**CSCI 3287**

**Spring 2016 Database System**

**Assignment 2**

**Exercise 3.7.1:** Use the chase test to tell whether each of the following dependencies hold in a relation R(A, B, C, D, E) with the dependencies A -» BC, B -> D, and C -» E.

Initial Table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |
| a | b1 | c1 | d | e |
| a | b1 | c | d1 | e |
| a | b | c | d | e |
| a | b | c | d1 | e |

A -» BC:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |
| a | b | c | d | e |
| a | b | c1 | d1 | e |
| a | b1 | c | d | e |
| a | b1 | c1 | d1 | e |

B -> D:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |
| a | b | c | d | e |
| a | b | c1 | d | e |
| a | b1 | c | d1 | e |
| a | b1 | c1 | d1 | e |

C -» E:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |
| a | b | c | d | e |
| a | b | c1 | d | e |
| a | b1 | c | d1 | e1 |
| a | b1 | c1 | d1 | e1 |

1. A -> D.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |
| a | b | c | d | e |
| a | b | c1 | d | e |
| a | b1 | c | d | e1 |
| a | b1 | c1 | d | e1 |

**Holds.**

All dependencies still apply to the table

1. A -» D.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |
| a | b | c | d | e |
| a | b | c1 | d | e |
| a | b1 | c | d1 | e1 |
| a | b1 | c1 | d1 | e1 |

Already **Holds.**

Value a in A already depends on d and d1 values in D.

1. A -> E.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |
| a | b | c | d | e |
| a | b | c1 | d | e |
| a | b1 | c | d1 | e |
| a | b1 | c1 | d1 | e |

**Doesn’t** Hold.

Dependency A -> E conflicts with dependency C -» E.

1. A -» E.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |
| a | b | c | d | e |
| a | b | c1 | d | e |
| a | b1 | c | d1 | e1 |
| a | b1 | c1 | d1 | e1 |

Already **Holds.**

Value a in A already depends on e and e1 values in E.

**Exercise 4.10.1:** Convert your ODL designs from the following exercises to relational database schemas.

a) Exercise 4.9.1.

Customers

(

firstName: string,

lastName: string,

address: string,

phone: string,

ssn: string,

accounts: list[integer]

)

Accounts

(

acctNo: integer,

acctType: string,

balance: integer

)

c) Exercise 4.9.3.

Team

(

teamName: string,

players: list[string],

teamCaptain: string,

teamColors: list[string]

)

Player

(

firstName: string,

lastName: string

)

Fan

(

firstName: string,

lastName: string,

favTeams: list[string],

favPlayers: list[string],

favColor: string

)

e) Exercise 4.9.5.

Person

(

firstName: string,

lastName: string,

mother: string,

father: string,

children: list[name: string],

education: list[string]

)