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Lab 7: Normalization 1

Part 1:
1. The table depicts a clear understanding of which software were installed in a computer. However, it may be difficult to delete a software from a certain computer, because all the information on that row will be deleted and those information are not intended to be removed. Updating information would be difficult as well, because changing data in one row does not change that same data that are in other rows. This leads to a very inconsistent set of data. Inserting new computers with no software installed or having a software that are not installed in any computers would result to an empty field.

2. 1NF Form:

PackID	TagNum	InstallMonth	InstallDay	InstallYear	SoftwareCost
AC01	32808	September	13	1995	754.95
DB32	32808	December	03	1995	380.00
DB32	37691	June	15	1995	380.00
DB33	57772	May	27	1995	412.77
WP08	32808	January	12	1996	185.00
WP08	37691	June	15	1995	227.50
WP08	57222	May	27	1995	170.24
WP09	59836	October	30	1995	35.00
WP09	77740	May	27	1995	35.00

3. The primary keys are PackID and TagNum.

Part 2:
4.

Software Package Name	PackID	Computer Model	TagNum	InstallMonth	InstallDay	InstallYear	SoftwareCost
GIMP	AC01	HP	32808	September	13	1995	754.95
Evergreen	DB32	HP	32808	December	03	1995	380.00
Evergreen	DB32	Apple	37691	June	15	1995	380.00
Portal	DB33	Toshiba	57772	May	27	1995	412.77
Zork	WP08	HP	32808	January	12	1996	185.00
Zork	WP08	Apple	37691	June	15	1995	227.50
Zork	WP08	Alienware	57222	May	27	1995	170.24
Pentaho	WP09	Sony	59836	October	30	1995	35.00
Pentaho	WP09	Lenovo	77740	May	27	1995	35.00

5. Functional Dependencies:
- PackID -> SoftwarePackageName
- TagNum -> ComputerModel

- InstallMonth, InstallDay, InstallYear, PackID, TagNum -> SoftwareCost
- SoftwareCost -> InstallMonth, InstallDay, InstallYear, PackID, TagNum   (Transitive Dependency)

6. This table is not in third normal form because it displays multiple transitive dependencies. For instance, ComputerModel depends on the TagNum and Software Package Name depends on the PackID. All these dependencies are shown in the same table and that violates the third normal form. For the third normal form to occur, the primary key columns in the table should functionally determine the non-primary key columns, and this is not the case in the table above.

Part 3:

Softwares---------------------------------

PackID	SoftwarePackageName
AC01	GIMP
DB32	Evergreen
DB33	Portal
WP08	Zork
WP09	Pentaho

Computers------------------------

TagNum	ComputerModel
32808	HP
37691	Apple
57222	Alienware
57772	Toshiba
59836	Sony
77740	Lenovo

InstallDates--

InstallID	InstallMonth	InstallDay	InstallYear
1	September	13	1995
2	December	03	1995
3	June	15	1995
4	May	27	1995
5	January	12	1996
6	October	30	1995

Installations--

PackID	TagNum	InstallID	SoftwareCost
AC01	32808	1	754.95
DB32	32808	2	380.00
DB32	37691	3	380.00
DB33	57772	4	412.77
WP08	32808	5	185.00
WP08	37691	3	227.50
WP08	57222	4	170.24
WP09	59836	6	35.00
WP09	77740	4	35.00

7. Softwares table has the primary key of PackID. Computers table has the primary key of TagNum. InstallDates table has the primary key of InstallID. Installations table has a composite primary key of PackID and TagNum.

8. Functional dependencies for:
Software table = PackID -> SoftwarePackageName
Computer table = TagNum -> ComputerModel
InstallDates table = InstallID -> InstallMonth, InstallDay, InstallYear
Installations table = PackID, TagNum, InstallID -> SoftwareCost

9. The new tables are in third normal form because they satisfy the requirements of the first and second normal form. The data for each row on the tables are unique and are not repetitive. This means the table has a primary key that uniquely identifies each row in the table. This satisfies the first normal form. To satisfy the second normal form, each table has no partial key dependencies. This means that the columns that are not considered as primary keys must depend on the columns that are considered as primary keys. Also, the non-primary key columns must depend on all the primary key columns, and not just on some of the primary key columns. The tables are also in third normal form because the non-primary key columns all depend on the primary key columns.

10.

Softwares	
PK	PackID
	SoftwarePackageName

Computers	
PK	TagNum
	ComputerModel

InstallDates	
PK	InstallID
	InstallMonth
	InstallDay
	InstallYear

Installations	
PK1, FK1	PackID
PK2, FK2	TagNum
FK3	InstallID
	SoftwareCost