Date - 17/10/2023 Team ID - 720 Project Name - Covid-19 Cases Analysis

In [10]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import r2_score, mean_absolute_error,mean_squared_error
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import Lasso
```

In [11]:
```
df=pd.read_csv('hi.csv')
```

In [12]:
```
df
```

Out[12]:

	dateRep	day	month	year	cases	deaths	countriesAndTerritories
0	31-05-2021	31	5	2021	366	5	Austria
1	30-05-2021	30	5	2021	570	6	Austria
2	29-05-2021	29	5	2021	538	11	Austria
3	28-05-2021	28	5	2021	639	4	Austria
4	27-05-2021	27	5	2021	405	19	Austria
...	...	...	...	...	...	...	...
2725	06-03-2021	6	3	2021	3455	17	Sweden
2726	05-03-2021	5	3	2021	4069	12	Sweden
2727	04-03-2021	4	3	2021	4884	14	Sweden
2728	03-03-2021	3	3	2021	4876	19	Sweden
2729	02-03-2021	2	3	2021	6191	19	Sweden

2730 rows × 7 columns

In [13]:
```
df.head()
```

Out[13]:

	dateRep	day	month	year	cases	deaths	countriesAndTerritories
0	31-05-2021	31	5	2021	366	5	Austria
1	30-05-2021	30	5	2021	570	6	Austria
2	29-05-2021	29	5	2021	538	11	Austria
3	28-05-2021	28	5	2021	639	4	Austria
4	27-05-2021	27	5	2021	405	19	Austria

In [14]:
```
df.tail()
```

Out[14]:

	dateRep	day	month	year	cases	deaths	countriesAndTerritories
2725	06-03-2021	6	3	2021	3455	17	Sweden
2726	05-03-2021	5	3	2021	4069	12	Sweden
2727	04-03-2021	4	3	2021	4884	14	Sweden
2728	03-03-2021	3	3	2021	4876	19	Sweden
2729	02-03-2021	2	3	2021	6191	19	Sweden

In [16]:
```
df.shape
```

Out[16]:
```
(2730, 7)
```

In [6]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2730 entries, 0 to 2729
Data columns (total 7 columns):
 #   Column                  Non-Null Count  Dtype 
---  ------                  --------------  ----- 
 0   dateRep                 2730 non-null   object
 1   day                     2730 non-null   int64 
 2   month                   2730 non-null   int64 
 3   year                    2730 non-null   int64 
 4   cases                   2730 non-null   int64 
 5   deaths                  2730 non-null   int64 
 6   countriesAndTerritories  2730 non-null   object
dtypes: int64(5), object(2)
memory usage: 149.4+ KB
```

In [17]:
```
df.isnull().sum()
```

Out[17]:
```
dateRep                   0
day                       0
month                     0
year                      0
cases                     0
deaths                    0
countriesAndTerritories    0
dtype: int64
```

In [19]:
```
dup=df.duplicated().any()
```

In [7]:
```
df.describe()
```

Out[7]:

	day	month	year	cases	deaths
count	2730.000000	2730.000000	2730.0	2730.000000	2730.000000
mean	16.000000	4.010989	2021.0	3661.010989	65.291941
std	8.765919	0.818813	0.0	6490.510073	113.956634
min	1.000000	3.000000	2021.0	-2001.000000	-3.000000
25%	8.000000	3.000000	2021.0	361.250000	2.000000
50%	16.000000	4.000000	2021.0	926.500000	14.500000
75%	24.000000	5.000000	2021.0	3916.250000	72.000000
max	31.000000	5.000000	2021.0	53843.000000	956.000000

In [8]:
```
df.columns
```

Out[8]:
```
Index(['dateRep', 'day', 'month', 'year', 'cases', 'deaths',
       'countriesAndTerritories'],
      dtype='object')
```

In [9]:
```
country_stats = df.groupby('countriesAndTerritories').agg({'cases': 'sum', 'deat
print("Total cases and deaths per country:\n", country_stats)
```

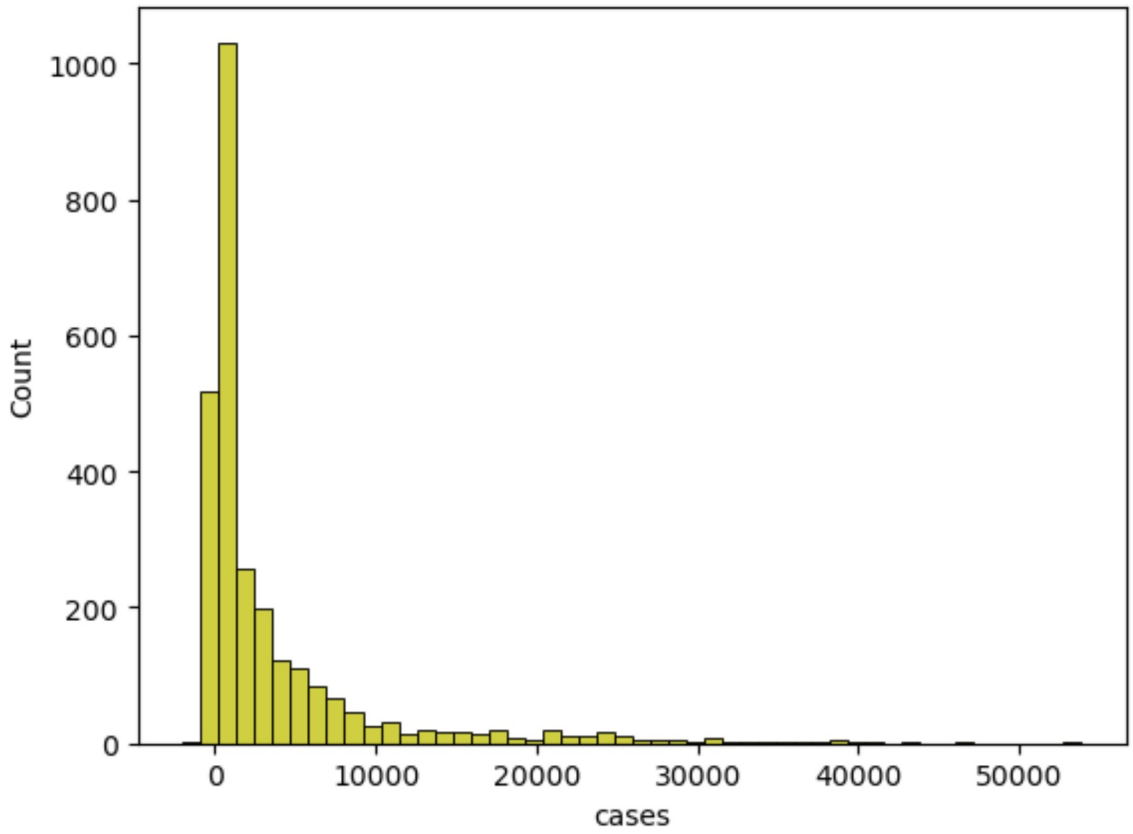
```
Total cases and deaths per country:
    countriesAndTerritories    cases  deaths
0                   Austria   184416    1925
1                   Belgium   288119    2696
2                  Bulgaria   171236    7471
3                   Croatia   113168    2488
4                    Cyprus    37700     129
5                   Czechia   421221    9639
6                   Denmark    69188     155
7                   Estonia    62916     654
8                   Finland    34760     177
9                    France  2020808   22977
10                  Germany  1234058   18337
11                   Greece   210201    5550
12                  Hungary   371613   14675
13                  Iceland      527       1
14                  Ireland    42057     622
15                    Italy  1290738   28347
16                   Latvia    46912     752
17            Liechtenstein      437       4
18                Lithuania    77040    1022
19               Luxembourg    14464     176
20                    Malta     7586     104
21              Netherlands   557983    2055
22                   Norway    53995     161
23                   Poland  1164964   29969
24                 Portugal    44096     706
25                  Romania   275590    9926
26                 Slovakia   178475    5150
27                 Slovenia    63550     582
28                    Spain   552723   10344
29                   Sweden   404019    1453
```

In [10]:
```
eu_countries = ['Austria', 'Belgium', 'Bulgaria', 'Croatia', 'Cyprus', 'Czechia'
eu_data = df[df['countriesAndTerritories'].isin(eu_countries)]
summary_stats = eu_data.groupby('countriesAndTerritories').agg({'cases': ['mean'
summary_stats.columns = ['Country', 'Mean Cases', 'Std Dev Cases', 'Mean Deaths'
print(summary_stats)
```

	Country	Mean Cases	Std Dev Cases	Mean Deaths	Std Dev Deaths
0	Austria	2026.549451	995.569254	21.153846	9.946438
1	Belgium	3166.142857	1489.367499	29.626374	10.526842
2	Bulgaria	1881.714286	1492.096052	82.098901	52.742573
3	Croatia	1243.604396	891.781561	27.340659	13.689590
4	Cyprus	414.285714	232.107987	1.417582	1.445806
5	Czechia	4628.802198	4568.044868	105.923077	79.977390
6	Denmark	760.307692	379.739609	1.703297	1.269247
7	Estonia	691.384615	512.714514	7.186813	5.462828
8	Finland	381.978022	229.646442	1.945055	1.753489
9	France	22206.681319	13071.979649	252.494505	122.023347
10	Germany	13561.076923	7094.986871	201.505495	98.548846
11	Greece	2309.901099	848.995944	60.989011	19.821142
12	Hungary	4083.659341	3320.112746	161.263736	80.336492
13	Ireland	462.164835	100.813057	6.835165	9.080215
14	Italy	14183.934066	7041.661404	311.505495	128.946016
15	Latvia	515.516484	212.667940	8.263736	4.813950
16	Lithuania	846.593407	365.604643	11.230769	4.187486
17	Luxembourg	158.945055	102.413797	1.934066	2.360801
18	Malta	83.362637	106.804548	1.142857	1.410842
19	Netherlands	6131.681319	1753.827097	22.582418	12.061017
20	Norway	593.351648	550.922386	1.769231	4.107113
21	Poland	12801.802198	10077.117328	329.329670	226.820539
22	Portugal	484.571429	180.257602	7.758242	9.337309
23	Romania	3028.461538	2039.807678	109.076923	44.712720
24	Slovakia	1961.263736	1590.997715	56.593407	32.456117
25	Slovenia	698.351648	396.183329	6.395604	6.858699
26	Spain	6073.879121	5228.258973	113.670330	131.547039
27	Sweden	4439.769231	2291.974835	15.967033	5.762813

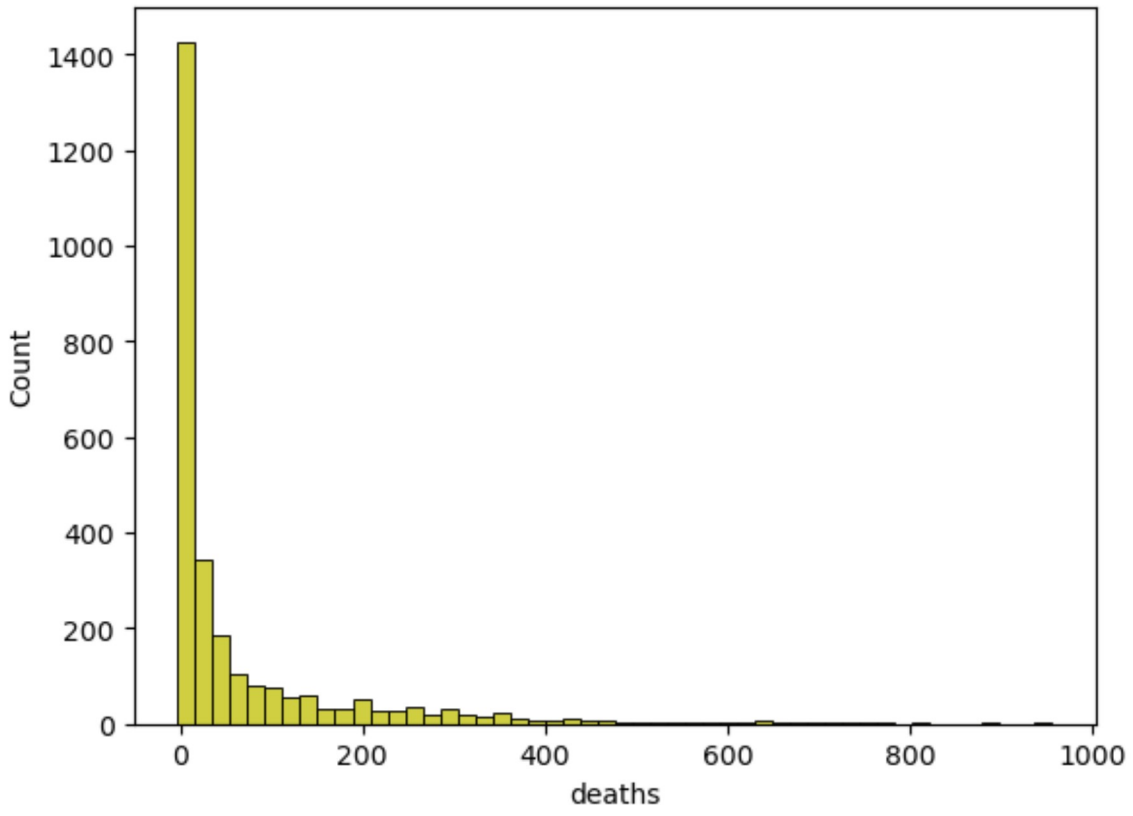
In [11]:
```
sns.histplot(df, x='cases' ,bins=50, color='y')
```

Out[11]:
```
<Axes: xlabel='cases', ylabel='Count'>
```



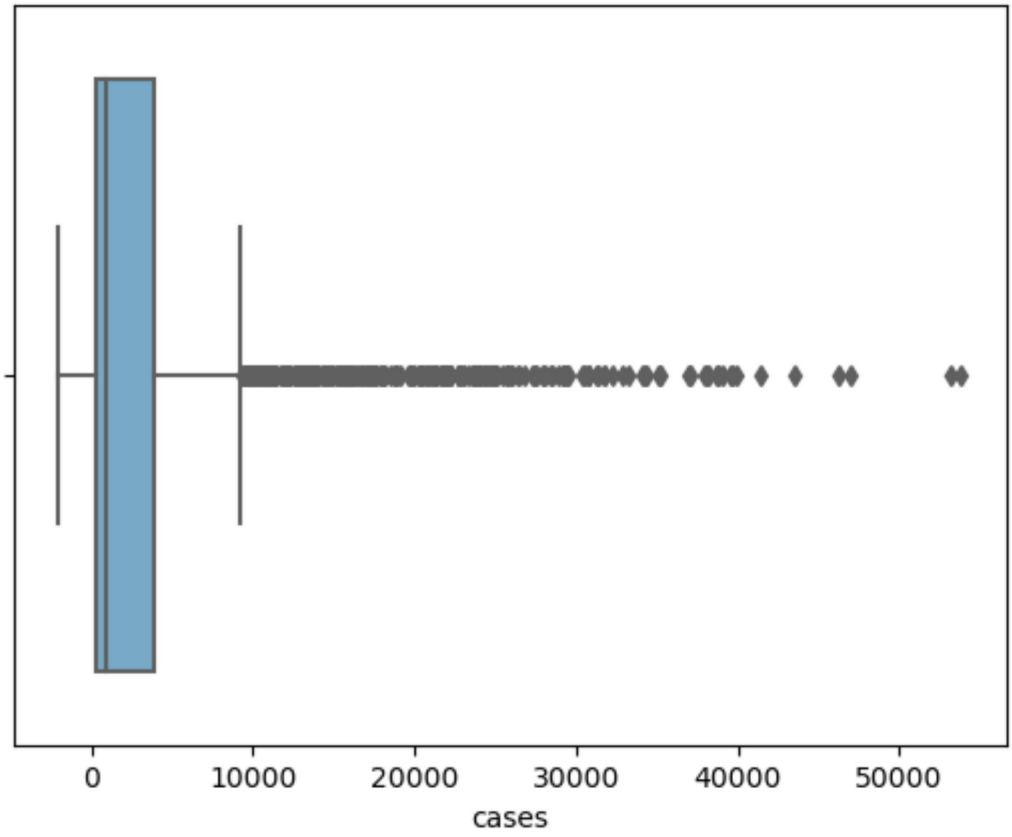
In [28]:
```
sns.histplot(df, x='deaths' ,bins=50, color='y')
```

Out[28]:
```
<Axes: xlabel='deaths', ylabel='Count'>
```



In [12]:
```
sns.boxplot(df, x='cases', palette='Blues')
```

Out[12]:
```
<Axes: xlabel='cases'>
```



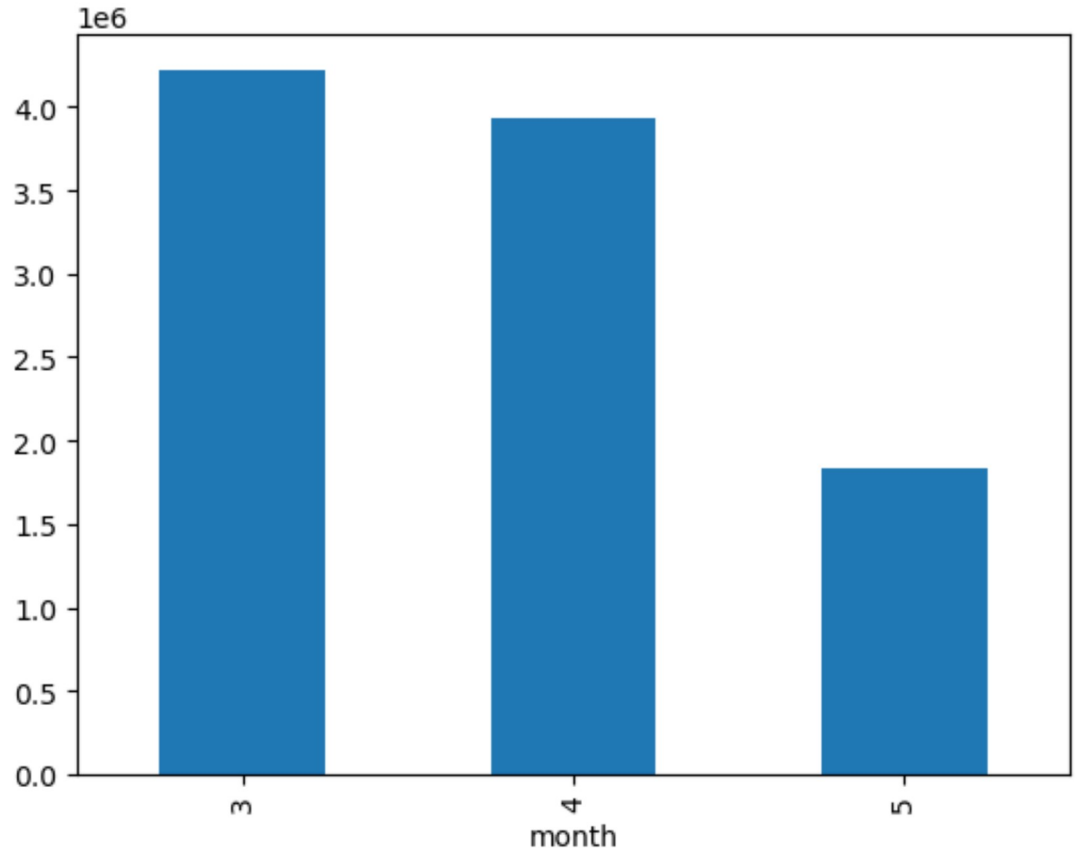
In [30]:
```
month=(df.groupby('month')['cases']).sum()
```

In [31]:
```
month
```

Out[31]:
```
month
3    4223468
4    3938341
5    1832751
Name: cases, dtype: int64
```

In [32]:
```
month.plot.bar()
```

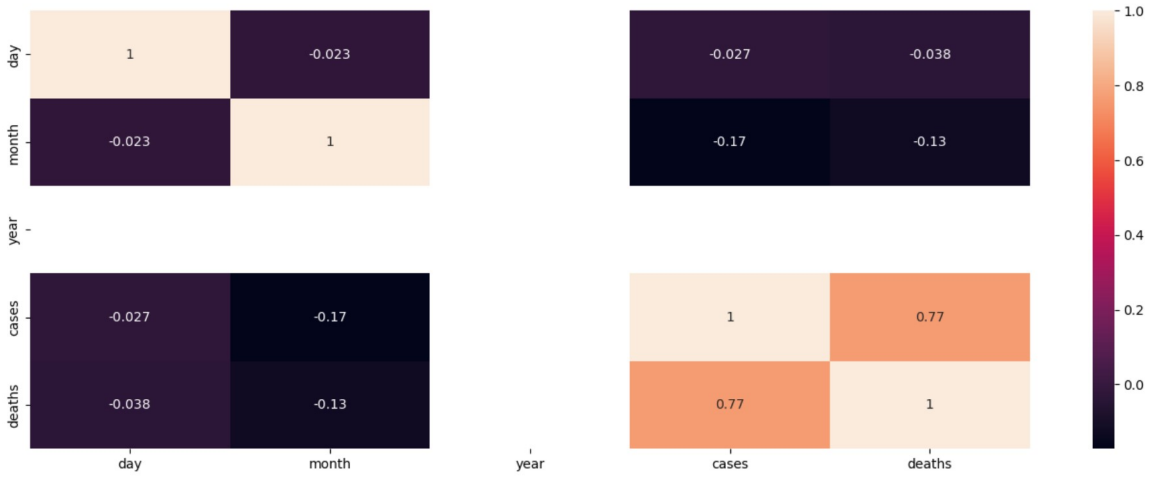
Out[32]:
```
<Axes: xlabel='month'>
```



In [37]:
```
plt.figure(figsize=(17,6))
sns.heatmap(df.corr(),annot=True)
```

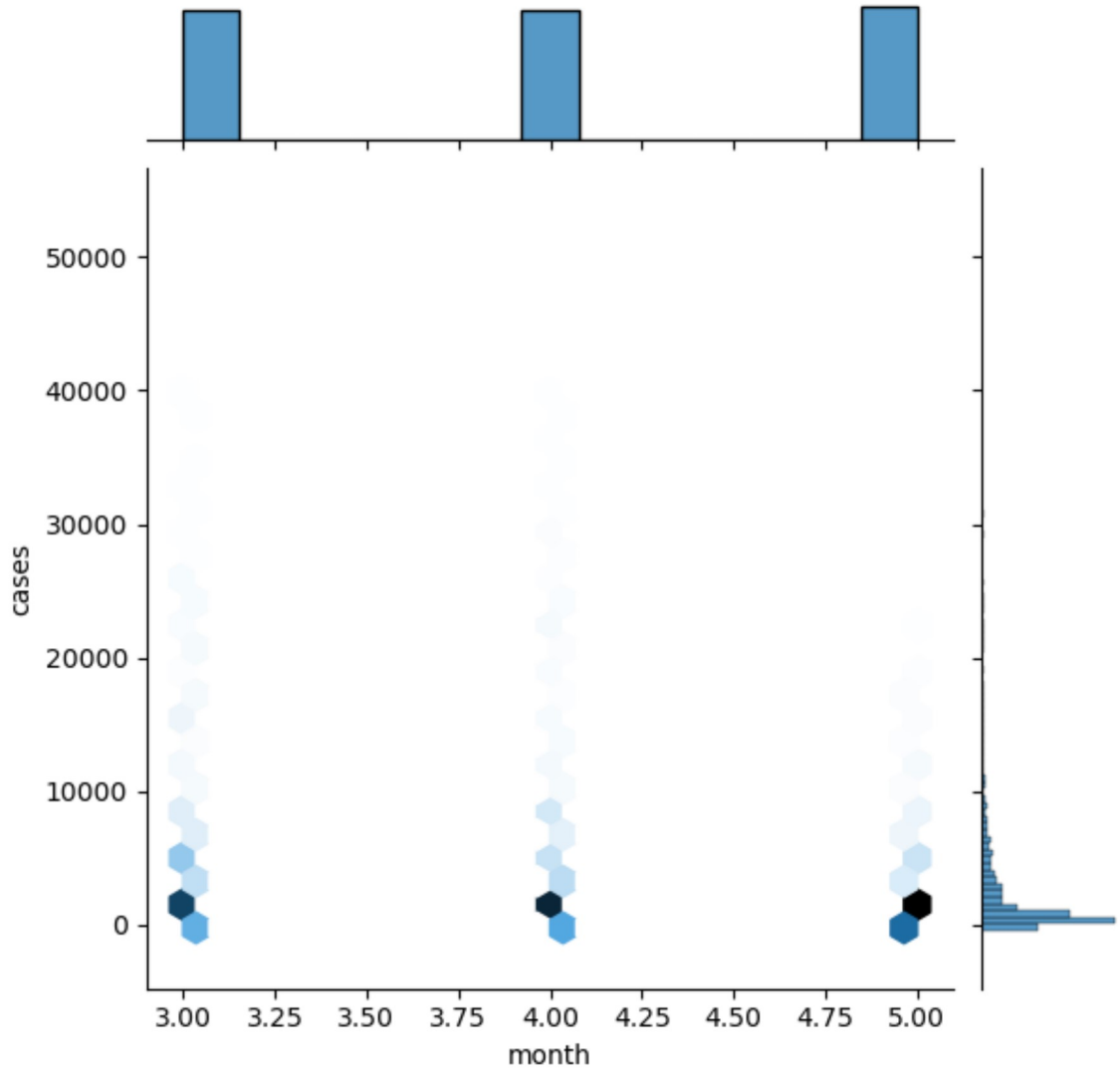
```
C:\Users\RANJITH B\AppData\Local\Temp\ipykernel_4932\3948157846.py:2: FutureWarn
ing: The default value of numeric_only in DataFrame.corr is deprecated. In a fut
ure version, it will default to False. Select only valid columns or specify the
value of numeric_only to silence this warning.
  sns.heatmap(df.corr(),annot=True)
```

Out[37]: <Axes: >



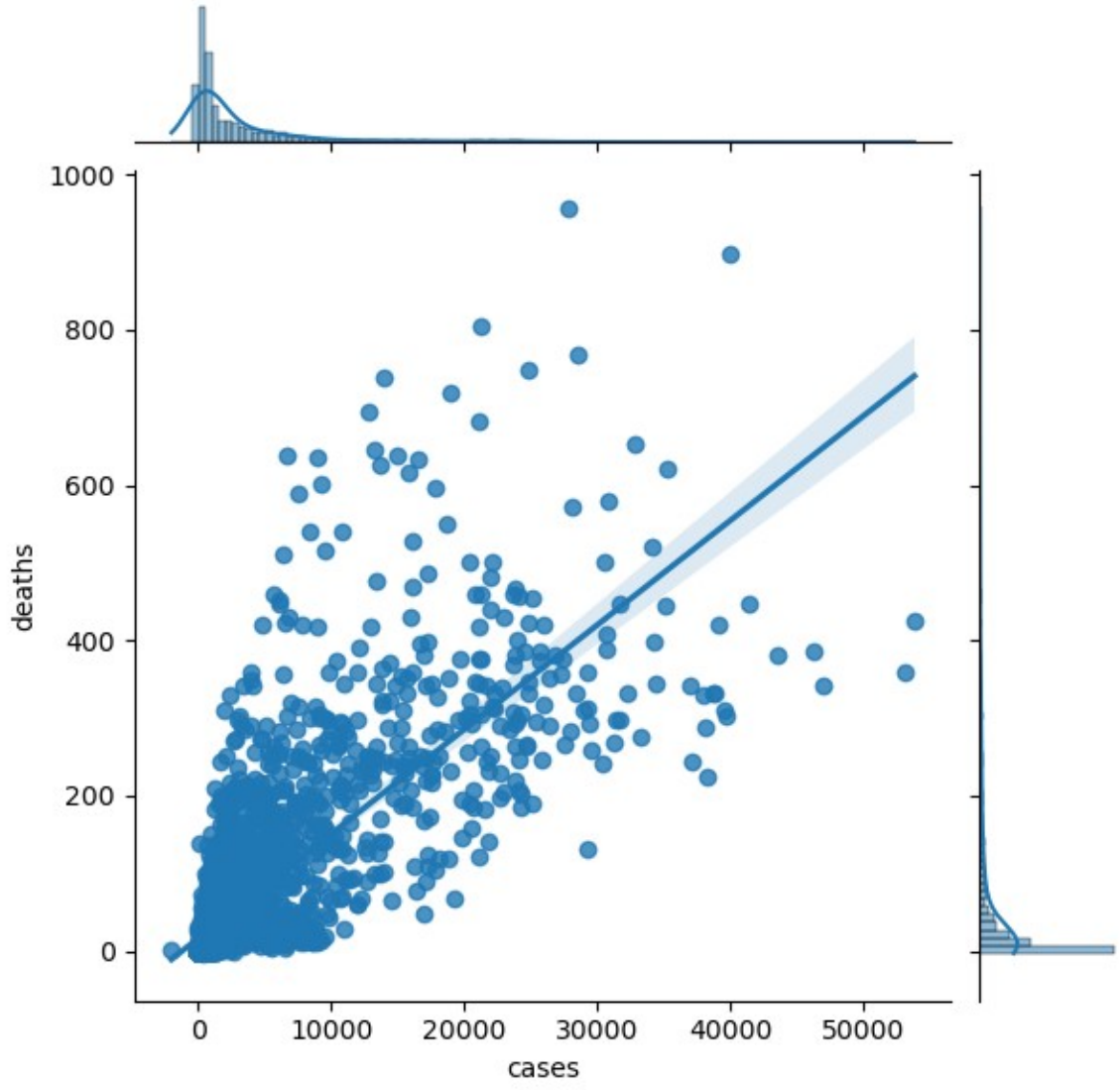
In [38]:
```
sns.jointplot(df, x='month', y='cases', kind='hex')
```

Out[38]: <seaborn.axisgrid.JointGrid at 0x1d5a9625d80>

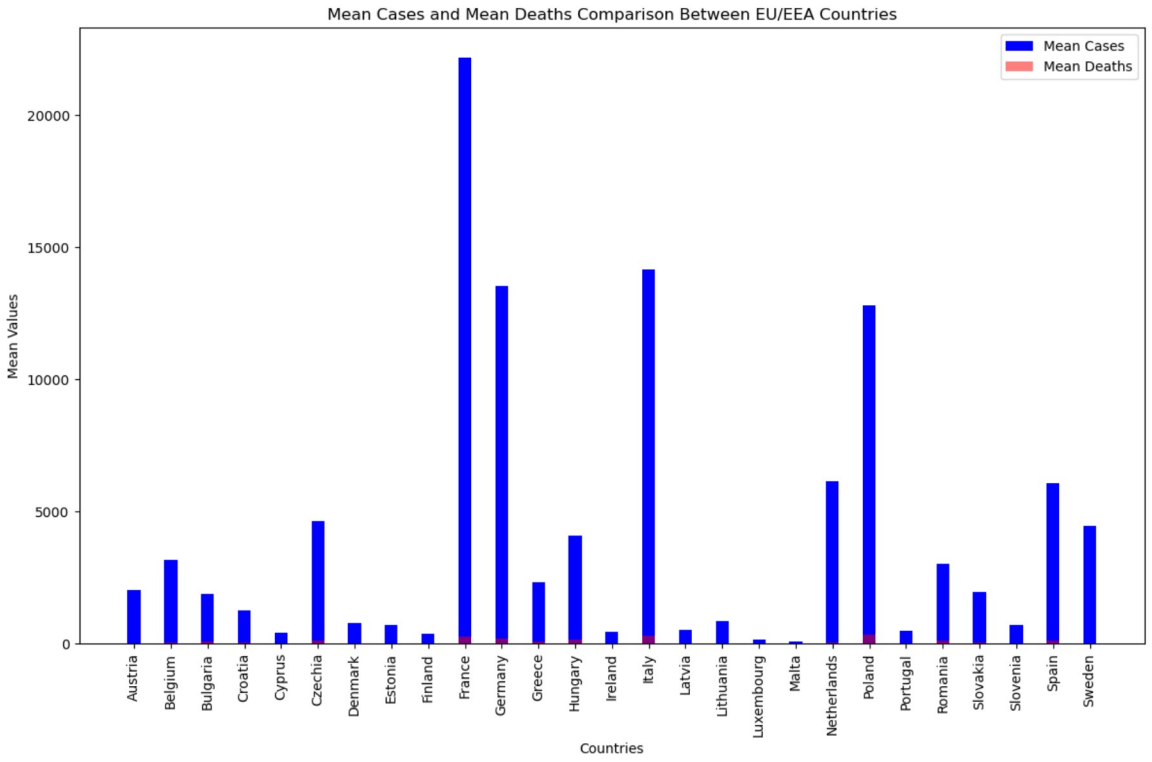


In [14]:
```
sns.jointplot(df, x='cases', y='deaths', kind='reg')
```

Out[14]:
```
<seaborn.axisgrid.JointGrid at 0x1d59e0fa500>
```

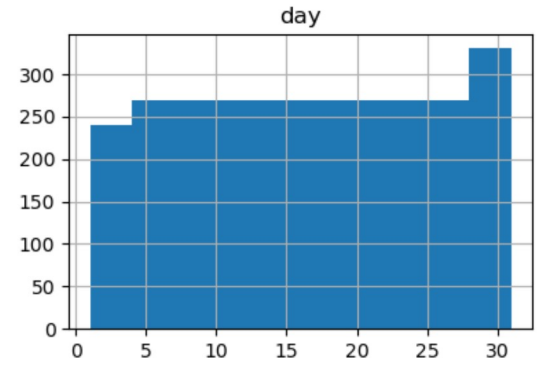

1000
800
600
400
200
0
deaths
0
10000
20000
30000
40000
50000
cases

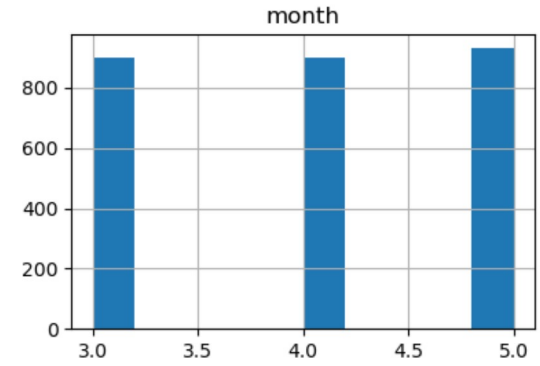
In [15]:
```
eu_countries = ['Austria', 'Belgium', 'Bulgaria', 'Croatia', 'Cyprus', 'Czechia'

eu_data = df[df['countriesAndTerritories'].isin(eu_countries)]

# Calculate the mean values of cases and deaths for each country
summary_stats = eu_data.groupby('countriesAndTerritories').agg({'cases': 'mean',

# Create a bar chart to compare mean values between each pair of countries
fig, ax = plt.subplots(figsize=(12, 8))
countries = summary_stats['countriesAndTerritories']
mean_cases = summary_stats['cases']
mean_deaths = summary_stats['deaths']

bar_width = 0.35
index = range(len(countries))

plt.bar(index, mean_cases, bar_width, label='Mean Cases', color='blue')
plt.bar(index, mean_deaths, bar_width, label='Mean Deaths', color='red', alpha=0

plt.xlabel('Countries')
plt.ylabel('Mean Values')
plt.title('Mean Cases and Mean Deaths Comparison Between EU/EEA Countries')
plt.xticks(index, countries, rotation=90)
plt.legend()

plt.tight_layout()
plt.show()
```

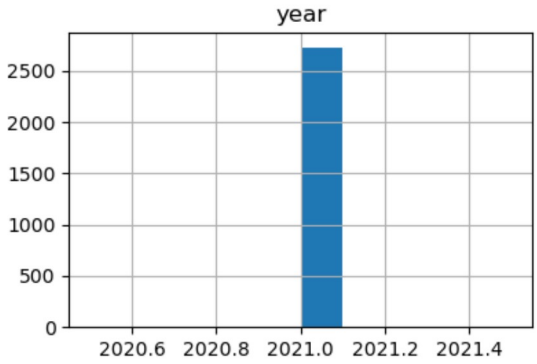


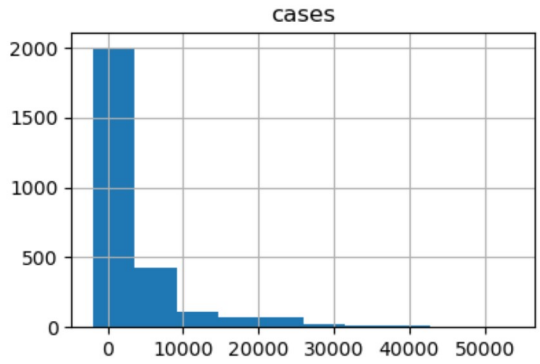
In [35]:
```
df.hist(figsize=(10,10))
```

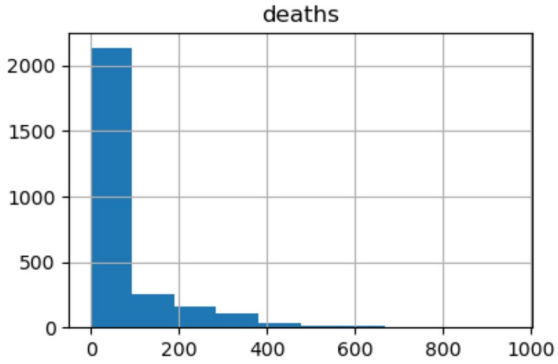
Out[35]:
```
array([[<Axes: title={'center': 'day'}>,
        <Axes: title={'center': 'month'}>],
       [<Axes: title={'center': 'year'}>,
        <Axes: title={'center': 'cases'}>],
       [<Axes: title={'center': 'deaths'}>, <Axes: >]], dtype=object)
```





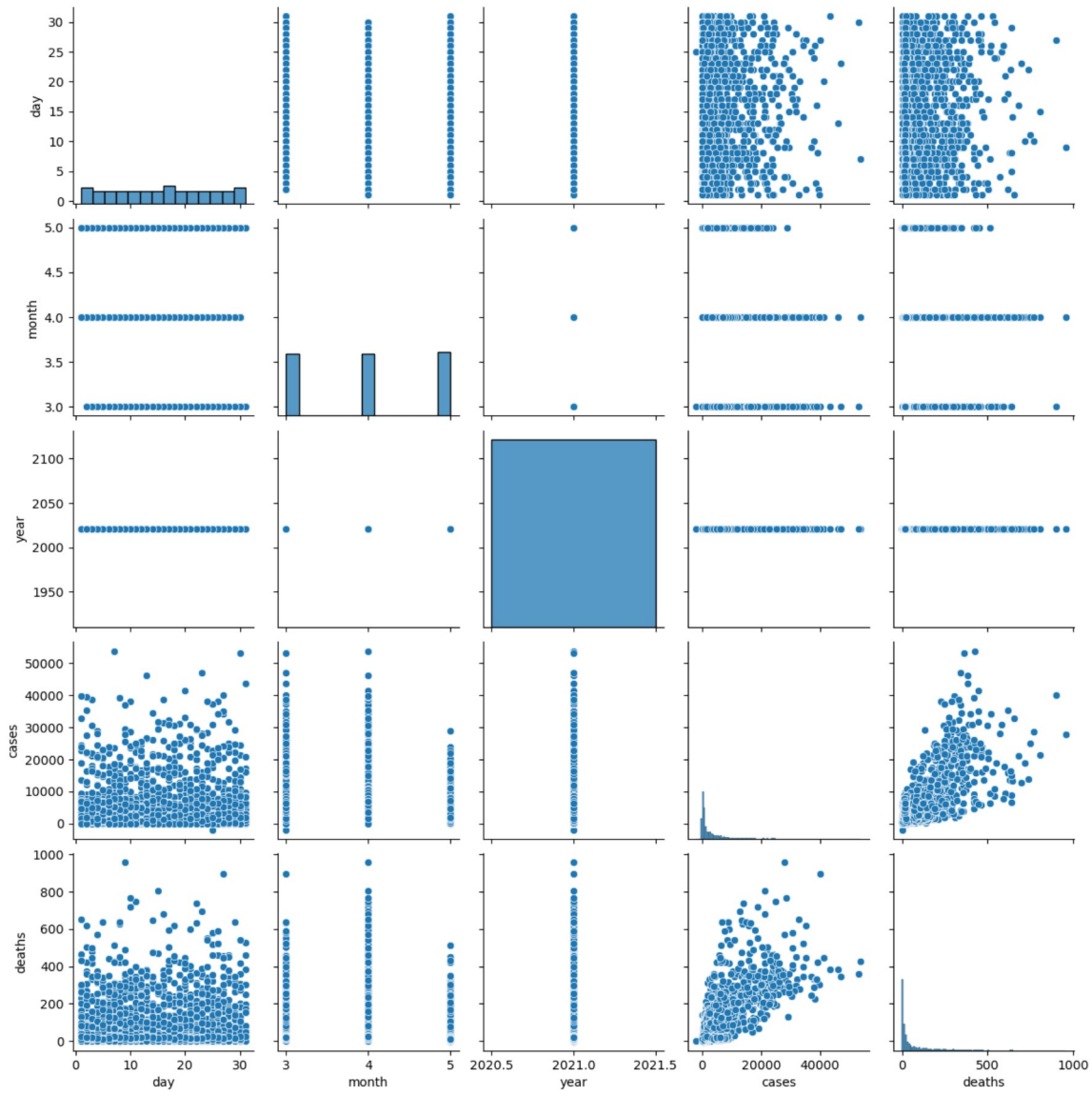






In [16]:
```
plt.figure(figsize=(12,8))
sns.pairplot(df)
```

Out[16]:
```
<seaborn.axisgrid.PairGrid at 0x1d5a2f03850>

<Figure size 1200x800 with 0 Axes>
```


day
month
year
cases
deaths
0
10
20
30
3
4
5
2020.5
2021.0
2021.5
0
20000
40000
0
500
1000

In [ ]: