Queen Mary
University of London

END OF TERM ASSIGNMENT

MTH785P – PROGRAMMING FOR BUSINESS ANALYTICS

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Part I Access/SQL

Query 1: Employee Number And Distance

01 Employee Number And Distance

EmployeeNumber	DistanceFromHome
1568	29
376	29
282	29
79	29
618	29
1725	29
473	29
569	29
1465	29
2019	29
1046	29
1211	29
1101	29
1225	29
2010	29
1784	29

01 Employee Number And Distance

```
SELECT
        EmployeeNumber,
        DistanceFromHome
FROM
        HRDatabase
ORDER BY
        DistanceFromHome
DESC;
```

^Pic 1: Query 1 Employee Number And Distance

Q1 solution: The objective of the first question was to display Employee number and distance from home from HRDatabase table where the list is ordered in descending order by distance from home.

<Pic 2: Query 1 result

Query 2: Average Starting Salary

02 Average Starting Salary

AvgOfStartingSalar	Gender	JobLevel
11086.27	Female	1
21224.51	Female	2
40410.81	Female	3
62032.14	Female	4
76788	Female	5
11301.18	Male	1
22064.83	Male	2
38487.71	Male	3
61325.63	Male	4
77019.26	Male	5

< Pic 3: Query 2 Results

02 Average Starting Salary

```
SELECT
        Round(Avg([Starting Salary]),2) AS AvgOfStartingSalary,
        Gender,
        JobLevel
FROM
        HRDatabase
GROUP BY
        Gender,
        JobLevel;
```

^Pic 4: Query 2 Average Starting Salary

Q2 solution: In 2nd query we have displayed average of starting salary where we have grouped the results by gender and job level.

Query 3: Minimum Age

03 Minimum Age

```
SELECT
        Min(Age) AS MinOfAge,
        JobLevel
FROM
        HRDatabase
WHERE
        JobLevel=4
GROUP BY
        JobLevel;
```

03 Minimum Age

MinOfAge	JobLevel
29	4

^Pic 5: Query 3 results

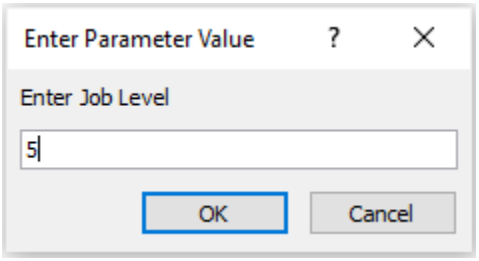
< Pic 6: Query 3 Minimum Age

Q3 solution: In 3rd query we have displayed employee with minimum age where the job level is 4.

Query 4: Job Satisfaction

04 Job Satisfaction

```
SELECT
        JobLevel,
        Round(Avg([Current Salary]),2) AS AvgOfCurrentSalary,
        Min(JobSatisfaction) AS MinOfJobSatisfaction,
        Max(JobSatisfaction) AS MaxOfJobSatisfaction
FROM
        HRDatabase
GROUP BY
        JobLevel
HAVING
        JobLevel=[Enter Job Level];
```



^Pic 7: Parameter input of query

<Pic 8: Query 4 Job Satisfaction

04 Job Satisfaction

JobLevel	AvgOfCurrentSalary	MinOfJobSa	MaxOfJobSa
5	59741.89	1	4

<Pic 8: Query 4 Result

Q4 solution: The objective in this query was to show average current salary, minmum job satisfaction and maximum job satisfaction of entered job level as a parameter where results are grouped by job level.

Query 5: Top 5 Current Salary

05 Top 5 Current Salary

EmployeeNumber	Current Salary	LevelOfJobSatisfaction
1898	107988	High
142	107836	High
2023	107824	Low
515	107656	Low
143	107588	Very High

^Pic 9: Query 5 Result

05 Top 5 Current Salary

```
SELECT TOP 5
        EmployeeNumber,
        [Current Salary],
        LevelOfJobSatisfaction
FROM
        HRDatabase
INNER JOIN
        JobSatisfactionIndexTable
ON
        HRDatabase.JobSatisfaction = JobSatisfactionIndexTable.JobSatisfactionID
ORDER BY
        [Current Salary]
DESC;
```

<Pic 10: Query 5 Top 5 Current Salary

Q5 solution: In this query we displayed top 5 employees number, current salary and level of job satisfaction, where we inner joined HRDatabase and Jobsatisfaction Descriptor table on Job satisfaction number as the joining parameter.

Query 6: Performance Rating

06 Performance Rating

```
SELECT
        Count(EmployeeCount) AS CountOfEmployeeCount,
        GradeOfPerformanceRating
FROM
        HRDatabase
INNER JOIN
        PerformanceRatingIndexTable
ON
        HRDatabase.PerformanceRating = PerformanceRatingIndexTable.PerformanceRatingID
GROUP BY
        GradeOfPerformanceRating;
```

<Pic 11: Query 6 Performance Rating

06 Performance Rating

CountOfEmp	GradeOfPerformanceRating
675	Excellent
125	Outstanding

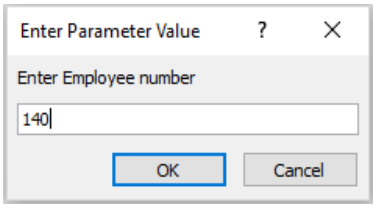
<Pic 12: Query 6 Result

Q6 solution: Objective in this query was to display number of employees for each performance rating descriptor grouped by performance rating , to achieve it we inner joined HRDatabase and Performance rating index table on performance ratings.

Query 7: Work Life Balance

07 Work Life Balance

```
SELECT
        EmployeeNumber,
        Department,
        RatingOfWorkLifeBalance
FROM
        HRDatabase
INNER JOIN
        WorkLifeBalanceIndexTable
ON
        HRDatabase.WorkLifeBalance = WorkLifeBalanceIndexTable.WorkLifeBalanceID
WHERE
        (HRDatabase.EmployeeNumber=[Enter Employee number]);
```



^Pic 13: Employee number as parameter input

<Pic 14: Query 7 Work Life Balance

07 Work Life Balance

EmployeeNumber	Department	RatingOfWorkLifeBalance
140	Human Resources	Better

^Pic 15: Query 7 Result

Q7 solution: In 7th Query the aim was to display department name and the descriptor of rating of work life balance of an employee, where employee number is taken as input parameter.

Query 8: Churn

08 Churn

```
SELECT
	Count(Attrition) AS Churn,
	LevelOfJobSatisfaction
FROM
	HRDatabase
INNER JOIN
	JobSatisfactionIndexTable
ON
	HRDatabase.JobSatisfaction = JobSatisfactionIndexTable.JobSatisfactionID
WHERE
	HRDatabase.PerformanceRating>2
AND
	HRDatabase.Attrition='Yes'
GROUP BY
	LevelOfJobSatisfaction;
```

<Pic 16: Query 8 Attrition

Q8 solution: For 8th we have displayed attrition of employees for different level of job statisfaction descriptor. Here we have inner joined HRDatabase and Job satisfaction index table on job statisfaction number. The main business objective of this query is to see how many employees with performance rating greater than 2 leaving the organization.

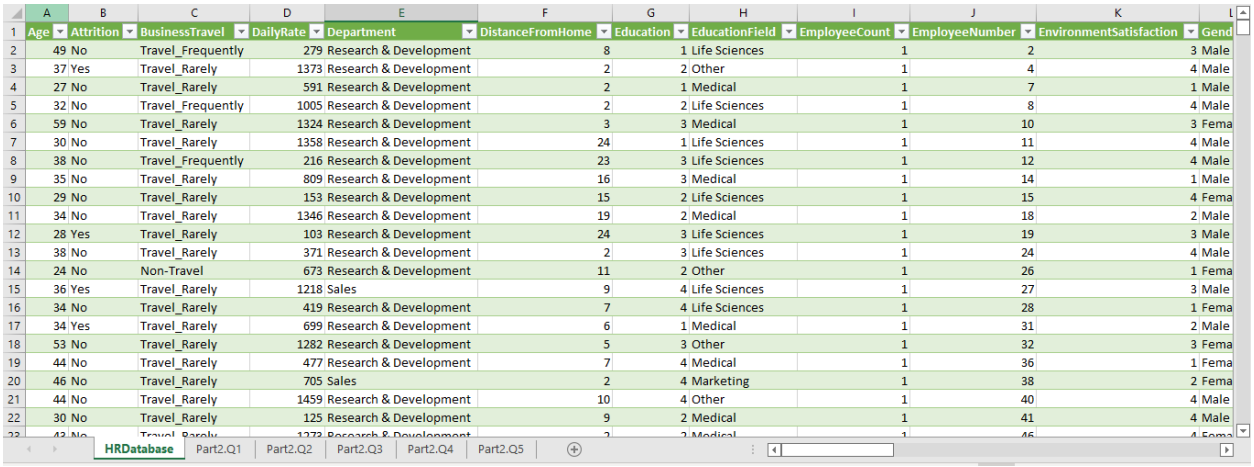
08 Churn

Churn	LevelOfJobSatisfaction
40	High
42	Low
26	Medium
31	Very High

<Pic 17: Query 8 Result

Part II Excel

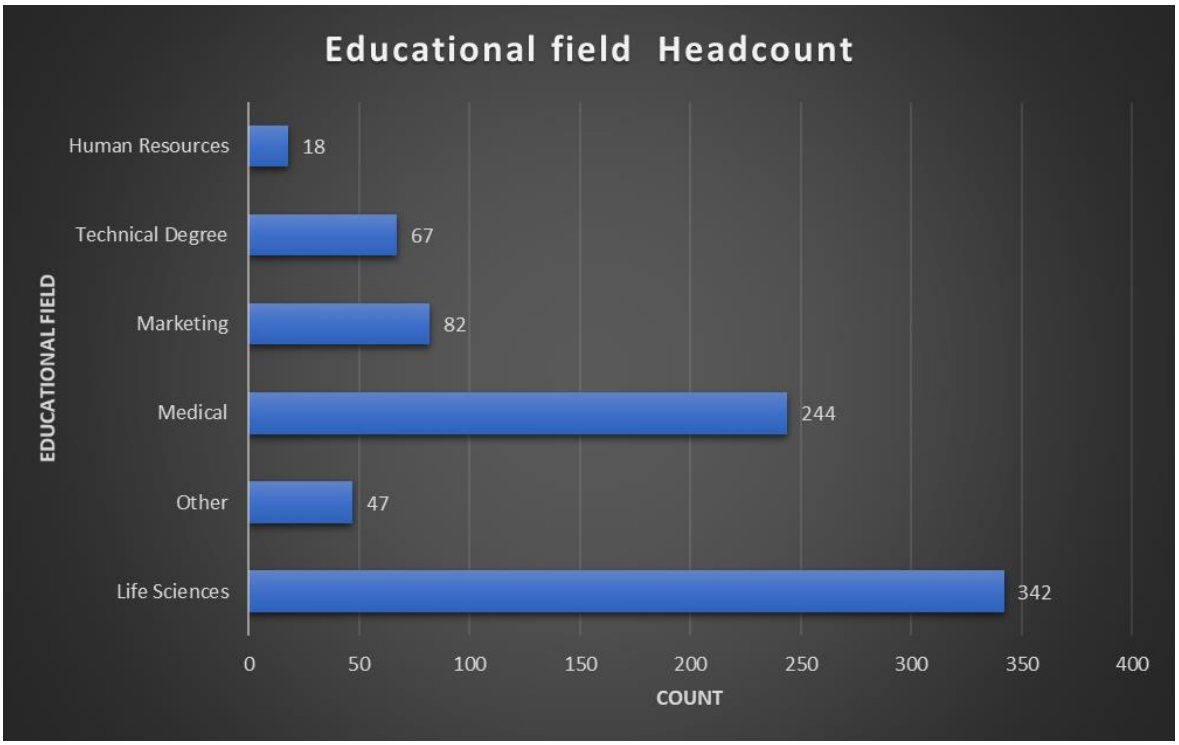
To begin with initially we connected Excel to the database in the previous part and imported the initial .csv file as power query option wasn't available with excel version 365. Following is the result after loading HRDatabase table in workbook sheet:



Age	Attrition	BusinessTravel	DailyRate	Department	DistanceFromHome	Education	EducationField	EmployeeCount	EmployeeNumber	EnvironmentSatisfaction	Gend
49	No	Travel_Frequently	279	Research & Development	8	1	Life Sciences	1	2	3	Male
37	Yes	Travel_Rarely	1373	Research & Development	2	2	Other	1	4	4	Male
27	No	Travel_Rarely	591	Research & Development	2	1	Medical	1	7	1	Male
32	No	Travel_Frequently	1005	Research & Development	2	2	Life Sciences	1	8	4	Male
59	No	Travel_Rarely	1324	Research & Development	3	3	Medical	1	10	3	Fema
30	No	Travel_Rarely	1358	Research & Development	24	1	Life Sciences	1	11	4	Male
38	No	Travel_Frequently	216	Research & Development	23	3	Life Sciences	1	12	4	Male
35	No	Travel_Rarely	809	Research & Development	16	3	Medical	1	14	1	Male
29	No	Travel_Rarely	153	Research & Development	15	2	Life Sciences	1	15	4	Fema
34	No	Travel_Rarely	1346	Research & Development	19	2	Medical	1	18	2	Male
28	Yes	Travel_Rarely	103	Research & Development	24	3	Life Sciences	1	19	3	Male
38	No	Travel_Rarely	371	Research & Development	2	3	Life Sciences	1	24	4	Male
24	No	Non-Travel	673	Research & Development	11	2	Other	1	26	1	Fema
36	Yes	Travel_Rarely	1218	Sales	9	4	Life Sciences	1	27	3	Male
34	No	Travel_Rarely	419	Research & Development	7	4	Life Sciences	1	28	1	Fema
34	Yes	Travel_Rarely	699	Research & Development	6	1	Medical	1	31	2	Male
53	No	Travel_Rarely	1282	Research & Development	5	3	Other	1	32	3	Fema
44	No	Travel_Rarely	477	Research & Development	7	4	Medical	1	36	1	Fema
46	No	Travel_Rarely	705	Sales	2	4	Marketing	1	38	2	Fema
44	No	Travel_Rarely	1459	Research & Development	10	4	Other	1	40	4	Male
30	No	Travel_Rarely	125	Research & Development	9	2	Medical	1	41	4	Male

Objective 1: Educational field headcount

EducationField	UniqueValue
Life Sciences	342
Other	47
Medical	244
Marketing	82
Technical Degree	67
Human Resources	18
TOTAL	800

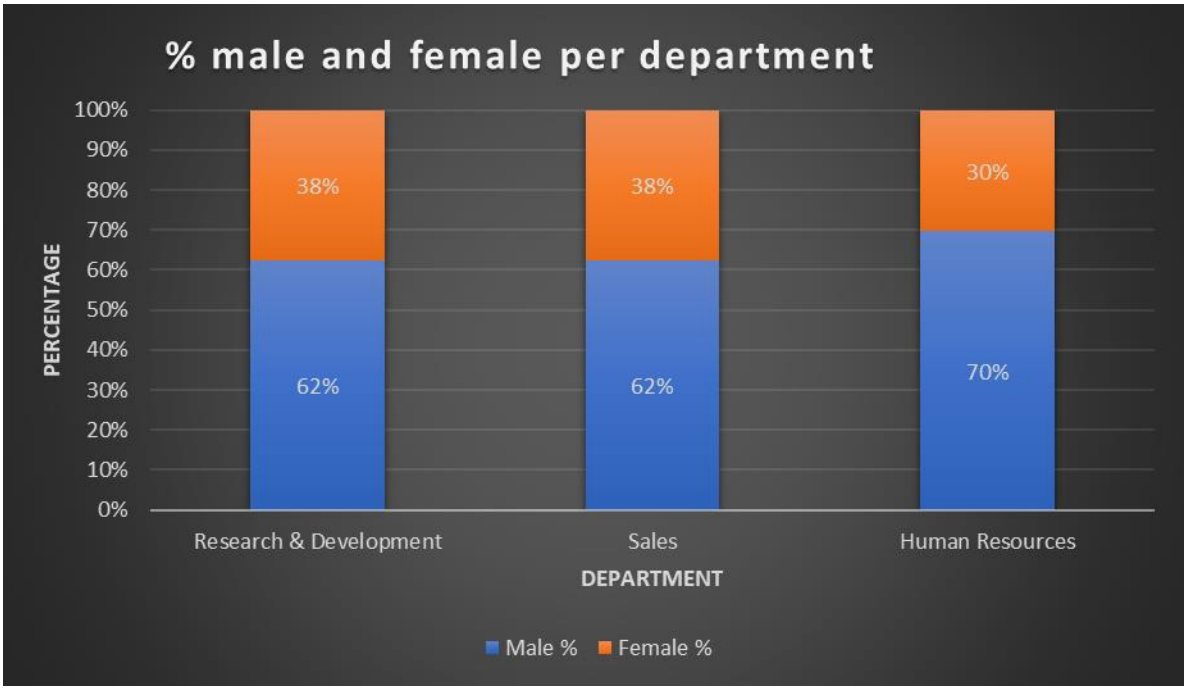


For the Education field column, we use UNIQUE function in order to find out all the distinct values whereas for a column named UniqueValue we used COUNTIF function to display the headcount of employees.

The main outcome we found out through graph here is the number of employees belonging to that each education field, where it is evident that Life Sciences has the maximum number of employees 342, Medical has the 2nd most number of employees 244. Human resources have the least number of headcounts ie 18.

Objective 2: Percent maleand female per department

Departments	TotalEmployees	NoOfMales	NoOfFemales	MalePercent	FemalePercent
Research & Development	526	328	198	62%	38%
Sales	241	150	91	62%	38%
Human Resources	33	23	10	70%	30%
TOTAL	800	501	299		

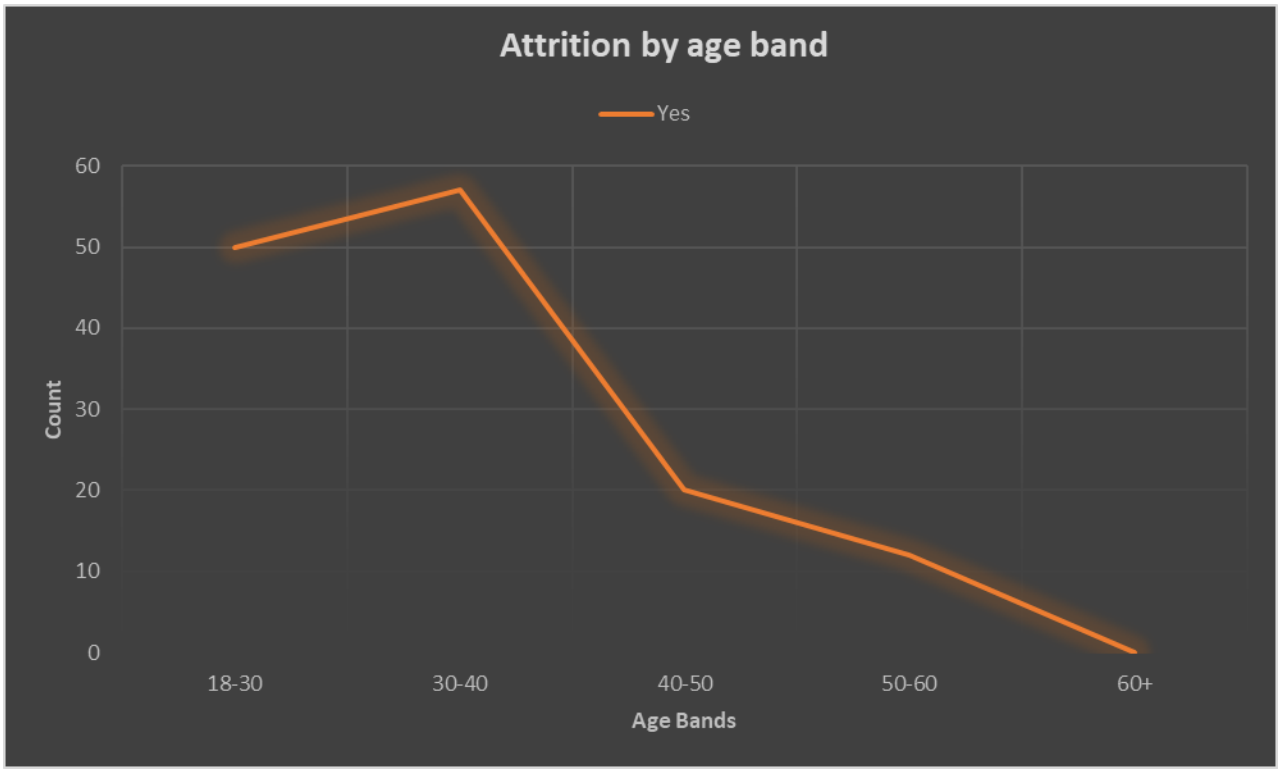


In the Department column we used the UNIQUE function in order to find out all the distinct values, for column TotalEmployees we calculated the total number of employees in each department. Then we calculated the number of males and females using the COUNTIF function in column NoOfMales and NoOfFemales respectively. We divided column MalePercent and FemalePercent with respective total employee values from column TotalEmployees and calculate the percentage of males and females in each Department.

The objective of this table was to find out the proportion of each gender in all the departments. Where we can clearly say that Research & Development and Sales department has the approximately same proportion of males and females. Whereas for human resources has 70% of male and 30% females. For the Education field column, we use UNIQUE function in order to find out all the distinct values whereas for a column named UniqueValue we used COUNTIF function to display the headcount of employees.

Objective 3: Attrition by age band

AgeBands	Yes
18-30	50
30-40	57
40-50	20
50-60	12
60+	0
Total	139

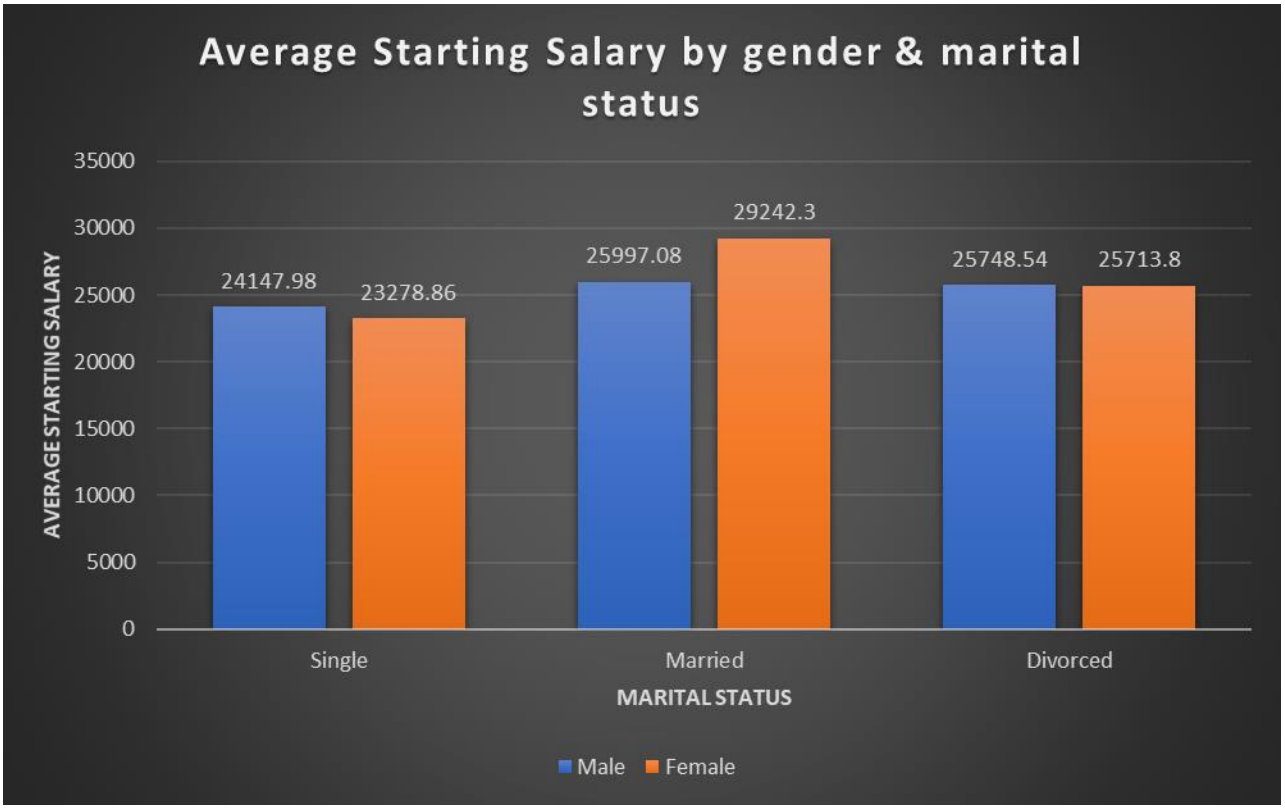


For column Yes we used COUNTIFS function and declared the criteria range1 AGE & criteria1 as <={lower limit, eg. 18}, criteria range2 AGE & criteria2 as ><={upper limit, eg. 30}, and criteria range3 Attrition & criteria3 as Yes.

From the graph, we can say that the Attrition is getting reduced as the employee ages band increases. This means a gradual but deliberate reduction in staff numbers decreases by the increase in age band.

Objective 4: Average starting salary by gender & martial status

Gender\Marital Status	Single	Married	Divorced
Male	24147.98	25997.08	25748.54
Female	23278.86	29242.3	25713.8

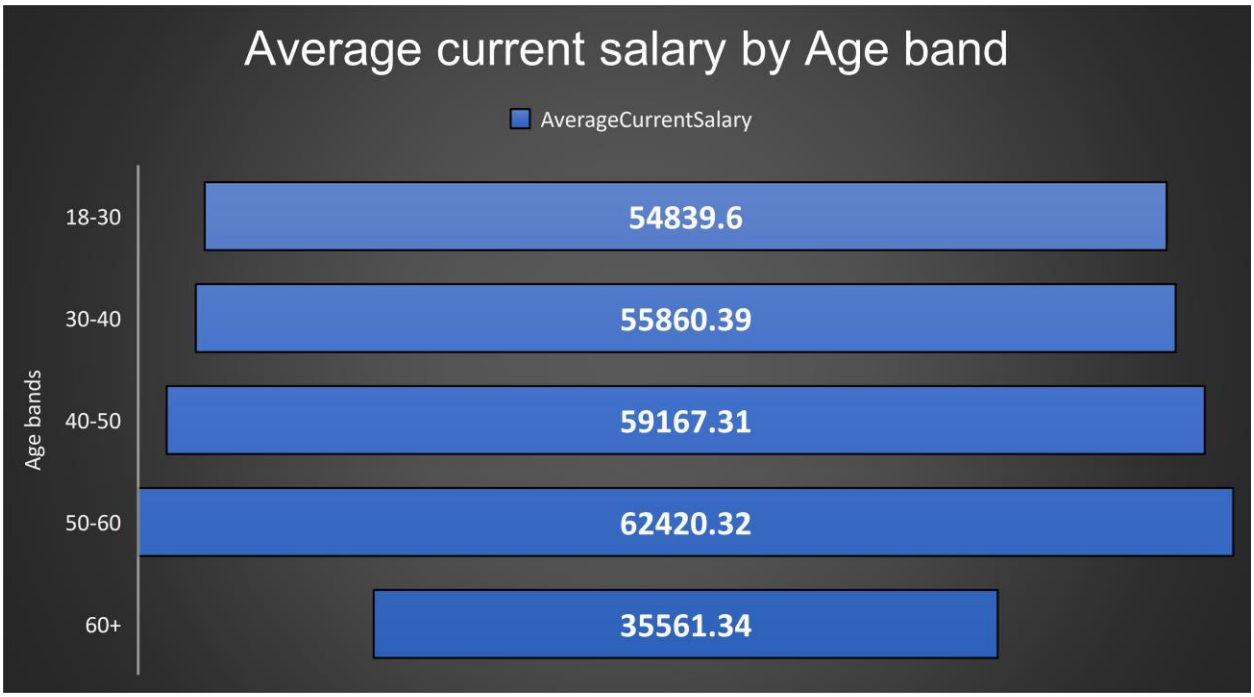


Here we used the AVERAGEIFS function where we used starting salary for average range, criteria range1 Gender and criteria range2 Marital status and criteria values for both respectively.

We observed for divorced people both the male and females receive the same amount of average starting salary, for single it seems that females earn a lesser average starting salary than male, and for married females earns a more average starting salary than males.

Objective 5: Average current salary by age band

AgeBands	AverageCurrentSalary
18-30	54839.6
30-40	55860.39
40-50	59167.31
50-60	62420.32
60+	35561.34

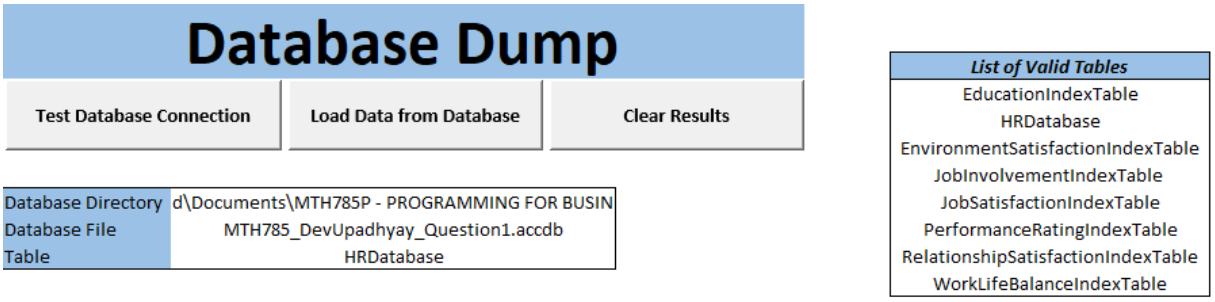


Here we used the AVERAGEIFS function to calculate the current salary for all the age groups, here we used starting salary for average range, criteria range1, and criteria range12 as Age with upper and lower limits of age bands.

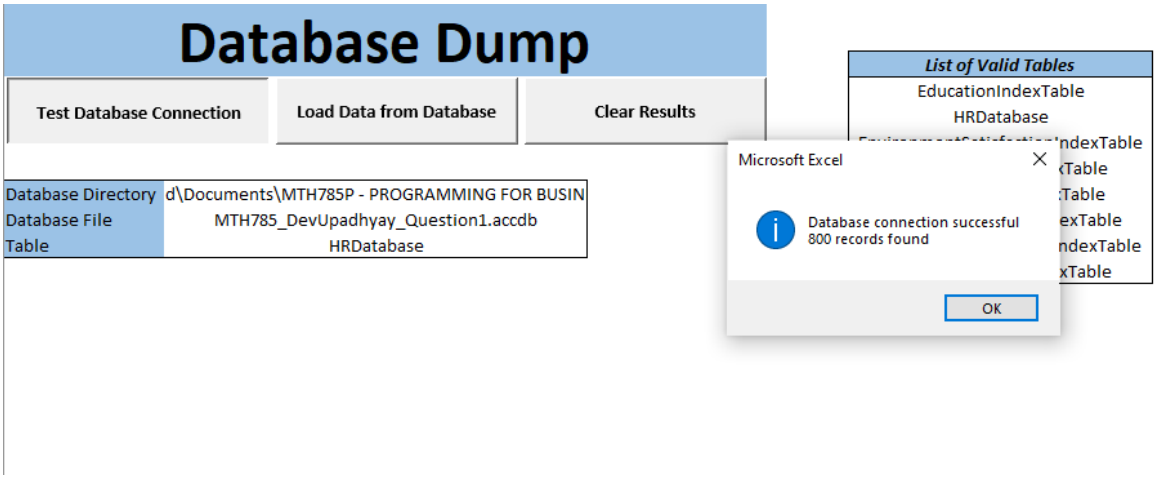
It is clear that as the age bracket increases for the employees their average current also increases but due to lack of data for age band 60 and above we observed the lowest average current salary, or maybe in that organization employees with age 60 and above retires.

Part III VBA

Spreadsheet layout



Test database connection result



Result of Load data from database button

Database Dump

Test Database Connection | Load Data from Database | Clear Results

Database Directory	d\Documents\MTH785P - PROGRAMMING FOR BUSIN
Database File	MTH785_DevUpadhyay_Question1.accdb
Table	HRDatabase

List of Valid Tables
EducationIndexTable
HRDatabase
EnvironmentSatisfactionIndexTable
JobInvolvementIndexTable
JobSatisfactionIndexTable
PerformanceRatingIndexTable
RelationshipSatisfactionIndexTable
WorkLifeBalanceIndexTable

Age	Attrition	BusinessT	DailyRate	Departme	DistanceF	Education	EducationFi	Employee	EmployeeNu	Environmen	Gender	HourlyRat	JobInvolv	JobLevel
55	No	Travel_Ra	111	Sales	1	2	Life Science	1	106	1	Male	70	3	3
46	No	Travel_Ra	991	Human Re	1	2	Life Science	1	1314	4	Female	44	3	1
36	No	Travel_Fre	635	Research	18	1	Medical	1	286	2	Female	73	3	1
39	No	Travel_Ra	170	Research	3	2	Medical	1	1627	3	Male	76	2	2
53	No	Travel_Ra	1376	Sales	2	2	Medical	1	981	3	Male	45	3	4
26	No	Travel_Ra	703	Sales	28	2	Marketing	1	641	1	Male	66	3	2
41	No	Non-Trave	267	Sales	10	2	Life Science	1	599	4	Male	56	3	2
44	No	Travel_Ra	1315	Research	3	4	Other	1	671	4	Male	35	3	5
49	No	Travel_Ra	1313	Sales	11	4	Marketing	1	1757	4	Female	80	3	2