UNF
APPOINTMENT(dentist_no, dentist_name, patient_no,patient_name, country_code, country_name, app_datetime,
surgeryroom_no)

1NF
APPOINTMENT(dentist_no, dentist_name, patient_no,patient_name, country_code, country_name, app_datetime,
surgeryroom_no)

Candidate keys:
(dentist_no, app_datetime),
(patient_no, app_datetime) and
(surgeryroom_no, app_datetime)

Partial dependency
dentist_no → dentist_name
patient_no → patient_name

2NF
APPOINTMENT(dentist_no, patient_no, country_code, country_name, app_datetime, surgeryroom_no)
DENTIST (dentist_no, dentist_name)
PATIENT (patient_no, patient_name)

Transitive dependency
country_code → country_name

3NF
APPOINTMENT(dentist_no, patient_no, country_code, app_datetime, surgeryroom_no)
DENTIST (dentist_no, dentist_name)
PATIENT (patient_no, patient_name)
COUNTRY (country_code, country_name)

Full dependency
dentist_no, app_datetime → patient_no, country_code,, surgeryroom_no
dentist_no → dentist_name
patient_no→ patient_name
country_code → country_name

5.2 Multiple Forms Normalisation -- Part 1

1st Form (Units currently approved)

UNF

UNIT(Unit_no, Unit_name, Unit_desc, Unit_value)

1NF

UNIT(Unit_no, Unit_name, Unit_desc, Unit_value)

Partial dependency

No partial dependency

2NF

UNIT(Unit_no, Unit_name, Unit_desc, Unit_value)

Transitive dependency

No transitive dependency

3NF

UNIT(Unit_no, Unit_name, Unit_desc, Unit_value)

Full dependency

Unit_no → Unit_name, Unit_desc, Unit_value

2nd Form

UNF

LECTURER(lecturer_no, lecturer_name, lecturer_office, lecturer_phone,(unit_no, unit_name))

1NF

LECTURER(lecturer_no, lecturer_name, lecturer_office, lecturer_phone)

ADVISE(unit_no, unit_name, lecturer_no)

Partial dependencies:

unit_no → unit_name

2NF

LECTURER(lecturer_no, lecturer_name, lecturer_office, lecturer_phone)

ADVISE(unit_no, lecturer_no)

UNIT (unit_no, unit_name)

Transitive dependency

No transitive dependency

3NF

LECTURER(lecturer_no, lecturer_name, lecturer_office, lecturer_phone)

ADVISE(unit_no, lecturer_no)

UNIT (unit_no, unit_name)

Full dependency
lecturer_no → lecturer_name, lecturer_office, lecturer_phone
unit_no → unit_name

3rd form
UNF

STUDENT(stud_no, stud_name, stud_address, course_enrolled, study_mode, lecturer_no, lecturer_name,(unit_no, unit_name, year, semester, grade))

1NF
STUDENT(stud_no, stud_name, stud_address, course_enrolled, study_mode, lecturer_no, lecturer_name)
RECORD (unit_no, unit_name, year, semester, grade, stud_no)

Candidate keys
(stud_no,unit_no,year,semester)

Partial Dependency
unit_no → unit_name

2NF
STUDENT(stud_no, stud_name, stud_address, course_enrolled, study_mode, lecturer_no, lecturer_name)
RECORD(unit_no, year, semester, grade, stud_no)
UNIT(unit_no, unit_name)

Transitive Dependency
lecturer_no → lecturer_name

3NF
STUDENT(stud_no, stud_name, stud_address, course_enrolled, study_mode, lecturer_no)
RECORD(unit_no, year, semester, grade, stud_no)
UNIT(unit_no, unit_name)
LECTURER(lecturer_no, lecturer_name)

Full Dependency
stud_no →, stud_name, stud_address, course_enrolled, study_mode, lecturer_no
stud_no, unit_no, year, semester → grade
unit_no →, unit_name
lecturer_no → lecturer_name

5.3 Multiple Forms Normalisation -- Part 2
3NF COLLECTIONS

1. UNIT(Unit_no, Unit_name, Unit_desc, Unit_value)
2. LECTURER(lecturer_no, lecturer_name, lecturer_office, lecturer_phone)
3. ADVISE(unit_no, lecturer_no)
4. UNIT (unit_no, unit_name)
5. STUDENT(stud_no, stud_name, stud_address, course_enrolled, study_mode, lecturer_no)
6. RECORD(unit_no, year, semester, grade, stud_no)
7. UNIT(unit_no, unit_name)
8. LECTURER(lecturer_no, lecturer_name)

Attribute Synthesis

1, 4 & 7
UNIT(Unit_no, Unit_name, Unit_desc, Unit_value)

2 & 8
LECTURER(lecturer_no, lecturer_name, lecturer_office, lecturer_phone)

3
ADVISE(unit_no, lecturer_no)

5
STUDENT(stud_no, stud_name, stud_address, course_enrolled, study_mode, lecturer_no)

STUDENT(stud_no, stud_name, stud_address, stud_course_enrolled, stud_study_mode, lecturer_no)
*use correct prefix
6
RECORD(unit_no, year, semester, grade, stud_no)

RECORD(unit_no, rec_year, rec_semester, rec_grade, stud_no)
*use correct prefix

Next, draw logical diagram.

5.3 Multiple Forms Normalisation -- Part 2

UNF
PROPERTY(prop_no, prop_add, owner_no, owner_given_name, owner_fam_name, owner_add, (maint_datetime, maint_desc, maint_cost))

1NF
PROPERTY(prop_no, prop_add, owner_no, owner_given_name, owner_fam_name, owner_add)
MAINTENANCE(maint_datetime, prop_no, maint_desc, maint_cost)

(NOTE: There is only a single maintenance for each property at a particular date and time.)

Partial dependency
No partial dependency

2NF
PROPERTY(prop_no, prop_add, owner_no, owner_given_name, owner_fam_name, owner_add)
MAINTENANCE(maint_datetime, prop_no, maint_desc, maint_cost)

Transitive dependencies:
owner_no → owner_given_name, owner_fam_name, owner_add

3NF
PROPERTY(prop_no, prop_add, owner_no)
MAINTENANCE(maint_datetime, prop_no, maint_desc, maint_cost))
OWNER(owner_no, owner_given_name, owner_fam_name, owner_add)

Full dependency:
prop_no ->prop_add, owner_no
maint_datetime, prop_no -> maint_desc, maint_cost
owner_no -> owner_given_name, owner_fam_name, owner_add

UNF
RENT(prop_no, prop_address, lease_start_date, weekly_rental_rate, bond, tenant_no, tenant_givname, tenant_famname, (pay_no, pday_date, pay_type, pay_amount, pay_by))

1NF

RENT(prop_no, prop_address, lease_start_date, weekly_rental_rate, bond, tenant_no, tenant_givname, tenant_famname)
PAYMENT(pay_no, pay_date, pay_type, pay_amount, pay_by, prop_no, lease_start_date)

Candidate Key
prop_no, prop_lease_start_date
pay_no

Partial Dependency
prop_no -> prop_address

2NF
RENT(prop_no, prop_address, lease_start_date, weekly_rental_rate, bond, tenant_no, tenant_givname, tenant_famname)
PROPERTY(prop_no, prop_address)
PAYMENT(pay_no, pay_date, pay_type, pay_amount, pay_by, prop_no, lease_start_date)

Transitive Dependency
tenant_no → tenant_givname, tenant_famname

3NF
RENT(prop_no, prop_address, lease_start_date, weekly_rental_rate, bond)
PROPERTY(prop_no, prop_address)
TENANT(tenant_no, tenant_givname, tenant_famname)
PAYMENT(pay_no, pay_date, pay_type, pay_amount, pay_by, prop_no, lease_start_date)

Full Dependency
prop_no, prop_address, prop_lease_start_date → prop_weekly_rental_rate, prop_bond
prop_no → prop_address
tenant_no → tenant_givname, tenant_famname
pay_no → pay_date, pay_type, pay_amount. pay_by, prop_no, lease_start_date

3NF COLLECTIONS
1. PROPERTY(prop_no, prop_add, owner_no)
2. MAINTENANCE(maint_datetime, prop_no, maint_desc, maint_cost))
3. OWNER(owner_no, owner_given_name, owner_fam_name, owner_add)
4. RENT(prop_no, prop_address, prop_lease_start_date, prop_weekly_rental_rate, prop_bond)
5. PROPERTY(prop_no, prop_address)
6. TENANT(tenant_no, tenant_givname, tenant_famname)
7. PAYMENT(pay_no, pay_date, pay_type, pay_amount, pay_by, prop_no, lease_start_date)

ATTRIBUTE SYNTHESIS

1, 5
PROPERTY(prop_no, prop_add, owner_no)

2
MAINTENANCE(maint_datetime, prop_no, maint_desc, maint_cost)

3
OWNER(owner_no, owner_given_name, owner_fam_name, owner_add)

4
RENT(prop_no, prop_address,lease_start_date, weekly_rental_rate, bond)

RENT(prop_no, prop_address, rent_lease_start_date, rent_weekly_rental_rate, rent_bond)
*use correct prefix
6
TENANT(tenant_no, tenant_givname, tenant_famname)

7
PAY(pay_no, pay_date, pay_type, pay_amount, pay_by, prop_no, lease_start_date)