This submission template is a convenient document for you to provide your work for Assignment 5. This submission template is intended to be used in conjunction with the Assignment 5 Instructions document. The instructions document contains the ERD and technical details you need to answer the questions.

**Name**: Scott Kaeneman

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**Section Two – Learning by Doing**

**1. To get started, list out all of the primary key columns in the schema. These have already been indexed by the database. Identify them using the standard tablename.columnname format as used in Examples 2 and 3 in the first section.**

Client.client\_id

Represents.represents\_id

Lawyer.lawyer\_id

Cases.cases\_id

State.state\_id

Case\_notes.case\_notes\_id

Location.location\_id

**2. Next, you need to identify all of the foreign key columns in the schema. As described in the first section, these all need to be indexed. You will need to decide whether to make them unique indexes, or non-unique indexes. List out all foreign key columns in tablename.columnname format, indicate for each whether a unique or non-unique index is needed, and explain your choice.**

Client.state\_id will have a non-unique index because there can be more than one client from the same state. If state\_id was unique it would mean that only 50 people could be entered into the client table, one for each state. So it needs to be non-unique to allow for repeating values.

Represents.client\_id will have a non-unique index due to the fact that multiple lawyers may end up working on the same cases together and would therefore represent the same client.

Represents.lawyer\_id should have a non-unique index because a lawyers id will need to be listed repeatedly in the Represents table. Each client that a lawyer represents will have the lawyer id listed.

Represents.cases\_id should be a non-unique index since two or more lawyers could be working on the same case, therefore each lawyer would be listed next to the same cases\_id.

Cases.location\_id should be a non-unique index since more than one case can be tried in the same courtroom.

Case\_notes.cases\_id should have a unique index since each case needs to be uniquely identified and no two cases should have the same value.

**3. You have been provided with some queries by the development team; they are a good resource to continue your index work. Indicate which columns would need to be indexed for the given queries using the tablename.columname format. Make sure to indicate whether the indexes should be unique or non-unique, and to explain your choice.**

Client.last\_name and Client.first\_name are included in the “where” statement in the first query and should therefore be considered as indexes. Both Client.last\_name and Client.first\_name should be non-unique since there may be family members with the same last name using the law firm and there will be multiple people with the same first name as well.

In the second query most of the statements within the “joins” are already indexed due to the fact that they are either primary or foreign keys. For example, Cases.cases\_id is already a primary key and index, and Case\_notes.cases\_id is a foreign key and should be indexed as a unique index. Location.location\_id is a primary key and already indexed and Cases.location\_id is a foreign key and should be a non-unique index since there are repeatable locations that need to be stored. Represents.cases\_id is a foreign key and should be a non-unique index since each case id is non repeatable. Lawyer.lawyer\_id is already indexed as a primary key. Represents.lawyer\_id is a foreign key and should be a non-unique index since the Represents table will have the same lawyer listed multiple times for the various clients he\she represents. I would not put an index on either Cases.case\_begin\_date or Cases.case\_end\_date due to that fact that Cases.case\_begin\_date will have to many unique values and Cases.case\_end\_date will have too many null values.

**4. At this point, you have seen a couple of queries used by the system, and have read a description of what the system does. Your next step is to identify all remaining columns that should be indexed based upon this information. You may recall that the original database designer did not index any columns, so all remaining columns should be considered. In order to accomplish this, you will need to make reasonable assumptions about what kinds of queries the system uses in order to do its work. State your assumptions, then list all additional columns (in tablename.columnname format) that need an index. Explain why the index is beneficial, taking into account the factors described in the first section. Also identify whether the index should be unique or non-unique, and justify that choice.**

An additional column that could be indexed is Client.city incase a lawyer needed to quickly find what jurisdiction the client falls under or particular ordinances within that city. The column would have a non-unique index since several clients may live within the same city.

Another column that could be indexed is Lawyer.state\_registration\_number if law clerks or administrative staff needed to lookup what state a particular lawyer was licensed to practice law in. The index should be non-unique since two or more lawyers could be licensed in the same state.

Your submission will be evaluated according to the following grading rubric.

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|  | **Grade** | **Qualities Demonstrated by the Assignment Submission** | **Grade Assigned** |
| **Content (70%)**  **Measures the quality of the content in the assignment** | A+ ➔ 100 | The content demonstrates exceptional understanding of all relevant subject matter and its inter-relationships. All major relevant issues are thoroughly covered, and all content is very focused and on-topic. There is no known way to improve the content, and there are absolutely no technical or coverage errors present. |  |
| A ➔ 96 | The content demonstrates exceptional understanding of all relevant subject matter and its inter-relationships. All major relevant issues are thoroughly covered, and all content is very focused and on-topic. At most one insignificant technical or coverage error may be present |
| A- ➔ 92 | The content demonstrates deep understanding of all relevant subject matter and its inter-relationships. All major relevant issues are covered, and all content is on-topic. |
| B+ ➔ 88 | The content demonstrates understanding of all relevant subject matter and its inter-relationships. Almost all major relevant issues are covered, and the content is at least reasonably on-topic. |
| B ➔ 85 | The content demonstrates understanding of most relevant subject matter and its inter-relationships. Almost all major relevant issues are covered, and all content is at least reasonably on-topic. |
| B- ➔ 82 | The content demonstrates moderate understanding of much relevant subject matter and its inter-relationships. There is reasonable coverage of major relevant issues, and the content is at least reasonably on-topic. |
| C+ ➔ 78 | The content demonstrates some understanding of relevant subject matter and its inter-relationships. Some major relevant issues are covered, and at least some content is on-topic. |
| C ➔ 75 | The content demonstrates understanding of a small portion of the relevant subject matter and its inter-relationships. Some major relevant issues are covered, and at least a small portion of the content is on-topic. |
| C- ➔ 72 | The content demonstrates little understanding of and insight into the relevant subject matter and its inter-relationships. A small portion of the major relevant issues are covered. The focus of the content may be off topic or on insubstantial or secondary topics |
| D ➔ 67 | The content demonstrates almost no understanding of or insight into the relevant subject matter and its inter-relationships. Almost none of the major relevant issues are covered, and the content may be almost entirely off-topic. |
| F ➔ 0 | The content demonstrates no understanding of or insight into the relevant subject matter and its inter-relationships. No major relevant issues are covered, and the content is entirely off-topic. |
| **Exposition (30%)**  **Measures how well the content is expressed** | A+ ➔ 100 | The presentation of all ideas and designs is exceptionally clear and persuasive; the entire submission is exceptionally organized. There is no known way to improve the clarity or organization of the submission. |  |
| A ➔ 96 | The presentation of all ideas and designs is exceptionally clear and persuasive; the entire submission is exceptionally organized. There may be at most one insignificant way to improve the clarity or organization of the submission. |
| A- ➔ 92 | The presentation of all ideas and designs is very clear and persuasive; the entire submission is very organized. |
| B+ ➔ 88 | The presentation of all ideas and designs is clear and persuasive; the entire submission is organized. |
| B ➔ 85 | The presentation of most ideas and designs is clear and persuasive; most of the submission is organized. |
| B- ➔ 82 | The presentation of most ideas and designs is generally clear; most of the submission is reasonably organized. |
| C+ ➔ 78 | Some parts of the submission are hard to understand; some parts are disorganized. |
| C ➔ 75 | About half of the submission is hard to understand; about half is disorganized. |
| C- ➔ 72 | Most parts of the submission are hard to understand; most parts are disorganized. |
| D ➔ 67 | Almost all of the submission is hard to understand and disorganized. |
| F ➔ 0 | The entire submission is hard to understand and disorganized. |