Import required libraries

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

Read the data

In [3]:
```
df=pd.read_csv("D:/project/Placement_Data_Full_Class.csv")
```

In [4]:
```
# show the top 5 records
```

In [5]:
```
df.head()
```

Out[5]:

	sl_no	gender	ssc_p	ssc_b	hsc_p	hsc_b	hsc_s	degree_p	degree_t	workex	etest_
0	1	M	67.00	Others	91.00	Others	Commerce	58.00	Sci&Tech	No	55.
1	2	M	79.33	Central	78.33	Others	Science	77.48	Sci&Tech	Yes	86.
2	3	M	65.00	Central	68.00	Central	Arts	64.00	Comm&Mgmt	No	75.
3	4	M	56.00	Central	52.00	Central	Science	52.00	Sci&Tech	No	66.
4	5	M	85.80	Central	73.60	Central	Commerce	73.30	Comm&Mgmt	No	96.

In [6]:
```
# show last 3 records
```

In [7]:
```
df.tail(3)
```

Out[7]:

	sl_no	gender	ssc_p	ssc_b	hsc_p	hsc_b	hsc_s	degree_p	degree_t	workex	etes
212	213	M	67.0	Others	67.0	Others	Commerce	73.0	Comm&Mgmt	Yes	
213	214	F	74.0	Others	66.0	Others	Commerce	58.0	Comm&Mgmt	No	
214	215	M	62.0	Central	58.0	Others	Science	53.0	Comm&Mgmt	No	

In [8]:
```
# show columns
```

In [9]:
```
df.columns
```

Out[9]:
```
Index(['sl_no', 'gender', 'ssc_p', 'ssc_b', 'hsc_p', 'hsc_b', 'hsc_s',
       'degree_p', 'degree_t', 'workex', 'etest_p', 'specialisation', 'mba_p',
       'status', 'salary'],
      dtype='object')
```

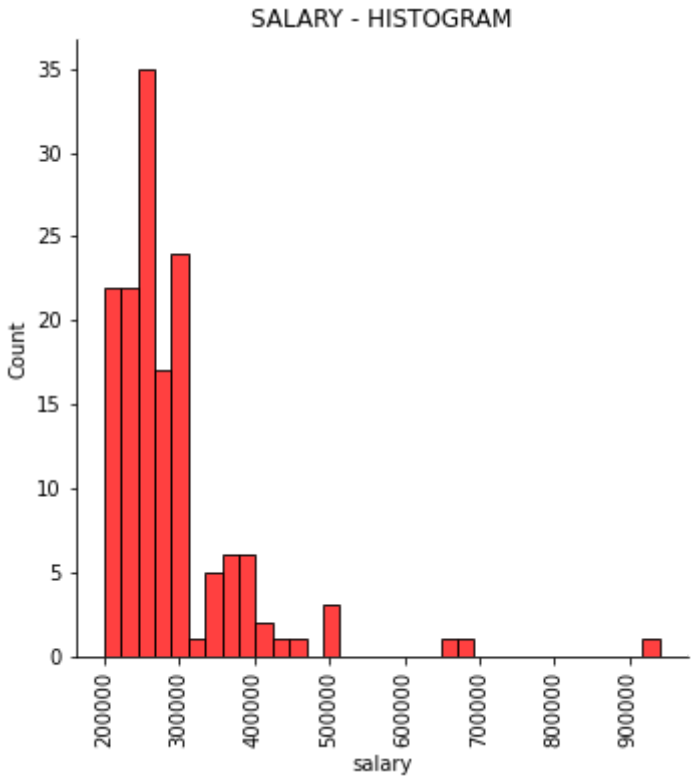
In [10]:
```
# check for null data
```

In [12]:
```
df.isna().sum()
```

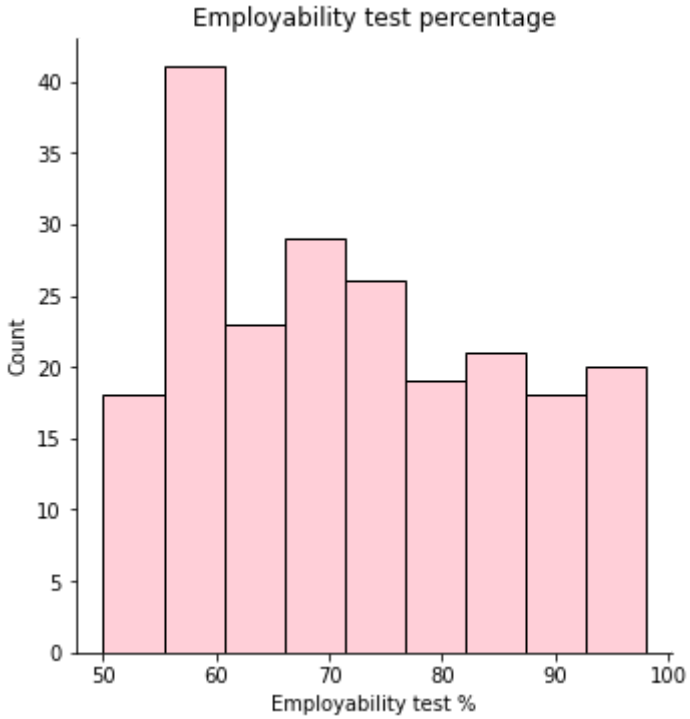
Out[12]:
```
sl_no             0
gender            0
ssc_p             0
ssc_b             0
```

```
hsc_p             0
hsc_b             0
hsc_s             0
degree_p          0
degree_t          0
workex            0
etest_p           0
specialisation    0
mba_p             0
status            0
salary           67
dtype: int64
```

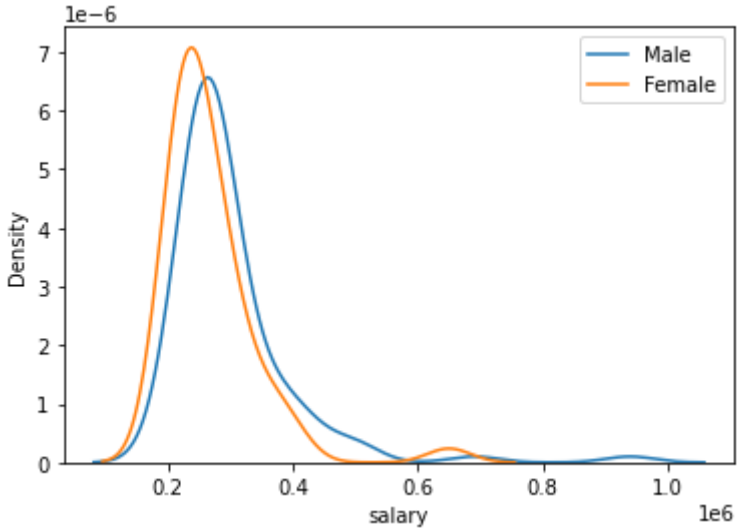
In [22]:
```
sns.displot(df.salary,color='red')
plt.title('SALARY - HISTOGRAM')
plt.xticks(rotation='vertical')
plt.show()
```



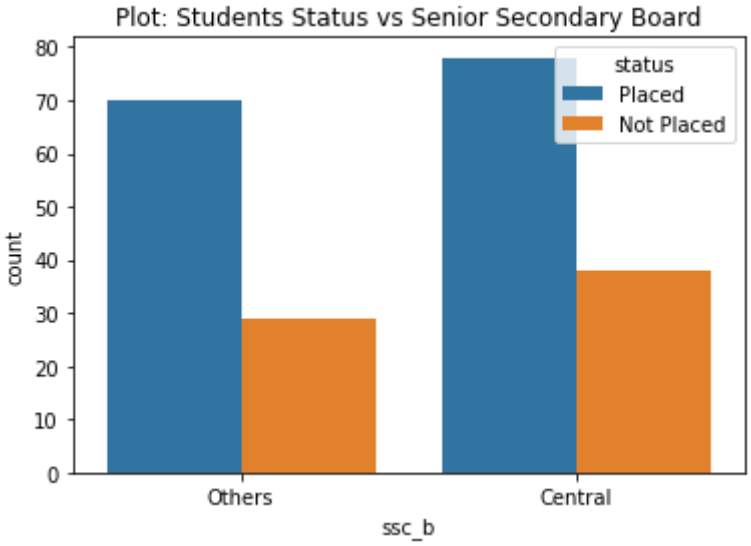
In [25]:
```
sns.displot(df.etest_p,color='pink')
plt.title('Employability test percentage')
plt.xlabel('Employability test %')
#plt.xticks(rotation='vertical')
plt.show()
```



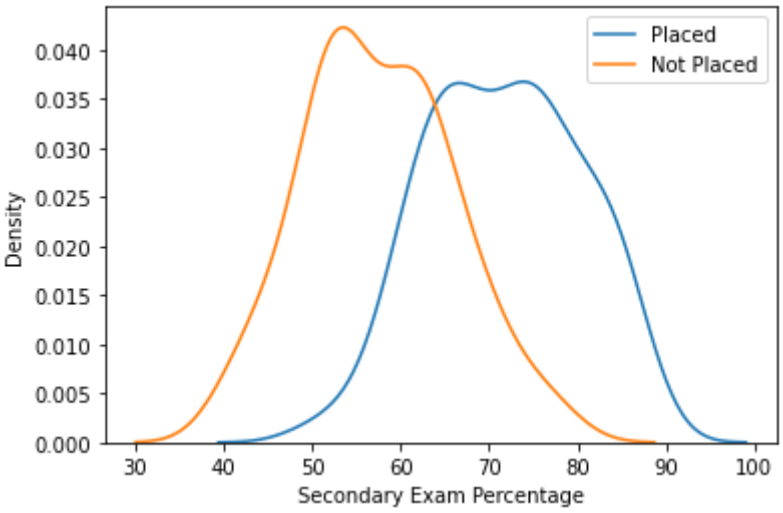
In [119…
```
sns.kdeplot(df.salary[df.gender=='M'])
sns.kdeplot(df.salary[df.gender=='F'])
plt.legend(['Male','Female'])
plt.show()
```



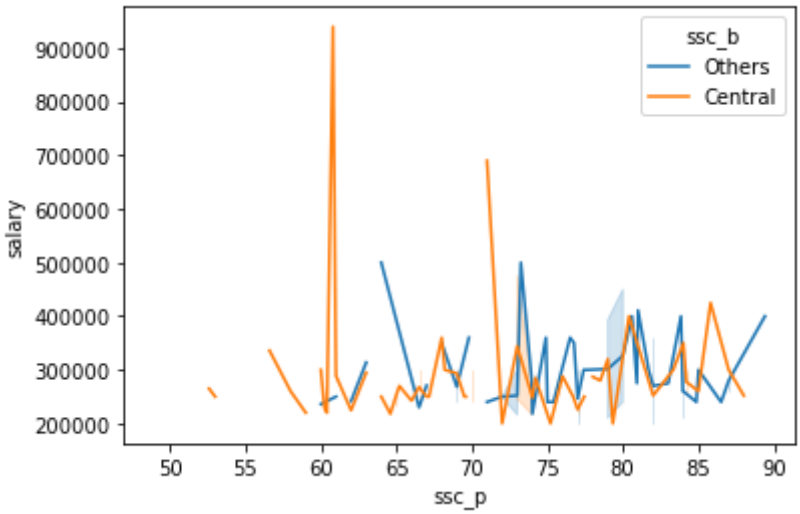
In [135…
```
sns.countplot(x='ssc_b',hue='status',data=df)
plt.title('Plot: Students Status vs Senior Secondary Board')
plt.show()
```



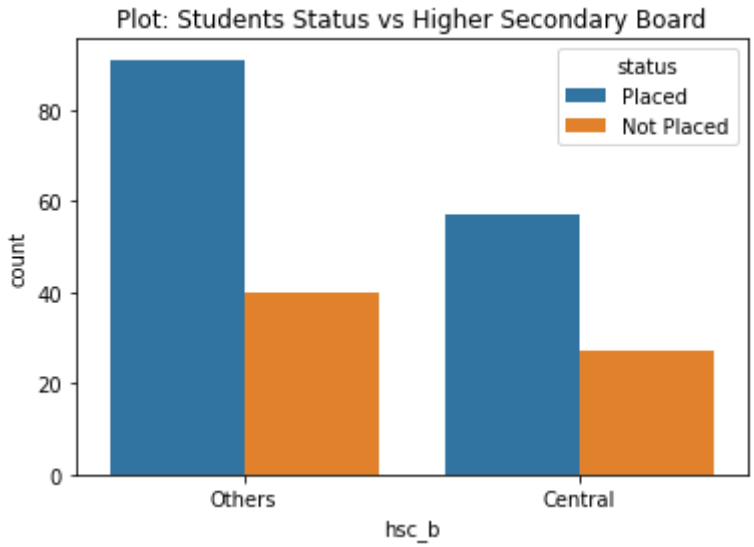
In [149…
```
sns.kdeplot(df.ssc_p[df.status=='Placed'])
sns.kdeplot(df.ssc_p[df.status=='Not Placed'])
plt.legend(['Placed','Not Placed'])
plt.xlabel("Secondary Exam Percentage")
plt.show()
```



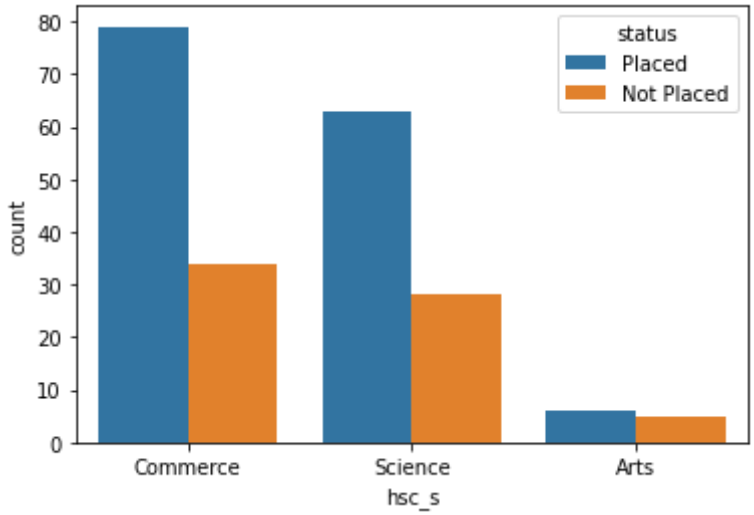
In [139…
```
sns.lineplot(x='ssc_p',y='salary',hue='ssc_b',data=df)
plt.show()
```



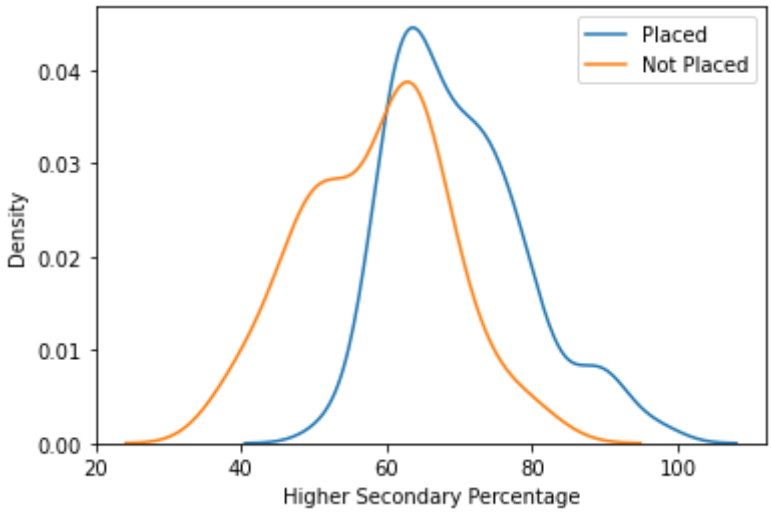
In [134…
```
sns.countplot(x='hsc_b',hue='status',data=df)
plt.title('Plot: Students Status vs Higher Secondary Board')
plt.show()
```



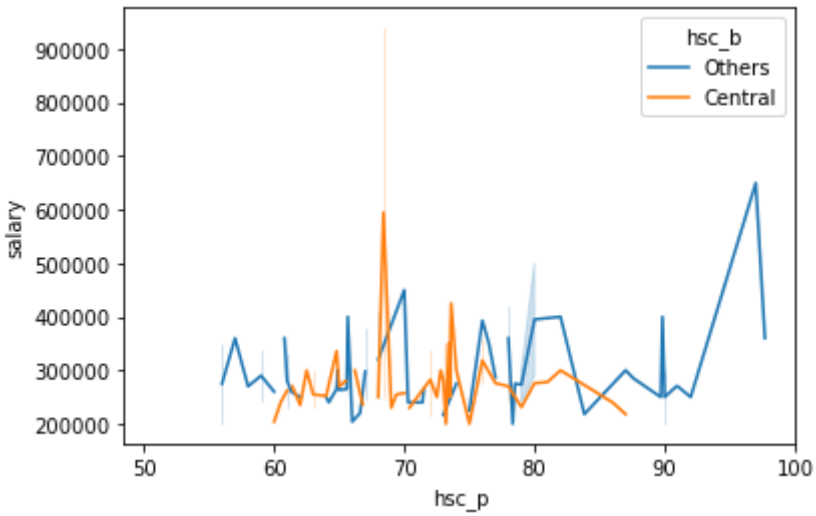
In [152…
```
sns.countplot(x='hsc_s',hue='status',data=df)
plt.show()
```



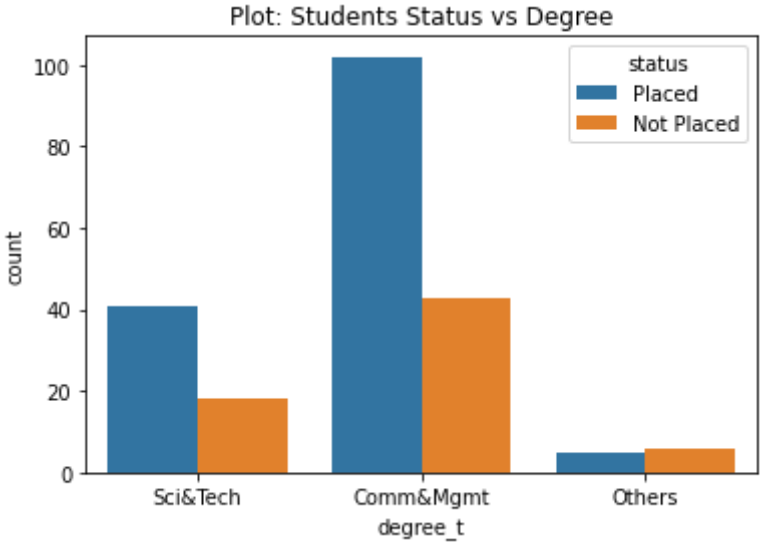
In [148…
```
sns.kdeplot(df.hsc_p[df.status=='Placed'])
sns.kdeplot(df.hsc_p[df.status=='Not Placed'])
plt.legend(['Placed','Not Placed'])
plt.xlabel("Higher Secondary Percentage")
plt.show()
```



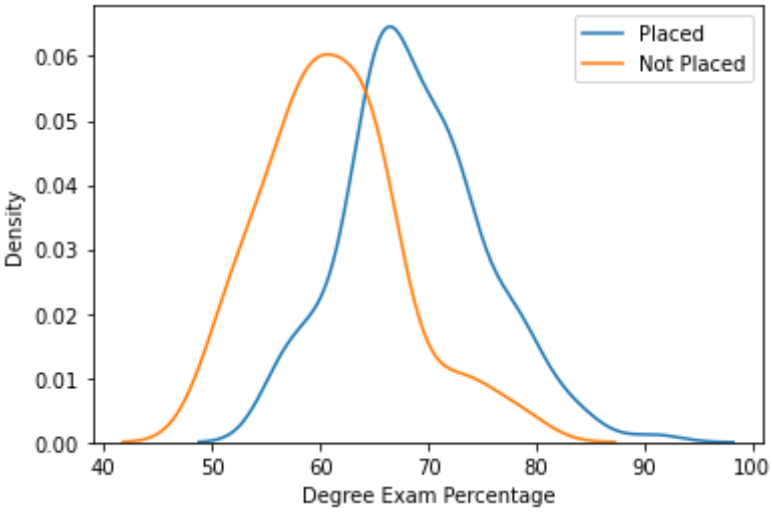
In [140…
```
sns.lineplot(x='hsc_p',y='salary',hue='hsc_b',data=df)
plt.show()
```



In [142…
```
sns.countplot(x='degree_t',hue='status',data=df)
plt.title('Plot: Students Status vs Degree')
plt.show()
```

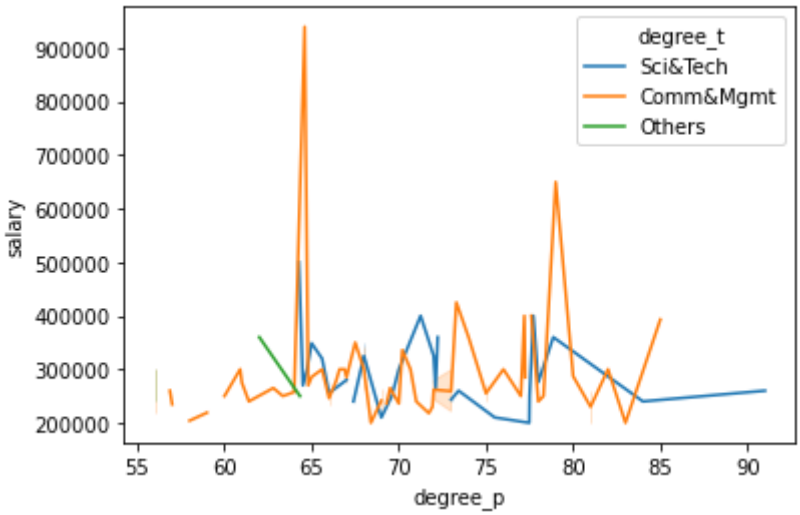


In [147…
```
sns.kdeplot(df.degree_p[df.status=='Placed'])
sns.kdeplot(df.degree_p[df.status=='Not Placed'])
plt.legend(['Placed','Not Placed'])
plt.xlabel("Degree Exam Percentage")
plt.show()
```



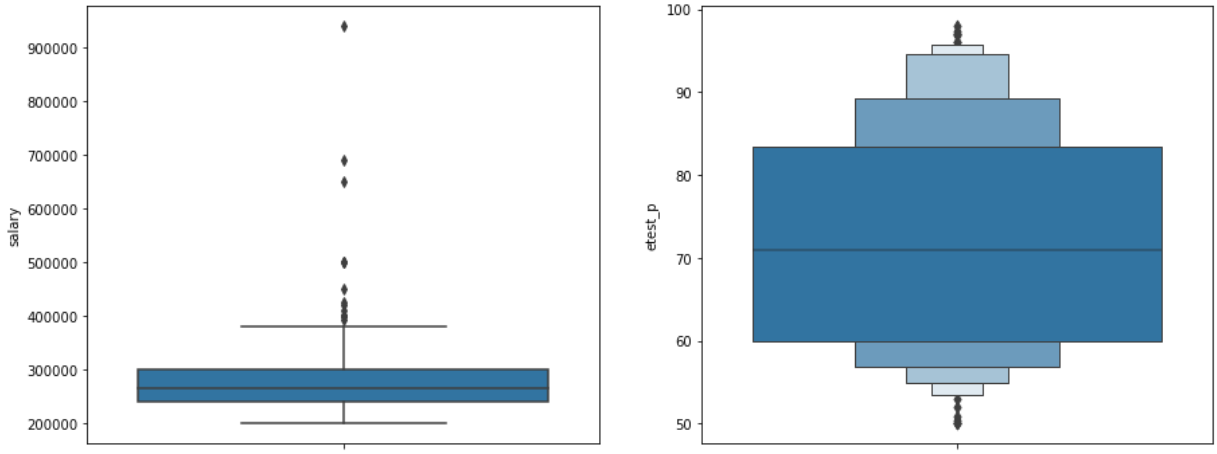
In [143…
```
sns.lineplot(x='degree_p',y='salary',hue='degree_t',data=df)
```

```
plt.show()
```

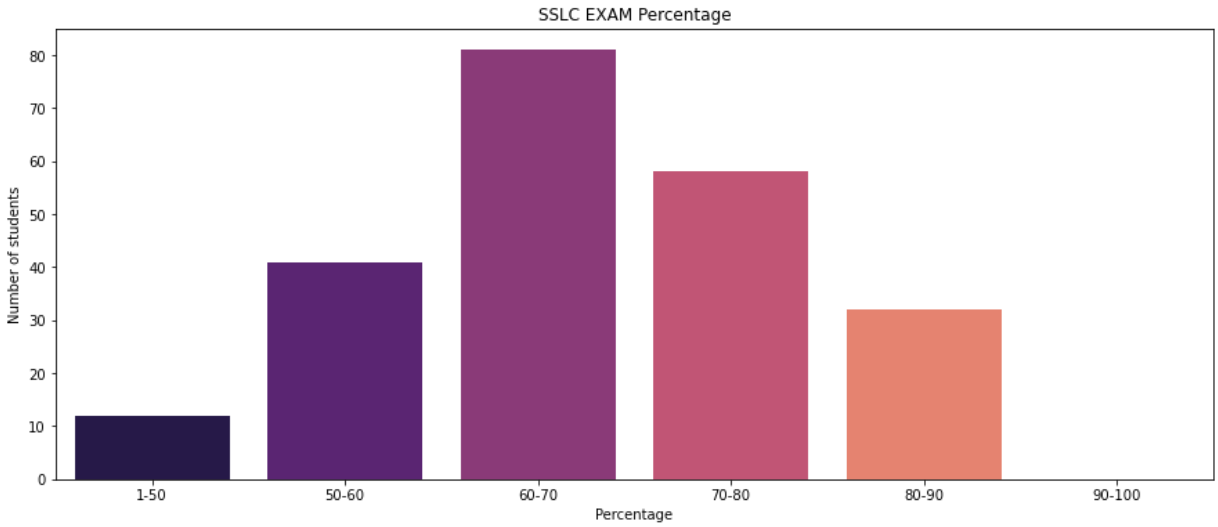


In [ ]:
```
sns.countplot()
```

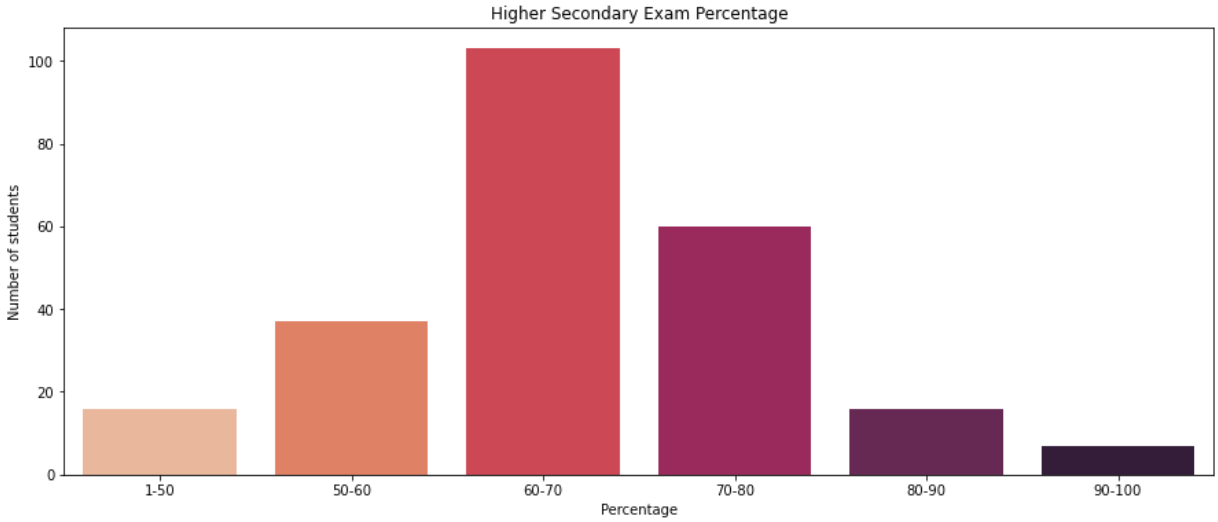
In [26]:
```
plt.figure(figsize=(15,6))
plt.subplot(1,2,1)
sns.boxplot(y=df.salary)
plt.subplot(1,2,2)
sns.boxenplot(y=df.etest_p)
plt.show()
```



In [56]:
```
sslc_50 = df.ssc_p[(df.ssc_p <=50)&(df.ssc_p >0)]
sslc50_60 = df.ssc_p[(df.ssc_p <=60)&(df.ssc_p >=50)]
sslc60_70 = df.ssc_p[(df.ssc_p <=70)&(df.ssc_p >=60)]
sslc70_80 = df.ssc_p[(df.ssc_p <=80)&(df.ssc_p >=70)]
sslc80_90 = df.ssc_p[(df.ssc_p <=90)&(df.ssc_p >=80)]
sslc90_100 = df.ssc_p[(df.ssc_p <=100)&(df.ssc_p >=90)]

sslc_x=['1-50','50-60','60-70','70-80','80-90','90-100']
sslc_y=[len(sslc_50.values),len(sslc50_60.values),len(sslc60_70.values),len(sslc70_8

plt.figure(figsize=(15,6))
sns.barplot(x=sslc_x,y=sslc_y,palette='magma')
plt.title('SSLC EXAM Percentage')
plt.xlabel('Percentage')
plt.ylabel('Number of students')
plt.show()
```

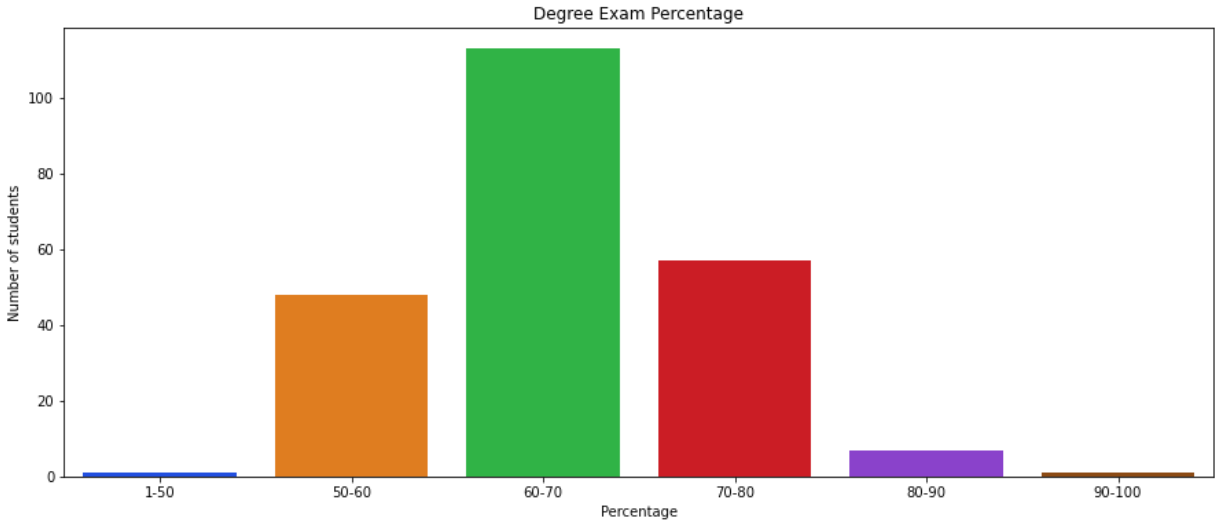


In [30]:
```
hsc_50 = df.hsc_p[(df.hsc_p <=50)&(df.hsc_p >0)]
hsc50_60 = df.hsc_p[(df.hsc_p <=60)&(df.hsc_p >=50)]
hsc60_70 = df.hsc_p[(df.hsc_p <=70)&(df.hsc_p >=60)]
hsc70_80 = df.hsc_p[(df.hsc_p <=80)&(df.hsc_p >=70)]
hsc80_90 = df.hsc_p[(df.hsc_p <=90)&(df.hsc_p >=80)]
hsc90_100 = df.hsc_p[(df.hsc_p <=100)&(df.hsc_p >=90)]

hsc_x=['1-50','50-60','60-70','70-80','80-90','90-100']
hsc_y=[len(hsc_50.values),len(hsc50_60.values),len(hsc60_70.values),len(hsc70_80),le

plt.figure(figsize=(15,6))
sns.barplot(x=hsc_x,y=hsc_y,palette='rocket_r')
plt.title('Higher Secondary Exam Percentage')
plt.xlabel('Percentage')
plt.ylabel('Number of students')
plt.show()
```

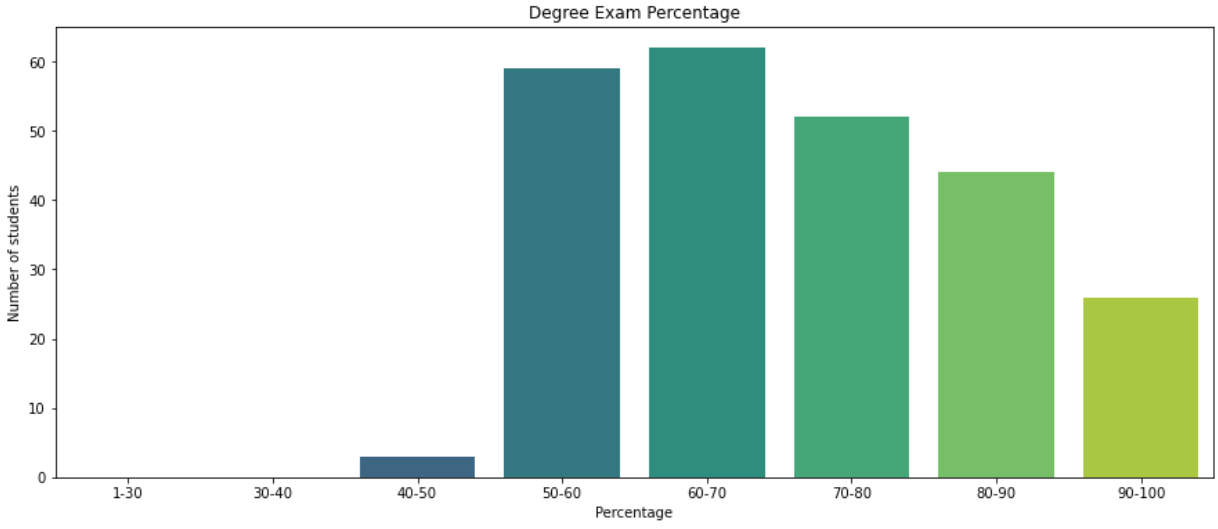


In [32]:
```
degree_50 = df.degree_p[(df.degree_p <=50)&(df.degree_p >0)]
degree50_60 = df.degree_p[(df.degree_p <=60)&(df.degree_p >=50)]
degree60_70 = df.degree_p[(df.degree_p <=70)&(df.degree_p >=60)]
degree70_80 = df.degree_p[(df.degree_p <=80)&(df.degree_p >=70)]
degree80_90 = df.degree_p[(df.degree_p <=90)&(df.degree_p >=80)]
degree90_100 = df.degree_p[(df.degree_p <=100)&(df.degree_p >=90)]

degree_x=['1-50','50-60','60-70','70-80','80-90','90-100']
degree_y=[len(degree_50.values),len(degree50_60.values),len(degree60_70.values),len(

plt.figure(figsize=(15,6))
sns.barplot(x=degree_x,y=degree_y,palette='bright')
```

```
plt.title('Degree Exam Percentage')
plt.xlabel('Percentage')
plt.ylabel('Number of students')
plt.show()
```

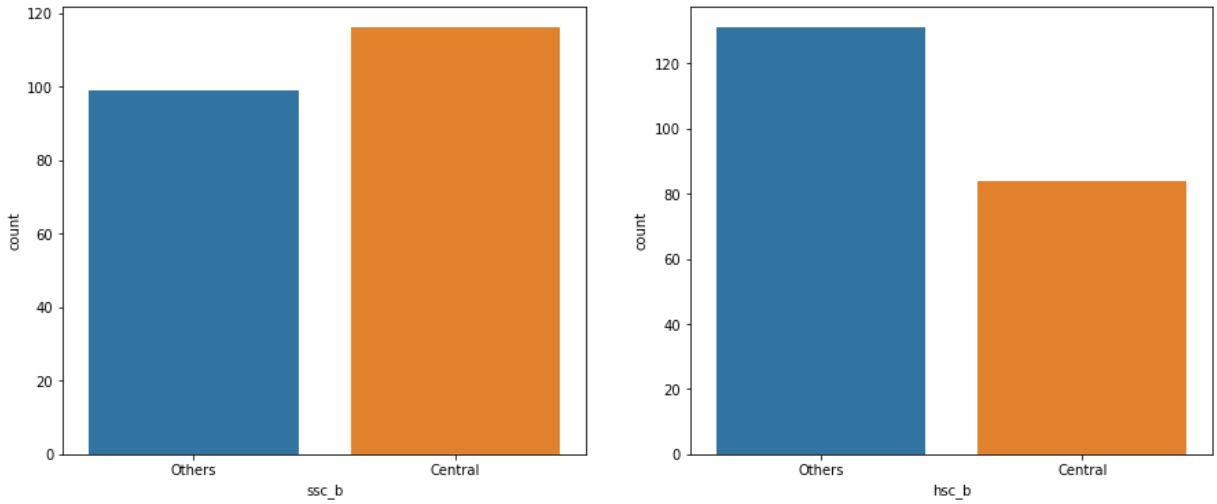


In [37]:
```
etest_30 = df.etest_p[(df.etest_p <=30)&(df.etest_p >0)]
etest30_40 = df.etest_p[(df.etest_p <=40)&(df.etest_p >30)]
etest40_50 = df.etest_p[(df.etest_p <=50)&(df.etest_p >40)]
etest50_60 = df.etest_p[(df.etest_p <=60)&(df.etest_p >=50)]
etest60_70 = df.etest_p[(df.etest_p <=70)&(df.etest_p >=60)]
etest70_80 = df.etest_p[(df.etest_p <=80)&(df.etest_p >=70)]
etest80_90 = df.etest_p[(df.etest_p <=90)&(df.etest_p >=80)]
etest90_100 = df.etest_p[(df.etest_p <=100)&(df.etest_p >=90)]

etest_x=['1-30','30-40','40-50','50-60','60-70','70-80','80-90','90-100']
etest_y=[len(etest_30.values),len(etest30_40.values),len(etest40_50.values),len(etes

plt.figure(figsize=(15,6))
sns.barplot(x=etest_x,y=etest_y,palette='viridis')
plt.title('Degree Exam Percentage')
plt.xlabel('Percentage')
plt.ylabel('Number of students')
plt.show()
```

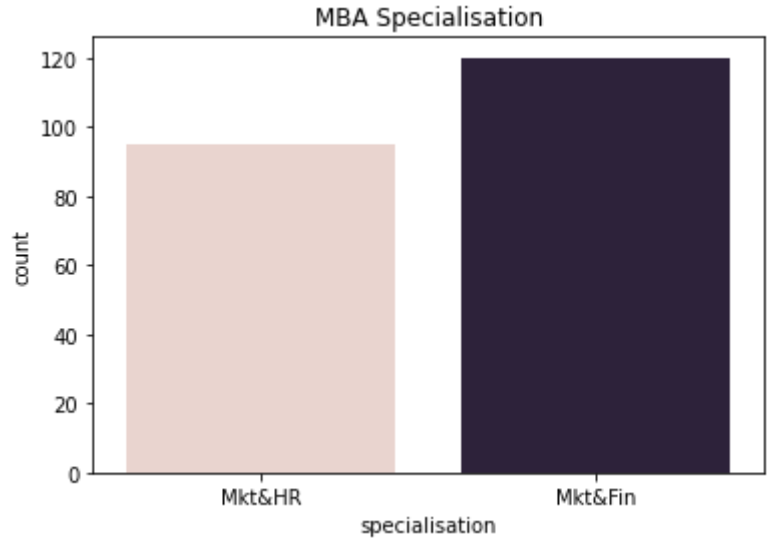


In [43]:
```
plt.figure(figsize=(15,6))
plt.subplot(1,2,1)
sns.countplot(x=df.ssc_b)

plt.subplot(1,2,2)
sns.countplot(x=df.hsc_b)
```

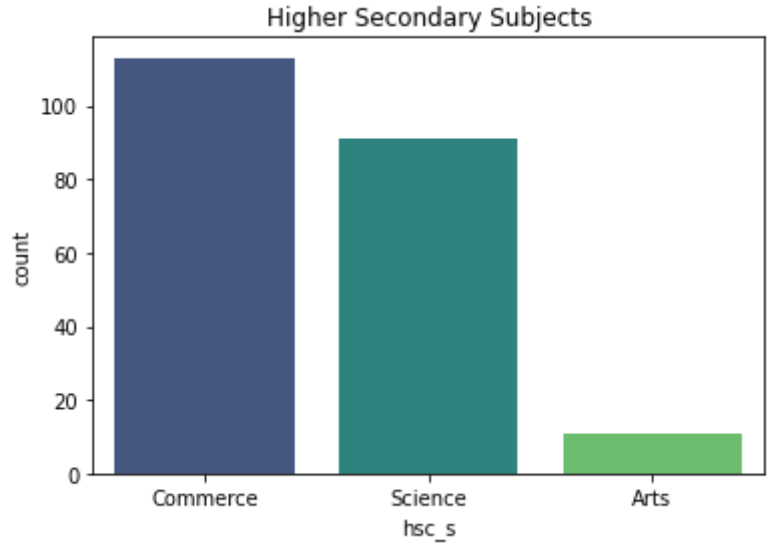
```
plt.show()
```



In [60]:
```
sns.countplot(x=df['specialisation'],palette='ch:.0015')
plt.title("MBA Specialisation")
plt.show()
```



In [52]:
```
sns.countplot(x=df.hsc_s,palette='viridis')
plt.title('Higher Secondary Subjects')
plt.show()
```



In [20]:
```
df.columns
```

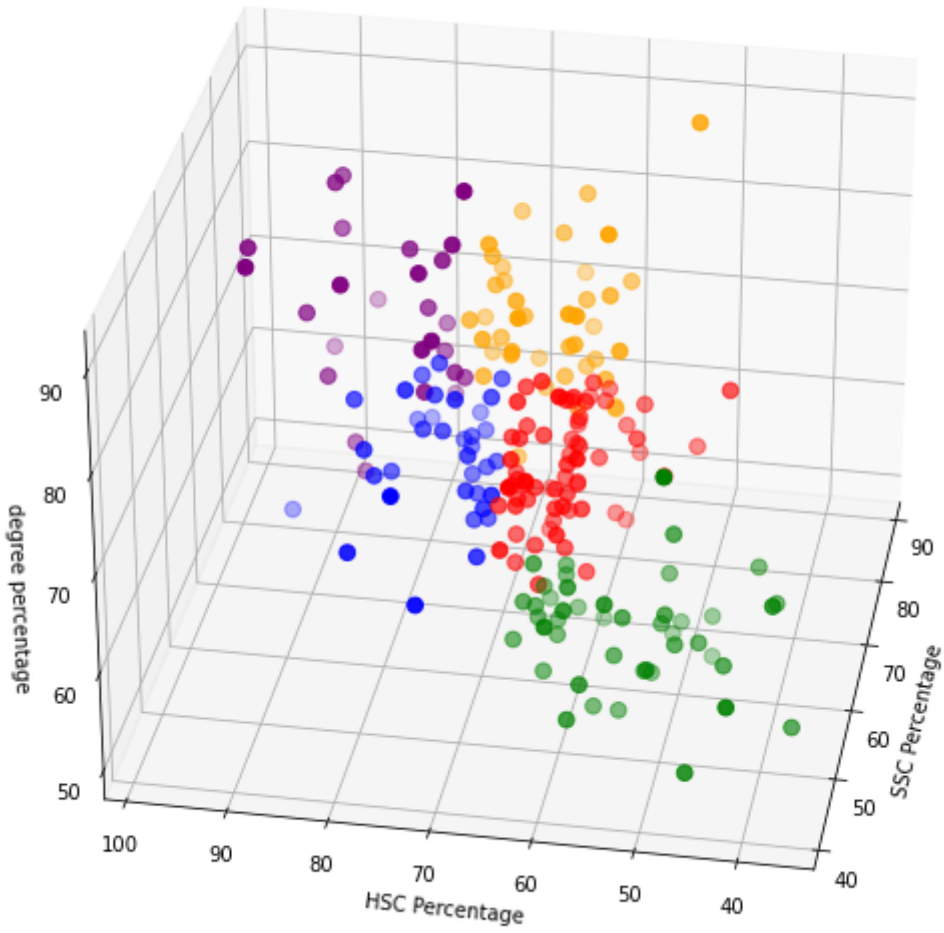
Out[20]:
```
Index(['sl_no', 'gender', 'ssc_p', 'ssc_b', 'hsc_p', 'hsc_b', 'hsc_s',
       'degree_p', 'degree_t', 'workex', 'etest_p', 'specialisation', 'mba_p',
       'status', 'salary'],
      dtype='object')
```

3D clustering using KMeans

In [67]:
```
df1=df[['gender','ssc_p','hsc_p','degree_p']]
```

In [79]:
```
from sklearn.cluster import KMeans
km = KMeans(n_clusters=5)
clusters = km.fit_predict(df1.iloc[:,1:])
df1['label'] = clusters

from mpl_toolkits.mplot3d import Axes3D
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd

fig = plt.figure(figsize=(20,10))
ax = fig.add_subplot(111, projection='3d')
ax.scatter(df1.ssc_p[df1.label == 0], df1['hsc_p'][df1.label ==0], df1['degree_p'][d
ax.scatter(df1.ssc_p[df1.label == 1], df1['hsc_p'][df1.label ==1], df1['degree_p'][d
ax.scatter(df1.ssc_p[df1.label == 2], df1['hsc_p'][df1.label ==2], df1['degree_p'][d
ax.scatter(df1.ssc_p[df1.label == 3], df1['hsc_p'][df1.label ==3], df1['degree_p'][d
ax.scatter(df1.ssc_p[df1.label == 4], df1['hsc_p'][df1.label ==4], df1['degree_p'][d
ax.view_init(30,190) # this is to fix the orientation of plot
plt.xlabel('SSC Percentage')
plt.ylabel('HSC Percentage')
ax.set_zlabel('degree percentage')
plt.show()
```

```
<ipython-input-79-0542c634644d>:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/u
ser_guide/indexing.html#returning-a-view-versus-a-copy
  df1['label'] = clusters
```



In [21]:
```
df.head(1)
```

Out[21]:

	sl_no	gender	ssc_p	ssc_b	hsc_p	hsc_b	hsc_s	degree_p	degree_t	workex	etest_p	sp
0	1	M	67.0	Others	91.0	Others	Commerce	58.0	Sci&Tech	No	55.0	

In [ ]: