Assignment 1B – MonH Forms Normalisation

Form (i): Data used by clerks in establishing costings for quotes

UNF

PURPOSE (purpose_no, purpose_desc, (combo_code, truck_vin, truck_reg_no, trailer_code, trailclass_manufacturer, trailclass_model, trailclass_code, trailer_load_cap, trailer_dimensions))

1NF

PURPOSE (<u>purpose_no</u>, purpose_desc)

COMBO_PURPOSE (<u>purpose_no</u>, <u>combo_code</u>, truck_vin, truck_reg_no, trailer_code, trailclass_manufacturer, trailclass_model, trailclass_code, trailer_load_cap, trailer_dimensions)

Note: there are three candidate keys for the COMBO_PURPOSE relation: (purpose_no, combo_code), (purpose_no, truck_vin, trailer_code) and (purpose_no, truck_reg_no, trailer_code). All the partial dependencies below are based on all these candidate keys. The candidate key that is selected to be the primary key for the COMBO_PURPOSE relation is (purpose_no, combo_code).

Partial dependencies:

- combo_code → truck_vin, truck_reg_no, trailer_code, trailclass_manufacturer, trailclass_model, trailclass_code, trailer_load_cap, trailer_dimensions
- trailer_code → trailclass_manufacturer, trailclass_model, trailclass_code, trailer_load_cap, trailer_dimensions

Note: "truck_vin → truck_reg_no" is not a partial dependency because truck_reg_no is a key attribute (i.e., it is part of a composite candidate key).

2NF

PURPOSE (<u>purpose_no</u>, purpose_desc)

COMBO_PURPOSE (<u>purpose_no</u>, <u>combo_code</u>)

COMBO (<u>combo_code</u>, truck_vin, truck_reg_no, trailer_code)

TRAILER (<u>trailer_code</u>, trailclass_manufacturer, trailclass_model, trailclass_code, trailer_load_cap, trailer_dimensions)

Transitive dependencies:

- trailclass_manufacturer, trailclass_model → trailclass_code

Note: "truck_vin → truck_reg_no" is not a transitive dependency because truck_reg_no is a key attribute (i.e., it is part of a composite candidate key).

3NF

PURPOSE (<u>purpose_no</u>, purpose_desc)

COMBO_PURPOSE (<u>purpose_no</u>, <u>combo_code</u>)

COMBO (<u>combo_code</u>, truck_vin, truck_reg_no, trailer_code)

TRAILER (<u>trailer_code</u>, trailclass_manufacturer, trailclass_model, trailer_load_cap, trailer_dimensions)

TRAILERCLASS (<u>trailclass_manufacturer</u>, <u>trailclass_model</u>, trailclass_code)

Full dependencies:

- purpose_no → purpose_desc
- combo_code → truck_vin, truck_reg_no, trailer_code
- trailer_code → trailclass_manufacturer, trailclass_model, trailer_load_cap, trailer_dimensions
- trailclass_manufacturer, trailclass_model → trailclass_code

Form (ii): Company Job Sheet

UNF

JOB (job_no, quote_no, quote_prep_date, purpose_no, purpose_desc, quote_days_required, quote_cost, combo_code, driver_emp_no, driver_famname, driver_givname, mechanic_emp_no, mechanic_famname, mechanic_givname, job_pickup_datetime, job_intended_dropoff_datetime, job_actual_dropoff_datetime, job_cost, job_date_paid)

Note: since we know from the Assignment 1A brief that MonH records employee family and given names separately, this means that it is required to decompose the employee (driver and mechanic) name attributes in Form (ii) into family name and given name as part of the normalisation process.

1NF

JOB (<u>job_no</u>, quote_no, quote_prep_date, purpose_no, purpose_desc, quote_days_required, quote_cost, combo_code, driver_emp_no, driver_famname, driver_givname, mechanic_emp_no, mechanic_famname, mechanic_givname, job_pickup_datetime, job_intended_dropoff_datetime, job_actual_dropoff_datetime, job_cost, job_date_paid)

Partial dependencies:

- *No partial dependencies present*

2NF

JOB (<u>job_no</u>, quote_no, quote_prep_date, purpose_no, purpose_desc, quote_days_required, quote_cost, combo_code, driver_emp_no, driver_famname, driver_givname, mechanic_emp_no, mechanic_famname, mechanic_givname, job_pickup_datetime, job_intended_dropoff_datetime, job_actual_dropoff_datetime, job_cost, job_date_paid)

Transitive dependencies:

- quote_no → quote_prep_date, purpose_no, purpose_desc, quote_days_required, quote_cost

- purpose_no → purpose_desc
- driver_emp_no → driver_famname, driver_givname
- mechanic_emp_no → mechanic_famname, mechanic_givname

3NF

JOB (job_no, quote_no, combo_code, driver_emp_no, mechanic_emp_no, job_pickup_datetime, job_intended_dropoff_datetime, job_actual_dropoff_datetime, job_cost, job_date_paid)

QUOTE (quote_no, quote_prep_date, purpose_no, quote_days_required, quote_cost)

PURPOSE (purpose_no, purpose_desc)

DRIVER (driver_emp_no, driver_famname, driver_givname)

MECHANIC (mechanic_emp_no, mechanic_famname, mechanic_givname)

Full dependencies:

- job_no → quote_no, combo_code, driver_emp_no, mechanic_emp_no, job_pickup_datetime, job_intended_dropoff_datetime, job_actual_dropoff_datetime, job_cost, job_date_paid
- quote_no → quote_prep_date, purpose_no, quote_days_required, quote_cost
- purpose_no → purpose_desc
- driver_emp_no → driver_famname, driver_givname
- mechanic_emp_no → mechanic_famname, mechanic_givname

Attribute Synthesis:

Collected 3NF Relations

1. PURPOSE (purpose_no, purpose_desc)
2. COMBO_PURPOSE (purpose_no, combo_code)
3. COMBO (combo_code, truck_vin, truck_reg_no, trailer_code)
4. TRAILER (trailer_code, trailclass_manufacturer, trailclass_model, trailer_load_cap, trailer_dimensions)
5. TRAILERCLASS (trailclass_manufacturer, trailclass_model, trailclass_code)
6. JOB (job_no, quote_no, combo_code, driver_emp_no, mechanic_emp_no, job_pickup_datetime, job_intended_dropoff_datetime, job_actual_dropoff_datetime, job_cost, job_date_paid)
7. QUOTE (quote_no, quote_prep_date, purpose_no, quote_days_required, quote_cost)
8. PURPOSE (purpose_no, purpose_desc)
9. DRIVER (driver_emp_no, driver_famname, driver_givname)
10. MECHANIC (mechanic_emp_no, mechanic_famname, mechanic_givname)

Relations to Combine

- Relation 1 and Relation 8 (i.e., PURPOSE from Form (i) and PURPOSE from Form (ii)).
- Relation 9 and Relation 10 (i.e., DRIVER from Form (ii) and MECHANIC from Form (ii)), since they both represent company employees.

Final 3NF

PURPOSE (purpose_no, purpose_desc)

COMBO_PURPOSE (purpose_no, combo_code)

COMBO (combo_code, truck_vin, truck_reg_no, trailer_code)

TRAILER (trailer_code, trailclass_manufacturer, trailclass_model, trailer_load_cap, trailer_dimensions)

TRAILERCLASS (trailclass_manufacturer, trailclass_model, trailclass_code)

JOB (job_no, quote_no, combo_code, driver_emp_no, mechanic_emp_no, job_pickup_datetime, job_intended_dropoff_datetime, job_actual_dropoff_datetime, job_cost, job_date_paid)

QUOTE (quote_no, quote_prep_date, purpose_no, quote_days_required, quote_cost)

EMPLOYEE (emp_no, emp_famname, emp_givname)