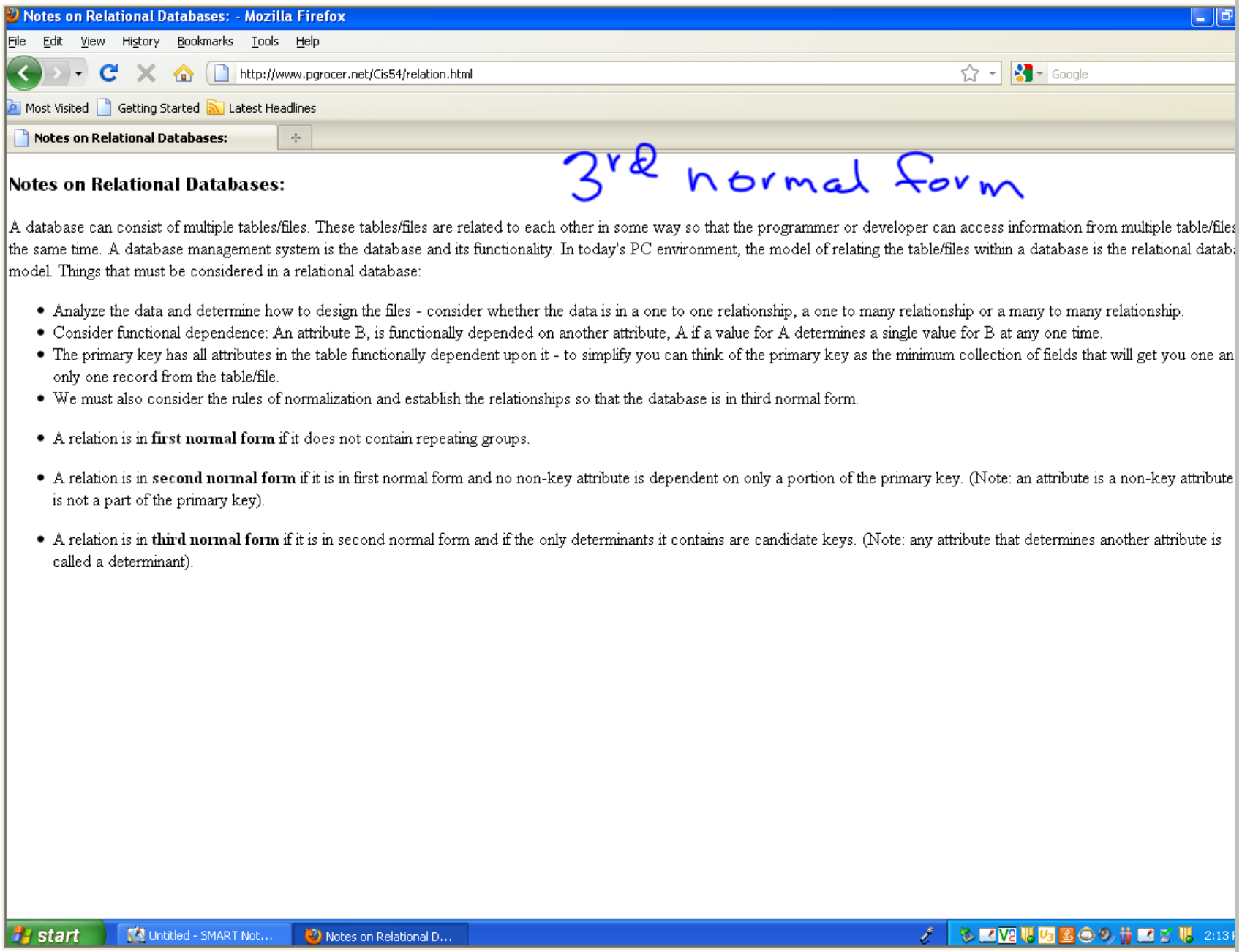
Notes on Relational Databases: - Mozilla Firefox
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http://www.pgrocer.net/Cis54/relation.html
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Notes on Relational Databases:
Notes on Relational Databases:
3rd normal form
A database can consist of multiple tables/files. These tables/files are related to each other in some way so that the programmer or developer can access information from multiple table/files
the same time. A database management system is the database and its functionality. In today's PC environment, the model of relating the table/files within a database is the relational databa
model. Things that must be considered in a relational database:
Analyze the data and determine how to design the files - consider whether the data is in a one to one relationship, a one to many relationship or a many to many relationship.
Consider functional dependence: An attribute B, is functionally depended on another attribute, A if a value for A determines a single value for B at any one time.
The primary key has all attributes in the table functionally dependent upon it - to simplify you can think of the primary key as the minimum collection of fields that will get you one an
only one record from the table/file.
We must also consider the rules of normalization and establish the relationships so that the database is in third normal form.
A relation is in first normal form if it does not contain repeating groups.
A relation is in second normal form if it is in first normal form and no non-key attribute is dependent on only a portion of the primary key. (Note: an attribute is a non-key attribute
is not a part of the primary key).
A relation is in third normal form if it is in second normal form and if the only determinants it contains are candidate keys. (Note: any attribute that determines another attribute is
called a determinant).
start
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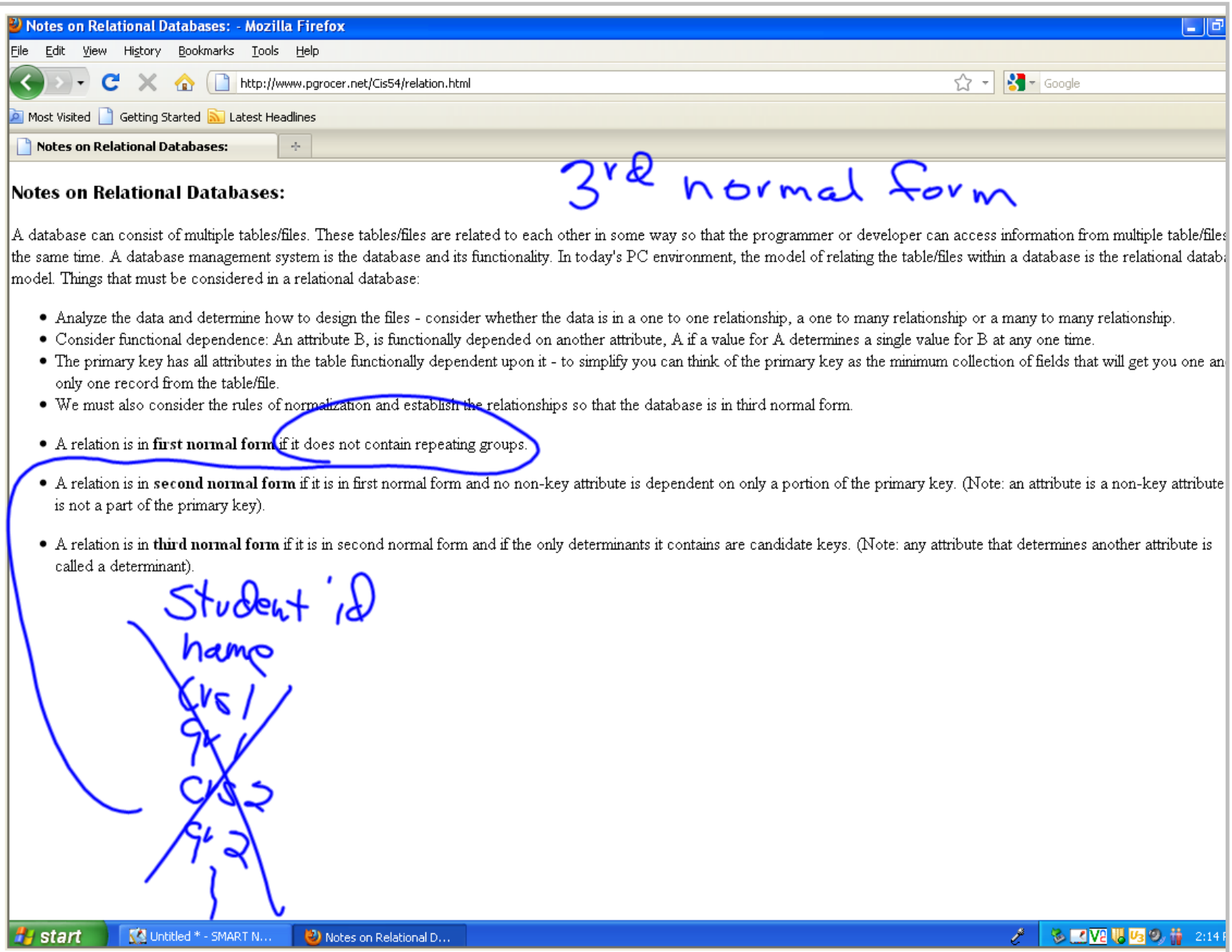
Notes on Relational D...
2:13



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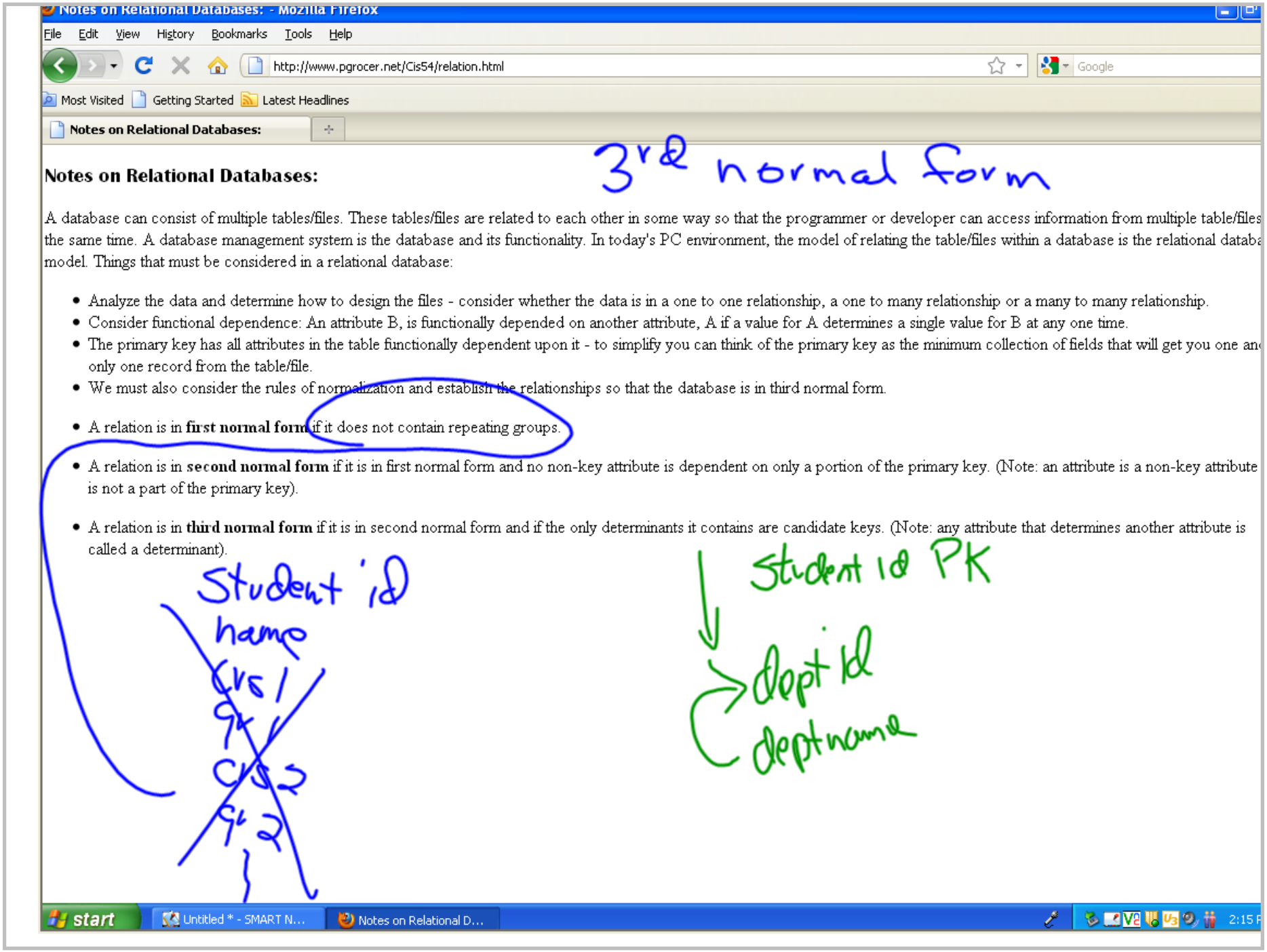

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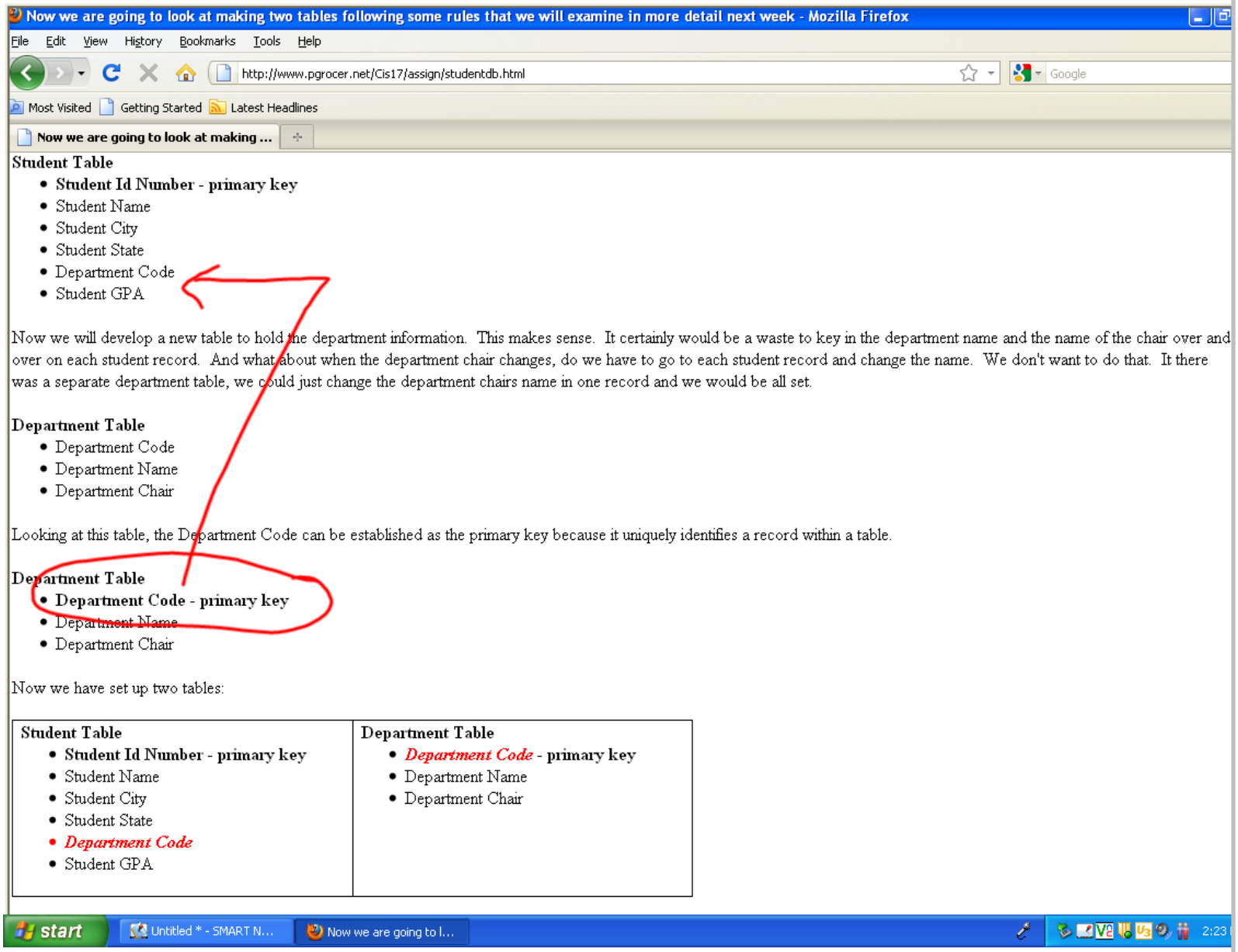
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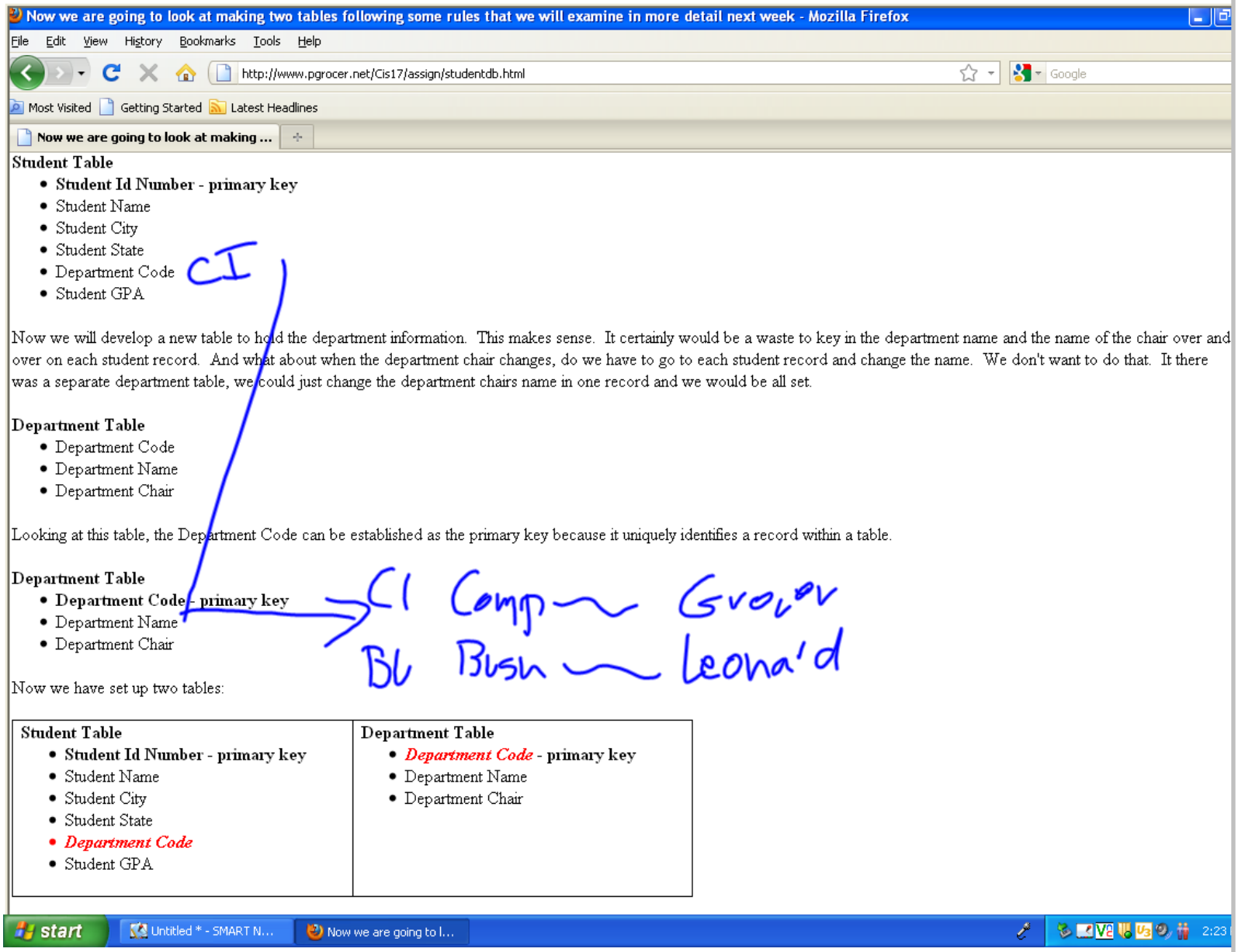
Now we are going to look at making ...
Student Table
Student Id Number - primary key
Student Name
Student City
Student State
Department Code
Student GPA
Now we will develop a new table to hold the department information. This makes sense. It certainly would be a waste to key in the department name and the name of the chair over and over on each student record. And what about when the department chair changes, do we have to go to each student record and change the name. We don't want to do that. It there was a separate department table, we could just change the department chairs name in one record and we would be all set.
Department Table
Department Code
Department Name
Department Chair
Looking at this table, the Department Code can be established as the primary key because it uniquely identifies a record within a table.
Department Table
Department Code - primary key
Department Name
Department Chair
Now we have set up two tables:
Student Table
Student Id Number - primary key
Student Name
Student City
Student State
Department Code
Student GPA
Department Table
Department Code - primary key
Department Name
Department Chair
start
Untitled * - SMART N...
Now we are going to l...
2:23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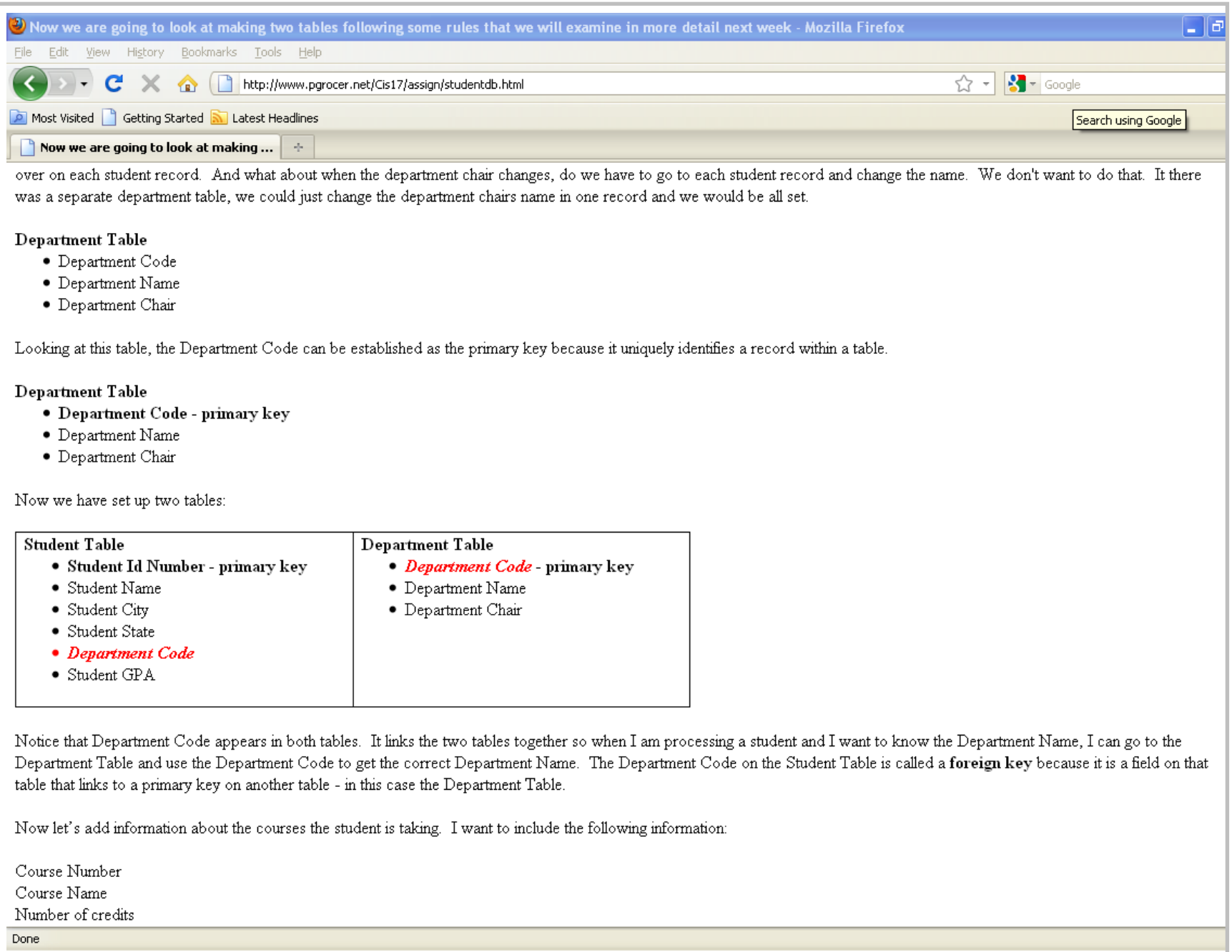
Now we are going to look at making ...
Student Table
Student Id Number - primary key
Student Name
Student City
Student State
Department Code
Student GPA
CI
Now we will develop a new table to hold the department information. This makes sense. It certainly would be a waste to key in the department name and the name of the chair over and over on each student record. And what about when the department chair changes, do we have to go to each student record and change the name. We don't want to do that. It there was a separate department table, we could just change the department chairs name in one record and we would be all set.
Department Table
Department Code
Department Name
Department Chair
Looking at this table, the Department Code can be established as the primary key because it uniquely identifies a record within a table.
Department Table
Department Code - primary key
Department Name
Department Chair
CI Comp — Grover
BL Bush — Leonard
Now we have set up two tables:
Student Table
Student Id Number - primary key
Student Name
Student City
Student State
Department Code
Student GPA
Department Table
Department Code - primary key
Department Name
Department Chair
start
Untitled * - SMART N...
Now we are going to l...
2:23



over on each student record. And what about when the department chair changes, do we have to go to each student record and change the name. We don't want to do that. It there was a separate department table, we could just change the department chairs name in one record and we would be all set.

Department Table

- Department Code
- Department Name
- Department Chair

Looking at this table, the Department Code can be established as the primary key because it uniquely identifies a record within a table.

Department Table

- **Department Code - primary key**
- Department Name
- Department Chair

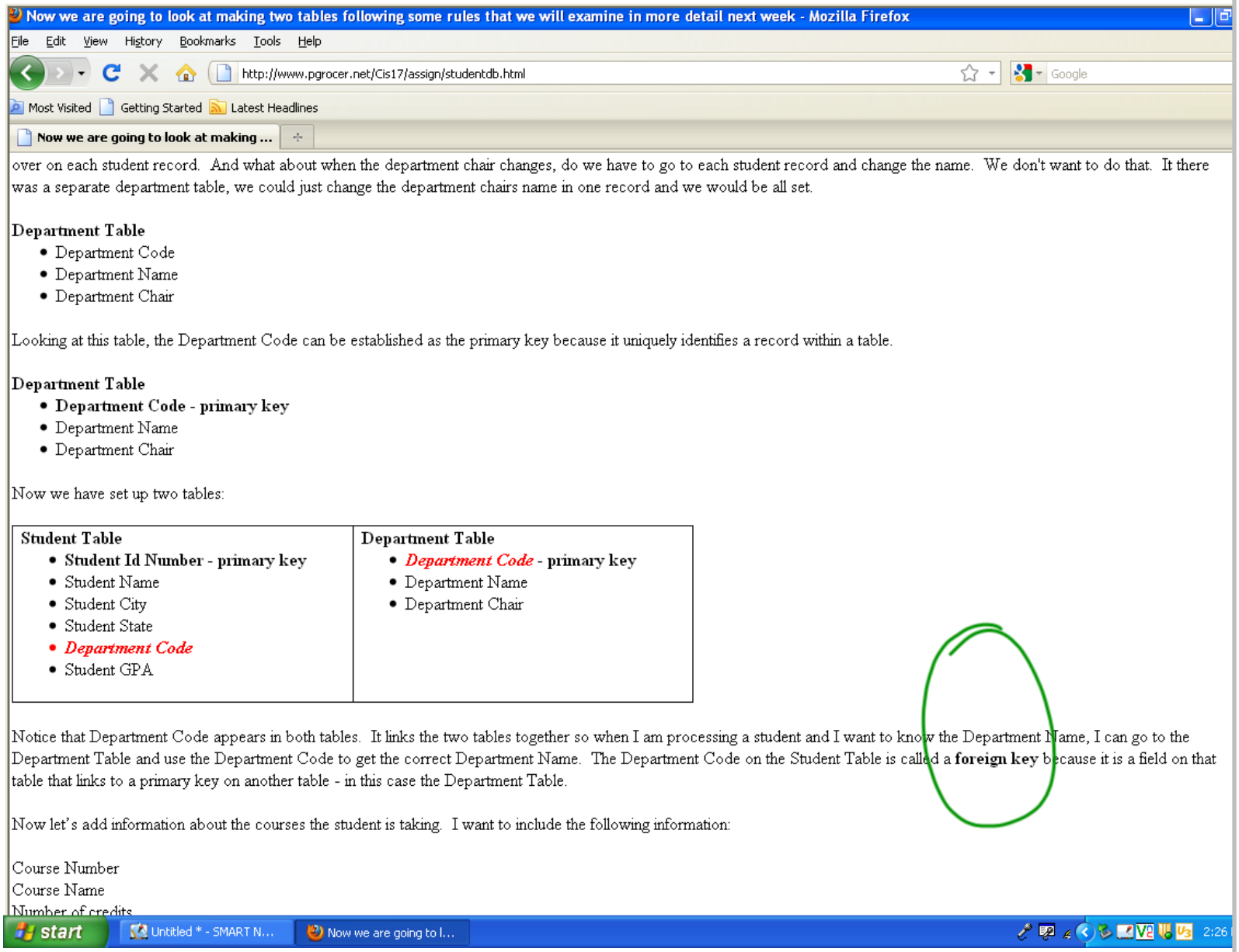
Now we have set up two tables:

Student Table	**Department Table**
• **Student Id Number - primary key** • Student Name • Student City • Student State • ***Department Code*** • Student GPA	• ***Department Code*** **- primary key** • Department Name • Department Chair

Notice that Department Code appears in both tables. It links the two tables together so when I am processing a student and I want to know the Department Name, I can go to the Department Table and use the Department Code to get the correct Department Name. The Department Code on the Student Table is called a **foreign key** because it is a field on that table that links to a primary key on another table - in this case the Department Table.

Now let's add information about the courses the student is taking. I want to include the following information:

Course Number
Course Name
Number of credits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Now we are going to look at making ...
over on each student record. And what about when the department chair changes, do we have to go to each student record and change the name. We don't want to do that. It there was a separate department table, we could just change the department chairs name in one record and we would be all set.
Department Table
Department Code
Department Name
Department Chair
Looking at this table, the Department Code can be established as the primary key because it uniquely identifies a record within a table.
Department Table
Department Code - primary key
Department Name
Department Chair
Now we have set up two tables:
Student Table
Student Id Number - primary key
Student Name
Student City
Student State
Department Code
Student GPA
Department Table
Department Code - primary key
Department Name
Department Chair
Notice that Department Code appears in both tables. It links the two tables together so when I am processing a student and I want to know the Department Name, I can go to the Department Table and use the Department Code to get the correct Department Name. The Department Code on the Student Table is called a foreign key because it is a field on that table that links to a primary key on another table - in this case the Department Table.
Now let's add information about the courses the student is taking. I want to include the following information:
Course Number
Course Name
Number of credits
start
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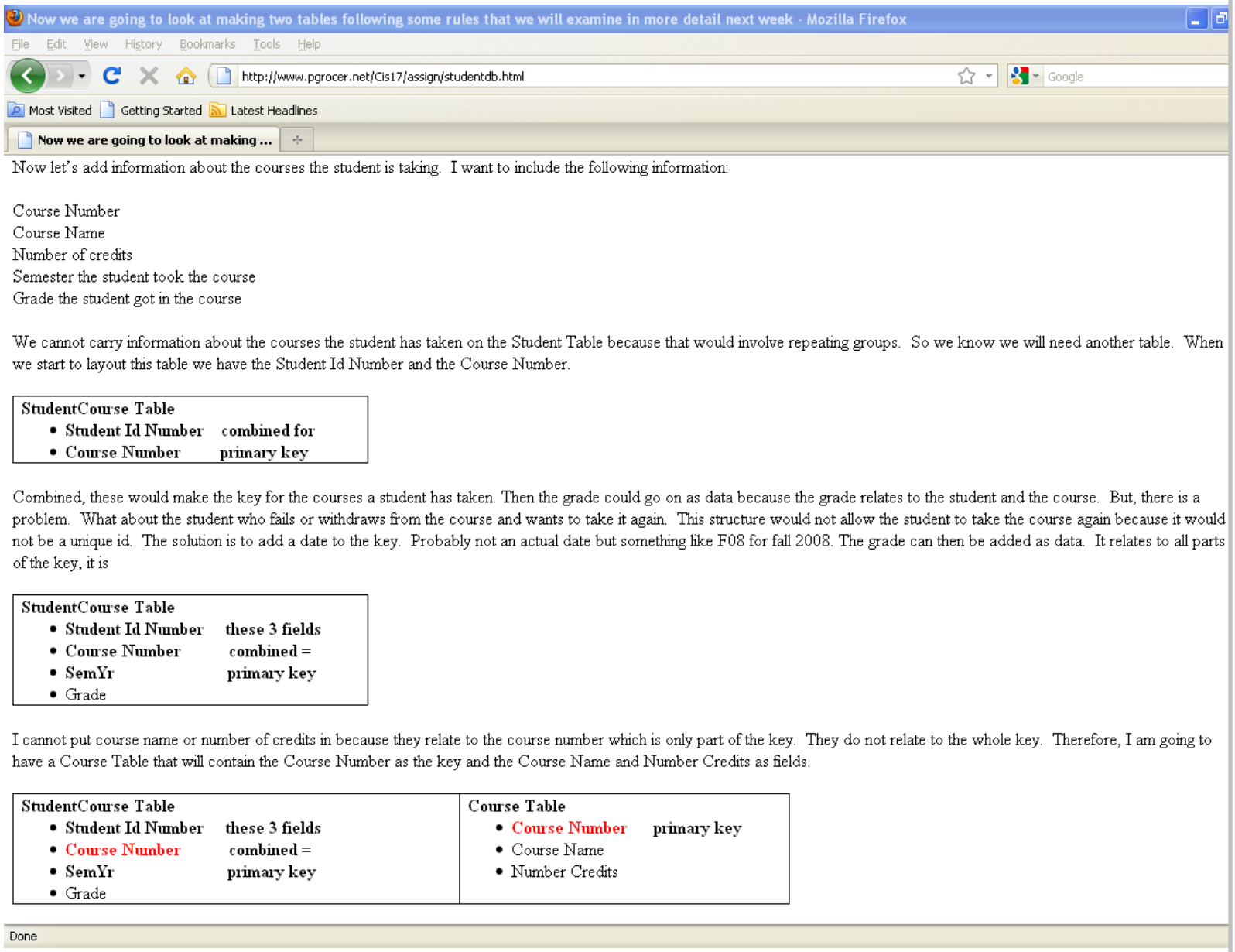
Now we are going to l...
2:26



Now let's add information about the courses the student is taking. I want to include the following information:

Course Number
Course Name
Number of credits
Semester the student took the course
Grade the student got in the course

We cannot carry information about the courses the student has taken on the Student Table because that would involve repeating groups. So we know we will need another table. When we start to layout this table we have the Student Id Number and the Course Number.

StudentCourse Table
- **Student Id Number** **combined for**
- **Course Number** **primary key**

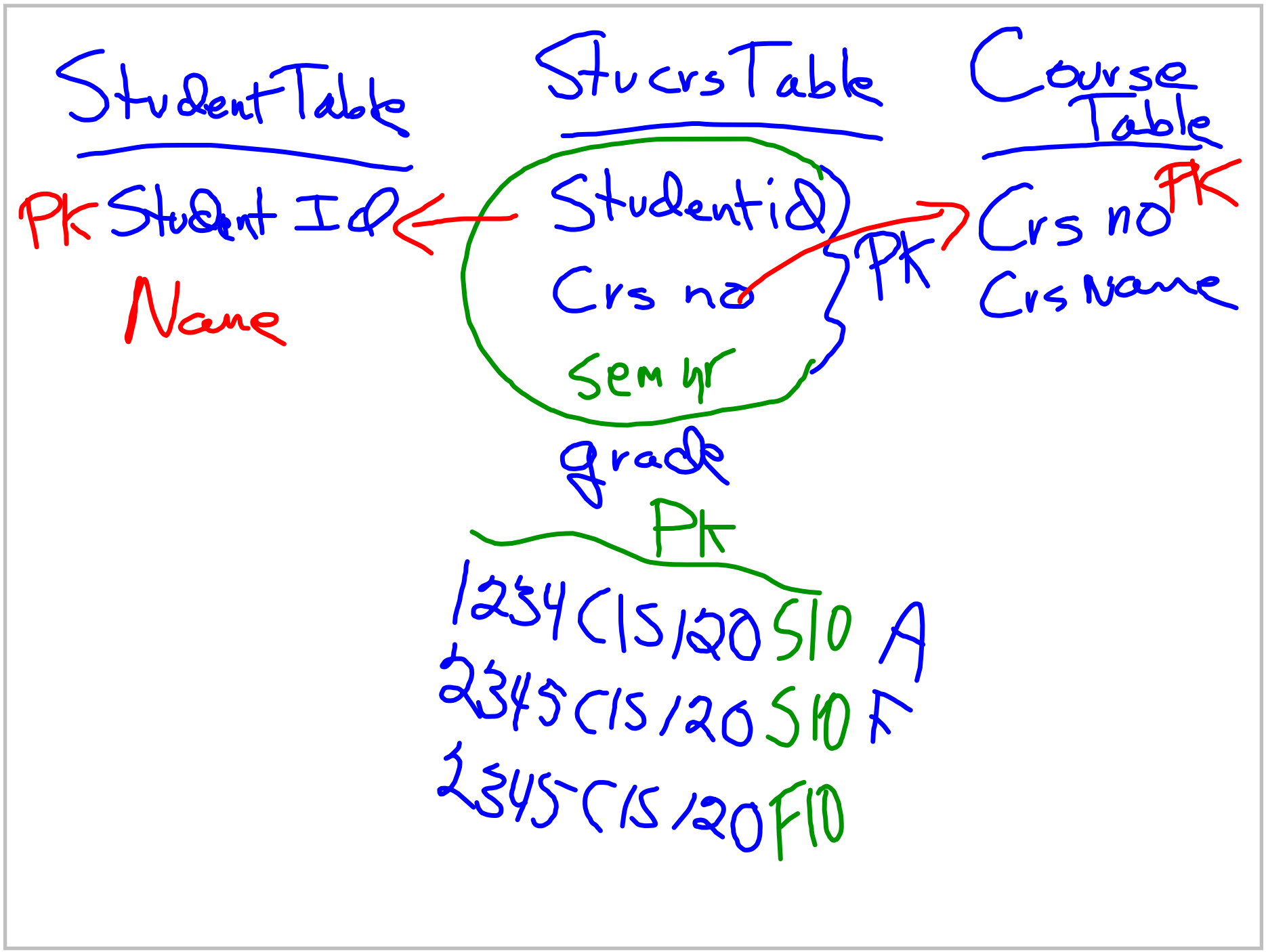
Combined, these would make the key for the courses a student has taken. Then the grade could go on as data because the grade relates to the student and the course. But, there is a problem. What about the student who fails or withdraws from the course and wants to take it again. This structure would not allow the student to take the course again because it would not be a unique id. The solution is to add a date to the key. Probably not an actual date but something like F08 for fall 2008. The grade can then be added as data. It relates to all parts of the key, it is

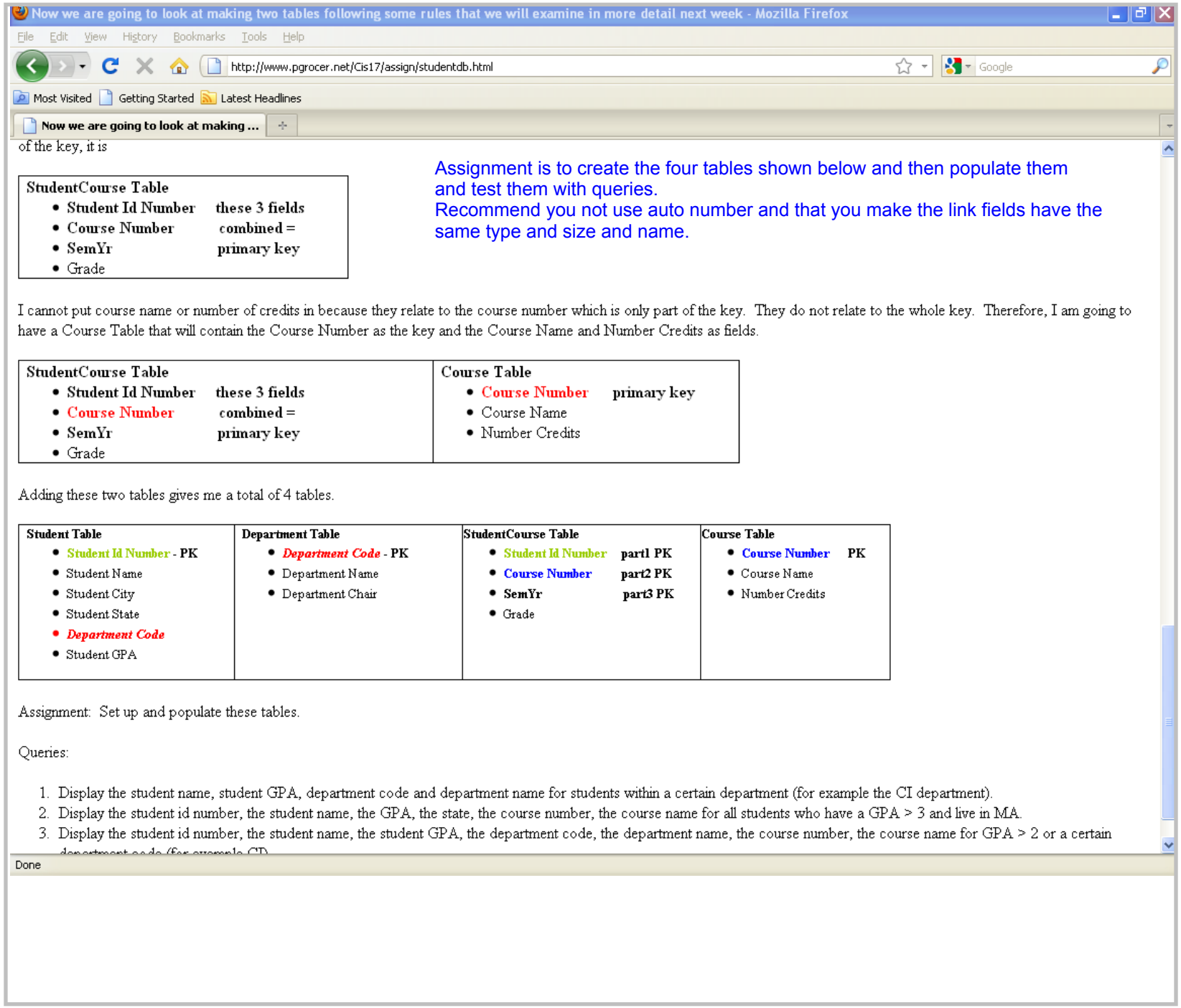
StudentCourse Table
- **Student Id Number** **these 3 fields**
- **Course Number** **combined =**
- **SemYr** **primary key**
- Grade

I cannot put course name or number of credits in because they relate to the course number which is only part of the key. They do not relate to the whole key. Therefore, I am going to have a Course Table that will contain the Course Number as the key and the Course Name and Number Credits as fields.

StudentCourse Table
- **Student Id Number** **these 3 fields**
- **Course Number** **combined =**
- **SemYr** **primary key**
- Grade

Course Table
- **Course Number** **primary key**
- Course Name
- Number Credits


StudentTable
PK StudentID
Name
StucrsTable
StudentID
Crs no
Sem yr
grade
PK
PK
1234 CIS 120 S10 A
2345 CIS 120 S10 F
2345 CIS 120 F10
CourseTable
Crs no
Crs Name
PK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Now we are going to look at making ...
of the key, it is
StudentCourse Table
Student Id Number these 3 fields
Course Number combined =
SemYr primary key
Grade
Assignment is to create the four tables shown below and then populate them and test them with queries.
Recommend you not use auto number and that you make the link fields have the same type and size and name.
I cannot put course name or number of credits in because they relate to the course number which is only part of the key. They do not relate to the whole key. Therefore, I am going to have a Course Table that will contain the Course Number as the key and the Course Name and Number Credits as fields.
StudentCourse Table
Student Id Number these 3 fields
Course Number combined =
SemYr primary key
Grade
Course Table
Course Number primary key
Course Name
Number Credits
Adding these two tables gives me a total of 4 tables.
Student Table
Student Id Number - PK
Student Name
Student City
Student State
Department Code
Student GPA
Department Table
Department Code - PK
Department Name
Department Chair
StudentCourse Table
Student Id Number part1 PK
Course Number part2 PK
SemYr part3 PK
Grade
Course Table
Course Number PK
Course Name
Number Credits
Assignment: Set up and populate these tables.
Queries:
1. Display the student name, student GPA, department code and department name for students within a certain department (for example the CI department).
2. Display the student id number, the student name, the GPA, the state, the course number, the course name for all students who have a GPA > 3 and live in MA.
3. Display the student id number, the student name, the student GPA, the department code, the department name, the course number, the course name for GPA > 2 or a certain
Done