IFB105 - WEEK 5

NORMALIZATION

RAW DATA
+ SEMANTICS

INFORMATION

CONCEPTUAL MODEL [ORM]

R-MAPPING

RELATIONAL SCHEMA

SQL

↓ FLAT FILE (EXCEL SHEET)

PERSON	PRODUCT	PRICE	INVOICE ...

Problems?
- Redundancy ✓
- loss of info ✓
- Inconsistency in info ✓

NORMALISATION

→ the output is already in 3rd NF

Full functional dependencies?

→ An attribute is fully functional dependent if you can find that attribute just by knowing the PK.

StuNo	StuNAME	StuDoB	degree	Faculty	SubjectNo	Result
1	John	05/06/90	MEDICINE	Science	A	7
1	-	-	-	-	B	6
-						
-						

Fully Functional Dependencies

- StudentNAME → StuNb
- StuDof → StuNo
- DeGree → StuNO
- faculty → StuNO

PARTIAL FUNCTIONAL DEPENDENCY

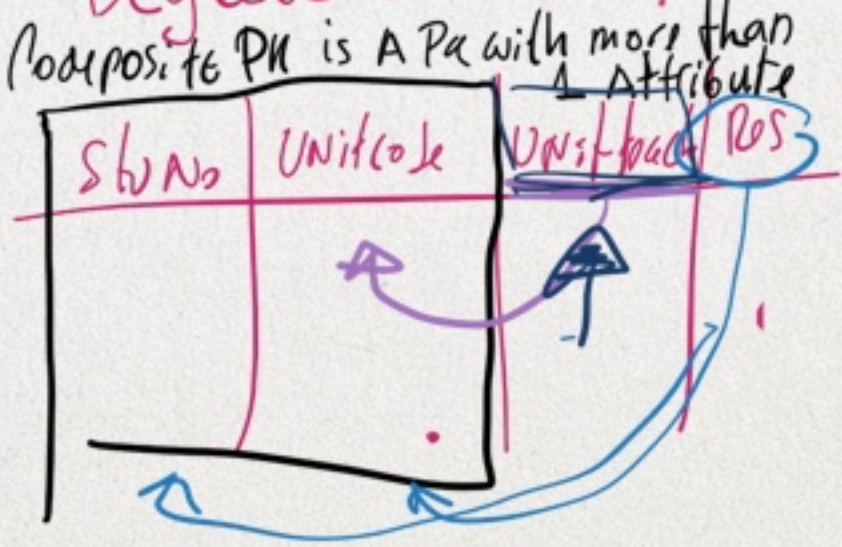
UnitTeacher → Unitcode

transitive dependencies
↓
(dependent ON NON PK)

Result → Subject

Subject → DEGREE

DEGREE → FACULTY



PK: { stuNo } other: NAME, Address..

SINGLE PK

PK: { stuNo, UnitCode } NAMEStu, UnitNAME, totalMark ...

PK: { stuNo, Unitcode, Faculty } ...

Composite PK ← PARTIAL FUNCTIONAL DEPENDENCY

NORMALIZATION:
(trying to MAKE our DB Efficient by
REMOVING REDUNDANCY, INFO LOSS, AND INCONSIS..)

IN this UNIT we COVER 3 NORMALISATION FORMS.

1NF:

- EACH TABLE MUST HAVE PK. ✓ Roll No
- SINGLE VALUED Attributes. (Atomic Attributes) ✗
- UNIQUE NAMES FOR ATTRIBUTES ✓
  - Attribute = COLUMN

→ TABLE is NOT is 1NF!

⚠ IF SINGLE VALUED Attributes are violated then you will NEED to UPDATE the PK

→ WHAT HAPPENS IF YOUR TABLE DOES NOT HAVE A PK?

2NF

A table is in 2NF if:

- It needs to be in 1NF
- It cannot have Partial Dependencies

2 Catarina's Partial Dependency method:

Pk: ? student_id, subject_id ?

For each Attribute that is not a Pk Ask:

- Is marks dependent on student_id? ✓
- " " " " subject_id? ✓

Conclude: marks are fully dependent on PK!

- Is teacher " " student_id? ✗
- " " " " subject_id? ✓

Conclude: teacher is Partial dependent PK. !!

- Is subject_name " " student_id? ✗
- " " " " subject_id? ✓

Subject_name is Partial Dependent PK !!

3NF.

A table is in 3NF if:

- it is in 2NF
- there are no transitive dependencies ✗

CATARINA's METHOD:

PK: {student_id}

NON PK: {name, reg_no, branch, address}

For each attribute that is not a PK ask:

- Is NAME dependent on reg_no? No ✓
  " " " " BRANCH? No ✓
  " " " " ADDRESS? No ✓
- Is reg_no dependent on NAME? ✓

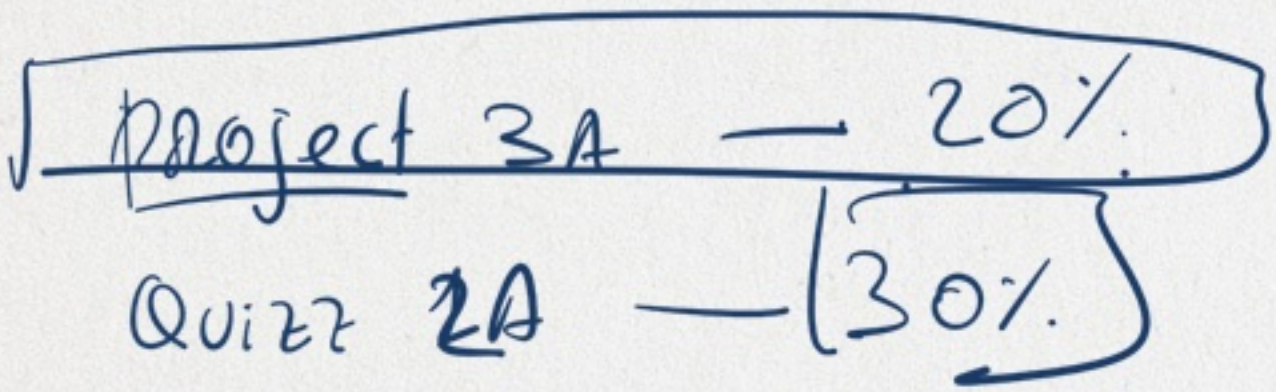
→ there are no transitive dependencies on student

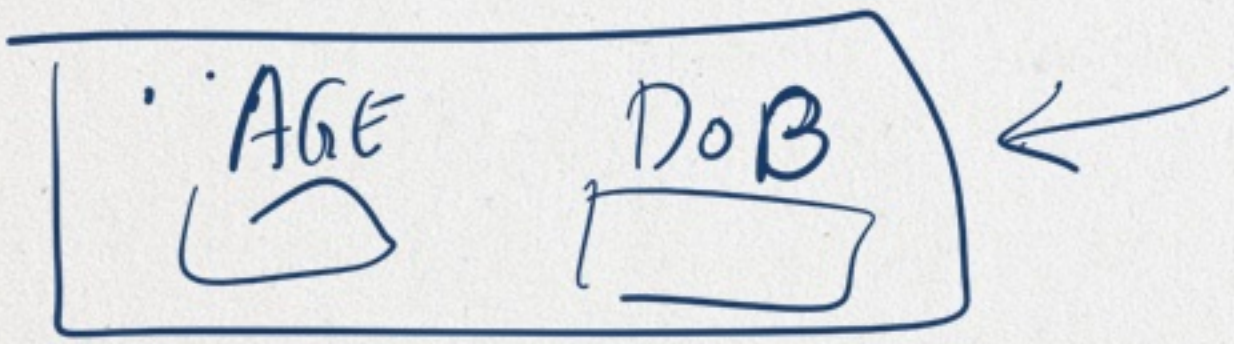
Street name	Postcode
123 whatever st	4107
125 whatever st	4107

4207

Address ⟶ Postcode

- Is MARKS dependent on EXAM_NAME? No
- Is [redacted] " " total_MARKS? No
- EXAM NAME dependent on totalMARKS? /
- Is total MARKS dependent on EXAM_NAME? Yes!!





TRANSITIVE DEPENDENCIES

? BRANCHNO, BRANCH Address, telNo ?

STAFF TABLE

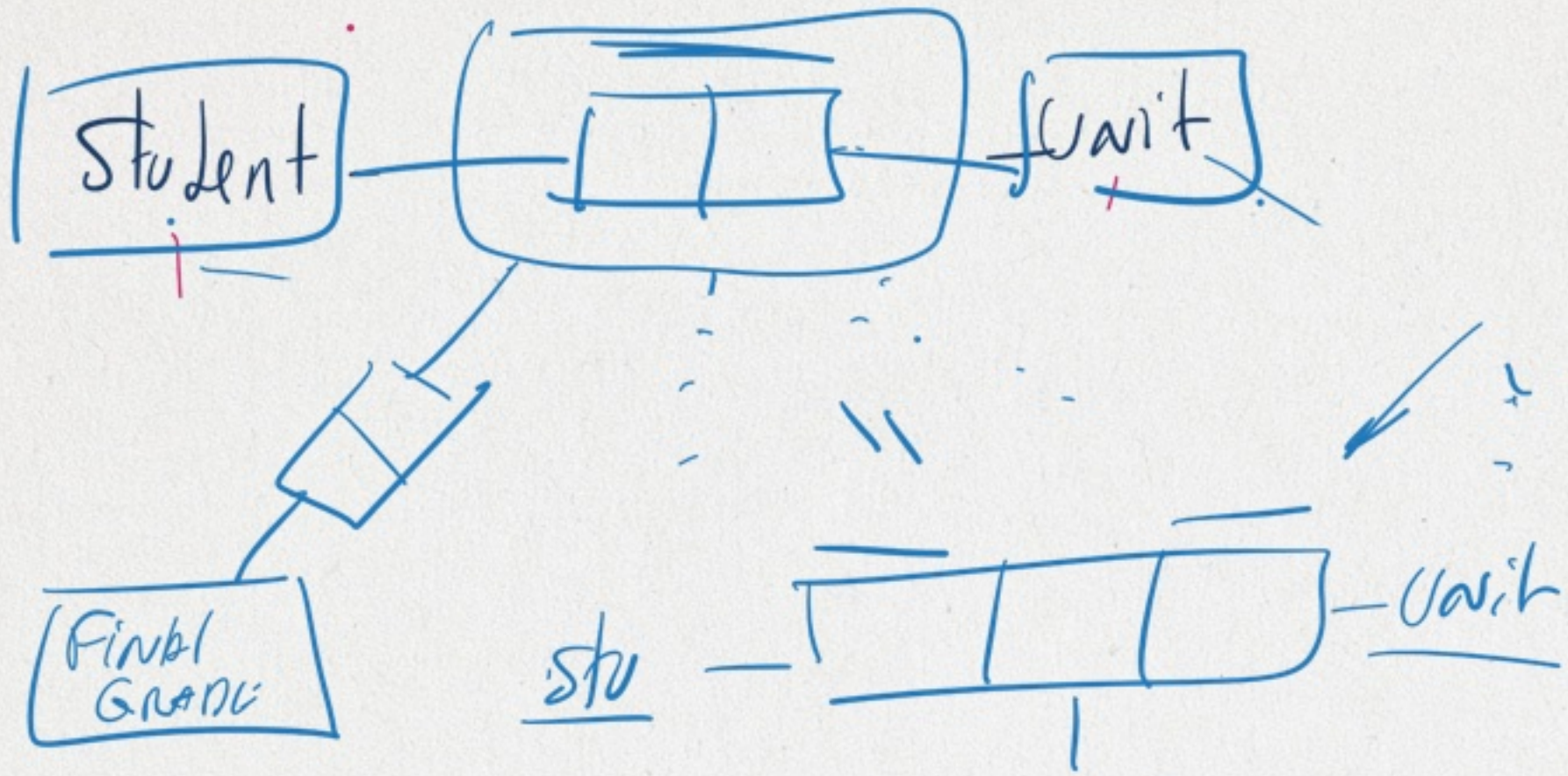
FK

STAFFNO	NAME	POSITION	SALARY	BRANCHNO

BRANCH TABLE

BRANCH_NO	Address	telNo

Nested Fact type



Student_id	Unit	Final Grade
1	IFB105	7
1	IFB104	6

Student id	Unit	Final Grade	Exam Grade	Project Grade
1	IFB105	7	Quiz 5	Project 3A 7
1	IFB104	7	Quiz 6	Project 3B 6