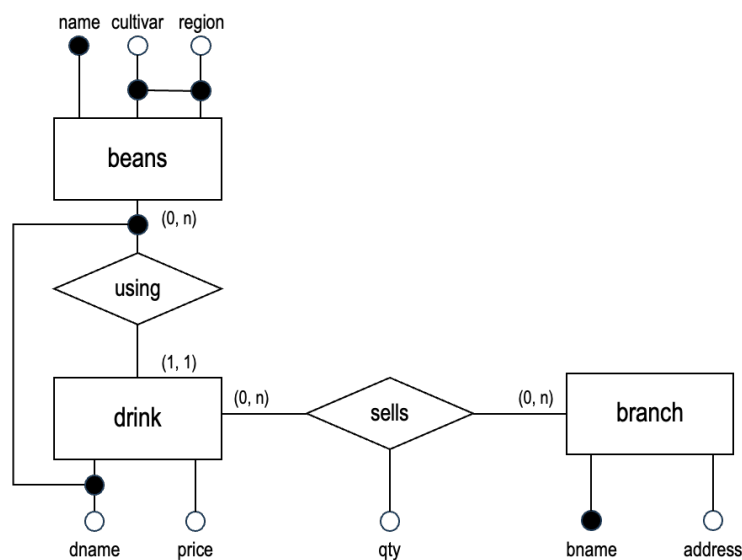


Tutorial: Functional Dependencies

- Consider the schema $R = \{A, B, C, D, E, F\}$ with a set of functional dependencies $\Sigma = \{\{A, B, C\} \rightarrow \{E\}, \{B, D\} \rightarrow \{A\}, \{C, F\} \rightarrow \{B\}\}$.
 - Compute $\{C, D, F\}^+$
 - Find all the candidate keys of R .
- Consider the schema $R = \{A, B, C, D\}$ with a set of functional dependencies $\Sigma = \{\{A\} \rightarrow \{C, D\}, \{A, C\} \rightarrow \{D\}, \{A, D\} \rightarrow \{B\}, \{C\} \rightarrow \{D\}\}$.
 - Find the minimal cover for Σ .
 - Find the canonical cover for Σ .
- Consider the following entity-relationship diagram regarding coffee shops. This involves the branch, the drink, and the coffee bean.



For simplicity, you may use the following characters to represent the attributes.

Attribute	Character
name	A
cultivar	B
region	C
dname	D

Attribute	Character
price	E
qty	F
bname	G
address	H

- (a) Find the attribute closure of $\{\mathbf{name}, \mathbf{dname}\}$. In other words, find $\{\mathbf{name}, \mathbf{dname}\}^+$.
- (b) Let Σ^+ be the closure of the set of functional dependencies that holds according to the entity-relationship diagram. We assume that we are using a single table but with the functional dependencies enforced (*e.g., via triggers?*). Find the canonical cover of Σ^+ .