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Database Management

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Part One:

1. A computer (uniquely identified by a Tag Number) can have multiple software packages installed and Package software (uniquely identified by a Package ID) can be installed on numerous computers. By looking at this alone, we know that we have a many to many relationship which already tells us that there is a high potential for duplicate data in the table. This can be a really big issue because if we needed to update a value in the table, let's say that one of the software packages was revamped and has a new Package ID, we would need to update in the table everywhere there is an instance of the older software Package ID. This, along with the risk of duplication, leaves room for inconsistent data which kills the purpose of us trying to store data in a database. If the information is not accurate, why even bother?
2.

Kramerica Enterprises			
Tag Number	PackageID	InstallDate	SoftwareCostUSD
32808	AC01	9/13/2005	$ 754.95
32808	DB32	12/3/2005	$ 380.00
32808	WP08	1/12/2006	$ 185.00
37691	DB32	6/15/2005	$ 380.00
37691	WP08	6/15/2005	$ 227.50
57222	WP08	5/27/2005	$ 170.24
57772	DB33	5/27/2005	$ 412.77
59836	WP09	10/30/2005	$ 35.00
77740	WP09	5/27/2005	$ 35.00

3. The primary key would be the composite key of Tag Number and Package ID because it uniquely identifies each entry of data that Kramerica Enterprises has provided.

Part Two:

4.

Kramerica Enterprises					
Tag Number	PackageID	InstallDate	SoftwareCostUSD	PackageName	ComputerModel
32808	AC01	9/13/2005	$ 754.95	Fallout3	Apple
32808	DB32	12/3/2005	$ 380.00	Super Smash	Apple
32808	WP08	1/12/2006	$ 185.00	Portal	Apple
37691	DB32	6/15/2005	$ 380.00	Super Smash	Asus
37691	WP08	6/15/2005	$ 227.50	Portal	Asus
57222	WP08	5/27/2005	$ 170.24	Portal	MSI
57772	DB33	5/27/2005	$ 412.77	Nightfire	MSI
59836	WP09	10/30/2005	$ 35.00	Half-life	Acer
77740	WP09	5/27/2005	$ 35.00	Half-life	Aorus

5.

Dependencies		
Tag Number	→	Computer Model
Package ID	→	Package Name
Tag Number, Package ID	→	InstallData, SoftwareCostUSD

6. The new table is **not** in third normal form because the primary key for this table is the Tag Number but if you look at the second dependency in that awesome table above (question 5), we see that the Package Name is functionally dependent on Package ID. This means that the primary key does not provide facts about the Package Name and this violates the third normal form. The golden rule is The key, the whole key and nothing but the key (Literally written in gold or what I hope is gold).

Part 3:

7.

Packages Table	
Package ID	Package Name
AC01	Fallout3
DB32	Super Smash
DB33	Nightfire
WP08	Portal
WP09	Half-life
Primary Key:	Package ID

Computers Table	
Tag Number	Computer Model
32808	Apple
37691	Asus
57222	MSI
57772	MSI
59836	Acer
77740	Aorus
Primary Key:	Tag Number

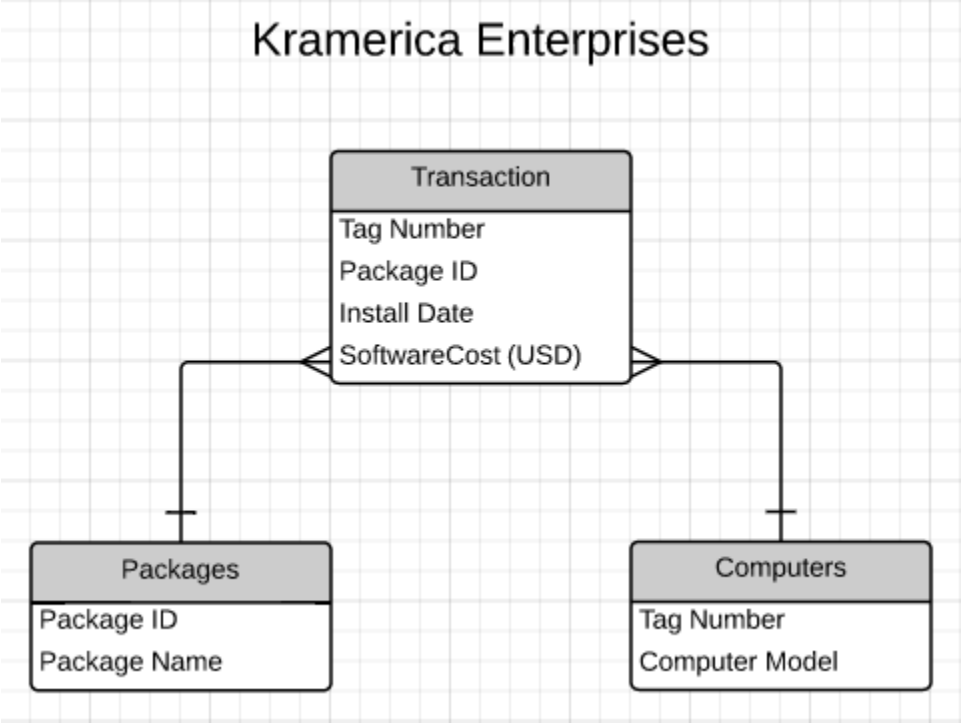
Transaction Table				
Tag Number	Package ID	Install Date	SoftwareCostUSD	
32808	AC01	9/13/2005	$	754.95
32808	DB32	12/3/2005	$	380.00
32808	WP08	1/12/2006	$	185.00
37691	DB32	6/15/2005	$	380.00
37691	WP08	6/15/2005	$	227.50
57222	WP08	5/27/2005	$	170.24
57772	DB33	5/27/2005	$	412.77
59836	WP09	10/30/2005	$	35.00
77740	WP09	5/27/2005	$	35.00
Primary Key:		(Tag Number, Package ID)		

8.

Functional Dependencies			
Computers Table	Tag Number	→	Computer Model
Packages Table	Package ID	→	Package Name
Transaction Table	Tag Number, Package ID	→	InstallData, SoftwareCostUSD

9. The new tables are in third normal form because in the Computers Table, the Computer Model is completely dependent on the Tag Number and the Tag Number can uniquely identify each column and row in the table. The same goes for the Packages Table. Package Names are completely dependent on the Package ID. With the Transaction Table, the Tag Number alone is not a strong enough primary key to identify each column of information in the entire table as well as the Package ID, but with a composite key of both the Tag Number and Package ID, we can uniquely identify each row and column in the table and have full dependency on the composite key.

10.


Kramerica Enterprises
Transaction
Tag Number
Package ID
Install Date
SoftwareCost (USD)
Packages
Package ID
Package Name
Computers
Tag Number
Computer Model