

# CSC343 Worksheet 12 Solution

June 30, 2020

1.
  - Keys
    - {id of molecule}
    - {x position, y position, z position}
  - Functional Dependencies
    - 1. id of molecule  $\rightarrow$  x position, y position, z position, x velocity, y velocity, z velocity
    - 2. x position, y position, z position  $\rightarrow$  id of molecule, x velocity, y velocity, z velocity

## Notes:

- Function Dependencies
  - *Functional Dependency* is a relationship between two attributes typically between the key and other non-key attributes within a table.

### Example:

SIN  $\rightarrow$  Name, Address, Birthdate

### Example 2:

ISBN  $\rightarrow$  Title

- Key of Relations
  - One or more attributes  $\{A_1, A_2, \dots, A_n\}$  is a key for a relation R if
    1. Those attributes functionally determine all other attributes of the relation
    2. No proper subset of  $\{A_1, A_2, \dots, A_n\}$  functionally determines all other attributes of R

### Example:

Given relation

$R = \text{Movies1}(\text{title, year, length, genre, studioName, starName})$

- i. {title, year, starName } form a key for the relation **Movies1**

- ii.  $\{ \text{year}, \text{starName} \}$  is not a key. Same star can be in multiple movies per year
- Superkeys
  - \* Means a set of attributes that contains a key
  - \* Don't need to be minimal

**Example:**

Given relation

$R = \text{Movies1}(\text{title}, \text{year}, \text{length}, \text{genre}, \text{studioName}, \text{starName})$

- $\{ \text{title}, \text{year}, \text{starName} \}$  is a key and superkey
- $\{ \text{title}, \text{year}, \text{starName}, \text{title}, \text{year}, \text{length} \}$  is a superkey

**References:**

1) OpenTextBC, Chapter 11 Functional Dependencies, [link](#)

2. a) **Notes:**

- The Splitting / Combining Rule
  - Combining Rule
  - Splitting Rule
    - \*  $A_1, A_2, \dots, A_n \rightarrow B_1, B_2, \dots, B_n$
    - $\Downarrow$
    - $A_1, A_2, \dots, A_n \rightarrow B_1, A_1, A_2, \dots, A_n \rightarrow B_2, \dots, A_1, A_2, \dots, A_n \rightarrow B_m$