UTM

UNIVERSITI TEKNOLOGI MALAYSIA

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FACULTY OF ENGINEERING, SCHOOL OF COMPUTING

SKUDAI, 81310 JOHOR BAHRU, JOHOR DARUL TAKZIM

(ISKANDAR MALAYSIA ECOLIFE CHALLENGE)

P4 : LOGICAL DESIGN

SCSD2523-03: DATABASE

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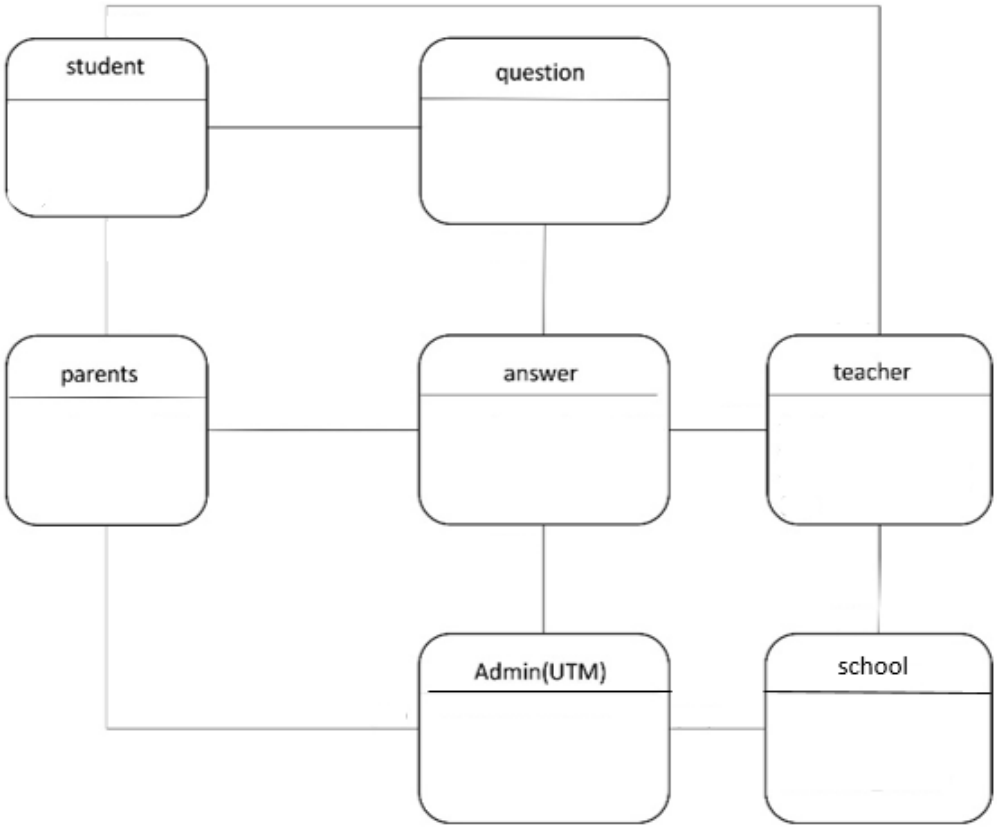
CONCEPTUAL ENTITY RELATIONSHIP MODEL

A process of constructing a model information used in an enterprise, independent of all physical considerations.

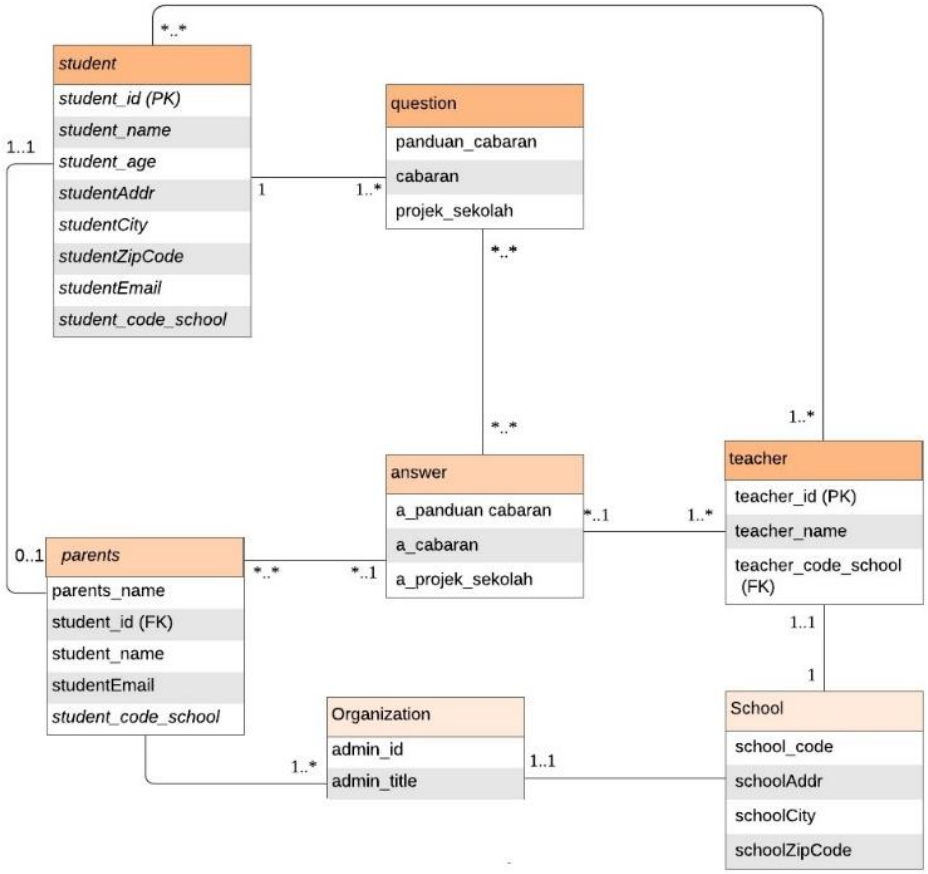
Entity relationship model; Data dictionary



LOGICAL ERD

Process of constructing a model of information used in an enterprise based on a specific data model (e.g relational) but independent of a particular DBMS and other physical considerations.

Normalized database relational schema.



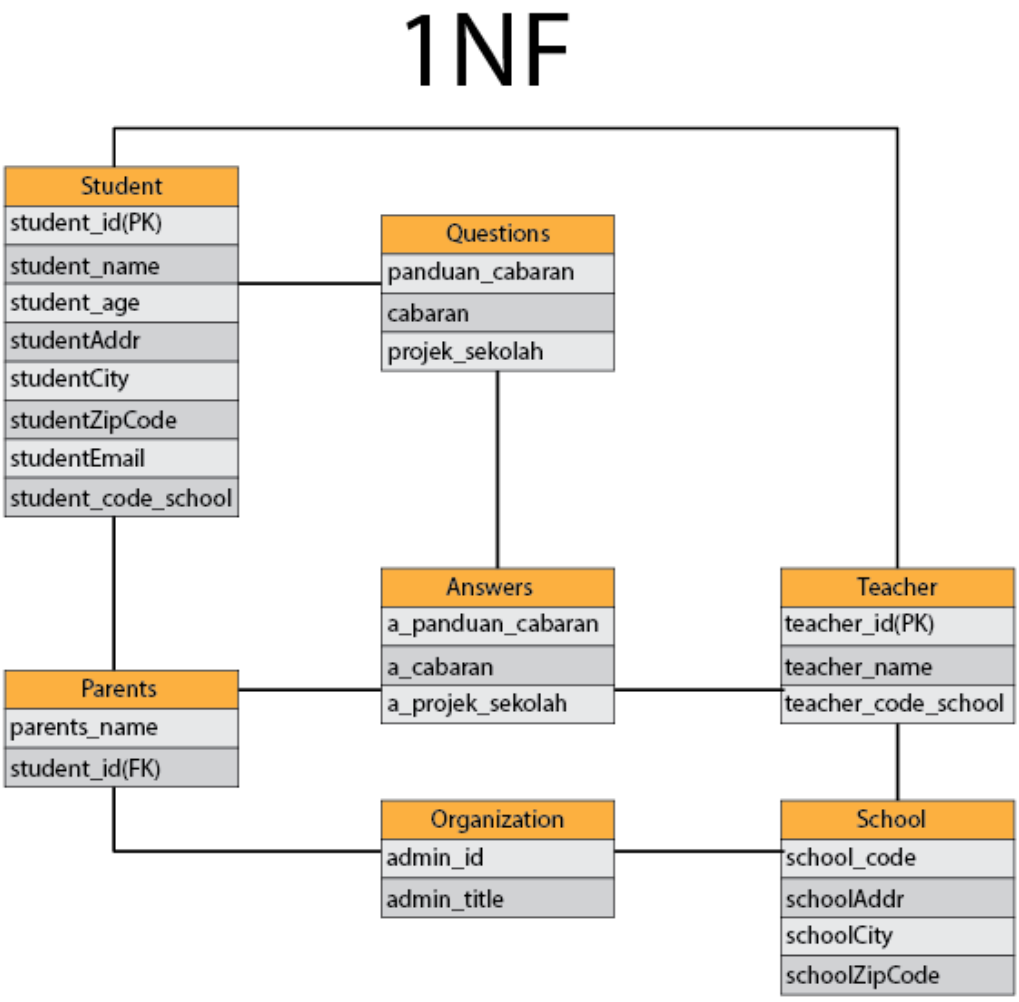
i. student (student_id, student_name, student_age, studentAddr, studentCity, studentZipCode, studentEmail, student_code_school)
ii. teacher (teacher_id, teacher_name, teacher_code_school)
iii. parents (parents_name, student_id, student_name, studentEmail, student_code_school)
iv. organization (admin_id, admin_title)
v. school (school_code, schoolAddr, schoolCity, schoolZipCode)
vi. answer (a_panduan_cabaran, a_cabaran, a_projek_school)
vii. question (panduan_cabaran, cabaran, projek_sekolah)

NORMALIZATION OF DATABASE RELATIONAL SCHEMA

1NF

An entity type is in first normal form (1NF) when it contains no repeating groups of data. Based on the previous logical data model, *Parents* table has several repeating attributes that are *student_name, studentEmail* and *student_code_school*. These attributes come from *Student* table. After removing the unnecessary attributes, the table become:

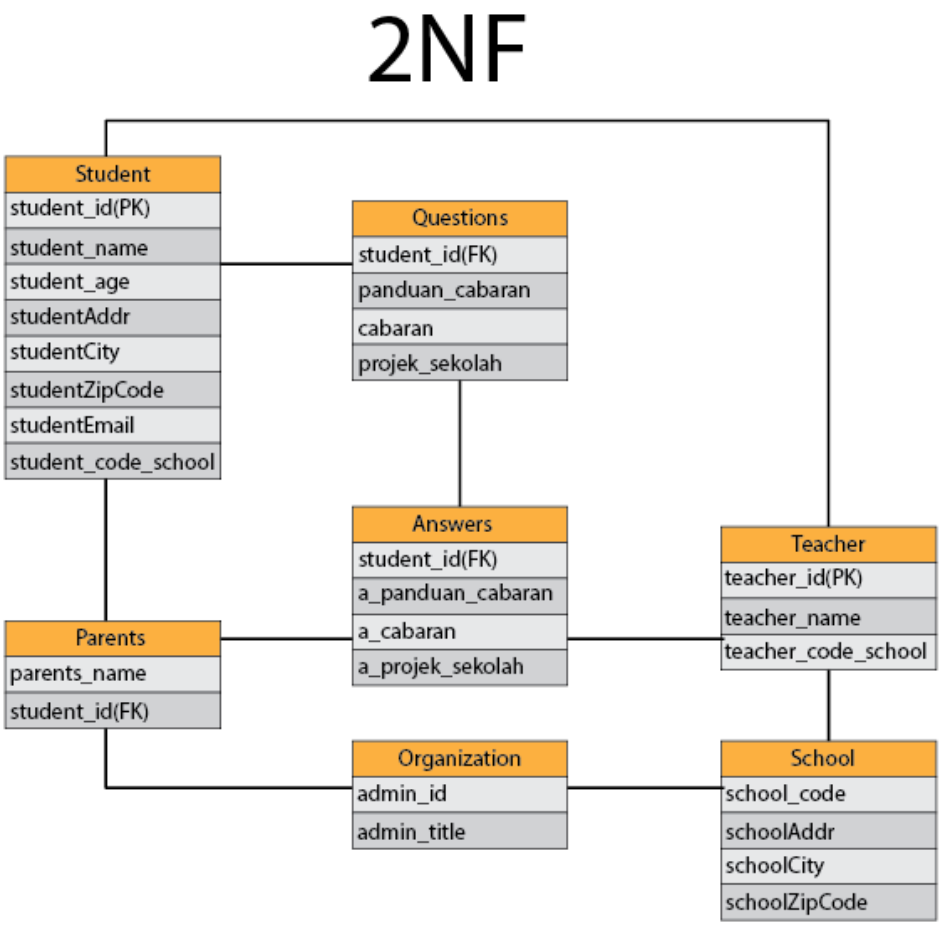
Parents (parents_name, student_id)



2NF

An entity type is in second normal form (2NF) when it is in 1NF and when every non-key attribute, any attribute that is not part of the primary key, is fully dependent on the primary key. Based on 1NF table, there is a problem question on *question* and *answer* table where the table was not fully dependable on the primary key. After putting the foreign key from *student* table, the table become:

i. Answer (student_id, a_panduan_cabaran, a_cabaran, a_projek_sekolah)
ii. Question (student_id, panduan_cabaran, cabaran, projek_sekolah)



3NF

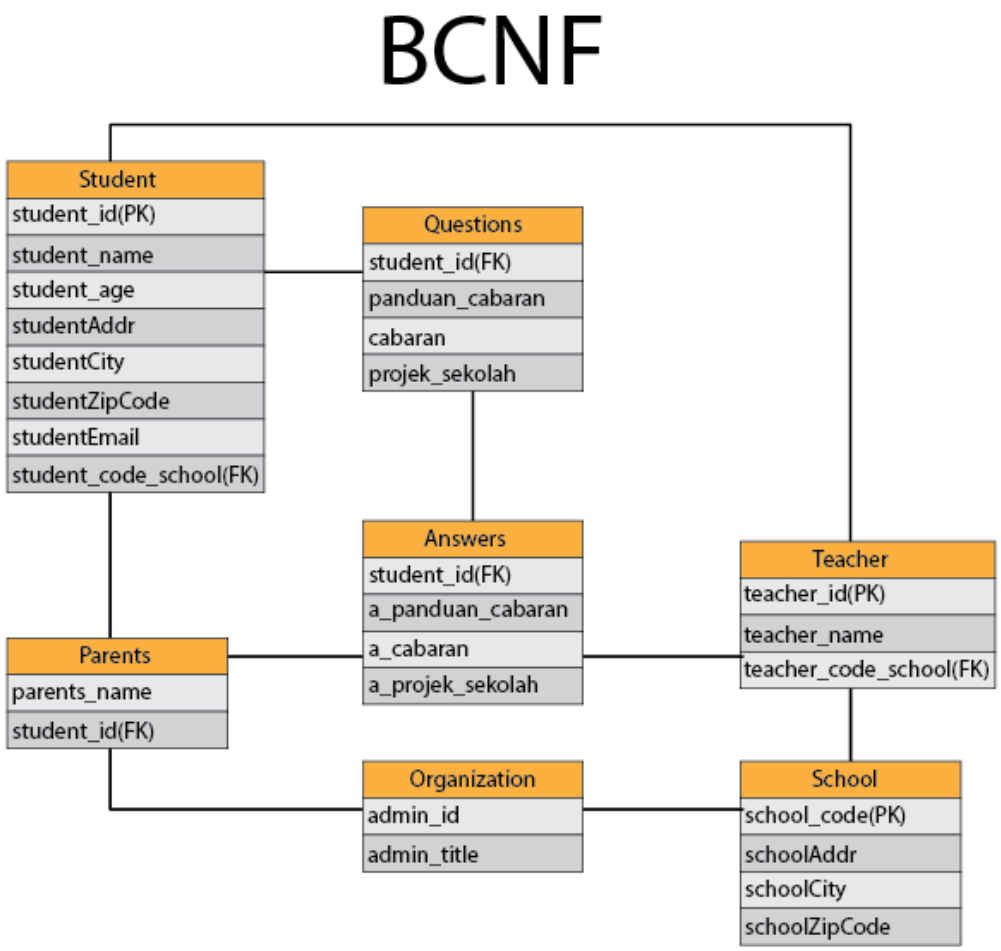
An entity type is in third normal form (3NF) when it is in 2NF and when all of its attributes are directly dependent on the primary key. Based on 2NF table, all of the entity is directly dependant on primary key.

BOYCE-CODD NORMAL FORM

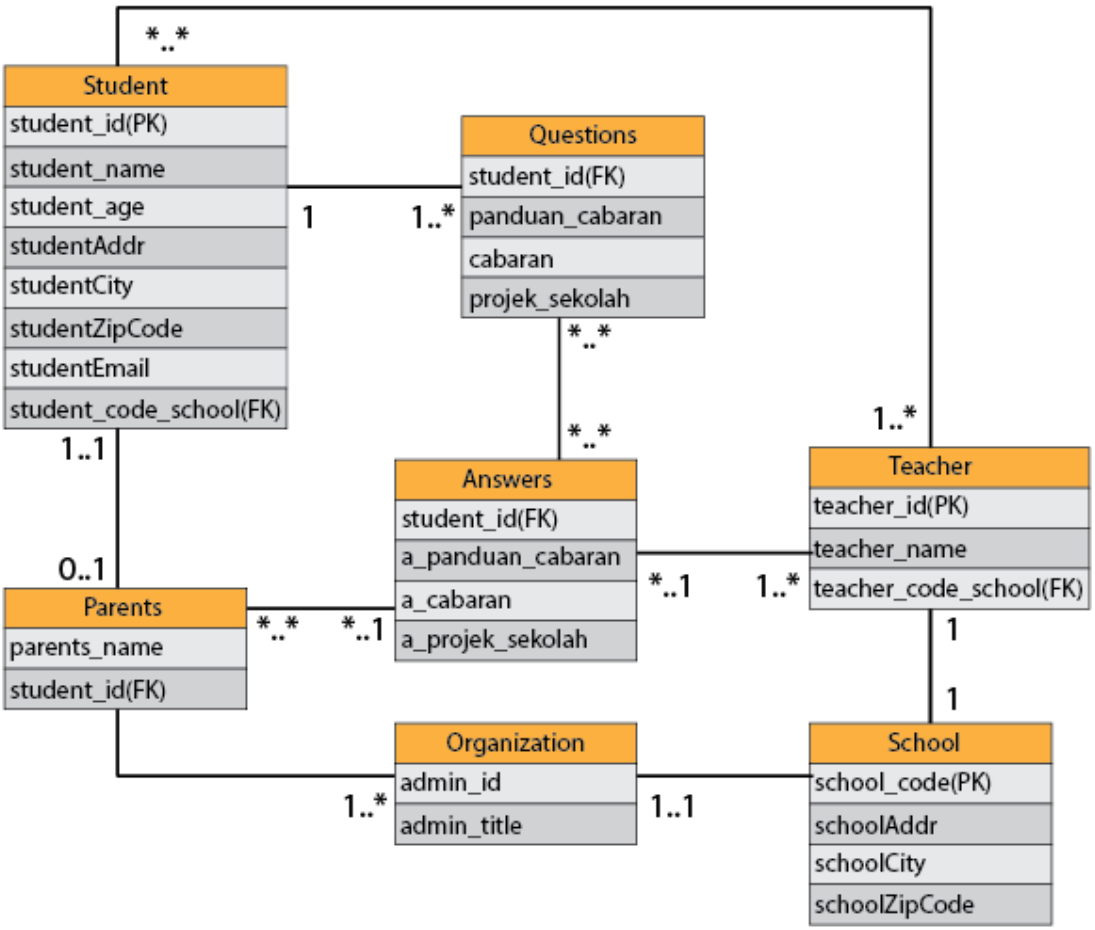
For a table to satisfy the Boyce-Codd Normal Form, it should satisfy the following two conditions:

i. It should be in the Third Normal Form.
ii. And, for any dependency A → B, A should be a super key.

Based on 3NF table, the table should be:



FINAL LOGICAL ERD



CONCEPTUAL DATA DICTIONARY

Data dictionary that documents the entities for Student of IMELC

Entity name	Description	Occurrence
Student	General term describing all student by IMELC.	Each student that went to Johor Bahru school.
Parents	General term describing all parents of the student.	Each parent has child or children that went to the particular school.
Teacher	General term describing all teachers in the school.	Each school has teachers that are teaching in the school.

Entity name	Multiplicity	Relationship	Entity name	Multiplicity
Student	*..* *..*	Answers Monitored by	Question Parents	*..* 1..1
Question	*..*	Keys in	Answer	*..*
Parents	1..1	Checks	Answer	*..*
Answer	*..*	Hands in	Teacher	1..*
Teacher	1..*	Sends	School	1..1
School	1..1	Submit to	Organization	1..1
Organization	1..1	Notifies	Parents	1..1

LOGICAL DATA DICTIONARY

DATA STUDENT

Field Number	Data type	Data Format	Field Size	Example	Description
studentID	integer	NNNNN	10	10,001	Unique number ID for all student
studentName	varchar		50	Muhammad Fikri bin Muhammad Faliq	Name for student
studentAge	integer	NN	10	12	The age for student
Gender	char	F/M	1	M	Gender for Gender
Address	varchar		100	11, Taman Universiti	Student Address
City	varchar		50	Skudai, Johor	City for the address
ZipCode	integer		10	81300	Code for Zip
studentEmail	varchar	db@gmail.com	25	fikri@gmail.com	Email for student
SchoolCode	integer	NNN	10	101	The code for School

DATA TEACHER

Field Number	Data type	Data Format	Field Size	Example	Description
TeacherID	integer	TNN	10	T01	unique number ID for all teacher
TeacherName	varchar		100	Khatijah Binti Amri	Name for teacher
SchoolCode	integer	NNN	10	101	The code for School

DATA PARENTS

Field Number	Data Type	Data Format	Field Size	Example	Description
Name	varchar		100	Hayati Binti Rahmat	Name for student's parents
studentID	integer	NNNN	10	10001	Unique number ID for all student
studentName	varchar		100	Muhammad Fikri bin Muhammad Faliq	Name for student
studentEmail	varchar		25	fikri@gmail.com	Email for student
SchoolCode	integer	db@gmail.com		101	The code for School