

CSE 370– Database Systems

Assignment 3

Summer 2024

Marks

Full Name (in Block Letter): _____

ID: _____ **Section:** ____ **Signature:** _____

Date: _____ **Total Marks: 20**

Question 1:

[1+4+5 = 10 marks]

Course_Offering (Course_code, Section_no, Semester, Course_title, Department, Credits, Coordinator_initial, Coordinator_name, Coordinator_email, Slot, Room_no, Building_no, Capacity, Total_students)

The primary key of the relation is underlined. The relation has the following additional functional dependencies (FDs):

FD1: Course_code → Department, Credits, Course_title

FD2: Course_code, Semester → Coordinator_initial, Coordinator_name, Coordinator_email

FD3: Coordinator_initial → Coordinator_Name, Coordinator_email

FD4: Building_no, Room_no → Capacity

- Explain** if the above relation is in the first normal form (1NF) or not? If not, **apply** 1NF normalization.
- Explain** if the relation(s) of no (a) is/are in the second normal form (2NF) or not? If not, **apply** 2NF normalization.
- Explain** if the relation(s) of no (b) is/are in the third normal form (3NF) or not? If not, **apply** 3NF normalization.

Question 2:

[10 marks]

Construct a B+ tree of order $n = 3$ for the following search key values inserted in the given order: **9, 5, 11, 15, 39, 29, 22, 30, 4, 27, 8, 52**. Each time there is a split, **a new B+ tree must** be drawn.

Question 3:

[10 marks]

Construct a B+ tree of order $n = 4$ for the following search key values inserted in the given order: **9, 5, 11, 15, 39, 29, 22, 30, 4, 27, 8, 52**. Each time there is a split, **a new B+ tree must** be drawn.