INNOMATICS RESERCH LABS.
IN9240149

EXPLORATOR DATA ANALYSIS (EDA)

[1]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
import numpy as np
import warnings
warnings.filterwarnings("ignore")

from scipy import stats
```

[2]:
```
df = pd.read_csv("data.xlsx - Sheet1.csv")
df
```

[2]:

	Unnamed: 0	ID	Salary	DOJ	DOL	Designation	JobCity	Gender	DOB
0	train	203097	420000.0	6/1/12 0:00	present	senior quality engineer	Bangalore	f	2/19/90 0:00
1	train	579905	500000.0	9/1/13 0:00	present	assistant manager	Indore	m	10/4/89 0:00
2	train	810601	325000.0	6/1/14 0:00	present	systems engineer	Chennai	f	8/3/92 0:00
3	train	267447	1100000.0	7/1/11 0:00	present	senior software engineer	Gurgaon	m	12/5/89 0:00
4	train	343523	200000.0	3/1/14 0:00	3/1/15 0:00	get	Manesar	m	2/27/91 0:00
…	…	…	…	…	…	…	…	…	…
3993	train	47916	280000.0	10/1/11 0:00	10/1/12 0:00	software engineer	New Delhi	m	4/15/87 0:00
3994	train	752781	100000.0	7/1/13 0:00	7/1/13 0:00	technical writer	Hyderabad	f	8/27/92 0:00
3995	train	355888	320000.0	7/1/13 0:00	present				
3996	train	947111	200000.0	7/1/14 0:00	1/1/15 0:00				
3997	train	324966	400000.0	2/1/13 0:00	present				

EXPLORATOR DATA ANALYSIS (EDA)

```
3995          associate software engineer  Bangalore  m     7/3/91 0:00
3996          software developer Asifabadbanglore     f 3/20/92 0:00
3997          senior systems engineer Chennai    f 2/26/91 0:00

          10percentage … ComputerScience MechanicalEngg ElectricalEngg \
0          84.30 …    -1    -1    -1
1          85.40 …    -1    -1    -1
2          85.00 …    -1    -1    -1
3          85.60 …    -1    -1    -1
4          78.00 …    -1    -1    -1
     …            … …             …             …             …
3993       52.09 …    -1    -1    -1
3994       90.00 …    -1    -1    -1
3995       81.86 …    -1    -1    -1
3996       78.72 …    438   -1    -1
3997       70.60 …    -1    -1    -1

   TelecomEngg CivilEngg conscientiousness agreeableness extraversion \
0           -1   -1    0.9737     0.8128     0.5269
1           -1   -1    -0.7335    0.3789     1.2396
2           -1   -1    0.2718     1.7109     0.1637
3           -1   -1    0.0464     0.3448     -0.3440
4           -1   -1    -0.8810    -0.2793    -1.0697
     …         …       …               …          …         …
3993        -1   -1    -0.1082    0.3448     0.2366
3994        -1   -1    -0.3027    0.8784     0.9322
3995        -1   -1    -1.5765    -1.5273    -1.5051
3996        -1   -1    -0.1590    0.0459     -0.4511
3997        -1   -1    -1.1128    -0.2793    -0.6343

nueroticism openess_to_experience
0        1.35490 -0.4455
1        -0.10760      0.8637
2        -0.86820      0.6721
```

EXPLORATOR DATA ANALYSIS (EDA)

```
3        -0.40780     -0.9194

4        0.09163 -0.1295

     …          …                   …

3993     0.64980 -0.9194

3994     0.77980 -0.0943

3995     -1.31840     -0.7615

3996     -0.36120     -0.0943

3997     1.32553 -0.6035

     [3998 rows x 39 columns]
```

[3]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3998 entries, 0 to 3997
Data columns (total 39 columns):
#   Column              Non-Null Count Dtype
--- ------              -------------- -----
0   Unnamed: 0          3998 non-null object
1    ID                 3998 non-null int64
2   Salary              3998 non-null float64
3    DOJ                3998 non-null object
4    DOL                3998 non-null object
5   Designation         3998 non-null object
6   JobCity             3998 non-null object
7   Gender              3998 non-null object
8    DOB                3998 non-null object
9   10percentage        3998 non-null float64
 10 10board             3998 non-null object
 11 12graduation        3998 non-null int64
 12 12percentage        3998 non-null float64
 13 12board             3998 non-null object
 14 CollegeID           3998 non-null int64
 15 CollegeTier         3998 non-null int64
 16 Degree              3998 non-null object
 17 Specialization      3998 non-null object
 18 collegeGPA          3998 non-null float64
 19 CollegeCityID       3998 non-null int64
 20 CollegeCityTier     3998 non-null int64
 21 CollegeState        3998 non-null object
 22 GraduationYear      3998 non-null int64
 23 English             3998 non-null int64
 24 Logical             3998 non-null int64
 25 Quant               3998 non-null int64
```

EXPLORATOR DATA ANALYSIS (EDA)

```
 26 Domain               3998 non-null float64
 27 ComputerProgramming 3998 non-null int64
 28 ElectronicsAndSemicon 3998 non-  int64
 null
29 ComputerScience      3998 non-null int64
30 MechanicalEngg       3998 non-null int64
31 ElectricalEngg       3998 non-null int64
32 TelecomEngg          3998 non-null int64
33 CivilEngg            3998 non-null int64
34 conscientiousness    3998 non-null float64
35 agreeableness        3998 non-null float64
36 extraversion         3998 non-null float64
37 nueroticism          3998 non-null float64
 38 openess_to_experience 3998 non-  float64
 null
dtypes: float64(10), int64(17),
object(12) memory usage: 1.2+ MB
```

[4]:
```
df = df.drop('Unnamed: 0', axis=1)
```

[5]:
```
df.columns
```

[5]:
```
Index(['ID', 'Salary', 'DOJ', 'DOL', 'Designation', 'JobCity',
'Gender', 'DOB',
       '10percentage', '10board', '12graduation', '12percentage',
       '12board',
       'CollegeID', 'CollegeTier', 'Degree', 'Specialization',
       'collegeGPA',
       'CollegeCityID', 'CollegeCityTier', 'CollegeState',
       'GraduationYear',
       'English', 'Logical', 'Quant', 'Domain', 'ComputerProgramming',
       'ElectronicsAndSemicon', 'ComputerScience', 'MechanicalEngg',
       'ElectricalEngg', 'TelecomEngg', 'CivilEngg',
       'conscientiousness',
       'agreeableness', 'extraversion', 'nueroticism',
       'openess_to_experience'],
      dtype='object')
```

[6]:
```
df.columns = df.columns.str.lower()
```

[7]:
```
df.head()
```

[7]:

	id	salary	doj	dol	designation	
0	203097	420000.0	6/1/12 0:00	present	senior quality engineer	
1	579905	500000.0	9/1/13 0:00	present	assistant manager	
2	810601	325000.0	6/1/14 0:00	present	systems engineer	
3	267447	1100000.0	7/1/11 0:00	present	senior software engineer	
4	343523	200000.0	3/1/14 0:00	3/1/15 0:00		get

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EXPLORATOR DATA ANALYSIS (EDA)

```
   jobcity gender        dob 10percentage \
0 Bangalore     f 2/19/90 0:00       84.3
1    Indore     m 10/4/89 0:00       85.4
2   Chennai     f 8/3/92 0:00        85.0
3   Gurgaon     m 12/5/89 0:00       85.6
4   Manesar     m 2/27/91 0:00       78.0
                      10board … computerscience mechanicalengg \
0 board ofsecondary education,ap …          -1             -
                                                           1
1                         cbse …          -1             -
                                                           1
2                         cbse …          -1             -
                                                           1
3                         cbse …          -1             -
                                                           1
4                         cbse …          -1             -
                                                           1
  electricalengg telecomengg civilengg conscientiousness
  agreeableness \
0           -1          -1         -1          0.9737      0.8128
1           -1          -1         -1         -0.7335      0.3789
2           -1          -1         -1          0.2718      1.7109
3           -1          -1         -1          0.0464      0.3448
4           -1          -1         -1         -0.8810     -
                                                          0.2793
   extraversion nueroticism openess_to_experience
0       0.5269     1.35490              -0.4455
1       1.2396    -0.10760               0.8637
2       0.1637    -0.86820               0.6721
3      -0.3440    -0.40780              -
                                        0.9194
4      -1.0697     0.09163              -
                                        0.1295
[5 rows x 38 columns]
```

[8]:
```
df['doj'] = pd.to_datetime(df['doj'])
```

[9]:
```
df.info()
```

```
<class
'pandas.core.frame.DataFrame'>
RangeIndex: 3998 entries, 0 to
3997 Data columns (total 38
columns):
#   Column              Non-Null Count Dtype
--- ------              -------------- -----
0   id                  3998 non-   int64
                        null
```

EXPLORATOR DATA ANALYSIS (EDA)

1	salary	3998 non-null	float64
2	doj	3998 non-null	datetime64[ns]
3	dol	3998 non-null	object
4	designation	3998 non-null	object
5	jobcity	3998 non-null	object
6	gender	3998 non-null	object
7	dob	3998 non-null	object
8	10percentage	3998 non-null	float64
9	10board	3998 non-null	object
10	12graduation	3998 non-null	int64
11	12percentage	3998 non-null	float64
12	12board	3998 non-null	object
13	collegeid	3998 non-null	int64
14	collegetier	3998 non-null	int64
15	degree	3998 non-null	object
16	specialization	3998 non-null	object
17	collegegpa	3998 non-null	float64
18	collegecityid	3998 non-null	int64
19	collegecitytier	3998 non-null	int64
20	collegestate	3998 non-null	object
21	graduationyear	3998 non-null	int64
22	english	3998 non-null	int64
23	logical	3998 non-null	int64
24	quant	3998 non-null	int64

EXPLORATOR DATA ANALYSIS (EDA)

```
 25 domain              3998 non-   float64
                        null
 26 computerprogramming 3998 non-   int64
                        null
 27 electronicsandsemicon 3998 non-int64
 null
28 computerscience    3998 non-nullint64
29 mechanicalengg     3998 non-nullint64
30 electricalengg     3998 non-nullint64
 31 telecomengg       3998 non-nullint64
 32 civilengg         3998 non-nullint64
 33 conscientiousness 3998 non-nullfloat64
 34 agreeableness     3998 non-nullfloat64
 35 extraversion      3998 non-nullfloat64
 36 nueroticism       3998 non-nullfloat64
 37 openess_to_experience 3998 non-float64
 null
dtypes: datetime64[ns](1), float64(10), int64(17),
object(10) memory usage: 1.2+ MB
```

[10]:
```
df.shape
```

[10]: (3998, 38)

1 Data Cleaning

[11]:
```
unique_cities = df['jobcity'].unique()
unique_cities
```

[11]:
```
array(['Bangalore', 'Indore', 'Chennai', 'Gurgaon', 'Manesar',
       'Hyderabad', 'Banglore', 'Noida', 'Kolkata', 'Pune', '-1',
       'mohali', 'Jhansi', 'Delhi', 'Hyderabad ', 'Bangalore ',
       'noida',
       'delhi', 'Bhubaneswar', 'Navi Mumbai', 'Mumbai', 'New Delhi',
       'Mangalore', 'Rewari', 'Gaziabaad', 'Bhiwadi', 'Mysore',
       'Rajkot',
       'Greater Noida', 'Jaipur', 'noida ', 'HYDERABAD', 'mysore',
       'THANE', 'Maharajganj', 'Thiruvananthapuram', 'Punchkula',
       'Bhubaneshwar', 'Pune ', 'coimbatore', 'Dhanbad', 'Lucknow',
       'Trivandrum', 'kolkata', 'mumbai', 'Gandhi Nagar', 'Una',
       'Daman and Diu', 'chennai', 'GURGOAN', 'vsakhapttnam', 'pune',
       'Nagpur', 'Bhagalpur', 'new delhi - jaisalmer', 'Coimbatore',
       'Ahmedabad', 'Kochi/Cochin', 'Bankura', 'Bengaluru', 'Mysore ',
       'Kanpur ', 'jaipur', 'Gurgaon ', 'bangalore', 'CHENNAI',
       'Vijayawada', 'Kochi', 'Beawar', 'Alwar', 'NOIDA', 'Greater
       noida',
```

EXPLORATOR DATA ANALYSIS (EDA)

'Siliguri ', 'raipur', 'gurgaon', 'Bhopal', 'Faridabad',
'Jodhpur',
'udaipur', 'Muzaffarpur', 'Kolkata`', 'Bulandshahar',
'Haridwar',
'Raigarh', 'Visakhapatnam', 'Jabalpur', 'hyderabad', 'Unnao',
'KOLKATA', 'Thane', 'Aurangabad', 'Belgaum', 'gurgoan',
'Dehradun',
'Rudrapur', 'Jamshedpur', 'vizag', 'Nouda', 'Dharamshala',
'Banagalore', 'Hissar', 'Ranchi', 'BANGALORE', 'Madurai',
'Gurga',
'Chandigarh', 'Australia', ' Chennai', 'CHEYYAR', 'Mumbai ',
'sonepat', 'Ghaziabad', 'Pantnagar', 'Siliguri', 'mumbai ',
'Jagdalpur', 'Chennai ', 'angul', 'Baroda', ' ariyalur',
'Jowai',
'Kochi/Cochin, Chennai and Coimbatore', 'bhubaneswar',
'Neemrana',
'VIZAG', 'Tirupathi', 'Lucknow ', 'Ahmedabad ', 'Bhubneshwar',
'Noida ', 'pune ', 'Calicut', 'Gandhinagar', 'LUCKNOW',
'Dubai',
'bengaluru', 'MUMBAI', 'Ahmednagar', 'Nashik', 'New delhi',
'Bellary', 'Ludhiana', 'New Delhi ', 'Muzaffarnagar', 'BHOPAL',
'Gurgoan', 'Gagret', 'Indirapuram, Ghaziabad', 'Gwalior',
'new delhi', 'TRIVANDRUM', 'Chennai & Mumbai', 'Rajasthan',
'Sonipat', 'Bareli', 'Kanpur', 'Hospete', 'Miryalaguda', '
mumbai',
'Dharuhera', 'lucknow', 'meerut', 'dehradun', 'Ganjam',
'Hubli',
'bangalore ', 'NAVI MUMBAI', 'ncr', 'Agra', 'Trichy',
'kudankulam ,tarapur', 'Ongole', 'Sambalpur', 'Pondicherry',
'Bundi', 'SADULPUR,RAJGARH,DISTT-CHURU,RAJASTHAN', 'AM',
'Bikaner',
'Vadodara', 'BAngalore', 'india', 'Asansol', 'Tirunelvelli',
'Ernakulam', 'DELHI', 'Bilaspur', 'Chandrapur', 'Nanded',
'Dharmapuri', 'Vandavasi', 'Rohtak', 'trivandrum', 'Nagpur ',
'Udaipur', 'Patna', 'banglore', 'indore', 'Salem', 'Nasikcity',
'Gandhinagar ', 'Technopark, Trivandrum', 'Bharuch',
'Tornagallu',
'Raipur', 'Kolkata ', 'Jaspur', 'Burdwan', 'Bhubaneswar ',
'Shimla', 'ahmedabad', 'Gajiabaad', 'Jammu', 'Shahdol',
'Muvattupuzha', 'Al Jubail,Saudi Arabia', 'Kalmar, Sweden',
'Secunderabad', 'A-64,sec-64,noida', 'Ratnagiri', 'Jhajjar',
'Gulbarga', 'hyderabad(bhadurpally)', 'Nalagarh', 'Chandigarh
',
'Jaipur ', 'Jeddah Saudi Arabia', ' Delhi', 'PATNA', 'SHAHDOL',
'Chennai, Bangalore', 'Bhopal ', 'Jamnagar', 'PUNE',
'Tirupati',

EXPLORATOR DATA ANALYSIS (EDA)

```
       'Gonda', 'jamnagar', 'chennai ', 'orissa', 'kharagpur',
       'Trivandrum ', 'Navi Mumbai , Hyderabad', 'Joshimath',
       'chandigarh', 'Bathinda', 'Johannesburg', 'kala amb ',
       'Karnal',
       'LONDON', 'Kota', 'Panchkula', 'Baddi HP', 'Nagari',
       'Mettur, Tamil Nadu ', 'Durgapur', 'pondi', 'Surat', 'Kurnool',
       'kolhapur', 'Madurai ', 'GREATER NOIDA', 'Bhilai', ' Pune',
       'hderabad', 'KOTA', 'thane', 'Vizag', 'Bahadurgarh',
       'Rayagada, Odisha', 'kakinada', 'GURGAON', 'Varanasi', 'punr',
       'Nellore', 'patna', 'Meerut', 'hyderabad ', 'Sahibabad',
       'Howrah',
       'BHUBANESWAR', 'Trichur', 'Ambala', 'Khopoli', 'keral',
       'Roorkee',
       'Greater NOIDA', 'Navi mumbai', 'ghaziabad', 'Allahabad',
       'Delhi/NCR', 'Panchkula ', 'Ranchi ', 'Jalandhar', 'manesar',
       'vapi', 'PILANI', 'muzzafarpur', 'RAS AL KHAIMAH', 'bihar',
       'singaruli', 'KANPUR', 'Banglore ', 'pondy', 'Mohali',
       'Phagwara',
       ' Mumbai', ' bangalore', 'GURAGAON', 'Baripada', 'MEERUT',
       'Yamuna Nagar', 'shahibabad', 'sampla', 'Guwahati', 'Rourkela',
       'Banaglore', 'Vellore', 'Dausa', 'latur (Maharashtra )',
       'NEW DELHI', 'kanpur', 'Mainpuri', 'karnal', 'Dammam',
       'Haldia',
       'sambalpur', 'RAE BARELI', 'ranchi', 'jAipur', 'BANGLORE',
       'Patiala', 'Gorakhpur', 'new dehli', 'BANGALORE ', 'Ambala
      City',
       'Karad', 'Rajpura', 'Pilani', 'haryana', 'Asifabadbanglore'],
      dtype=object)
```

[12]:
```
df.jobcity = df.jobcity.str.strip().str.lower()

unique_cities_cleaned = df['jobcity'].unique()
print(unique_cities_cleaned)
```

```
['bangalore' 'indore' 'chennai' 'gurgaon' 'manesar' 'hyderabad'
'banglore'
 'noida' 'kolkata' 'pune' '-1' 'mohali' 'jhansi' 'delhi' 'bhubaneswar'
 'navi mumbai' 'mumbai' 'new delhi' 'mangalore' 'rewari' 'gaziabaad'
 'bhiwadi' 'mysore' 'rajkot' 'greater noida' 'jaipur' 'thane'
 'maharajganj' 'thiruvananthapuram' 'punchkula' 'bhubaneshwar'
 'coimbatore' 'dhanbad' 'lucknow' 'trivandrum' 'gandhi nagar' 'una'
 'daman and diu' 'gurgoan' 'vsakhapttnam' 'nagpur' 'bhagalpur'
 'new delhi - jaisalmer' 'ahmedabad' 'kochi/cochin' 'bankura'
 'bengaluru'
 'kanpur' 'vijayawada' 'kochi' 'beawar' 'alwar' 'siliguri' 'raipur'
 'bhopal' 'faridabad' 'jodhpur' 'udaipur' 'muzaffarpur' 'kolkata`'
```

EXPLORATOR DATA ANALYSIS (EDA)

```
'bulandshahar' 'haridwar' 'raigarh' 'visakhapatnam' 'jabalpur'
'unnao'
'aurangabad' 'belgaum' 'dehradun' 'rudrapur' 'jamshedpur' 'vizag'
'nouda'
'dharamshala' 'banagalore' 'hissar' 'ranchi' 'madurai' 'gurga'
'chandigarh' 'australia' 'cheyyar' 'sonepat' 'ghaziabad' 'pantnagar'
'jagdalpur' 'angul' 'baroda' 'ariyalur' 'jowai'
'kochi/cochin, chennai and coimbatore' 'neemrana' 'tirupathi'
'bhubneshwar' 'calicut' 'gandhinagar' 'dubai' 'ahmednagar' 'nashik'
'bellary' 'ludhiana' 'muzaffarnagar' 'gagret' 'indirapuram,
ghaziabad'
'gwalior' 'chennai & mumbai' 'rajasthan' 'sonipat' 'bareli' 'hospete'
'miryalaguda' 'dharuhera' 'meerut' 'ganjam' 'hubli' 'ncr' 'agra'
'trichy'
'kudankulam ,tarapur' 'ongole' 'sambalpur' 'pondicherry' 'bundi'
'sadulpur,rajgarh,distt-churu,rajasthan' 'am' 'bikaner' 'vadodara'
'india' 'asansol' 'tirunelvelli' 'ernakulam' 'bilaspur' 'chandrapur'
'nanded' 'dharmapuri' 'vandavasi' 'rohtak' 'patna' 'salem'
'nasikcity'
'technopark, trivandrum' 'bharuch' 'tornagallu' 'jaspur' 'burdwan'
'shimla' 'gajiabaad' 'jammu' 'shahdol' 'muvattupuzha'
'al jubail,saudi arabia' 'kalmar, sweden' 'secunderabad'
'a-64,sec-64,noida' 'ratnagiri' 'jhajjar' 'gulbarga'
'hyderabad(bhadurpally)' 'nalagarh' 'jeddah saudi arabia'
'chennai, bangalore' 'jamnagar' 'tirupati' 'gonda' 'orissa'
'kharagpur'
'navi mumbai , hyderabad' 'joshimath' 'bathinda' 'johannesburg'
'kala amb' 'karnal' 'london' 'kota' 'panchkula' 'baddi hp' 'nagari'
'mettur, tamil nadu' 'durgapur' 'pondi' 'surat' 'kurnool' 'kolhapur'
'bhilai' 'hderabad' 'bahadurgarh' 'rayagada, odisha' 'kakinada'
'varanasi' 'punr' 'nellore' 'sahibabad' 'howrah' 'trichur' 'ambala'
'khopoli' 'keral' 'roorkee' 'allahabad' 'delhi/ncr' 'jalandhar'
'vapi'
'pilani' 'muzzafarpur' 'ras al khaimah' 'bihar' 'singaruli' 'pondy'
'phagwara' 'guragaon' 'baripada' 'yamuna nagar' 'shahibabad' 'sampla'
'guwahati' 'rourkela' 'banaglore' 'vellore' 'dausa'
'latur (maharashtra )' 'mainpuri' 'dammam' 'haldia' 'rae bareli'
'patiala' 'gorakhpur' 'new dehli' 'ambala city' 'karad'
'rajpura' 'haryana' 'asifabadbanglore']
```

[13]:
```
city_mapping = {
    'bangalore': 'Bangalore',
    'banglore': 'Bangalore',
    'banagalore': 'Bangalore',
```

```
    'bengaluru': 'Bangalore',
    'asifabadbanglore':'Bangalore',
    'indore': 'Indore',
    'chennai': 'Chennai',
    'gurgaon': 'Gurgaon',
    'gurgoan': 'Gurgaon',
    'gurga': 'Gurgaon',
    'manesar': 'Manesar',
    'hyderabad': 'Hyderabad',
    'hderabad': 'Hyderabad',
    'hyderabad(bhadurpally)': 'Hyderabad',
    'noida': 'Noida',
    'nouda': 'Noida',
    'kolkata': 'Kolkata',
    'kolkata`': 'Kolkata',
    'pune': 'Pune',
    '-1': 'Unknown',
    'mohali': 'Mohali',
    'jhansi': 'Jhansi',
    'delhi': 'Delhi',
    'new delhi': 'New Delhi',
    'bhubaneswar': 'Bhubaneswar',
    'bhubaneshwar': 'Bhubaneswar',
    'navi mumbai': 'Navi Mumbai',
    'mumbai': 'Mumbai',
    'mangalore': 'Mangalore',
    'rewari': 'Rewari',
    'gaziabaad': 'Ghaziabad',
    'ghaziabad': 'Ghaziabad',
    'bhiwadi': 'Bhiwadi',
    'mysore': 'Mysore',
    'rajkot': 'Rajkot',
    'greater noida': 'Greater Noida',
    'jaipur': 'Jaipur',
    'thane': 'Thane',
    'maharajganj': 'Maharajganj',
    'thiruvananthapuram': 'Thiruvananthapuram',
    'punchkula': 'Panchkula',
    'coimbatore': 'Coimbatore',
    'dhanbad': 'Dhanbad',
    'lucknow': 'Lucknow',
    'trivandrum': 'Thiruvananthapuram',
    'gandhi nagar': 'Gandhinagar',
    'una': 'Una',
    'daman and diu': 'Daman and Diu',
    'vsakhapttnam': 'Visakhapatnam',
    'nagpur': 'Nagpur',
```

```
    'bhagalpur': 'Bhagalpur',
    'new delhi - jaisalmer': 'New Delhi',
    'ahmedabad': 'Ahmedabad',
    'kochi/cochin': 'Kochi',
    'bankura': 'Bankura',
    'kanpur': 'Kanpur',
    'vijayawada': 'Vijayawada',
    'kochi': 'Kochi',
    'beawar': 'Beawar',
    'alwar': 'Alwar',
    'siliguri': 'Siliguri',
    'raipur': 'Raipur',
    'bhopal': 'Bhopal',
    'faridabad': 'Faridabad',
    'jodhpur': 'Jodhpur',
    'udaipur': 'Udaipur',
    'muzaffarpur': 'Muzaffarpur',
    'bulandshahar': 'Bulandshahar',
    'haridwar': 'Haridwar',
    'raigarh': 'Raigarh',
    'visakhapatnam': 'Visakhapatnam',
    'jabalpur': 'Jabalpur',
    'unnao': 'Unnao',
    'aurangabad': 'Aurangabad',
    'belgaum': 'Belgaum',
    'dehradun': 'Dehradun',
    'rudrapur': 'Rudrapur',
    'jamshedpur': 'Jamshedpur',
    'vizag': 'Visakhapatnam',
    'nouda': 'Noida',
    'dharamshala': 'Dharamshala',
    'hissar': 'Hisar',
    'ranchi': 'Ranchi',
    'madurai': 'Madurai',
    'chandigarh': 'Chandigarh',
    'australia': 'Australia',
    'cheyyar': 'Cheyyar',
    'sonepat': 'Sonepat',
    'pantnagar': 'Pantnagar',
    'jagdalpur': 'Jagdalpur',
    'angul': 'Angul',
    'baroda': 'Vadodara',
    'ariyalur': 'Ariyalur',
    'jowai': 'Jowai',
    'neemrana': 'Neemrana',
    'tirupathi': 'Tirupati',
    'bhubneshwar': 'Bhubaneswar',
```

```
    'calicut': 'Kozhikode',
    'gandhinagar': 'Gandhinagar',
    'dubai': 'Dubai',
    'ahmednagar': 'Ahmednagar',
    'nashik': 'Nashik',
    'bellary': 'Bellary',
    'ludhiana': 'Ludhiana',
    'muzaffarnagar': 'Muzaffarnagar',
    'gagret': 'Gagret',
    'indirapuram, ghaziabad': 'Ghaziabad',
    'gwalior': 'Gwalior',
    'chennai & mumbai': 'Chennai',
    'rajasthan': 'Rajasthan',
    'sonipat': 'Sonipat',
    'bareli': 'Bareli',
    'hospete': 'Hospete',
    'miryalaguda': 'Miryalaguda',
    'dharuhera': 'Dharuhera',
    'meerut': 'Meerut',
    'ganjam': 'Ganjam',
    'hubli': 'Hubli',
    'ncr': 'NCR',
    'agra': 'Agra',
    'trichy': 'Tiruchirappalli',
    'kudankulam ,tarapur': 'Kudankulam',
    'ongole': 'Ongole',
    'sambalpur': 'Sambalpur',
    'pondicherry': 'Puducherry',
    'bundi': 'Bundi',
    'sadulpur,rajgarh,distt-churu,rajasthan': 'Rajasthan',
    'am': 'Am',
    'bikaner': 'Bikaner',
    'vadodara': 'Vadodara',
    'india': 'India',
    'asansol': 'Asansol',
    'tirunelvelli': 'Tirunelveli',
    'ernakulam': 'Ernakulam',
    'bilaspur': 'Bilaspur',
    'chandrapur': 'Chandrapur',
    'nanded': 'Nanded',
    'dharmapuri': 'Dharmapuri',
    'vandavasi': 'Vandavasi',
    'rohtak': 'Rohtak',
    'patna': 'Patna',
    'salem': 'Salem',
    'nasikcity': 'Nashik',
    'technopark, trivandrum': 'Trivandrum',
```

```
    'bharuch': 'Bharuch',
    'tornagallu': 'Tornagallu',
    'jaspur': 'Jaspur',
    'burdwan': 'Burdwan',
    'shimla': 'Shimla',
    'gajiabaad': 'Ghaziabad',
    'jammu': 'Jammu',
    'shahdol': 'Shahdol',
    'muvattupuzha': 'Muvattupuzha',
    'al jubail,saudi arabia': 'Al Jubail',
    'kalmar, sweden': 'Kalmar',
    'secunderabad': 'Secunderabad',
    'a-64,sec-64,noida': 'Noida',
    'ratnagiri': 'Ratnagiri',
    'jhajjar': 'Jhajjar',
    'gulbarga': 'Gulbarga',
    'hyderabad(bhadurpally)': 'Hyderabad',
    'nalagarh': 'Nalagarh',
    'jeddah saudi arabia': 'Jeddah',
    'chennai, bangalore': 'Chennai',
    'jamnagar': 'Jamnagar',
    'tirupati': 'Tirupati',
    'gonda': 'Gonda',
    'orissa': 'Odisha',
    'kharagpur': 'Kharagpur',
    'navi mumbai , hyderabad': 'Navi Mumbai',
    'joshimath': 'Joshimath',
    'bathinda': 'Bathinda',
    'johannesburg': 'Johannesburg',
    'kala amb': 'Kala Amb',
    'karnal': 'Karnal',
    'london': 'London',
    'kota': 'Kota',
    'dehraj': 'Dehradun',
    'melbourne': 'Melbourne',
    'moradabad': 'Moradabad',
    'delhi-gurgaon': 'Delhi',
    'ambala': 'Ambala',
    'faridkot': 'Faridkot',
    'rohtak, haryana': 'Rohtak',
    'khammam': 'Khammam',
    'khurda': 'Khurda',
    'jhalawar': 'Jhalawar',
    'kaithal': 'Kaithal',
    'sonbhadra': 'Sonbhadra',
    'fatehgarh sahib': 'Fatehgarh Sahib',
    'kaithal-haryana': 'Kaithal',
```

EXPLORATOR DATA ANALYSIS (EDA)

```
    'bhilwara': 'Bhilwara',
    'coimbatore, tirupur': 'Coimbatore',
    'sri ganganagar': 'Sri Ganganagar',
    'manipal': 'Manipal',
    'tirupathi': 'Tirupati',
    'kharagpur, west bengal': 'Kharagpur',
    'kolkata': 'Kolkata',
    'trichy-tiruchirappalli': 'Tiruchirappalli',
}
```

[14]:
```
df['jobcity'] = df['jobcity'].replace(city_mapping)
```

[15]:
```
df['jobcity'] = df.jobcity.str.strip().str.lower()
```

[16]:
```
df
```

[16]:
```
          id     salary       doj          dol                 designation  \
0 203097 420000.0 2012-06-01 present senior quality engineer 1 579905
500000.0  2013-09-01  present  assistant  manager  2  810601  325000.0
2014-06-01 present systems engineer 3 267447 1100000.0 2011-07-01
present senior software engineer
4    343523 200000.0 2014-03-01 3/1/15 0:00                      get
…      …       …       …          …                          …
3993 47916 280000.0 2011-10-01 10/1/12 0:00 software engineer 3994
752781 100000.0 2013-07-01 7/1/13 0:00 technical writer 3995 355888
320000.0 2013-07-01 present associate software engineer
3996  947111      200000.0 2014-07-01   1/1/15 0:00      software
      developer
3997  324966      400000.0 2013-02-01   present    senior systems
      engineer jobcity gender     dob 10percentage \
0    bangalore     f 2/19/90 0:00       84.30
1       indore     m 10/4/89 0:00       85.40
2      chennai     f 8/3/92 0:00        85.00
3      gurgaon     m 12/5/89 0:00       85.60
4      manesar     m 2/27/91 0:00       78.00
…         …    …          …          …
3993 new delhi     m 4/15/87 0:00       52.09
3994 hyderabad     f 8/27/92 0:00       90.00
3995 bangalore     m 7/3/91 0:00        81.86
3996 bangalore     f 3/20/92 0:00       78.72
3997   chennai     f 2/26/91 0:00       70.60

                          10board … computerscience mechanicalengg \
0                          board ofsecondary education,ap …-1
                                -1
1                          cbse …     -1    -1
2                          cbse …     -1    -1
```

EXPLORATOR DATA ANALYSIS (EDA)

```
3                          cbse …     -1    -1


4                          cbse …             -1            -
                                                            1
…                         … …              …           …
3993                       cbse …             -1            -
                                                            1
3994                 state board …            -1            -
                                                            1
3995                  bse,odisha …            -1            -
                                                            1
3996                 state board …           438            -
                                                            1
3997                       cbse …             -1            -
                                                            1
electricalengg telecomengg civilengg conscientiousness agreeableness \
0              -1          -1        -1          0.9737      0.8128
1              -1          -1        -1         -0.7335      0.3789
2              -1          -1        -1          0.2718      1.7109
3              -1          -1        -1          0.0464      0.3448
4              -1          -1        -1         -0.8810     -0.2793
…             …          …        …              …          …
3993           -1          -1        -1         -0.1082      0.3448
3994           -1          -1        -1         -0.3027      0.8784
3995           -1          -1        -1         -1.5765     -1.5273
3996           -1          -1        -1         -0.1590      0.0459
3997           -1          -1        -1         -1.1128     -0.2793

     extraversion nueroticism openess_to_experience
0          0.5269    1.35490              -0.4455
1          1.2396   -0.10760               0.8637
2          0.1637   -0.86820               0.6721
3         -0.3440   -0.40780              -0.9194
4         -1.0697    0.09163              -0.1295
…           …         …                   …
3993       0.2366    0.64980              -0.9194
3994       0.9322    0.77980              -0.0943
3995      -1.5051   -1.31840              -0.7615
3996      -0.4511   -0.36120              -0.0943
```

EXPLORATOR DATA ANALYSIS (EDA)

```
3997     -0.6343     1.32553              -0.6035

[3998 rows x 38 columns]
```

[17]:
```
# Replace date values with "Left" in dol
df['dol'] = df['dol'].apply(lambda x: "Left" if x != "present" else x)
```

[18]:
```
df.head()
```

[18]:
```
       id     salary       doj      dol              designation    jobcity  \
0  203097   420000.0 2012-06-01 present senior quality engineer
   bangalore
1  579905   500000.0 2013-09-01 present assistant manager     indore 2
   810601   325000.0 2014-06-01 present systems engineer chennai 3
   267447 1100000.0 2011-07-01 present  senior software engineer
      gurgaon
4 343523   200000.0 2014-03-01   Left  get   manesar gender   dob
10percentage     10board … \
0     f 2/19/90 0:00         84.3       board       ofsecondary
                             education,ap …
1     m 10/4/89 0:00         85.4                          cbse …
2      f 8/3/92 0:00         85.0                          cbse …
3     m 12/5/89 0:00         85.6                          cbse …
4     m 2/27/91 0:00         78.0                          cbse …
  computerscience mechanicalengg electricalengg telecomengg civilengg \
0     -1    -1    -1    -1    -1

1     -1    -1    -1    -1    -1

2     -1    -1    -1    -1    -1

3     -1    -1    -1    -1 -1 4     -1    -1    -1    -1 -1

conscientiousness agreeableness extraversion nueroticism \

0           0.9737     0.8128     0.5269     1.35490

1           -0.7335    0.3789     1.2396     -0.10760

2           0.2718     1.7109     0.1637     -0.86820

3           0.0464     0.3448     -0.3440    -0.40780

4           -0.8810    -0.2793    -1.0697    0.09163

        openess_to_experience
0               -0.4455
1               0.8637 2     0.6721 3   -
                0.9194
4     -0.1295

5     rows x 38 columns]
```

EXPLORATOR DATA ANALYSIS (EDA)

[19]:
```
df['dol'].value_counts()
```

[19]:
```
dol
Left  2123 present
1875
Name: count, dtype: int64
```

[20]:
```
df.salary.mean().round(2)
```

[20]:
```
307699.85
```

[21]:
```
df.salary.max()
```

[21]:
```
4000000.0
```

[22]:
```
df.salary.min()
```

[22]:
```
35000.0
```

[23]:
```
df.gender.value_counts()
```

[23]:
```
gender
m 3041
f    957
Name: count, dtype: int64
```

[24]:
```
df.computerscience =
df.computerscience.replace(-1,0)
df.mechanicalengg = df.mechanicalengg.replace(-
1,0) df.electricalengg =
df.electricalengg.replace(-1,0) df.telecomengg =
df.telecomengg.replace(-1,0) df.civilengg =
df.civilengg.replace(-1,0)
```

[25]:
```
df.head()
```

[25]:
```
      id    salary       doj     dol             designation   jobcity \
0  203097   420000.0 2012-06-01 present senior quality engineer
   bangalore
1  579905   500000.0 2013-09-01 present assistant manager     indore 2
   810601   325000.0 2014-06-01 present systems engineer chennai 3
   267447 1100000.0 2011-07-01 present senior software engineer
      gurgaon
4 343523 200000.0 2014-03-01 Left get manesar gender dob 10percentage
  10board … \
0     f 2/19/90 0:00        84.3       board       ofsecondary
                            education,ap …
1     m 10/4/89 0:00        85.4                         cbse …
2      f 8/3/92 0:00        85.0                         cbse …
3     m 12/5/89 0:00        85.6                         cbse …
```

EXPLORATOR DATA ANALYSIS (EDA)

```
4     m 2/27/91 0:00         78.0                          cbse …
   computerscience mechanicalengg electricalengg telecomengg
   civilengg \
0               0 0     0     0     0
1               0 0     0     0     0
2               0 0     0     0     0
3               0 0     0     0     0
4               0 0     0     0     0

  conscientiousness agreeableness extraversion nueroticism \
0            0.9737       0.8128       0.5269     1.35490
1           -0.7335       0.3789       1.2396    -
                                                  0.10760
2            0.2718       1.7109       0.1637    -
                                                  0.86820
3            0.0464       0.3448      -0.3440    -
                                                  0.40780
4           -0.8810      -0.2793      -1.0697     0.09163
   openess_to_experience
0               -0.4455
1               0.8637 2     0.6721 3   -
                0.9194
4              -0.1295

[5 rows x 38 columns]
```

[26]:
```
df['salary'].describe()
```

[26]:
```
count 3.998000e+03
mean    3.076998e+05
std     2.127375e+05
min     3.500000e+04
25%     1.800000e+05
50%     3.000000e+05
75%     3.700000e+05
max     4.000000e+06
 Name: salary, dtype: float64
```

[27]:
```
pd.options.display.float_format = '{:,.0f}'.format

# Display the describe() output for the 'salary' column
df.describe().transpose()
```

[27]:
```
                    count                          mean  \
id                  3,998                       663,795
salary              3,998                       307,700
doj                  3998                2013-07-02
                     11:04:10.325162496
```

EXPLORATOR DATA ANALYSIS (EDA)

10percentage	3,998	78
12graduation	3,998	2,008
12percentage	3,998	74
collegeid	3,998	5,157
collegetier	3,998	2
collegegpa	3,998	71
collegecityid	3,998	5,157
collegecitytier	3,998	0
graduationyear	3,998	2,012
english	3,998	502
logical	3,998	502
quant	3,998	513
domain	3,998	1
computerprogramming	3,998	353
electronicsandsemicon	3,998	95
computerscience	3,998	92
mechanicalengg	3,998	24
electricalengg	3,998	17
telecomengg	3,998	33
civilengg	3,998	4
conscientiousness	3,998	-0
agreeableness	3,998	0
extraversion	3,998	0
nueroticism	3,998	-0
openess_to_experience	3,998	-0

	min	25% \
id	11,244	334,284
salary	35,000	180,000
doj	1991-06-01 00:00:00	2012-10-01 00:00:00
10percentage	43	72
12graduation	1,995	2,007
12percentage	40	66
collegeid	2	494
collegetier	1	2
collegegpa	6	66
collegecityid	2	494
collegecitytier	0	0
graduationyear	0	2,012

EXPLORATOR DATA ANALYSIS (EDA)

english	180	425
logical	195	445
quant	120	430
domain	-1	0
computerprogramming	-1	295
electronicsandsemicon	-1	-1
computerscience	0	0
mechanicalengg	0	0
electricalengg	0	0
telecomengg	0	0
civilengg	0	0
conscientiousness	-4	-1
agreeableness	-6	-0
extraversion	-5	-1
nueroticism	-3	-1
openess_to_experience	-7	-1

	50%	75% \
id	639,600	990,480
salary	300,000	370,000
doj	2013-11-01 00:00:00	2014-07-01 00:00:00
10percentage	79	86
12graduation	2,008	2,009
12percentage	74	83
collegeid	3,879	8,818
collegetier	2	2
collegegpa	72	76
collegecityid	3,879	8,818
collegecitytier	0	1
graduationyear	2,013	2,014
english	500	570

EXPLORATOR DATA ANALYSIS (EDA)

logical	505	565
quant	515	595
domain	1	1
computerprogramming	415	495
electronicsandsemicon	-1	233
computerscience	0	0
mechanicalengg	0	0
electricalengg	0	0
telecomengg	0	0
civilengg	0	0
conscientiousness	0	1
agreeableness	0	1
extraversion	0	1
nueroticism	-0	1
openess_to_experience	-0	1

	max	std
id	1,298,275	363,218
salary	4,000,000	212,737
doj	2015-12-01 00:00:00	NaN
10percentage	98	10
12graduation	2,013	2
12percentage	99	11
collegeid	18,409	4,802
collegetier	2	0
collegegpa	100	8
collegecityid	18,409	4,802
collegecitytier	1	0
graduationyear	2,017	32
english	875	105
logical	795	87

EXPLORATOR DATA ANALYSIS (EDA)

quant	900	122
domain	1	0
computerprogramming	840	205
electronicsandsemicon	612	158
computerscience	715	175
mechanicalengg	623	98
electricalengg	676	87
telecomengg	548	105
civilengg	516	37
conscientiousness	2	1
agreeableness	2	1
extraversion	3	1
nueroticism	3	1
openess_to_experience	2	1

[28]:
```
df.columns
```

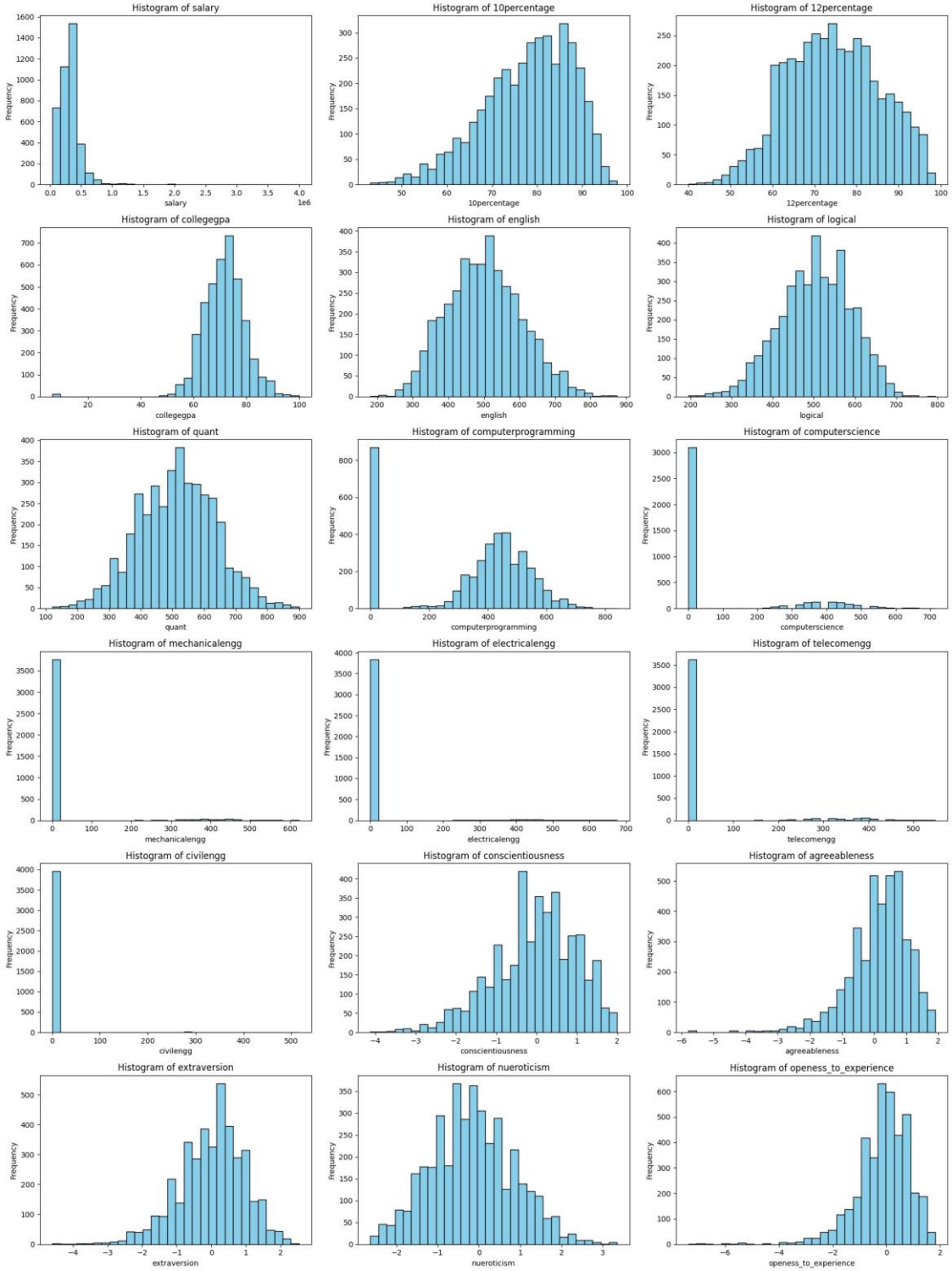
[28]:
```
Index(['id', 'salary', 'doj', 'dol', 'designation', 'jobcity',
'gender', 'dob',
       '10percentage', '10board', '12graduation', '12percentage',
       '12board',
       'collegeid', 'collegetier', 'degree', 'specialization',
       'collegegpa',
       'collegecityid', 'collegecitytier', 'collegestate',
       'graduationyear',
       'english', 'logical', 'quant', 'domain', 'computerprogramming',
       'electronicsandsemicon', 'computerscience', 'mechanicalengg',
       'electricalengg', 'telecomengg', 'civilengg',
       'conscientiousness',
       'agreeableness', 'extraversion', 'nueroticism',
       'openess_to_experience'],
      dtype='object')
```

[29]:
```
# Select the columns you want to plot columns_to_plot =
['salary', '10percentage', '12percentage', 'collegegpa',␣
↪'english', 'logical',
                'quant', 'computerprogramming', 'computerscience',␣
↪'mechanicalengg',
                'electricalengg', 'telecomengg', 'civilengg',␣
```

```
 ↪'conscientiousness',
                'agreeableness', 'extraversion', 'nueroticism',␣
 ↪'openess_to_experience']

# Set up the figure and axes for subplots fig, axes =
plt.subplots(nrows=6, ncols=3, figsize=(18, 24)) # 6 rows, 3␣
 ↪columns layout axes = axes.flatten() # Flatten the 2D array
of axes into 1D for easier␣ ↪iteration

# Loop through each column and its respective axis for
i, column in enumerate(columns_to_plot):
axes[i].hist(df[column].dropna(), bins=30,
color='skyblue',␣
 ↪edgecolor='black') # Plot histogram
    axes[i].set_title(f'Histogram of {column}') # Set title for
    each subplot axes[i].set_xlabel(column) # X-axis label
    axes[i].set_ylabel('Frequency') # Y-axis label

# Remove any unused subplots (if there are more axes than
columns) for j in range(i+1, len(axes)):
    fig.delaxes(axes[j])

# Adjust layout to prevent overlapping
plt.tight_layout()
```

EXPLORATOR DATA ANALYSIS (EDA)

```
# Show the plot
plt.show()
```



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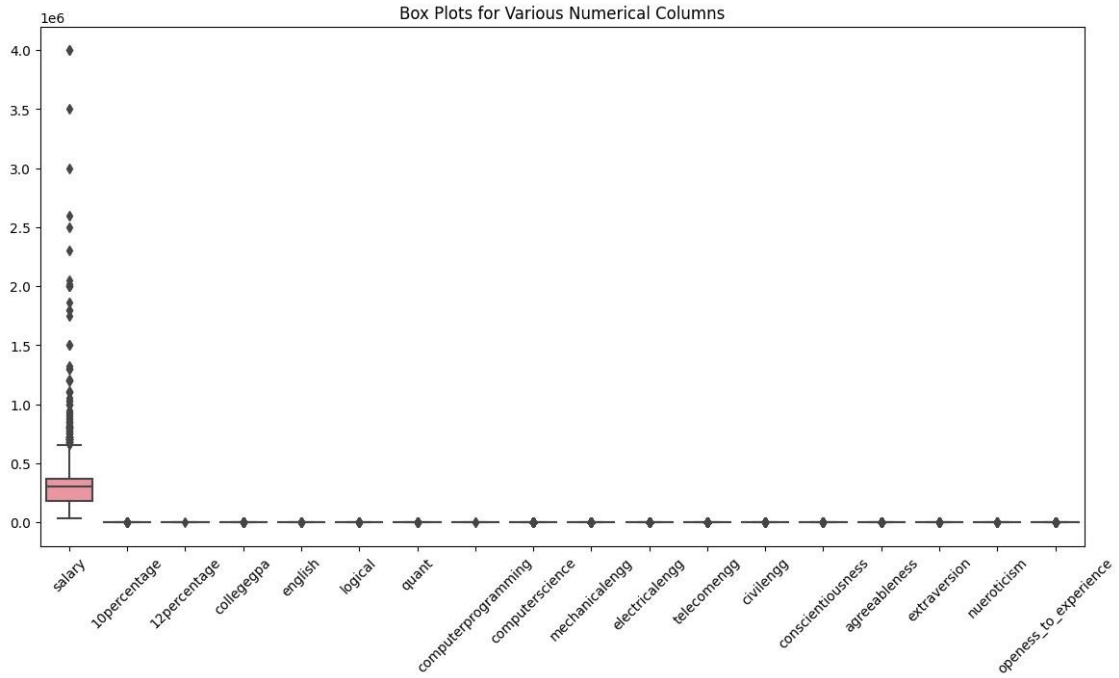
EXPLORATOR DATA ANALYSIS (EDA)

[30]:
```
# Correct list of columns to plot (only numerical columns)
columns_to_plot = ['salary', '10percentage', '12percentage', 'collegegpa',
                   'english', 'logical', 'quant', 'computerprogramming',
                   'computerscience', 'mechanicalengg', 'electricalengg',
                   'telecomengg', 'civilengg', 'conscientiousness',
                   'agreeableness', 'extraversion', 'nueroticism',
                   'openess_to_experience']

# Plot the box plot with valid columns
plt.figure(figsize=(14, 7))
sns.boxplot(data=df[columns_to_plot])
plt.title('Box Plots for Various Numerical Columns ')
plt.xticks(rotation=45)
plt.show()
```



[31]:
```
import matplotlib.pyplot as plt

# Select only numerical columns
columns_to_plot = ['salary', '10percentage', '12percentage', 'collegegpa',␣
 ↪'english', 'logical',
                   'quant', 'computerprogramming', 'computerscience',␣
 ↪'mechanicalengg',
```

EXPLORATOR DATA ANALYSIS (EDA)

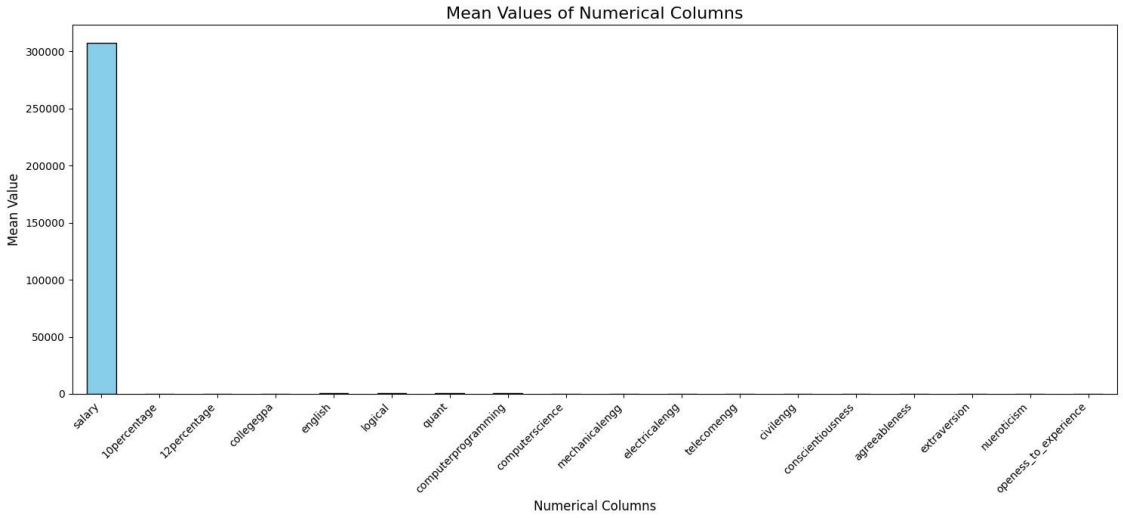
```
                  'electricalengg', 'telecomengg', 'civilengg',␣
 ↪'conscientiousness',
                  'agreeableness', 'extraversion', 'nueroticism',␣
 ↪'openess_to_experience']

# Calculate the mean of each numerical column
mean_values = df[columns_to_plot].mean()

# Create the bar plot
plt.figure(figsize=(15, 7))  # Set the figure size
mean_values.plot(kind='bar', color='skyblue', edgecolor='black')

# Customize the plot
plt.title('Mean Values of Numerical Columns ', fontsize=16)
plt.xlabel('Numerical Columns', fontsize=12)
plt.ylabel('Mean Value', fontsize=12)
plt.xticks(rotation=45, ha='right')  # Rotate x labels for better visibility

# Show the plot
plt.tight_layout()
plt.show()
```



[32]:
```
# Set the style of seaborn
sns.set(style="whitegrid")

# Define the columns for plotting
columns_to_plot = ['salary', '10percentage', '12percentage', 'collegegpa',␣
 ↪'english', 'logical',
                  'quant', 'computerprogramming', 'computerscience',␣
```

EXPLORATOR DATA ANALYSIS (EDA)

```
 ↪'mechanicalengg',
                'electricalengg', 'telecomengg', 'civilengg',␣
 ↪'conscientiousness',
                'agreeableness', 'extraversion', 'nueroticism',␣
 ↪'openess_to_experience']

# Create a figure with subplots fig, axes =
plt.subplots(nrows=len(columns_to_plot), ncols=2, figsize=(14,␣
↪len(columns_to_plot) * 4))

# Loop through each numerical column to
plot for i, column in
enumerate(columns_to_plot):
    # Frequency Distribution sns.histplot(df[column], ax=axes[i, 0],
    bins=30, kde=False, color='skyblue') axes[i,
    0].set_title(f'Frequency Distribution of {column}', fontsize=12)
    axes[i, 0].set_xlabel(column) axes[i, 0].set_ylabel('Frequency')

    # Probability Distribution (KDE)
    sns.kdeplot(df[column], ax=axes[i, 1], color='orange') axes[i,
    1].set_title(f'Probability Distribution of {column}',
    fontsize=12) axes[i, 1].set_xlabel(column)
    axes[i, 1].set_ylabel('Probability Density')

# Adjust layout
plt.tight_layout()
plt.show()
```

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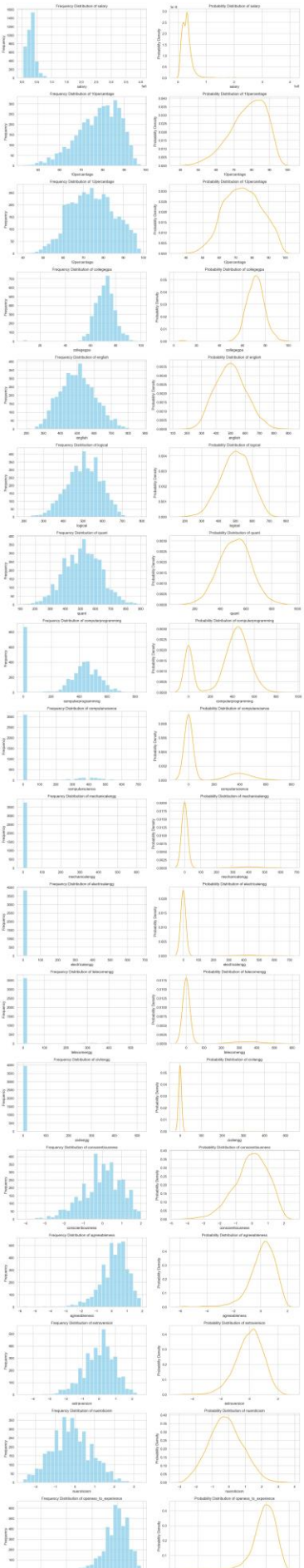
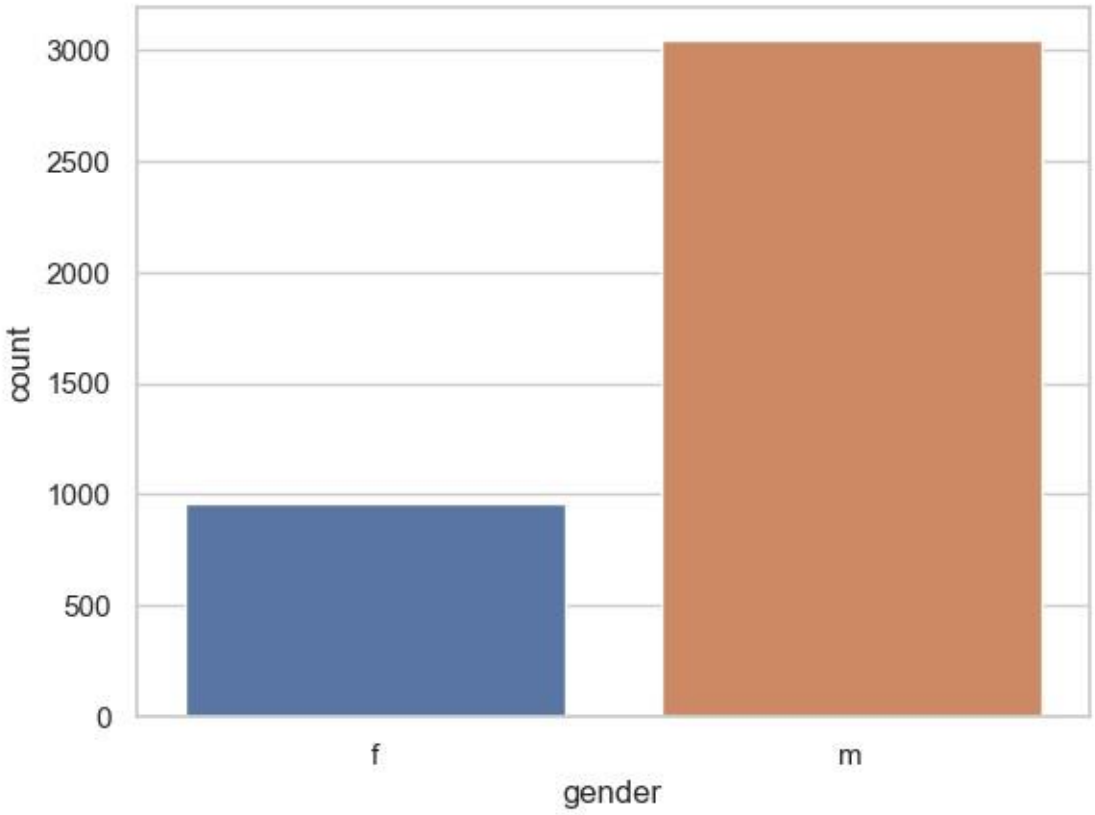
EXPLORATOR DATA ANALYSIS (EDA)



EXPLORATOR DATA ANALYSIS (EDA)

[33]:
```
sns.countplot(x=df['gender'])
```

[33]: <Axes: xlabel='gender', ylabel='count'>



[34]:
```
df.columns
```

[34]:
```
Index(['id', 'salary', 'doj', 'dol', 'designation', 'jobcity',
'gender', 'dob',
       '10percentage', '10board', '12graduation', '12percentage',
       '12board',
       'collegeid', 'collegetier', 'degree', 'specialization',
       'collegegpa',
       'collegecityid', 'collegecitytier', 'collegestate',
       'graduationyear',
       'english', 'logical', 'quant', 'domain', 'computerprogramming',
       'electronicsandsemicon', 'computerscience', 'mechanicalengg',
       'electricalengg', 'telecomengg', 'civilengg',
       'conscientiousness',
       'agreeableness', 'extraversion', 'nueroticism',
       'openess_to_experience'],
      dtype='object')
```

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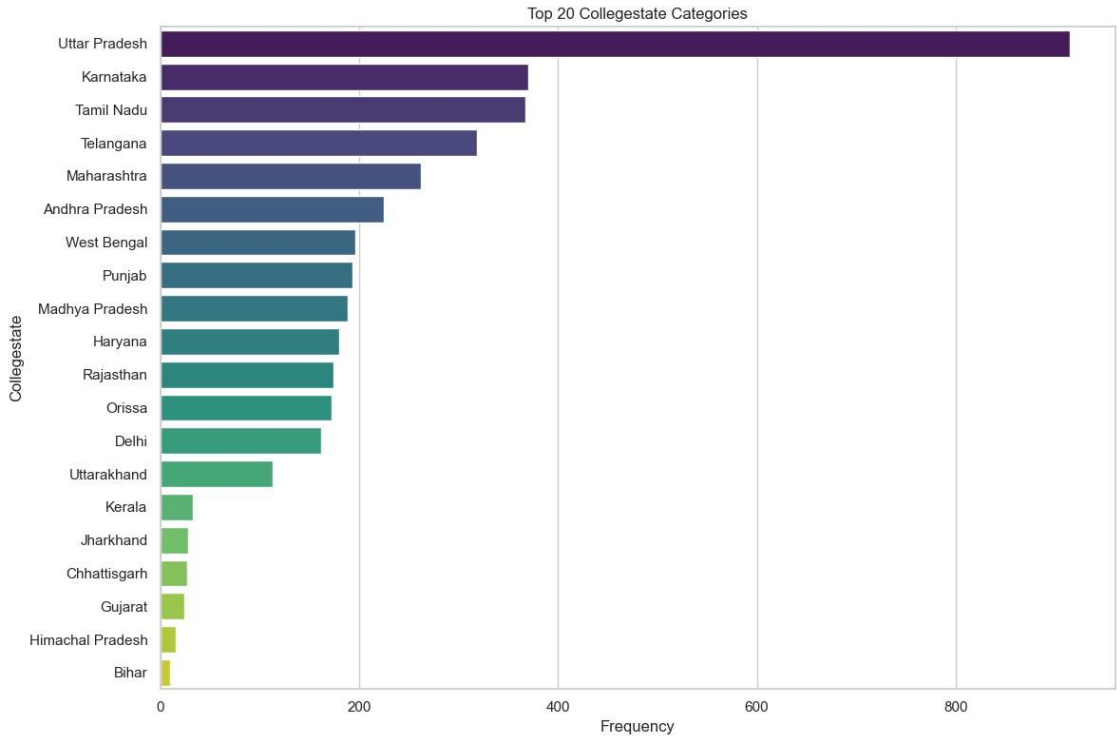
EXPLORATOR DATA ANALYSIS (EDA)

[35]:
```
top_collegestates = df['collegestate'].value_counts().nlargest(20)
plt.figure(figsize=(12, 8))
sns.countplot(y='collegestate', data=df[df['collegestate'].
 ↪isin(top_collegestates.index)],
              palette='viridis', order=top_collegestates.index)
plt.title('Top 20 Collegestate Categories ')
plt.xlabel('Frequency')
plt.ylabel('Collegestate')
plt.tight_layout()
plt.show()
```

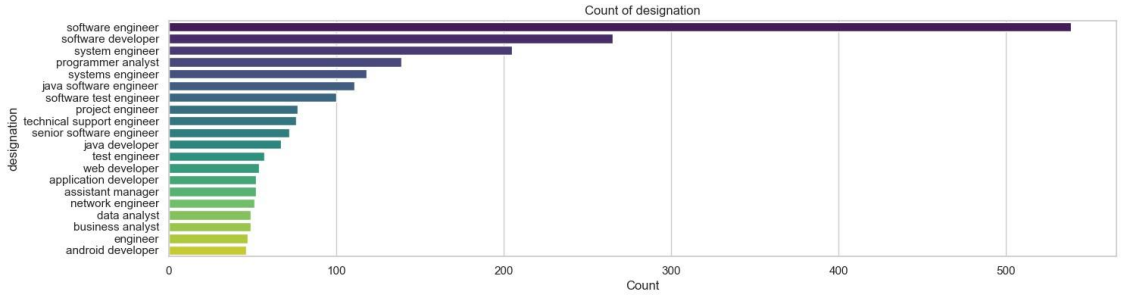


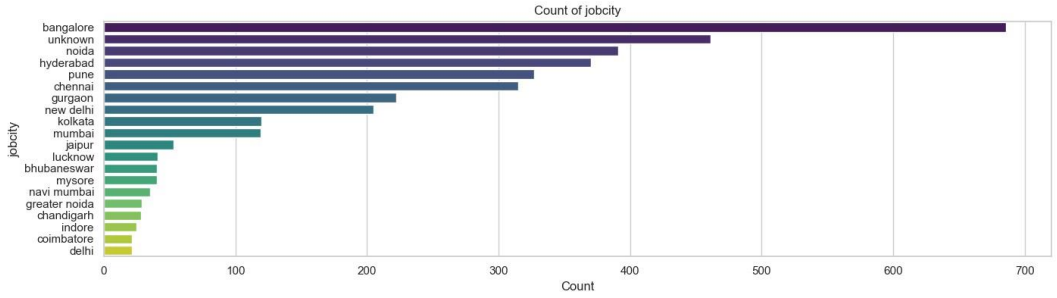
[36]:
```
import matplotlib.pyplot as plt
import seaborn as sns

# Set the aesthetics for the plots
sns.set(style="whitegrid")

# List of important categorical columns
important_categorical_columns = ['designation', 'jobcity', 'gender',␣
 ↪'collegetier', 'degree']

# Create a bar plot for each important categorical column
plt.figure(figsize=(15, 20))  # Adjust the figure size as needed
```

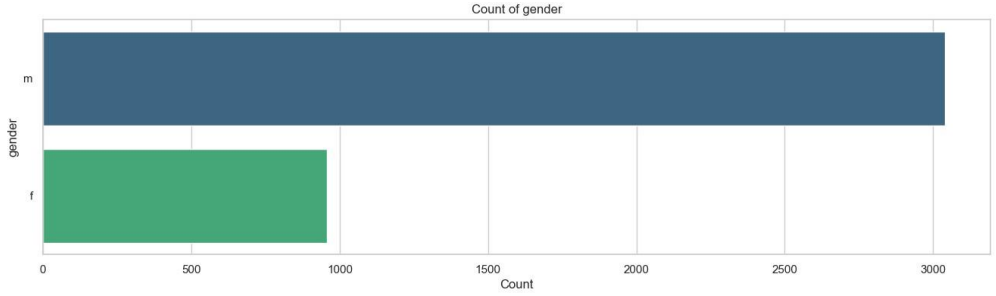
EXPLORATOR DATA ANALYSIS (EDA)

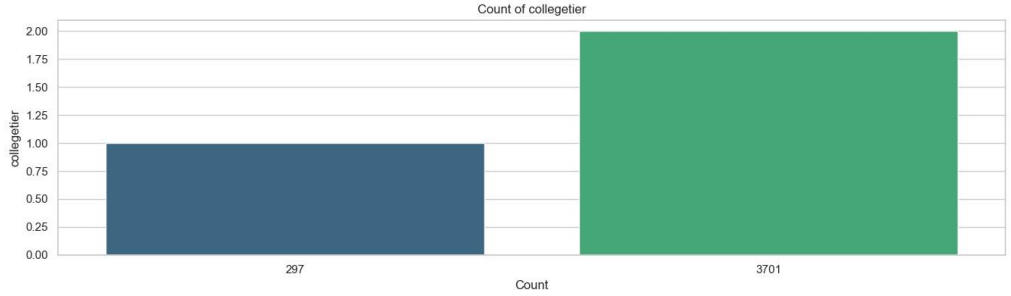
```
for i, column in enumerate(important_categorical_columns):
plt.subplot(len(important_categorical_columns), 1, i + 1) # Create a␣
 ↪subplot for each column top_values =
   df[column].value_counts().nlargest(20) # Get top 20 values
   sns.barplot(x=top_values.values, y=top_values.index,
   palette='viridis') #␣
 ↪Horizontal bar plot plt.title(f'Count of
   {column}') # Set the title
   plt.xlabel('Count') # Label for x-axis
   plt.ylabel(column) # Label for y-axis

plt.tight_layout() # Adjust layout to prevent clipping of tick-
labels plt.show()
```

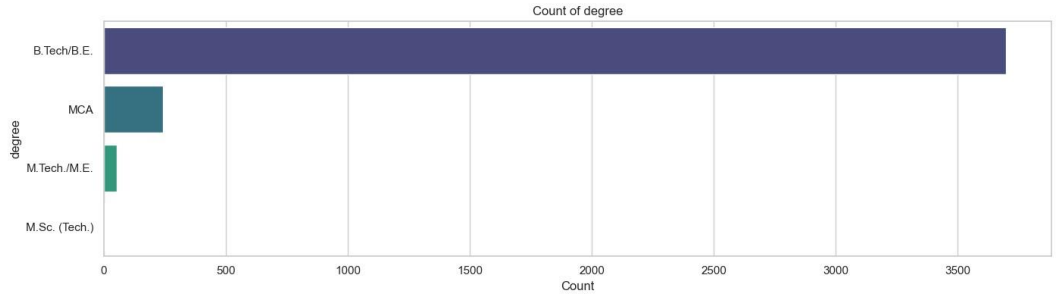
EXPLORATOR DATA ANALYSIS (EDA)





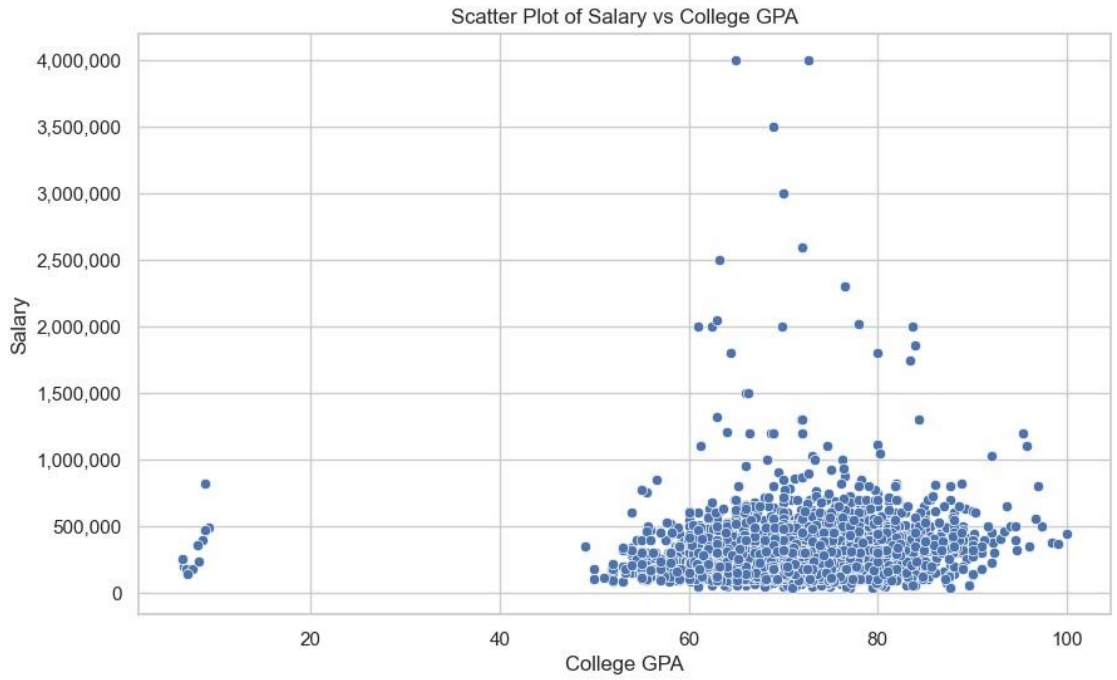






2 Bivariate Analysis

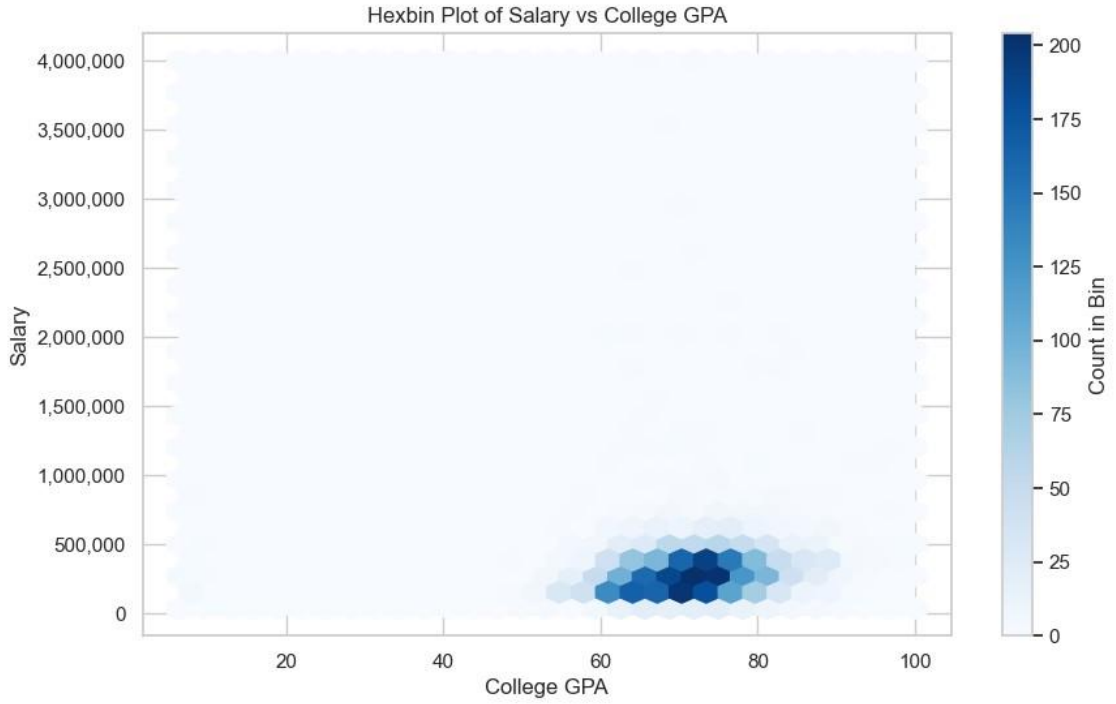
[37]:
```
from matplotlib.ticker import FuncFormatter

# Function to format y-axis labels
def currency(x, _):
    return f'{int(x):,}'  # Format as integer with commas

plt.figure(figsize=(10, 6))
sns.scatterplot(data=df, x='collegegpa',  ='salary')
plt.title('Scatter Plot of Salary vs College GPA ')
plt.xlabel('College GPA')
plt.ylabel('Salary')
plt.grid(True)

# Apply the formatter to the y-axis
plt.gca().yaxis.set_major_formatter(FuncFormatter(currency))

plt.show()
```



[38]:
```
 plt.figure(figsize=(10,  6))  plt.hexbin(df['collegegpa'],
df['salary'],           gridsize=30,           cmap='Blues')
plt.colorbar(label='Count in Bin') plt.title('Hexbin Plot of
Salary vs College GPA') plt.xlabel('College GPA')
```

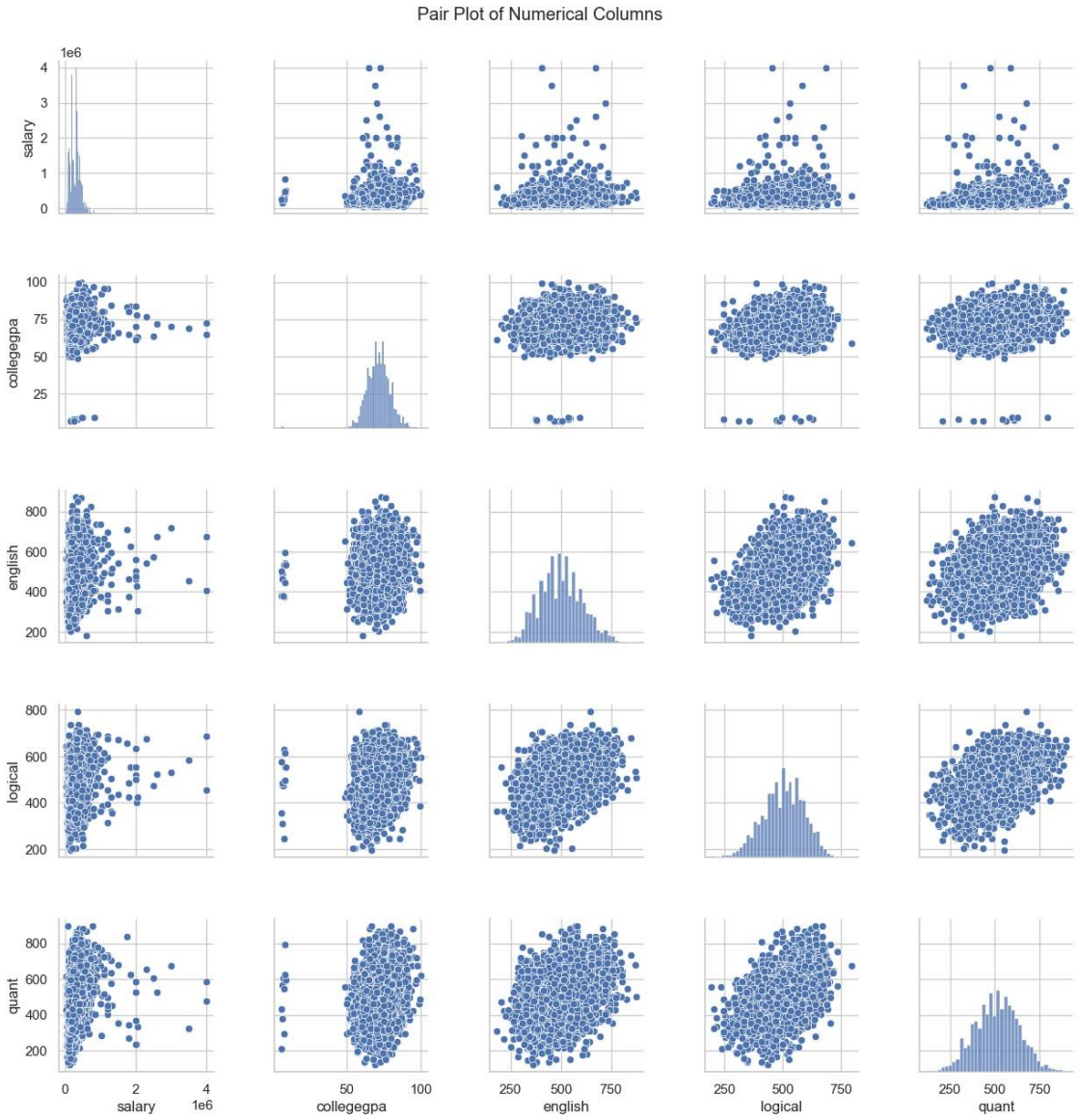
EXPLORATOR DATA ANALYSIS (EDA)

```
plt.ylabel('Salary')
plt.gca().yaxis.set_major_formatter(FuncFormatter(currency))
plt.show()
```



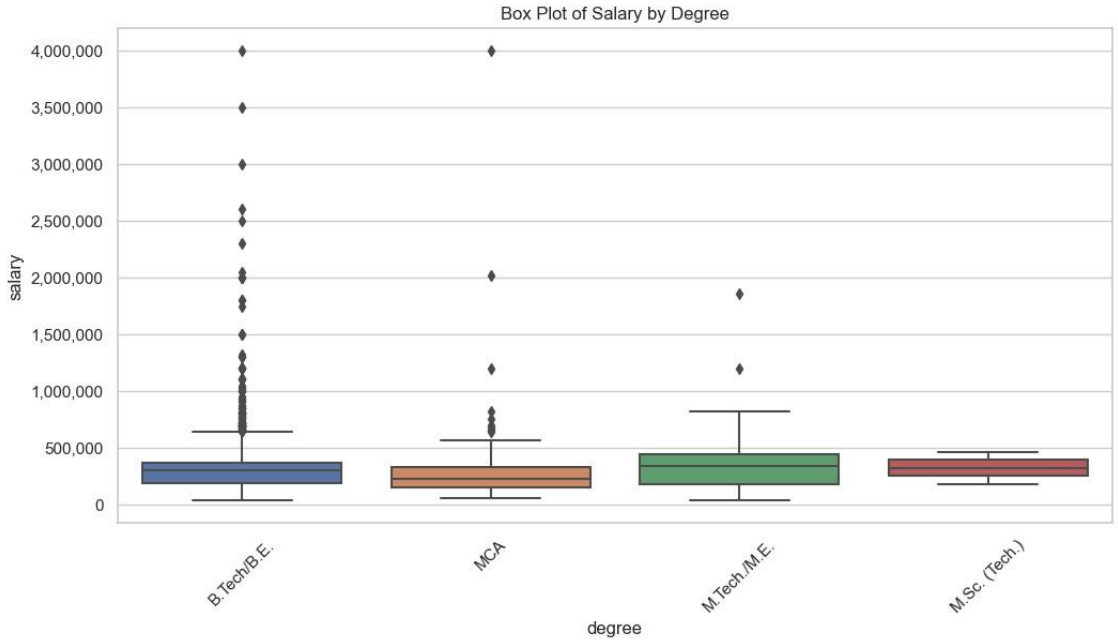
[39]:
```
numerical_columns = ['salary', 'collegegpa', 'english',
'logical', 'quant'] sns.set(style="whitegrid") pair_plot =
sns.pairplot(df[numerical_columns]) plt.suptitle('Pair Plot of
Numerical Columns', y=1.02)
plt.subplots_adjust(hspace=0.4, wspace=0.4)
plt.gca().yaxis.set_major_formatter(FuncFormatter(currency))

plt.show()
```

EXPLORATOR DATA ANALYSIS (EDA)

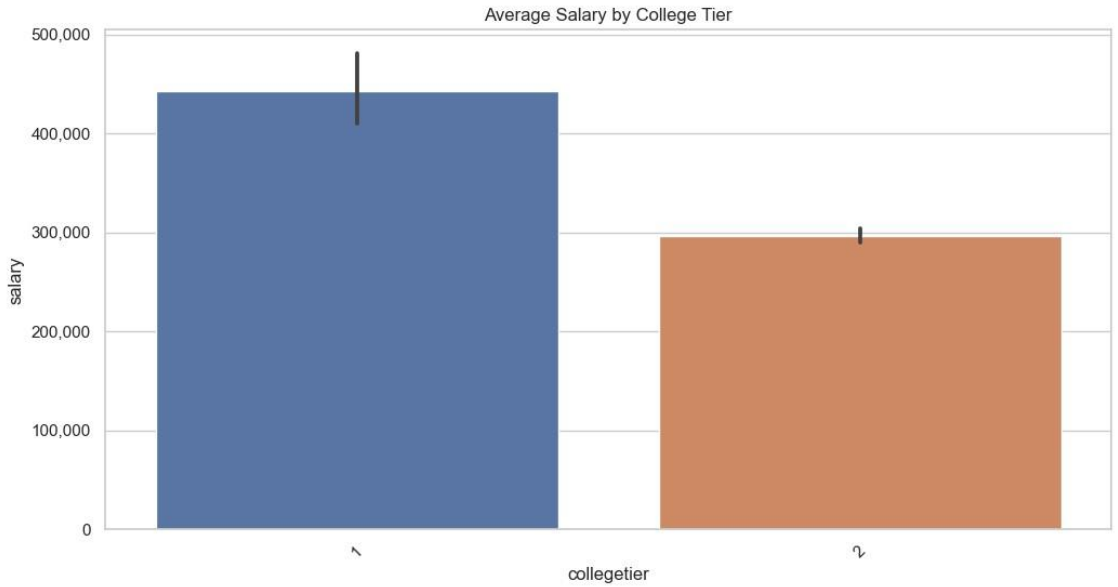


[40]:
```
plt.figure(figsize=(12, 6))
sns.boxplot(data=df, x='degree', y='salary') plt.title('Box Plot of Salary by Degree')
plt.xticks(rotation=45)
plt.gca().yaxis.set_major_formatter(FuncFormatter(currency))
plt.show()
```

EXPLORATOR DATA ANALYSIS (EDA)

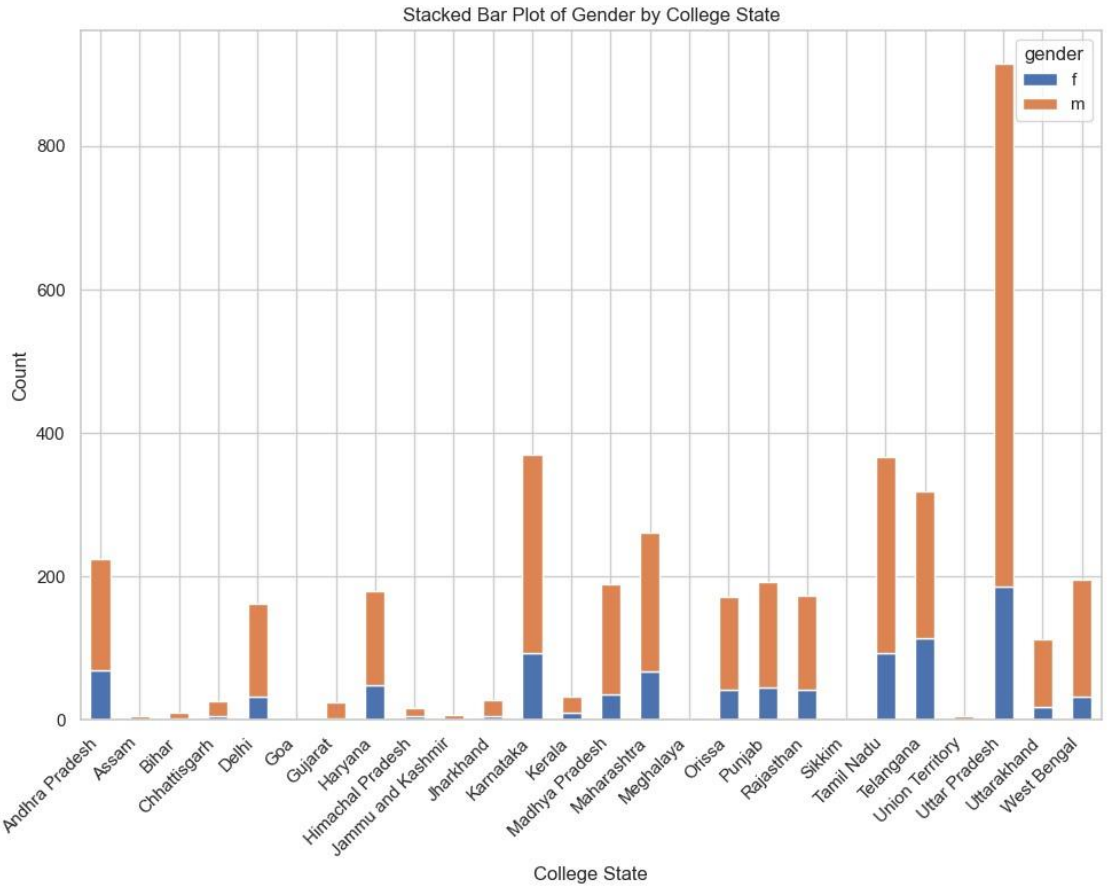


[41]:
```
plt.figure(figsize=(12, 6))
sns.barplot(data=df, x='collegetier',  ='salary', estimator=np.mean)
plt.title('Average Salary by College Tier ')
plt.xticks(rotation=45)
plt.gca().yaxis.set_major_formatter(FuncFormatter(currency))
plt.show()
```



EXPLORATOR DATA ANALYSIS (EDA)

[42]:
```
pivot_table = df.pivot_table(index='collegestate', columns='gender',␣
 ↪values='salary', aggfunc='count').fillna(0)
pivot_table.plot(kind='bar', stacked=True, figsize=(10, 8))
plt.title('Stacked Bar Plot of Gender by College State ')
plt.xlabel('College State')
plt.ylabel('Count')
plt.xticks(rotation=45, ha='right')  # Adjusted alignment to 'right'
plt.tight_layout()  # Adjust layout to prevent clipping
plt.show()
```



3 Step - 5 - Research Questions

[43]:
```
df.columns
```

[43]:
```
Index(['id', 'salary', 'doj', 'dol', 'designation', 'jobcity',
'gender', 'dob',
       '10percentage', '10board', '12graduation', '12percentage',
       '12board',
       'collegeid', 'collegetier', 'degree', 'specialization',
       'collegegpa',
       'collegecityid', 'collegecitytier', 'collegestate',
       'graduationyear',
       'english', 'logical', 'quant', 'domain', 'computerprogramming',
       'electronicsandsemicon', 'computerscience', 'mechanicalengg',
       'electricalengg', 'telecomengg', 'civilengg',
       'conscientiousness',
       'agreeableness', 'extraversion', 'nueroticism',
       'openess_to_experience'],
```

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EXPLORATOR DATA ANALYSIS (EDA)

```
      dtype='object')
```

[44]:
```
from scipy import stats

# Specify the claimed salary range
lower_bound = 2.5 * 100000  # converting lakhs to actual number
upper_bound = 3 * 100000

# Filter data for specified job titles
job_titles = ['Programming Analyst', 'Software Engineer', 'Hardware Engineer',␣
 ↪'Associate Engineer']
filtered_data = df[df['designation'].isin(job_titles)]

# Perform one-sample t-test on salary
if not filtered_data.empty:
    t_statistic, p_value = stats.ttest_1samp(filtered_data['salary'],␣
 ↪lower_bound)

    # Display the results
    print(f"T-statistic: {t_statistic}, P-value: {p_value}")

    # Interpret the p-value
    alpha = 0.05
    if p_value < alpha:
        print("Reject the null hypothesis: Average salary significantly differs␣
 ↪from the claimed range.")
    else:
        print("Fail to reject the null hypothesis: Average salary does not␣
 ↪significantly differ from the claimed range.")
else:
    print("No data found for the specified job titles.")
```

```
No data found for the specified job titles.
```

[45]:
```
# Assuming df is your DataFrame containing the data job_titles =
['Programming Analyst', 'Software Engineer', 'Hardware Engineer',␣
 ↪'Associate Engineer'] salary_data =
df[df['designation'].isin(job_titles)]

# Calculate the average salary for each job title
average_salaries =
salary_data.groupby('designation')['salary'].mean().
 ↪reset_index()
# Check if average salaries are within the claimed range of 2.5
to 3 Lakhs average_salaries['within_claimed_range'] =
average_salaries['salary']. ↪apply(lambda x: 2.5 <= x <= 3)
```

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EXPLORATOR DATA ANALYSIS (EDA)

```
print("Average Salaries for Specified Job Titles:")
print(average_salaries)

print("\nAverage Salaries within Claimed Range:")
print(average_salaries[average_salaries['within_claimed_range']])
```

```
Average Salaries for Specified Job Titles:
Empty DataFrame
Columns: [designation, salary,
within_claimed_range] Index: []

Average Salaries within Claimed Range:
Empty DataFrame
Columns: []
Index: []
```

[46]:
```
# Create a contingency table
contingency_table = pd.crosstab(df['gender'], df['specialization'])

# Display the contingency table
print("Contingency Table:")
print(contingency_table)

# Perform Chi-Square test
chi2_stat, p_value, dof, expected = stats.chi2_contingency(contingency_table)

# Create a results DataFrame with reset index
results = pd.DataFrame({
    'Metric':  'Chi-Squared Statistic', 'P-value', 'Degrees of Freedom',␣
 ↪'Conclusion'],
    'Value':
        chi2_stat,
        p_value,
        dof,
        "Reject the null hypothesis" if p_value < 0.05 else "Fail to reject the␣
 ↪null hypothesis"
    ]
})

# Reset the index of the results DataFrame
results.reset_index(drop=True, inplace=True)
```

```
# Display the results
print("\nChi-Square Test Results:")
print(results)
```

EXPLORATOR DATA ANALYSIS (EDA)

Contingency Table: specialization
aeronautical engineering \ gender
f 1

m 2

specialization applied electronics and instrumentation
\ gender
f 2 m 7

specialization automobile/automotive engineering biomedical
engineering \ gender
f 0 2 m 5 0

specialization biotechnology ceramic engineering chemical engineering
\ gender
f 9 0 1 m 6 1 8

specialization civil engineering computer and communication
engineering \ gender
f 6 0 m 23 1

specialization computer application … internal combustion engine \
gender …
f 59 … 0 m 185 … 1

specialization mechanical & production engineering \
gender
f 0

m 1

specialization mechanical and automation mechanical engineering
\ gender
f 0 10 m 5 191

specialization mechatronics metallurgical engineering other \
gender
f1 0 0 m 3 2 13

specialization polymer technology power systems and automation
\ gender
f 0 0

m 1 1

specialization telecommunication engineering

EXPLORATOR DATA ANALYSIS (EDA)

```
gender
     f                                    1
     m                                    5
[2 rows x 46 columns] Chi-Square Test Results:
                    Metric                    Value
0              Chi-Squared Statistic  104
1              P-value0
2              Degrees of Freedom     45
3              Conclusion Reject the null hypothesis
```

[ ]: