Biocomputing with

MINOR PROJECT

BSAS LAB

PROJECT TEAM

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Problem Statement:

FACULTY DEMOGRAPHICS

Background: Faculty demographics data provides basic information of the faculty profile. At an engineering institution, there are multiple departments in which faculty of different cadre are working as course facilitators. This demographic data can be represented at various levels through tables and charts for quick review and analysis.

About the dataset: There are several information provided in the dataset. An explanation is provided here that could be useful while coding to obtain the necessary output. There are 60 faculty whose data is provided.

- **Staff Id**: Each staff has unique Id Number
- **Name**: Name of the faculty is hidden here in the form of Name 1 to Name 60.
- **Gender:** Male is M and Female is F
- **Dept**: The department to which a faculty belongs
- **Qualification**: Highest qualification of the faculty member: PHD or PG. Note that PG stands for Postgraduation and could be either M.Tech. or M.Sc. Qualification PHD is superior to PG.
- **Cadre:** Faculty cadre depends on the years of experience and qualification. There are 3 types of cadre in the institution and follows this order: Professor (Higher), Associate Professor (Mid) and Assistant Professor (Lower).
- **DOB:** Date of birth in the form DD-MM-YYYY
- **DOJ:** Date of Joining the Institute. Note that a faculty could have worked at some other place (Institution/Industry) before joining this institute.
- **Total Exp:** The years of experience in teaching. This number of years is cumulative of experience of the faculty at this institute and earlier.

- **Journals:** Number of journals published by the faculty in his/her entire career.
- **Salary Monthly:** Monthly salary in INR.
- **Residence:** The place from where the faculty commutes daily to college.
- **Age:** Age of the faculty calculated from their Date of Birth.
- **Department:** Dept column converted to their full form which tells the department to which a faculty belongs.

Analytics Requirements:

1. Prepare department wise faculty list with Staff Id, Name, Cadre, Qualification, Date of Joining, Experience. Name should be with their salutation like Dr. (faculty with PHD qualification), Mr. / Ms. Based on gender for PG qualification. Name must be in upper case. The list must be sorted according to Cadre. Check table 1 in mock shell for reference.
2. Create a summary statistics table for gender distribution.
3. Draw charts for Dept wise for number of faculty, Dept wise cadre distribution.
4. Calculate the average experience dept wise.
5. Generate Line chart for Department-wise Comparison of Monthly Salary by Cadre.
6. Generate a Scatter plot Relationship between Total Experience and Monthly Salary.
7. Generate a Clustered Bar Chart for Gender Distribution by Residence Location.
8. Calculate Department wise Qualification Count and create tables and a clustered bar chart.
9. Create a Bubble Plot for Age, Salary, and Experience of Staff Members.
10. Export & submit the overall report as in Mock Shell in the form of PDF.

Mock Shell

NMAM Institute of Technology, Nitte, Karkala

Faculty Demographics

Table 1. Department wise faculty list

Dept: Biotechnology Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
	Dr. NAME1	**Professor**		
	Mr. NAME2	**Associate Professor**		
	Ms. NAME3	**Assistant Professor**		

Similar tables for all departments

Table 2. Summary Statistics of Faculty

xx. Gender Distribution

Gender	n	%
Female		xx.xx
Male		xx.xx

"Pie Chart"

Figure 1. Dept wise for number of faculty

"Clustered Bar Chart"

Figure 2. Dept wise cadre distribution

Table 3. Average Experience of faculty department wise

Dept	Average Experience (Years)
	xx.x

"Line Chart"

Figure 3. Department-wise Comparison of Monthly Salary by Cadre

"Scatter Plot"

Figure 4. Relationship between Total Experience and Monthly Salary

“Clustered Bar Chart”

Figure 5. Gender Distribution by Residence Location

Table 4. Department wise Qualification Count

Department	**Qualification**	**Number of Faculties**
	PG or PHD	x
		x

“Clustered Bar Chart”

Figure 5. Department-wise Faculty Qualification Count

“Bubble Plot”

Figure 7. Age, Salary, and Experience of Staff Members

OUTPUT

NMAM Institute of Technology, Nitte, Karkala
Faculty Demographics
Table 1. Department wise faculty list

Department=Biotechnology Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
NM02	Dr. Kunal Sharma	Professor	PHD	33
NM01	Dr. Rajesh Patel	Associate Professor	PHD	21
NM07	Dr. Gayatri Sharma	Associate Professor	PHD	21
NM28	Dr. Pallavi Gandhi	Assistant Professor	PHD	12
NM45	Mr. Aniket Goswami	Assistant Professor	PG	11
NM29	Ms. Asha Dixit	Assistant Professor	PG	10
NM46	Mr. Praveen Ghosh	Assistant Professor	PG	9
NM03	Mr. Suraj Mukherjee	Assistant Professor	PG	5
NM58	Ms. Kirti Venkatesh	Assistant Professor	PG	4

Department=Civil Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
NM09	Dr. Suman Kaur	Professor	PHD	29
NM08	Dr. Deepak Singh	Professor	PHD	28
NM10	Dr. Akshara Rathod	Professor	PHD	27
NM49	Dr. Richa Rajan	Associate Professor	PHD	20
NM48	Dr. Aditi Sareen	Associate Professor	PHD	19
NM60	Mr. Ashish Thakur	Assistant Professor	PG	12
NM50	Mr. Sunil Biswas	Assistant Professor	PG	11
NM51	Ms. Radha Narayan	Assistant Professor	PG	11
NM59	Mr. Mahesh Balakrishnan	Assistant Professor	PG	11
NM32	Mr. Rishi Kamble	Assistant Professor	PG	10
NM33	Mr. Puneet Verma	Assistant Professor	PG	8
NM31	Dr. Vibha Dutta	Assistant Professor	PHD	7
NM47	Mr. Satish Shukla	Assistant Professor	PG	6
NM57	Mr. Vik Khandelwal	Assistant Professor	PG	5

NMAM Institute of Technology, Nitte, Karkala
Faculty Demographics
Table 1. Department wise faculty list

Department=Computer Science Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
NM34	Dr. Sanjay Dey	Professor	PHD	32
NM04	Dr. Aisha Chakraborty	Professor	PHD	30
NM05	Dr. Anushka Jha	Associate Professor	PHD	19
NM36	Dr. Rohit Jain	Associate Professor	PHD	19
NM44	Dr. Smita Majumdar	Associate Professor	PHD	19
NM06	Ms. Isha Rao	Assistant Professor	PG	9
NM30	Ms. Chandni Iyer	Assistant Professor	PG	8
NM52	Dr. Pradeep Kapoor	Assistant Professor	PHD	8
NM43	Mr. Jatin Deshpande	Assistant Professor	PG	6

Department=Electronics & Communication Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
NM13	Dr. Jeevan Mishra	Professor	PHD	30
NM12	Dr. Tarun Yadav	Professor	PHD	24
NM14	Dr. Hemant Pandey	Associate Professor	PHD	22
NM11	Dr. Darshan Gupta	Associate Professor	PHD	21
NM15	Dr. Lokesh Nair	Associate Professor	PHD	20
NM35	Dr. Akshay Chatterjee	Associate Professor	PHD	19
NM16	Ms. Nandini Menon	Assistant Professor	PG	12
NM38	Ms. Shikha Bhatia	Assistant Professor	PG	12
NM37	Ms. Avantika Sethi	Assistant Professor	PG	11
NM39	Mr. Santosh Saxena	Assistant Professor	PG	11
NM41	Mr. Gopal Soni	Assistant Professor	PG	11
NM42	Ms. Bhavna Bhattacharya	Assistant Professor	PG	7
NM40	Dr. Vaibhav Sinha	Assistant Professor	PHD	6
NM55	Dr. Neha Mahajan	Assistant Professor	PHD	6
NM56	Ms. Anjali Gokhale	Assistant Professor	PG	2

NMAM Institute of Technology, Nitte, Karkala
Faculty Demographics
Table 1. Department wise faculty list

Department=Mechanical Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
NM17	Dr. Sakshi Chauhan	Professor	PHD	29
NM20	Dr. Siddharth Malik	Professor	PHD	27
NM18	Dr. Bhuvan Desai	Professor	PHD	26
NM19	Dr. Shivani Choudhary	Professor	PHD	25
NM25	Dr. Shantanu Roy	Associate Professor	PHD	22
NM24	Dr. Pragya Srivastava	Associate Professor	PHD	21
NM21	Dr. Kavita Kulkarni	Associate Professor	PHD	20
NM26	Mr. Nikhil Kumar	Assistant Professor	PG	10
NM23	Ms. Sonal Shah	Assistant Professor	PG	9
NM27	Ms. Urvashi Sharma	Assistant Professor	PG	8
NM54	Mr. Manoj Malhotra	Assistant Professor	PG	8
NM53	Ms. Devanshi Chawla	Assistant Professor	PG	7
NM22	Dr. Meenakshi Amin	Assistant Professor	PHD	2

Table 2. Summary Statistics of Faculty
A. Gender Distribution

Department=Biotechnology Engineering

Gender	Number of Faculties	Percentage %
Female	4	44.44
Male	5	55.56

Department=Civil Engineering

Gender	Number of Faculties	Percentage %
Female	6	42.86
Male	8	57.14

Department=Computer Science Engineering

Gender	Number of Faculties	Percentage %
Female	5	55.56
Male	4	44.44

Department=Electronics & Communication Engineering

Gender	Number of Faculties	Percentage %
Female	6	40.00
Male	9	60.00

Department=Mechanical Engineering

Gender	Number of Faculties	Percentage %
Female	8	61.54
Male	5	38.46

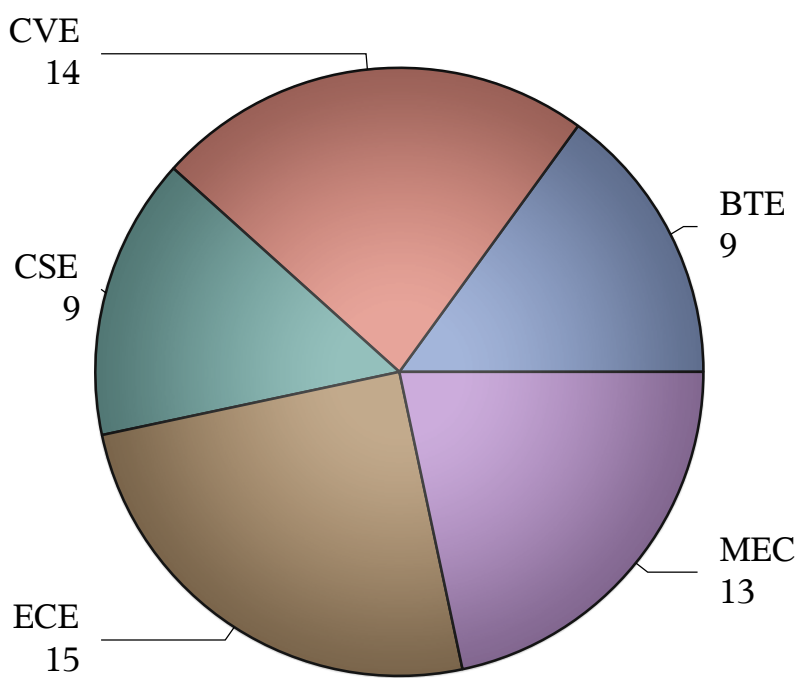

Figure 1. Dept wise for number of faculty

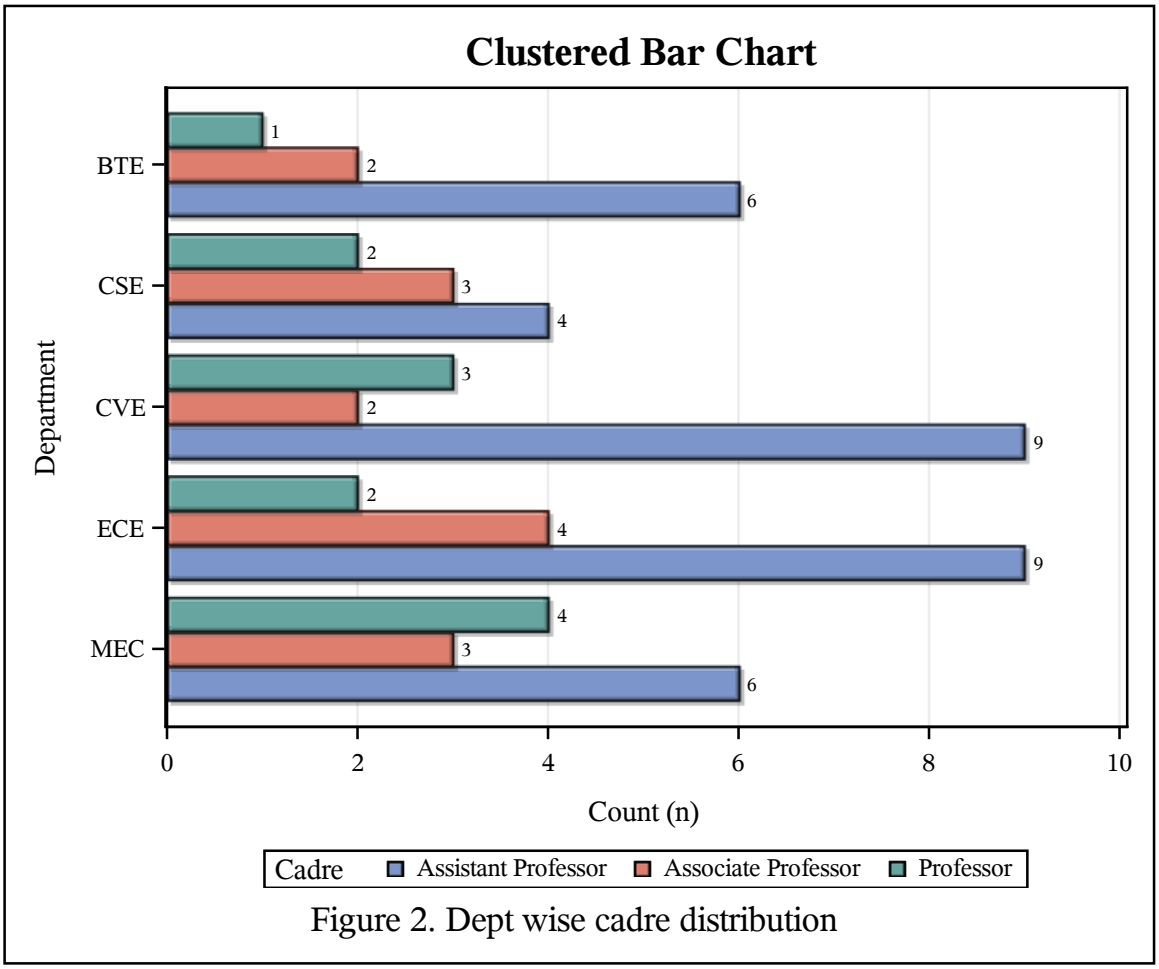

Figure 2. Dept wise cadre distribution

Table 3. Average Experience of faculty department wise

Department	Average Experience (Years)
BTE	14.0
CSE	16.7
CVE	14.6
ECE	14.3
MEC	16.5

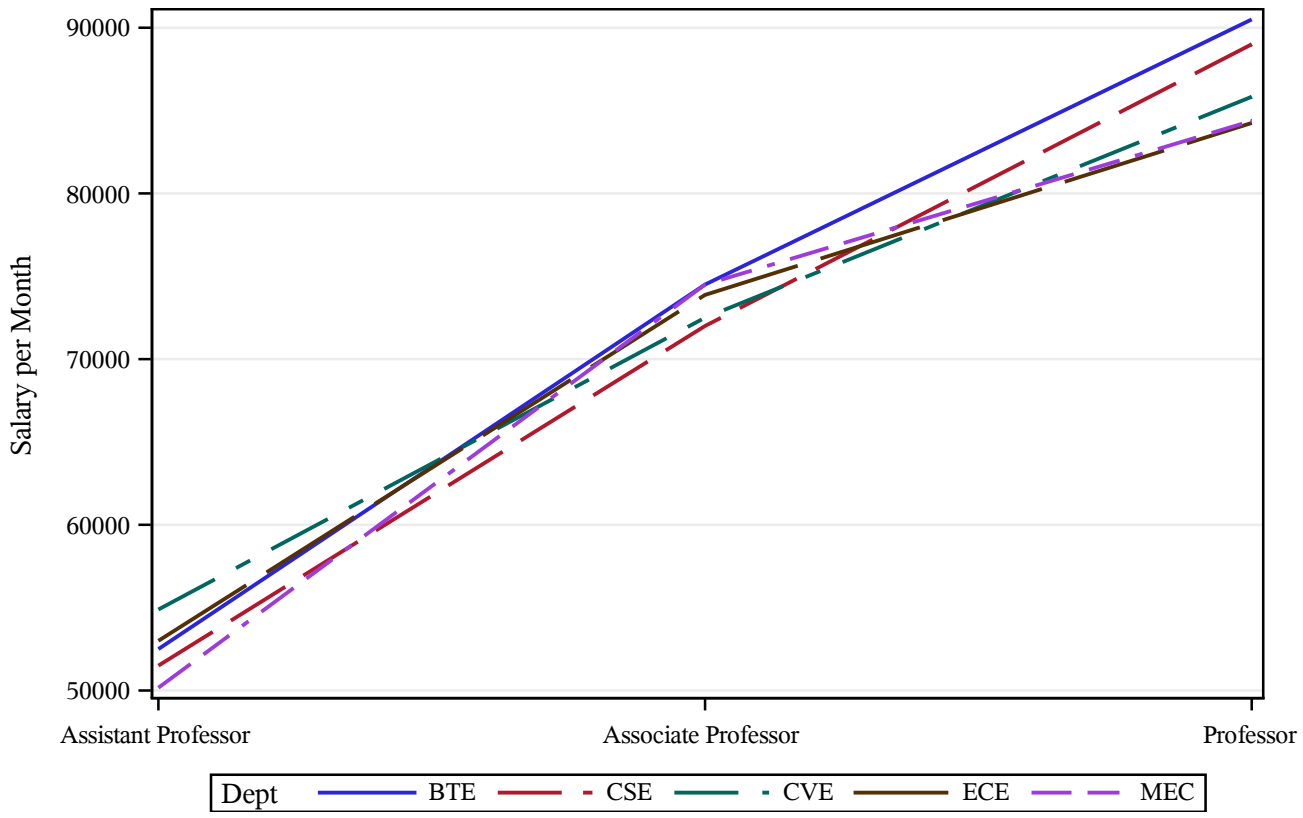

Figure 3. Department-wise Comparison of Monthly Salary by Cadre

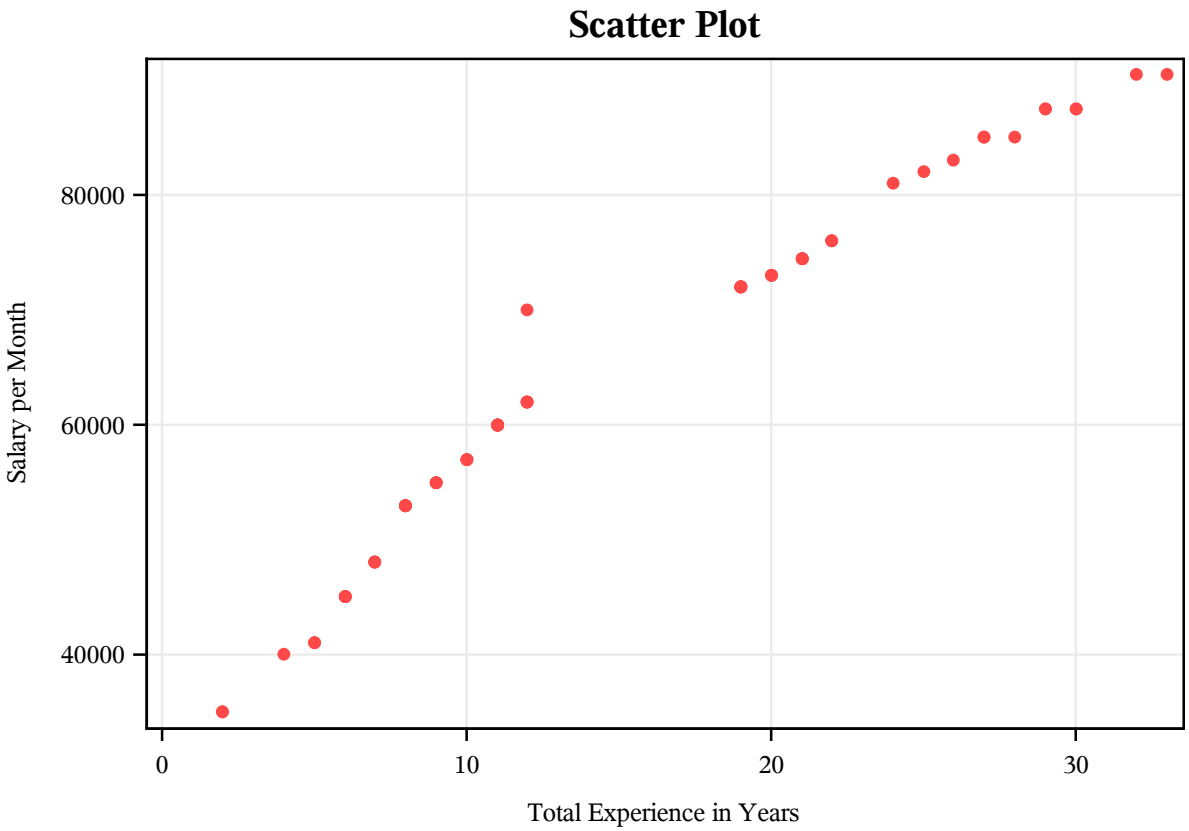

Figure 4. Relationship between Total Experience and Monthly Salary

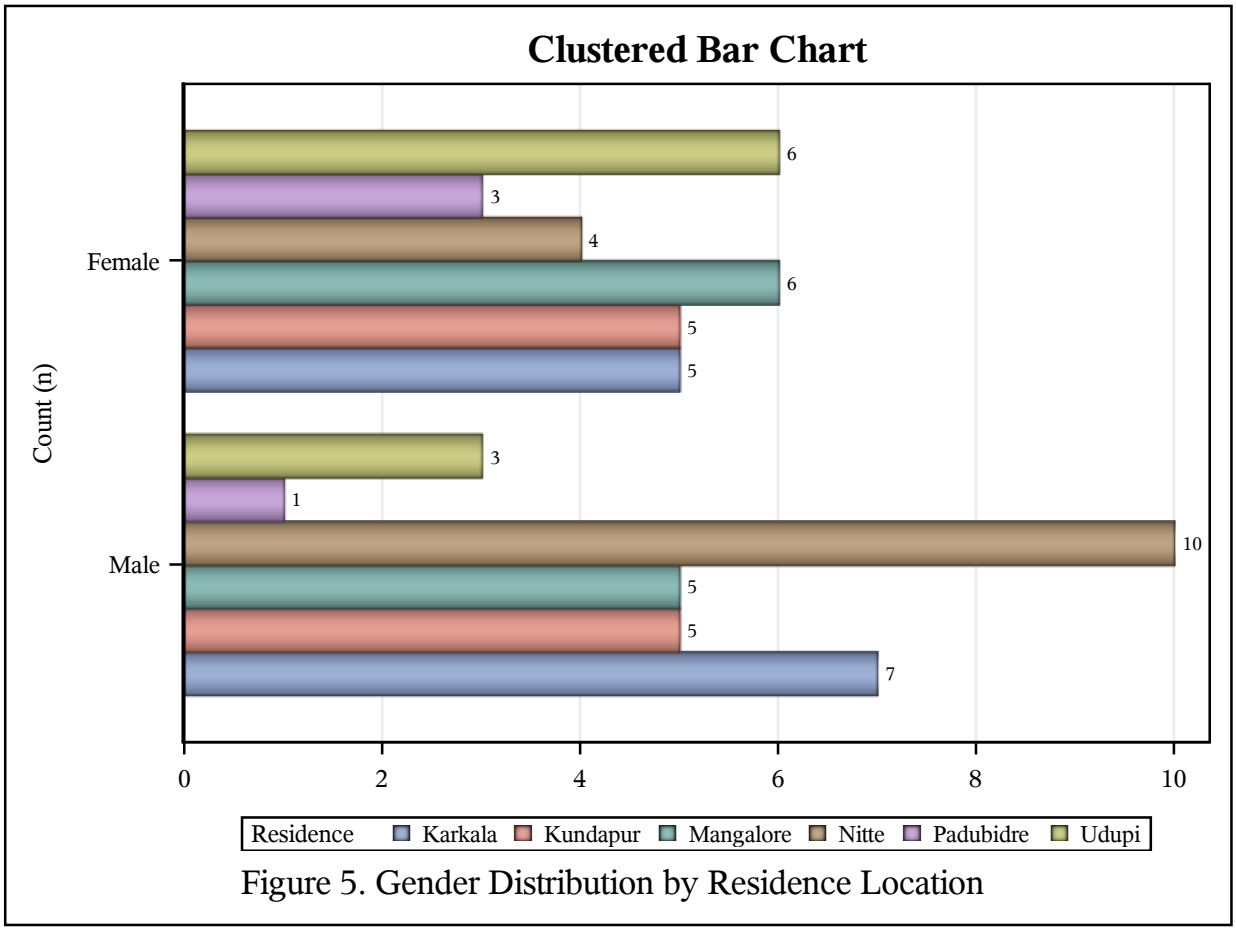

Figure 5. Gender Distribution by Residence Location

Table 4. Department wise Qualification Count

Department	Qualification	Number of Faculties
Biotechnology Engineering	PG	5
Biotechnology Engineering	PHD	4
Civil Engineering	PG	8
Civil Engineering	PHD	6
Computer Science Engineering	PG	3
Computer Science Engineering	PHD	6
Electronics & Communication Engineering	PG	7
Electronics & Communication Engineering	PHD	8
Mechanical Engineering	PG	5
Mechanical Engineering	PHD	8

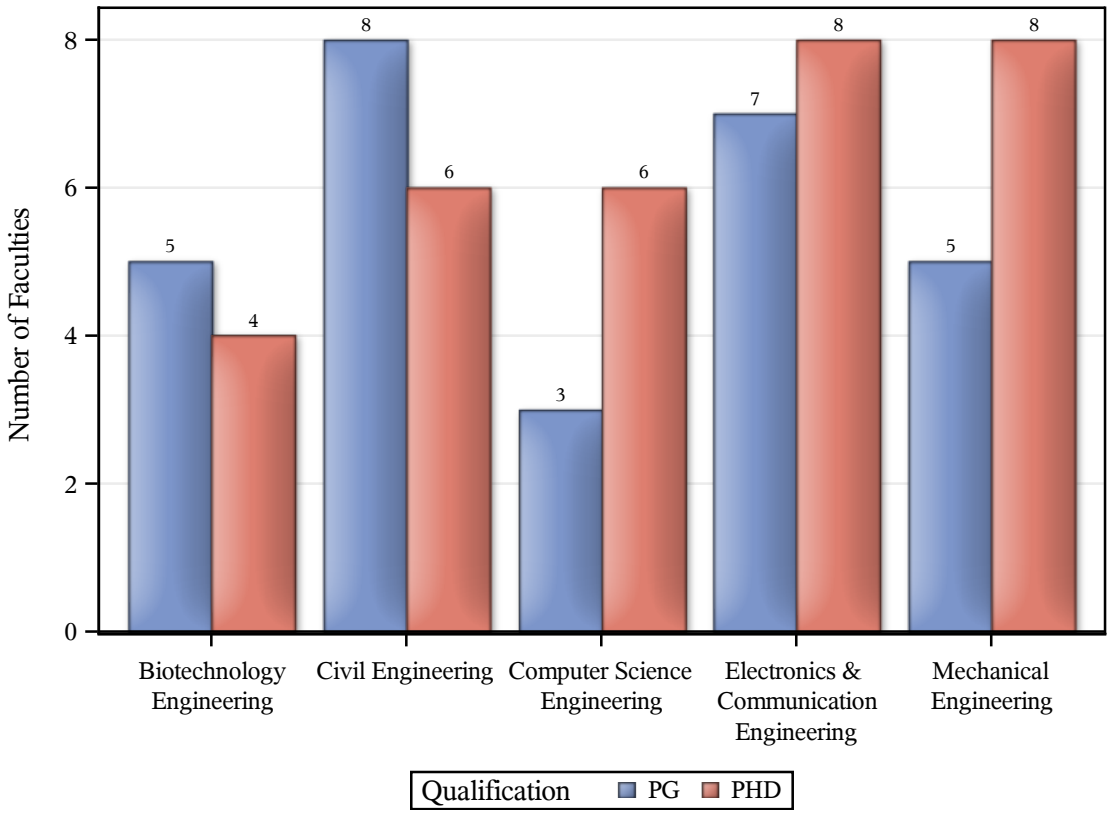

Figure 5. Department-wise Faculty Qualification Count

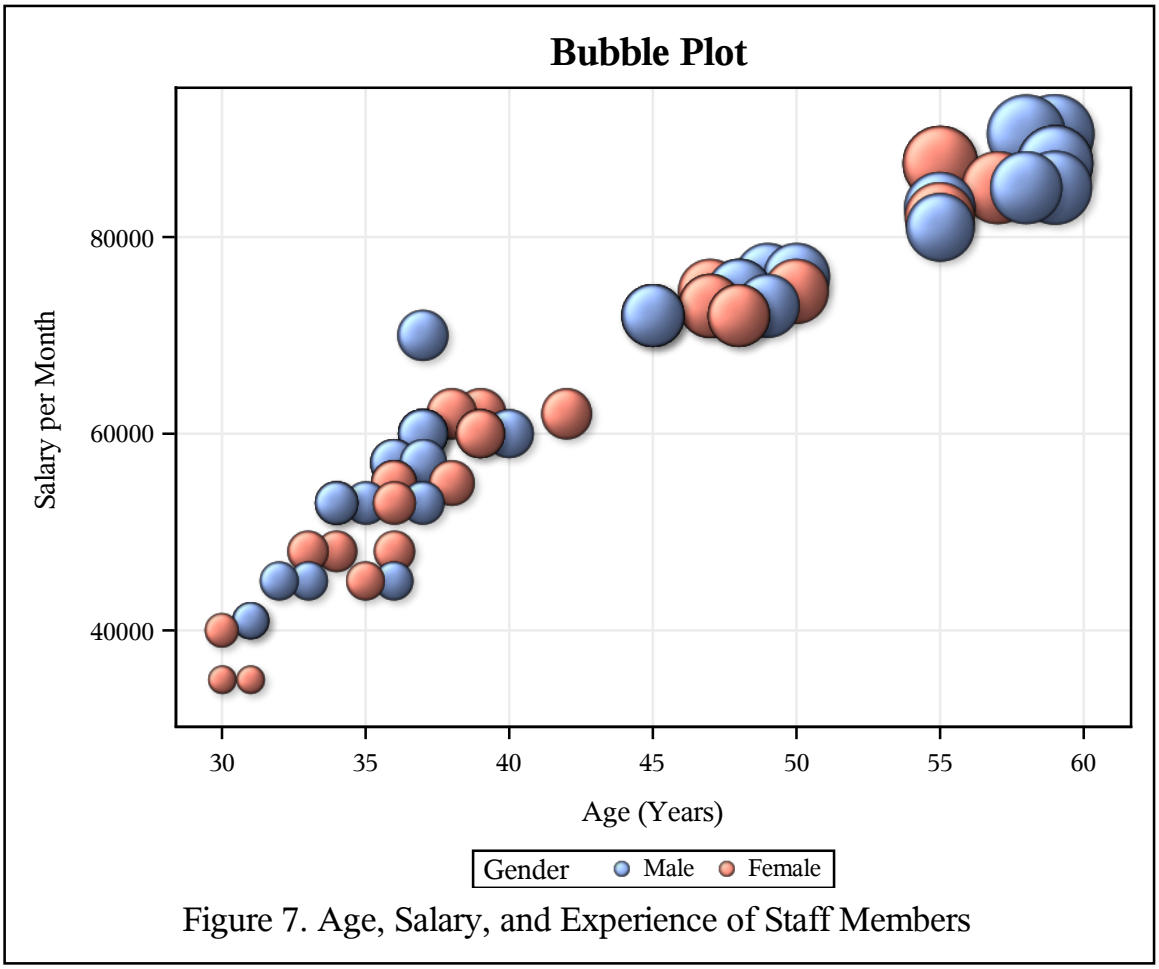

Figure 7. Age, Salary, and Experience of Staff Members

```sas
/* Library is created and linked to the data folder which can be accessed in the future */
libname bsaspro "/home/u59606296/BSAS MINOR PROJECT/Data";

/* Raw Data excel file is converted into a sas table which is saved in the data folder and also can be accessed
form the library */
options validvarname=v7;
proc import datafile="/home/u59606296/BSAS MINOR PROJECT/Data/Faculty_Demographics_RawData.xlsx"
            dbms=xlsx out=bsaspro.rawdata
            replace;
run;

*******************************************************************************;
*******************************************************************************;
/* Checking the contents of the raw data sas table. */
/* Checking for various variables present in the raw data sas table */
proc contents data=bsaspro.rawdata;
run;

/* Dept, Cadre, Qualification and Residence variables do not have unique values */
proc freq data=bsaspro.rawdata;
    tables  Dept Cadre Qualification Residence / nocum nopercent;
run;    /*NOCUM and NOPERCENT is used to remove unnecessary values from ouput*/

/* Observation: */
/*  There are 5 Dept.They are BTE,CSE,CVE,ECE and MEC. */
/*  There are 4 types of Cadre.They are Professor, PROFESSOR ,Associate Professor and Assistant Professor.*/
/*  Here Professor is repeated twice since some are in Upper case and some in proper case.
Hence 4 types of cadres
are displayed */
/*  There are 2 Qualifications. They are PG and PHD. */
/*  Faculties reside in 5 different locations. They are Mangalore, Karkala, Padubidre, Nitte, Kundapur
and Udupi. */
*******************************************************************************;
*******************************************************************************;
/* Resolving the issue of the value 'PROFESSOR'&'Professor' */
data bsaspro.rawdata;
    set bsaspro.rawdata;
    if Cadre="PROFESSOR" then Cadre="Professor";
run;
/* Cross-checking the values again */
proc freq data=bsaspro.rawdata;
    tables Cadre;
run;

/* Observation: */
/* Since Professor and PROFESSOR both are same, this issue has been resolved uisng an IF condition. */
/* Now there are only 3 types of Cadre. */

/* The Cadre must be in the order Professor,Associate Professor and Assistant Professor. */
/* This can be done by assigning them with values and later sorting these values. */
data bsaspro.rawdata;
    set bsaspro.rawdata;
    if Cadre="Professor" then rank=1;
    else if Cadre="Associate Professor" then rank=2;
    else rank=3;
run;

/* Name and Surname are concatenated using the catx function. */
/* Since the default lenght of Name is 9 after concatenating the values will be truncated. */
/* To overcome this issue the length of the Name is set to 50 */
data bsaspro.rawdata;
    length Name $50;
    format Name $50.;
    set bsaspro.rawdata;
    Name=catx(' ',name,surname);
run;


/* This data steps assigns the specific title for specific names based on their Qualification and Gender. */
/* Faculties with a PHD Degree is assigned with Dr. title in front of their Name. */
/* Male and Female Faculties who don't have PHD degree are assinged with Mr. and Ms. respectively. */
data bsaspro.rawdata;
    set bsaspro.rawdata;
    if Qualification="PHD" then Name="Dr. " || Name;
    else if gender="Male" and Qualification ne "PHD" then Name="Mr. "|| Name;
    else Name="Ms. " || Name;
run;


/* Labels are assigned to the Column names which will be displayed in the Results */
```

```
data bsaspro.rawdata;
    set bsaspro.rawdata;
    label   DOB="Date of Birth" DOJ="Date of Joining"
            Total_Exp="Experience (Years)"  Salary_Monthly="Salary per Month";
run;

/* Age of the Faculties is calculated using the intck function by extracting the year from their
Date of Birth. */
data bsaspro.rawdata;
    set bsaspro.rawdata;
    Age = intck('YEAR',DOB,today());
    format age 2.;
run;

/* New column is created called Department for full forms of the column Dept which tells us the
department to which a faculty belongs */
data bsaspro.rawdata;
    set bsaspro.rawdata;
    length Department $50;          /*Setting the length and format of the new column*/
    format Department $50.;
        if dept="BTE" then Department="Biotechnology Engineering";
        else if dept="CSE" then Department="Computer Science Engineering";
        else if dept="ECE" then Department="Electronics & Communication Engineering";
        else if dept="CVE" then Department="Civil Engineering";
        else if dept="MEC" then Department="Mechanical Engineering";
run;

/* The Data is sorted by Department, after sorting Department wise it is again sorted by Rank and at
last it is sorted by Experience. */
/* Descending option is used to sort Experience form highest to lowest. */
/* Sorting again to avoid any errors in upcoming procedures but using the Department
and not Dept Column*/
proc sort data=bsaspro.rawdata;
    by  Department Rank descending Total_Exp ;
run;

/* The data is copied into another sas table so that the copied data can be used for further
analysis without manipulating the original data */
data bsaspro.masterdata;
    set bsaspro.rawdata;
run;

/* Before the Final Print all the coding required for Analytics is done in upcoming lines */
/* Necessary titles are given before the proc step making the titles global statement*/
title1"NMAM Institute of Technology, Nitte, Karkala" ;
title2 "Faculty Demographics" ;
title3 "Table 1. Department wise faculty list";

proc print  data=bsaspro.masterdata label noobs
            STYLE(header)={backgroundcolor=lightblue color=black};
            by  Department;
            var  Staff_Id Name Cadre Qualification Total_Exp;
run;
title1;
title2;
title3;

*******************************************************************************;
*******************************************************************************;
/* Proc freq step has been carried out using the masterdata sas table. */
/* Gender column is selected for the summary statistics to be carried out to produce frequency tables. */
/* The output table is saved in the bsaspro library for further use. */

proc freq data=bsaspro.masterdata notitle;
    table  Gender / nocum out=bsaspro.summary;
    by department;
run;

/* Necessary Titles are given. */
title1 "Table 2. Summary Statistics of Faculty";
title2 "A. Gender Distribution";
/* The output table from the previous proc freq step is printed here.
Labels are given for the column names. */
proc print data=bsaspro.summary noobs label;
    where gender;
    by department;
    var  Gender COUNT PERCENT;
    label Gender="Gender" Count="Number of Faculties" Percent="Percentage %";
    format Percent 5.2;
run;
title1;

```

```
158 title2;
159
160 ********************************************************************************;
161 ********************************************************************************;
162 /* Pie Chart */
163 /* Pie Chart is created using the GUIs in Tasks and Utilities */
164 /* Department wise total faculty no. is visualized using a Pie Chart */
165
166 proc template;
167     define statgraph SASStudio.Pie;
168         begingraph;
169         entrytitle "Pie Chart" / textattrs=(size=15) ;
170         entryfootnote halign=center "Figure 1. Dept wise for number of faculty" /
171             textattrs=(size=13);
172         layout region;
173         piechart category=Dept /  datalabellocation=callout datalabelattrs=(size=13)
174             dataskin=pressed;
175         endlayout;
176         endgraph;
177     end;
178 run;
179
180 ods graphics / reset width=6in height=5in imagemap;
181
182 proc sgrender template=SASStudio.Pie data=BSASPRO.MASTERDATA;
183 run;
184
185 ods graphics / reset;
186 ********************************************************************************;
187 ********************************************************************************;
188 /* Clustered Bar Chart */
189 /* Clustered Bar Chart is plotted using GUIs in Tasks and Utilities. */
190 /* This is done by selecting Category as Dept and Subcategory as Cadre */
191 /* This gives the visualization of Count of faculties in each Department which is again branched
192 based on their Cadre */
193
194 ods graphics / reset width=6in height=5in imagemap;
195
196 proc sgplot data=BSASPRO.MASTERDATA;
197     title height=15pt "Clustered Bar Chart";
198     footnote2 justify=center height=13pt "Figure 2. Dept wise cadre distribution";
199     hbar Dept / group=Cadre groupdisplay=cluster datalabel dataskin=crisp;
200     yaxis label="Department";
201     xaxis max=10 grid label="Count (n)";
202 run;
203
204 ods graphics / reset;
205 title;
206 footnote2;
207 ********************************************************************************;
208 ********************************************************************************;
209 /* Average Experience of faculty department wise */
210 /* This is done using the proc means procedure. */
211 /* Proc means initiates the PROC MEANS procedure to calculate summary statistics for the masterdata
212 dataset. */
213 /* "class Dept" specifies the variable "Dept" as a classification variable, indicating that
214 the analysis  */
215 /* should be performed separately for each unique value of the variable. */
216 /* "var Total_Exp" specifies the variable "Total_Exp" as the numeric variable  */
217 /* for which the summary statistics are to be calculated. */
218 /* output out creates a new output dataset. */
219 /* "mean=AvgExp" calculates the mean (average) Total_Exp  */
220 /* for each unique value of "Dept" and stores the result in a new variable called "AvgExp". */
221
222 proc means data=bsaspro.masterdata;
223   class Dept;
224   var  Total_Exp;
225   output out=bsaspro.dept_avg_exp mean=AvgExp;
226   label Dept="Department" AvgExp="Average Experience (Years)";
227 run;
228
229 /* The output table is displayed using the proc print procedure. */
230 /* By using the "where TYPE=1" statement in the "proc print" code, SAS will only print observations  */
231 /* that correspond to the summary statistics for each department, which is what we are interested in
232 for this analysis */
233
234 title "Table 3. Average Experience of faculty department wise";
235 proc print data=bsaspro.dept_avg_exp label noobs;
236     format AvgExp 5.1;
    var  Dept AvgExp;
    where  _TYPE_=1;
```

```
run;
title;
*******************************************************************************;
*******************************************************************************;
/* Department-wise Comparison of Monthly Salary by Cadre */
ods graphics / reset width=7in height=5in imagemap;

proc sgplot data=BSASPRO.MASTERDATA;
    title height=14pt "Line Chart";
    footnote2 justify=center height=13pt
        "Figure 3. Department-wise Comparison of Monthly Salary by Cadre";
    vline Cadre / response=Salary_Monthly group=Dept lineattrs=(thickness=2)
        stat=mean;
    xaxis display=(nolabel);
    yaxis grid;
run;

ods graphics / reset;
title;
footnote2;
*******************************************************************************;
*******************************************************************************;
/* Relationship between Total Experience and Monthly Salary */
ods graphics / reset width=6.4in height=4.8in imagemap;

proc sgplot data=BSASPRO.MASTERDATA;
    title height=14pt "Scatter Plot";
    footnote2 justify=center height=12pt
        "Figure 4. Relationship between Date of Joining and Monthly Salary";
    scatter x=Total_Exp y=Salary_Monthly / markerattrs=(symbol=circlefilled
        color=CXff4949 size=8);
    xaxis grid label="Total Experience in Years";
    yaxis grid;
run;

ods graphics / reset;
title;
footnote2;
*******************************************************************************;
*******************************************************************************;
/* Gender Distribution by Residence Location */
ods graphics / reset width=6.4in height=4.8in imagemap;

proc sgplot data=BSASPRO.MASTERDATA;
    title height=14pt "Clustered Bar Chart";
    footnote2 justify=center height=13pt
        "Figure 5. Gender Distribution by Residence Location";
    hbar Gender / group=Residence groupdisplay=cluster datalabel dataskin=pressed;
    yaxis label="Count (n)";
    xaxis grid display=(nolabel);
run;

ods graphics / reset;
title;
footnote2;
*******************************************************************************;
*******************************************************************************;
/* To calculate total number of faculties for each qualification from each daprtment */
proc freq data=bsaspro.masterdata notitle;
    tables Department*Qualification /  nocum nocol nopercent norow out=bsaspro.qualitable;
run;

title1 "Table 4. Department wise Qualification Count";
proc print data=bsaspro.qualitable noobs label STYLE(header)={backgroundcolor=lightblue color=black};
    var  Department Qualification COUNT;
    label Count="Number of Faculties" Percent="Percentage %";
    format Percent 5.2 ;
run;

/* Clustered Bar Chart */
ods graphics / reset width=6in height=5in imagemap;

proc sgplot data=BSASPRO.MASTERDATA;
    title height=15pt "Clustered Bar Chart";
    footnote2 justify=Center height=12pt
        "Figure 5. Department-wise Faculty Qualification Count";
    vbar Department / group=Qualification groupdisplay=cluster datalabel
        dataskin=matte;
    xaxis display=(nolabel);
    yaxis grid label="Number of Faculties";
run;

```

```
316
317 ods graphics / reset;
318 title;
319 footnote2;
320 ********************************************************************************;
321 ********************************************************************************;
322 /* Bubble Plot */
323 ods graphics / reset width=6in height=5in imagemap;
324
325 proc sgplot data=BSASPRO.MASTERDATA;
326     title height=15pt "Bubble Plot";
327     footnote2 justify=center height=13pt
328         "Figure 7. Age, Salary, and Experience of Staff Members";
329     bubble x=Age y=Salary_Monthly size=Total_Exp/ group=Gender dataskin=sheen
330         bradiusmin=7 bradiusmax=20;
331     xaxis grid label="Age (Years)";
332     yaxis grid;
333 run;
334
335 ods graphics / reset;
336 title;
337 footnote2;
338 ********************************************************************************;
339 *                              FINAL REPORT PRINT                              *;
340 ********************************************************************************;
341 ods pdf file="/home/u59606296/BSAS MINOR PROJECT/Output/Faculty Demograpics.pdf"
342     style=printer startpage= now pdftoc=1;
343 options nodate;
344 options nonumber;
345 title1"NMAM Institute of Technology, Nitte, Karkala" ;
346 title2 "Faculty Demographics" ;
347 title3 "Table 1. Department wise faculty list";
348
349 proc print  data=bsaspro.masterdata label noobs
350             STYLE(header)={backgroundcolor=lightblue color=black};
351             by  Department;
352         var  Staff_Id Name Cadre Qualification Total_Exp;
353 run;
354 title1;
355 title2;
356 title3;
357 title4;
358
359
360 ********************************************************************************;
361 ********************************************************************************;
362
363 title1 "Table 2. Summary Statistics of Faculty";
364 title2 "A. Gender Distribution";
365 proc print data=bsaspro.summary noobs label STYLE(header)={backgroundcolor=lightblue color=black};
366     where gender;
367     by department;
368     var  Gender COUNT PERCENT;
369     label Gender="Gender" Count="Number of Faculties" Percent="Percentage %";
370     format Percent 5.2;
371 run;
372 title1;
373 title2;
374
375 ********************************************************************************;
376 ********************************************************************************;
377
378 /* Pie Chart */
379 proc template;
380     define statgraph SASStudio.Pie;
381         begingraph;
382         entrytitle "Pie Chart" / textattrs=(size=15) ;
383         entryfootnote halign=center "Figure 1. Dept wise for number of faculty" /
384             textattrs=(size=13);
385         layout region;
386         piechart category=Dept /  datalabellocation=callout datalabelattrs=(size=13)
387             dataskin=pressed;
388         endlayout;
389         endgraph;
390     end;
391 run;
392
393 ods graphics / reset width=6in height=5in imagemap;
394
395 proc sgrender template=SASStudio.Pie data=BSASPRO.MASTERDATA;
396 run;
397
```

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395
396 ods graphics / reset;
397 ********************************************************************************;
398 ********************************************************************************;
399 /* Clustered Bar Chart */
400
401 ods graphics / reset width=6in height=5in imagemap;
402
403 proc sgplot data=BSASPRO.MASTERDATA;
404     title height=15pt "Clustered Bar Chart";
405     footnote2 justify=center height=13pt "Figure 2. Dept wise cadre distribution";
406     hbar Dept / group=Cadre groupdisplay=cluster datalabel dataskin=crisp;
407     yaxis label="Department";
408     xaxis max=10 grid label="Count (n)";
409 run;
410
411 ods graphics / reset;
412 title;
413 footnote2;
414 ********************************************************************************;
415 ********************************************************************************;
416 title "Table 3. Average Experience of faculty department wise";
417 proc print data=bsaspro.dept_avg_exp label noobs;
418     format AvgExp 5.1;
419     var  Dept AvgExp;
420     where  _TYPE_=1;
421 run;
422 title;
423 ********************************************************************************;
424 ********************************************************************************;
425 /* Department-wise Comparison of Monthly Salary by Cadre */
426 ods graphics / reset width=7in height=5in imagemap;
427
428 proc sgplot data=BSASPRO.MASTERDATA;
429     title height=14pt "Line Chart";
430     footnote2 justify=center height=13pt
431         "Figure 3. Department-wise Comparison of Monthly Salary by Cadre";
432     vline Cadre / response=Salary_Monthly group=Dept lineattrs=(thickness=2)
433         stat=mean;
434     xaxis display=(nolabel);
435     yaxis grid;
436 run;
437
438 ods graphics / reset;
439 title;
440 footnote2;
441 ********************************************************************************;
442 ********************************************************************************;
443 ods graphics / reset width=6.4in height=4.8in imagemap;
444
445 proc sgplot data=BSASPRO.MASTERDATA;
446     title height=14pt "Scatter Plot";
447     footnote2 justify=center height=12pt
448         "Figure 4. Relationship between Total Experience and Monthly Salary";
449     scatter x=Total_Exp y=Salary_Monthly / markerattrs=(symbol=circlefilled
450         color=CXff4949 size=8);
451     xaxis grid label="Total Experience in Years";
452     yaxis grid;
453 run;
454
455 ods graphics / reset;
456 title;
457 footnote2;
458 ********************************************************************************;
459 ********************************************************************************;
460 ods graphics / reset width=6.4in height=4.8in imagemap;
461
462 proc sgplot data=BSASPRO.MASTERDATA;
463     title height=14pt "Clustered Bar Chart";
464     footnote2 justify=center height=13pt
465         "Figure 5. Gender Distribution by Residence Location";
466     hbar Gender / group=Residence groupdisplay=cluster datalabel dataskin=pressed;
467     yaxis label="Count (n)";
468     xaxis grid display=(nolabel);
469 run;
470
471 ods graphics / reset;
472 title;
473 footnote2;
```

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474
475 ********************************************************************************;
476 ********************************************************************************;
477 title "Table 4. Department wise Qualification Count";
478 proc print data=bsaspro.qualitable noobs label STYLE(header)={backgroundcolor=lightblue color=black};
479     var  Department Qualification COUNT;
480     label Count="Number of Faculties" Percent="Percentage %";
481     format Percent 5.2 ;
482 run;
483 /* Clustered Bar Chart */
484 ods graphics / reset width=6in height=5in imagemap;
485
486 proc sgplot data=BSASPRO.MASTERDATA;
487     title height=15pt "Clustered Bar Chart";
488     footnote2 justify=Center height=12pt
489         "Figure 5. Department-wise Faculty Qualification Count";
490     vbar Department / group=Qualification groupdisplay=cluster datalabel
491         dataskin=matte;
492     xaxis display=(nolabel);
493     yaxis grid label="Number of Faculties";
494 run;
495
496 ods graphics / reset;
497 title;
498 footnote2;
499
500 ********************************************************************************;
501 ********************************************************************************;
502 ods graphics / reset width=6in height=5in imagemap;
503
504 proc sgplot data=BSASPRO.MASTERDATA;
505     title height=15pt "Bubble Plot";
506     footnote2 justify=center height=13pt
507         "Figure 7. Age, Salary, and Experience of Staff Members";
508     bubble x=Age y=Salary_Monthly size=Total_Exp/ group=Gender dataskin=sheen
509         bradiusmin=7 bradiusmax=20;
510     xaxis grid label="Age (Years)";
511     yaxis grid;
512 run;
513
514 ods graphics / reset;
515 title;
516 footnote2;
517 ********************************************************************************;
518 ********************************************************************************;
519
520 ods pdf close;
521
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