

## Let's Try: FDs

| A | B | C |
| :---: | :---: | :---: |
| 1 | aa | $x$ |
| 1 | aa | $x$ |
| 2 | bb | y |
| 2 | cc | y |
| 3 | bb | z |

Which of the following is functional dependency?
(a) $A \rightarrow B$
(b) $B \rightarrow C$
(c) $\mathrm{AB} \rightarrow \mathrm{C}$
(d) $A \rightarrow C$
(e) $C \rightarrow B$

## Example: Attribute Closure

```
Given R(A,B,C)
\[
\text { FDs }=\{A \rightarrow B, B \rightarrow C\}
\]
```

Compute the attribute closures for all attribute and combination of attributes. Then, think about what can inferred.

|  | $A$ | $B$ | $C$ | $A B$ | $A C$ | $B C$ | $A B C$ |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $A$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ |
| $B$ |  |  |  |  |  |  |  |
| $C$ |  |  |  |  |  |  |  |
| $A B$ |  |  |  |  |  |  |  |
| $A C$ |  |  |  |  |  |  |  |
| $B C$ |  |  |  |  |  |  |  |
| $A B C$ |  |  |  |  |  |  |  |


| Summary: attribute closure |
| :--- |
| $A+=A B C$ |
| $B+==$ |
| $C+==$ |
| $A B+=$ |
| $A C+==$ |
| $B C+=$ |
| $A B C+=$ |

## Example1: Computing F+

```
Given R(A,B,C,D,E)
```



```
Compute F+
```


## Example2: Computing F+

```
Given R(A,B,C,D,E)
```



```
Compute F+
```


## Example3: F+ to Candidate Key

Consider a relation Stocks(B, O, I, S, Q, D), whose attributes may be thought of informally as broker, office (of the broker), investor, stock quantity (of the stock owned by the investor), and dividend (of the stock). Let the set of FDs for Stocks be

FDs $=\{S \rightarrow D, I \rightarrow B, I S \rightarrow Q, B \rightarrow O\}$
List all candidate keys for the Stocks relation

