Part One: Kramerica CEO Miles Meservy has put together a spreadsheet of all the data he has so far, which he personally collected.

1. As he shows you the spreadsheet, having just signed your consulting agreement, he asks what you think of it. How do you reply?

> "First, please allow me to take a moment Mr. Meservy, to compliment you and your team on the excellent work completed thus far; you've assembled some very comprehensive and superduperawesome data here. That said, and having completed an exhaustive (an exhausting) assessment of these data, I'm delighted to conclude that we will be able to build upon the solid foundation of your legacy asset management methodology to develop systems for even more elastic analysis and, dare I say it, heretofore unimagined contextual discovery. In short, we are well positioned to transform this data into information! For example and to *get down to brass tacks*, as they say… most certainly through no deficiency of yours, and perhaps attributable strictly to limitations of the apparatuses at your disposal, I note that PackageID and TagNumber relationships are repetitive and not readily evident. Furthermore, the current spreadsheet format makes no provision for maintaining a catalog or reference for available software and current cost. Similarly, a limitation may become apparent, or records may appear anomalous when attempting to catalogue a computer that has not as yet had any software installed. Finally, the requirement to "track the installation date of each package on each computer, as well as the cost of that software for that computer at install time," might better be accomplished through implementation of a transaction table to aggregate installs by date and retain historical records of software cost per install. Fortunately, I assure you that upon completion of our engagement, we will have remedied the aforementioned deficiencies and fashioned a bespoke information system with the dexterity to accommodate [inaudible qualifiers] unanticipated exigencies."

2. Put his data in 1NF and display it. (Show me the table; no SQL.)

Output pane

Data Output | Explain | Messages | History

	packageid character(4)	tagnumber integer	installdate date	softwarecostusd numeric(5,2)
1	AC01	32808	2005-09-13	754.95
2	DB32	32808	2005-12-03	380.00
3	DB32	37691	2005-06-15	380.00
4	DB33	57772	2005-05-27	412.77
5	WP08	32808	2006-01-12	185.00
6	WP08	37691	2005-06-15	227.50
7	WP08	57222	2005-05-27	170.24
8	WP09	59836	2005-10-30	35.00
9	WP09	77740	2005-05-27	35.00

3. What is the primary key?

primary key(packageID,tagNumber)

Part Two: Add two columns of new data: one column for software package name (e.g., Zork, Portal, etc.) and one for computer model (e.g., IBM, Apple, etc.). Be sure that your new data is consistent with the original data. Do not add any additional columns.

4. Display the new table.

Output pane

Data Output | Explain | Messages | History

	packageid character(4)	packagename text	softwarecostusd numeric(5,2)	installdate date	tagnumber integer	computermodel text
1	AC01	Zork	754.95	2005-09-13	32808	IBM
2	DB32	Portal	380.00	2005-12-03	32808	IBM
3	DB32	Portal	380.00	2005-06-15	37691	Apple
4	DB33	Wolfenstein 3D	412.77	2005-05-27	57772	Compaq
5	WP08	Redneck Rampage	185.00	2006-01-12	32808	IBM
6	WP08	Redneck Rampage	227.50	2005-06-15	37691	Apple
7	WP08	Redneck Rampage	170.24	2005-05-27	57222	Dynabyte
8	WP09	Blake Stone	35.00	2005-10-30	59836	Tandy
9	WP09	Blake Stone	35.00	2005-05-27	77740	Commodore

5. Identify and document all functional dependencies.

   computerModel depends upon tagNumber
   packageName depends upon packageID
   softwareCostUSD depends upon packageID
   installDate depends upon tagNumber & packageID

6. Explain why this new table is not in third normal form.

   There are multiple dependencies (non-key attributes are dependent on more than the key, the whole key and nothing but the key).

Part Three: Decompose your 1NF table into a set of tables that are in at least third normal form. (BCNF would be better.) Remember that it's wrong to add artilicial keys to associative entities. Actually, as I said before, do not add any additional columns.

Output pane

Data Output | Explain | Messages

	tagnumber integer	computermodel text
1	32808	IBM
2	37691	Apple
3	57772	Compaq
4	57222	Dynabyte
5	59836	Tandy
6	77740	Commodore

Output pane

Data Output | Explain | Messages | History

	packageid character(4)	packagename text	softwarecostusd numeric(5,2)
1	AC01	Zork	754.95
2	DB32	Portal	380.00
3	DB33	Wolfenstein 3D	412.77
4	WP08	Redneck Rampage	170.24
5	WP09	Blake Stone	35.00

Output pane

Data Output | Explain | Messages | History

	installdate date	tagnumber integer	packageid character(4)	softwarecostusd numeric(5,2)
1	2005-09-13	32808	AC01	754.95
2	2005-12-03	32808	DB32	380.00
3	2005-06-15	37691	DB32	380.00
4	2005-05-27	57772	DB33	412.77
5	2006-01-12	32808	WP08	185.00
6	2005-06-15	37691	WP08	227.50
7	2005-05-27	57222	WP08	170.24
8	2005-10-30	59836	WP09	35.00
9	2005-05-27	77740	WP09	35.00

7. Identify all primary keys (determinants) for all tables.

   [table 1] computers (tagNumber)
   [table 2] packages (packageID)
   [table 3] installs (installDate, tagNumber, packageID)

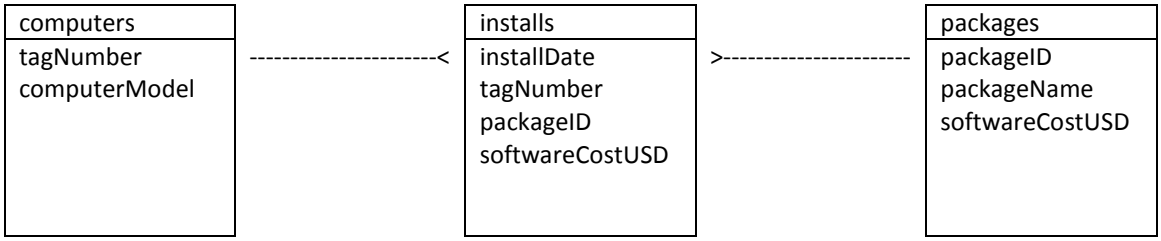
8. Identify all functional dependencies for all tables.

   computers: computerModel depends upon tagNumber
   packages: packageName depends upon packageID
   packages: softwareCostUSD depends upon packageID

9. Explain why the new tables are in third normal form.

   There are no multiple dependencies (all non-key attributes are dependent on the key, the whole key and nothing but the key).

10. Draw a beautiful E/R diagram.



Note: softwareCostUST is NOT linked from packages to installs. It is updated on a per transaction basis.