In [2]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
```

In [3]:
```
aerofit = pd.read_csv('aerofit_treadmill.csv')
```

In [145…
```
aerofit.head()
#We can see that the data is already clean and there are no missing values by using
```

Out[145]:

	Product	Age	Gender	Education	MaritalStatus	Usage	Fitness	Income	Miles
0	KP281	18	Male	14	Single	3	4	29562	112
1	KP281	19	Male	15	Single	2	3	31836	75
2	KP281	19	Female	14	Partnered	4	3	30699	66
3	KP281	19	Male	12	Single	3	3	32973	85
4	KP281	20	Male	13	Partnered	4	2	35247	47

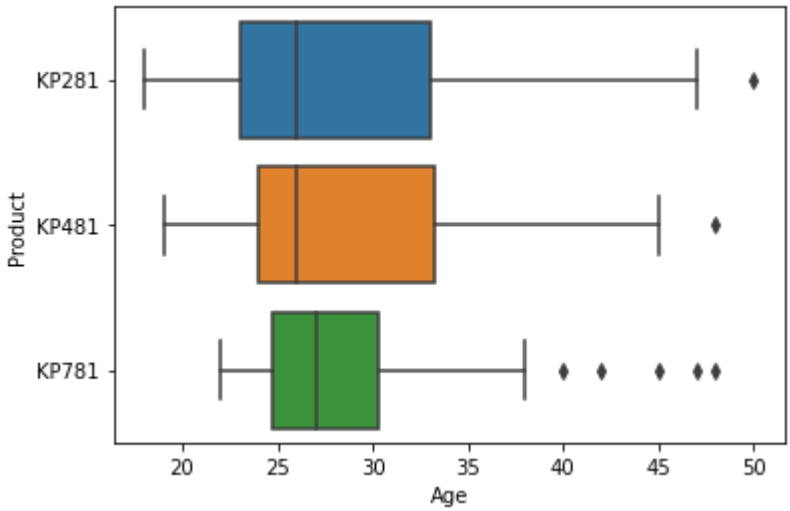
In [10]:
```
aerofit.describe()
```

Out[10]:

	Age	Education	Usage	Fitness	Income	Miles
count	180.000000	180.000000	180.000000	180.000000	180.000000	180.000000
mean	28.788889	15.572222	3.455556	3.311111	53719.577778	103.194444
std	6.943498	1.617055	1.084797	0.958869	16506.684226	51.863605
min	18.000000	12.000000	2.000000	1.000000	29562.000000	21.000000
25%	24.000000	14.000000	3.000000	3.000000	44058.750000	66.000000
50%	26.000000	16.000000	3.000000	3.000000	50596.500000	94.000000
75%	33.000000	16.000000	4.000000	4.000000	58668.000000	114.750000
max	50.000000	21.000000	7.000000	5.000000	104581.000000	360.000000

In [134…
```
sns.boxplot(data=aerofit, x="Age", y='Product')
#Max sales can be infer between 18-33 where as only 1 outlier can be seen for KP281
#Whereas for KP781 5 outliers can be seen above the age of 40 which indicates that
#older segment prefer the premium segment of KP781, which mayb due to thier higher
```

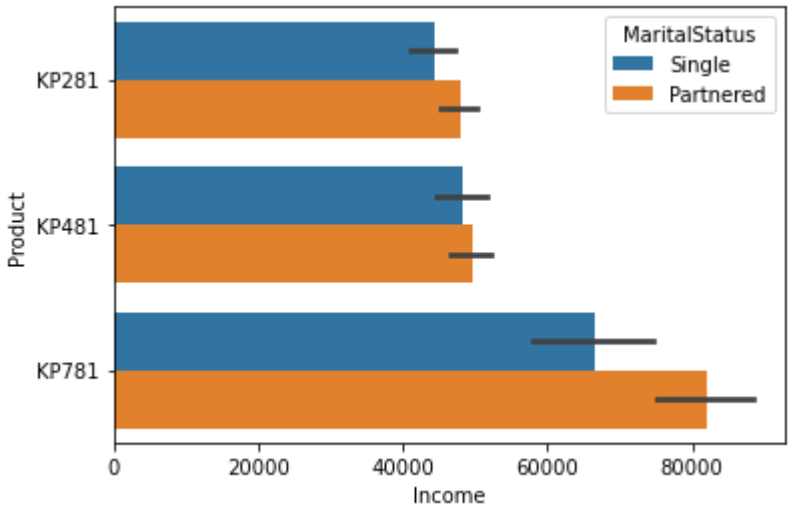
Out[134]:
```
<AxesSubplot:xlabel='Age', ylabel='Product'>
```



Miles -> avg. miles walked Income -> Annual income Fitness -> 1-5 [self_rated] Martial_status -> [0,1] Products:- KP281 -> $1500 KP481 -> >1750 KP781 -> $2500 Product Age Gender Education MaritalStatus Usage Fitness Income Miles

In [135…
```
sns.barplot(data=aerofit, x="Income", y="Product", hue="MaritalStatus")
#from here we can clearly see that income grp buying KP781 is much higher
#Also it is clear that Partnered couples are earning more in general in comparision
#to the Single people...So some customizations can be made accordingly
```

Out[135]: <AxesSubplot:xlabel='Income', ylabel='Product'>



In [129…
```
data_crosstab = pd.crosstab(aerofit['Product'], aerofit['Age'], margins = False)
pd.set_option('display.max_columns', None)
data_crosstab.loc['Total'] = data_crosstab.loc[:,:].sum()
data_crosstab['Total'] = data_crosstab.sum(axis=1)
data_crosstab
```

Out[129]:

Age	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Product																					
KP281	1	3	2	4	4	8	5	7	7	3	6	3	2	2	2	2	2	3	1	1	4
KP481	0	1	3	3	0	7	3	11	3	1	0	1	2	3	2	5	3	4	0	1	2
KP781	0	0	0	0	3	3	4	7	2	3	3	2	3	1	0	1	1	1	0	0	1
Total	1	4	5	7	7	18	12	25	12	7	9	6	7	6	4	8	6	8	1	2	7

In [133…
```
#From the above data we can easily infer that
#KP281 was bought by 80 people
#KP481 was bought by 60 people
#KP781 was bought by 40 people
#Also we can clear see that the probabilty of 25 years old buying any product
#is much higher than the rest 25/180 -> 13.88%
```

In [142…
```
data_crosstab = pd.crosstab(aerofit['Gender'], aerofit['Product'], margins = False)
data_crosstab.loc['Total'] = data_crosstab.loc[:,:].sum()
data_crosstab['Total'] = data_crosstab.sum(axis=1)
data_crosstab
```

Out[142]:

Product	KP281	KP481	KP781	Total
Gender				
Female	40	29	7	76
Male	40	31	33	104
Total	80	60	40	180

In [139…
```
#Lets see the probabilties for Males & Females buying these products
#If we calculate conditional probabilities say...Given a person entered is Female
#Calculate the probability of her buying KP281

#40/(40+29+7)-> 52.63%
#Similary for Products KP481 & KP781 -> 38.15% & 9.21% resp.
#these probabilites can be easily calculated by normalizing the index
```

In [16]:
```
#Probability of crosstab values
pd.crosstab(aerofit.Gender, aerofit.Product, normalize='index')
```

Out[16]:

Product	KP281	KP481	KP781
Gender			
Female	0.526316	0.381579	0.092105
Male	0.384615	0.298077	0.317308

In [143…
```
#Similarly can be done incase of people who are married or not
#Again we can also get the percentage of both partnered & single
data_crosstab = pd.crosstab(aerofit['MaritalStatus'], aerofit['Product'], margins =
```

```
data_crosstab.loc['Total'] = data_crosstab.loc[:,:].sum()
data_crosstab['Total'] = data_crosstab.sum(axis=1)
data_crosstab
```

Out[143]:

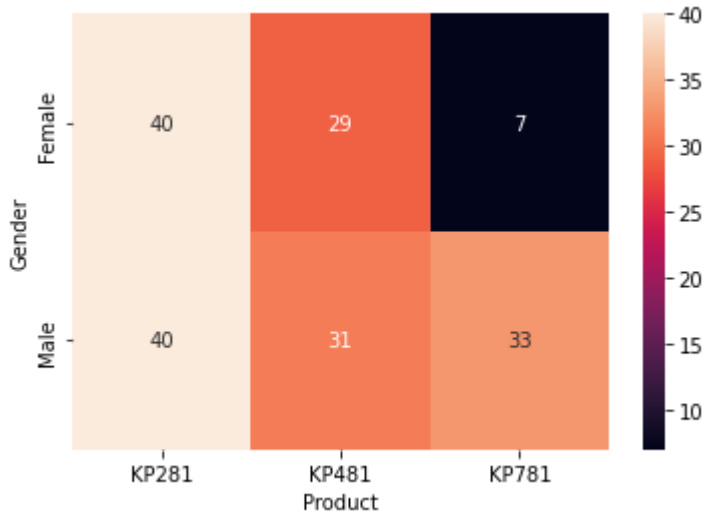
Product	KP281	KP481	KP781	Total
MaritalStatus				
Partnered	48	36	23	107
Single	32	24	17	73
Total	80	60	40	180

In [144…
```
#Probability of crosstab values
pd.crosstab(aerofit.MaritalStatus, aerofit.Product, normalize='index')
```

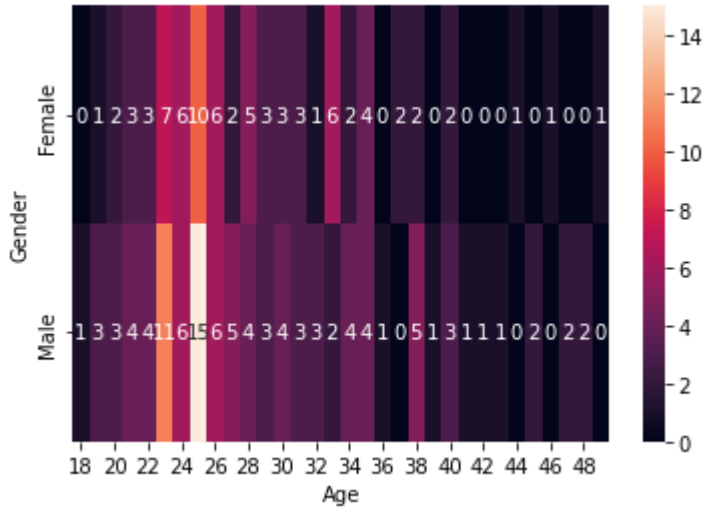
Out[144]:

Product	KP281	KP481	KP781
MaritalStatus			
Partnered	0.448598	0.336449	0.214953
Single	0.438356	0.328767	0.232877

In [17]:
```
# plotting the heatmap
hm = sns.heatmap(data=data_crosstab,annot=True)
plt.show()
```



In [140…
```
# plotting the heatmap
#Product        Age     Gender  Education       MaritalStatus   Usage   Fitness Inc
data_crosstab = pd.crosstab(aerofit['Gender'], aerofit['Age'], margins = False)
hm = sns.heatmap(data=data_crosstab,annot=True)
plt.show()
```



In [ ]:
```
# INSIGHTS & RECOMMENDATIONS

#1. First we can clearly see that people in the age of 23-26 are majority buyers of
# So we can increase the sales by targeting this segment by launching exiting offer

#2. Also we can clearly see that people with higher income groups are more inclined
# as it falls in the premium segment and parteners more than single so people who a
# in high income category are more likely to buy K781

#3. Both male and females are likely to buy K281 & K481 but when it comes to K781 "
# buy this product so offers and customizations should be made available keeping th
```