Milestone 1: Project proposal

1.Preparation

- Dataset selected: SportsStats as it's much closer and more understandable than politic data (xD)
- Import and clean data: i will use pandas in this project to work with SQL file

In [1]:

```
import pandas as pd

athlete_data = pd.read_csv('athlete_events.csv')
noc_data = pd.read_csv('noc_regions.csv')
```

- Initial data exploration:

In [2]:

```
athlete_data.info()
athlete_data.head(3)
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 271116 entries, 0 to 271115
Data columns (total 15 columns):
 #   Column  Non-Null Count   Dtype  
---  ------  --------------   -----  
 0   ID      271116 non-null  int64  
 1   Name    271116 non-null  object 
 2   Sex     271116 non-null  object 
 3   Age     261642 non-null  float64
 4   Height  210945 non-null  float64
 5   Weight  208241 non-null  float64
 6   Team    271116 non-null  object 
 7   NOC     271116 non-null  object 
 8   Games   271116 non-null  object 
 9   Year    271116 non-null  int64  
 10  Season  271116 non-null  object 
 11  City    271116 non-null  object 
 12  Sport   271116 non-null  object 
 13  Event   271116 non-null  object 
 14  Medal   39783 non-null   object 
dtypes: float64(3), int64(2), object(10)
memory usage: 31.0+ MB
```

Out[2]:

	ID	Name	Sex	Age	Height	Weight	Team	NOC	Games	Year	Season	City
0	1	A Dijiang	M	24.0	180.0	80.0	China	CHN	1992 Summer	1992	Summer	Barcelona
1	2	A Lamusi	M	23.0	170.0	60.0	China	CHN	2012 Summer	2012	Summer	London
2	3	Gunnar Nielsen Aaby	M	24.0	NaN	NaN	Denmark	DEN	1920 Summer	1920	Summer	Antwerpen

- Seems like there are some missing data with Age, Height and Weight. Ignorable, as the number of missing data is not significant

In [3]:

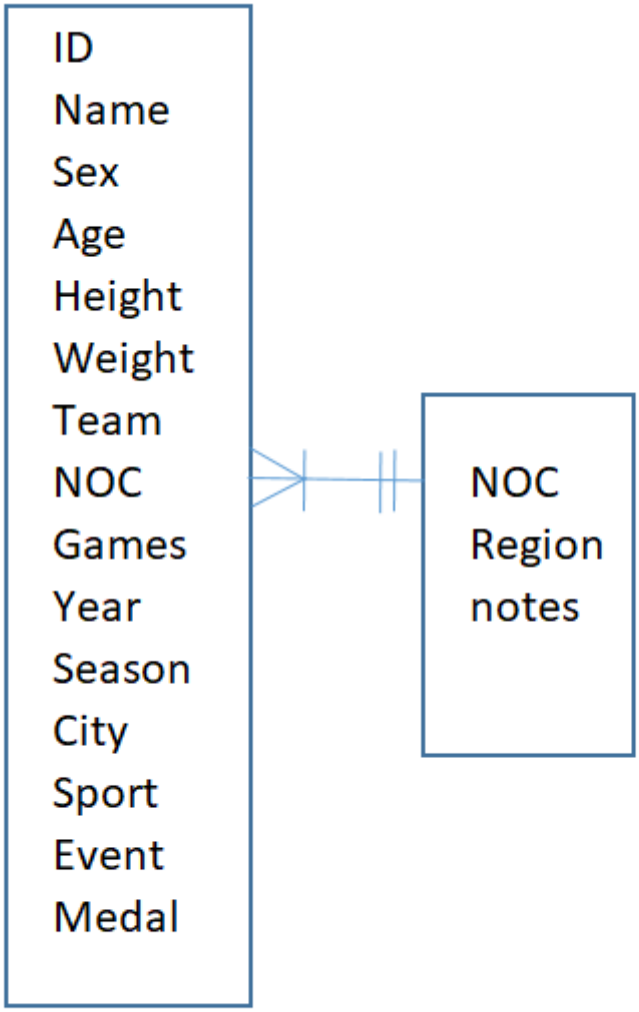
```
noc_data.info()
noc_data.head(3)
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 230 entries, 0 to 229
Data columns (total 3 columns):
 #   Column  Non-Null Count  Dtype 
---  ------  --------------  ----- 
 0   NOC     230 non-null    object
 1   region  227 non-null    object
 2   notes   21 non-null     object
dtypes: object(3)
memory usage: 5.5+ KB
```

Out[3]:

	NOC	region	notes
0	AFG	Afghanistan	NaN
1	AHO	Curacao	Netherlands Antilles
2	ALB	Albania	NaN

- ERD of dataset:


ID
Name
Sex
Age
Height
Weight
Team
NOC
Games
Year
Season
City
Sport
Event
Medal
NOC
Region
notes

2. Proposal

- This is project Alma. Objective of this project is to find the insight from 120 years of Olympics data, which could be patterns/trends highlighting certain groups/events/countries, etc. for the purpose of developing a news story or discovering key health insights. Main target audience of this project would be elite personal trainers and news company. Our main tool would be Jupyter notebook.

Hypothesis:

- Hypothesis 1: There is a relationship between athlete's age and the medal they gained. Maybe younger athlete had higher chance of getting prize than those who were older
- Hypothesis 2: Some countries have greater advantage than other in specific season, and that's not the same between summer and winter. Maybe countries in colder area around the year would be more comfortable to compete in winter?

Approach:

- Filter the dataset for data needed -> visualize for judgement

Milestone 2: Descriptive Stats

In [4]:

```
#This command will allow us to use SQL command on pandas dataframe
from pandasql import sqldf
pysqldf = lambda q: sqldf(q,globals())
```

1. Checking hypothesis

Hypothesis 1: There is a relationship between athlete's age and the medal they gained. Maybe younger athlete had higher chance of getting prize than those who were older

In [5]:

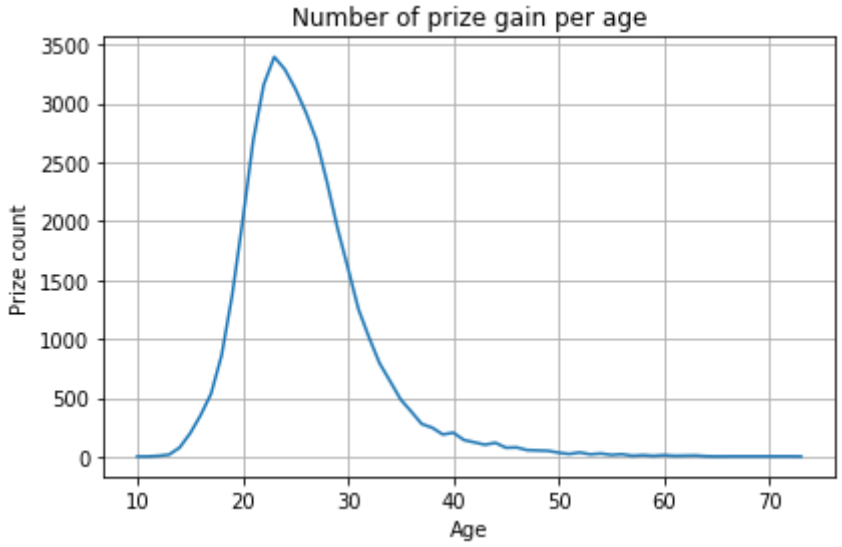
```
#Count the number of medal per age
athlete_data_medal_age = pysqldf('SELECT Age, COUNT(Medal)FROM athlete_data WHERE (Meda
l IS NOT NULL AND Age IS NOT NULL) GROUP BY Age ORDER BY Age')

#Visualize the number of medal per age
from matplotlib import pyplot as plt


hypo1_age = athlete_data_medal_age['Age']
hypo1_medal = athlete_data_medal_age['COUNT(Medal)']

plt.plot(hypo1_age,hypo1_medal)

plt.title('Number of prize gain per age')
plt.xlabel('Age')
plt.ylabel('Prize count')
plt.tight_layout()
plt.grid()
plt.savefig('abc.png')
```



Conclusion 1: Yes, there is a relationship between age and probability of gain the prize, as prime age is around 23-24

Hypothesis 2: Some countries have greater advantage than other in specific season, and that's not the same between summer and winter. Maybe countries in colder area around the year would be more comfortable to compete in winter?

In [6]:

```
# Summer medal count
pysqldf('SELECT Team, COUNT(Medal) AS Summer_medal FROM athlete_data WHERE Season = "Su
mmer" GROUP BY Team ORDER BY COUNT(Medal) DESC LIMIT 5')
```

Out[6]:

	Team	Summer_medal
0	United States	4686
1	Soviet Union	2061
2	Germany	1687
3	Great Britain	1598
4	France	1408

In [7]:

```
#Winter medal count
pysqldf('SELECT Team, COUNT(Medal) AS Winter_medal FROM athlete_data WHERE Season = "Wi
nter" GROUP BY Team ORDER BY COUNT(Medal) DESC LIMIT 5')
```

Out[7]:

	Team	Winter_medal
0	Canada	575
1	United States	533
2	Norway	443
3	Sweden	428
4	Finland	426

Conclusion 2: Seems like it's true, with top 5 countries in Summer different from those in Winter, except for USA

2. Descriptive stats

In [8]:

```
print(athlete_data.describe(include='all'))
```

```
                  ID                 Name     Sex            Age  \
count   271116.000000               271116  271116  261642.000000
unique            NaN               134732       2            NaN
top               NaN  Robert Tait McKenzie       M            NaN
freq              NaN                   58  196594            NaN
mean      68248.954396                  NaN     NaN      25.556898
std       39022.286345                  NaN     NaN       6.393561
min           1.000000                  NaN     NaN      10.000000
25%       34643.000000                  NaN     NaN      21.000000
50%       68205.000000                  NaN     NaN      24.000000
75%      102097.250000                  NaN     NaN      28.000000
max      135571.000000                  NaN     NaN      97.000000

               Height         Weight           Team     NOC        Games
\
count   210945.000000  208241.000000         271116  271116       271116
unique            NaN            NaN           1184     230           51
top               NaN            NaN  United States     USA  2000 Summer
freq              NaN            NaN          17847   18853        13821
mean       175.338970      70.702393            NaN     NaN          NaN
std         10.518462      14.348020            NaN     NaN          NaN
min        127.000000      25.000000            NaN     NaN          NaN
25%        168.000000      60.000000            NaN     NaN          NaN
50%        175.000000      70.000000            NaN     NaN          NaN
75%        183.000000      79.000000            NaN     NaN          NaN
max        226.000000     214.000000            NaN     NaN          NaN

                Year  Season    City      Sport                    Event
\
count   271116.000000  271116  271116     271116                   271116
unique            NaN       2      42         66                      765
top               NaN  Summer  London  Athletics  Football Men's Football
freq              NaN  222552   22426      38624                     5733
mean      1978.378480     NaN     NaN        NaN                      NaN
std         29.877632     NaN     NaN        NaN                      NaN
min       1896.000000     NaN     NaN        NaN                      NaN
25%       1960.000000     NaN     NaN        NaN                      NaN
50%       1988.000000     NaN     NaN        NaN                      NaN
75%       2002.000000     NaN     NaN        NaN                      NaN
max       2016.000000     NaN     NaN        NaN                      NaN

        Medal
count   39783
unique      3
top      Gold
freq    13372
mean      NaN
std       NaN
min       NaN
25%       NaN
50%       NaN
75%       NaN
max       NaN
```

3. Further question

- Does BMI index affect the chance of gaining higher prize?

Milestone 3: Beyond Descriptive Stats

- In order to answer the above question related to BMI index, we need to create 2 new metric: BMI and medal in number (gold/silver/bronze as 3/2/1)

In [9]:

```
#Create a new metric - BMI and turn medal from gold/silver/bronze to 3/2/1
athlete_data_BMI_medal = pysqldf('SELECT Weight/Height/Height*10000 AS  BMI_index, CASE
WHEN Medal = "Gold" THEN 3 WHEN Medal = "Silver" THEN 2 WHEN Medal = "Bronze" THEN 1 EN
D prize_num FROM athlete_data WHERE (Medal IS NOT NULL AND Weight IS NOT NULL AND Heigh
t IS NOT NULL) ORDER BY Weight/Height/Height ASC')
athlete_data_BMI_medal_round = pysqldf('SELECT ROUND(BMI_index,0) AS BMI, COUNT(prize_n
um) AS prize_count, AVG(prize_num) as prize_avg FROM athlete_data_BMI_medal GROUP BY RO
UND(BMI_index,0) ORDER BY ROUND(BMI_index,0) ASC')
```

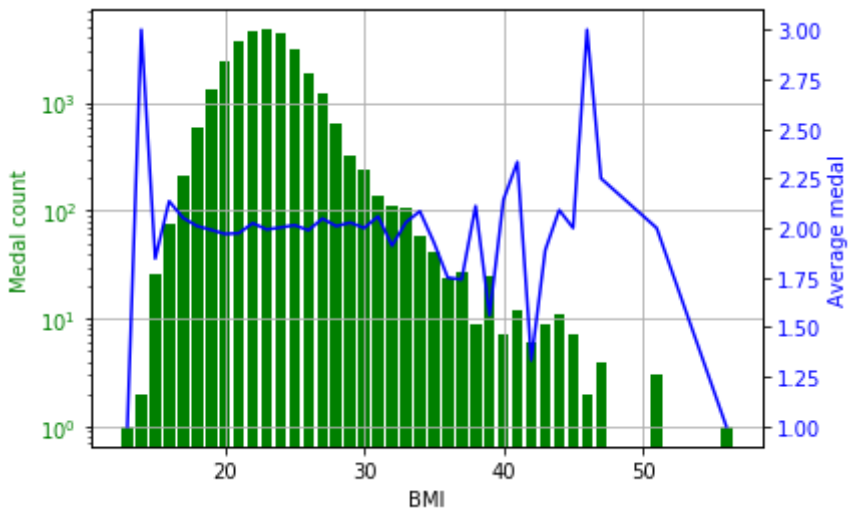
In [10]:

```
bmi = athlete_data_BMI_medal_round['BMI']
prize_count = athlete_data_BMI_medal_round['prize_count']
prize_avg = athlete_data_BMI_medal_round['prize_avg']

plt.bar(bmi,prize_count,color='Green',log=True)
plt.xlabel('BMI')
plt.ylabel('Medal count',color = 'Green')
plt.tick_params(axis='y', labelcolor='Green')
plt.grid()

plt2 = plt.twinx()
plt2.plot(bmi,prize_avg,color='Blue')
plt2.set_ylabel('Average medal',color='Blue')
plt2.tick_params(axis='y', labelcolor='Blue')

plt.savefig('123.png')
```



- As we can see, there are no specific relationship between BMI and medal gained. However, we can see that the prime BMI for athlete would be around 20 - 22, where they would gain the highest number of medal