Objective:

- Explore the dataset and extract actionable insights that will enable growth in the market.
- Perform univariate and multivariate analysis.
- Building customer profiles (characteristics of a customer) for the different products.
- Generate set recommendations that will help the company in targeting new customers.

Data:

CardioGoodFitness.csv - it contains information about customers purchasing product.

- Product - the model no. of the treadmill
- Age - in no of years, of the customer
- Gender - of the customer
- Education - in no. of years, of the customer
- Marital Status - of the customer
- Usage - Avg. # times the customer wants to use the treadmill every week
- Fitness - Self rated fitness score of the customer (5 - very fit, 1 - very unfit)
- Income - of the customer
- Miles- expected to run

Import the necessary packages

In [1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings('ignore')
```

Read the dataset

In [2]:
```
data=pd.read_csv("CardioGoodFitness.csv")
```

In [3]:
```
# copying data to another varaible to avoid any changes to original data
cardio=data.copy()
```

View the first and last 5 rows of the dataset.

In [4]:
```
cardio.head()
```

Out[4]:

	Product	Age	Gender	Education	MaritalStatus	Usage	Fitness	Income	Miles
0	TM195	18	Male	14	Single	3	4	29562	112
1	TM195	19	Male	15	Single	2	3	31836	75
2	TM195	19	Female	14	Partnered	4	3	30699	66
3	TM195	19	Male	12	Single	3	3	32973	85
4	TM195	20	Male	13	Partnered	4	2	35247	47

In [5]:
```
cardio.tail()
```

Out[5]:

	Product	Age	Gender	Education	MaritalStatus	Usage	Fitness	Income	Miles
175	TM798	40	Male	21	Single	6	5	83416	200
176	TM798	42	Male	18	Single	5	4	89641	200
177	TM798	45	Male	16	Single	5	5	90886	160
178	TM798	47	Male	18	Partnered	4	5	104581	120
179	TM798	48	Male	18	Partnered	4	5	95508	180

Understand the shape of the dataset.

In [6]:
```
cardio.shape
```

Out[6]: (180, 9)

- Dataset has 180 rows and 9 columns.

Check the data types of the columns for the dataset.

In [7]:
```
cardio.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 180 entries, 0 to 179
Data columns (total 9 columns):
 #   Column         Non-Null Count  Dtype 
---  ------         --------------  ----- 
 0   Product        180 non-null    object
 1   Age            180 non-null    int64 
 2   Gender         180 non-null    object
 3   Education      180 non-null    int64 
 4   MaritalStatus  180 non-null    object
 5   Usage          180 non-null    int64 
 6   Fitness        180 non-null    int64 
 7   Income         180 non-null    int64 
 8   Miles          180 non-null    int64 
dtypes: int64(6), object(3)
memory usage: 12.8+ KB
```

Fixing the data types

- All variables are Integer are valid data type except for fitness, it is a rating given by a customer for self-fitness on a scale of 5, it should be treated as a category.
- Product,Gender and Marital Status are of object type, we can change them to categories.

`coverting "objects" to "category" reduces the data space required to store the dataframe`

In [8]:
```
cardio["Product"]=cardio["Product"].astype("category")
cardio["Gender"]=cardio["Gender"].astype("category")
cardio["MaritalStatus"]=cardio["MaritalStatus"].astype("category")
cardio["Fitness"]=cardio["Fitness"].astype("category")
```

In [9]:
```
cardio.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 180 entries, 0 to 179
Data columns (total 9 columns):
 #   Column         Non-Null Count  Dtype   
---  ------         --------------  -----   
 0   Product        180 non-null    category
 1   Age            180 non-null    int64   
 2   Gender         180 non-null    category
 3   Education      180 non-null    int64   
 4   MaritalStatus  180 non-null    category
 5   Usage          180 non-null    int64   
 6   Fitness        180 non-null    category
 7   Income         180 non-null    int64   
 8   Miles          180 non-null    int64   
dtypes: category(4), int64(5)
memory usage: 8.3 KB
```

- Product,Gender, Marital Status and Fitness have been converted to categories

`we can see that the memory usage has decreased from 12.8KB to 8.3KB`

Give a statistical summary for the dataset.

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

Out[10]:

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

- Mean of Age is greater than the median, this suggests that Age is right skewed.
- Education,Usage,Fitness has approximately same mean and median.
- Mean is greater than the median for Income and Miles variable which suggests that these variables are right skewed.

In [11]:
```
cardio.describe(include=["category"])
```

Out[11]:

	Product	Gender	MaritalStatus	Fitness
count	180	180	180	180
unique	3	2	2	5
top	TM195	Male	Partnered	3
freq	80	104	107	97

- Product has three types of treadmill models, TM195 being the most sold model.
- Males(104) have purchased most products as compared to females(76).
- Married customers(107) have purchased most products as compared to singles(73)
- Most customers(97) rate them as 3 on a scale of 1 to 5 in Fitness levels.

Check for missing values

In [12]:
```
cardio.isnull().sum()
```

Out[12]:
```
Product          0
Age              0
Gender           0
Education        0
MaritalStatus    0
Usage            0
Fitness          0
Income           0
Miles            0
dtype: int64
```

- There are no missing values in the data.

EDA

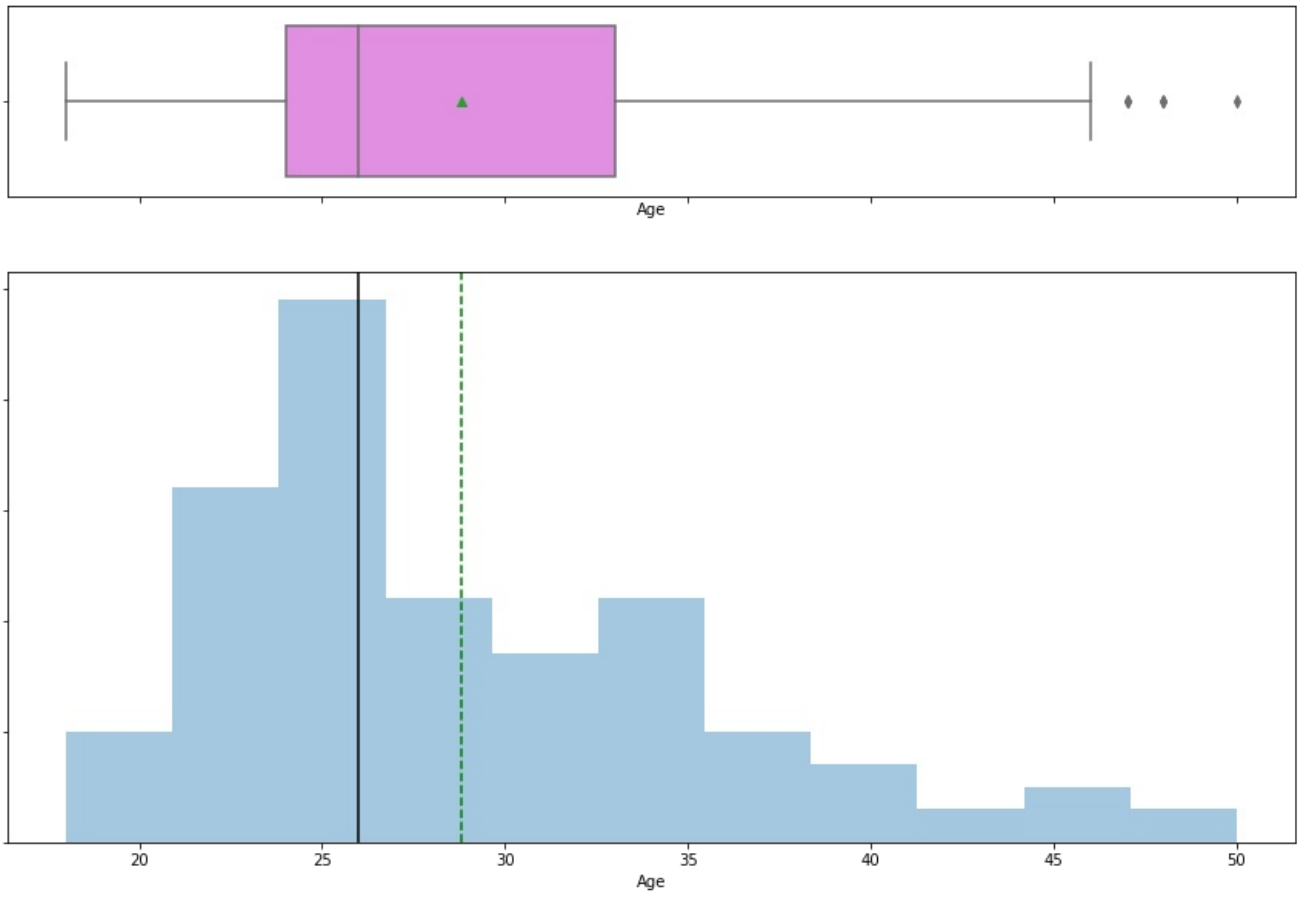
Univariate analysis

In [13]:
```
# While doing uni-variate analysis of numerical variables we want to study their central tendency
# and dispersion.
# Let us write a function that will help us create boxplot and histogram for any input numerical
```

```
# variable.
# This function takes the numerical column as the input and returns the boxplots
# and histograms for the variable.
# Let us see if this help us write faster and cleaner code.
def histogram_boxplot(feature, figsize=(15,10), bins = None):
    """ Boxplot and histogram combined
    feature: 1-d feature array
    figsize: size of fig (default (9,8))
    bins: number of bins (default None / auto)
    """
    f2, (ax_box2, ax_hist2) = plt.subplots(nrows = 2, # Number of rows of the subplot grid= 2
                                           sharex = True, # x-axis will be shared among all subplots
                                           gridspec_kw = {"height_ratios": (.25, .75)},
                                           figsize = figsize
                                           ) # creating the 2 subplots
    sns.boxplot(feature, ax=ax_box2, showmeans=True, color='violet') # boxplot will be created and a star will ir
    sns.distplot(feature, kde=F, ax=ax_hist2, bins=bins,palette="winter") if bins else sns.distplot(feature, kde=
    ax_hist2.axvline(np.mean(feature), color='green', linestyle='--') # Add mean to the histogram
    ax_hist2.axvline(np.median(feature), color='black', linestyle='-') # Add median to the histogram
```

Observations on Age

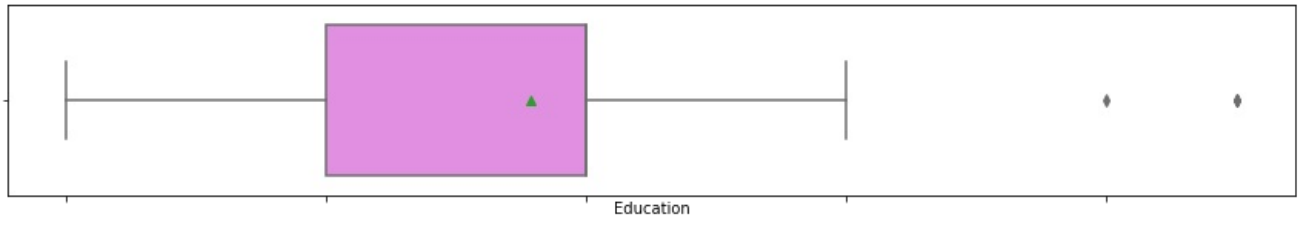
In [14]:
```
histogram_boxplot(cardio["Age"])
```

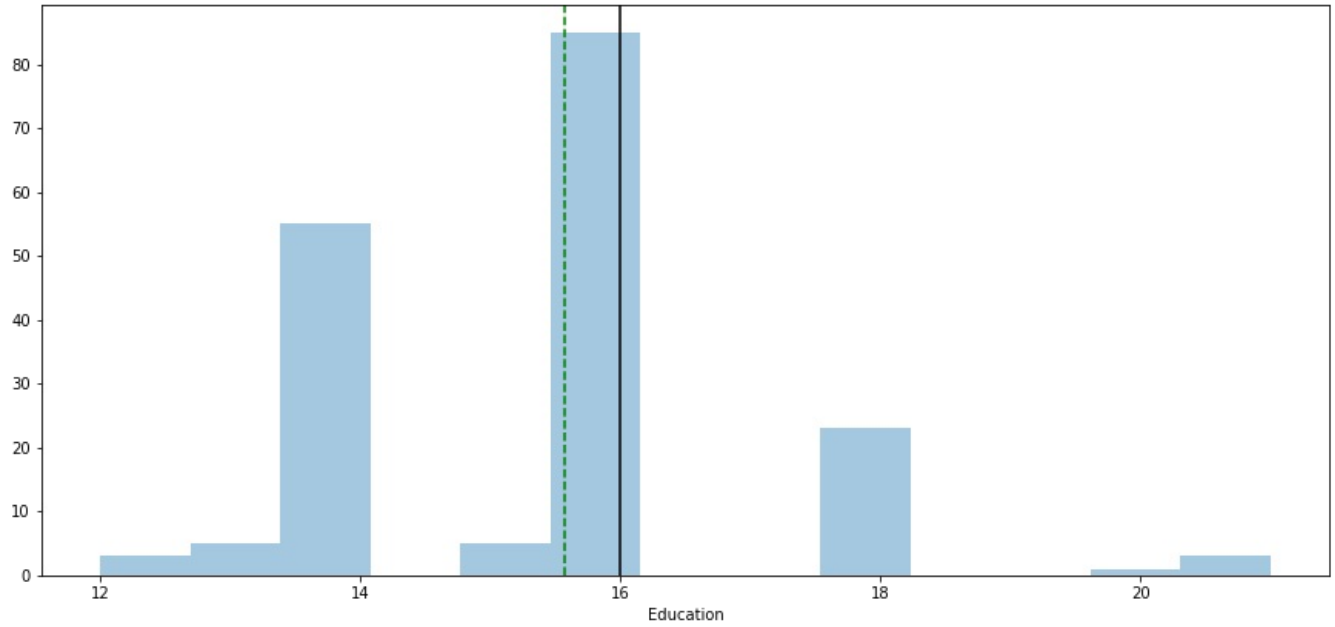


- The distribution of Age is right skewed.
- There are a outliers in this variable.
- From boxplot we can see that the third quartile(Q3) is equal to 33 which means 75% of customers are below the age of 33.

Observations on Education

In [15]:
```
histogram_boxplot(cardio["Education"])
```

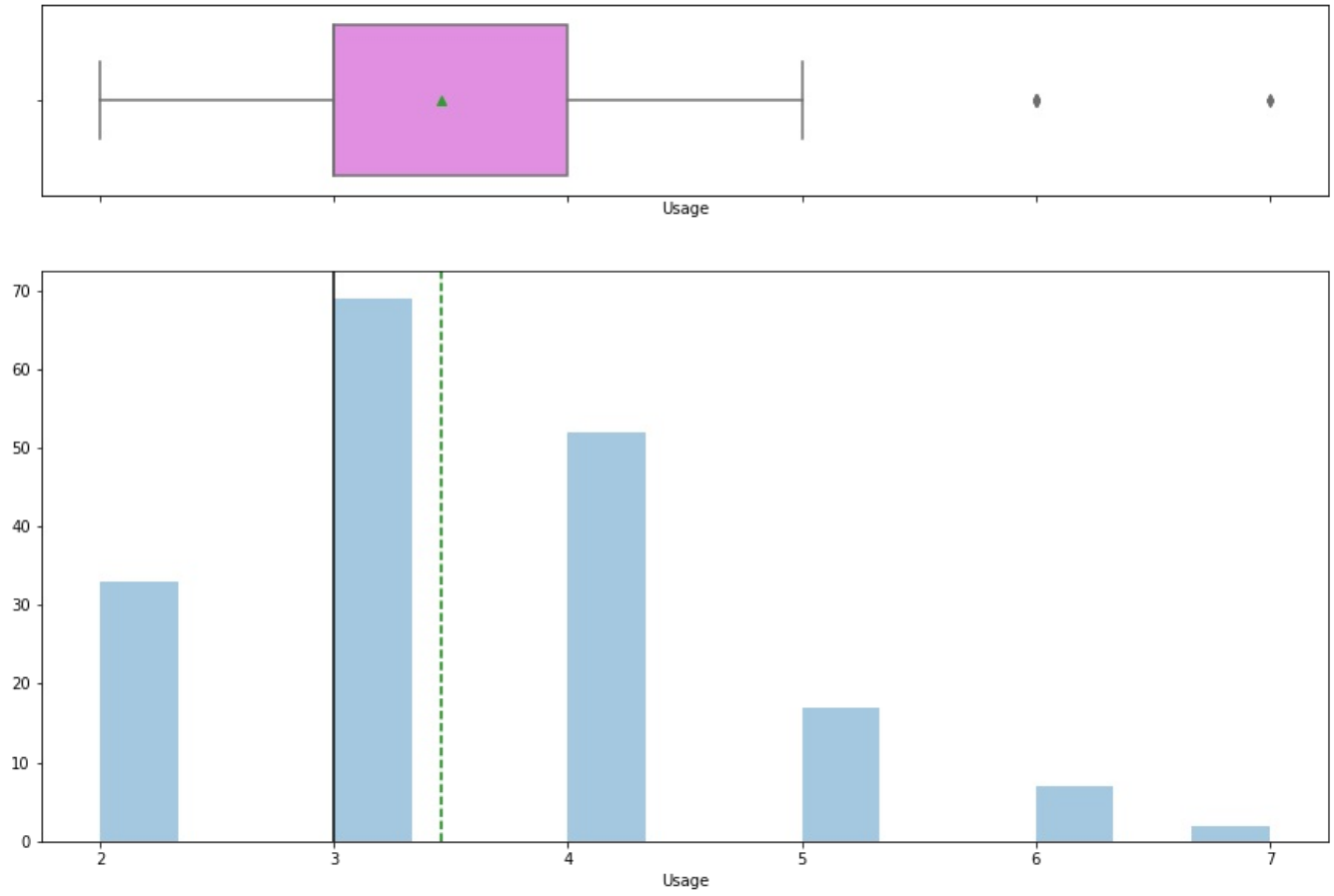




- Mean education for customers is 15.5 years
- There are a few outliers present in data (customers who have education of more than 18 years)

Observations on Usage

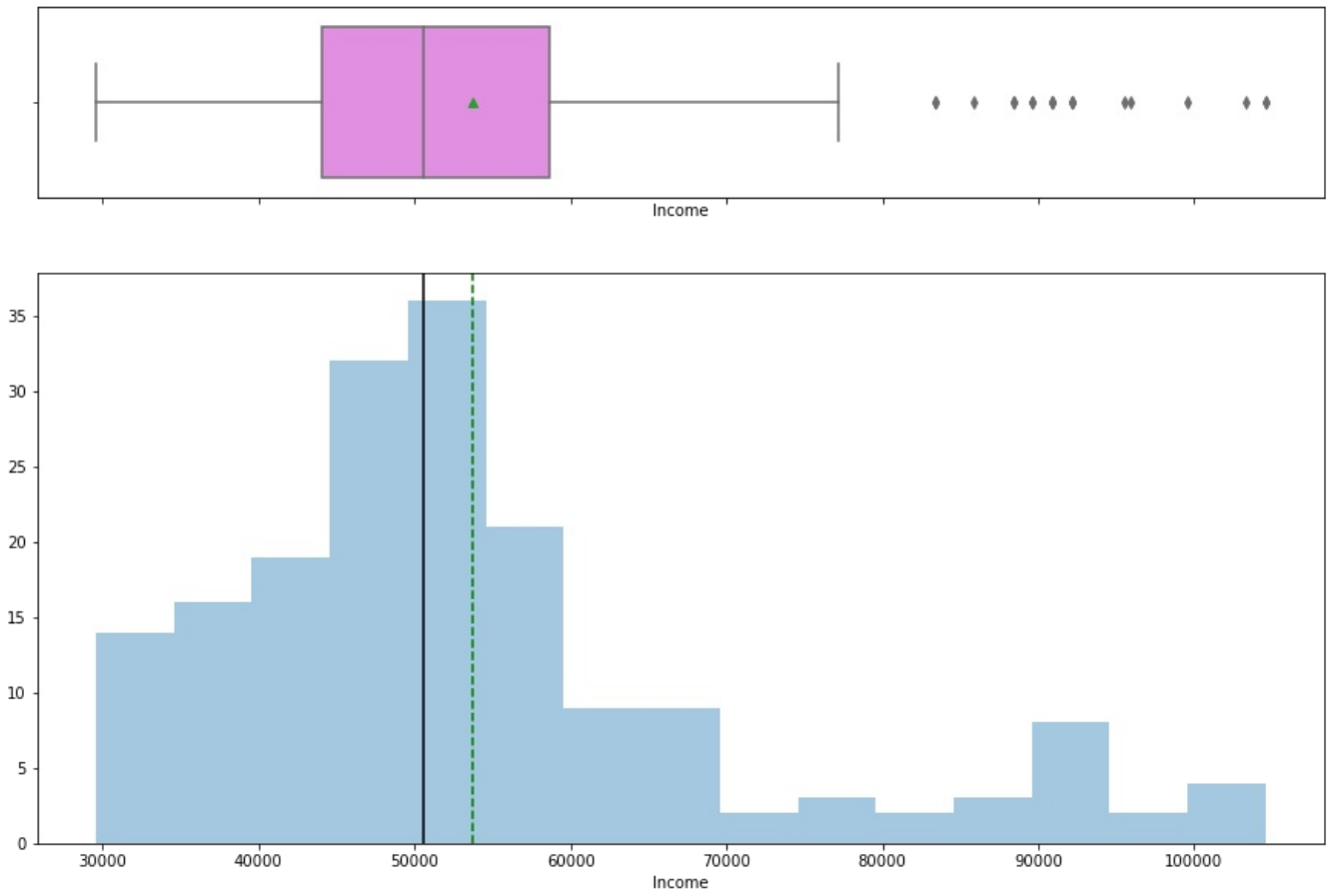
In [16]:
```
histogram_boxplot(cardio["Usage"])
```



- Customers want to use the treadmills 3-4 times a week on an average.
- There are few outliers, customers who wish to use treadmills 6-7 times a week.

Observations on Income

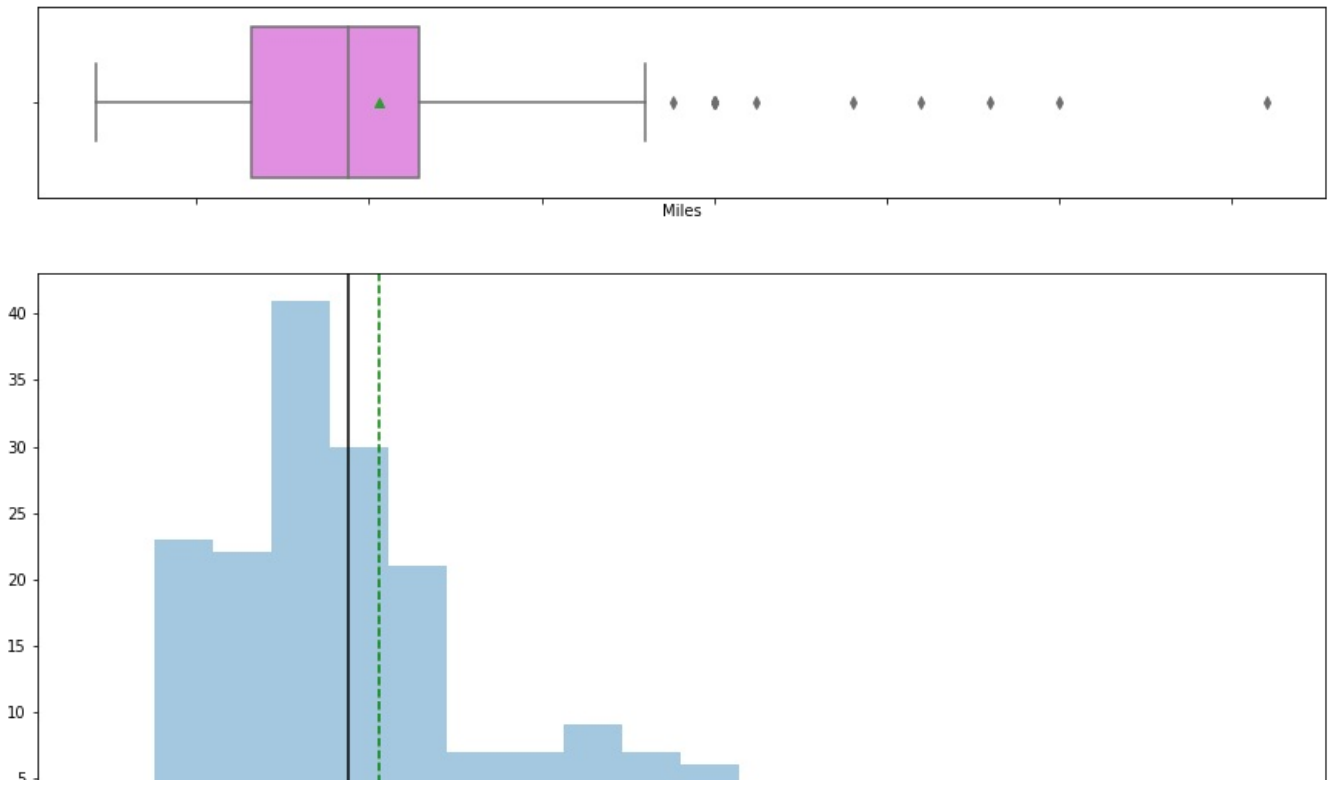
In [17]:
```
histogram_boxplot(cardio["Income"])
```

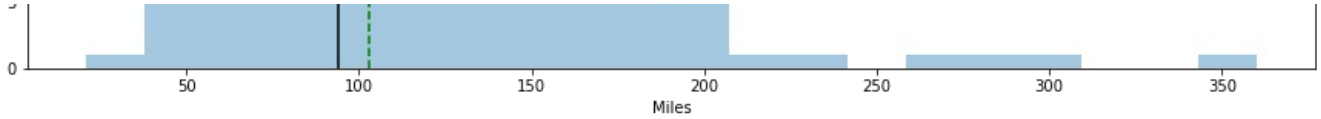


- Mean income of customers who bought treadmill is around 55000.
- Income is right skewed.
- It has many ouliers towards the higher end.

Observations on Miles

In [18]:
```
histogram_boxplot(cardio["Miles"])
```





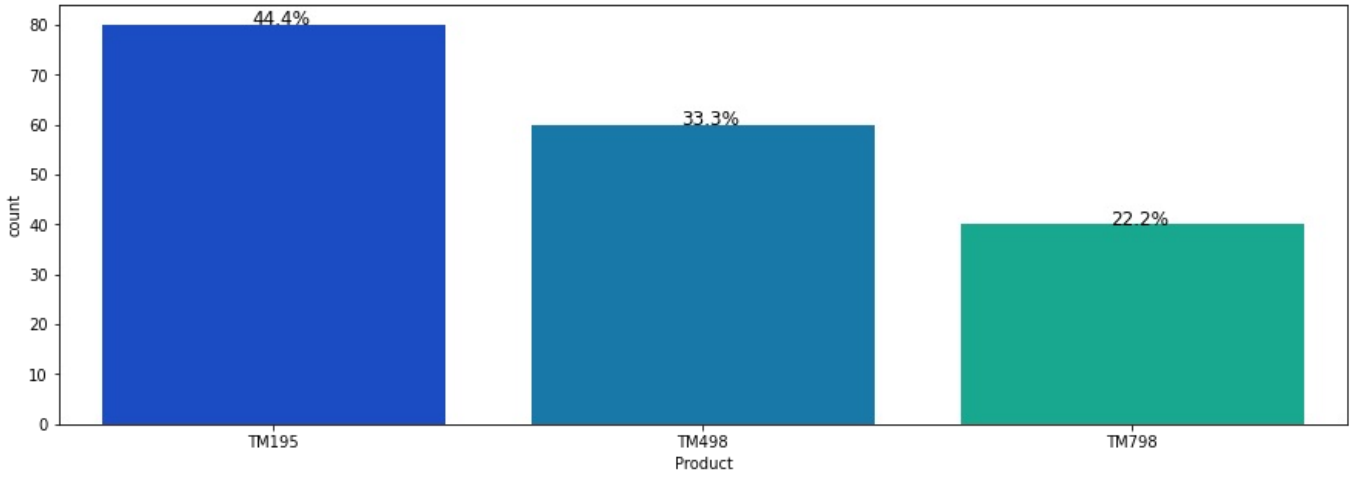
- Most customers expect to run 100 miles per week.
- Miles run is right skewed
- There are outliers present, some customers expect to run more than 200 miles per week, some customers wish to run more than 350 miles per week this could be an error in data collection or any professional runner bought the product.

In [19]:
```
# Function to create barplots that indicate percentage for each category.

def perc_on_bar(plot, feature):
    '''
    plot
    feature: categorical feature
    the function won't work if a column is passed in hue parameter
    '''
    total = len(feature) # length of the column
    for p in ax.patches:
        percentage = '{:.1f}%'.format(100 * p.get_height()/total) # percentage of each class of the category
        x = p.get_x() + p.get_width() / 2 - 0.05 # width of the plot
        y = p.get_y() + p.get_height()           # hieght of the plot
        ax.annotate(percentage, (x, y), size = 12) # annotate the percantage
    plt.show() # show the plot
```

Observations on Product

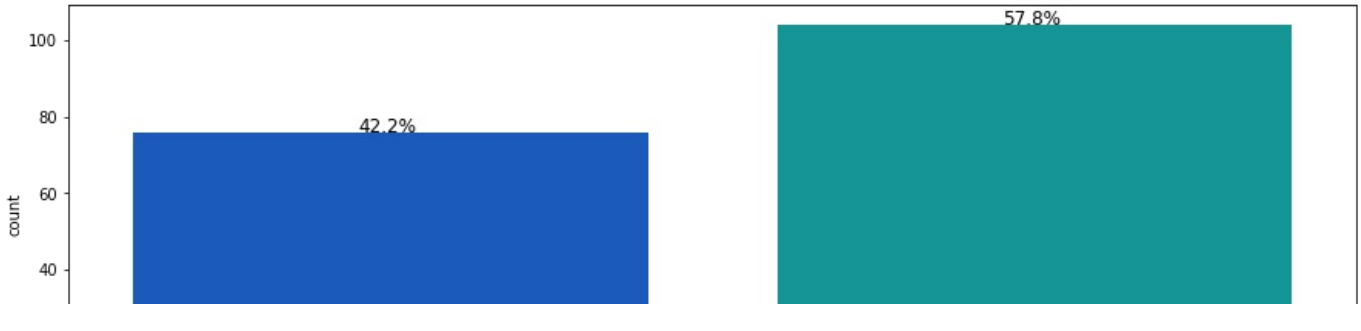
In [20]:
```
plt.figure(figsize=(15,5))
ax = sns.countplot(cardio["Product"],palette='winter')
perc_on_bar(ax,cardio["Product"])
```

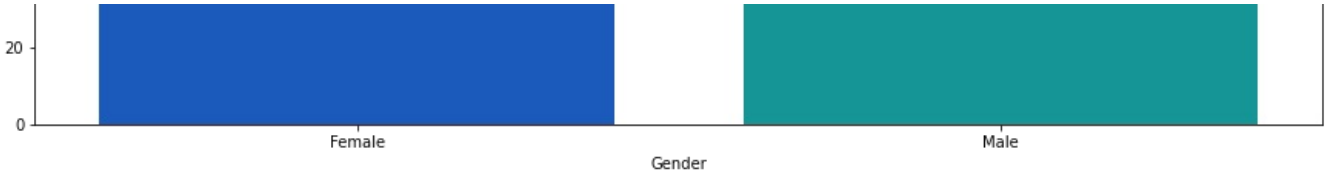


- Highest selling product is TM195(44.4%),followed by TM498(33.3%) and TM798(22.2%)

Observations on Gender

In [21]:
```
plt.figure(figsize=(15,5))
ax = sns.countplot(cardio["Gender"],palette='winter')
perc_on_bar(ax,cardio["Gender"])
```

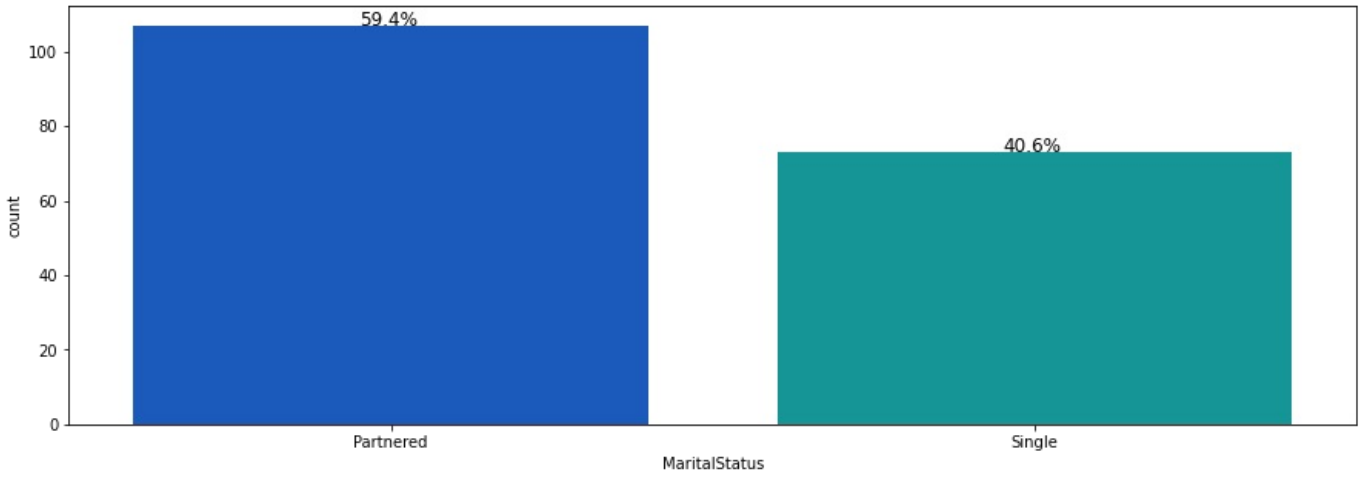




- There are more males customers(57.8%) than females(42.2%)

Observations on Marital Status

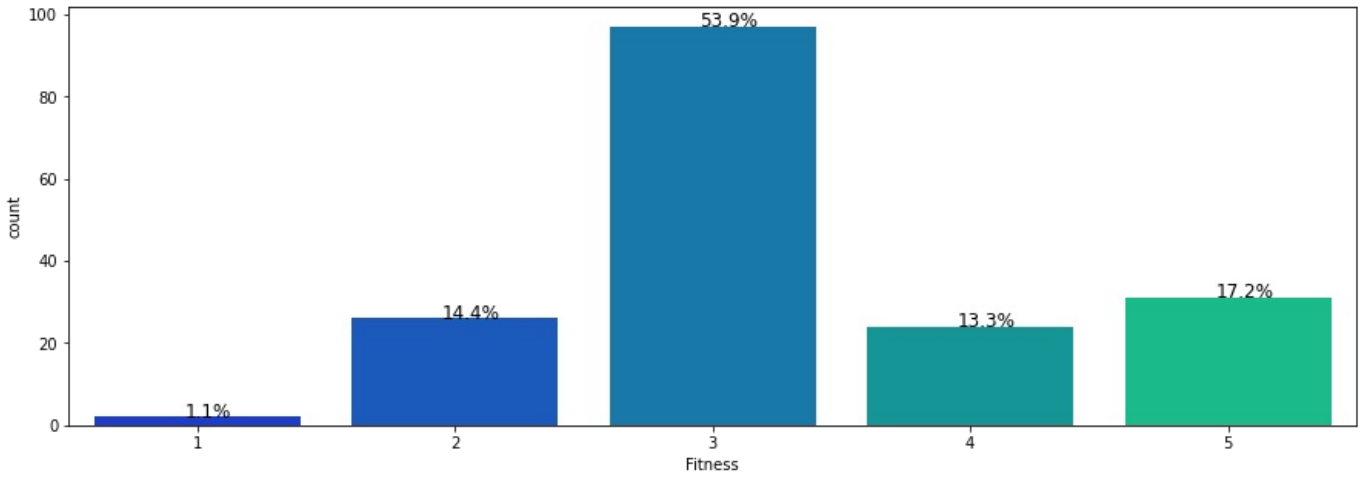
In [22]:
```
plt.figure(figsize=(15,5))
ax = sns.countplot(cardio["MaritalStatus"],palette='winter')
perc_on_bar(ax,cardio["MaritalStatus"])
```



- 40.6% of customers are single while 59.4% of customers have a partner.

Observations on Fitness

In [23]:
```
plt.figure(figsize=(15,5))
ax = sns.countplot(cardio["Fitness"],palette='winter')
perc_on_bar(ax,cardio["Fitness"])
```



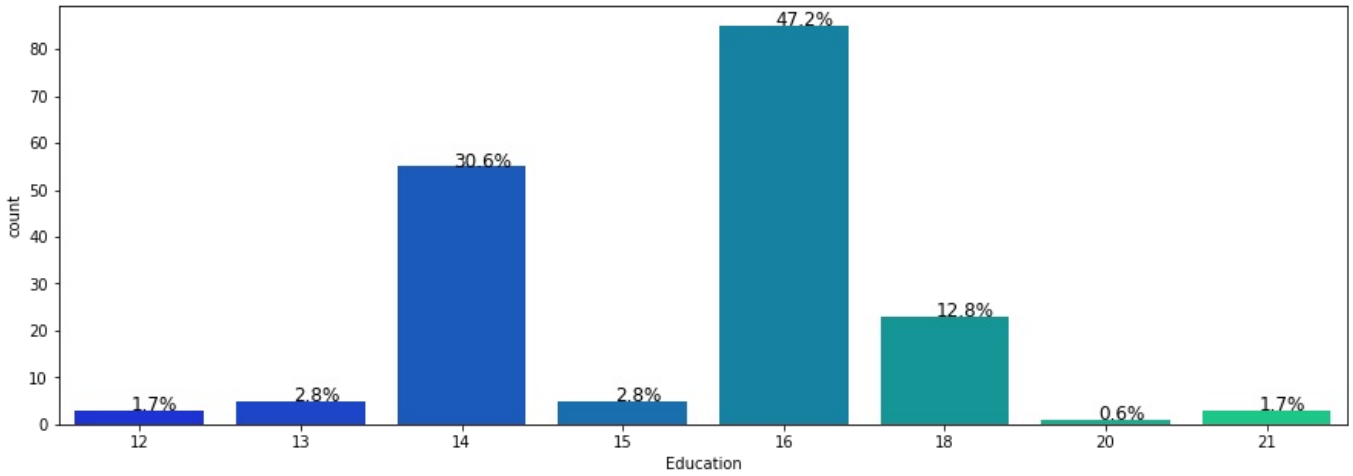
- 53.9% of the customers have rated them at 3 on a scale of 5 (1 being the least fit and 5 being the most fit),followed by 5 rating (17.2%).

Observations on Education

- We saw earlier that years of education has a mean of 15.5 years of education, let's check what is the proportion of each level of

education among our customer population.

In [24]:
```
plt.figure(figsize=(15,5))
ax = sns.countplot(cardio["Education"],palette='winter')
perc_on_bar(ax,cardio["Education"])
```

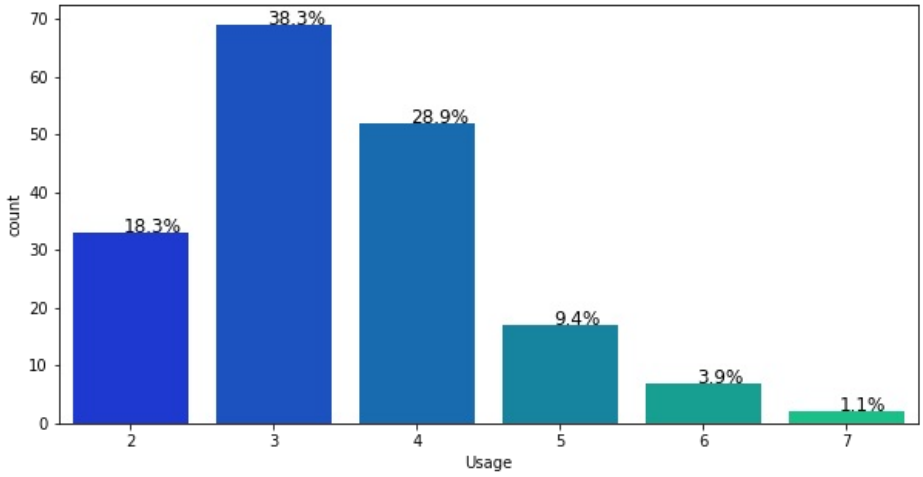


- 47.2% of customers have 16 years of education, followed by 14 years of education(30.6%).

Observations on Usage

- We saw earlier that customers wish to use products for 3-4 days in a week, let's check what is the proportion of each level of usage among our customer population.

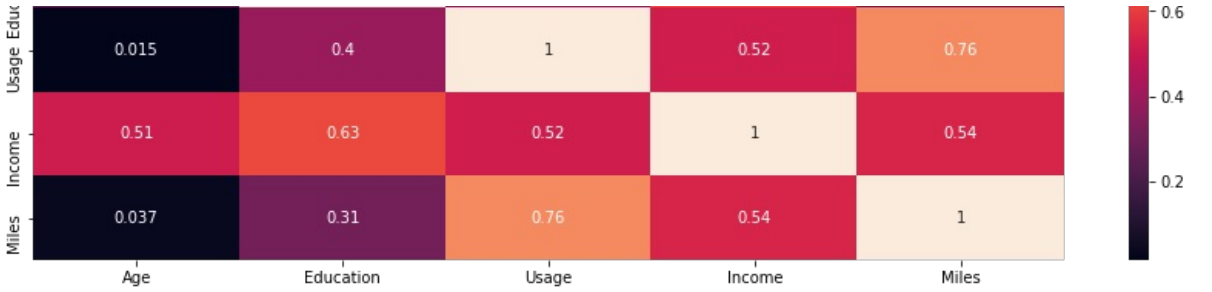
In [25]:
```
plt.figure(figsize=(10,5))
ax = sns.countplot(cardio["Usage"],palette='winter')
perc_on_bar(ax,cardio["Usage"])
```



- 38.3% of customers wish to use the product 3 times a week followed by 28.9% customers who wish to use the product 4 times a week.

Bivariate Analysis

In [26]:
```
plt.figure(figsize=(15,5))
sns.heatmap(cardio.corr(),annot=True)
plt.show()
```



- Miles is highly correlated with usage, a customer running more miles would mean he is also using the treadmill more.
- Education and Income has a positive correlation, indicating higher the education higher would be the income.
- Income shows a positive correlation with Age , Usage, and Miles.
- A positive correlation between age and income is expected but a high poistive correlation of income with usage and miles should be investigated further.

In [27]:

```
sns.pairplot(data=cardio.drop(["Fitness"],axis=1),hue="Product")
plt.show()
```

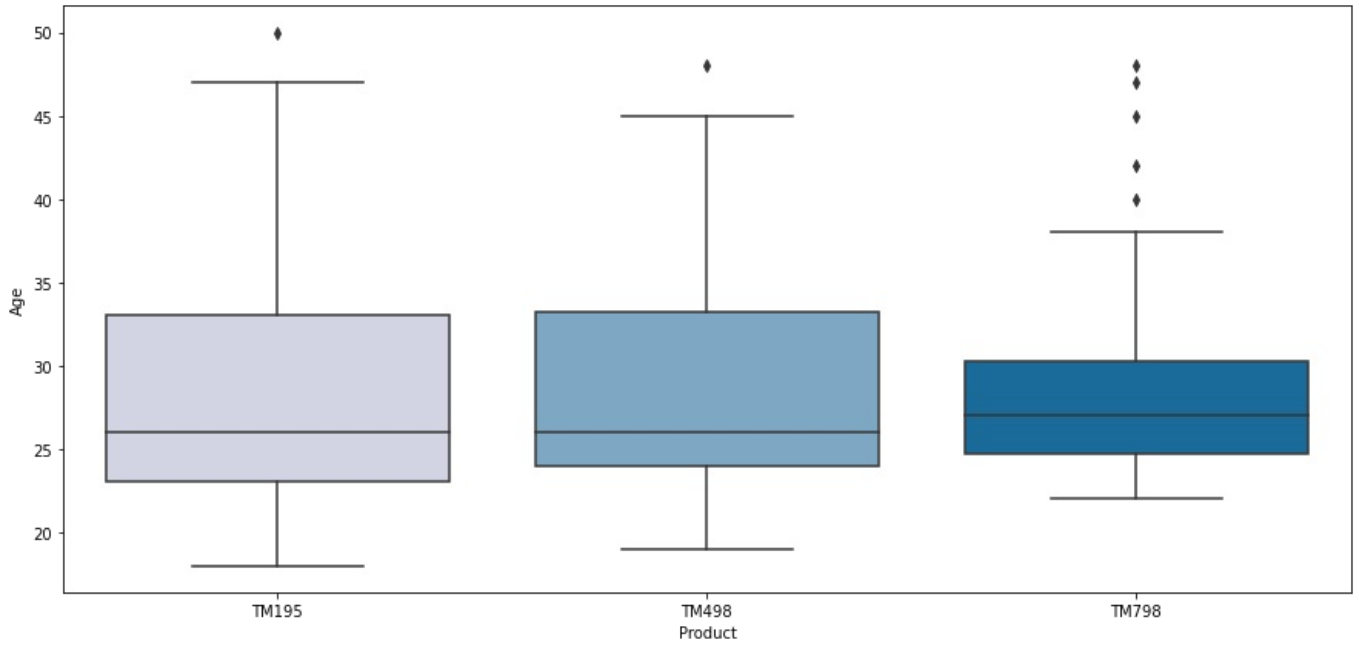
- We can see varying distributions in variables for different products, we should investigate it further.

Product vs Age

In [28]:

```
plt.figure(figsize=(15,7))
```

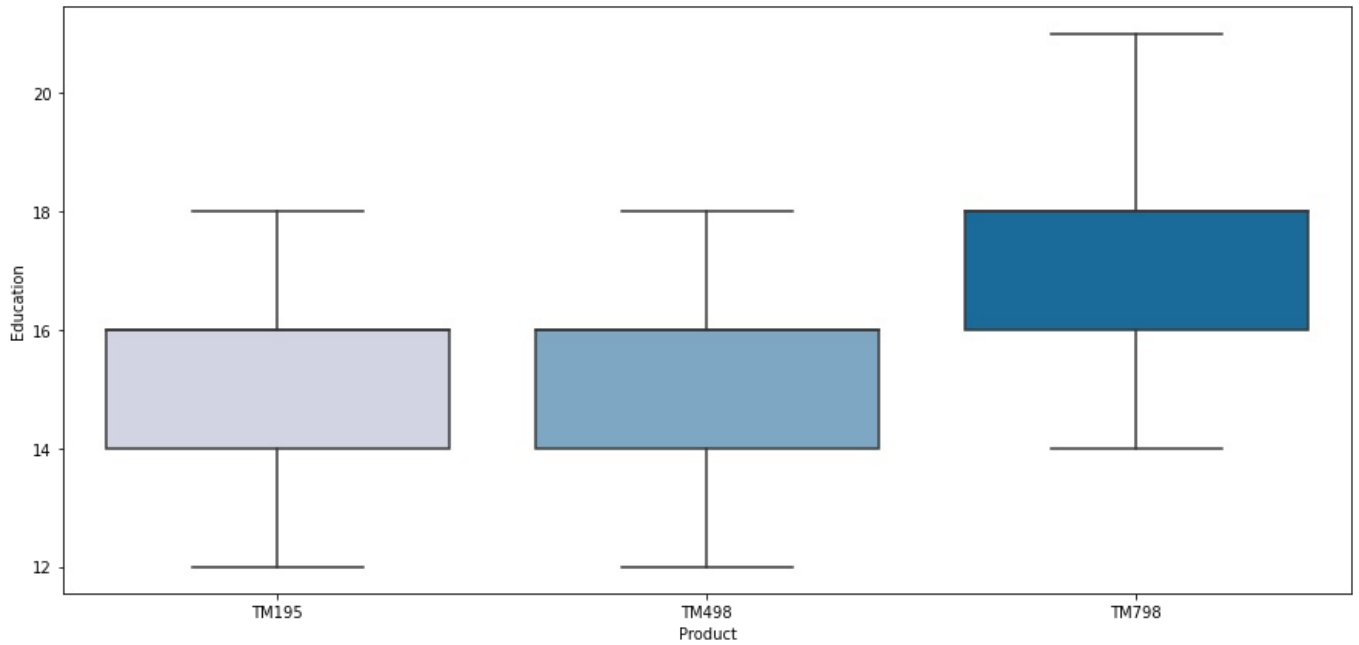
```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Product"],cardio["Age"],palette="PuBu")
plt.show()
```



- TM195 and TM498 are preferred by customers of all ages but for TM798 customers are in the range of above 22 and below 38 (but there are some outliers)

Product vs Education

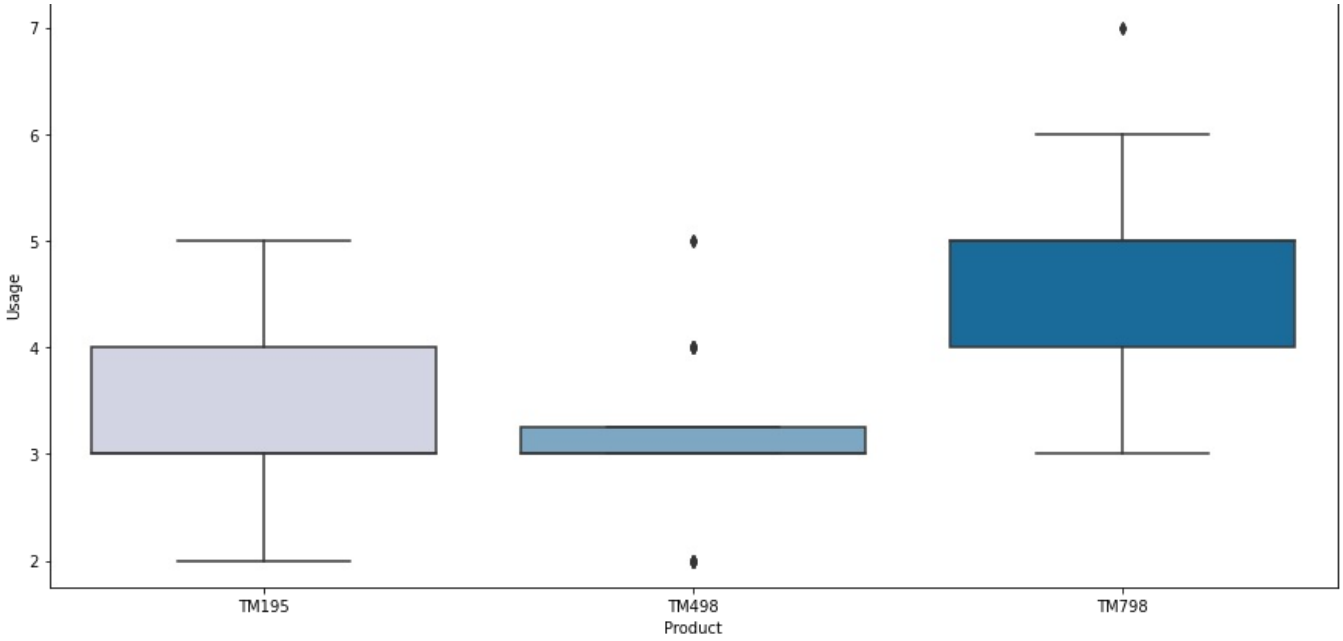
In [29]:
```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Product"],cardio["Education"],palette="PuBu")
plt.show()
```



- Customers buying TM798 have higher education as compared to the customers buying the other two other products

Product vs Usage

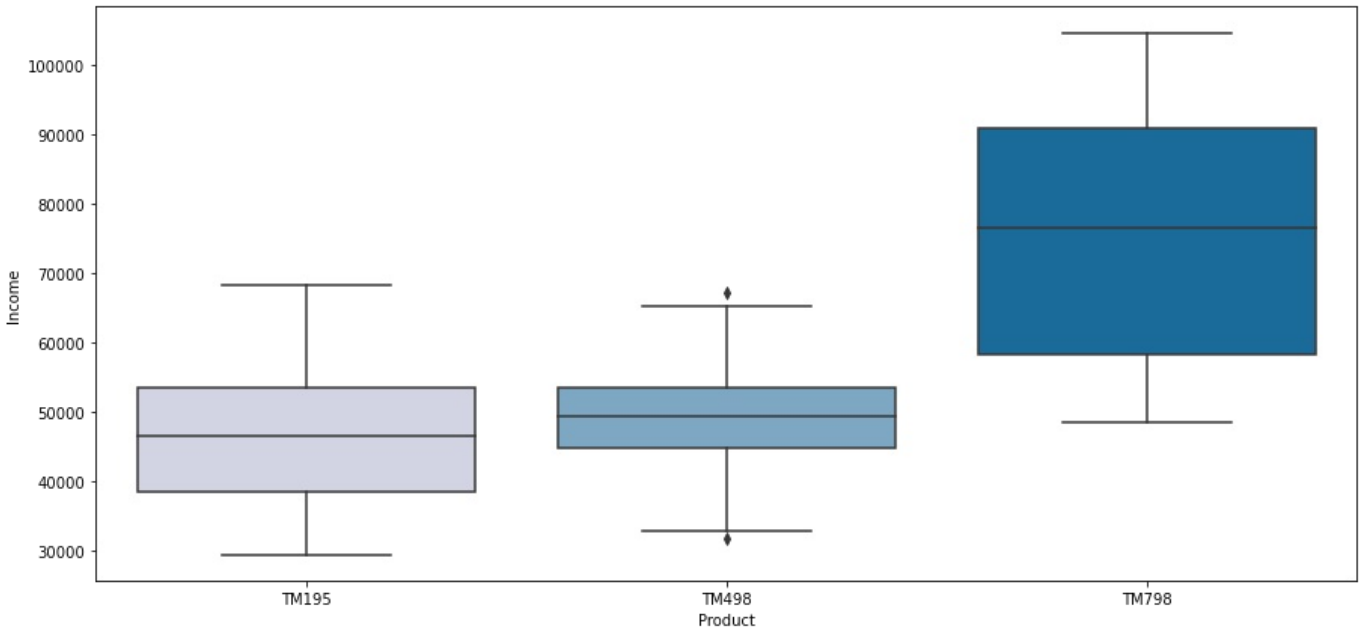
In [30]:
```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Product"],cardio["Usage"],palette="PuBu")
plt.show()
```



- Customers who have higher expected treadmill usage(greater than 3 days) prefer the TM798 product, Customers with very light(2-3 days) usage prefer TM498, customers who have moderate usage (greater than 2 days but less than or equal to 5 days) prefer TM195.

Product vs Income

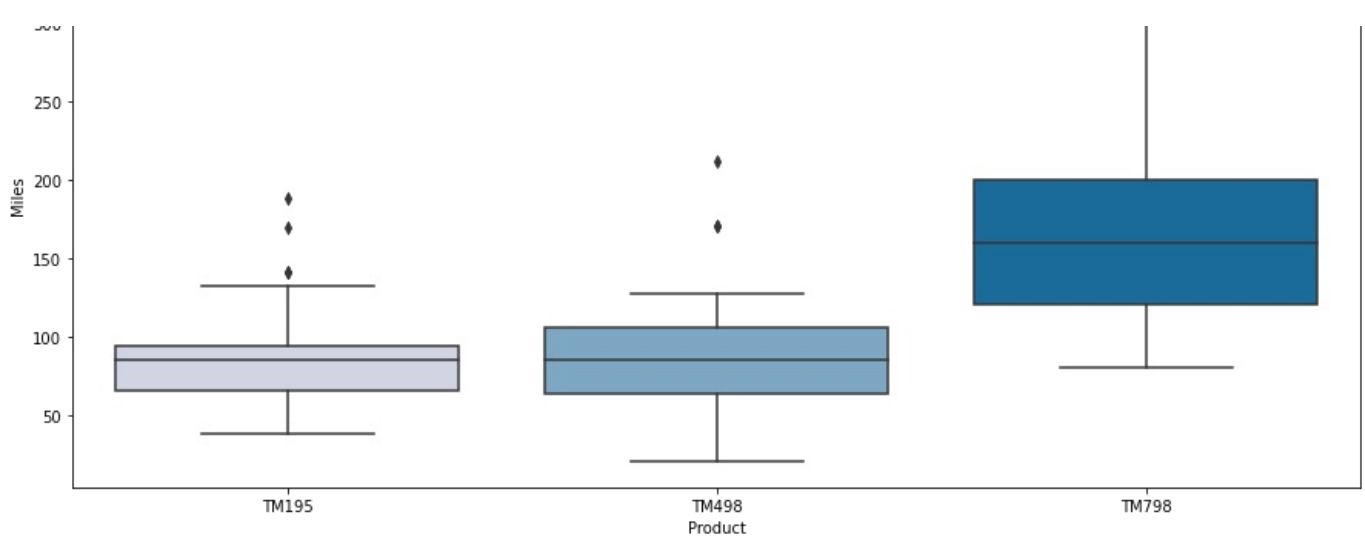
In [31]:
```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Product"],cardio["Income"],palette="PuBu")
plt.show()
```



- Customers with higher income prefer TM798, whereas TM195 and TM498 are prefered by middle income customers.

Product vs Miles

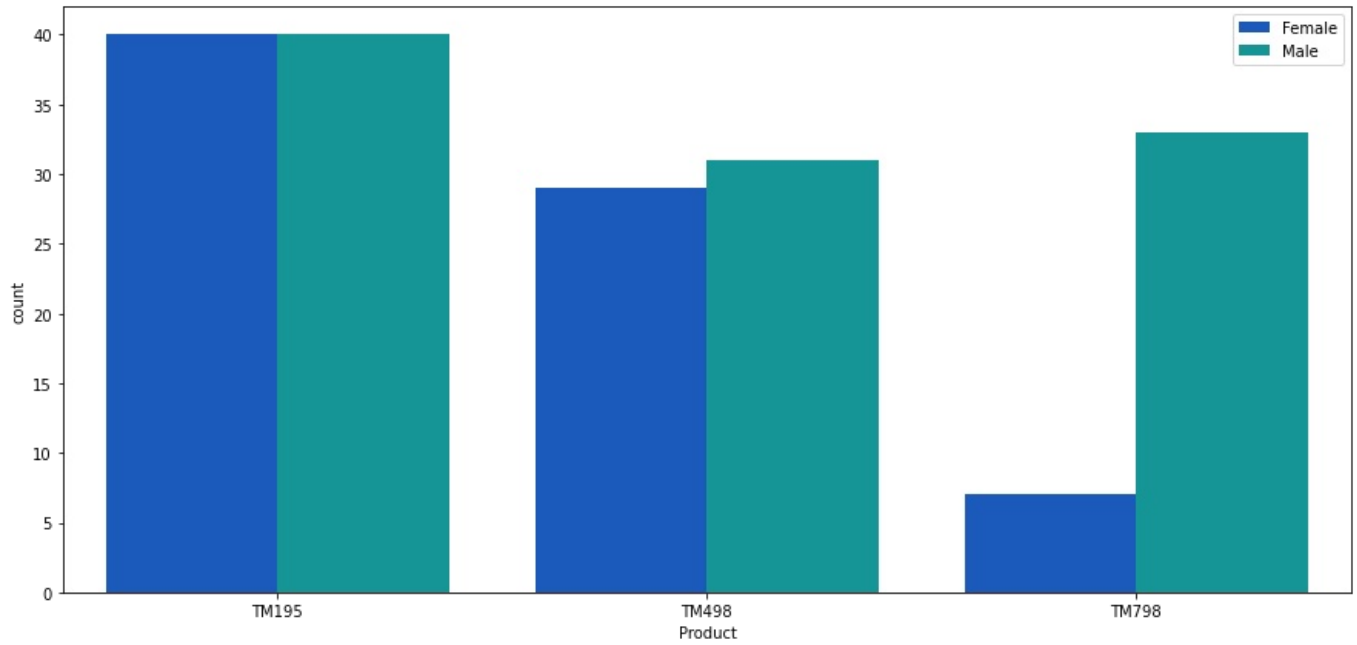
In [32]:
```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Product"],cardio["Miles"],palette="PuBu")
plt.show()
```



- Customers who expect to run higher miles go for TM798.

Product vs Gender

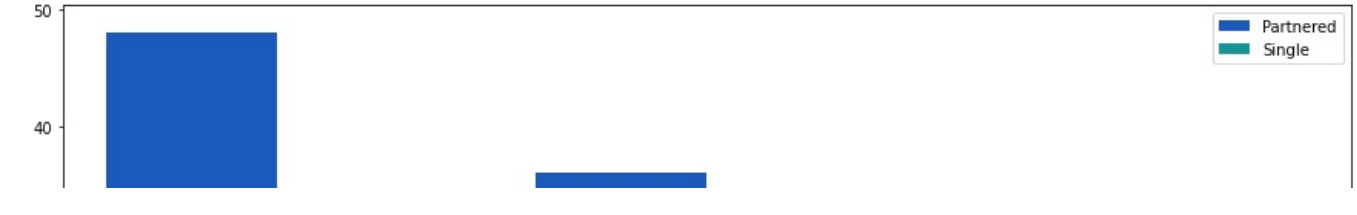
In [33]:
```
plt.figure(figsize=(15,7))
sns.countplot(cardio["Product"],hue=cardio["Gender"],palette='winter')
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```

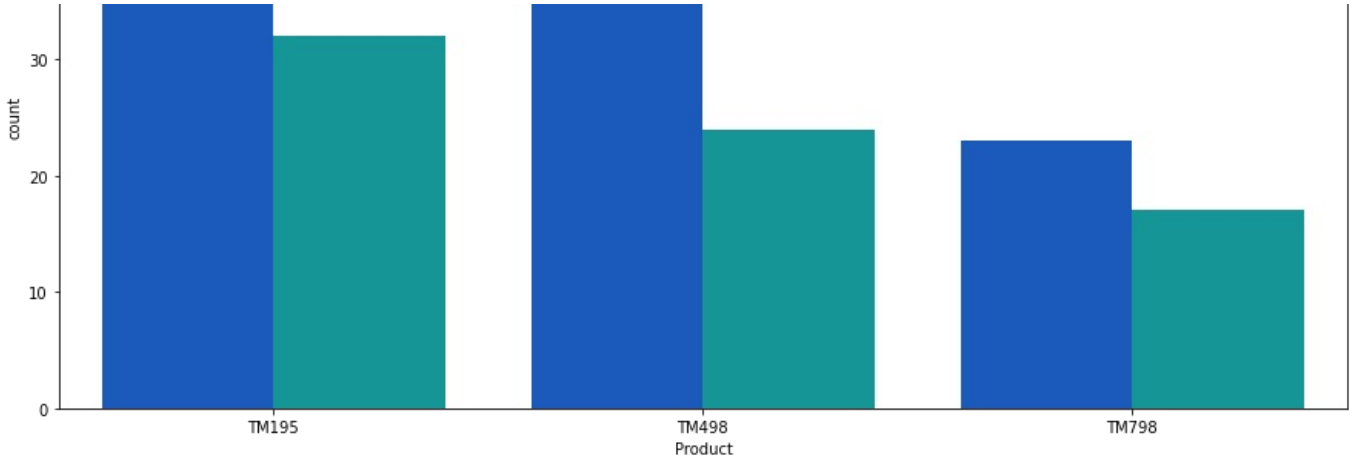


- TM798 has been bought more by the male customers as compared to the female customers, for TM195 and TM498 there is equal distribution among genders

Product vs Marital Status

In [34]:
```
plt.figure(figsize=(15,7))
sns.countplot(cardio["Product"],hue=cardio["MaritalStatus"],palette='winter')
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```

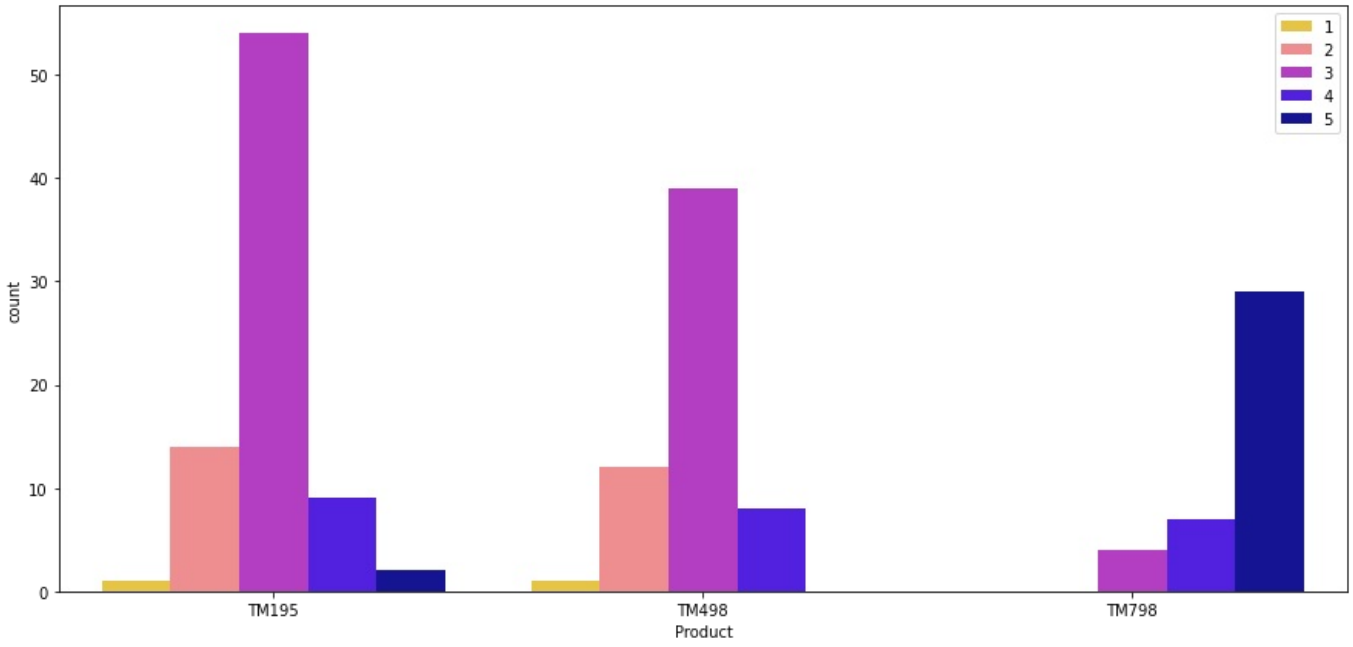




- All the products are couple/partner friendly.
- Couples/partnered customers have a higher chance of buying a product when compared to single customers.

Product vs Fitness

In [35]:
```
plt.figure(figsize=(15,7))
sns.countplot(cardio["Product"],hue=cardio["Fitness"],palette="gnuplot2_r")
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```



- Customers who purchased TM195 and TM498 gave themselves a balanced fitness rating of 3 (on a scale of 5, 1 being the least fit and 5 being the most fit), but for TM798 most of customers have rated themselves higher in fitness that is 5.

Grouping data w.r.t to products to build customer profiles

In [36]:
```
cardio[cardio["Product"]=="TM195"].describe(include="all")
```

Out[36]:

	Product	Age	Gender	Education	MaritalStatus	Usage	Fitness	Income	Miles
count	80	80.000000	80	80.000000	80	80.000000	80.0	80.00000	80.000000
unique	1	NaN	2	NaN	2	NaN	5.0	NaN	NaN
top	TM195	NaN	Male	NaN	Partnered	NaN	3.0	NaN	NaN
freq	80	NaN	40	NaN	48	NaN	54.0	NaN	NaN
mean	NaN	28.550000	NaN	15.037500	NaN	3.087500	NaN	46418.02500	82.787500
std	NaN	7.221452	NaN	1.216383	NaN	0.782624	NaN	9075.78319	28.874102

min	NaN	18.000000	NaN	12.000000	NaN	2.000000	NaN	29562.00000	38.000000
25%	NaN	23.000000	NaN	14.000000	NaN	3.000000	NaN	38658.00000	66.000000
50%	NaN	26.000000	NaN	16.000000	NaN	3.000000	NaN	46617.00000	85.000000
75%	NaN	33.000000	NaN	16.000000	NaN	4.000000	NaN	53439.00000	94.000000
max	NaN	50.000000	NaN	18.000000	NaN	5.000000	NaN	68220.00000	188.000000

TM195 Customer

The TM195 customer is our regular customer (since this product is sold more than others).

- Early 20's to early 30's
- 12-18 years of educataion
- Income between 40K and 50K
- Plans to use treadmill three to four times per week for light usage.
- Has an average fitness level (rated 3)

In [37]:
```
cardio[cardio["Product"]=="TM498"].describe(include="all")
```

Out[37]:

	Product	Age	Gender	Education	MaritalStatus	Usage	Fitness	Income	Miles
count	60	60.000000	60	60.000000	60	60.000000	60.0	60.000000	60.000000
unique	1	NaN	2	NaN	2	NaN	4.0	NaN	NaN
top	TM498	NaN	Male	NaN	Partnered	NaN	3.0	NaN	NaN
freq	60	NaN	31	NaN	36	NaN	39.0	NaN	NaN
mean	NaN	28.900000	NaN	15.116667	NaN	3.066667	NaN	48973.650000	87.933333
std	NaN	6.645248	NaN	1.222552	NaN	0.799717	NaN	8653.989388	33.263135
min	NaN	19.000000	NaN	12.000000	NaN	2.000000	NaN	31836.000000	21.000000
25%	NaN	24.000000	NaN	14.000000	NaN	3.000000	NaN	44911.500000	64.000000
50%	NaN	26.000000	NaN	16.000000	NaN	3.000000	NaN	49459.500000	85.000000
75%	NaN	33.250000	NaN	16.000000	NaN	3.250000	NaN	53439.000000	106.000000
max	NaN	48.000000	NaN	18.000000	NaN	5.000000	NaN	67083.000000	212.000000

TM498 Customer

The TM498 customers is similar to the TM195 customer in most aspects. The differences are that these customers have a slightly higher annual income, a narrower usage, and a broader expectation of Miles to run each week.

With such a specific usage anticipation it is likely the TM498 customer is a working adult with a fixed or busy schedule (since these customers only tend to use the treadmill 3 times a week)

- Adult in their mid 20's to early 30's
- 12-18 years of educatation.
- Income around 50K.
- Plans to use treadmill three days a week for a light to moderate amount.
- Has an average fitness level.

In [38]:
```
cardio[cardio["Product"]=="TM798"].describe(include="all")
```

Out[38]:

	Product	Age	Gender	Education	MaritalStatus	Usage	Fitness	Income	Miles
count	40	40.000000	40	40.000000	40	40.000000	40.0	40.00000	40.000000
unique	1	NaN	2	NaN	2	NaN	3.0	NaN	NaN
top	TM798	NaN	Male	NaN	Partnered	NaN	5.0	NaN	NaN
freq	40	NaN	33	NaN	23	NaN	29.0	NaN	NaN
mean	NaN	29.100000	NaN	17.325000	NaN	4.775000	NaN	75441.57500	166.900000
std	NaN	6.971738	NaN	1.639066	NaN	0.946993	NaN	18505.83672	60.066544
min	NaN	22.000000	NaN	14.000000	NaN	3.000000	NaN	48556.00000	80.000000
25%	NaN	24.750000	NaN	16.000000	NaN	4.000000	NaN	58204.75000	120.000000
50%	NaN	27.000000	NaN	18.000000	NaN	5.000000	NaN	76568.50000	160.000000
75%	NaN	30.250000	NaN	18.000000	NaN	5.000000	NaN	90886.00000	200.000000

max	NaN	48.000000	NaN	21.000000	NaN	7.000000	NaN	104581.00000	360.000000

TM798 Customer

The TM798 model attracts a specific customer. In stark contrast to models T498 and T195, the T798 customer is predominantly male, highly educated and has higher salary.

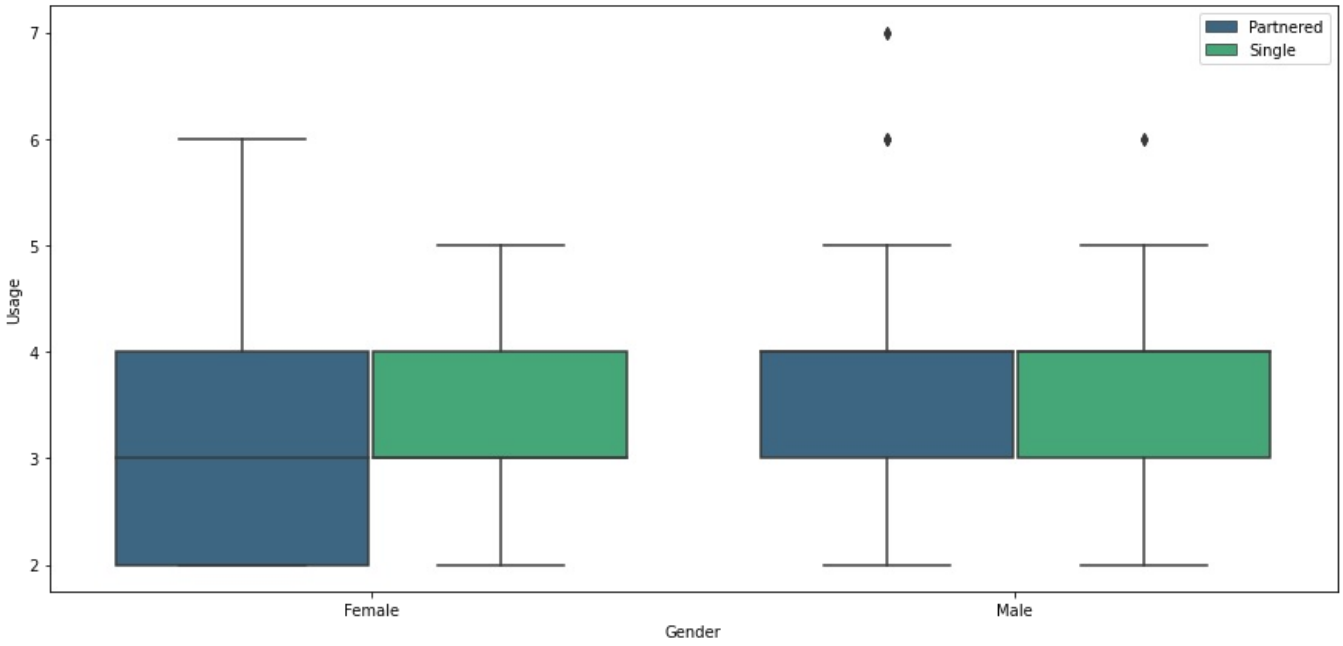
- Generally preferred by Males in late 20's
- Highly Educated
- Higher income earner
- Plans to use treadmill 4-5 days a week, running 160 miles on an average.
- Considers themselves very fit.

Customer Segmentation

This will help us to understand and cater needs of customers better based on their gender,marital status, Age etc.

Usage vs Gender vs Marital Status

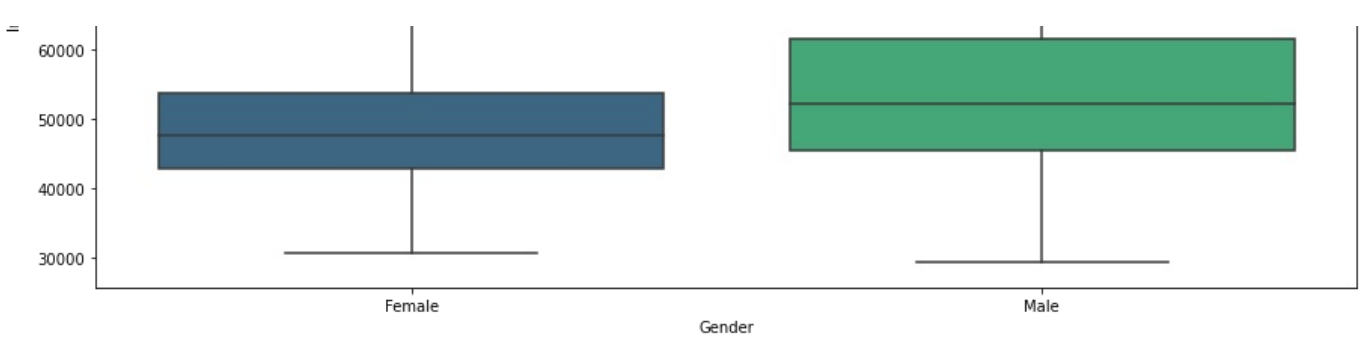
In [39]:
```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Gender"],cardio["Usage"],hue=cardio["MaritalStatus"],palette="viridis")
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```



- Usage for single females, single or partnered male is same it varies for females that have a partner.

Gender vs Income

In [40]:
```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Gender"],cardio["Income"],palette="viridis")
plt.show()
```

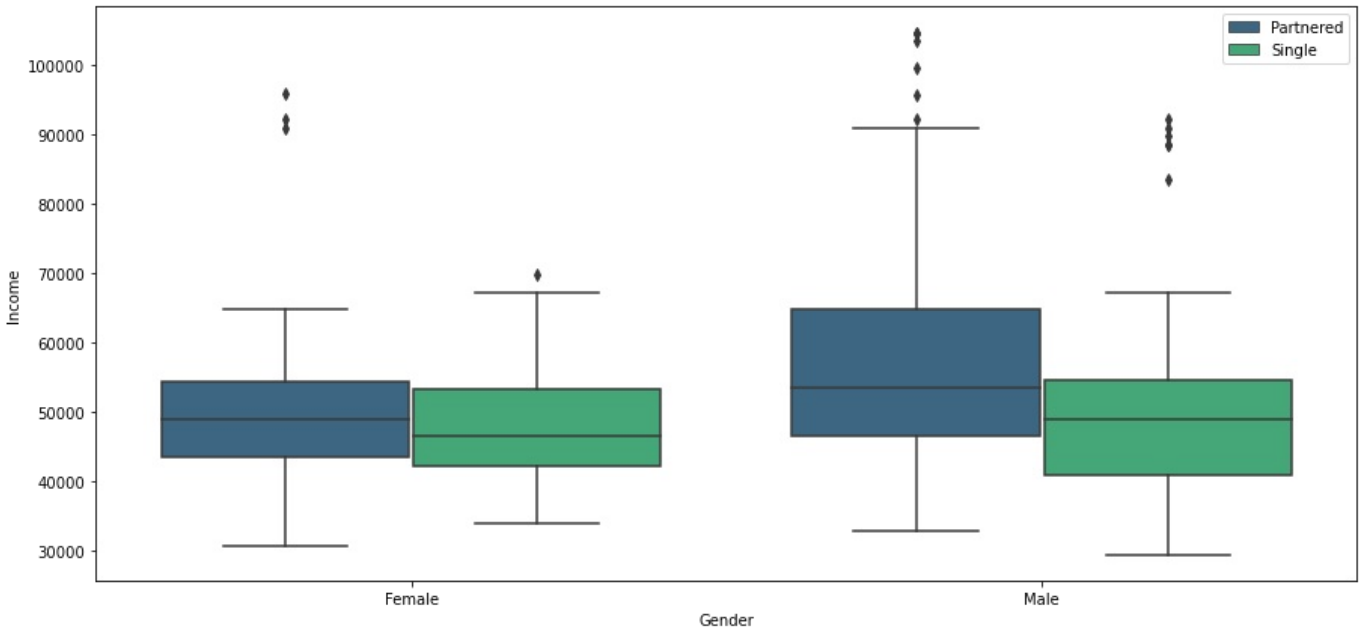


- There is a large disparity in income of both the genders, there are more males with higher income than females.

Gender vs Income vs Marital Status

In [41]:

```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Gender"],cardio["Income"],hue=cardio["MaritalStatus"],palette="viridis")
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```

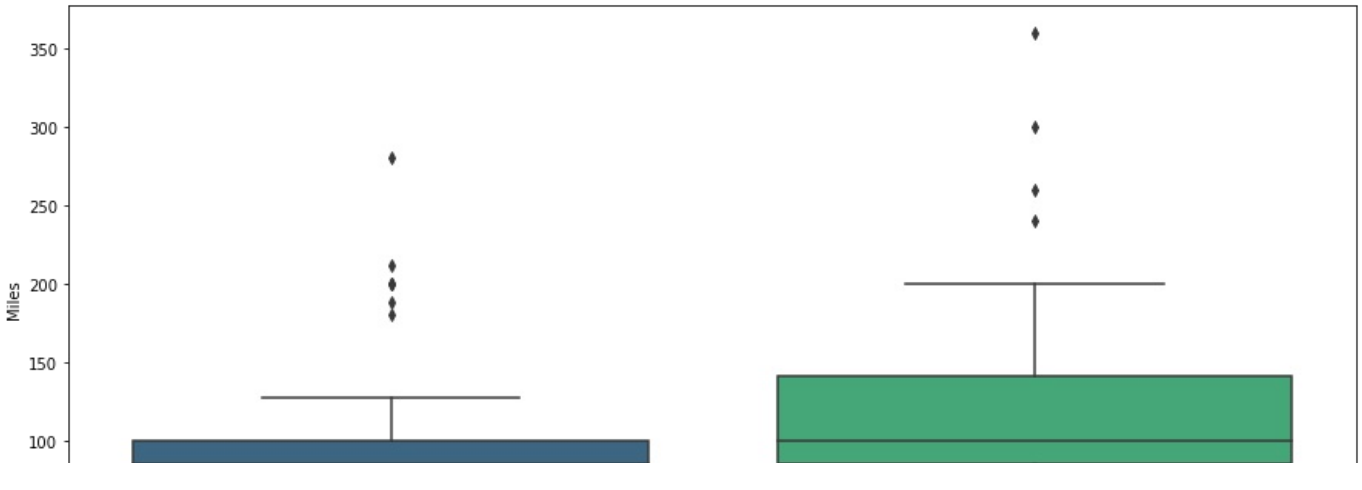


- Males with a partner have higher income, while the income for single and partnered females is almost compareable.

Gender vs Miles

In [42]:

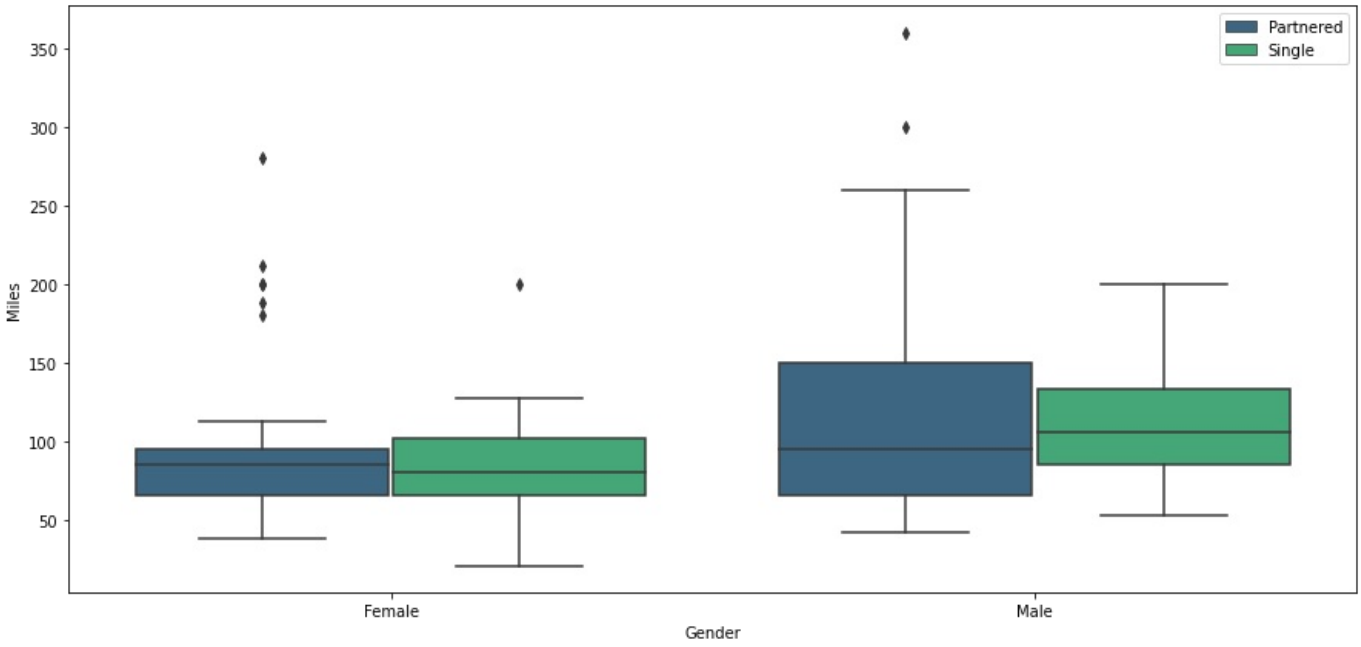
```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Gender"],cardio["Miles"],palette="viridis")
plt.show()
```



- Males expect to run more miles than females

Gender vs Miles vs Marital Status

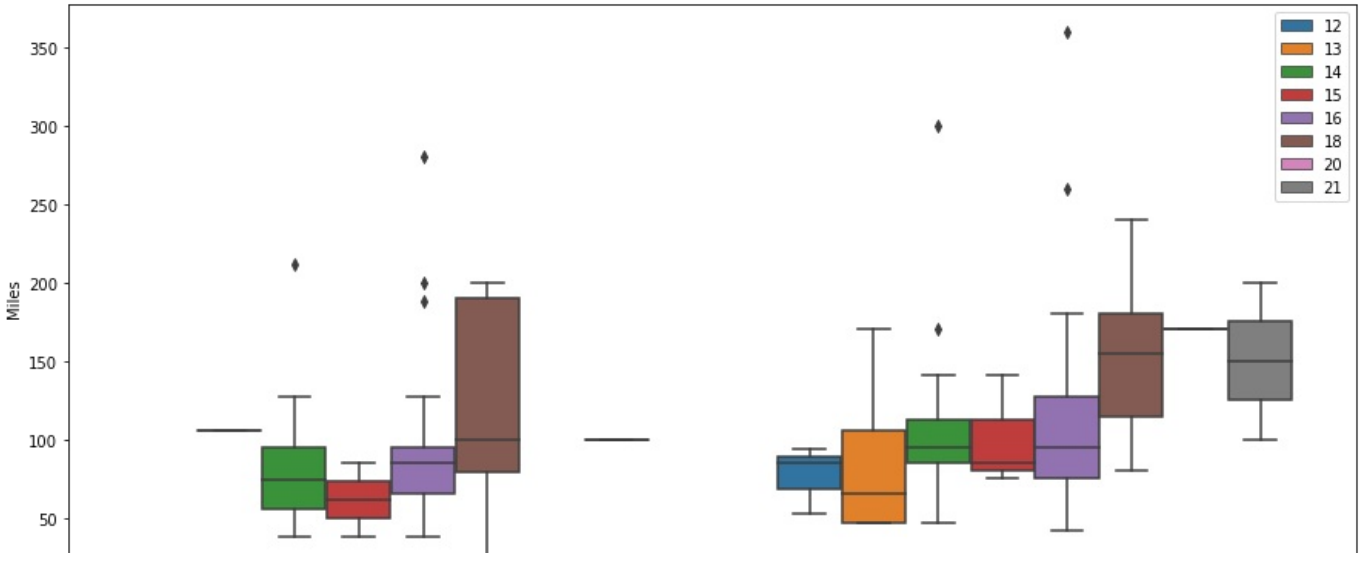
In [43]:
```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Gender"],cardio["Miles"],hue=cardio["MaritalStatus"],palette="viridis")
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```



- Single and Partnered male expect to run more miles, while not much difference can be noticed between Single or Partnered females.

Gender vs Miles vs Education

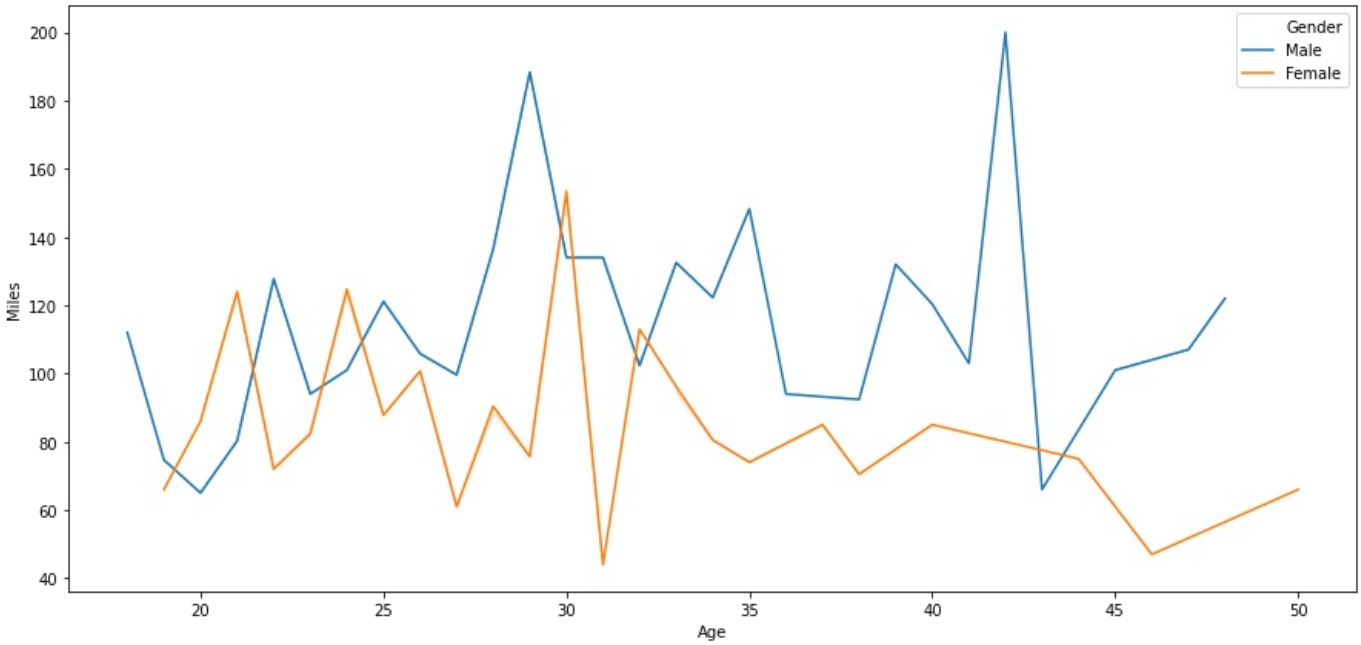
In [44]:
```
plt.figure(figsize=(15,7))
sns.boxplot(cardio["Gender"],cardio["Miles"],hue=cardio["Education"])
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```



- The expected miles to run increases as the education level increases, indicating that the more educated customers are more fitness aware.

Age vs Miles vs Gender

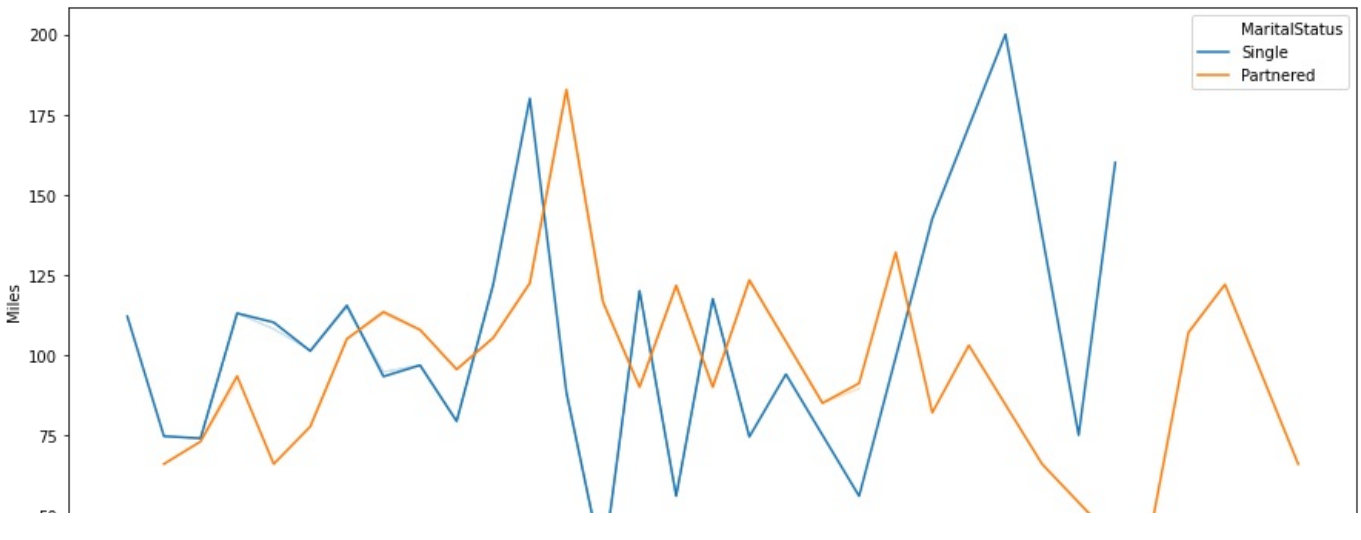
In [45]:
```
plt.figure(figsize=(15,7))
sns.lineplot(cardio["Age"],cardio["Miles"],hue=cardio["Gender"],ci=0)
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```

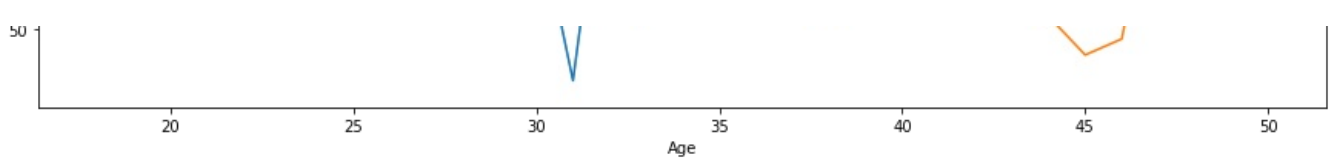


- With the increase in age the average expected miles to run decreases in females, whereas for males it shows an increasing and decreasing trend.
- As the age increases above 25, males expect to run more miles than females.
- After 30 there is a sharp decrease in the Average miles a female expects to run.

Age vs Miles vs Marital Status

In [46]:
```
plt.figure(figsize=(15,7))
sns.lineplot(cardio["Age"],cardio["Miles"],hue=cardio["MaritalStatus"],ci=0)
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```

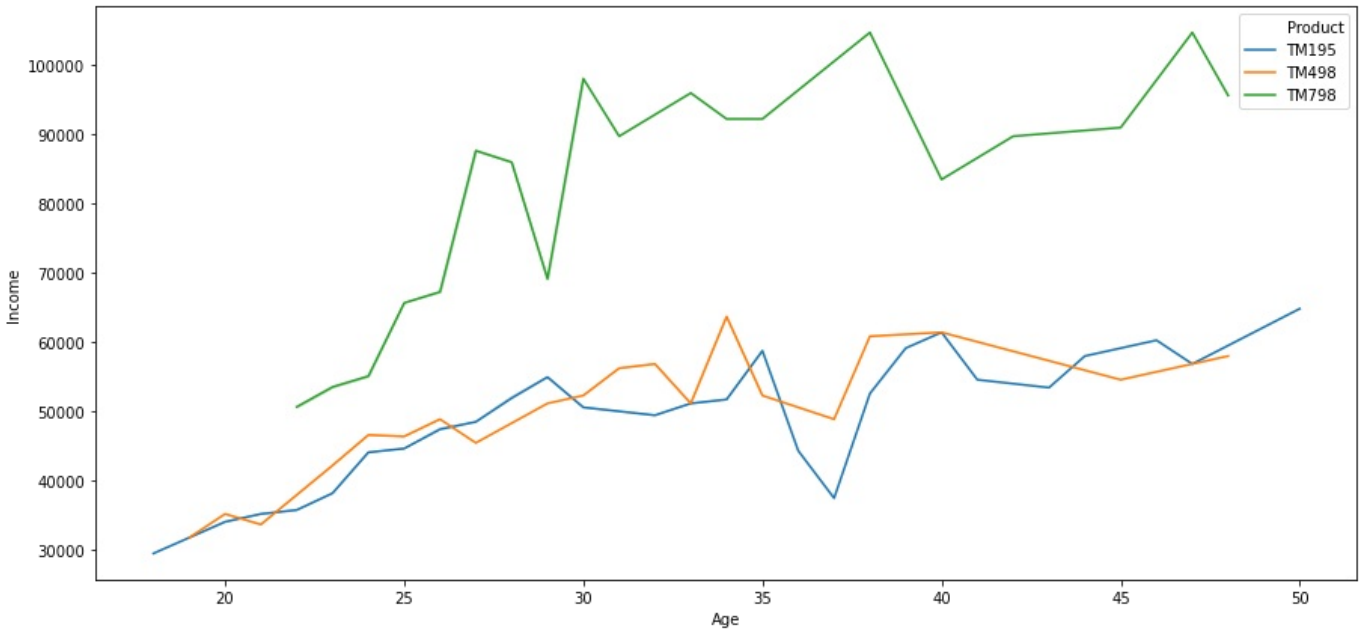




- The trend is mostly similar across younger years for a single or a customer with a partner, however after 40 years singles tend to work more on their fitness.

Age vs Income vs Product

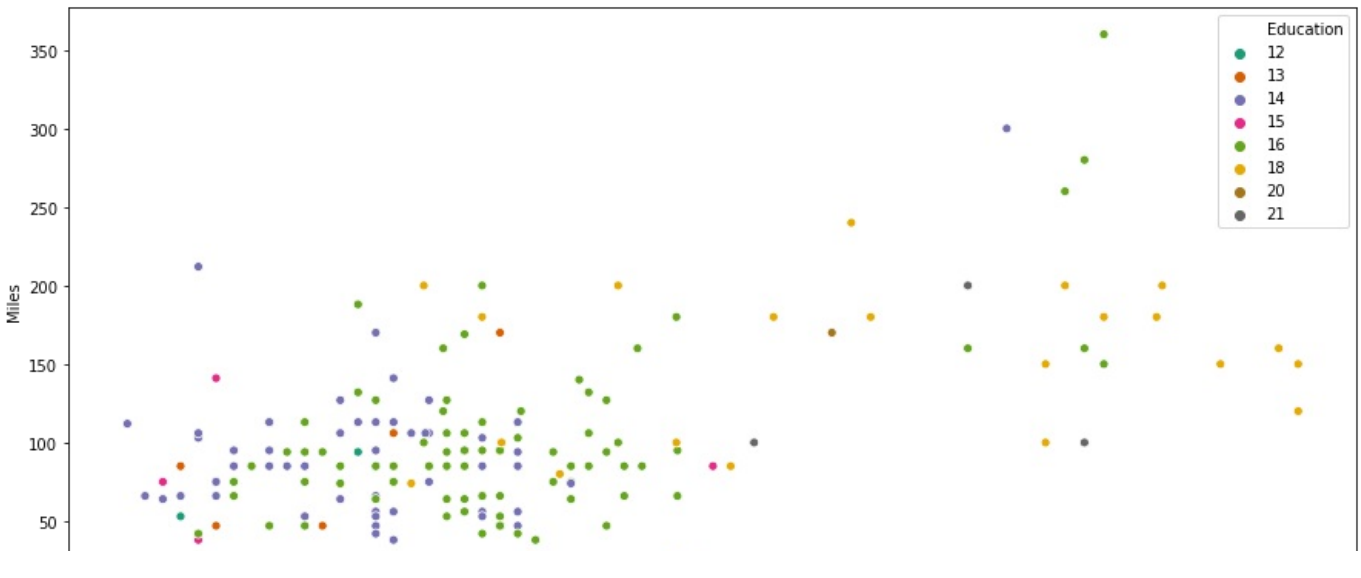
In [47]:
```
plt.figure(figsize=(15,7))
sns.lineplot(cardio["Age"],cardio["Income"],hue=cardio["Product"],ci=0)
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```



- TM195 and TM498 have simlilar income group customers[30k-60k] for all age groups but TM798 is purchased by higher income [greater than 60k] customers only for all age groups.

Income vs Miles vs Education

In [48]:
```
plt.figure(figsize=(15,7))
sns.scatterplot(cardio["Income"],cardio["Miles"],hue=cardio["Education"],ci=0.,palette="Dark2")
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```

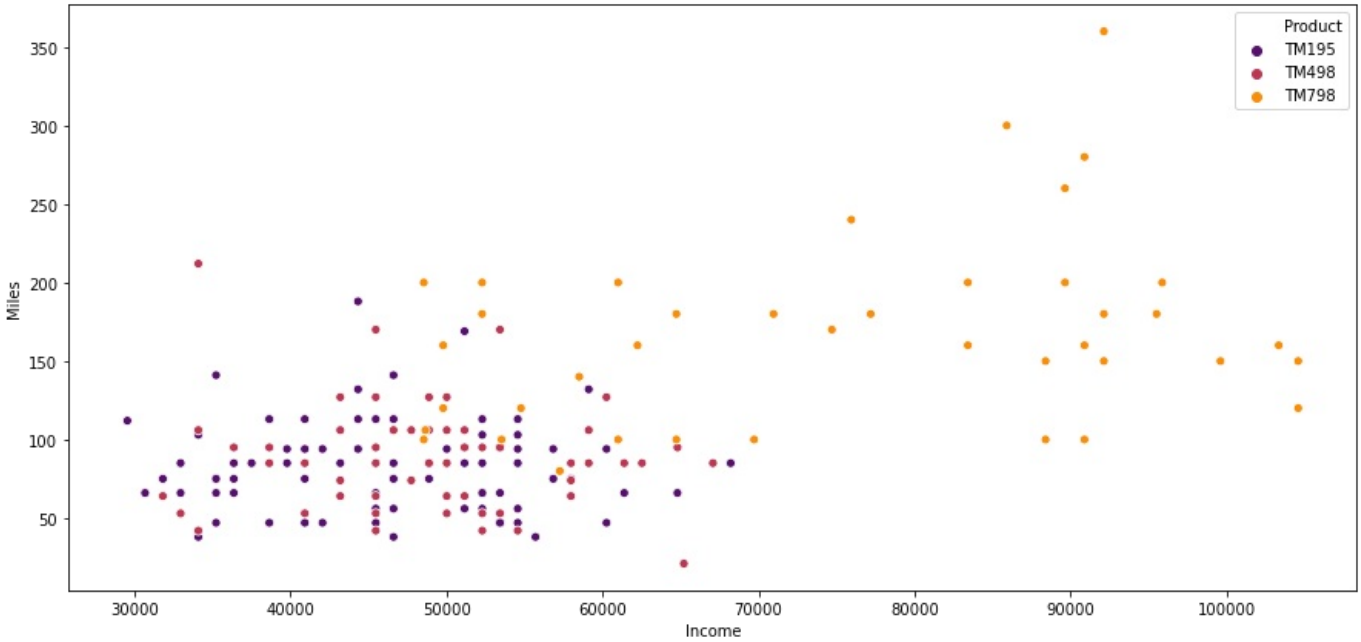


- Customers having an income of more than 70k have 18-21 years of education and expect to run 100-200 miles a week.

Income vs Miles vs Product

In [49]:

```
plt.figure(figsize=(15,7))
sns.scatterplot(cardio["Income"],cardio["Miles"],hue=cardio["Product"],ci=0,palette="inferno")
plt.legend(bbox_to_anchor=(1.00, 1))
plt.show()
```



- Customers having an income of more than 70k tend to buy TM798 and run more miles.

Conclusion

Explore the dataset to extract actionable insights for market growth. Perform univariate and multivariate analysis. Build customer profiles for different products. Generate recommendations to help the company target new customers. Data Overview:

The dataset contains information about customers purchasing treadmills, including product model, age, gender, education, marital status, usage, fitness, income, and miles expected to run. Key Insights:

Product TM195:

Target Audience: Early 20's to early 30's, income between 40K and 50K, moderate fitness level (rated 3), plans to use treadmill 3-4 times a week. Usage: Light to moderate usage. Strategy: Market as an entry-level product for first-time fitness enthusiasts or college-going population. Product TM498:

Target Audience: Mid 20's to early 30's, income around 50K, average fitness level, plans to use treadmill 3 times a week. Usage: Light to moderate usage. Strategy: Highlight additional features compared to TM195 to attract slightly higher-income customers with a fixed or busy schedule. Product TM798:

Target Audience: Late 20's, highly educated, higher income earners (above 60K), considers themselves very fit, plans to use treadmill 4-5 days a week, running 160 miles on average. Usage: High usage. Strategy: Market as a premium product for fitness enthusiasts and professionals. Emphasize advanced features and build brand exclusivity. Customer Segmentation:

Gender:

More males (57.8%) purchase products compared to females (42.2%). Males prefer TM798 more than females. Strategy: Engage in marketing campaigns to make TM798 appealing to both genders. Marital Status:

Couples/partnered customers have a higher chance of buying products. Strategy: Focus on couple-friendly features and joint fitness plans to attract partnered customers. Education and Income:

Higher education is positively correlated with income. Strategy: Recommend TM798 to customers with higher education levels. Age:

Younger customers (below 33) prefer TM195 and TM498. Older singles (above 40) prefer higher-end products. Strategy: Tailor marketing messages based on age groups and recommend appropriate products. Actionable Recommendations:

Targeted Marketing for TM798:

Engage in campaigns to highlight that TM798 is suitable for both genders. Lure younger age groups into buying TM798 by emphasizing its advanced features and fitness benefits. Education-Based Recommendations:

Recommend TM798 to customers with higher education as they tend to have higher incomes and are more fitness-aware. Female Customers:

Recommend lower-end products (TM195 and TM498) to females above 30 years who run fewer miles. Suggest all product types to partnered females based on their varying usage levels. Singles and Partnered Males:

Recommend TM798 to singles above 40 years and partnered males due to their higher income and higher expected mileage. Couple-Friendly Marketing:

Highlight features that cater to partnered users to attract more couple/partner customers. Income-Based Segmentation:

Promote TM195 and TM498 to middle-income customers. Focus on TM798 for higher-income customers with targeted promotions based on their income levels. Next Steps:

Implement targeted marketing campaigns based on customer profiles. Personalize product recommendations using customer demographics and usage patterns. Monitor the impact of these strategies on sales and customer satisfaction. Continuously analyze customer data to refine and optimize marketing and product strategies.### Key insights

TM195:

- An affordable and general-purpose treadmill that can be used for a wide range of users.
- It can be considered as an entry-level product generally targeted for first-time fitness enthusiasts or college-going population.
- Customers with light to moderate usage 3 to 4 times a week go for this product.

TM495:

- An affordable product like the TM195 with more features and probably has a high price than TM195.
- The product also generally targets the same age group as the TM195 but has users of slightly higher income.
- The product is used generally 3 times per week.

TM798:

- A top of the range treadmill with plenty of features that excite the fitness enthusiasts.
- It has a higher price point and probably the flagship product of the company.
- The buyers of the product are core users that rate themselves very highly on the fitness score as evident from the usage and expected miles to run.
- The buyers in this segment are more educated, have an income(greater than 60k) more than the other two treadmill users, and take their fitness very seriously.
- Male customers prefer this product more than females.

Business Recommendations

- The company has an affordable product in its portfolio that brings in the bulk of the volume of its sales, which is the TM195. The TM798 is their flagship product that brings in the profits for the company.
- The company needs to engage in more marketing to convey that product TM798 is suitable for both the genders and try to lure the younger age group into buying their flagship product. Currently, it seems TM798 is marketed as an exclusive product for the males making more money as there is a large disparity in income for both genders.
- Years of education are proportionate to income, and so customers with higher education can be recommended an expensive

model(TM798).

- Females above 30 years can be recommended the lower end products(TM195 and TM498) since they wish to run a fewer number of miles and therefore the usage of the product won't be higher.
- Partnered Females can be recommended all types of products (low end to high end) since their usage varies from 2 days per week to 6 days per week.
- Singles above 40 years can be recommended the higher end product(TM798) since they wish to run more miles and therefore the usage would be higher.
- Partnered males have a higher income and also expect to run more miles hence the higher end product TM798 would be a good recommendation for them.