CSCI 5080 Assignment 3

Use Microsoft **WORD** to write your answer and submit it to the Dropbox in D2L.
Please indicate **how much time** you spend on each problem.

Part I (60 points)

1. (30 points) Suppose that a data warehouse for *Big-University* consists of the following four dimensions: *student, course, semester*, and *instructor*, and two measures *count* and *avg grade*. When at the lowest conceptual level (e.g., for a given student, course, semester, and instructor combination), the *avg grade* measure stores the actual course grade of the student. At higher conceptual levels, *avg grade* stores the average grade for the given combination.

(a) Draw a *snowflake schema* diagram for the data warehouse.

(b) Starting with the base cuboid [*student, course, semester, instructor*], what specific *OLAP operations* (e.g., roll-up from *semester* to *year*) should one perform in order to list the average grade of *CS* courses for each *Big-University* student.

(c) If each dimension has five levels (including all), such as "*student < major < status < university <* all", how many cuboids will this cube contain (including the base and apex cuboids)?

2. (30 points) Suppose that a base cuboid has three dimensions, *A, B, C*, with the following number of cells: $|A| = 100{,}000$, $|B| = 100$, and $|C| = 10{,}000$. Suppose that each dimension is evenly partitioned into 10 portions for *chunking*.

(a) Assuming each dimension has only one level, draw the complete lattice of the cube.

(b) If each cube cell stores one measure with 4 bytes, what is the total size of the computed cube if the cube is *dense*?

(c) State the order for computing the chunks in the cube that requires the least amount of space, and compute the total amount of main memory space required for computing the 2-D planes.

Part II (40 Points)

1. Review SQL Server 2012 <u>Analysis Services Tutorial Scenario</u>.

2. Review handout on SQL Server Analysis Services Tutorials (updated with two more screenshots).

3. Complete the following SQL Server 2012 Analysis Services Tutorial Lessons.

(5 points) Lesson 1: Defining a Data Source View within an Analysis Services Project

Turn in the screenshot that shows the Data Source with the server name on your computer.
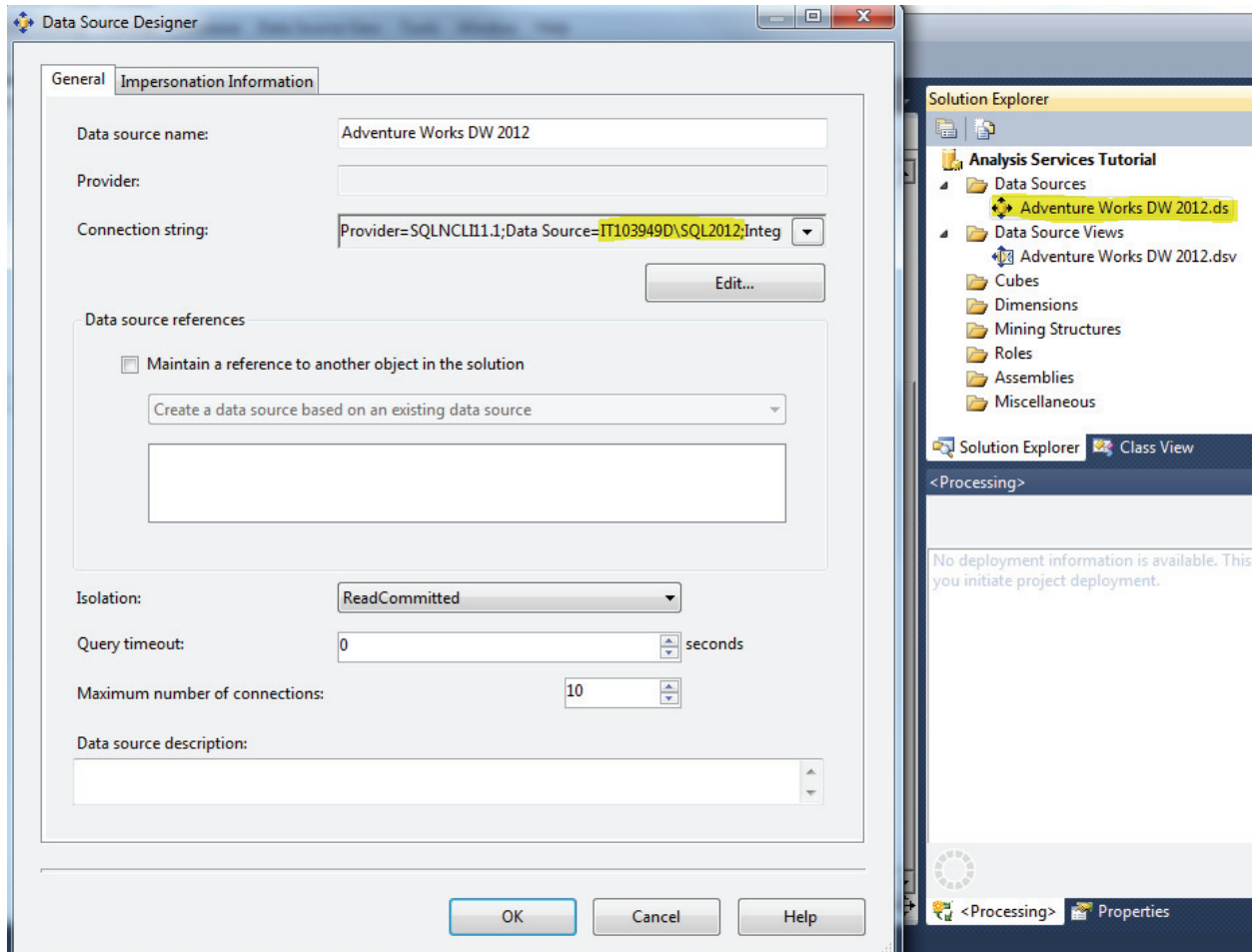
(15 points) Lesson 2: Defining and Deploying a Cube

Turn in the screenshot that shows (1) Server name (2) Deployment Completed Successfully (3) Measures (4) Dimensions, and (5) Data Source View.

Turn in the screenshot in SQL Server Management Studio that shows (1) Connection and Server name and (2) The properties of Internet Sales partition.
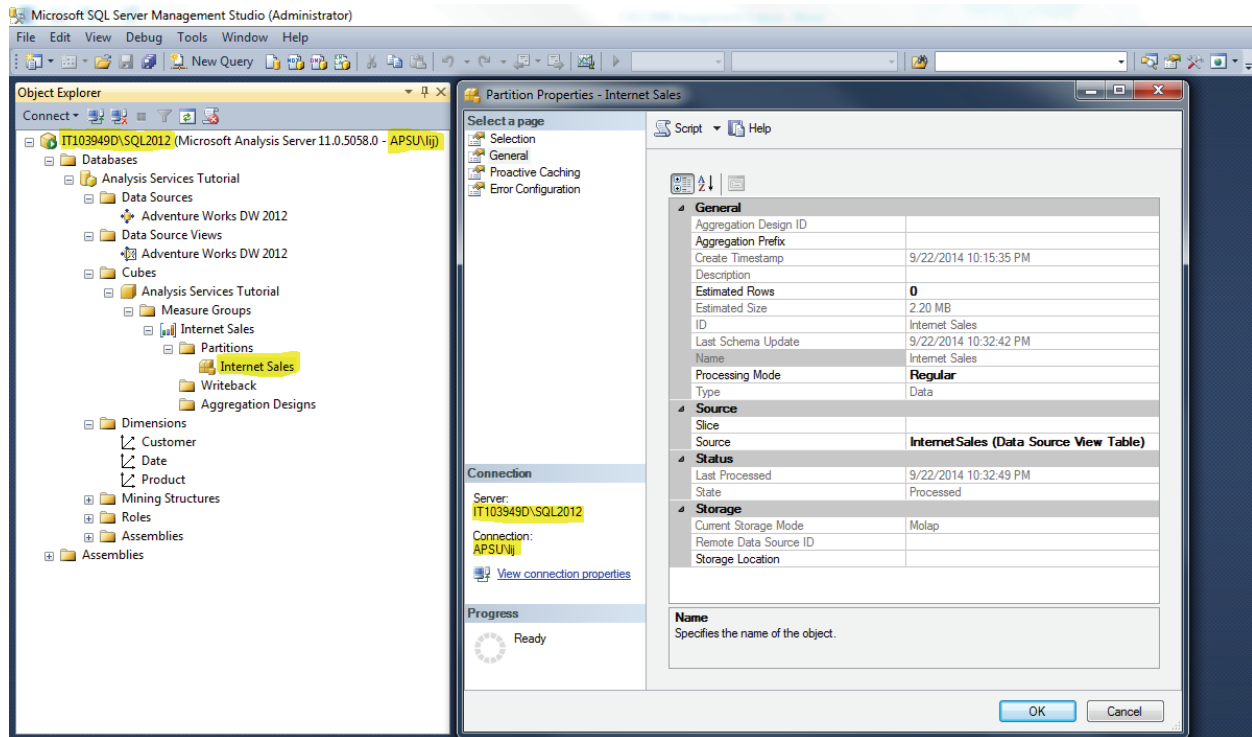
(20 points) Lesson 3: Modifying Measures, Attributes and Hierarchies

Turn in the screenshot of your Excel Pivot table that shows Internet sales by region and product line for the month of August, 2007.