Knowledge_4                 Knowledge_5  \
ResponseId
72666     Neither agree nor disagree                   Agree
46338                   Disagree                    Disagree
86269                        NaN                         NaN
85854                      Agree                       Agree
10000     Neither agree nor disagree  Neither agree nor disagree
…                              …                           …
89069                      Agree                       Agree
89120                        NaN                         NaN
89122                        NaN                         NaN
89165                      Agree                       Agree
89166                      Agree              Strongly agree


                     Knowledge_6                 Knowledge_7  \
ResponseId
72666                      Agree                       Agree
46338                      Agree                       Agree
86269                        NaN                         NaN
```
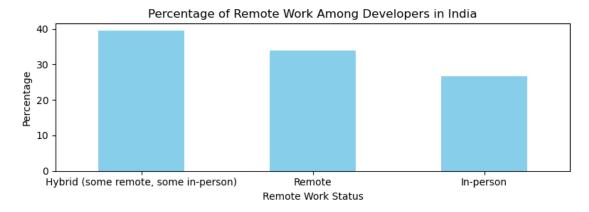
```
85854                 Strongly agree                         Agree
10000                          Agree  Neither agree nor disagree
…                                  …                           …
89069     Neither agree nor disagree                         Agree
89120                            NaN                           NaN
89122                            NaN                           NaN
89165                          Agree                         Agree
89166     Neither agree nor disagree                Strongly agree


                        Knowledge_8      Frequency_1      Frequency_2  \
ResponseId
72666     Neither agree nor disagree  1-2 times a week  1-2 times a week
46338                 Strongly agree  1-2 times a week  3-5 times a week
86269                            NaN               NaN               NaN
85854                            NaN             Never  1-2 times a week
10000     Neither agree nor disagree             Never  1-2 times a week
…                                  …                 …                 …
89069                       Disagree             Never             Never
89120                            NaN               NaN               NaN
89122                            NaN               NaN               NaN
89165                          Agree             Never  1-2 times a week
89166                 Strongly agree  1-2 times a week  3-5 times a week


                Frequency_3            TimeSearching  \
ResponseId
72666     1-2 times a week        30-60 minutes a day
46338     1-2 times a week        15-30 minutes a day
86269                  NaN                        NaN
85854     1-2 times a week        30-60 minutes a day
10000                Never  Less than 15 minutes a day
…                        …                          …
89069                  NaN       60-120 minutes a day
89120                  NaN                        NaN
89122                  NaN                        NaN
89165                Never  Less than 15 minutes a day
89166     1-2 times a week        30-60 minutes a day


                TimeAnswering  \
ResponseId
72666     15-30 minutes a day
46338                     NaN
86269                     NaN
85854     30-60 minutes a day
10000     30-60 minutes a day
…                           …
89069     15-30 minutes a day
89120                     NaN
```

```
89122                              NaN
89165       Less than 15 minutes a day
89166               30-60 minutes a day


                                         ProfessionalTech  \
ResponseId
72666       Microservices;Continuous integration (CI) and …
46338       Developer portal or other central places to fi…
86269                                                    NaN
85854       DevOps function;Microservices;Automated testin…
10000       DevOps function;Microservices;Automated testin…
…                                                         …
89069                                          DevOps function
89120                                                    NaN
89122                                                    NaN
89165       DevOps function;Microservices;Automated testin…
89166       Observability tools;Innersource initiative;Dev…


                                              Industry  \
ResponseId
72666       Information Services, IT, Software Development…
46338                                                NaN
86269                                                NaN
85854                                              Other
10000       Information Services, IT, Software Development…
…                                                      …
89069       Information Services, IT, Software Development…
89120                                                NaN
89122                                                NaN
89165                                 Financial Services
89166       Information Services, IT, Software Development…


                 SurveyLength                    SurveyEase  \
ResponseId
72666                Too long                          Easy
46338                Too long  Neither easy nor difficult
86269                Too long  Neither easy nor difficult
85854                Too long  Neither easy nor difficult
10000       Appropriate in length  Neither easy nor difficult
…                           …                             …
89069       Appropriate in length  Neither easy nor difficult
89120                Too long  Neither easy nor difficult
89122       Appropriate in length                        Easy
89165       Appropriate in length  Neither easy nor difficult
89166       Appropriate in length  Neither easy nor difficult


            ConvertedCompYearly
```

56

```
         ResponseId
72666                 424091.0
46338                 384998.0
86269                 339273.0
85854                 300000.0
10000                 290805.0
…                          …
89069                      NaN
89120                      NaN
89122                      NaN
89165                      NaN
89166                      NaN

[5625 rows x 83 columns]
```

[34]: `indian_dev=country_grp.get_group('India')`

[35]: `indian_dev.describe()`

[35]:
```
            CompTotal       WorkExp  ConvertedCompYearly
count   1.915000e+03   2901.000000          1868.000000
mean    1.205815e+07      6.292658         27346.822805
std     3.095875e+08      5.360794         32138.077600
min     0.000000e+00      0.000000             1.000000
25%     6.000000e+05      2.000000          8482.000000
50%     1.450000e+06      5.000000         19023.000000
75%     2.700000e+06      9.000000         36351.000000
max     1.000000e+10     50.000000        424091.000000
```

[28]:
```
filt=df['Country']=='India'
df[filt]['RemoteWork'].value_counts(normalize=True).apply(lambda x: "{:.2%}".
  ↪format(x))
```

[28]:
```
RemoteWork
Hybrid (some remote, some in-person)    39.50%
Remote                                  33.88%
In-person                               26.62%
Name: proportion, dtype: object
```

[36]: `indian_dev['RemoteWork'].count()`

[36]: 4147
```

# 7 Remote work in india

```python
[39]: remote_work_india = (indian_dev['RemoteWork'].value_counts() /␣
      ↪indian_dev['RemoteWork'].count() * 100).round(2)

      # Plotting the bar chart
      plt.figure(figsize=(8, 3))
      remote_work_india.plot(kind='bar', color='skyblue')
      plt.title('Percentage of Remote Work Among Developers in India')
      plt.xlabel('Remote Work Status')
      plt.ylabel('Percentage')
      plt.xticks(rotation=0)
      plt.tight_layout()
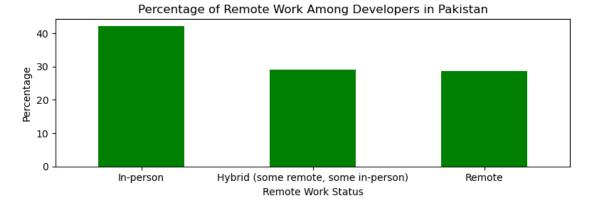      plt.show()
```


8 remote work in other countries

```python
[46]: (country_grp['RemoteWork'].value_counts().head(10)/(country_grp['RemoteWork'].
      ↪count()) * 100 ).round(2)
```

```
[46]: Country       RemoteWork
      Afghanistan   Hybrid (some remote, some in-person)    40.48
                    Remote                                  40.48
                    In-person                               19.05
      Albania       Hybrid (some remote, some in-person)    36.00
                    In-person                               34.00
                    Remote                                  30.00
      Algeria       Remote                                  54.00
                    Hybrid (some remote, some in-person)    24.00
                    In-person                               22.00
      Andorra       In-person                               46.15
      dtype: float64
```

```
[47]: Pak_dev=country_grp.get_group('Pakistan')
```

```
[48]: ((Pak_dev['RemoteWork'].value_counts())/(Pak_dev['RemoteWork'].count()) * 100 ).
      ↪round(2)
```

```
[48]: RemoteWork
      In-person                            42.13
      Hybrid (some remote, some in-person) 29.15
      Remote                               28.72
      Name: count, dtype: float64
```

```
[53]: remote_work_pak=((Pak_dev['RemoteWork'].value_counts())/(Pak_dev['RemoteWork'].
      ↪count()) * 100 ).round(2)
      # Plotting the bar chart
      plt.figure(figsize=(8, 3))
      remote_work_pak.plot(kind='bar', color='green')
      plt.title('Percentage of Remote Work Among Developers in Pakistan')
      plt.xlabel('Remote Work Status')
      plt.ylabel('Percentage')
      plt.xticks(rotation=0)
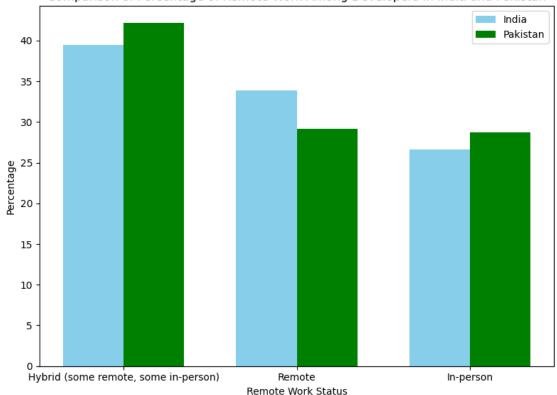      plt.tight_layout()
      plt.show()
```



```
[ ]: ## Comparion between India and Pakistan
```

```
[57]: # Plotting the comparison bar chart
      categories = remote_work_india.index
      ind = np.arange(len(categories))
      width = 0.35
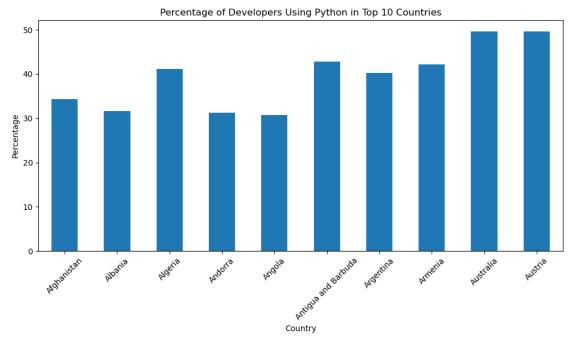
      plt.figure(figsize=(8, 6))
```

```
plt.bar(ind - width/2, remote_work_india, width, label='India', color='skyblue')
plt.bar(ind + width/2, remote_work_pak, width, label='Pakistan', color='green')

plt.xlabel('Remote Work Status')
plt.ylabel('Percentage')
plt.title('Comparison of Percentage of Remote Work Among Developers in India␣
 ↪and Pakistan')
plt.xticks(ind, categories)
plt.legend()
plt.tight_layout()
plt.show()
```


9 Avg salary grouped by a country

```
[59]: (country_grp['ConvertedCompYearly'].median())
```

```
[59]: Country
      Afghanistan                                      915.0
      Albania                                        10741.0
```

```
Algeria                              8782.0
Andorra                             42836.0
Angola                               4302.0
                                        …
Venezuela, Bolivarian Republic of…   12000.0
Viet Nam                            12763.0
Yemen                                6500.0
Zambia                               9687.0
Zimbabwe                            12500.0
Name: ConvertedCompYearly, Length: 185, dtype: float64
```

[65]:
```python
python_usage_percentage=(country_grp['LanguageHaveWorkedWith'].apply(lambda x:
↪x.str.contains('Python').sum()) / country_grp['LanguageHaveWorkedWith'].
↪size()) * 100
```

[66]:
```python
python_usage_percentage_top_10 = python_usage_percentage.head(10)
plt.figure(figsize=(10, 6))
python_usage_percentage_top_10.plot(kind='bar')
plt.title('Percentage of Developers Using Python in Top 10 Countries')
plt.xlabel('Country')
plt.ylabel('Percentage')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```

```
[ ]: df.isna()
```

```
[ ]:
```

```
[ ]: df['Age'].head(50)
```

10 avg developers age

```
[ ]: age_mapping = {
         'Under 18 years old': 16,
         '18-24 years old': 21,
         '25-34 years old': 30,
         '35-44 years old': 40,
         '45-54 years old': 50,
         '55-64 years old': 60,
         '65 years or older': 70,
         'Prefer not to say': None   # Assigner la valeur NaN à "Prefer not to say"
     }

     # Mapper les catégories d'âge aux valeurs numériques
     df['NumericAge'] = df['Age'].map(age_mapping)

     # Calculer l'âge moyen en excluant les valeurs NaN
     mean_age = df['NumericAge'].mean(skipna=True)

     age_ranges = {
         (0, 18): "Under 18 years old",
         (18, 25): "18-24 years old",
         (25, 35): "25-34 years old",
         (35, 45): "35-44 years old",
         (45, 55): "45-54 years old",
         (55, 65): "55-64 years old",
         (65, 100): "65 years or older"
     }

     for age_range, category in age_ranges.items():
         if age_range[0] <= mean_age < age_range[1]:
             print(category)
             break
```

```
[67]: df['YearsCode'].dropna()
```

```
[67]: ResponseId
      88348      8
      86039     10
      1335       3
```

```
57362     4
17873     3
           ..
77716     4
78741     5
81438     1
86366     4
88574     2
Name: YearsCode, Length: 87435, dtype: object
```

[68]: `df['YearsCode'].replace('Less than 1 year',0,inplace=True)`

[69]: `df['YearsCode'].replace('More than 50 years',0,inplace=True)`

[70]: `df['YearsCode'].astype(float).dropna().median()`

[70]: 10.0

[ ]:

[ ]: