Database Revision Worksheet :

1 The following figure shows the entry proof of a student for the Singapore-Cambridge GCE A-Level Examination. (DHS 2017)

2017 SINGAPORE-CAMBRIDGE GCE A-LEVEL EXAMINATION
Entry Proof for School Candidates

Statutory Name : LIM AH SENG
NRIC : S9987654A
Centre / Index No. : 3101/1234
Academic Level : JC 2
School Name : RESERVED JUNIOR COLLEGE
Class Name : 23

Subject Code / Paper	Subject Name	Mode of Assessment	School Code	Exam Date	Start Time	Duration
9749 / 04	H2 PHYSICS	SCIENCE PRACTICAL		16-OCT-2017		2 hr 30 min
8807 / 01	H1 GENERAL PAPER	WRITTEN	3101	06-NOV-2017	08:00	1 hr 30 min
8807 / 02	H1 GENERAL PAPER	WRITTEN	3101	06-NOV-2017	10:30	1 hr 30 min
8872 / 02	H1 CHEMISTRY	WRITTEN	3101	07-NOV-2017	08:00	2 hr 0 min
9758 / 01	H2 MATHEMATICS	WRITTEN	3101	09-NOV-2017	08:00	3 hr 0 min
9758 / 02	H2 MATHEMATICS	WRITTEN	3101	13-NOV-2017	08:00	3 hr 0 min
9749 / 02	H2 PHYSICS	WRITTEN	3101	16-NOV-2017	08:00	2 hr 0 min
9749 / 03	H2 PHYSICS	WRITTEN	3101	22-NOV-2017	14:00	2 hr 0 min
9753 / 01	H2 MUSIC	WRITTEN	3101	27-NOV-2017	14:00	2 hr 30 min
8872 / 01	H1 CHEMISTRY	WRITTEN	3101	29-NOV-2017	14:00	0 hr 50 min
9749 / 01	H2 PHYSICS	WRITTEN	3101	01-DEC-2017	14:30	1 hr 0 min
9753 / 21	H2 MUSIC	PRACTICAL				0 hr 25 min
9753 / 32	H2 MUSIC	COURSEWORK	3101			
9819 / 01	H3 MUSIC	PROJECT-BASED	3101			

School Code	Centre Name	Address
3101	RESERVED JUNIOR COLLEGE	12 WALKOVER STREET. SINGAPORE 345678.

The exam board wishes to manage this information using a relational database. The normalised design requires a number of tables.

(a) Draw an entity-relationship diagram (ERD) to model the main entities and their relationships.

(b) A table description can be expressed as:

TableName (Attribute1, Attribute2, Attribute3, …)

The primary key is indicated by underlining one or more attributes. A foreign key is indicated by an asterisk (*).
Derive the table descriptions for the tables.

(c) There are some fields with missing or null values. Explain how these arise and how a Database Management System (DBMS) may provide facilities to ensure the information is appropriately managed

2 The following figure shows the partial contents of an unnormalised relational database table for library book loans by an amateur database administrator.

CallNo	Title	Author	Publisher ID	Publisher Name	Borrower ID	Borrower Name	Email	LoanDate
A2345	Superhuman	Peter Smith	P0928	Healthy Global	X894	Robert Lim	roblim@gmail.com	20181004
A1133	Agile Methodology	Sophia Jones	P7823	CS Books	X894	Robert Lim	roblim@gmail.com	20181004
B5104	Python Advanced	Zen Wang	P8246	Make It Harder	Y532	Mary Tan	maryt@yahoo.com	20181007
A2257	Computer Science	Berry Mile	P8246	Make It Harder	X451	Ben Neo	benn@gmail.com	20181007
B7513	Alibaba	Jacky Ma	P3245	Ali Pub	X451	Ben Neo	benn@gmail.com	20181007

(a) Give **two** potential anomalies that can occur with this design

(b) Draw an E-R diagram to represent your normalised design

(c) Give the table specification in 3NF