In [1]:
```
print('Name: ')
print('Plot a heatmap which help you visualize percentage of blood leaving the he
print('Plot a heatmap which help you visualize Percentage of blood leaving the he
```

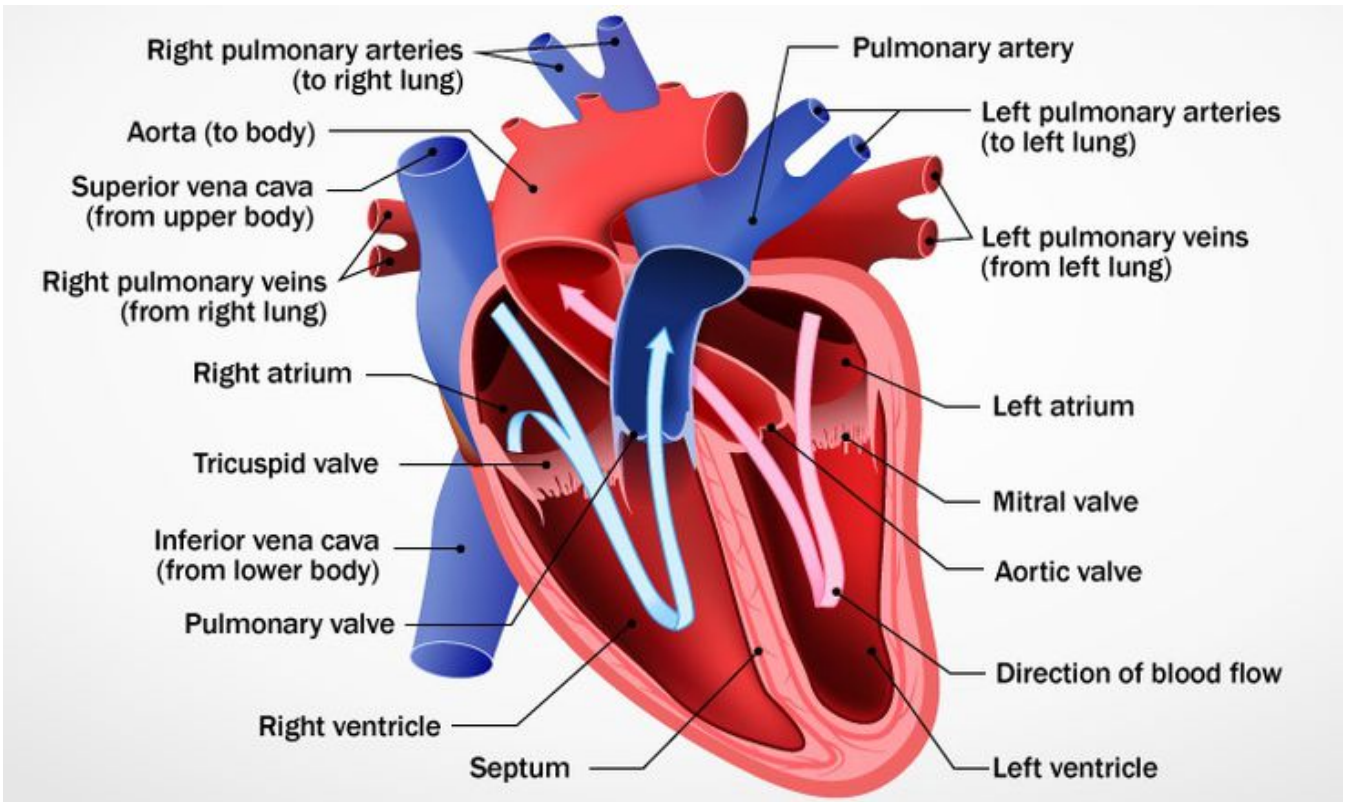
```
Name:
Plot a heatmap which help you visualize percentage of blood leaving the heart a
t each contraction of a smoking and non smoking person heart
Plot a heatmap which help you visualize Percentage of blood leaving the heart a
t each contraction of person who died due to cardio vascular disease
```

Task 1 - Plot heat map to visualize percentage of blood leaving the heart at each contraction of a smoking and non smoking person

A normal, healthy heart will never completely empty, but it will pump out 55-70 percent of the blood that's inside it. An ejection fraction of 55-70 percent is normal; 40-55 percent is below normal. Anything less than 40 percent may indicate heart failure, and below 35 percent there's a risk for life-threating arrhythmias

In [2]:
```
#predefine code for image
from IPython.display import Image
Image(filename='heart.png')
#predefine code end
```

Out[2]:



The right side of your heart receives oxygen-poor blood from your veins and pumps it to your lungs, where it picks up oxygen and gets rid of carbon dioxide. The left side of your heart receives oxygen-rich blood from your lungs and pumps it through your arteries to the rest of your body.

In [3]:
```
# Import all the libraries and read heart_failure_clinical_records_dataset.csv
import numpy as np
import pandas as pd
import matplotlib. pyplot as plt
import seaborn as sns

df = pd.read_csv('heart_failure_clinical_records_dataset.csv')
df
```

Out[3]:

	age	anaemia	creatinine_phosphokinase	diabetes	ejection_fraction	high_blood_pressure	platelets	s
0	75.0	0	582	0	20	1	265000.00	
1	55.0	0	7861	0	38	0	263358.03	
2	65.0	0	146	0	20	0	162000.00	
3	50.0	1	111	0	20	0	210000.00	
4	65.0	1	160	1	20	0	327000.00	
...	...	...	...	...	...	...	...	
294	62.0	0	61	1	38	1	155000.00	
295	55.0	0	1820	0	38	0	270000.00	
296	45.0	0	2060	1	60	0	742000.00	
297	45.0	0	2413	0	38	0	140000.00	
298	50.0	0	196	0	45	0	395000.00	

299 rows × 13 columns

In [4]:
```
#Group by age and smokers and find the average ejection_fraction rate
groupby_age = df.groupby(['age','smoking'])['ejection_fraction'].mean().reset_ind
groupby_age
```

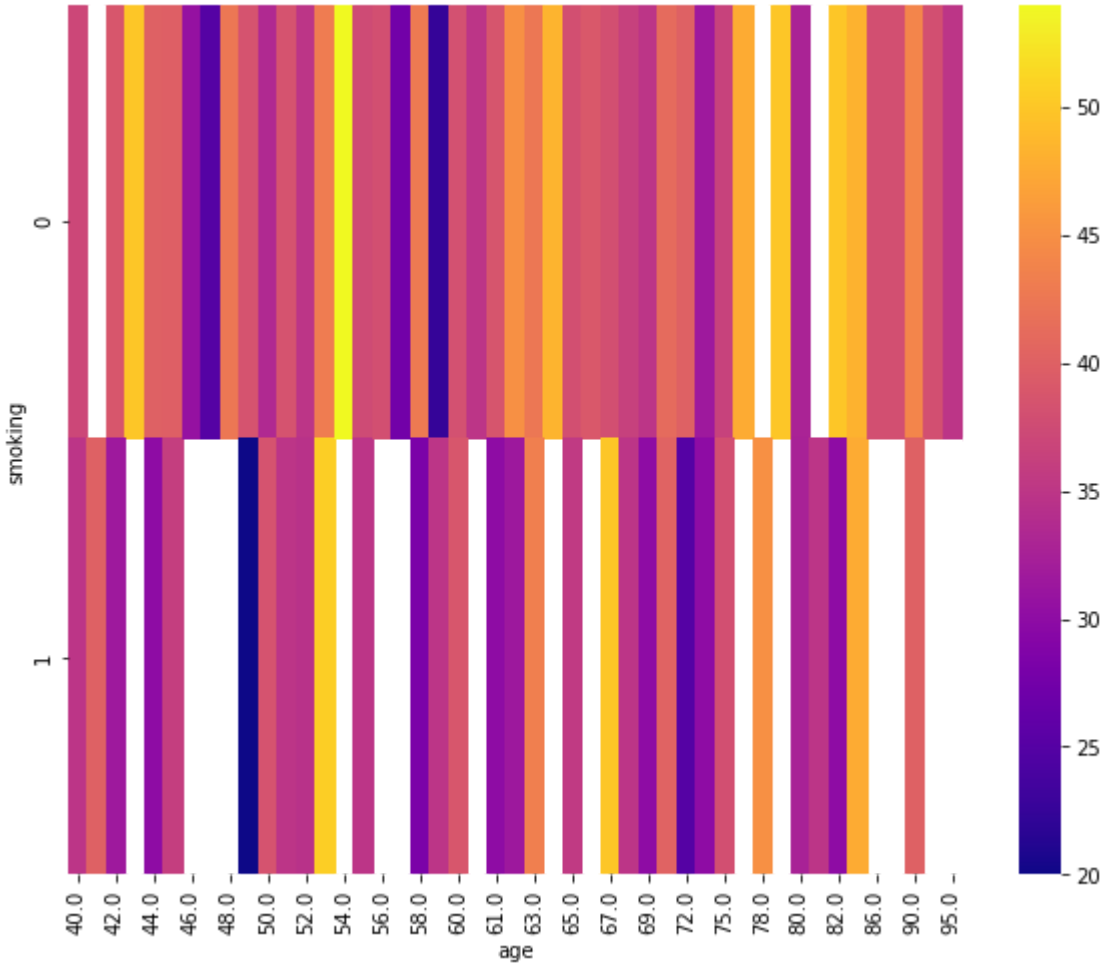
Out[4]:

	age	smoking	ejection_fraction
0	40.0	0	37.000000
1	40.0	1	35.000000
2	41.0	1	40.000000
3	42.0	0	38.750000
4	42.0	1	31.666667
...	...	...	...
70	87.0	0	38.000000
71	90.0	0	44.000000
72	90.0	1	40.000000
73	94.0	0	38.000000
74	95.0	0	35.000000

75 rows × 3 columns

In [6]:
```
# Plot a heatmap to show the ejection fraction rate in smokers and non smokers he
plt.figure(figsize = (10,8))
heatmap_df = pd.pivot_table( values ='ejection_fraction', index ='smoking', colum
sns.heatmap(heatmap_df,cmap = 'plasma')
```

Out[6]:
```
<AxesSubplot:xlabel='age', ylabel='smoking'>
```



0 are non smokers and 1 are smokers

Conclusion - =

Task 2 Plot a heatmap to visualize percentage of blood leaving the heart at each contraction of people who died due to cardio vascular disease

In [7]:
```
#Group by death events and ejection fraction rate and find the average ejection f

group_death_events = df.groupby(['age','DEATH_EVENT'])['ejection_fraction'].mean(
group_death_events
```

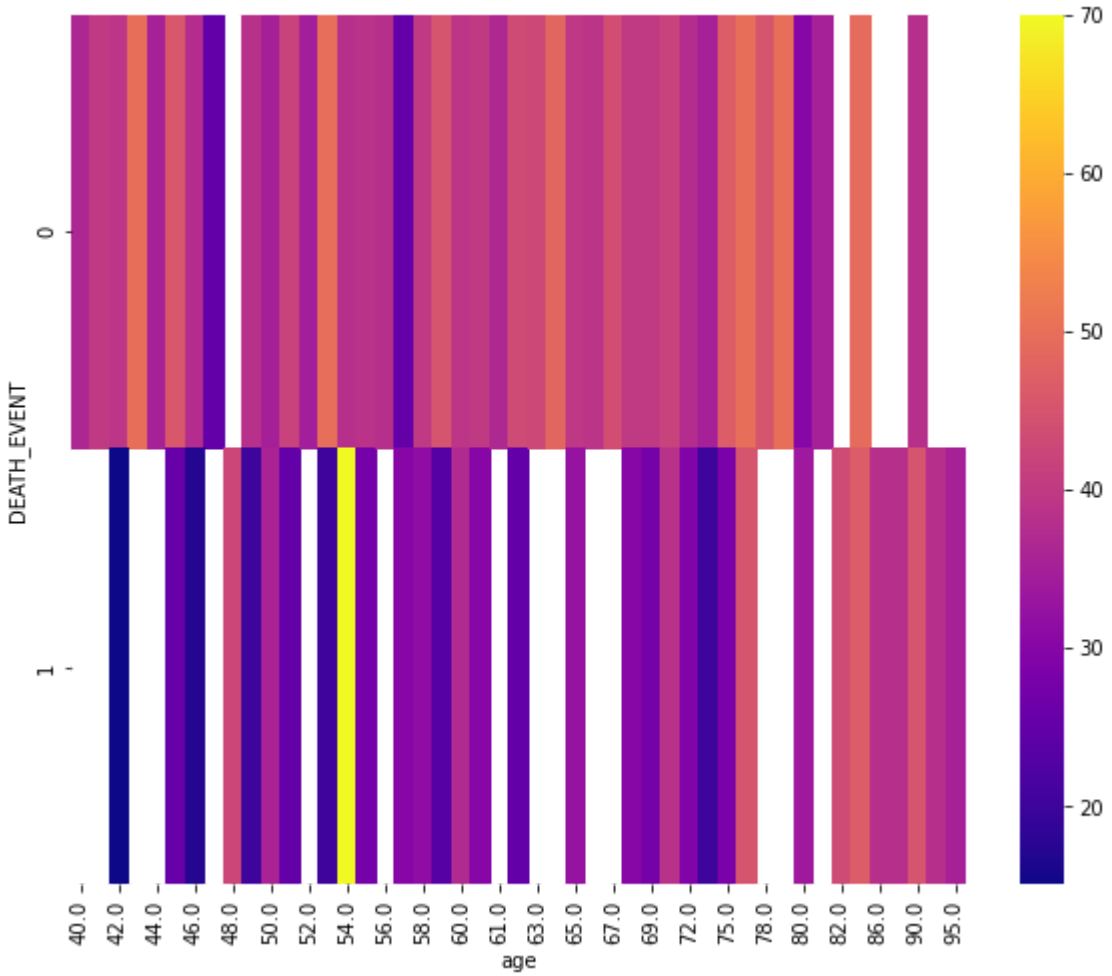
Out[7]:

	age	DEATH_EVENT	ejection_fraction
0	40.0	0	36.428571
1	41.0	0	40.000000
2	42.0	0	39.166667
3	42.0	1	15.000000
4	43.0	0	50.000000
...	...	...	...
68	87.0	1	38.000000
69	90.0	0	38.000000
70	90.0	1	45.000000
71	94.0	1	38.000000
72	95.0	1	35.000000

73 rows × 3 columns

In [10]:
```
lot a heatmap to show the ejection fraction rate of people who died due to cardiov
.figure(figsize = (10,8))
tmap_df2 = pd.pivot_table(values ='ejection_fraction', index ='DEATH_EVENT', colun
.heatmap(heatmap_df2,cmap = 'plasma')
```

Out[10]: <AxesSubplot:xlabel='age', ylabel='DEATH_EVENT'>



1 are people died due to cardiovascular disease

Conclusion -

In [ ]: