CPS 510: Assignment 8

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Located at the top of each table section is a table that includes all of the table attributes.
PK - Primary key
U - Unique
F - Foreign

Converting all tables to proper 3NF/BCNF Normalization.

Student Table(Candidate Key -> BCNF):

SIN (U)	Student_number (PK)	U o G	First_ name	Last_ name	Phone_ number	indig	Citizenship	Disability

Includes a primary key of Student_number and a unique identifier SIN#

Step 1 and Step 2:

Functional Dependencies of Student Table:

Student_number -> SIN, UoG, firstname, last name, phone number, indig, citizenship, disability

Step 3 and Step 4:

After normalisation to BCNF:

Candidate Keys: {Student_number, SIN}

SIN (U)	Student_number (PK)	U o G	First_ name	Last_ name	Phone_ number	indig	Citizenship	Disability

Functional dependencies: Student_number -> SIN, UoG, firstname, last name, phone number, indig, citizenship, disability

SIN (U)	Student_number (PK)	U o G	First_ name	Last_ name	Phone_ number	indig	Citizenship	Disability

Functional dependencies: SIN -> UoG, firstname, last name, phone number, indig, citizenship, disability, Student_number

Since SIN -> UoG, firstname, last name, phone number, indig, citizenship, disability, is a subset of the first table, we can eliminate it resulting in:

SIN (U)	Student_number (PK)	UoG	First_ name	Last_ name	Phone_ number	indig	Citizenship	Disability

Functional dependencies: Student_number -> SIN, UoG, firstname, last name, phone number, indig, citizenship, disability

Transaction Table (Candidate Key -> 3NF):
Done with Bernstein's algorithm

Student_number (PK)	TID(U)	TAmount	Tdesc	Tterm	Tdate

Includes a primary key relationship of student number to the Table student, with a unique transaction ID.

Step 1 and Step 2:
Functional Dependencies of Transaction Table:
Student_number -> TID, TAmount, Tdesc, Tterm, tdate

Step 3 and Step 4:
After normalisation to 3NF:
Candidate Keys: {Student_number, TID}
STrans table

Student_number (PK)	TID(U)	TAmount	Tdesc	Tterm	Tdate

Functional dependencies: Student_number -> TID, TAmount, Tdesc, Tterm, tdate

Transaction table

Student_number (PK)	TID(U)	TAmount	Tdesc	Tterm	Tdate

Functional dependencies: TID -> Student_number, TAmount, Tdesc, Tterm, Tdate

Since TID -> TAmount, Tdesc, Tterm, Tdate is a subset of the first table the relationship breaks down into:

Final Table

Student_number (PK)	TID(U)	TAmount	Tdesc	Tterm	Tdate

Functional dependencies: Student_number -> TID, TAmount, Tdesc, Tterm, tdate

Addresses Table:

Student_number (PK)	Address	City	Prov	Country	Postal

Includes primary key of student number references student table.
Functional Dependencies of Addresses Table:
Student_number -> city, prov, country, postal, address

Course Table:

Course_number(PK)	Course_name	Credits

Includes a primary key Course number
Functional Dependencies of Course Table:
Course_number -> Course_name, Credits

Section Table(Transitive -> 3NF):

Course_number	Instructor	Section_number (PK)	SYear	Sterm

Includes a reference to course number, and also a primary key of section number
Functional Dependencies of Section Table:
Course_number -> Section _number
Section_number -> Instructor, Syear, Sterm

After normalisation to 3NF:

Course_number	Section_number (PK)

Functional dependencies: Course_number -> Section _number

Section_number (PK)	Instructor	SYear	Sterm

Functional dependencies: Section_number -> Instructor, Syear, Sterm

Department Table: (Transitive -> 3NF)

Course_number (PK)	Dhead	Dphone	Demail	Dname	Doffice

Includes a primary key reference of course number.
Functional Dependencies of Department Table:
Course_number -> Dname
Dname -> Dhead, Dphone, Demail, Doffice

After normalisation to 3NF:

Course_number (PK)	Dname

Functional dependencies: Course_number -> Dname

Dname	Dphone	Demail	Dhead	Doffice

Functional dependencies: Dname -> Dhead, Dphone, Demail, Doffice

Registered Table: (Transitive -> 3NF)

Student_number	Course_number	Section_number

Includes a relationship between all of the main keys, section number, course number and student number.

Compound Primary keys (Student_number, Course_number, Section_number)

Functional Dependencies of Registered Table:

Student_number -> Course_number

Course_number -> Section _number

Student_number -> Section_number

After normalization to 3NF:

Registered table:

Student_number (PK)	Course_number (F)

Functional dependencies: Student_number -> Course_number

Sections table:

Course_number (PK)	Section_number

Functional dependencies: Course_number -> Section_number

Undergrad Table:

Student_number(U)	UoG	Udegree

Includes a unique reference to the student number.
Functional Dependencies of Undergrad Table:
Student_number -> UoG, Udegree

Graduate Table:

Student_number (U)	UoG	GDegree	Gphone	Goffice

Includes a unique key reference to the student number.
Functional Dependencies of Graduate Table:
Student_number -> UoG, GDegree, GPhone, GOffice

SDegree Table:

Student_number(PK)	UDegree	School

Includes a primary key reference to student number
Functional Dependencies of SDegree Table:
Student_number -> UDegree, School

Documents Table:

Student_number(U)	Enrollment	Transcript	TransferCredits

Includes a unique reference to the student number.
Functional Dependencies of Documents Table:
Student_number -> Enrollment, Transcript, TransferCredits