In [81]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

# Import seaborn
import seaborn as sns

# we are using the inline backend
%matplotlib inline
```

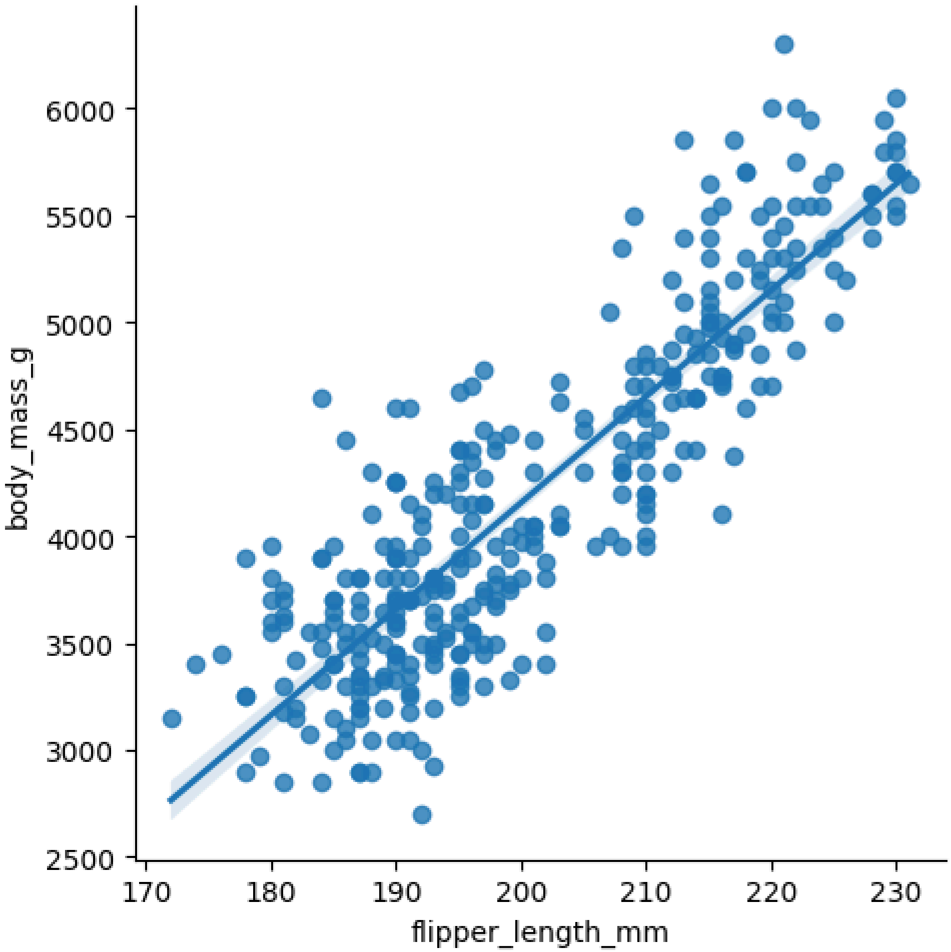
## EXERCISE 1

Using different Seaborn plots, check the correlation between different penguin characteristics.

- Use the dataset penguins from Seaborn.
- Check the correlation between flipper length and body mass. Use linear regression plots to make predictions.
- Check the correlation between body mass and bill length. Differentiate data based on sex attribute and create one plot per species.
- Create a heatmap for the penguins data.
- Check this article and verify the ideas presented using seaborn: https://www.linkedin.com/pulse/penguin-paradox-garima-anand/

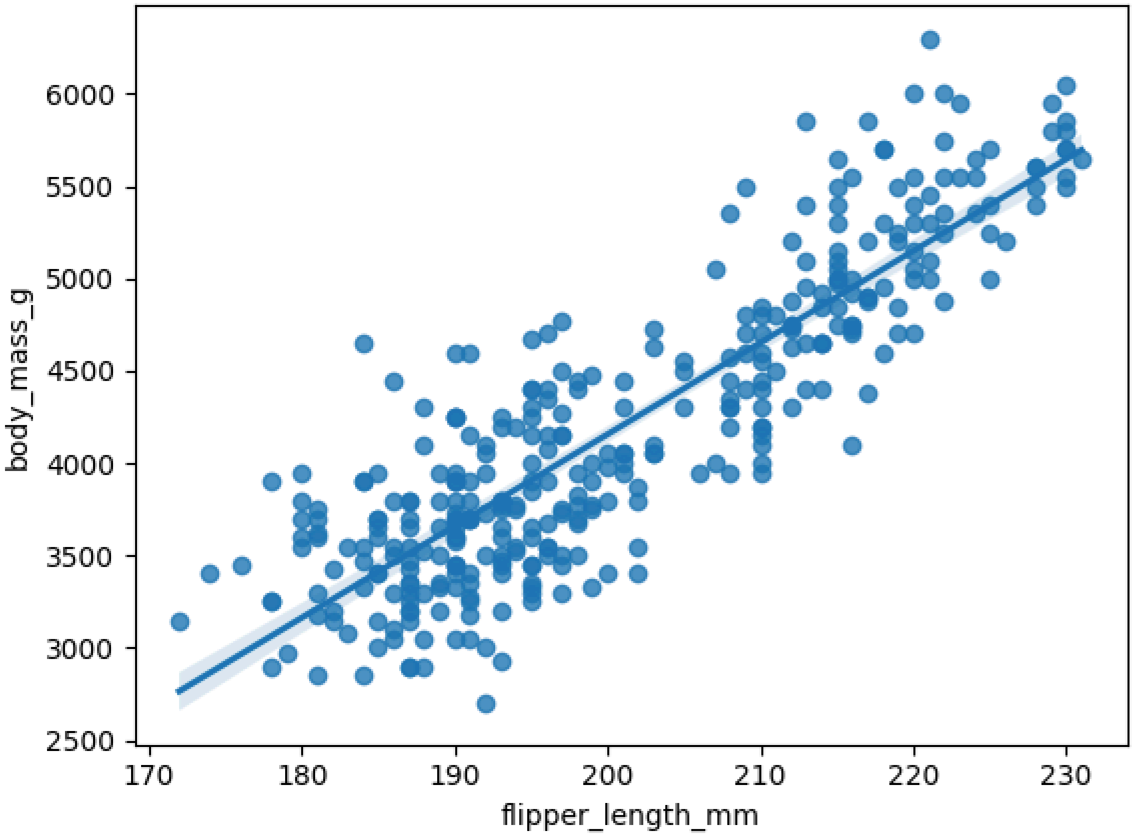
In [82]:

```
penguins = sns.load_dataset('penguins')

# Correlation between flipper length and body mass using lmplot
sns.lmplot(data = penguins,x = 'flipper_length_mm',y = 'body_mass_g')
plt.show()
```



In [83]:

```
# Correlation between flipper length and body mass using lmplot
sns.regplot(data=penguins,x='flipper_length_mm',y='body_mass_g')
plt.show()
```

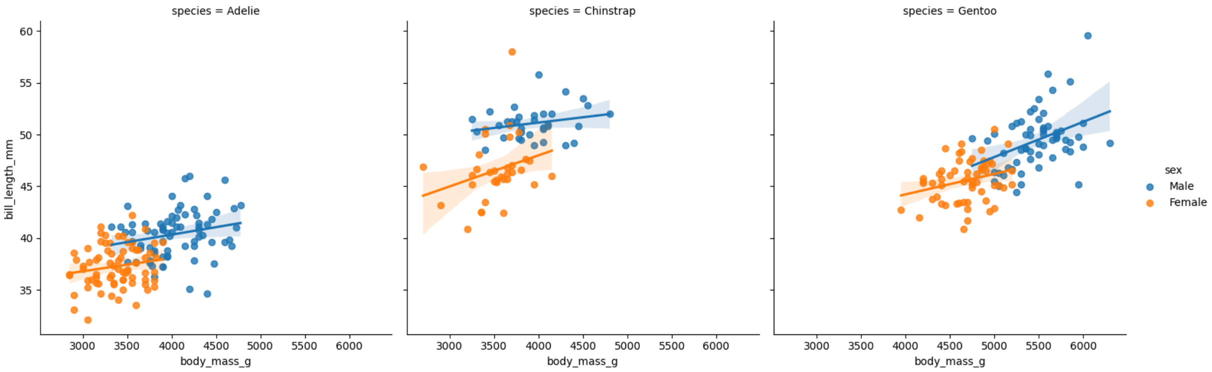


In [84]:

```
# Correlation between body mass and bill length, diferrentiated by sex
sns.lmplot(data=penguins, x='body_mass_g',y='bill_length_mm', col='species', hue='s
plt.show
```

Out[84]:

```
<function matplotlib.pyplot.show(close=None, block=None)>
```

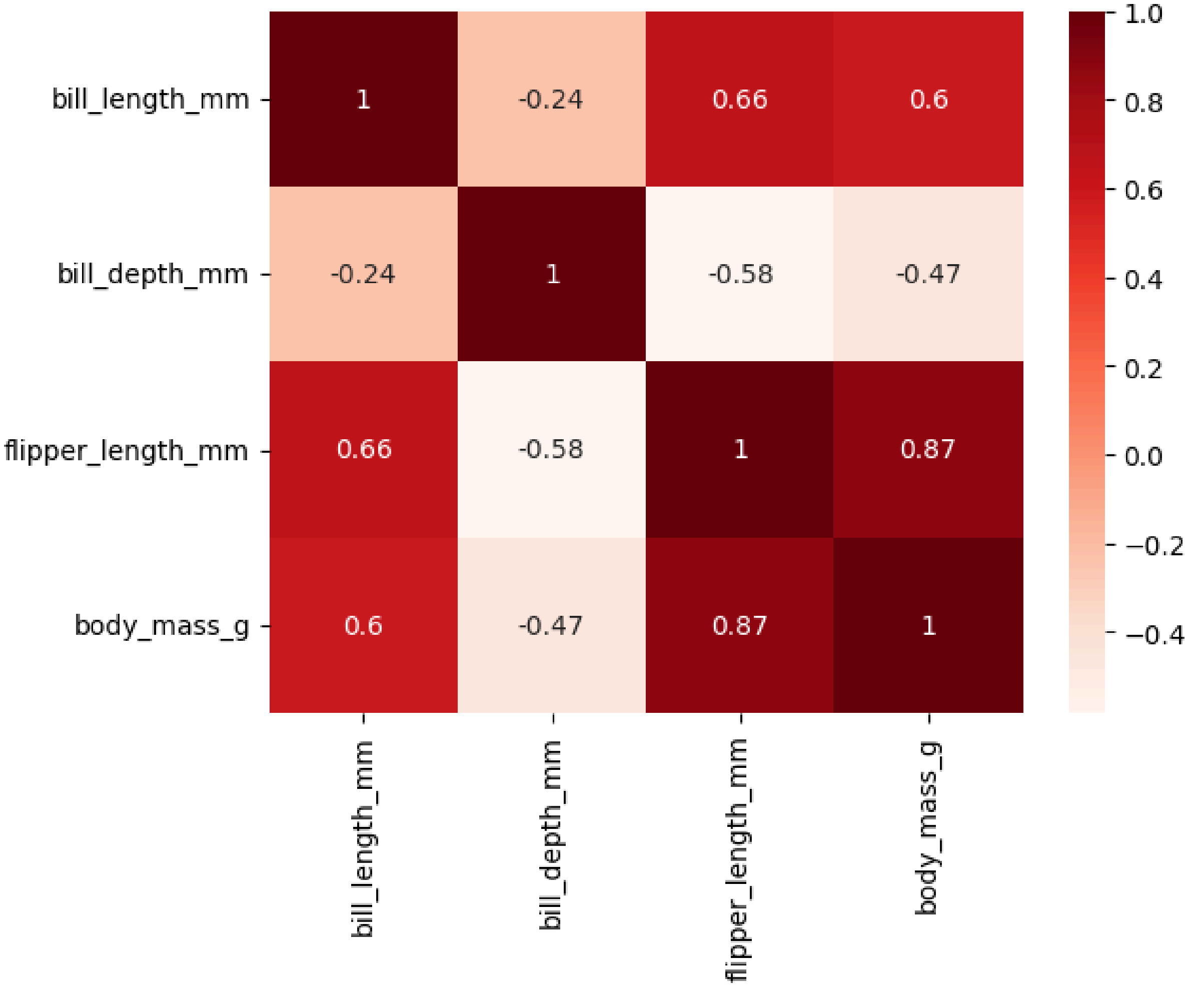


In [85]:

```
# Heatmap for the penguins data

penguins_mx = penguins.corr(numeric_only=True)
sns.heatmap(penguins_mx, annot=True, cmap='Reds')
```

Out[85]:

```
<Axes: >
```



## EXERCISE 2

Create different seaborn plots for the dataset 'attention'.

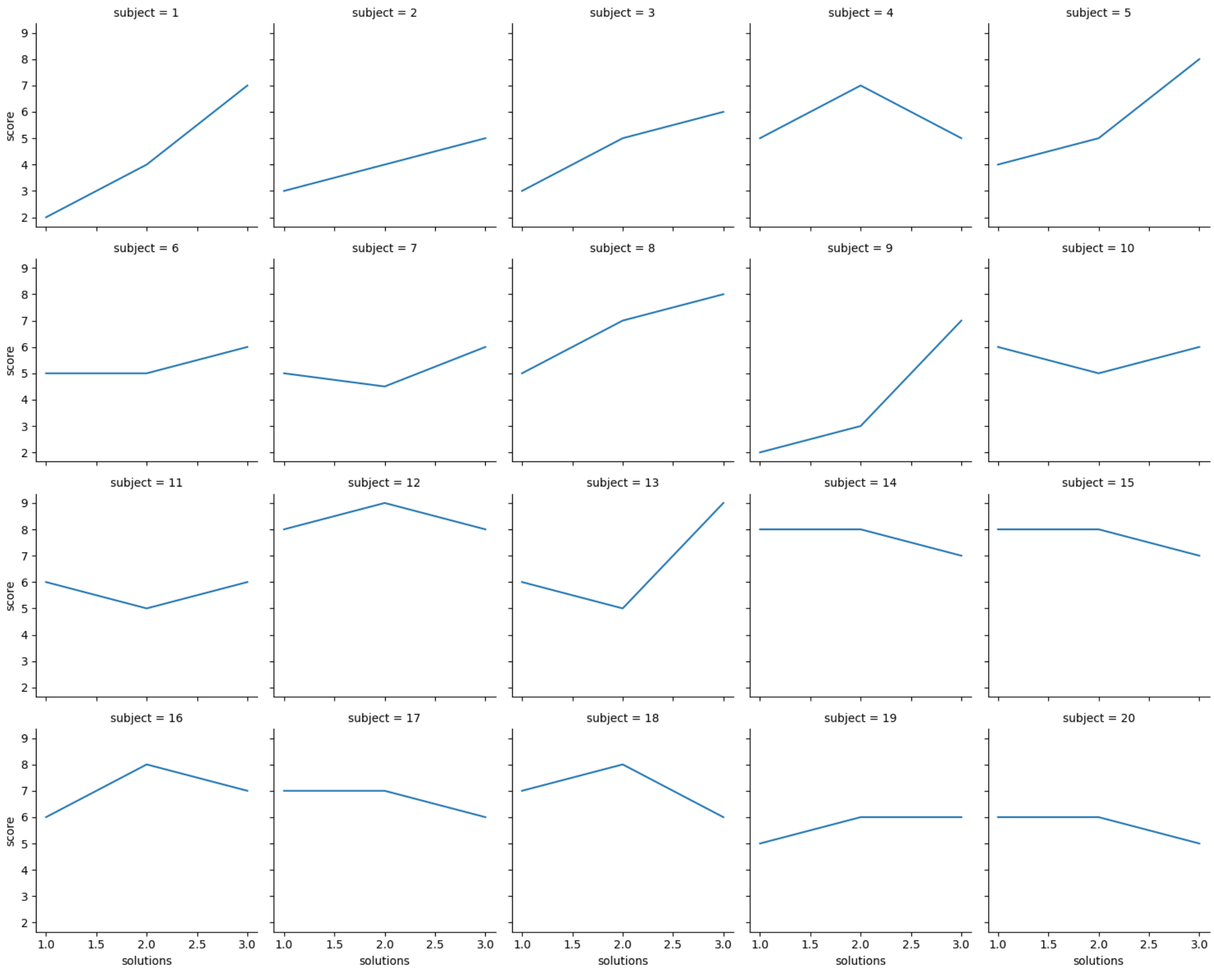
- Create a facet grid with each the solution scores of each subject. Put each person in their own plot with 5 per line and plot their scores.
- Create a regression plot with data separated by attention attribute (divided vs. focused). You should have two plots here. Check the difference between setting *col="attention"* and *hue="attention"*.

In [86]:

```
attention = sns.load_dataset('attention')

# facet grid
attention_g = sns.FacetGrid(attention, col="subject", col_wrap=5, height=3)
attention_g.map(sns.lineplot, "solutions", "score")
```

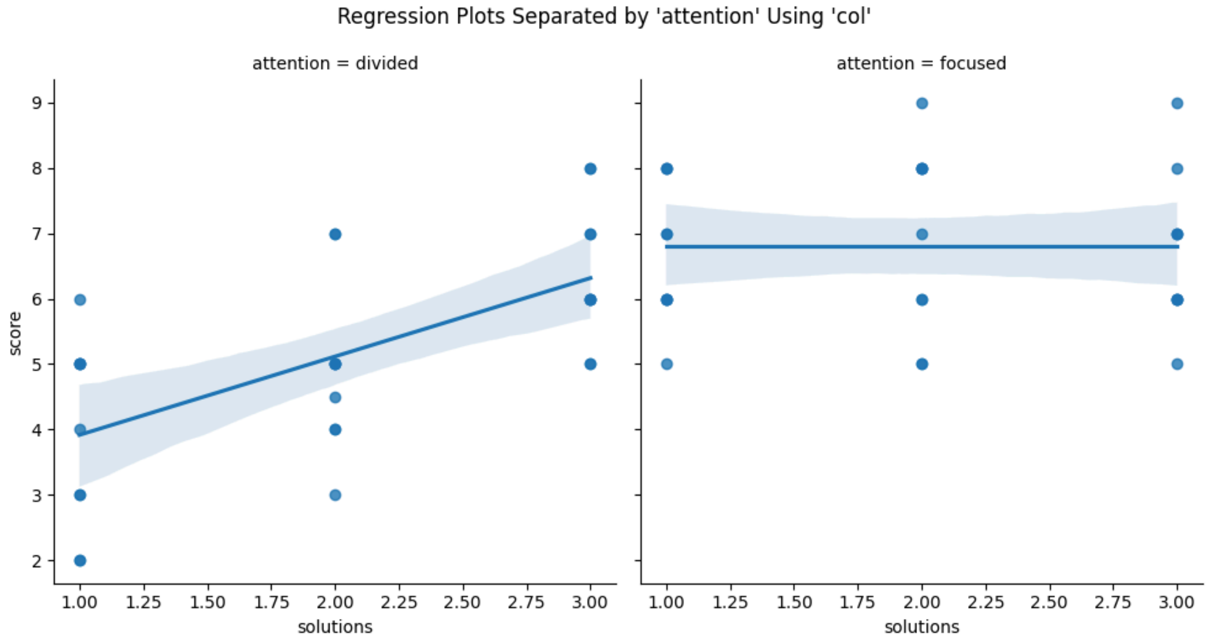
Out[86]:

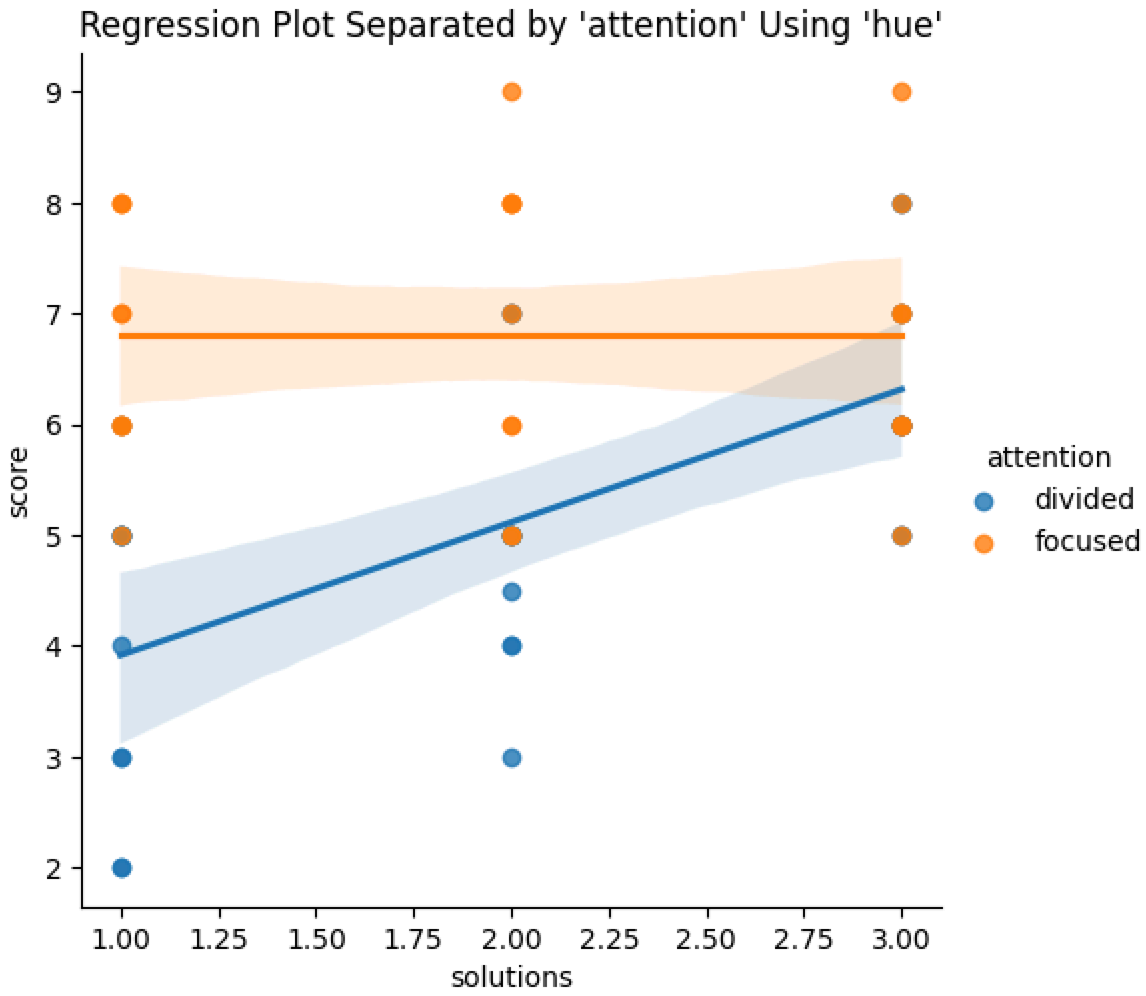
```
<seaborn.axisgrid.FacetGrid at 0x1f8b79bf050>
```



In [87]:

```
# Regression plot with data separated by attention using col and hue

sns.lmplot(data=attention, x="solutions", y="score", col="attention", height=5)
plt.suptitle("Regression Plots Separated by 'attention' Using 'col'", y=1.05)
plt.show()

sns.lmplot(data=attention, x="solutions", y="score", hue="attention", height=5)
plt.title("Regression Plot Separated by 'attention' Using 'hue'")
plt.show()
```





## EXERCISE 3

Create different seaborn plots for the Canada immigration dataset.

- Create a regression plot for the Romanian immigrants from 1980 to 2013.
- Create a scatter plot with a regression line to visualize the total immigration from Denmark, Sweden, and Norway to Canada from 1980 to 2013.
- Create any other seaborn plots you consider most interesting.

In [88]:

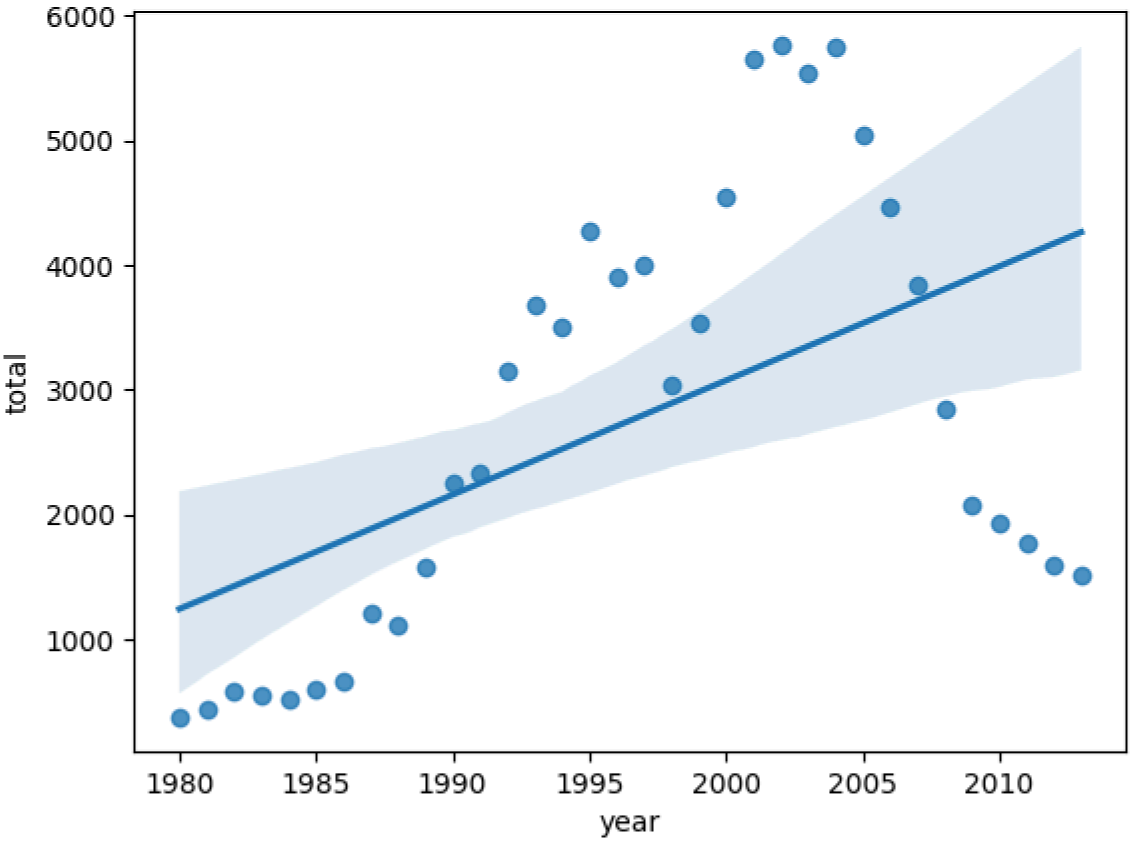
```
df_canada = pd.read_excel('../datasets/Canada.xlsx',
                          sheet_name='Canada by Citizenship',
                          skiprows=range(20),
                          skipfooter=2)

# 1. Remove columns that are not necessary
df_canada.drop(['AREA', 'REG', 'DEV', 'Type', 'Coverage'], axis=1, inplace=True)

# 2. Rename some columns
df_canada.rename(columns={'OdName':'Country', 'AreaName':'Continent','RegName':'Reg

# 3. Column labels should be strings
df_canada.columns = list(map(str, df_canada.columns))

# 4. Set the index to the country column
df_canada.set_index('Country', inplace=True)

# 5. Add an extra column: Total
df_canada['Total'] = df_canada.sum(axis=1, numeric_only = True)

# Create a list of years from 1980 - 2013 as strings
years = list(map(str, range(1980, 2014)))
```

In [89]:

```
# Regression plot for the Romanian immigrants from 1980 to 2013.as_integer_ratiodf_

df_romania = df_canada.loc[['Romania'], years].T
df_romania.index = map(float, df_romania.index)
df_romania.reset_index(inplace=True)
df_romania.columns = ['year', 'total']
sns.regplot(x='year', y='total', data=df_romania)
```

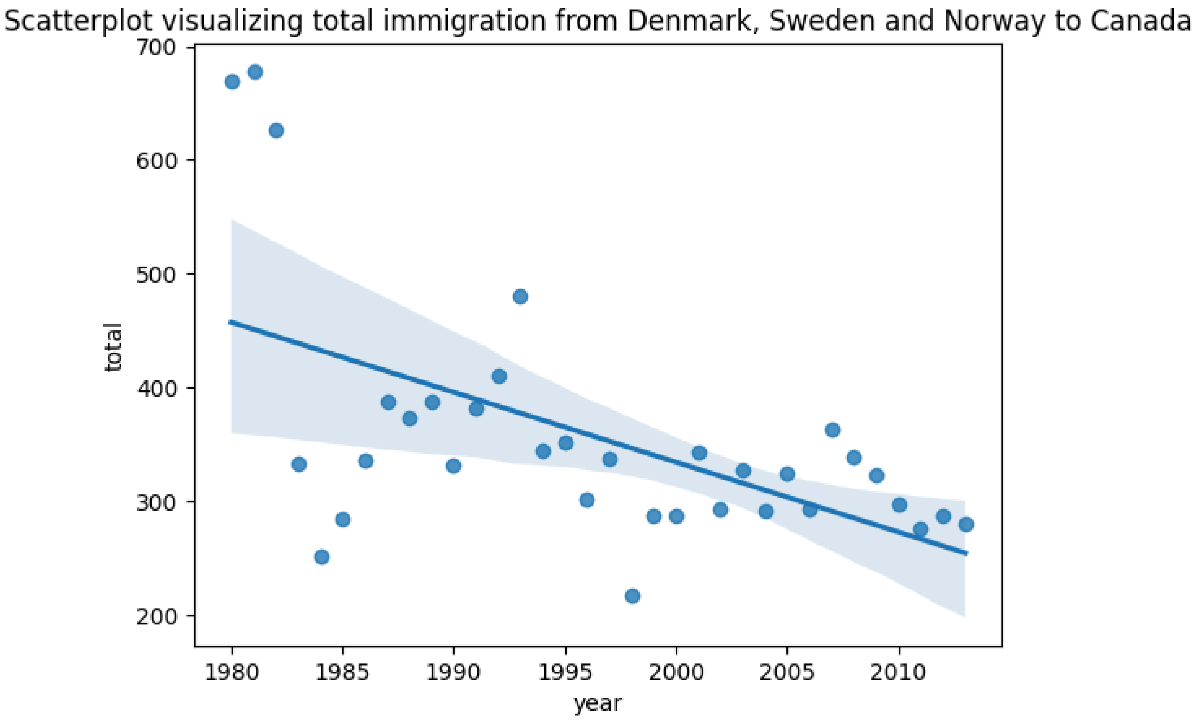
Out[89]:

```
<Axes: xlabel='year', ylabel='total'>
```



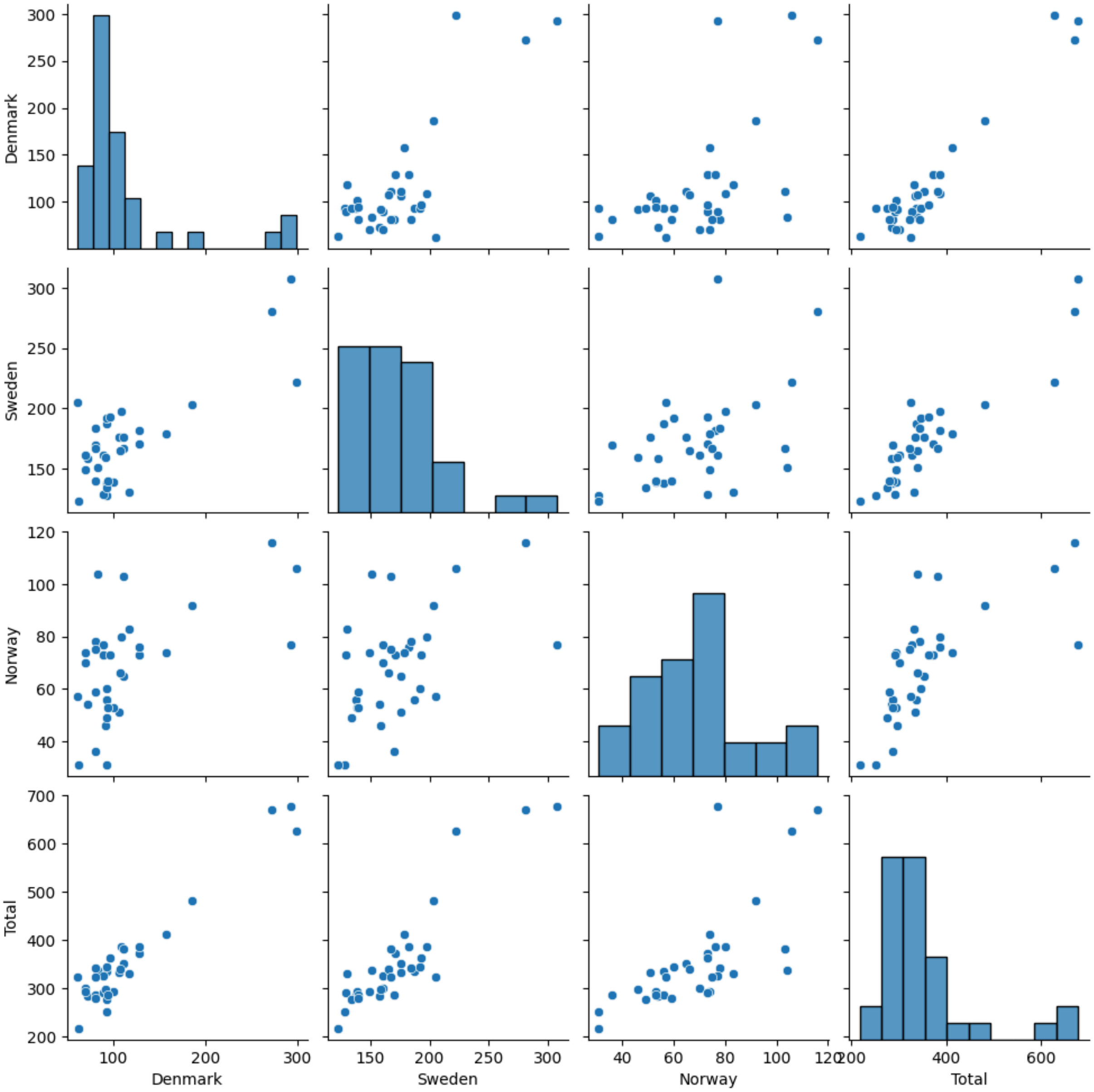
In [91]:

```
# Scatter plot with a regression line to visualize the
# total immigration from Denmark, Sweden, and Norway to Canada from 1980 to 2013.

countries = ['Denmark', 'Sweden', 'Norway']
df_dsn = df_canada.loc[countries, years].T

df_dsn['Total'] = df_dsn.sum(axis=1)

df_dsn.drop(columns=countries, inplace=True)

df_dsn.index = map(float, df_dsn.index)
df_dsn.reset_index(inplace=True)
df_dsn.columns = ['year', 'total']

sns.regplot(data=df_dsn, x='year', y='total')
plt.title('Scatterplot visualizing total immigration from Denmark, Sweden and Norwa
plt.show()
```



```
In [95]: countries = ['Denmark', 'Sweden', 'Norway']
         df_dsn2 = df_canada.loc[countries, years].T

         df_dsn2['Total'] = df_dsn2.sum(axis=1)

         sns.pairplot(df_dsn2)
```

```
Out[95]: <seaborn.axisgrid.PairGrid at 0x1f8bd909370>
```


Denmark
Sweden
Norway
Total
300
250
200
150
100
300
250
200
150
120
100
80
60
40
700
600
500
400
300
200
100
200
300
150
200
250
300
40
60
80
100
120
200
400
600
Denmark
Sweden
Norway
Total