# ER Diagram

# 

# Part 1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Student Table | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| WIN | First\_Name | Last\_Name | Sex | BOD | Major | Lavel | Current\_city | C\_Zip\_code | C\_State | Permenet\_city | P\_Zip\_code | P\_State | C\_Phone | P\_Phone | coures\_number | grade |

Course table

|  |  |  |  |
| --- | --- | --- | --- |
| **Course\_number** | name | description | department\_id |

Section Table

|  |  |  |  |
| --- | --- | --- | --- |
| **Section\_number** | Semester | year | course\_number |

Department\_ table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Department\_code** | Name | mani\_building | room\_number | college | Office\_phone |

Instructor\_table

|  |  |  |  |
| --- | --- | --- | --- |
| **WIN** | First\_Name | Last\_name | Department\_code |

1. Student\_table

CREATE TABLE Student (  
    WIN int NOT NULL, First\_Name String,Last\_Name String,Sex String,P\_Zip\_code int,

P\_State String,C\_Phone String ,P\_Phone String ,coures\_number String,grade String,BOD DATE,

MajorLavel String, Current\_city String .C\_Zip\_code String,C\_State String,

Permenet\_city String

    PRIMARY KEY (WIN),  
      
);

02. Course table

CREATE TABLE Course (  
    Course\_number int NOT NULL, Name String,Description String, department\_id int

    PRIMARY KEY (Course\_number),

CONSTRAINT department\_id FOREIGN KEY (**Department\_code**)  
    REFERENCES Department(**Department\_code**)  
      
);

**03.** Section Table

CREATE TABLE **Section** (  
    **Section\_number** int NOT NULL, Semester String, year DATE, co\_number int

PRIMARY KEY (**Section\_number**),CONSTRAINT co\_number FOREIGN KEY (Course\_number)  
    REFERENCES Department(Course\_number)      
);

04. Department\_ table

CREATE TABLE **Section** (  
    **Department\_code** int NOT NULL, Name String, mani\_building int, room\_number int , college string , Office\_phone string

PRIMARY KEY (**Department\_code**)  
);

05. Instructor table

CREATE TABLE Instructor (  
    WIN int NOT NULL, Department\_code NOT NULL, First\_Name String, Last\_Name String

    PRIMARY KEY (WIN),

CONSTRAINT department\_id FOREIGN KEY (**Department\_code**)  
    REFERENCES Department(**Department\_code**)

Part 2

# 1. C → D, C → A, B → C

i. Candidate keys: B

ii. R is in 2NF but not 3NF

iii. C → D, and C → A both cause violations of BCNF. One way to obtain a

(lossless) join preserving decomposition is to decompose R into AC, BC, and CD

# 2. B → C, D → A

i. Candidate keys: BD

ii. R is in 1NF but not 2NF

iii. Both B → C, and D → A cause BCNF violations. One possible decomposition: AD, BC, BD is BCNF and lossless and join-preserving

# (c) ABC → D, D → A

i. Candidate keys: ABC, BCD

ii. R is in 3NF but not BCNF

iii. No BCNF decomposition.

# (d) A → B, BC → D, A → C

i. Candidate keys: A

ii. R is in 2NF but not 3NF

iii. BC → D violates BCNF, split up R as in: BCD, ABC