Student Number |__|__|__|__|__|__|__|
Family Name   _____
First Name   _____

CP2404 Database Modelling

Final Exam SP53, 2021
Online Examination for JCUS student only
College of Science and Engineering

Exam Duration

3 hours (this includes uploading of answers to the assigned submission folder within the given duration and **Late submission will not be processed.)**

Student to complete their examination at least 20 minutes before the due time and submit in LearnJCU at least 15 minutes before due time.

Technical Issue

Do a screenshot of the issues with the date and time on the computer and email to exams-singapore@jcu.edu.au with the following details:
1. **Name, Student ID and Subject Code**
2. **Details of the issue**
3. **Contact Number we can call you at**

Exam Advisory

Students are advised not to share their answer scripts with other students, copy material from online and offline sources as well as discuss their answers.

Students caught through plagiarism checks, will be referred to the Exam misconduct panel with a possibility of their exam attempt being voided or shown a failure in the subject.

Instructions To Students*:*
1.   Students answer the exam by typing on a word document or hand write on paper
2.   Type/Write your full name, JCU number and Subject Code on the top right-hand corner of each answer page
3.   Number your answer clearly on each answer page.
4.   Upon completion of the answer script:
      a. For Handwritten scripts on paper: students are to take pictures of their answer scripts using the Clear Scanner app, save the answer script into a single PDF file
      b. For those typed on a word document: students to save the file

Submission:

Upload exam answers into the dropbox in LearnJCU. The title of the dropbox is '**CP2404 Database Modelling SP53(2021) Final Exam Dropbox**'.

Submit the exam, then ensure the upload is complete before pressing 'submit' again. Confirm that you see a 'Not graded' notification under Grading to indicate that the assessment has been submitted.

Answer all short-answer questions. Each question is worth marks as indicated in parenthesis
 [TOTAL: 64 MARKS].

Section A: Multiple Choice Questions (Total: 20 marks)
Answer ALL questions. Each question is worth 1 mark.
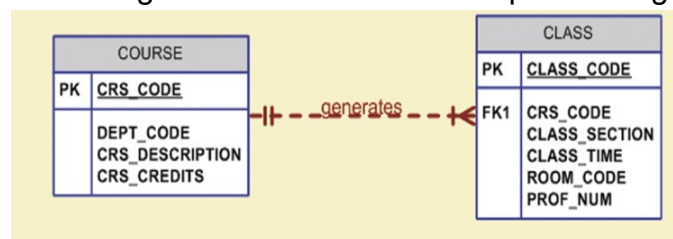
1. A relationship is an association between _____.
   a. objects
   b. databases
   c. entities
   d. fields

2. _____ might be represented with a multivalued attribute.
   a. A person's name
   b. A bank account balance
   c. Household phone numbers
   d. A book title

3. Which of the following best describes a "Primary Key"?
   a. Preferably multi attribute
   b. Preferably a date format
   c. No change over time
   d. Non-security compliant

4. Which of the following statement is FALSE?
   a. Business rules apply to businesses and government groups, but not to other types of organizations such as religious groups or research laboratories.
   b. Business rules must be rendered in writing.
   c. Each row in the relational table is known as an entity instance or entity occurrence in the ER model.
   d. The entity relationship model is limited to conceptual modeling, with no implementation component.

5.   _____ describes a condition in which all tuples within a table are **uniquely** identified by their primary key. The unique value requirement prohibits a null primary key value.
   a. Referential integrity
   b. Entity integrity
   c. Primary key
   d. Foreign key

6.   If one department chair (a professor) can chair only one department and one department can have only one department chair, then the entities PROFESSOR and DEPARTMENT exhibit a(n) _____ relationship.
   a. 1:1
   b. 1:M
   c. M:1
   d. M:N

7.   An entity is said to be _____-dependent if it can exist in the database only when it is associated with another related entity occurrence.
   a. existence
   b. weak
   c. relationship
   d. business

8.   Which of the following describes the relationship for the figure correctly?

   a. strong (non-identifying) relationship
   b. weak (non-identifying) relationship
   c. strong (identifying) relationship
   d. weak (identifying) relationship

9.   Which of the following SQL statement is INCORRECT?
        a. ALTER TABLE PRODUCT

            ADD   P_SALECODE CHAR(1);

        b. ALTER TABLE VENDOR

            DROP COLUMN V_ORDER;

        c. UPDATE PRODUCT

            WHERE   P_SALECODE = '2'

            WITHOUT P_CODE = '1546-QQ2';

        d.   UPDATE PRODUCT

            SET   P_SALECODE = '1'

            WHERE P_INDATE >= '16-JAN-2006'

            AND   P_INDATE < '10-FEB-2006';

10.   A ____ is a textual representation of the database tables where each table is
        listed by its name followed by the list of its attributes in parentheses.
        a. relational dictionary

        b. relational schema

        c. logical schema

        d. data dictionary

11.   Surrogate primary keys are especially helpful when there is no _____ key.
        a. Composite

        b. primary

        c. natural

        d. foreign

12.   Which of the following statement is TRUE?
        a. The general normalization process starts by breaking the table into new set

            of tables

        b. Higher forms (4NF or BCNF) are necessary for most business environment

        c. The general normalization process starts by identifying the dependencies of

            each table

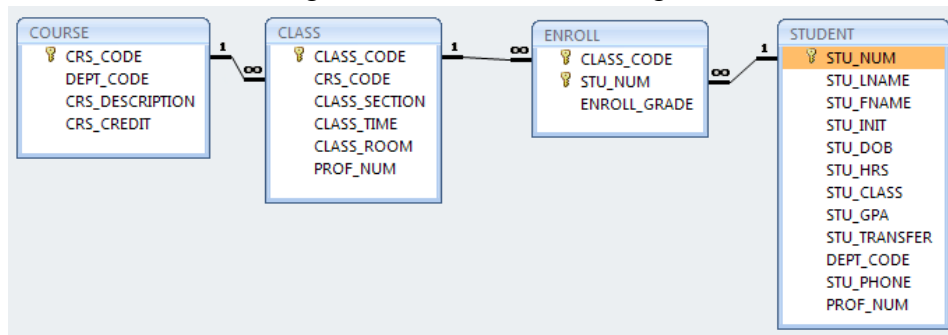   d. Primary key is identified in the third normal form (3NF)

13. The _____ attribute(s) make up the primary key in the table definition:

CLASS   (CRS_CODE,   CLASS_SECTION,   CLASS_TIME,   CLASS_ROOM,
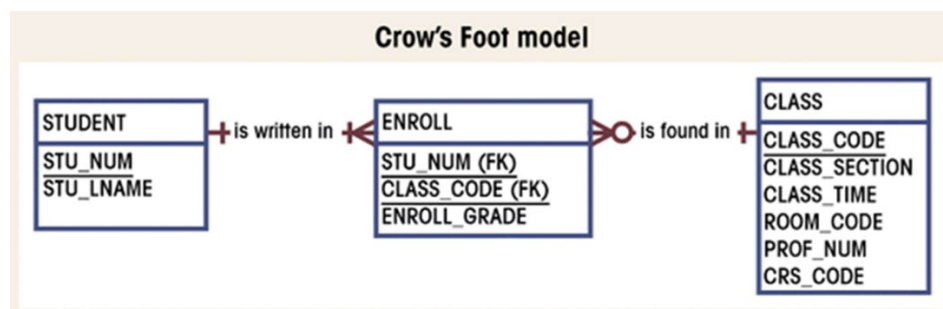   PROF_NUM)

   a. CRS_CODE

   b. CRS_CODE and CLASS_SECTION

   c. CLASS_SECTION

   d. There is no primary key

14.   The _____ type of attribute cannot be created in a DBMS.
   a. single-valued

   b. composite

   c. multi-valued

   d. simple

15.   The Crow's foot symbol with two parallel lines indicates _____ cardinality.
   a. (0, N)

   b. (1, N)

   c. (1, 1)

   d. (0, 1)

16.   In an ER diagram, primary keys are indicated by _____.
   a. bolding

   b. underlining

   c. italics

   d. special font

17.   Ideally, an entity identifier is composed of _____ attribute(s).
   a. zero

   b. two

   c. one

   d. six

18. Attribute A determines attribute B (that is, B is functionally _____ on A) if all of the rows in the table that agree in value for attribute A also agree in value for attribute B.

   a. candidate

   b. dependent

   c. entity

   d. foreign

19. The following figure presents a relational diagram showing the initial entities and attributes for a College. Which of the following business rule is FALSE?

   a.   One course can generate many classes
   b.   Each individual enrolment references one class
   c.   Each individual enrolment entry shows one student
   d.   Many classes can be referenced in enrolment many times

20. The "ENROLL" entity in the crow's foot model below is a _____
   a. primary entity

   b. secondary entity

   c. composite entity

   d. bridge entity

Section B: Structured Questions (Total: 44 marks)

Answer ALL questions.

Question 1 (20 marks)

Phewzz is a fast food chain that operates in various branches in the Indonesia. Phewzz sells their own burger, Potato fries and drinks. The fast food products are supplied by Phewzz's registered suppliers. All food is pre-packed, and Phewzz owns the licenses for their pre-packed food which are also supplied to local supermarkets. At fast food branch, the pre-packed food is sold as meals. Customers place their orders online and is delivered by Phewzz delivery service.

    a)   There are 10 branches in Indonesia and each branch is managed by a manager.

    b)   Each BRANCH is uniquely identified by branch id and location (city).

    c)   Each branch may or may not have kitchen helpers and delivery staff.

    d)   Each STAFF are uniquely identified by staff id, name, branch id.

    e)   There are total of 7 registered suppliers who may or may not supply to all branches and the supermarkets.

    f)   Each SUPPLIER is uniquely identified by supplier id, name, and their supplies.

    g)   There are total of 10 SUPERMARKET that carries Phewzz pre-packed food and each supermarket is identified with unique Supermarket code, location, and contact person.

    h)   Some supermarkets may or may not offer it as a meal.

    i)   The pre-packed food MEAL sold at the fast food branches are Family meal, Super meal, Junior meal, Deluxe meal, Single meal, and Special meal. Each meal is uniquely identified by meal code and meal description.

    j)   Each ORDER record is uniquely identified by order id and branch id, as well as customer address, email, contact number and order details.

Given the above information, draw the crow's foot ERD / EERD capturing the business requirements for Phewzz. You are to identify all entities, it's attributes, state clearly the FKs & PKs, as well as the relationships, connectivities, cardinalities and optionalities.

Question 2

Write the SQL statement to retrieve the information queried from Table 1 & Table 2 for questions a – d.

MEMBERSHIP

Mem_ Num	Mem_ Fname	Mem_ Lname	Mem_Street	Mem_City	Mem_ State	Mem_Zip	Mem_ Balance
102	Tami	Dawson	2632 Takli Circle	Norene	TN	37136	11
103	Curt	Knight	4025 Cornell Court	Flatgap	KY	41219	6
104	Jamal	Melendez	788 East 145th Avenue	Quebeck	TN	38579	0
105	Iva	Mcclain	6045 Musket Ball Circle	Summit	KY	42783	15
106	Miranda	Parks	4469 Maxwell Place	Germantown	TN	38183	0

DETAILRENTAL

Rent_Num	Vid_Num	Detail_Fee	Detail_Duedate	Detail_Returndate	Detail_Dailylatefee
1001	34342	2	04-MAR-09	02-MAR-09	1
1001	61353	2	04-MAR-09	03-MAR-09	1
1002	59237	3.5	04-MAR-09	04-MAR-09	3
1003	54325	3.5	04-MAR-09	09-MAR-09	3
1003	61369	2	06-MAR-09	09-MAR-09	1
1003	61388	0	06-MAR-09	09-MAR-09	1
1004	44392	3.5	05-MAR-09	07-MAR-09	3

RENTAL

Rent_Num	Rent_Date	Mem_Num
1001	01-MAR-09	103
1002	01-MAR-09	105
1003	02-MAR-09	102
1004	02-MAR-09	110
1005	02-MAR-09	111
1006	02-MAR-09	107
1007	02-MAR-09	104
1008	03-MAR-09	105
1009	03-MAR-09	111

a. List the member number, member fname, and member balance for all members with a balance less than $10.

[3 marks]

b. List the membership number, first name, last name, and balance of the memberships that have a rental.

[4 marks]

c. Display the minimum balance, maximum balance, and average balance for memberships that have a rental.

[5 marks]

d. List the membership number, last name, and total rental fees earned from that membership. The total rental fee is the sum of all of the detail fees (without the late fees).

[6 marks]

Question 3

Attribute Name	Sample Value	Sample Value	Sample Value	Sample Value
ORDER_ID	O20056	O20059	O20060	O20061
ORDER_DATE	04/09/2021	01/09/2021	05/09/2021	10/09/2021
ORDER_QTY	40	150	60	40
SALESPERSON_ID	S0035	S0044	S0045	S0050
SALESPERSON	Betty Simons	Daniel G	Kenneth F	Betty Simons
DEPARTMENT	SPORTS	LADIES	SPORTS	SPORTS
CUSTOMER_ID	C1200	C1202	C1204	C1209
CUSTOMER_NAME	Seattle Pte Ltd	Seattle Pte Ltd	Lane Pte Ltd	Lane Pte Ltd
CUSTOMER_EMAIL	Mandy@seattle.com	Mandy@seattle.com	Susan@lane.com	Susan@lane.com
ITEM_DESCRIPTION	Gloves (Black)	Scarf (P005)	Socks (P400)	Sports Gear (P566)
PRICE_PER_UNIT	$56	$33	$12	$22
DELIVERY_DATE	20/09/2020	27/09/2020	28/09/2020	28/09/2020
DELIVERY_TIME	2PM	2PM	11AM	3PM

Based on the information provided above, perform the necessary Normalization, **up to 3NF**, and express your answer by EITHER:

- Typing out the textual relational schema OR
- Draw the rest of the dependency diagrams

[6 marks]

- End of Exam -