NORMAUZATION : DATABASES a. What is normalization? A. Normalization refers to the procen of structuring a relational database in accordance with a series of "normal tonns" in order to reduce data reductancy and improve data integrity. - All normal forms are progressive, ie. a database in the 3rd Normal Form is also in the 1st and 2nd NF INF: Each attribute only has "atomic" data Is ie the simplest, and most single "tom of the data + Each table has a unique identifier being represented called a "primary key" for example: "20 tyres at S90/tyre" broken down into atomic data Product Quantity Price/unit Tyre 50 LastName Date order 1D First Name 35 candybars at \$1.25/ea. Smith John 01/01/20 40 shovers at \$50.00/ea. Jake 02/03/19 Doe 3 Brenda 05/04/18 10 TUS at \$950/ea. Brown G This is not in 1905 Group of attributes This databasse converted into INF, would look like: Product Price/unit 1D First Name Last Name Date Qty 350 Condybar Tohn Smith 01/01/20 1.25 shovel Jake 02/03/19 40 50.00 Doe Brenda 81/40/20 950.00 $\tau \circ$ 10 Brown (exclusively) 2NF: Every non-prime attribute depends only and only on the primary key + There are no partial dependencies Now let's consider why the database we just normalized to INF is NOT in 2NF. Product 1D First Name Last Name Date Price/unit Oty. 250 1.25 Candybar Smith John 01/01/20 50.00 shovel Jake Doe 40 02/03/19 Brenda 950.00 81/20/20 てい Brown 10 Note: As a rule of thumb, we can't clearly tell whether this table is meant to contain data for "austomers" or for whenever it seems like a single table is showing too unch information

| DV 100 MM | my things | Cie. m this | s case. | "orders" | | | | | | |
|---|---|--|------------------------|---|---|--|--|--|--|--|
| our table is | s showing | both cus | tomer | | member: A table primarily | | | | | |
| details and | | | | <u>d</u> | shows data relevant | | | | | |
| indication | that it's | not in 201 | - and | | to one entity | | | | | |
| to be split | up into m | ultiple table | es. | 7 | | | | | | |
| | | | | | | | | | | |
| CUSTOMER | 2 | | | | | | | | | |
| customerID | FirstName | LastName | | Normalized to | | | | | | |
| | | Smith | | database we | ould now look | | | | | |
| | Jake | | | like: | | | | | | |
| 3_ | Brenda | Brown | | <u> </u> | | | | | | |
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| ORDER | | | | | | | | | | |
| OrderID | CustomerID | | Oty. | Price/unit | | | | | | |
| | t | 01/01/20 | <u>35</u> 0 | | Candybar | | | | | |
| 2 | 2 | 02/03/19 | 40 | | shovel | | | | | |
| 3 | 3 | 81/40/20 | 10 | 950.00 | てり | | | | | |
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| | 1 1 1 | <u> </u> | ••• | | | | | | | |
| 3NF : Attrib | utes are deter | wined ONLY 6 | ng the pri | many key | | | | | | |
| aka. All | attributes in o | a table vary ov | the pri | many key varies | | | | | | |
| | | | | 1 | | | | | | |
| Now lets cor | Now let's consider why our 2NF database violates 3NF | | | | | | | | | |
| | | | | | | | | | | |
| CUSTONIES | | | | | | | | | | |
| CUSTOMER | 2 | | | | | | | | | |
| customerD | 2 First-Name | LastName | | | | | | | | |
| customer ID | Eirst Name John | LastName Smith | | | | | | | | |
| customer ID 1 2 | First Name John Jake | LastName Smith Doe | | | | | | | | |
| customer ID | Eirst Name John | LastName Smith | | | | | | | | |
| customerID 1 2 3 | First Name John Jake | LastName Smith Doe | | | | | | | | |
| customerID 1 2 3 ORDER | First Name Tohn Take Brenda | CastName Smith Doe Brown | | | Product | | | | | |
| customerID 1 2 3 | First Name John Jake | LastName Smith Doe Brown | Qty. | Price/unit | Product | | | | | |
| customerID 1 2 3 ORDER | First Name Tohn Take Brenda Customer ID | CastName Smith Doe Brown Date 01/01/20 | Qty. | Price/unit | condybar | | | | | |
| customerID 1 2 3 ORDER OrderID 1 2 | First-Name Tohn Take Brenda Customer ID 1 | Cast Name Smith Doe Brown Date 01/01/20 02/03/19 | Oty. 35 40 | Price/unit 1.25 So.00 | condybar shovel | | | | | |
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| customerID 1 2 3 ORDER OrderID 1 2 | First-Name Tohn Take Brenda Customer ID 1 | Cast Name Smith Doe Brown Date 01/01/20 02/03/19 | Oty. 35 40 | Price/unit 1.25 So.00 | condybar shovel | | | | | |
| customerID 1 2 3 ORDER OrderID 1 2 | First-Name Tohn Take Brenda Customer ID 1 | Cast Name Smith Doe Brown Date 01/01/20 02/03/19 | Oty. 35 40 | Price/unit 1.25 50.00 950.00 | Coundybar shovel TV | | | | | |
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| 2 | 2 | | 3 3 | 12 | | |
| 3 | 3 | 05/04/18 | 10 | 13 | | |
| 3 | | 03/04/10 | | | | |
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| PRODUCT | | | | | | |
| Production | Price/uni | t Product | - | | | |
| 11 | 1.25 | Candi | | | | |
| 12 | 50.00 | show | | | | |
| 1.3 | 950.00 | 5 TV | | | | |
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