

- Given $F = \{a \rightarrow b, \quad b \rightarrow c \quad c \rightarrow \{de\}\}$. What is the closure of b

The closure is $b^+ \rightarrow b, c, d, e$

- Given $R(a,b,c,d,e,f)$. Given the following functional dependency:
 $F = \{ ab \rightarrow cdef, \quad c \rightarrow abdef \}$.
 Identify the L M R, candidate keys, prime/non prime and normal form using the table below

L	M	R	Candidate Keys	prime	Non prime	Normal Form
	a	d	c	a	d	Second NF
	b	e	ab	b	e	
	c	f			f	

- Relation: $R(a, b, c, d, e, f)$
 - Functional dependencies: $ab \rightarrow cdef$
 $c \rightarrow abdef$
 - Finding candidate key: $a^+ = \{a\}$
 $b^+ = \{b\}$
 $c^+ = \{a, b, c, d, e, f\}$
 $ab^+ = \{a, b, c, d, e, f\}$
 - ab and c are primary keys.
 - Since, $ab \rightarrow c$ and $c \rightarrow d$ then the given relation is in second normal form.
- Given $R(a,b,c,d,e,f)$. Given the following functional dependency:
 $F = \{ ab \rightarrow cdef \quad c \rightarrow abdef \quad e \rightarrow a \}$.
 Identify the L M R, candidate keys, prime/non prime and normal form using the table below

L	M	R	Candidate Keys	prime	Non prime	Normal Form
	a	d	c	a	d	Second NF
	b	f	ab	b	f	
	c		be	e		
	e					

- Relation: $R(a, b, c, d, e, f)$
- Functional dependencies: $ab \rightarrow cdef$
 $c \rightarrow abdef$
 $e \rightarrow a$
- Finding candidate key: $a^+ = \{a\}$
 $b^+ = \{b\}$
 $c^+ = \{a, b, c, d, e, f\}$
 $ae^+ = \{a, e\}$
 $be^+ = \{b, e, a, c, d, f\}$
 - c , ab , and be are the candidate keys.
- Since, $ab \rightarrow c$ and $c \rightarrow d$ then the given relation is in second normal form.

4. Given $R(a,b,c,d,e,f,g)$. Given the following functional dependency:
 $F = \{ ab \rightarrow \{cdeg, \quad c \rightarrow abdef, \quad d \rightarrow b\}$
 Identify the L M R, candidate keys, prime/non prime and normal form using the table below

L	M	R	Candidate Keys	prime	Non prime	Normal Form
	a	e	c	a	e	First NF
	b	f	ab	b	f	
	c	g	ad	d	g	
	d					

- Functional dependencies: $a, b \rightarrow c, d, e, g$
 $c \rightarrow abdef$
 $d \rightarrow b$
- Finding candidate key:
 - $a^+ = \{a\}$
 - $b^+ = \{b\}$
 - $c^+ = \{a, b, c, d, e, f, g\}$
 - $d^+ = \{d, b\}$
 - $ab^+ = \{a, b, c, d, e, f, g\}$
 - $ad^+ = \{a, b, c, d, e, f, g\}$
 - $bd^+ = \{b, d\}$
 - \circ $c, ab,$ and ad are the candidate keys.
- By default, every relation is in the first normal because a table is said to be in first normal form if and only if each cell of the table contains the atomic value. Which means the given table is in first normal form.