Hope Artificial Intelligence

Inferential Data Analysis Answers

In [1]:
```
import pandas as pd
```

In [2]:
```
dataset = pd.read_csv("Placement.csv")
```

1) Replace the NaN values with correct value. And justify why you have chosen the same.

In [3]:
```
dataset.isna().sum()
```

Out[3]:
```
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 [4]:
```
dataset["salary"].fillna(0,inplace=True)
```

In [5]:
```
dataset.isna().sum()
```

Out[5]:
```
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            0
dtype: int64
```

2) How many of them are not placed?

In [6]:
```
Not_Placed = dataset[dataset['status']=="Not Placed"]
No_of_Not_Placed = len(Not_Placed.index)
print(No_of_Not_Placed, "Students are Not Placed")
```

```
67 Students are Not Placed
```

3) Find the reason for non placement from the dataset?

In [7]:
```
quan = [col for col in dataset.columns if dataset[col].dtype != 'O']
dataset[quan].corr()
```

Out[7]:

	sl_no	ssc_p	hsc_p	degree_p	etest_p	mba_p	sala
sl_no	1.000000	-0.078155	-0.085711	-0.088281	0.063636	0.022327	0.0025
ssc_p	-0.078155	1.000000	0.511472	0.538404	0.261993	0.388478	0.5380
hsc_p	-0.085711	0.511472	1.000000	0.434206	0.245113	0.354823	0.4525
degree_p	-0.088281	0.538404	0.434206	1.000000	0.224470	0.402364	0.4083
etest_p	0.063636	0.261993	0.245113	0.224470	1.000000	0.218055	0.1869
mba_p	0.022327	0.388478	0.354823	0.402364	0.218055	1.000000	0.1398
salary	0.002543	0.538090	0.452569	0.408371	0.186988	0.139823	1.0000

Since, SSC, HSC and Degree marks are highly corellated with salary, they maybe the reason for the placement of a candidate

In [8]:
```
below_avg_ssc = 0
below_avg_hsc = 0
below_avg_degree = 0

for index, row in dataset.iterrows():
    ssc_p = row["ssc_p"]
```

```
    degree_p = row["degree_p"]
    status = row["status"]

    if ssc_p <= 57 and status == "Not Placed":
        below_avg_ssc += 1
    elif hsc_p <= 58 and status == "Not Placed":
        below_avg_hsc += 1
    elif degree_p <= 69 and status == "Not Placed":
        below_avg_degree += 1

if below_avg_ssc > below_avg_hsc > below_avg_degree:
    print("Those who scored less in SSC and HSC are not placed")
elif below_avg_ssc > below_avg_degree > below_avg_hsc:
    print("Those who scored less in SSC and degree are not placed")
elif below_avg_hsc > below_avg_degree > below_avg_ssc:
    print("Those who scored less in HSC and degree are not placed")
elif below_avg_hsc > below_avg_ssc > below_avg_degree:
    print("Those who scored less in HSC and SSC are not placed")
elif below_avg_degree > below_avg_ssc > below_avg_hsc:
    print("Those who scored less in degree and SSC are not placed")
elif below_avg_degree > below_avg_hsc > below_avg_ssc:
    print("Those who scored less in degree and HSC are not placed")
```

```
Those who scored less in SSC and degree are not placed
```

4) What kind of relation between salary and mba_p

In [9]:
```
quan = [col for col in dataset.columns if dataset[col].dtype != 'O']
```

In [10]:
```
dataset[quan].corr()
```

Out[10]:

	sl_no	ssc_p	hsc_p	degree_p	etest_p	mba_p	sala
sl_no	1.000000	-0.078155	-0.085711	-0.088281	0.063636	0.022327	0.0025
ssc_p	-0.078155	1.000000	0.511472	0.538404	0.261993	0.388478	0.5380
hsc_p	-0.085711	0.511472	1.000000	0.434206	0.245113	0.354823	0.4525
degree_p	-0.088281	0.538404	0.434206	1.000000	0.224470	0.402364	0.4083
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salary	0.002543	0.538090	0.452569	0.408371	0.186988	0.139823	1.0000

In [11]:
```
# Salary and MBA_p has low Degree Positive Correlation with a value of 0.13
```

5) Which specialization is getting minimum salary?

In [12]:
```
Mkt_HR = dataset[dataset['specialisation']=="Mkt&HR"]['salary']
Mkt_Fin = dataset[dataset['specialisation']=="Mkt&Fin"]['salary']

Mkt_HR_Sal = Mkt_HR.mean()
Mkt_Fin_Sal = Mkt_Fin.mean()
```

```
if(Mkt_HR_Sal < Mkt_Fin_Sal):
    difference = Mkt_Fin_Sal - Mkt_HR_Sal
    print("Marketing and Finance gets higher salary than Marketing and HR wi
else:
    difference = Mkt_HR_Sal - Mkt_Fin_Sal
    print("Marketing and HR gets higher salary than Marketing and Finance wi
```

```
Marketing and Finance gets higher salary than Marketing and HR with ₹ 85749.
56140350876
```

6) How many of them getting above 500000 salary?

In [13]:
```
list = 0
for sal in dataset['salary']:
    if (sal < 500000):
        list+=1

print(list,"Of the Placed students getting the salary above 500000")
```

```
209 Of the Placed students getting the salary above 500000
```

7) Test the Analysis of Variance between etest_p and mba_p at signifance level 5%.(Make decision using Hypothesis Testing)

In [14]:
```
import scipy.stats as stats
stats.f_oneway(dataset['etest_p'],dataset['mba_p'])
print('There is a Significant Differeance between Enterance test and MBA Pas
```

```
There is a Significant Differeance between Enterance test and MBA Pass mark
```

8) Test the similarity between the degree_t(Sci&Tech) and specialisation(Mkt&HR) with respect to salary at significance level of 5%.(Make decision using Hypothesis Testing)

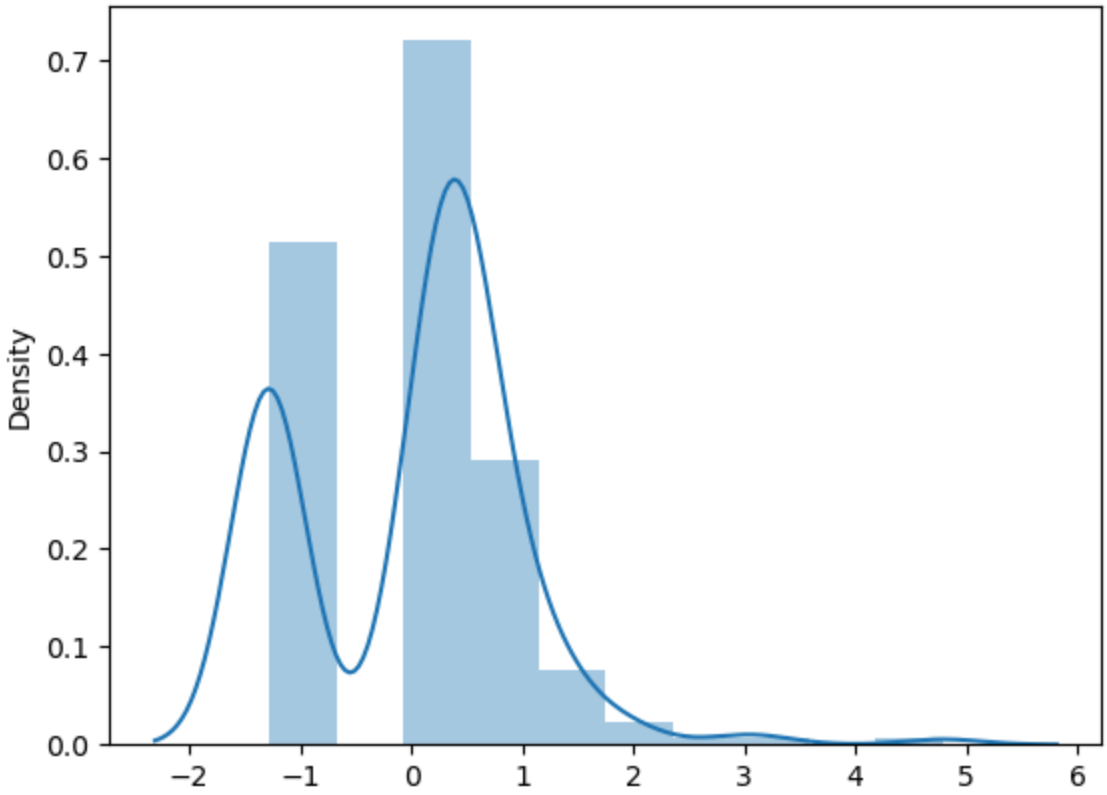
In [15]:
```
Sci_Tech = dataset[dataset['degree_t']=="Sci&Tech"]['salary']
Mkt_HR = dataset[dataset['specialisation']=="Mkt&HR"]['salary']

from scipy import stats
print(stats.ttest_ind(Sci_Tech, Mkt_HR))

print("Accept Alternate Hypothesis since p value is less than 0.05. Threfore
```

```
TtestResult(statistic=2.692041243555374, pvalue=0.007897969943471179, df=15
2.0)
Accept Alternate Hypothesis since p value is less than 0.05. Threfore, there
is a similarity between the degree_t(Sci&Tech) and specialisation(Mkt&HR) wi
th respect to salary
```

9) Convert the normal distribution to standard normal distribution for salary column

In [17]:
```
def stdNBgraph(dataset):
        # Coverted to standard Normal Distribution
    import seaborn as sns
```

```
    mean=dataset.mean()
    std=dataset.std()

    values=[i for i in dataset]

    z_score=[((j-mean)/std) for j in values]

    sns.distplot(z_score,kde=True)

    sum(z_score)/len(z_score)
    #z_score.std()

stdNBgraph(dataset["salary"])
```



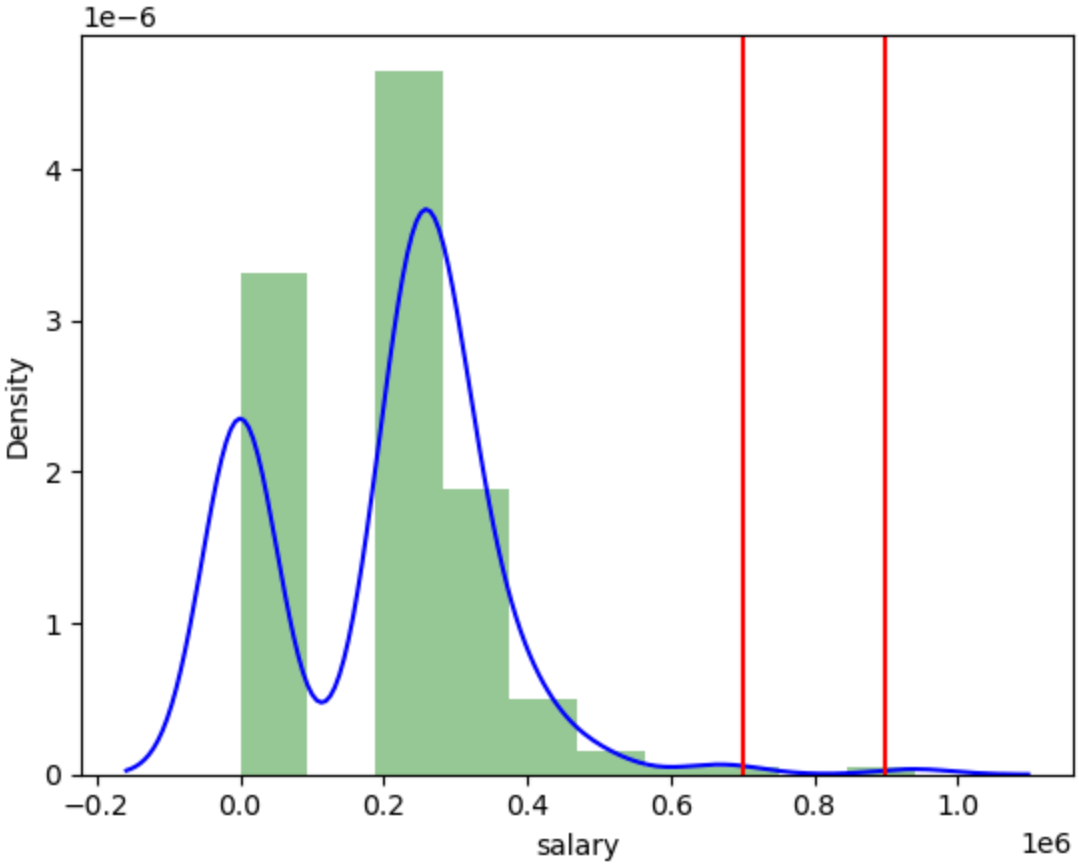
10) What is the probability Density Function of the salary range from 700000 to 900000?

In [18]:
```
def get_pdf_probability(dataset,startrange,endrange):
    from matplotlib import pyplot
    from scipy.stats import norm
    import seaborn as sns
    ax = sns.distplot(dataset,kde=True,kde_kws={'color':'blue'},color='Greer
    pyplot.axvline(startrange,color='Red')
    pyplot.axvline(endrange,color='Red')
    # generate a sample
    sample = dataset
    # calculate parameters
    sample_mean =sample.mean()
    sample_std = sample.std()
    print('Mean=%.3f, Standard Deviation=%.3f' % (sample_mean, sample_std))
```

```
    # define the distribution
    dist = norm(sample_mean, sample_std)

    # sample probabilities for a range of outcomes
    values = [value for value in range(startrange, endrange)]
    probabilities = [dist.pdf(value) for value in values]
    prob=sum(probabilities)
    print("The area between range({},{}):{}".format(startrange,endrange,sum(
    return prob

get_pdf_probability(dataset["salary"],700000,900000)
```

```
Mean=198702.326, Standard Deviation=154780.927
The area between range(700000,900000):0.0005973310593974901
```

Out[18]: 0.0005973310593974901



11) Test the similarity between the degree_t(Sci&Tech)with respect to etest_p and mba_p at significance level of 5%.(Make decision using Hypothesis Testing)

In [19]:
```
Etest = dataset[dataset['degree_t']=="Sci&Tech"]['etest_p']
MBA = dataset[dataset['degree_t']=="Sci&Tech"]['mba_p']

from scipy import stats
print(stats.ttest_ind(Etest, MBA))

print("Accept Null Hypothesis since p value is Greater than 0.05. Threfore,
```

```
TtestResult(statistic=4.532000225151251, pvalue=1.4289217003775636e-05, df=1
16.0)
Accept Null Hypothesis since p value is Greater than 0.05. Threfore, there i
s a significant Difference between the degree_t(Sci&Tech)with respect to ete
st_p and mba_p at significance level of 5%
```

12) Which parameter is highly correlated with salary?

In [20]:
```
dataset[quan].corr()
```

Out[20]:

	sl_no	ssc_p	hsc_p	degree_p	etest_p	mba_p	sala
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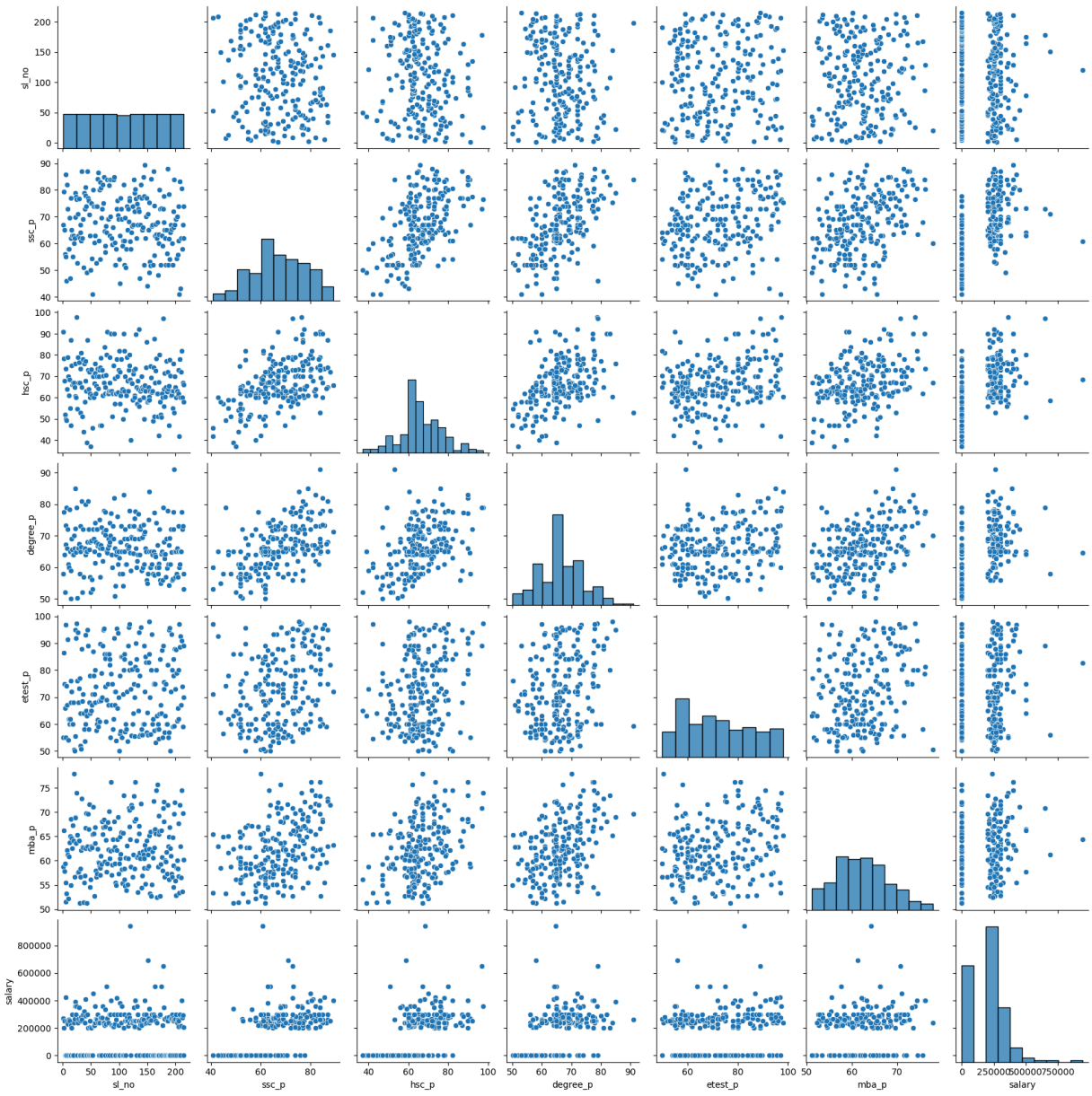
mba_p	0.022327	0.388478	0.354823	0.402364	0.218055	1.000000	0.1398
salary	0.002543	0.538090	0.452569	0.408371	0.186988	0.139823	1.0000

In [21]:
```
# SSC_P is Higly correlated with salary with 53%
```

13) plot any useful graph and explain it.

In [22]:
```
import seaborn as sns
sns.pairplot(dataset)
```

Out[22]:
```
<seaborn.axisgrid.PairGrid at 0x1a778a11610>
```



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