

In [81]:

```
print('Name: Lakshya Singh Chauhan')  
print('Plot a heatmap which help you visualize percentage of blood leaving the heart at  
print('Plot a heatmap which help you visualize Percentage of blood leaving the heart at
```

Name: Lakshya Singh Chauhan

Plot a heatmap which help you visualize percentage of blood leaving the heart at each contraction of a smoking and non smoking person heart

Plot a heatmap which help you visualize Percentage of blood leaving the heart at each contraction of person who died due to cardio vascular diseases

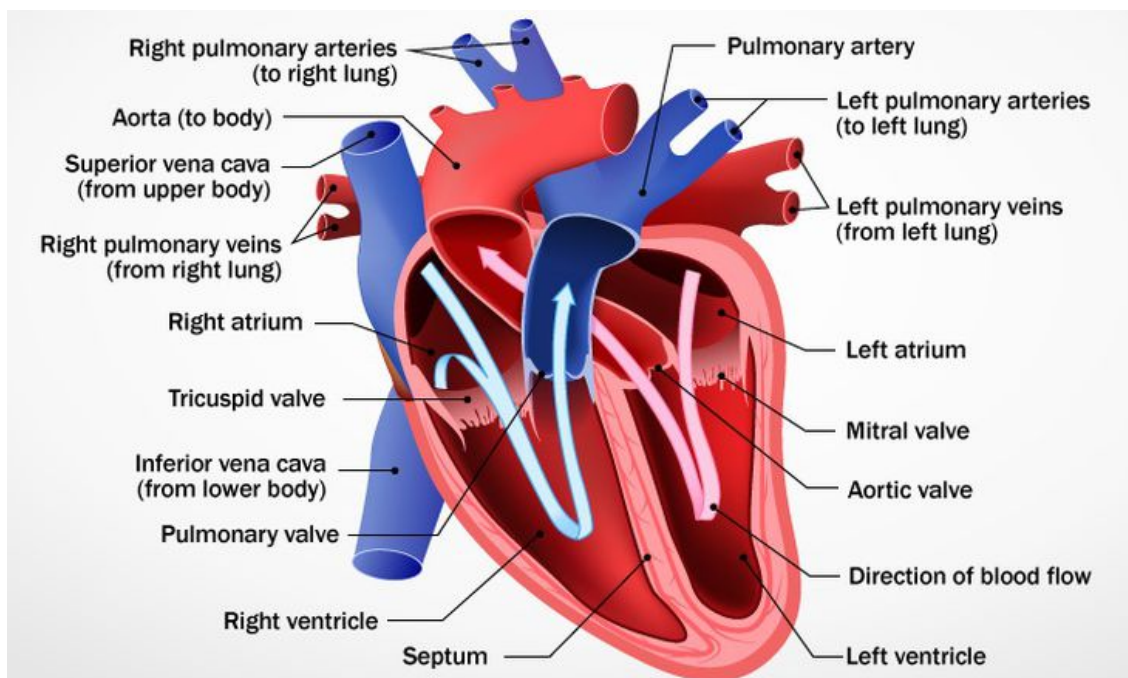
Task 1 - Plot heat map to visualize percentage of blood leaving the heart at each contraction of a smoking and non smoking person

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-threatening arrhythmias

In [82]:

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

Out[82]:



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 [83]:

```
# Import all the libraries and read heart_failure_clinical_records_dataset.csv
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[83]:

	age	anaemia	creatinine_phosphokinase	diabetes	ejection_fraction	high_blood_pressu
0	75.0	0	582	0	20	
1	55.0	0	7861	0	38	
2	65.0	0	146	0	20	
3	50.0	1	111	0	20	
4	65.0	1	160	1	20	
...	
294	62.0	0	61	1	38	
295	55.0	0	1820	0	38	
296	45.0	0	2060	1	60	
297	45.0	0	2413	0	38	
298	50.0	0	196	0	45	

299 rows × 13 columns



In [84]:

```
#Group by age and smokers and find the average ejection_fraction rate
ejection_fraction1 = df.groupby(["age", "smoking"])["ejection_fraction"].mean().reset_index()
ejection_fraction1
```

Out[84]:

	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

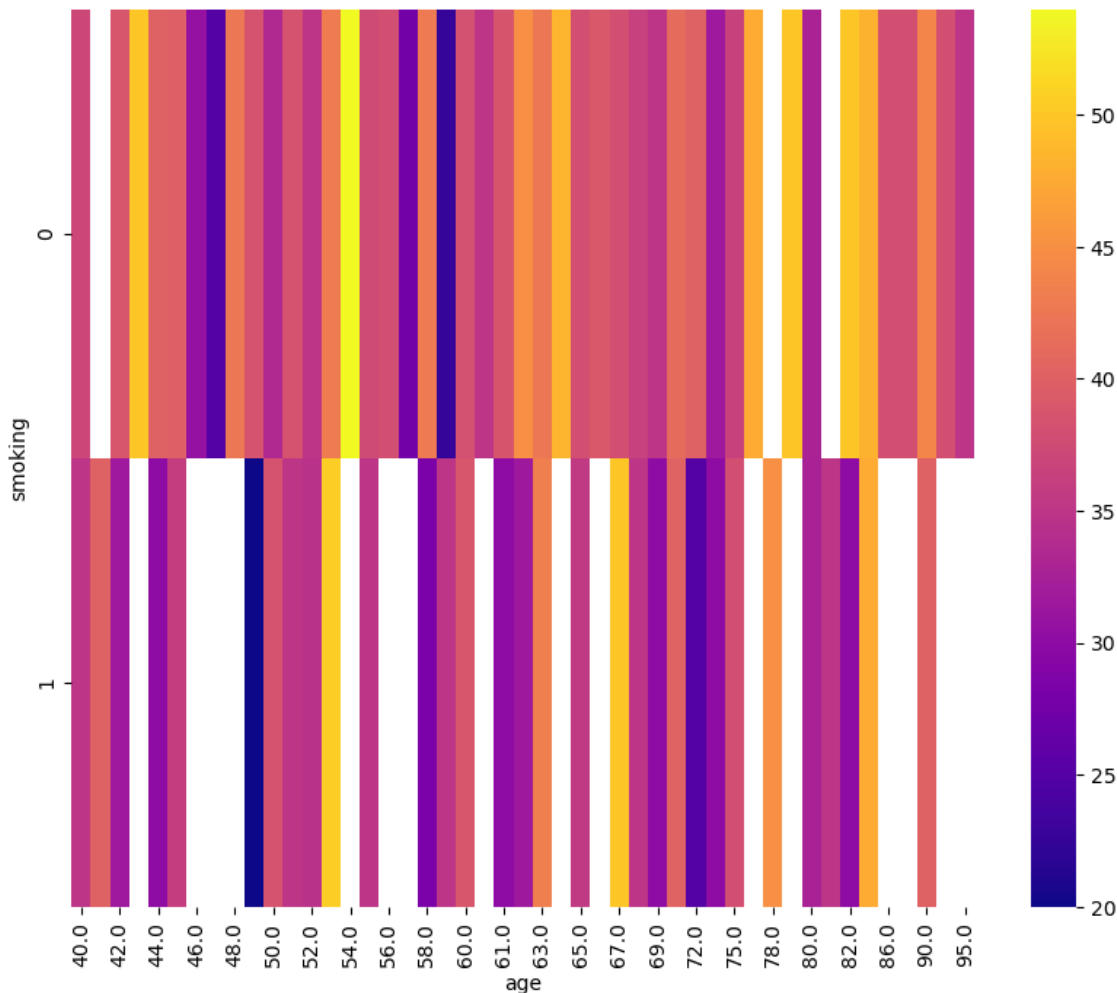
75 rows × 3 columns

In [85]:

```
# Plot a heatmap to show the ejection fraction rate in smokers and non smokers heart
plt.figure(figsize=(10, 8))
heatmap_df = pd.pivot_table(values="ejection_fraction", index="smoking", columns="age",
sns.heatmap(heatmap_df, cmap="plasma")
```

Out[85]:

```
<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 [86]:

```
#Group by death events and ejection fraction rate and find the average ejection fraction
death_dataframe = df.groupby(["age", "DEATH_EVENT"])["ejection_fraction"].mean().reset_index()
death_dataframe
```

Out[86]:

	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

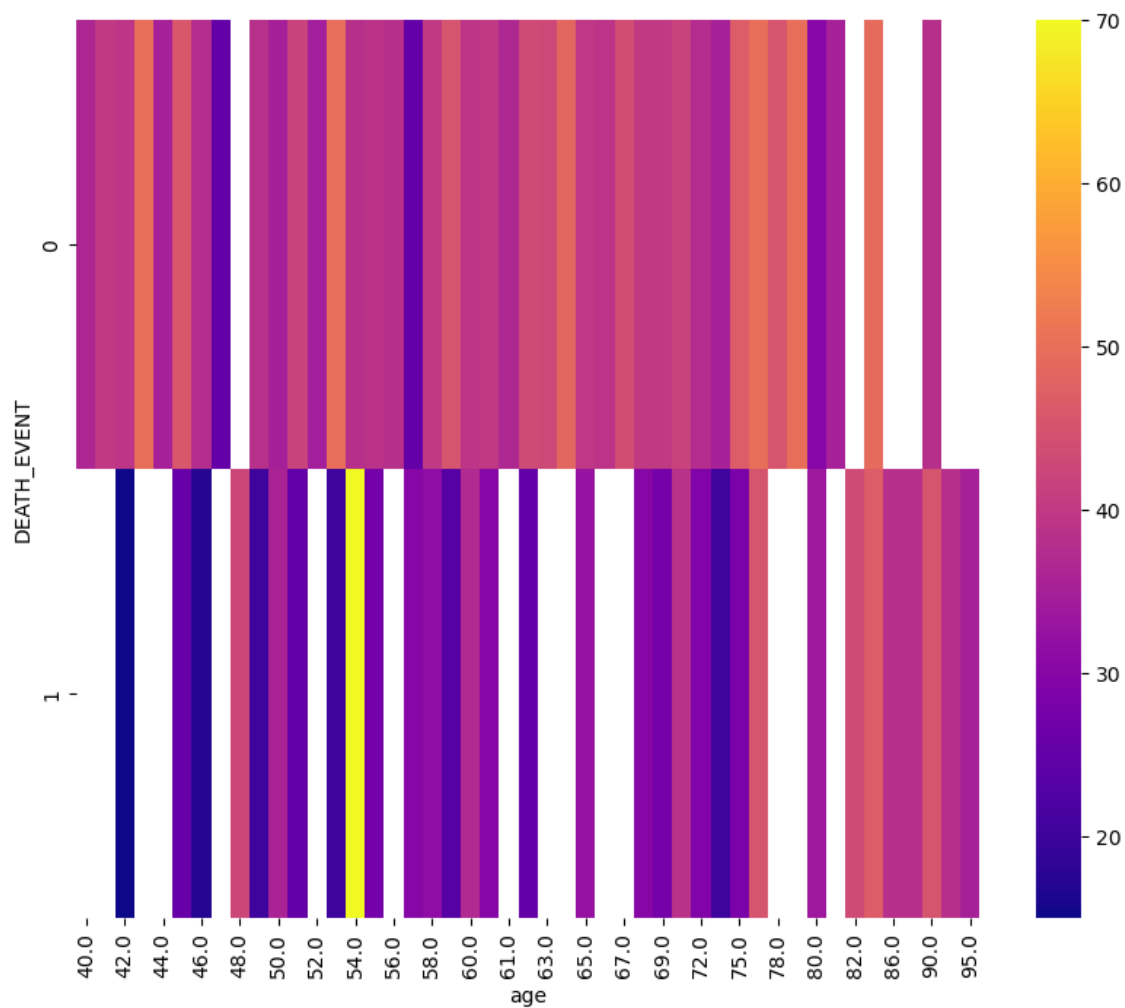
73 rows × 3 columns

In [87]:

```
# Plot a heatmap to show the ejection fraction rate of people who died due to cardiovascular
plt.figure(figsize=(10, 8))
heatmap_df2 = pd.pivot_table(values="ejection_fraction", index="DEATH_EVENT", columns="age")
sns.heatmap(heatmap_df2, cmap="plasma")
```

Out[87]:

<AxesSubplot:xlabel='age', ylabel='DEATH_EVENT'>



1 are people died due to cardiovascular disease

Conclusion -

In []: