UNIVERSITY *of* LIMERICK

O L L S C O I L   L U I M N I G H

COLLEGE *of* INFORMATICS *and* ELECTRONICS

Department of Computer Science & Information Systems

EXAMINATION

MAY 2004

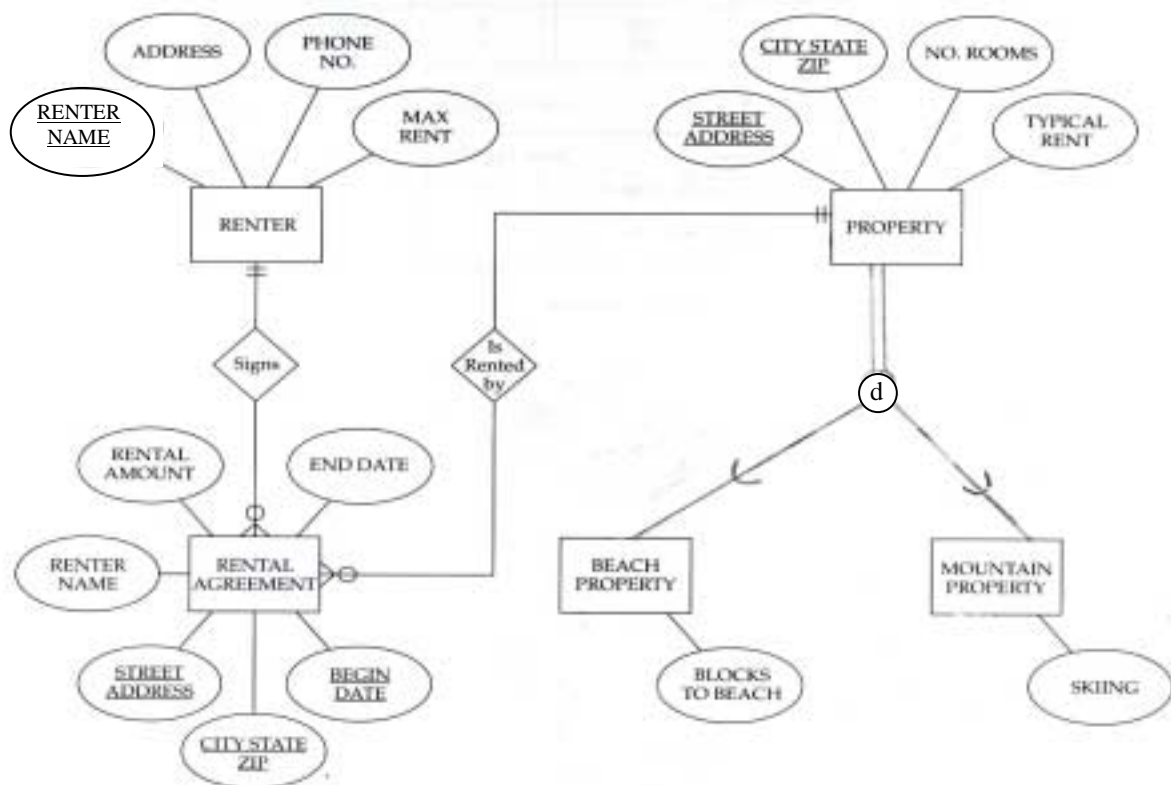|	
INSTRUCTIONAL OFFERING (SUBJECT):	Database Systems
SUBJECT CODE:	CS4416
DURATION:	2.5 hours
TOTAL MARKS:	100
NUMBER OF QUESTIONS:	5
NUMBER OF PAGES:	10
EXAMINER:	S. Zheleva

INSTRUCTIONS / REQUIREMENTS:

ANSWER ALL QUESTIONS

WRITE INTELLIGIBLY

HAND IN THE QUESTION PAPER TOGETHER WITH YOUR ANSWER BOOK

QUESTION ONE (44 MARKS max)

Multiple choice questions

QUESTION TWO (13 MARKS)

Presented below is a conceptual data model for Vocation Property Rentals.

2.1.   Transform this Entity-Relationship diagram into a set of relations.   (12)

2.2.   State in what (highest) Normal Form these relations are?   (1)

QUESTION THREE (25 MARKS)

The shorthand representation of a database for a construction company is provided as follows:

WORKER (<u>WORKER-ID</u>, WORKER-NAME, HOURLY-RATE, SKILL-TYPE, SUPERVISOR-ID)

BUILDING (<u>BLDG-ID,</u> BLDG-ADDRESS, TYPE, QUALITY-LEVEL, STATUS)

ASSIGNMENT (<u>WORKER-ID, BLDG-ID</u>, START-DATE, NUM-DAYS)

Using this representation, write SQL commands to perform the following operations:

3.1.   For each supervisor managing more than one worker, list the supervisor's ID and the
        highest hourly wage paid to a worker reporting to this supervisor.   (5)

3.2.   List the IDs of all buildings that are of type 'Office' or those that have worker 1312
        assigned to them.   (5)

3.3.   Increase by 5% the hourly rate of every employee who is working for supervisor 1670.
                                                                                               (4)
3.4.   Define a view called ELEC-ASSIGNMENT. It should contain the name of the workers
        with electrical skills, the IDs of buildings they are assigned to, and the starting date of the
        assignment.   (6)

3.5.   Create an index called SUPERVIND on the combination of SUPERVISOR-ID and
        WORKER-NAME in descending order for the table WORKER.   (3)

3.6.   Find the data type of the column called SKILL-TYPE.   (2)

QUESTION FOUR (4 MARKS)

*"A data warehouse is a **subject-oriented**, **integrated**, **time-variant**, **nonvolatile** collection of data
in support of management's decision-making process."*

                                                                                W. H. Inmon (1990)
 Explain the meaning of each term (in bold) in this definition of data warehouse.
                                                                                               (4)

QUESTION FIVE (14 MARKS)

The relation below concerns order information:

ORDER (ORDER-No, ORDER-DATE, PRODUCT-No, PRODUCT-NAME, PROD-DESCRIPTION, UNIT-PRICE, QUANTITY, VENDOR-NAME, VENDOIR-ADDRESS)

For a given order (identified by the ORDER-No) there will be an order date and a single vendor. The vendor name and address appear on the order. For each product that appears the product-No, description, unit price and quantity are shown.

5.1.   Present **all** functional dependencies in the relation, each on separate line.   (5)

5.2.   Identify and state the candidate key.   (1)

5.3.   Convert the relation into a set of relations that are **all** in **third normal form**.   (8)