In [1]:

```
import pandas as pd
```

In [2]:

```
df = pd.read_csv("placement.csv")
```

In [3]:

```
df.head()
```

Out[3]:

	Unnamed: 0	cgpa	iq	placement
0	0	6.8	123.0	1
1	1	5.9	106.0	0
2	2	5.3	121.0	0
3	3	7.4	132.0	1
4	4	5.8	142.0	0

In [4]:

```
df.shape
```

Out[4]:

```
(100, 4)
```

In [5]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 4 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   Unnamed: 0  100 non-null    int64  
 1   cgpa        100 non-null    float64
 2   iq          100 non-null    float64
 3   placement   100 non-null    int64  
dtypes: float64(2), int64(2)
memory usage: 3.2 KB
```

In [6]:

```
df.describe()
```

Out[6]:

	Unnamed: 0	cgpa	iq	placement
count	100.000000	100.000000	100.000000	100.000000
mean	49.500000	5.991000	123.580000	0.500000
std	29.011492	1.143634	39.944198	0.502519
min	0.000000	3.300000	37.000000	0.000000
25%	24.750000	5.075000	101.500000	0.000000
50%	49.500000	6.000000	127.500000	0.500000
75%	74.250000	6.900000	149.000000	1.000000
max	99.000000	8.500000	233.000000	1.000000

In [7]:

```
df.isnull().sum()
```

Out[7]:

```
Unnamed: 0    0
cgpa          0
iq            0
placement     0
dtype: int64
```

In [8]:

```
df.value_counts("placement")
```

Out[8]:

```
placement
0    50
1    50
dtype: int64
```

In [9]:

```
df.head(1)
```

Out[9]:

	Unnamed: 0	cgpa	iq	placement
0	0	6.8	123.0	1

In [10]:

```
x = df.iloc[:,1:]
```

In [11]:

```
# df.drop(columns="Unnamed: 0")
```

In [12]:

```
y = df.iloc[:,-1]
```

In [13]:

```
x.head(1)
```

Out[13]:

	cgpa	iq	placement
0	6.8	123.0	1

In [14]:

```
y.head(1)
```

Out[14]:

```
0    1
Name: placement, dtype: int64
```

In [15]:

```
import matplotlib.pyplot as plt
```

In [16]:

```
print(x.shape)
print(y.shape)
```

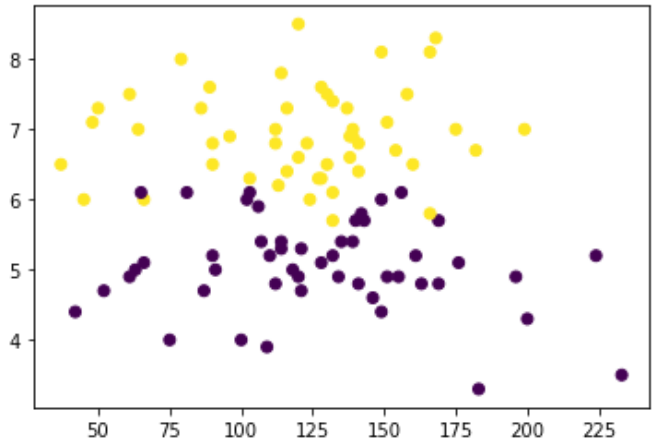
```
(100, 3)
(100,)
```

In [17]:

```
plt.scatter(df["iq"],df["cgpa"],c=df["placement"])
```

Out[17]:

```
<matplotlib.collections.PathCollection at 0x7fc7e88b2d60>
```



In [18]:

```
from sklearn.model_selection import train_test_split
```

In [19]:

```
X_train,X_test,y_train,y_test = train_test_split(x,y,test_size=0.1)
```

In [20]:

```
X_train.head()
```

Out[20]:

	cgpa	iq	placement
40	4.9	134.0	0
91	7.5	158.0	1
30	7.6	128.0	1
31	3.9	109.0	0
84	5.7	169.0	0

In [21]:

```
y_train.head()
```

Out[21]:

```
40    0
91    1
30    1
31    0
84    0
Name: placement, dtype: int64
```

Scale the values

In [22]:

```
from sklearn.preprocessing import StandardScaler
```

In [23]:

```
sc = StandardScaler()
```

In [24]:

```
X_train = sc.fit_transform(X_train)
```

We tarined our model in small values so we only scale the values of X_train and X_test, no need to scale the values of output

In [25]:

```
X_train
```

Out[25]:

```
array([[-0.92973029,  0.29662105, -0.97801929],
       [ 1.30850929,  0.88821981,  1.02247472],
       [ 1.39459543,  0.14872136,  1.02247472],
       [-1.79059166, -0.31962767, -0.97801929],
       [-0.24104119,  1.15936924, -0.97801929],
       [ 2.16937067, -0.04847823,  1.02247472],
       [-0.84364415, -0.76332674, -0.97801929],
       [ 0.79199247, -0.640077  ,  1.02247472],
       [-0.84364415, -0.09777813, -0.97801929],
       [-1.70450553, -0.5414772 , -0.97801929],
       [ 1.73893998, -1.05912612,  1.02247472],
       [-0.67147187, -0.29497772, -0.97801929],
       [-1.36016097, -1.97117421, -0.97801929],
       [-0.75755801,  0.14872136, -0.97801929],
       [ 0.10330337,  0.24732115,  1.02247472],
       [ 0.44764792,  0.93751971,  1.02247472],
       [ 0.79199247,  0.39522084,  1.02247472],
       [-0.92973029, -0.04847823, -0.97801929],
       [ 0.10330337, -0.46752736, -0.97801929],
       [ 0.27547564,  0.14872136,  1.02247472],
       [-0.15495505,  0.49382063, -0.97801929],
       [-0.75755801, -1.37957545, -0.97801929],
       [-0.24104119,  0.51847058, -0.97801929],
       [ 0.8780786 , -1.42887535,  1.02247472],
       [-0.67147187,  0.24732115, -0.97801929],
       [-1.01581642, -0.24567782, -0.97801929],
       [ 1.30850929, -1.50282519,  1.02247472],
       [ 0.36156178,  0.46917069,  1.02247472],
       [-1.10190256, -0.86192653, -0.97801929],
       [-1.44624711,  1.92351765, -0.97801929],
       [ 1.82502612,  1.0854194 ,  1.02247472],
       [-0.75755801,  1.33191888, -0.97801929],
       [ 1.13633702,  0.37057089,  1.02247472],
       [-0.58538574, -0.19637792, -0.97801929],
       [-0.92973029, -1.50282519, -0.97801929],
       [ 0.70590633,  0.46917069,  1.02247472],
       [ 1.99719839,  1.13471929,  1.02247472],
       [ 0.10330337,  0.83891991, -0.97801929],
       [-1.70450553, -1.15772591, -0.97801929],
       [-1.10190256, -1.72467473, -0.97801929],
       [ 0.10330337, -1.00982622, -0.97801929],
       [-0.4992996 , -0.36892756, -0.97801929],
       [-1.01581642,  1.15936924, -0.97801929],
       [ 0.44764792, -2.09442395,  1.02247472],
       [ 1.82502612,  0.66637027,  1.02247472],
       [-0.15495505,  1.0854194 ,  1.02247472],
```

```
       [-1.01581642,  0.46917069, -0.97801929],
       [-0.92973029,  0.71567017, -0.97801929],
       [-1.01581642,  1.01146955, -0.97801929],
       [-0.06886891, -0.39357751, -0.97801929],
       [ 0.01721723, -1.89722437,  1.02247472],
       [-0.92973029,  0.81426996, -0.97801929],
       [ 0.01721723,  0.66637027, -0.97801929],
       [ 0.53373405, -0.04847823,  1.02247472],
       [ 0.96416474, -1.82327452,  1.02247472],
       [ 0.8780786 ,  1.30726893,  1.02247472],
       [ 1.22242315,  0.24732115,  1.02247472],
       [ 0.01721723, -0.4921773 , -0.97801929],
       [ 0.44764792,  0.19802125,  1.02247472],
       [-1.1879887 ,  0.59242043, -0.97801929],
       [-0.67147187, -0.78797669, -0.97801929],
       [ 0.27547564, -0.46752736,  1.02247472],
       [ 0.70590633, -0.24567782,  1.02247472],
       [ 1.13633702, -0.14707803,  1.02247472],
       [ 0.36156178, -0.14707803,  1.02247472],
       [ 1.13633702, -0.88657648,  1.02247472],
       [ 1.39459543, -0.81262663,  1.02247472],
       [ 0.96416474,  0.71567017,  1.02247472],
       [-0.92973029,  1.82491785, -0.97801929],
       [-0.4992996 , -0.19637792, -0.97801929],
       [ 0.44764792, -0.78797669,  1.02247472],
       [-0.4992996 ,  0.41987079, -0.97801929],
       [ 1.56676771, -0.19637792,  1.02247472],
       [ 0.27547564,  0.12407141,  1.02247472],
       [ 0.01721723, -1.37957545,  1.02247472],
       [ 0.79199247,  0.41987079,  1.02247472],
       [-1.36016097,  0.66637027, -0.97801929],
       [-0.84364415, -1.45352529, -0.97801929],
       [-0.67147187,  2.51511641, -0.97801929],
       [ 0.8780786 , -0.24567782,  1.02247472],
       [-2.30710849,  1.50446852, -0.97801929],
       [ 0.8780786 ,  0.41987079,  1.02247472],
       [-2.13493621,  2.73696594, -0.97801929],
       [ 0.61982019,  1.47981857,  1.02247472],
       [ 0.01721723,  0.05012156,  1.02247472],
       [ 1.13633702, -1.77397462,  1.02247472],
       [ 0.10330337, -1.4042254 , -0.97801929],
       [ 0.70590633,  0.02547161,  1.02247472],
       [ 0.1893895 , -0.22102787,  1.02247472],
       [-0.24104119,  0.44452074, -0.97801929]])
```

In [26]:

```
X_train.shape
```

Out[26]:

```
(90, 3)
```

In [27]:

```
# Only transfrom because pattern is already fit
X_test= sc.transform(X_test)
```

In [28]:

```
X_test
```

Out[28]:

```
array([[-0.67147187,  0.96216966, -0.97801929],
       [-1.10190256, -0.02382828, -0.97801929],
       [ 1.30850929,  0.19802125,  1.02247472],
       [ 0.8780786 ,  1.8988677 ,  1.02247472],
       [ 0.61982019,  0.78962002,  1.02247472],
       [-0.58538574, -0.02382828, -0.97801929],
       [ 0.70590633, -0.78797669,  1.02247472],
       [ 0.53373405,  0.39522084,  1.02247472],
       [-0.24104119,  0.24732115,  1.02247472]
```

[-0.4992996 , 0.321271 , -0.97801929]])

In [29]:

```
X_test.shape
```

Out[29]:

```
(10, 3)
```

In [30]:

```
from sklearn.linear_model import LogisticRegression
```

In [31]:

```
model  = LogisticRegression()
```

In [32]:

```
model.fit(X_train,y_train)
```

Out[32]:

```
LogisticRegression()
```

In [33]:

```
y_pred = model.predict(X_test)
```

In [34]:

```
y_pred
```

Out[34]:

```
array([0, 0, 1, 1, 1, 0, 1, 1, 1, 0])
```

In [35]:

```
y_test
```

Out[35]:

```
47    0
24    0
83    1
26    1
74    1
2     0
35    1
48    1
87    1
49    0
Name: placement, dtype: int64
```

In [36]:

```
# Evaluate the model
```

In [37]:

```
from sklearn.metrics import accuracy_score
```

In [40]:

```
accuracy_score(y_test,y_pred)
```

Out[40]:

```
1.0
```

This is the greate example of model overfitting accuracy is 100 so something in data collecting problem may be data is not proper way

Create a decision tree

In [41]:

```
from mlxtend.plotting import plot_decision_regions
```

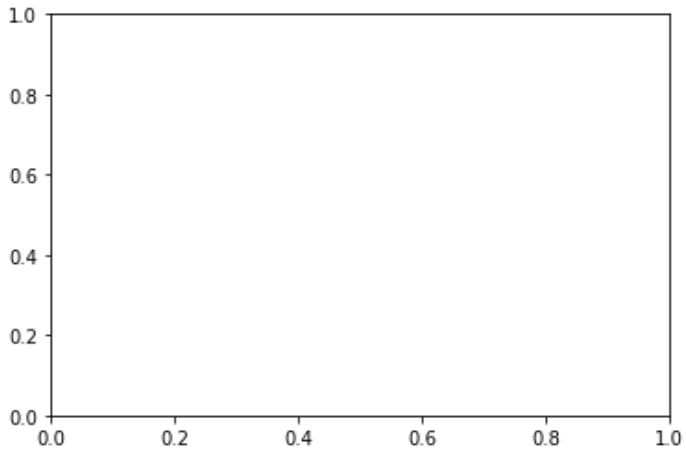
In [72]:

```
plot_decision_regions(X_train,y_train.values,clf=model,)
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
/tmp/ipykernel_78848/2179695925.py in <module>
----> 1 plot_decision_regions(X_train,y_train.values,clf=model,)

~/anaconda3/lib/python3.8/site-packages/mlxtend/plotting/decision_regions.py in plot_deci
sion_regions(X, y, clf, feature_index, filler_feature_values, filler_feature_ranges, ax,
X_highlight, zoom_factor, legend, hide_spines, markers, colors, scatter_kwargs, contourf_
kwargs, scatter_highlight_kwargs)
    175     if dim > 2:
    176         if filler_feature_values is None:
--> 177             raise ValueError('Filler values must be provided when '
    178                              'X has more than 2 training features.')
    179

ValueError: Filler values must be provided when X has more than 2 training features.
```



In [70]:

```
import pickle
```

In [71]:

```
pickle.dump(model,open("model.pkl","wb"))
```

In [ ]:

```

```