Database Development 1

Database Development 1(DADE1)	
Assignment Number	1
Assignment Name	Formative Assessment
NQF Level	5
Credits	14
Due Date	
Marks	Total marks = 130 Formative assessments through the semester contribute towards the student's module mark and are used to assess progress and identify areas for improvement. This formative assessment will contribute 25% towards final mark. Take note of the following with regards to late submissions: a. One (1) day late (-5%) b. Two (2) days late (-10%) c. Three (3) days late (-15%)
Individual / Group Assignment	Individual
Lecturer Information	
Lecturer	
Lecturer E-mail	

Learning Objective:

Formative assessment 1 will cover the following concepts:

a. Database development
b. Modelling entities
c. Modelling relatiosnhips
d. Adding detail to the diagram
e. Unique Identifiers
f. Resolving Many to Many Relationships
g. Recursive Relationships
h. Modelling More Complex Structures
i. Normalisation
j. Database Design
k. Mapping Exclusive Relationships and Entities

Attributes/Competencies Assessed:

a. 115365 - Apply the principles of designing computer system inputs and outputs
b. 114049 - Demonstrate an understanding of Computer Database Management Systems

Scope:

The aim of relational data modeling design concepts is to provide a structured approach for designing a database schema that efficiently and accurately represents the data requirements of an organization or system.

Relational data modeling is a process of identifying entities, attributes, and relationships between them, and organizing them into tables and defining the constraints that ensure data integrity. It is used to create a blueprint for a database, which can be used as a guide for building a physical database.

Technical Aspects:

The number of pages for this formative assessment is ***15*** and the following font and size should be used in your report:

a. Font: Arial
b. Size: 12 and 14 for headings
c. Font colour: Black

Save and upload the report as a .PDF**(No backgrounds)** with the following naming convention:

a. Student no_StudentName_StudentSurname_ModuleCode_FA1**(No ZIP folder uploads)**

Ensure adequate referencing is used when using information from either books or internet. Plagiarism is a serious offecne and can result in 0% for the assessment when excessive work is copied without proper referencing.

Additional research required for question 2

Please complete the following and sign as requested for Portfolio of Evidence (POE)

a. Pre-Assessment agreement (Save, sign and submit as PDF)
b. Assessment Feedback Agreement (Save, sign and submit as PDF)

Mark allocation for report

See Mark allocation sheet below

Question 1 (70)

Unit standard	*Specific outcome*	*Assessment criterion*
115365	*1*	*1*
	1	*2*
	1	*3*
	1	*4*

	1	*5*
	2	*1*
	2	*2*
	2	*3*
	3	*1*
	3	*1*

Requirements

a. Submission must include:
   i. Initial ER diagram
   ii. Normalisation
   iii. Mapping to tables
   iv. Documentation rough work (if any)
b. Initial ER diagram
c. Draw an ER diagram which must indicate the following:
   i. Optionality of relationships (may or must)
   ii. Cardinality of relationships (one or many)
   iii. Optionality of attributes (* or o)
   iv. Clear indication of PKs and FKs
   v. Named relationships and entities
d. Use normalization
   i. Place the attributes in zero normal form.
   ii. Normalise the attributes to third normal form. Show each of the intermediate normal forms.
   iii. Draw an ER diagram from the third normal form.
e. Mapping to tables
f. Create a database design from the ER diagram created from 3NF and provide at least two rows of sample data.
g. Documentation
   i. Supply author name and surname, date, and project name.
   ii. Describe the purpose of the project.
   iii. Describe each attribute and its function in the system.
   iv. Describe possible changes when mapping to an actual database.

Scenario

Project 1 Specification: Suzi's yoga studio

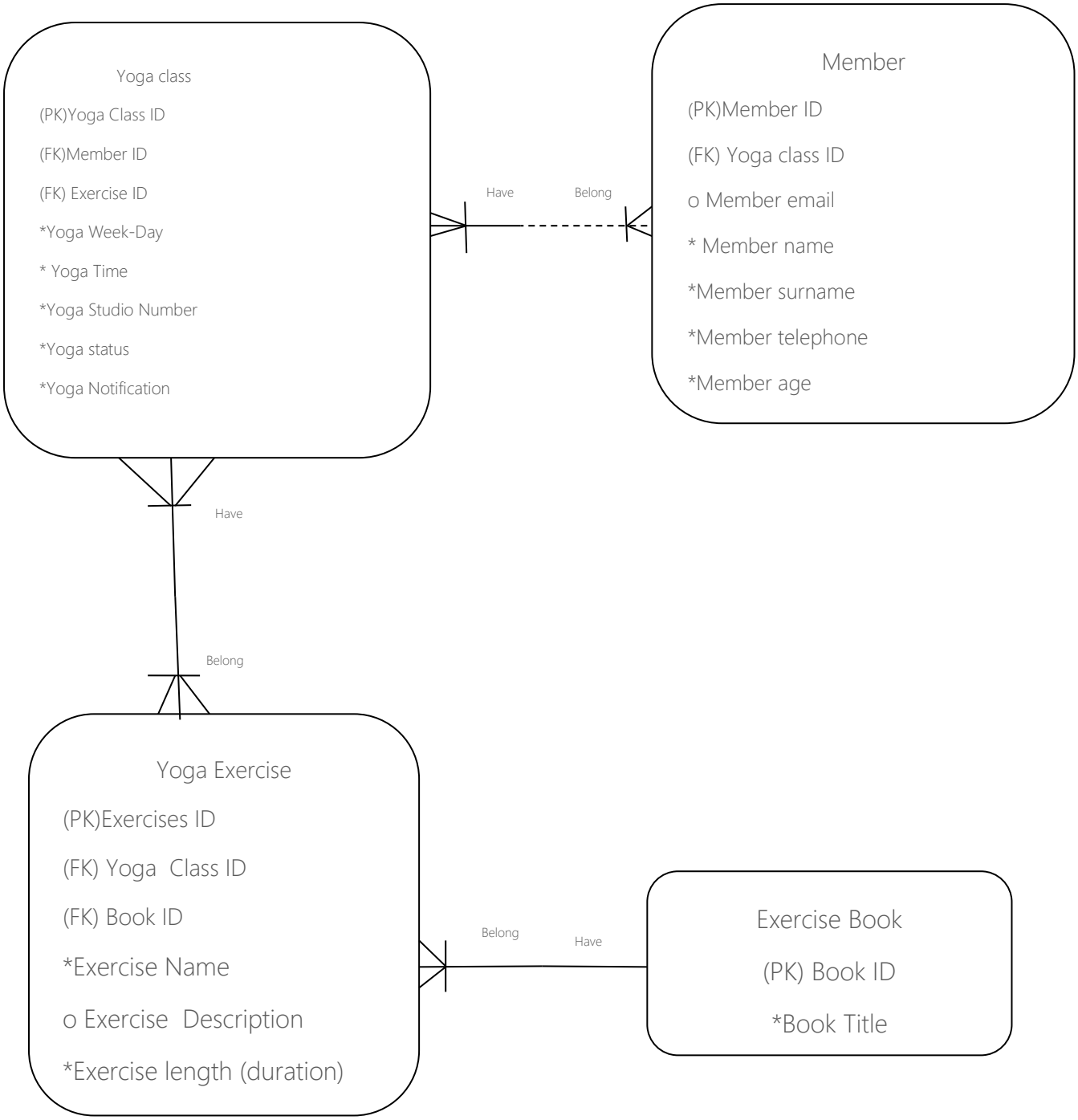
Suzi's family started their own yoga school and enlarged their house to accommodate four studios. Suzi has recruited you to be their database designer.

The database will store information on their members, yoga classes/sessions, and the various yoga exercises.

- People must be 16 years of age or older in order to become a member and they are welcome to assign themselves to more than one class/session per week.
- If a class is cancelled, Suzi must be able to contact members via telephone. Members who provide their email address will also be notified via email.
- Fixed yoga sessions are scheduled: for example, every Monday morning at 07:00 studio #1 is used and every Tuesday at 18:00 studio #4 is used. Each class/session record must contain sufficient information to indicate which weekday, time, and studio is reserved for it.
- Suzi references each exercise from a particular book and she would like to keep track of the book IDs and titles in case she needs to do more research on a particular exercise.
- Suzi needs to keep track of the different exercises performed at the sessions. She specifically wants to know the name, description, and the length of each exercise in terms of minutes.
- Suzi also needs to specify how many times an exercise must be performed per session/class.

ANSWER:

b) Initial ER diagram (step 1)

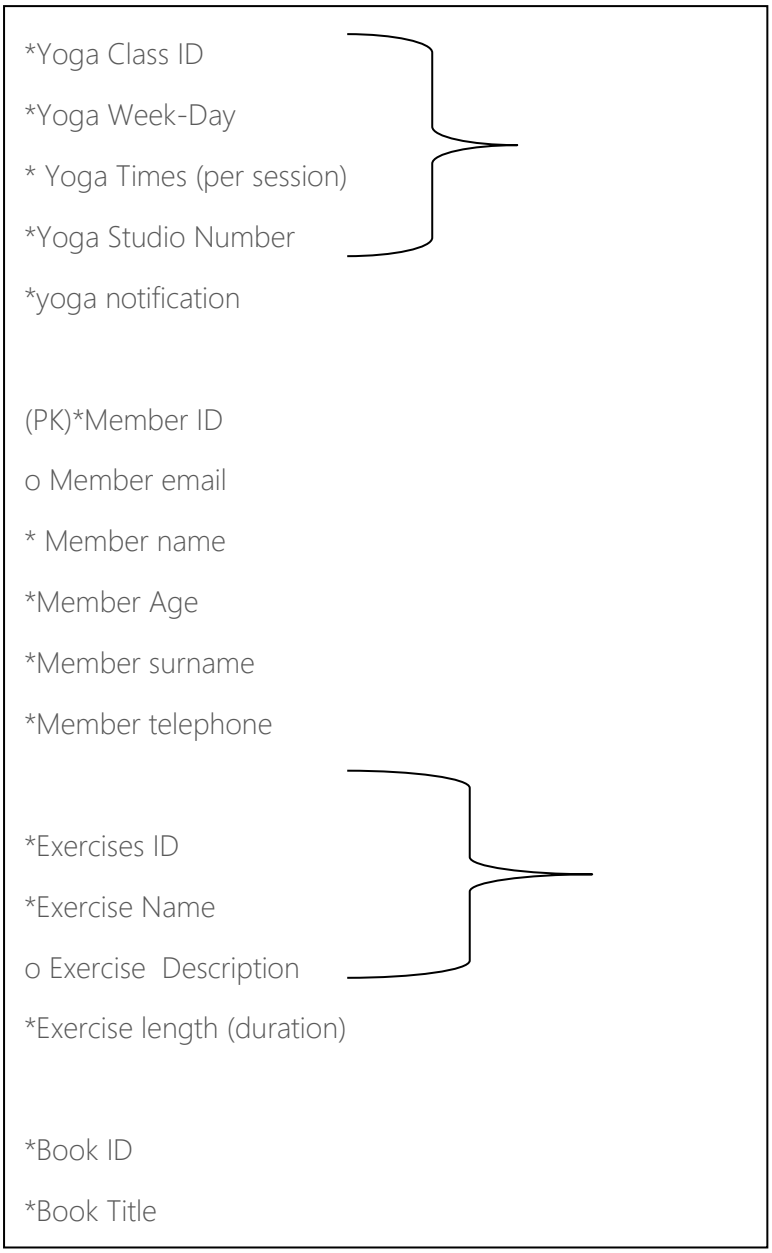


Above is a initial Entity Relationship Diagram

d. Use normalization

Answer

0NF (step2)



Step3 (1NF)

Removing repeating groups in 0NF

(PK)Member ID o Member email * Member name *Member surname *Member telephone *Member Age *Book ID *Book Title	(PK)Member Class ID { (FK)Member ID Yoga Class ID *Yoga Week-Day * Yoga Time *Yoga Studio Number *yoga Notification	(PK) Member Exercises ID { (FK)Member ID Exercises ID *Exercise Name o Exercise Description *Exercise length (duration) * Exercises per session

Step 3(2NF)

Removing part-key dependencies

(PK)Member ID Member email Member Age Member name Member surname Member telephone Book ID (FK)	{ (FK)Member ID Yoga Class ID Yoga Week-Day Yoga Time	New group (PK)Yoga class ID Yoga studio Number	{ (FK)Member ID Exercises ID Exercise length (duration)	New group (PK)Exercise ID Exercise Name Exercise description

New group

(PK) Book ID Book title

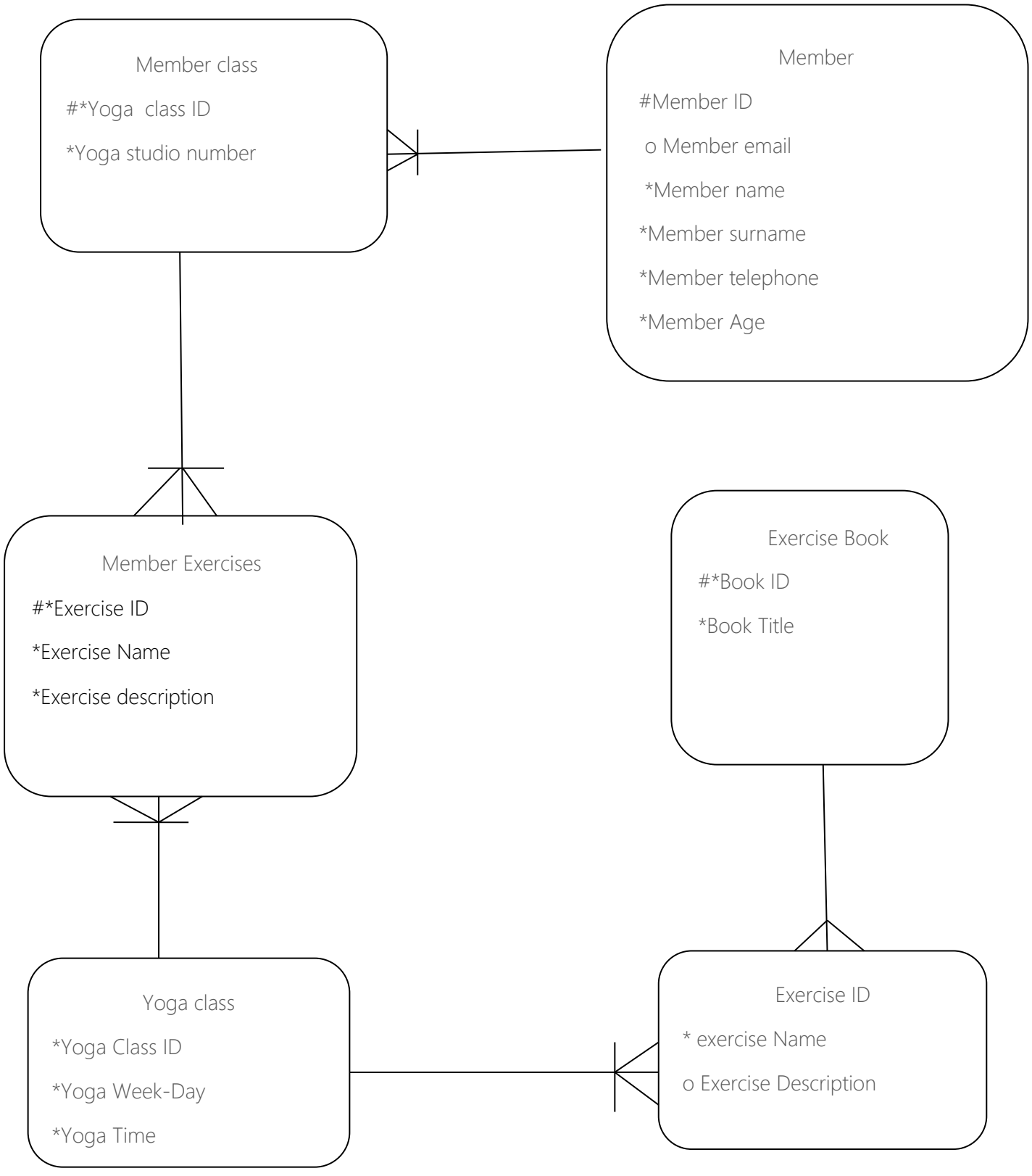
Step 4 (3NF)

Removing –inter data dependencies

(PK)Member ID Member email Member Age Member name Member surname Member telephone Book ID(FK)	(FK)Member ID Yoga Class ID Yoga Week-Day Yoga Times Yoga Studio Number	New group Yoga class ID Yoga studio Number	(FK)Member ID Exercises ID Exercise Name Exercise Description Exercise length (duration) Exercise Times	New group Exercise ID Exercise Name Exercise description

Step 5

An Entity Relationship Diagram


Member class
#*Yoga class ID
*Yoga studio number
Member
#Member ID
o Member email
*Member name
*Member surname
*Member telephone
*Member Age
Member Exercises
#*Exercise ID
*Exercise Name
*Exercise description
Exercise Book
#*Book ID
*Book Title
Yoga class
*Yoga Class ID
*Yoga Week-Day
*Yoga Time
Exercise ID
* exercise Name
o Exercise Description

e. Mapping to tables

Answer

Yoga class							
Column names	Yoga Class ID	Member ID	Exercise ID	Yoga week-day	Yoga Studio Number	Yoga status	Yoga time
Key type	PK	FK	FK				
nulls	NN	NN	NN	NN	NN	NN	NN
Sample data	Yc145	0145	E268	Monday	2	Active	09:00

Yoga exercise							
Column names	Exercise ID	Book ID	Yoga class ID	Exercise Duration	Exercise Description	Exercise name	Exercise times (per session)
Key type	PK	FK	FK				
Nulls	NN	NN	NN	NN		NN	
Sample data	E278	ISBN15678	Yc 147	1hr 30 mins		Warrior2	4

Exercise Book		
Column names	Book ID	Book Title
Key type	PK	
Nulls	NN	NN
Sample data	1256	Yoga exercises guide

Member							
Column names	Member ID	Yoga class ID	Email	Member Name	Member Surname	Member Telephone	Member Age
Key type	PK	FK					
Nulls	NN	NN		NN	NN	NN	NN
Sample data	2356	Yc 1234	depheny@gmail.com	Depheny	James	07895643	23

Member Exercises			
Column Names	Exercise ID	Exercise Name	Exercise Description
Key Type	PK		
Nulls	NN	NN	
Sample Data	E 1234	Warrior2	

Member Class		
Column names	Yoga Studio number	Yoga class ID
Key type		PK
Nulls	NN	NN
Sample data	4	Yc 135

f. Create a database design from the ER diagram created from 3NF and provide at least two rows of sample data.

Answer

Member ID	Name	surname	Age	Telephone	Email	Exercise ID	Exercise Name	Times per session	duration	Exercise description	Class ID	status	time	weekday	Studio Number	Book ID	Book Title
12334	charity	Terry	25	01234	johnterry@gmail.com	E234	Child's pose	3	15		C145	Active	08:00	Monday	3	2004	Yoga exercises guide
12335	Deon	Bat	21	0245678	Bat06@gmail.com	E 256	Uttanasa	4	20		C148	Active	09:00	Wednesday	!	2378	Yoga exercises guide
23456	Audrey	Moses	19	0678235	audreyMoses@gmail.com	E267	Warrior 2	4	10		C 158	Active	15:30	Thursday	2	2986	Yoga exercises guide

g. Documentation

Answer

i. Supply author name and surname, date, and project name.

Answer

- Author name : Tafadzwa Chiripanyanga
- Date: 8 August 2023
- Project name :Suzi's Yoga School Database design

ii. Describe the purpose of the project.

Answer

- To design a simple database system for Suzi's yoga school so that information will be stored in an organized manner and that will make it convenient to retrieve or look up for data / information in the system .

iii. Describe each attribute and its function in the system.

Answer

1. Member
    a. Member ID- It is a UID for each member (distinguishes different members)
    b. Name – name of the person
    c. Surname – last name of the person
    d. Age – age of the person
    e. Email /telephone – contact details of the person
2. Yoga class
    a. Yoga class ID -Unique identifier for each yoga class
    b. Studio number -place of the yoga activity
    c. Status – indicate if there is a class or not
    d. Time – time when yoga class start
    e. Weekday – day of the week when a yoga class is done
3. Yoga Exercises
    a. Exercise ID – unique identifier for each exercise
    b. Exercise Name – name of the exercise
    c. Exercise Description – what is the exercise about
    d. Exercise times – number of times that exercise id done per session
    e. Duration – how long the exercise is in minuets
4. Exercise Book
    a. Book Id – Unique Identifier for an exercise book
    b. Title – name given to the book

iv. Describe possible changes when mapping to an actual database.

Answer

a. Manage or handle data security and access control
b. Defining data types on attributes (for example , integer , varchar …)
c. Establishing constraints

Question 2 (60)

Unit standard	*Specific outcome*	*Assessment criterion*
114049	*1*	*1*
	1	*2*
	2	*1*
	2	*2*
	3	*1*
	3	*2*
	4	*1*
	4	*2*
	4	*3*

This question requires additional research

Use "ChatGPT" to research the following topics

a. Identify the four (4) different types of Database Management Systems (12)

ANSWER:

- Relational Database Management System (RDBMS)- manages and stores data in tables form , rows represents a record and attributes are in columns .
- Object-Oriented Database Management System (OODBMS)-stores data in the form of objects that expresses both data and the methods or operations to be performed on data.
- Hierarchical Database Management System – data is organized in a hierarchy (a tree like structure) with each record linked to a parent record , except for the root record an example include XML.

- NewSQL Database Management System – a database system that try to combine the advantages of traditional SQL with benefits of NoSQL an example includes cockroachDB

b. Database Management Systems (DBMS) provide various end-user tools to interact with and manipulate the data stored in databases. These tools purpose is to simplify the process of accessing, querying, analyzing, and visualizing data for non-technical users.

Identify six (6) commonly used DBMS end-user tools.

(6)

ANSWER:

- Report Generators
- Business intelligence (BI) Tools
- SQL Query Tools
- Data Visualization Tools
- Extract , Transform , Load (ETL) Tools
- Graphical User Interface (GUI) Tools

c. Data management issues refer to challenges or problems encountered when handling and organizing data within an organization. A Database Management System (DBMS) addresses these issues through its features and capabilities. Identify six (6) common data management issues and how DBMSs help address them.

(18)

ANSWER:

- Data integrity –refers to maintaining consistency and constrains of data over time , DBMSs help to address these issues through constraints and validation rules .
- Data Redundancy – leads to inconsistence and increase storage space , DBMS mitigate this issue through normalizing and organizing data into separate tables with minimal duplication.
- Data Security and Privacy –is protecting sensitive data from unauthorized users and DBMS try to solve this problem by implementing / inserting robust security features such as encryption and authentication .
- Data Scalability – with an increased amount of data in an organization data efficient becomes a problem and DBMS mitigate this problem by offering Horizontal scaling(adding more servers to distribute data load) and vertical scaling (upgrading hardware resources)
- Data backup and recovery – data can be lost because of software or hardware failure but DBMSs offer backup and recovery mechanisms that ensures that data can be stored to a consistent state in case of failures
- Data Retrieval Performance -slow data retrieval can delay decision making and negatively impact user experience therefore the DBMSs solve this problem by

using caching , indexing and query optimization techniques to speed up data retrieval .

d. Commercial Database Management Systems (DBMS) offer a wide range of features and capabilities to meet the diverse needs of organizations. Identify eight (8) commonly implemented features found in commercial DBMS.

(24)

ANSWER:

1. Data Manipulation
    a. Joins – put together data from multiple tables based on specific conditions
    b. Query language – languages likes SQL are used for querying and manipulating data
    c. Insert , Update and Delete Operations – alter /modify records within the database
2. Backup and Recovery
    a. Data backup :Makes copies of the database regularly just in case of failure
    b. Point- In –time Recovery :stores data to a certain time so that data could be retrieved in times of system failure
3. Data Storage and Retrieval
    a. Indexes – speed up data retrieval by creating index structures on columns
    b. Tables :data is stored in rows and columns just like a table
    c. Triggers :automated actions triggered when there is a change in data structures
4. Support for various Data Types : different data formats are supported
5. Data analysis and reporting :
    a. Data warehouse – stores data for analysis and reporting purposes
    b. Business Intelligence Tools : used for data visualization and analysis
6. Data Integrity and security :
    a. Data encryption :protects sensitive data using encryption algorithms
    b. Access Control : permit certain users to view certain data while blocking other users
    c. Authentication And Authorization : verifies user identity and give certain privileges
    d. Auditing : checks data activities for security and compliances purposes
7. Scalability and performances
    a. Caching : stores data is frequently accessed in memory for a speedy retrieval
    b. Replications : duplicates data for improved performances and availability
8. Database Administration
    a. Monitoring and diagnostics : provides tools to monitor database health and performances .

Mark allocation for student			
Section	Sub-section	Maximum Mark	Learner mark
Body of the report	Question 1: Initial ER diagram	14	
	Question 1: Normalisation – 0NF	6	
	Question 1: Normalisation – 1NF	5	
	Question 1: Normalisation – 2NF	5	
	Question 1: Normalisation – 3NF	5	
	Question 1: ER diagram from 3NF	15	
	Question 1: Mapping to tables from ERD	10	

	Question 1: User documentation	10	
	Question 2.a	12	
	Question 2.b	6	
	Question 2.c	18	
	Question 2.d	24	
Deductions	1 day late	-5	
	2 days late	-10	
	3 days late	-15	
	Total:	130	

PRE-ASSESSMENT AGREEMENT

Assessment Preparation: Preparing the Candidate

Student name and surname	Tafadzwa Chiripanyanga	Date	06/08/2023
		Time	8 AM
Assessor name and surname		Venue	Online

How to prepare the candidate	Document Requirements	Agree (tick)	Action Required
Explain to the candidate why you are meeting and the purpose of the assessment.	Assessment Policy Assessment process	✓	
Discuss the assessment plan in detail.	Assessment strategy	✓	
Explain assessment process, show assessment instruments to candidate and describe assessment conditions.	Assessment instruments	✓	
Identify the role-players during assessment.	Assessors Moderator	✓	
Describe the evidence required to be declared competent.	Examples of evidence	✓	
Explain how evidence will be judged.	Mark allocation explained	✓	
Explain to the candidate how to prepare: Give candidate	Assessment task description	✓	

assessment task description.			
Confirm with the candidate what he/she should bring to the assessment.	Detailed briefing on exact requirements to be given to candidate in writing	✓	
Ensure that candidate understands the procedures of all assessment practices.	Appeals Policy Appeals procedure Assessment Policy Assessment Procedure Moderation Policy Moderation procedure Verification Policy Verification Procedure	✓	
Ask the candidate if he/she foresees any problems or identify any special needs.	List needs	✓	

Agreed Assessment Plan			
Student name and surname:		Tafadzwa Chiripanyanga	
Assessor name and surname:			
Module name:		Database Development 1	
Unit Standard/s:		N/A	
Type of Assessment i.e. Formative assignment, Formative test, Formative Practical, Summative etc.		Formative Assessment 1	
Special Assessment Requirements:		N/A	
Event	**Date, time and location**	**Resources required**	**Evidence to be generated**
Assessments due date		Assessments	Completed documentation
Complete activity on MyAIE and upload to MyAIE			Completed Portfolio of Evidence
Submit Portfolio of Evidence			

Assessor Roles and Responsibility	
Roles	Assessor

	Guide Feedback Agent Reviewer
Responsibilities	Consult candidate re-assessment, assessment process and plan. Agree assessment process and plan with candidate. Forward documentation to candidate: plan, guide and assessment instruments. Assess candidate with the use of different instruments. Provide feedback on assessment findings. Support candidate through assessment process. Source feedback from candidate on assessment process. Review assessment process and outcome. Use assessment process as opportunity to transform assessment activities and outcomes.

Candidate Roles and Responsibility	
Roles	• Leaner • Feedback agent • Reviewer
Responsibilities	• Be available for assessment. • Be actively involved in the consultative process. • Learn from the assessment process. • Provide feedback to the assessor in terms of the assessment as learning activity. • Provide feedback to the assessor on the efficacy of the assessment process. • Review own role and assessor role in the assessment process.
Assessment Instruments	• Portfolio of Evidence • Questionnaire • Report • Presentation • Reflexive questions • Work sample • Practical's • Group Activity • Research activities

Assessment Process

• Evaluation of POE addressing Essential Embedded Knowledge in unit standards. • Evaluation of Research Projects and other evidence addressing specific unit standards. • Consultation: assessment plan and assessment activities and instruments. Pre-assessment moderation and interviews conducted at this stage. • Observation: feedback on assessment against specific outcomes, critical outcomes in unit standards. • Feedback: to candidate regarding sufficiency of evidence and possible interview to gain supplementary evidence. • Feedback to candidate regarding assessment findings as well as review process.	
Feedback	Written feedback to be given to all stakeholders at the end of the assessment process, as well as verbal feedback to the candidate during assessment activities.
Recording Process	Process and findings to be recorded and submitted for record keeping purposes as well as moderation and verification.
Review Process	The review process is the responsibility of the assessor and the candidate. Joint reviewing will take place after feedback has been given to the candidate.
Right to appeal	The candidate must be advised of the right to appeal.
Resources Required	Assignments • POE • Assessments • Guides

I confirm that:

- I have been consulted on and have agreed to the training and assessment process as detailed in the assessment guide.
- I have been advised of my right to appeal against any assessment that is unfair, unreliable, invalid or impracticable.
- I have read and understood the appeal procedure.
- I know that assessments may be moderated or verified by an external party.
- The purpose of the assessment has been clearly explained to me.
- The criteria have been discussed with me, and I know I will be assessed against these criteria.
- I know when and where I will be assessed, and I was given fair notice.
- I know how the assessment will be done, and any other requirements related to the assessment.

Signed: _Tafadzwa_____ Date: ___06/08/2023_____

Overall Assessment Decision	Competent		Not yet competent	
Student's Signature	Tafadzwa		Date:	06/08/2023
Assessor's Signature			Date:	
Moderator's Signature			Date:	

ASSESSMENT FEEDBACK AGREEMENT

Assessment feedback: Feedback to learner

Qualification Name:	
Qualification SAQA Number:	
Subject Name:	Database Development 1
Subject Code:	DADE1
Assessment Name:	Formative Assessment 1
Assessment Code:	DADE1_FA1
Assessment Type:	Fomative

Feedback report	1st Attempt		2nd Attempt	
	C	NYC	C	NYC
Unit standard Number(s)				
US115365				
SO1,AC1				

SO1,AC2				
SO1,AC3				
SO1,AC4				
SO1,AC5				
SO2,AC1				
SO2,AC2				
SO2,AC3				
SO3,AC1				
SO3,AC2				
US114049				
SO1,AC1				
SO1,AC2				
SO2,AC1				
SO2,AC2				
SO3,AC1				
SO3,AC2				
SO4,AC1				
SO4,AC2				
SO4,AC3				

General feedback to learner (Attempt 1)

Supply comprehensive feedback why learner is found NYC

Learner Number:	258196		
Learner name and surname:	Tafadzwa Chiripanyanga	Date:	06/08/2023
Learner Signature:	*Tafadzwa*		
Lecturer name and surname:		Date:	
Lecturer Signature:			
Assessor name and surname:		Date:	
Assessor Signature:			
Moderator name and surname:		Date:	
Moderator Signature:			

Note to learner
Review the feedback provided by your lecturer to check that you have been found competent in this assessment. If there are any areas where you have been found not yet competent, you must redo those parts of the assessment and resubmit within the stipulated time frame. The section below will only be completed in cases where the learner was asked to resubmit parts of the assessment where they were found not yet competent.

General feedback to learner (Attempt 2) Supply comprehensive feedback why learner is found NYC

Learner Number:			
Learner name and surname:		Date:	
Learner Signature:			
Lecturer name and surname:		Date:	
Lecturer Signature:			
Assessor name and surname:		Date:	
Assessor Signature:			
Moderator name and surname:		Date:	
Moderator Signature:			