In [ ]:

```python
# import the necessary libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [ ]:

```python
# Load the dataset
df = pd.read_csv('medical_examination.csv')
```

In [ ]:

```python
# A glimpse of the dataset
df.head()
```

Out[ ]:

	id	age	sex	height	weight	ap_hi	ap_lo	cholesterol	gluc	smoke	alco	active	cardio
0	0	18393	2	168	62.0	110	80	1	1	0	0	1	0
1	1	20228	1	156	85.0	140	90	3	1	0	0	1	1
2	2	18857	1	165	64.0	130	70	3	1	0	0	0	1
3	3	17623	2	169	82.0	150	100	1	1	0	0	1	1
4	4	17474	1	156	56.0	100	60	1	1	0	0	0	0

cholesterol / glucose:

1 = normal 2 = above normal 3 = well above normal

In [ ]:

```python
# descriptive statistics
df.describe()
```

Out[ ]:

	id	age	sex	height	weight	ap_hi	ap
count	70000.000000	70000.000000	70000.000000	70000.000000	70000.000000	70000.000000	70000.000
mean	49972.419900	19468.865814	1.349843	164.359229	74.205690	128.817286	96.630
std	28851.302323	2467.251667	0.477253	8.210126	14.395757	154.011419	188.472
min	0.000000	10798.000000	1.000000	55.000000	10.000000	-150.000000	-70.000
25%	25006.750000	17664.000000	1.000000	159.000000	65.000000	120.000000	80.000
50%	50001.500000	19703.000000	1.000000	165.000000	72.000000	120.000000	80.000
75%	74889.250000	21327.000000	2.000000	170.000000	82.000000	140.000000	90.000
max	99999.000000	23713.000000	3.000000	250.000000	200.000000	16020.000000	11000.000

In [ ]:

```python
# Summary info on columns
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 70000 entries, 0 to 69999
Data columns (total 13 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   id           70000 non-null  int64  
 1   age          70000 non-null  int64  
 2   sex          70000 non-null  int64  
 3   height       70000 non-null  int64  
 4   weight       70000 non-null  float64
 5   ap_hi        70000 non-null  int64  
 6   ap_lo        70000 non-null  int64  
 7   cholesterol  70000 non-null  int64  
 8   gluc         70000 non-null  int64  
 9   smoke        70000 non-null  int64  
 10  alco         70000 non-null  int64  
 11  active       70000 non-null  int64  
 12  cardio       70000 non-null  int64  
dtypes: float64(1), int64(12)
memory usage: 6.9 MB
```

In [ ]:
```
# Determine if people are overweight or not
df['height'] = df['height'] / 100
df['bmi'] = round((df['weight'])/(df['height'])**2, 2)
df['overweight'] = 0
df.loc[df['bmi'] > 25, 'overweight'] = 1
df.head()
```

Out[ ]:

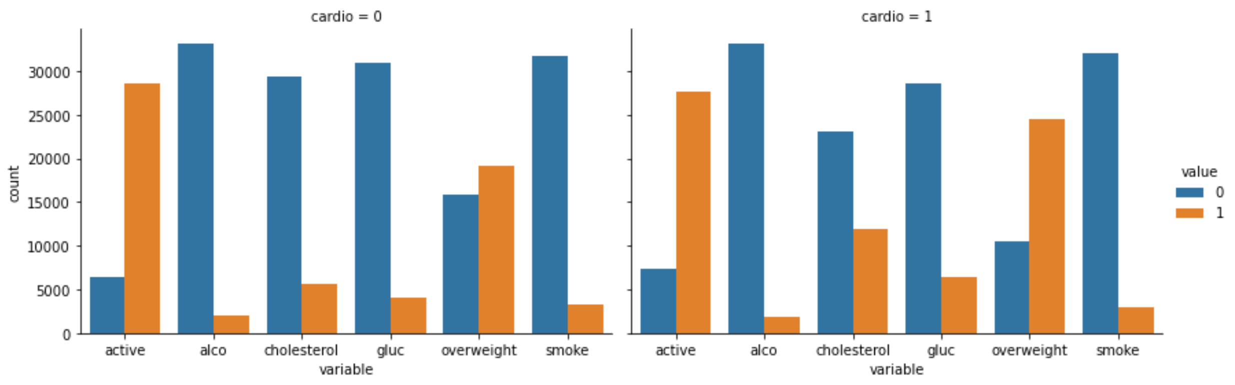
	id	age	sex	height	weight	ap_hi	ap_lo	cholesterol	gluc	smoke	alco	active	cardio	bmi
0	0	18393	2	1.68	62.0	110	80	1	1	0	0	1	0	21.97
1	1	20228	1	1.56	85.0	140	90	3	1	0	0	1	1	34.93
2	2	18857	1	1.65	64.0	130	70	3	1	0	0	0	1	23.51
3	3	17623	2	1.69	82.0	150	100	1	1	0	0	1	1	28.71
4	4	17474	1	1.56	56.0	100	60	1	1	0	0	0	0	23.01

In [ ]:
```
# Transform the glucose and cholesterol columns into binary (0 for good, 1 for bad)
df['gluc'] = df['gluc'].replace({1:0, 2:1, 3:1})
df['cholesterol'] = df['cholesterol'].replace({1:0, 2:1, 3:1})
df = df.drop('bmi', axis=1)
```

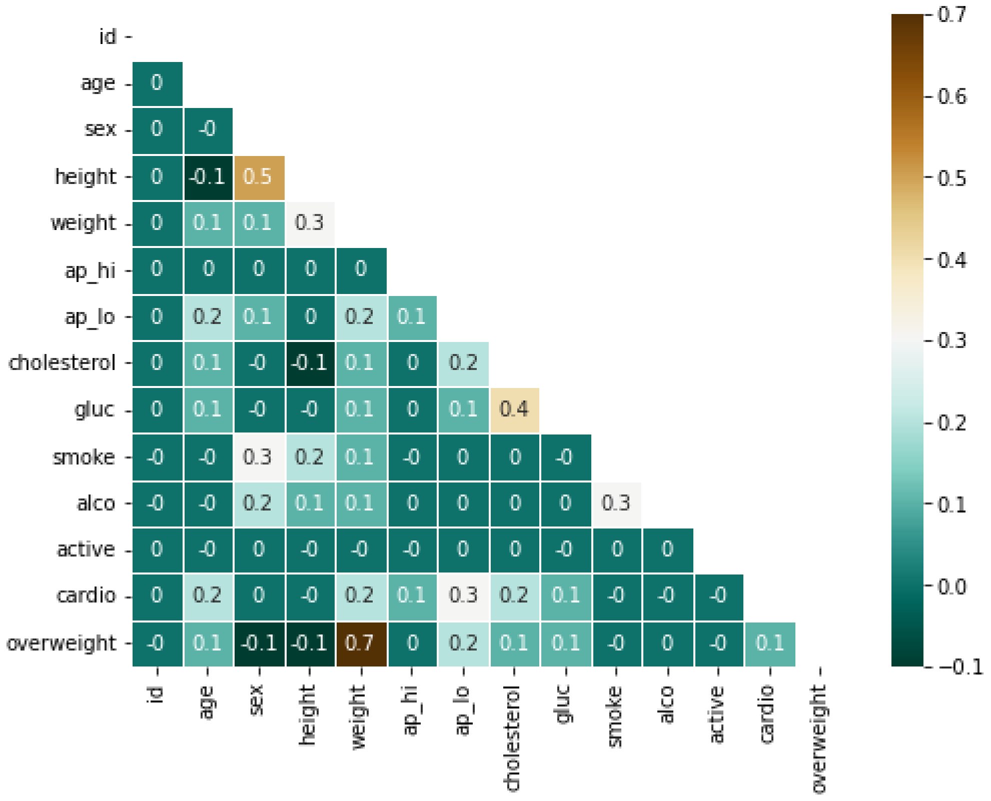
In [ ]:
```
def draw_catplot():
    # Transform data into long format
    df_long = pd.melt(df, id_vars='cardio', value_vars=['active', 'alco', 'cholesterol

    # Drwa the catplot
    fig = sns.catplot(data=df_long,x='variable',col='cardio',hue='value',kind='count',

    # Save the figure
    fig.savefig('catplot.png', facecolor='white')

    return fig
```

In [ ]:
```
def draw_heatmap():
    # Clean the data
    height_percentiles = df['height'].quantile([0.025, 0.975])
    weight_percentiles = df['weight'].quantile([0.025, 0.975])
    filtered_data = df[(df['ap_lo'] <= df['ap_hi']) &
                     (df['height'] >= height_percentiles[0.025]) &
                     (df['height'] <= height_percentiles[0.975]) &
                     (df['weight'] >= weight_percentiles[0.025]) &
                     (df['weight'] <= weight_percentiles[0.975])]

    # Calculate the correlation matrix
    correlation_matrix = round(filtered_data.corr(), 1)

    # Generate a mask for the upper triangle
    mask = np.triu(np.ones_like(correlation_matrix, dtype=bool))

    # Set up a matplotlib figure
    fig, ax = plt.subplots(figsize=(8, 6))

    # Draw the heatmap
    sns.heatmap(correlation_matrix, mask=mask, annot=True, cmap='BrBG_r', linewidths=

    # Save the heatmap
    fig.savefig('heatmap.png', facecolor='white')

    return fig
```

In [ ]:
```
test_01 = draw_catplot()
```



In [ ]:
```
test_02 = draw_heatmap()
```



id
age
sex
height
weight
ap_hi
ap_lo
cholesterol
gluc
smoke
alco
active
cardio
overweight
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
−0.1

```
In [ ]:
```