```
import warnings
warnings.filterwarnings('ignore')


import numpy as np
import pandas as pd



from google.colab import drive
drive.mount('/content/drive')
```

```
Mounted at /content/drive
```

```
import seaborn as sns
import matplotlib.pyplot as plt
import plotly.express as px


am1 = pd.read_csv("/content/drive/MyDrive/collab /prevalence-by-mental-and-substance-use-disorder.csv")
am2 = pd.read_csv("/content/drive/MyDrive/collab /mental-and-substance-use-as-share-of-disease (1).csv")



am1.head()
```

	Entity	Code	Year	Prevalence - Schizophrenia - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Bipolar disorder - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Eating disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Anxiety disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Drug use disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Depressive disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Alcohol use disorders - Sex: Both - Age: Age-standardized (Percent)
0	Afghanistan	AFG	1990	0.228979	0.721207	0.131001	4.835127	0.454202	5.125291	0.444036
1	Afghanistan	AFG	1991	0.228120	0.719952	0.126395	4.821765	0.447112	5.116306	0.444250
2	Afghanistan	AFG	1992	0.227328	0.718418	0.121832	4.801434	0.441190	5.106558	0.445501
3	Afghanistan	AFG	1993	0.226468	0.717452	0.117942	4.789363	0.435581	5.100328	0.445958
4	Afghanistan	AFG	1994	0.225567	0.717012	0.114547	4.784923	0.431822	5.099424	0.445779

```
am2.head(10)
```

	Entity	Code	Year	DALYs (Disability-Adjusted Life Years) - Mental disorders - Sex: Both - Age: All Ages (Percent)
0	Afghanistan	AFG	1990	1.696670
1	Afghanistan	AFG	1991	1.734281
2	Afghanistan	AFG	1992	1.791189
3	Afghanistan	AFG	1993	1.776779
4	Afghanistan	AFG	1994	1.712986
5	Afghanistan	AFG	1995	1.738272
6	Afghanistan	AFG	1996	1.778098
7	Afghanistan	AFG	1997	1.781815
8	Afghanistan	AFG	1998	1.729402
9	Afghanistan	AFG	1999	1.850988

```
data = pd.merge(am1,am2)
data.head(10)
```

	Entity	Code	Year	Prevalence - Schizophrenia - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Bipolar disorder - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Eating disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Anxiety disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Drug use disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Depressive disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Alcohol use disorders - Sex: Both - Age: Age-standardized (Percent)
0	Afghanistan	AFG	1990	0.228979	0.721207	0.131001	4.835127	0.454202	5.125291	0.444036
1	Afghanistan	AFG	1991	0.228120	0.719952	0.126395	4.821765	0.447112	5.116306	0.444250
2	Afghanistan	AFG	1992	0.227328	0.718418	0.121832	4.801434	0.441190	5.106558	0.445501
3	Afghanistan	AFG	1993	0.226468	0.717452	0.117942	4.789363	0.435581	5.100328	0.445958
4	Afghanistan	AFG	1994	0.225567	0.717012	0.114547	4.784923	0.431822	5.099424	0.445779

```
data.isnull().sum()
```

```
Entity                                                                    0
Code                                                                    690
Year                                                                      0
Prevalence - Schizophrenia - Sex: Both - Age: Age-standardized (Percent)  0
Prevalence - Bipolar disorder - Sex: Both - Age: Age-standardized (Percent)  0
Prevalence - Eating disorders - Sex: Both - Age: Age-standardized (Percent)  0
Prevalence - Anxiety disorders - Sex: Both - Age: Age-standardized (Percent)  0
Prevalence - Drug use disorders - Sex: Both - Age: Age-standardized (Percent)  0
Prevalence - Depressive disorders - Sex: Both - Age: Age-standardized (Percent)  0
Prevalence - Alcohol use disorders - Sex: Both - Age: Age-standardized (Percent)  0
DALYs (Disability-Adjusted Life Years) - Mental disorders - Sex: Both - Age: All Ages (Percent)  0
dtype: int64
```

```
data.drop('Code',axis=1,inplace=True)
```

```
data.head(10)
```

	Entity	Year	Prevalence - Schizophrenia - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Bipolar disorder - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Eating disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Anxiety disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Drug use disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Depressive disorders - Sex: Both - Age: Age-standardized (Percent)	Prevalence - Alcohol use disorders - Sex: Both - Age: Age-standardized (Percent)	(Dis Lif dis Sex (
0	Afghanistan	1990	0.228979	0.721207	0.131001	4.835127	0.454202	5.125291	0.444036	
1	Afghanistan	1991	0.228120	0.719952	0.126395	4.821765	0.447112	5.116306	0.444250	
2	Afghanistan	1992	0.227328	0.718418	0.121832	4.801434	0.441190	5.106558	0.445501	
3	Afghanistan	1993	0.226468	0.717452	0.117942	4.789363	0.435581	5.100328	0.445958	
4	Afghanistan	1994	0.225567	0.717012	0.114547	4.784923	0.431822	5.099424	0.445779	
5	Afghanistan	1995	0.224713	0.716686	0.111129	4.780851	0.428578	5.098495	0.445422	
6	Afghanistan	1996	0.223690	0.716388	0.107786	4.777272	0.426393	5.100580	0.444837	
7	Afghanistan	1997	0.222424	0.716143	0.103931	4.775242	0.423720	5.105474	0.443938	
8	Afghanistan	1998	0.221129	0.716139	0.100343	4.777377	0.422491	5.113707	0.442665	
9	Afghanistan	1999	0.220065	0.716323	0.097946	4.782067	0.421215	5.120480	0.441428	

```
data.size,data.shape
```

```
(68400, (6840, 10))
```

```
data.set_axis(['Country', 'Year', 'Schizophrenia', 'Bipolar_disorder', 'Eating_disorder', 'Anxiety', 'drug_usage', 'depression', 'alcohol', '
```

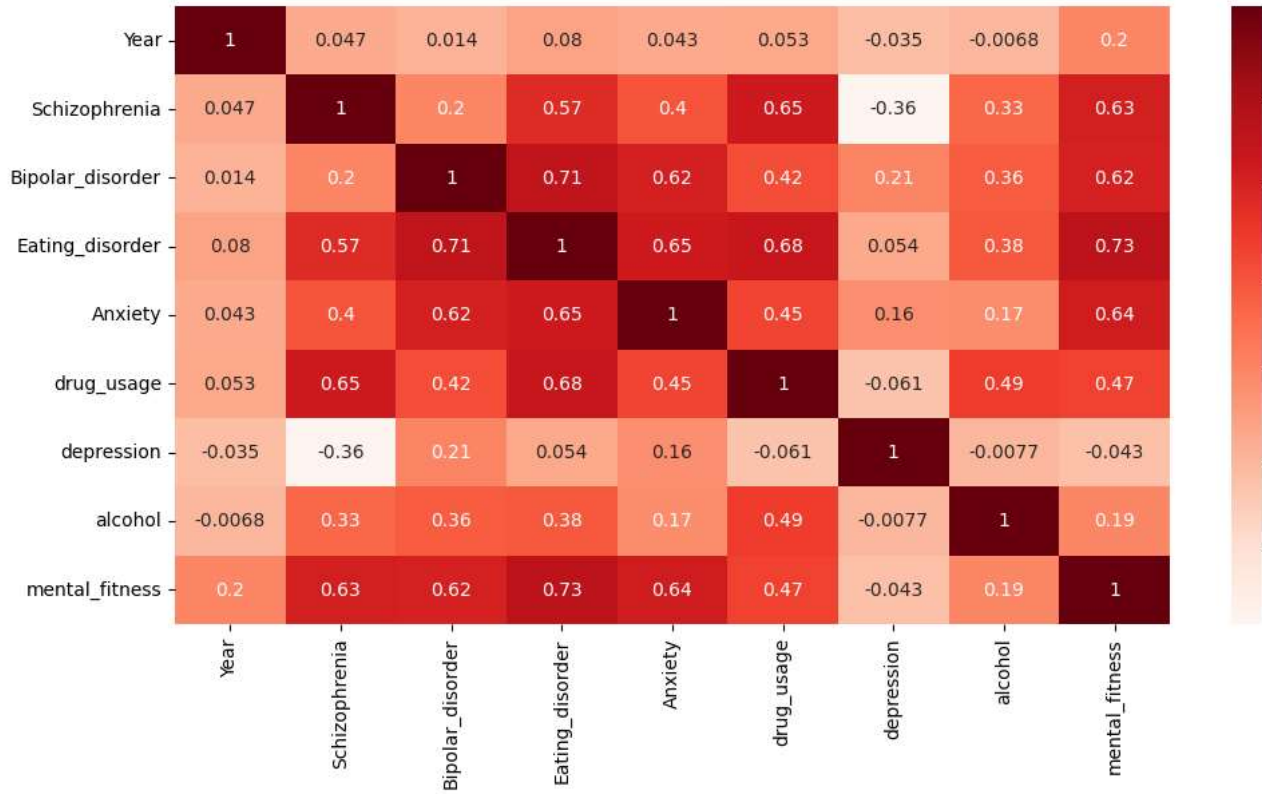
```
data.head(10)
```

	Country	Year	Schizophrenia	Bipolar_disorder	Eating_disorder	Anxiety	drug_usage	depression	alcohol	mental_fit
0	Afghanistan	1990	0.228979	0.721207	0.131001	4.835127	0.454202	5.125291	0.444036	1.69
1	Afghanistan	1991	0.228120	0.719952	0.126395	4.821765	0.447112	5.116306	0.444250	1.73
2	Afghanistan	1992	0.227328	0.718418	0.121832	4.801434	0.441190	5.106558	0.445501	1.79
3	Afghanistan	1993	0.226468	0.717452	0.117942	4.789363	0.435581	5.100328	0.445958	1.77
4	Afghanistan	1994	0.225567	0.717012	0.114547	4.784923	0.431822	5.099424	0.445779	1.71
5	Afghanistan	1995	0.224713	0.716686	0.111129	4.780851	0.428578	5.098495	0.445422	1.73
6	Afghanistan	1996	0.223690	0.716388	0.107786	4.777272	0.426393	5.100580	0.444837	1.77
7	Afghanistan	1997	0.222424	0.716143	0.103931	4.775242	0.423720	5.105474	0.443938	1.78
8	Afghanistan	1998	0.221129	0.716139	0.100343	4.777377	0.422491	5.113707	0.442665	1.72

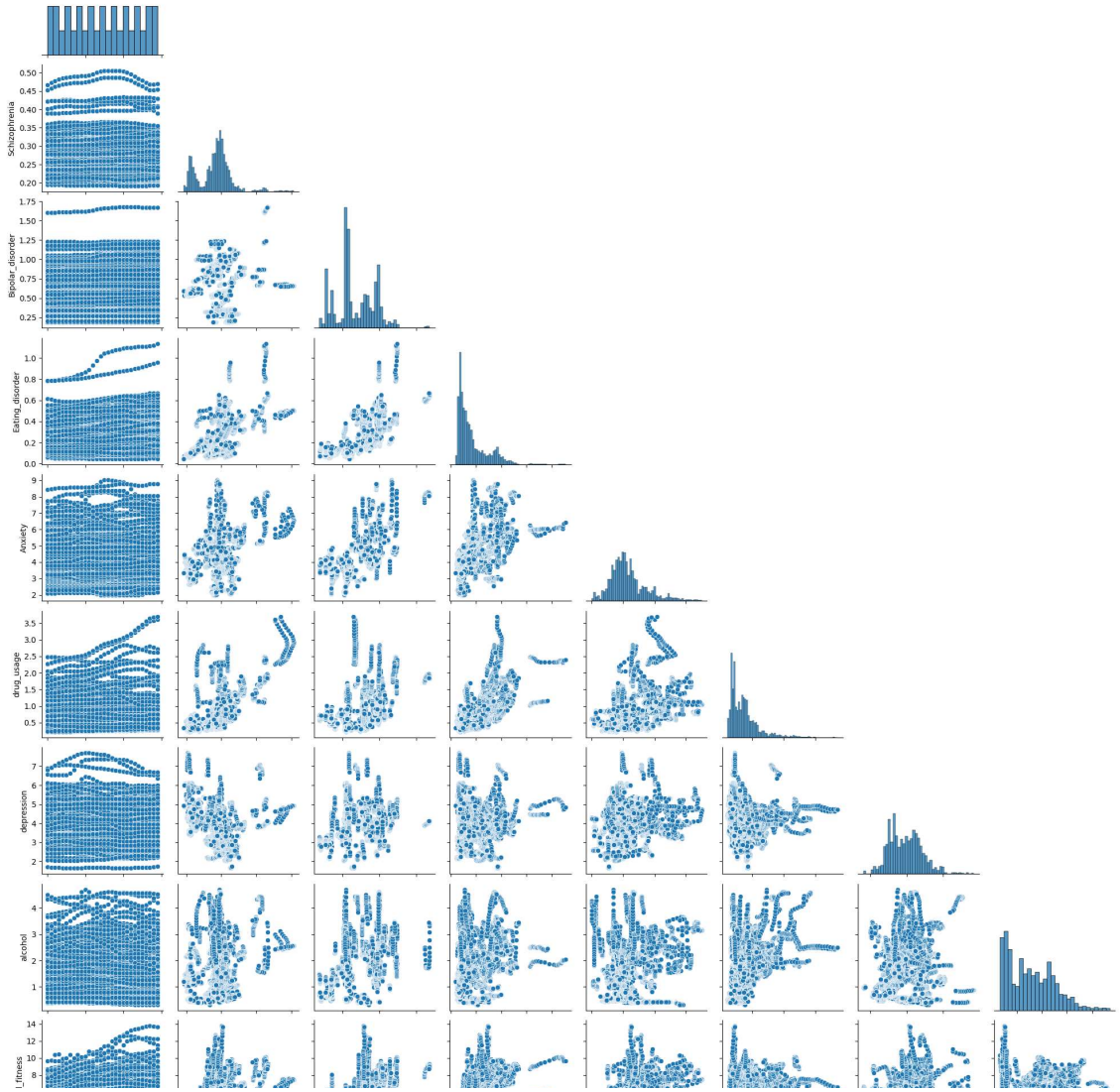
Double-click (or enter) to edit

```
plt.figure(figsize=(12,6))
sns.heatmap(data.corr(),annot=True,cmap='Reds')
plt.plot()
```

```
[]
```



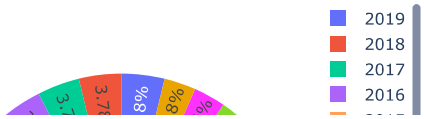

```
sns.pairplot(data,corner=True)
plt.show()
```



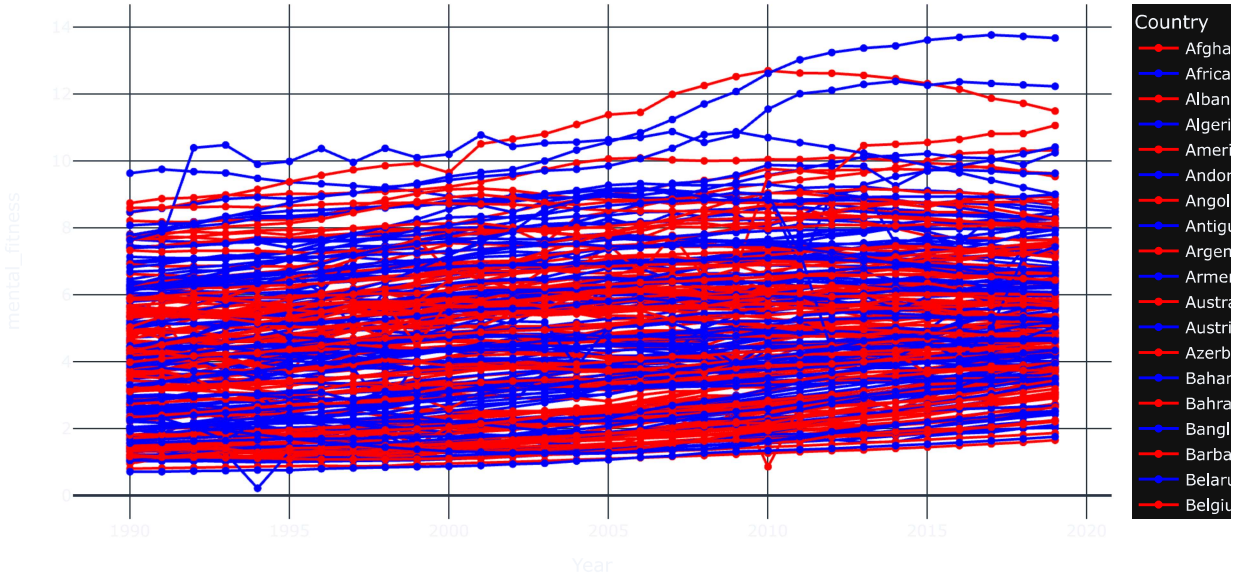

```
mean = data['mental_fitness'].mean()
mean
```

```
4.8180618117506135
```

```
fig = px.pie(data,values='mental_fitness',names='Year')
fig.show()
```




```
fig = px.line(data,x ="Year",y="mental_fitness",color='Country',markers=True,color_discrete_sequence=['red','blue'],template='plotly_dark')
fig.show()
```




```
df = data.copy()
```

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 6840 entries, 0 to 6839
Data columns (total 10 columns):
 #   Column            Non-Null Count  Dtype  
---  ------            --------------  -----  
 0   Country           6840 non-null   object 
 1   Year              6840 non-null   int64  
 2   Schizophrenia     6840 non-null   float64
 3   Bipolar_disorder  6840 non-null   float64
 4   Eating_disorder   6840 non-null   float64
 5   Anxiety           6840 non-null   float64
 6   drug_usage        6840 non-null   float64
 7   depression        6840 non-null   float64
 8   alcohol           6840 non-null   float64
 9   mental_fitness    6840 non-null   float64
dtypes: float64(8), int64(1), object(1)
memory usage: 587.8+ KB
```

```
from sklearn.preprocessing import LabelEncoder
l=LabelEncoder()
for i in df.columns:
    if df[i].dtype == 'object':
        df[i]=l.fit_transform(df[i])
```

```
df.shape
```

```
(6840, 10)
```

```
x = df.drop('mental_fitness',axis=1)
y = df['mental_fitness']
```

```
from sklearn.model_selection import train_test_split
xtrain, xtest,ytrain,ytest = train_test_split(X,y, test_size=.20,random_state=2)
```

```
df.head()
```

	Country	Year	Schizophrenia	Bipolar_disorder	Eating_disorder	Anxiety	drug_usage	depression	alcohol	mental_fit
0	Afghanistan	1990	0.228979	0.721207	0.131001	4.835127	0.454202	5.125291	0.444036	1.69
1	Afghanistan	1991	0.228120	0.719952	0.126395	4.821765	0.447112	5.116306	0.444250	1.73
2	Afghanistan	1992	0.227328	0.718418	0.121832	4.801434	0.441190	5.106558	0.445501	1.79
3	Afghanistan	1993	0.226468	0.717452	0.117942	4.789363	0.435581	5.100328	0.445958	1.77
4	Afghanistan	1994	0.225567	0.717012	0.114547	4.784923	0.431822	5.099424	0.445779	1.71

```
print("xtrain: ",xtrain.shape)
print("xtest: ",xtest.shape)
print("\n ytrain: ",ytrain.shape)
print("ytest: ",ytest.shape)
```

```
xtrain:  (5472, 9)
xtest:  (1368, 9)

 ytrain:  (5472,)
ytest:  (1368,)
```

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error,r2_score
lr = LinearRegression()
lr.fit(xtrain,ytrain)

ytrain_pred = lr.predict(xtrain)
mse = mean_squared_error(ytrain,ytrain_pred)
rmse =(np.sqrt(mean_squared_error(ytrain,ytrain_pred)))
r2 = r2_score(ytrain,ytrain_pred)

print("The Linear Regression model performance for training set")
print("--------------------------------")
print('MSE is{}'.format(mse))
print('RMSE is{}'.format(rmse))
print('R2 score is{}'.format(r2))
```

```
The Linear Regression model performance for training set
--------------------------------
MSE is1.389959372405798
RMSE is1.1789653821914357
R2 score is0.7413245790025275
```

```
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import mean_squared_error, r2_score

# Create an instance of the RandomForestRegressor
rf = RandomForestRegressor()

# Fit the model to the training data
rf.fit(xtrain, ytrain)

# Make predictions on the training data
ytrain_pred = rf.predict(xtrain)

# Calculate the evaluation metrics
mse = mean_squared_error(ytrain, ytrain_pred)
rmse = np.sqrt(mse)
r2 = r2_score(ytrain, ytrain_pred)

# Print the performance metrics
print("The Random Forest Regressor model performance for the training set")
print("----------------------------------------")
print('MSE is {}'.format(mse))
print('RMSE is {}'.format(rmse))
print('R2 score is {}'.format(r2))
```

```
The Random Forest Regressor model performance for the training set
----------------------------------------
MSE is 0.004922871041127231
RMSE is 0.07016317439460126
R2 score is 0.999083839596782
```

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score


# Linear Regression model instantiation
lr = LinearRegression()

# Fit the model to the training data
lr.fit(xtrain, ytrain)

# Linear Regression model evaluation
ytest_pred = lr.predict(xtest)
mse = mean_squared_error(ytest, ytest_pred)
rmse = np.sqrt(mse)
r2 = r2_score(ytest, ytest_pred)

print("The Linear Regression model performance for the testing set")
print("----------------------------------------")
print('MSE is {}'.format(mse))
print('RMSE is {}'.format(rmse))
print('R2 score is {}'.format(r2))

# Random Forest Regressor model evaluation
ytest_pred = rf.predict(xtest)
mse = mean_squared_error(ytest, ytest_pred)
rmse = np.sqrt(mse)
r2 = r2_score(ytest, ytest_pred)

print("\n\nThe Random Forest Regressor model performance for the testing set")
print("----------------------------------------")
print('MSE is {}'.format(mse))
print('RMSE is {}'.format(rmse))
print('R2 score is {}'.format(r2))
```

```
The Linear Regression model performance for the testing set
----------------------------------------
MSE is 1.1357545319272384
RMSE is 1.0657178481789813
R2 score is 0.7638974087055272


The Random Forest Regressor model performance for the testing set
----------------------------------------
MSE is 0.029894060286320644
RMSE is 0.17289898867928824
R2 score is 0.993785571706294
```

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