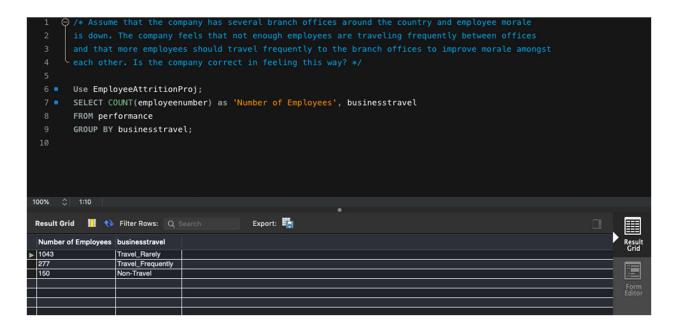Using the same data model and physical database created in Phase 1, please write queries using mySQL and Mongo for all the questions provided to you. Complete the appropriate sections in the project report you had started for the project that contains the data model. Please ensure that all sections in your document are completed, including previously submitted details for phase 1. Any changes made to the database model and/or data must be mentioned along with reasons why they were revised. Please ensure that you submit your response here in elearning **before Saturday, 11:59pm, May 2, 2020**. No exceptions will be allowed to this submission deadline.

1. Assume that the company has several branch offices around the country and employee morale is down. The company feels that not enough employees are traveling frequently between offices and that more employees should travel frequently to the branch offices to improve morale amongst each other. Is the company correct in feeling this way?
2. Which department's employee is the most likely to have the shortest commute between home and work?
3. A new employee from a Medical-related education field wants to work in Sales. Do you believe the company might be able to give her a chance to work in Sales? Why or Why not?
4. The HR department feels they have the highest job satisfaction while Research & Development department feels their department has the highest environment satisfaction. Who is right?
5. An employee in Sales department has complained to HR saying that females are paid less than males in the company, in all departments. What insight can you provide to prove or disprove that statement?
6. A press article in a business magazine has said that at this company, married men have higher performance ratings than divorced or single men. What initial finding can you obtain from the data to help articulate the company's response in this regard?

Provide provide answers to each question and support your answer with screen shots containing your assumptions about the data, translation, query and results for each question below. Provide your responses for both SQL and Mongo in the same document. You have two attempts to provide a response. Only the last response will be considered for grading. Do not email any submissions to this project - they will not be considered.

SQL Query 1:

Question: Assume that the company has several branch offices around the country and employee morale is down. The company feels that not enough employees are traveling frequently between offices and that more employees should travel frequently to the branch offices to improve morale amongst each other. Is the company correct in feeling this way? As we can see in the result, approximately 71% of employees (1043) rarely travel. Only 18.8% of employees are traveling frequently. In Conclusion, we would recommend increasing the travel rate for employees so they can gain more skills to improve morale and the company is correct about their feeling.

```
1    /* Assume that the company has several branch offices around the country and employee morale
2    is down. The company feels that not enough employees are traveling frequently between offices
3    and that more employees should travel frequently to the branch offices to improve morale amongst
4    each other. Is the company correct in feeling this way? */
5
6    Use EmployeeAttritionProj;
7    SELECT COUNT(employeenumber) as 'Number of Employees', businesstravel
8    FROM performance
9    GROUP BY businesstravel;
10
```

100%   1:10

Result Grid   Filter Rows: Q Search   Export:

Number of Employees	businesstravel
1043	Travel_Rarely
277	Travel_Frequently
150	Non-Travel

SQL Query 2:

Question: Which department's employee is the most likely to have the shortest commute between home and work?

a. Number of employees in each department that has minimal distance form home:

```
1    /* Which department's employee is the most likely to have the shortest
2       commute between home and work?
3       Translation: Select department from dept_emp table, distancefromhome from job_satisfaction table,
4       count number of employees in each department by selecting employeenumber from dept_emp table,
5       join employeenumber from dept_emp table, where distancefromhome is 1 and group by department
6
7       Clean up: Select department from dept_emp, distancefromhome from job_satisfaction, COUNT employeenumber
8       from dept_emp as number of employees, and left join employeenumber from dept_emp, where distancefromhome= = 1,
9       group by department
10      */
11   USE EmployeeAttritionProj;
12   SELECT dept_emp.Department, job_satisfaction.DistanceFromHome, COUNT(dept_emp.EmployeeNumber)
13      as 'Number of Employees'
14      FROM dept_emp
15      JOIN job_satisfaction ON dept_emp.EmployeeNumber = job_satisfaction.EmployeeNumber
16      WHERE DistanceFromHome = 1
17      GROUP BY department;
18
```

100%   2:15

Result Grid   Filter Rows: Q Search   Export:

Department	DistanceFromHome	Number of Employees
Sales	1	51
Research & Development	1	147
Human Resources	1	10

b. list of employees with minimal distance from home:

We select all employees who has the min(distance from home) and group by department name with the count of number of employees in each department so we can see the real picture. So we performed to task (two queries) to gain the insight.

```
1   SELECT dept_emp.Department, job_satisfaction.DistanceFromHome, job_satisfaction.emp_no
2      as 'Employee Number'
3      FROM dept_emp
4      JOIN job_satisfaction ON dept_emp.emp_no = job_satisfaction.emp_no
5      WHERE DistanceFromHome = (select min(DistanceFromHome) from job_satisfaction)
6      ;
7
```

Result Grid   Filter Rows: Export: Wrap Cell Content: ĀA

Department	DistanceFromHome	Employee Number
Sales	1	1
Research & Development	1	45
Sales	1	52
Research & Development	1	57
Research & Development	1	64
Sales	1	68
Research & Development	1	73
Research & Development	1	77
Research & Development	1	78
Research & Development	1	88
Sales	1	91

SQL Query 3:

Question: A new employee from a Medical-related education field wants to work in Sales. Do you believe the company might be able to give her a chance to work in Sales? Why or Why not?

As we can see, the majority of employees in Sales department has background in Medical or medical related. This new employee is a perfect candidate to apply into Sales department.

```
1   /* A new employee from a Medical-related education field wants to work in Sales.
2     Do you believe the company might be able to give her a chance to work in Sales? Why or Why not?
3
4     Translation: Select educationfield and employee number from education table, jobrole from current_employment table,
5     and join employeenumber from education table, where jobrole is either sales representative or sales executive, and
6     education field is medical
7     Clean up: Select educationfield from Education, employeenumber from Education, jobrole from current_employment,
8     join employeenumber from education, where jobrole = sales representative or sales executive,
9     and educationfield = medical */
10
11 •  Use EmployeeAttritionProj;
12 •  SELECT Education.EducationField, Education.EmployeeNumber, current_employment.JobRole
13     FROM Education
14     JOIN Current_Employment ON Education.EmployeeNumber = current_employment.EmployeeNumber
15     WHERE (JobRole = "Sales Representative" OR JobRole = "Sales Executive") AND EducationField = "Medical";
```

100%   27:6

Result Grid | Filter Rows: Q Search   Export:

EducationField	EmployeeNumber	JobRole
Medical	131	Sales Executive
Medical	195	Sales Executive
Medical	291	Sales Executive
Medical	302	Sales Executive
Medical	312	Sales Executive
Medical	366	Sales Executive
Medical	378	Sales Executive
Medical	382	Sales Executive
Medical	411	Sales Represe...
Medical	445	Sales Executive
Medical	453	Sales Executive
Medical	467	Sales Represe...

Result 8   Read Only

Result Grid

Form Editor

Field Types

SQL Query 4:

Question: The HR department feels they have the highest job satisfaction while Research & Development department feels their department has the highest environment satisfaction. Who is right?

As we can see Research & Development department has higher number of employees with maximum job satisfaction rate. We can conclude that Research and Develop department has higher JOB satisfaction rate base on the data that we have.

```
1    /* Translation: we select deparmtent name from department table, job satisfaction rate and count the number of empolyee, where the job satisfaction is
2    highest then we group by each department for view.
3    clean up: we select department name, count number of employee in each department where job satisfaction equal MAX. Then we group by department*/
4  ● SELECT dept_emp.Department, job_satisfaction.JobSatisfaction, count(job_satisfaction.emp_no)
5    as 'Employee Number'
6    FROM dept_emp
7    JOIN job_satisfaction ON dept_emp.emp_no = job_satisfaction.emp_no
8    WHERE JobSatisfaction = (select max(JobSatisfaction) from job_satisfaction)
9    group by department;
10
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Department	JobSatisfaction	Employee Number
Sales	4	147
Research & Development	4	295
Human Resources	4	17

SQL Query 5:

Question: An employee in Sales department has complained to HR saying that females are paid less than males in the company, in all departments. What insight can you provide to prove or disprove that statement? As we can see the average monthly income for female is higher than male employee in All departments. However, if we just base on our data, there result is insufficient to answer this question. We need to test to see the significant different between two groups as well as consider the differences in job position's pay rate. So, the statement from Sales employee is not correct.

```
1    /* Translation: we select monthly rate as monthly income and taking its average value from all department. We join table employee
2    and dept_emp and payrate. Then, we group our result by gender.alter
3    clean uo: we slect employees gender and average of payrate from employees table.
4    Join employees table with dept_emp and join pay_rate table on emp_no. Then grouby() employee gender*/
5
6 •  Select DISTINCT  employees.gender,
7       AVG(pay_rate.monthly_rate) as 'Average Monthly Income'
8       FROM employees
9       JOIN dept_emp ON employees.emp_no = dept_emp.emp_no
10      JOIN pay_rate ON employees.emp_no = pay_rate.emp_no
11       GROUP BY employees.gender;
12
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

gender	Number of Employees	Average Monthly Income
Female	588	14674.6003
Male	882	14072.1054

SQL Query 6:

Question: A press article in a business magazine has said that at this company, married men have higher performance ratings than divorced or single men. What initial finding can you obtain from the data to help articulate the company's response in this regard?

From the result, we can say that Married man has slightly lower performance rating (3.1471) comparing to single men (3.1624).

```
1    /* A press article in a business magazine has said that at this company, married men have higher performance
2     ratings than divorced or single men. What initial finding can you obtain from the data to help articulate
3     the company's response in this regard? */
4
5  •  Use EmployeeAttritionProj;
6  •  SELECT employees.maritalstatus, AVG(performance.performancerating) as 'Average Performance Rating'
7     FROM employees
8     JOIN performance ON employees.employeenumber = performance.employeenumber
9     WHERE gender = 'male'
10    GROUP BY maritalstatus;
```

100%   25:10

Result Grid   Filter Rows: Q Search   Export:

maritalstatus	Average Performance Rating
Married	3.1471
Single	3.1624
Divorced	3.1381

MongoDB Queries

1.
2.
3.
4.
5.
6.

MongoDB Physical Database

Local

> 13 DBS   41 COLLECTIONS   C
☆ FAVORITE

🔍 Filter your data

> Zips
> admin
> config
∨ employee_attrition   ⊕ 🗑
  benefit
  current_employment
  departments
  dept_emp
  education
  emp_hist
  employees
  job_satisfaction
  pay_rate
  performance
  work_hours
> local
> sample_airbnb
> sample_analytics
> sample_mflix
> sample_supplies
> sample_training
> sample_weatherdata

Collections

CREATE COLLECTION

Collection Name ▲	Documents	Avg. Document Size	Total Document Size	Num. Indexes	Total Index Size	Properties	
benefit	1,471	144.7 B	212.8 KB	1	28.7 KB		🗑
current_employment	1,471	129.7 B	190.8 KB	1	28.7 KB		🗑
departments	3	70.0 B	210.0 B	1	36.9 KB		🗑
dept_emp	1,471	99.0 B	145.6 KB	1	28.7 KB		🗑
education	1,471	111.2 B	163.6 KB	1	28.7 KB		🗑
emp_hist	1,471	226.6 B	333.4 KB	1	28.7 KB		🗑
employees	1,471	135.3 B	199.0 KB	1	28.7 KB		🗑
job_satisfaction	1,471	164.0 B	241.3 KB	1	28.7 KB		🗑
pay_rate	1,471	178.9 B	263.2 KB	1	28.7 KB		🗑
performance	1,471	159.1 B	234.1 KB	1	28.7 KB		🗑
work_hours	1,471	103.0 B	151.5 KB	1	28.7 KB		🗑

Departments Table

employee_attrition.departments

| DOCUMENTS 3 | TOTAL SIZE 210B | AVG. SIZE 70B | INDEXES 1 | TOTAL SIZE 20.0KB | AVG. SIZE 20.0KB |

Documents   Aggregations   Schema   Explain Plan   Indexes   Validation

FILTER   ▸ OPTIONS   FIND   RESET   ...

ADD DATA ▾   VIEW ☰ {} ⊞   Displaying documents 1 - 3 of 3   < >   ⟳ REFRESH

```
_id: ObjectId("5ea09a4a321a088af02ea378")
dept_no: "d003"
dept_name: "Human Resources"
```

```
_id: ObjectId("5ea09a4a321a088af02ea379")
dept_no: "d002"
dept_name: "Research & Development"
```

```
_id: ObjectId("5ea09a4a321a088af02ea37a")
dept_no: "d001"
dept_name: "Sales"
```

Benefit Table

employee_attrition.benefit

| DOCUMENTS 1.5k | TOTAL SIZE 207.8KB | AVG. SIZE 145B | INDEXES 1 | TOTAL SIZE 28.0KB | AVG. SIZE 28.0KB |

Documents   Aggregations   Schema   Explain Plan   Indexes   Validation

FILTER   ▸ OPTIONS   FIND   RESET   ...

ADD DATA ▾   VIEW ☰ {} ⊞   Displaying documents 1 - 20 of 1471   < >   ⟳ REFRESH

```
_id: ObjectId("5e9ff066321a088af02e6a02")
Benefit_id: "1"
StockOptionLevel: "0"
WorkLifeBalance: "1"
EnvironmentSatisfaction: "2"
EmployeeNumber: "1"
```

```
_id: ObjectId("5e9ff066321a088af02e6a03")
Benefit_id: "2"
StockOptionLevel: "1"
WorkLifeBalance: "3"
EnvironmentSatisfaction: "3"
EmployeeNumber: "2"
```

```
_id: ObjectId("5e9ff066321a088af02e6a04")
Benefit_id: "3"
StockOptionLevel: "0"
WorkLifeBalance: "3"
EnvironmentSatisfaction: "4"
EmployeeNumber: "4"
```

```
_id: ObjectId("5e9ff066321a088af02e6a05")
Benefit_id: "4"
StockOptionLevel: "0"
WorkLifeBalance: "3"
EnvironmentSatisfaction: "4"
EmployeeNumber: "5"
```

Current Employment Table

Dept_Emp Table

Education Table

Emp_Hist Table

Employees Table

Job_Satisfaction Table

employee_attrition.job_satisfaction

DOCUMENTS 1.5k   TOTAL SIZE 235.6KB   AVG. SIZE 164B   INDEXES 1   TOTAL SIZE 28.0KB   AVG. SIZE 28.0KB

Documents | Aggregations | Schema | Explain Plan | Indexes | Validation

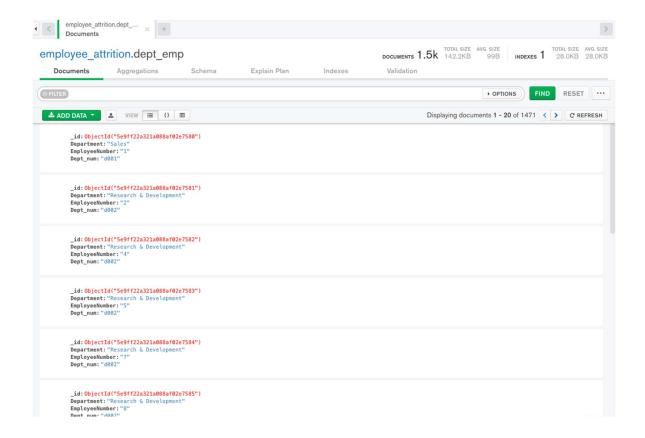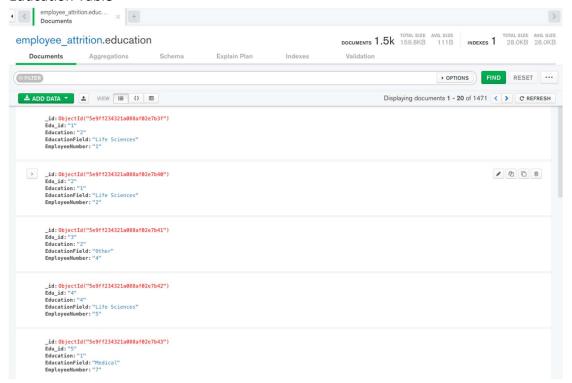FILTER   ▸ OPTIONS   FIND   RESET   ⋯

ADD DATA ▾   VIEW ≣ {} ▦   Displaying documents 1 - 20 of 1471   ‹ ›   ⟳ REFRESH

```
_id: ObjectId("5e9ff258321a088af02e8c7c")
job_id: "1"
DistanceFromHome: "1"
JobInvolvement: "3"
JobSatisfaction: "4"
RelationshipSatisfaction: "1"
EmployeeNumber: "1"

_id: ObjectId("5e9ff258321a088af02e8c7d")
job_id: "2"
DistanceFromHome: "8"
JobInvolvement: "2"
JobSatisfaction: "2"
RelationshipSatisfaction: "4"
EmployeeNumber: "2"

_id: ObjectId("5e9ff258321a088af02e8c7e")
job_id: "3"
DistanceFromHome: "2"
JobInvolvement: "2"
JobSatisfaction: "3"
RelationshipSatisfaction: "2"
EmployeeNumber: "4"

_id: ObjectId("5e9ff258321a088af02e8c7f")
job_id: "4"
DistanceFromHome: "3"
JobInvolvement: "3"
JobSatisfaction: "3"
RelationshipSatisfaction: "3"
EmployeeNumber: "5"
```

Pay_Table

employee_attrition.pay_rate

DOCUMENTS 1.5k   TOTAL SIZE 257.0KB   AVG. SIZE 179B   INDEXES 1   TOTAL SIZE 28.0KB   AVG. SIZE 28.0KB

Documents | Aggregations | Schema | Explain Plan | Indexes | Validation

FILTER   ▸ OPTIONS   FIND   RESET   ⋯

ADD DATA ▾   VIEW ≣ {} ▦   Displaying documents 1 - 20 of 1471   ‹ ›   ⟳ REFRESH

```
_id: ObjectId("5e9ff263321a088af02e923b")
pay_rate_id: "1"
HourlyRate: "94"
DailyRate: "1102"
MonthlyRate: "19479"
PercentSalaryHike: "11"
MonthlyIncome: "5993"
EmployeeNumber: "1"

_id: ObjectId("5e9ff263321a088af02e923c")
pay_rate_id: "2"
HourlyRate: "61"
DailyRate: "279"
MonthlyRate: "24907"
PercentSalaryHike: "23"
MonthlyIncome: "5130"
EmployeeNumber: "2"

_id: ObjectId("5e9ff263321a088af02e923d")
pay_rate_id: "3"
HourlyRate: "92"
DailyRate: "1373"
MonthlyRate: "2396"
PercentSalaryHike: "15"
MonthlyIncome: "2090"
EmployeeNumber: "4"

_id: ObjectId("5e9ff263321a088af02e923e")
```

Performance Table

employee_attrition.perfor...
Documents

employee_attrition.performance

DOCUMENTS 1.5k TOTAL SIZE 228.6KB AVG. SIZE 159B INDEXES 1 TOTAL SIZE 28.0KB AVG. SIZE 28.0KB

Documents   Aggregations   Schema   Explain Plan   Indexes   Validation

FILTER   ▸ OPTIONS   FIND   RESET   ...

ADD DATA ▼   ↥   VIEW ☰ {} ⊞   Displaying documents 1 - 20 of 1471 ‹ › ↻ REFRESH

_id: ObjectId("5e9ff26e321a088af02e97fa")
performance_id: "1"
BusinessTravel: "Travel_Rarely"
EmployeeNumber: "1"
PerformanceRating: "3"
TrainingTimesLastYear: "0"

_id: ObjectId("5e9ff26e321a088af02e97fb")
performance_id: "2"
BusinessTravel: "Travel_Frequently"
EmployeeNumber: "2"
PerformanceRating: "4"
TrainingTimesLastYear: "3"

_id: ObjectId("5e9ff26e321a088af02e97fc")
performance_id: "3"
BusinessTravel: "Travel_Rarely"
EmployeeNumber: "4"   employee_attrition.dept_emp
PerformanceRating: "3"
TrainingTimesLastYear: "3"

_id: ObjectId("5e9ff26e321a088af02e97fd")
performance_id: "4"
BusinessTravel: "Travel_Frequently"
EmployeeNumber: "5"
PerformanceRating: "3"
TrainingTimesLastYear: "3"

Work_Hours Table

employee_attrition.work_...
Documents

employee_attrition.work_hours

DOCUMENTS 1.5k TOTAL SIZE 147.9KB AVG. SIZE 103B INDEXES 1 TOTAL SIZE 28.0KB AVG. SIZE 28.0KB

Documents   Aggregations   Schema   Explain Plan   Indexes   Validation

FILTER   ▸ OPTIONS   FIND   RESET   ...

ADD DATA ▼   ↥   VIEW ☰ {} ⊞   Displaying documents 1 - 20 of 1471 ‹ › ↻ REFRESH

_id: ObjectId("5e9ff279321a088af02e9db9")
Time_ID: "1"
OverTime: "Yes"
StandardHours: "80"
EmployeeNumber: "1"

_id: ObjectId("5e9ff279321a088af02e9dba")
Time_ID: "2"
OverTime: "No"
StandardHours: "80"
EmployeeNumber: "2"

_id: ObjectId("5e9ff279321a088af02e9dbb")
Time_ID: "3"
OverTime: "Yes"
StandardHours: "80"
EmployeeNumber: "4"

_id: ObjectId("5e9ff279321a088af02e9dbc")
Time_ID: "4"
OverTime: "Yes"
StandardHours: "80"
EmployeeNumber: "5"

_id: ObjectId("5e9ff279321a088af02e9dbd")
Time_ID: "5"