

# Normalisation

i) Tours which are available at a given port

## UNF

PORT (port\_code, port\_name, country\_code, country\_name, (port\_temp\_month, port\_temp\_average\_high, port\_temp\_average\_low), (tour\_number, tour\_name, tour\_description, tour\_hours\_required, tour\_cost\_per\_person, tour\_wheel\_chair\_access, tour\_availability, tour\_start\_time))

## 1NF

PORT (port\_code, port\_name, country\_code, country\_name)

PORT\_TEMP (port\_temp\_month, port\_code, port\_temp\_average\_high, port\_temp\_average\_low)

PORT\_AVAILABLE\_TOUR (tour\_number, port\_code, tour\_name, tour\_description, tour\_hours\_required, tour\_cost\_per\_person, tour\_wheel\_chair\_access, tour\_availability, tour\_start\_time)

## Candidate keys

For PORT

- (port\_code)

For PORT\_TEMP

- (temp\_month, port\_code)

For PORT\_AVAILABLE\_TOUR

- (tour\_number, port\_code)
- (port\_code, tour\_name)

## Partial dependencies:

For PORT

- No partial dependencies present

For PORT\_TEMP

- No partial dependencies present

For PORT\_AVAILABLE\_TOUR

- No partial dependencies present

# Normalisation

## 2NF

PORT (port\_code, port\_name, country\_code, country\_name)

PORT\_TEMP (port\_temp\_month, port\_code, port\_temp\_average\_high, port\_temp\_average\_low)

PORT\_AVAILABLE\_TOUR (tour\_number, port\_code, tour\_name, tour\_description, tour\_hours\_required, tour\_cost\_per\_person, tour\_wheel\_chair\_access, tour\_availability, tour\_start\_time)

### Transitive dependencies:

#### For PORT

- country\_code -> country\_name

#### For PORT\_TEMP

- No transitive dependencies present

#### For PORT\_AVAILABLE\_TOUR

- No transitive dependencies present

## 3NF

PORT (port\_code, port\_name, country\_code)

PORT\_TEMP (port\_temp\_month, port\_code, port\_temp\_average\_high, port\_temp\_average\_low)

PORT\_AVAILABLE\_TOUR (tour\_number, port\_code, tour\_name, tour\_description, tour\_hours\_required, tour\_cost\_per\_person, tour\_wheel\_chair\_access, tour\_availability, tour\_start\_time)

COUNTRY (country\_code, country\_name)

## Full Dependency

port\_code -> port\_name, country\_code

port\_temp\_month, port\_code -> port\_temp\_average\_high, port\_temp\_average\_low

tour\_number, port\_code -> tour\_name, tour\_description, tour\_hours\_required, tour\_cost\_per\_person, tour\_wheel\_chair\_access, tour\_availability, tour\_start\_time

country\_code -> country\_name

# Normalisation

ii) Participants for a particular tour instance

## UNF

PORT\_TOUR (port\_code, tour\_number, tour\_name, tour\_date, tour\_start\_time, (passenger\_id, passenger\_name, passenger\_spoken\_language, cruise\_id, cruise\_name, payment\_received))

## 1NF

PORT\_TOUR (port\_code, tour\_number, tour\_date, tour\_name, tour\_start\_time)

PORT\_TOUR\_PARTICIPANT (passenger\_id, port\_code, tour\_number, tour\_date, cruise\_id, passenger\_name, passenger\_spoken\_language, cruise\_name, payment\_received)

## Candidate keys

For PORT\_TOUR

- (port\_code, tour\_number, tour\_date)

For PORT\_TOUR\_PARTICIPANT

- (passenger\_id, port\_code, tour\_number, tour\_date)

## Partial dependencies:

For PORT\_TOUR

- No partial dependencies present

For PORT\_TOUR\_PARTICIPANT

- passenger\_id -> passenger\_name, passenger\_spoken\_language

# Normalisation

## 2NF

PORT\_TOUR (port\_code, tour\_number, tour\_date, tour\_name, tour\_start\_time)

PORT\_TOUR\_PARTICIPANT (passenger\_id, port\_code, tour\_number, tour\_date, cruise\_id, cruise\_name, payment\_received)

PASSENGER (passenger\_id, passenger\_name, passenger\_spoken\_language)

### Transitive dependencies:

#### For PORT\_TOUR

- No transitive dependencies present

#### For PORT\_TOUR\_PARTICIPANT

- cruise\_id -> cruise\_name

#### For PASSENGER

- No transitive dependencies present

## 3NF

PORT\_TOUR (port\_code, tour\_number, tour\_date, tour\_name, tour\_start\_time)

PORT\_TOUR\_PARTICIPANT (passenger\_id, port\_code, tour\_number, tour\_date, cruise\_id, payment\_received)

PASSENGER (passenger\_id, passenger\_name, passenger\_spoken\_language)

CRUISE (cruise\_id, cruise\_name)

## Full Dependency

port\_code, tour\_number, tour\_date -> tour\_name, tour\_start\_time

passenger\_id, port\_code, tour\_number, tour\_date -> cruise\_id, payment\_received

passenger\_id -> passenger\_name, passenger\_spoken\_language

cruise\_id -> cruise\_name

# Normalisation

## Collected 3NF Relations

1. PORT (port\_code, port\_name, country\_code)
2. PORT\_TEMP (port\_temp\_month, port\_code, port\_temp\_average\_high, port\_temp\_average\_low)
3. PORT\_AVAILABLE\_TOUR (tour\_number, port\_code, tour\_name, tour\_description, tour\_hours\_required, tour\_cost\_per\_person, tour\_wheel\_chair\_access, tour\_availability, tour\_start\_time)
4. COUNTRY (country\_code, country\_name)
5. PORT\_TOUR (port\_code, tour\_number, tour\_date, tour\_name, tour\_start\_time)
6. PORT\_TOUR\_PARTICIPANT (passenger\_id, port\_code, tour\_number, tour\_date, cruise\_id, payment\_received)
7. PASSENGER (passenger\_id, passenger\_name, passenger\_spoken\_language)
8. CRUISE (cruise\_id, cruise\_name)

## Attribute Synthesis

1.

PORT (port\_code, port\_name, country\_code)

2.

PORT\_TEMP (port\_temp\_month, port\_code, port\_temp\_average\_high, port\_temp\_average\_low)

3. and 5.

PORT\_AVAILABLE\_TOUR (tour\_number, port\_code, tour\_name, tour\_description, tour\_hours\_required, tour\_cost\_per\_person, tour\_wheel\_chair\_access, tour\_availability, tour\_start\_time)

PORT\_TOUR (port\_code, tour\_number, tour\_date, tour\_name, tour\_start\_time)

Even though both relations do not have exactly the same key, they both represent the same entity. We could combine them as we would want to store **tour\_datetime** as a single attribute (composite of **tour\_date** and **tour\_start\_time**) as we would also be storing datetime as a single attribute in our logical model

### Combined Relation

PORT\_TOUR(port\_code, tour\_number, tour\_datetime, tour\_name, tour\_description, tour\_hours\_required, tour\_cost\_per\_person, tour\_wheel\_chair\_access, tour\_availability)

# Normalisation

4.

COUNTRY (country\_code, country\_name)

6.

PORT\_TOUR\_PARTICIPANT (passenger\_id, port\_code, tour\_number, tour\_date, cruise\_id, payment\_received)

7.

PASSENGER (passenger\_id, passenger\_name, passenger\_spoken\_language)

8.

CRUISE (cruise\_id, cruise\_name)