1. Fire Event Report

UNF:

FIRE_EVENT (fire_event_id, fire_event_name, fire_event_Sdate, fire_event_LiLost, fire_event_Tdamage, (pro_id, building_id, building_class, dam_Bdamage_cost, Totally_destr, insurance_cov))

1NF:

FIRE_EVENT (fire_event_id, fire_event_name, fire_event_Sdate, fire_event_LiLost, fire_event_Tdamage)

BUILDING_DAMAGE (fire_event_id, pro_id, building_id, building_class, dam_Bdamage_cost, Totally_destr, insurance_cov)

Partial dependencies:

(pro_id, building_id)→ building_class, insurance_cov, Totally_destr

2NF:

FIRE_EVENT (fire_event_id, fire_event_name, fire_event_Sdate, fire_event_LiLost, fire_event_Tdamage)

BUILDING_DAMAGE (fire_event_id, pro_id, building_id, dam_Bdamage_cost)

BUILDING (pro_id, building_id, building_class, insurance_cov, Totally_destr)

Transitive dependencies:

No transitive dependency

3NF:

FIRE_EVENT (fire_event_id, fire_event_name, fire_event_Sdate, fire_event_LiLost, fire_event_Tdamage)

BUILDING_DAMAGE (fire_event_id, pro_id, building_id, dam_Bdamage_cost)

BUILDING (pro_id, building_id, building_class, insurance_cov, Totally_destr)

Full dependencies:

fire_event_id → fire_event_name, fire_event_date, fire_event_LiLost, fire_event_Tdamage

fire_event_id, pro_id, building_id → dam_cost

pro_id, building_id → building_class, insurance_cov, Totally_destr

final 3NF after rename (maintain relation name prefixes**):**

FIRE_EVENT (fire_event_id, fire_event_name, fire_event_Sdate, fire_event_LiLost, fire_event_Tdamage)

BUILDING_DAMAGE (fire_event_id, pro_id, building_id, dam_Bdamage_cost)

BUILDING (pro_id, building_id, building_class, building_insur_cov, building_Totally_destr)

2. Building Damage Assessment Visits

UNF:

ASSESSMENT_REPORT (pro_id, pro_addStreet, pro_addTown, pro_addPostcode, LGA_code, LGA_name, Building_id, LGA_Building_value, Building_class, fire_event_id, assessor_id, assessor_Gname, assessor_fname, (arrive_date, arrive_time, depart_date, depart_time))

1NF:

ASSESSMENT_REPORT (pro_id, Building_id, fire_event_id, pro_addStreet, pro_addTown, pro_addPostcode, LGA_code, LGA_name, LGA_Building_value, Building_class, assessor_id, assessor_Gname, assessor_Fname)

VISIT (pro_id, Building_id, arrive_date, arrive_time, depart_date, depart_time, fire_event_id)

Candidate key:

(pro_id, Building_id, arrive_date, arrive_time)

(pro_id, Building_id, depart_date, depart_time)

Partial dependencies:

pro_id → pro_addStreet, pro_addTown, pro_addPostcode, LGA_code, LGA_name

pro_id, Building_id → Building_class

2NF:

ASSESSMENT_REPORT (pro_id, Building_id, fire_event_id, assessor_id, assessor_Gname, assessor_Fname, LGA_Building_value)

VISIT (pro_id, Building_id, arrive_date, arrive_time, depart_date, depart_time, fire_event_id)

PROPERTY (pro_id, pro_addStreet, pro_addTown, pro_addPostcode, LGA_code, LGA_name)

BUILDING (pro_id, Building_id, Building_class)

Transitive dependencies:

assessor_id → assessor_Gname, assessor_Fname

LGA_code → LGA_name

3NF:

ASSESSMENT_REPORT (pro_id, Building_id, fire_event_id, assessor_id, LGA_Building_value)

VISIT (pro_id, Building_id, arrive_date, arrive_time, depart_date, depart_time, fire_event_id)

PROPERTY (pro_id, pro_addStreet, pro_addTown, pro_addPostcode, LGA_code)

BUILDING (pro_id, Building_id, Building_class)

ASSESSOR (assessor_id, assessor_Gname, assessor_Fname)

LGA (LGA_code, LGA_name)

Full dependencies:

pro_id, Building_id, fire_event_id → Building_class, assessor_id, LGA_Building_value

pro_id, Building_id, arrive_date, arrive_time → fire_event_id, depart_date, depart_time

pro_id → pro_addStreet, pro_addTown, pro_addPostcode, LGA_code

pro_id, Building_id → Building_class

assessor_id → assessor_Gname, assessor_Fname

LGA_code → LGA_name

final 3NF after rename (maintain relation name prefixes**):**

ASSESSMENT_REPORT (pro_id, Building_id, fire_event_id, assessor_id, asse_Building_value)

VISIT (pro_id, Building_id, Vi_arrive_date, Vi_arrive_time, Vi_depart_date, Vi_depart_time, fire_event_id)

PROPERTY (pro_id, pro_addStreet, pro_addTown, pro_addPostcode, LGA_code)

BUILDING (pro_id, Building_id, Building_class)

ASSESSOR (assessor_id, assessor_Gname, assessor_Fname)

LGA (LGA_code, LGA_name)

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Combine some relations in these two 3NF in order to consolidate logical model
*ASSESSMENT_REPORT in second form and BUILDING_DAMAGE in first form are the same relation
*BUILDING in first form and BUILDING in second form are the same relation

3NF after combination:

ASSESSMENT_DAMAGE (pro_id, Building_id, fire_event_id, asse_Bdamage_cost, asse_Building_value, assessor_id)

VISIT (pro_id, Building_id, Vi_arrive_date, Vi_arrive_time, Vi_depart_date, Vi_depart_time, fire_event_id)

PROPERTY (pro_id, pro_addStreet, pro_addTown, pro_addPostcode, LGA_code)

BUILDING (pro_id, Building_id, Building_class, building_insur_cov, building_Totally_destr)

ASSESSOR (assessor_id, assessor_Gname, assessor_Fname)

LGA (LGA_code, LGA_name)

FIRE_EVENT (fire_event_id, fire_event_name, fire_event_Sdate, fire_event_LiLost, fire_event_Tdamage)

Full dependencies:

pro_id, Building_id, fire_event_id → asse_Bdamage_cost, asse_Building_value, assessor_id
pro_id, Building_id, Vi_arrive_date, Vi_arrive_time → Vi_depart_date, Vi_depart_time, fire_event_id
pro_id → pro_addStreet, pro_addTown, pro_addPostcode, LGA_code
pro_id, Building_id → Building_class, building_insur_cov, building_Totally_destr
assessor_id → assessor_Gname, assessor_Fname
LGA_code → LGA_name
fire_event_id→ fire_event_name, fire_event_Sdate, fire_event_LiLost, fire_event_Tdamage
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