



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
Faculty of Engineering

SECD2523 – DATABASE

PROJECT PHASE 4

LOGICAL DESIGN

SECTION: 03 – 2SECR

COURSE NAME: BACHELOR OF COMPUTER SCIENCE – COMPUTER NETWORKS & SECURITY

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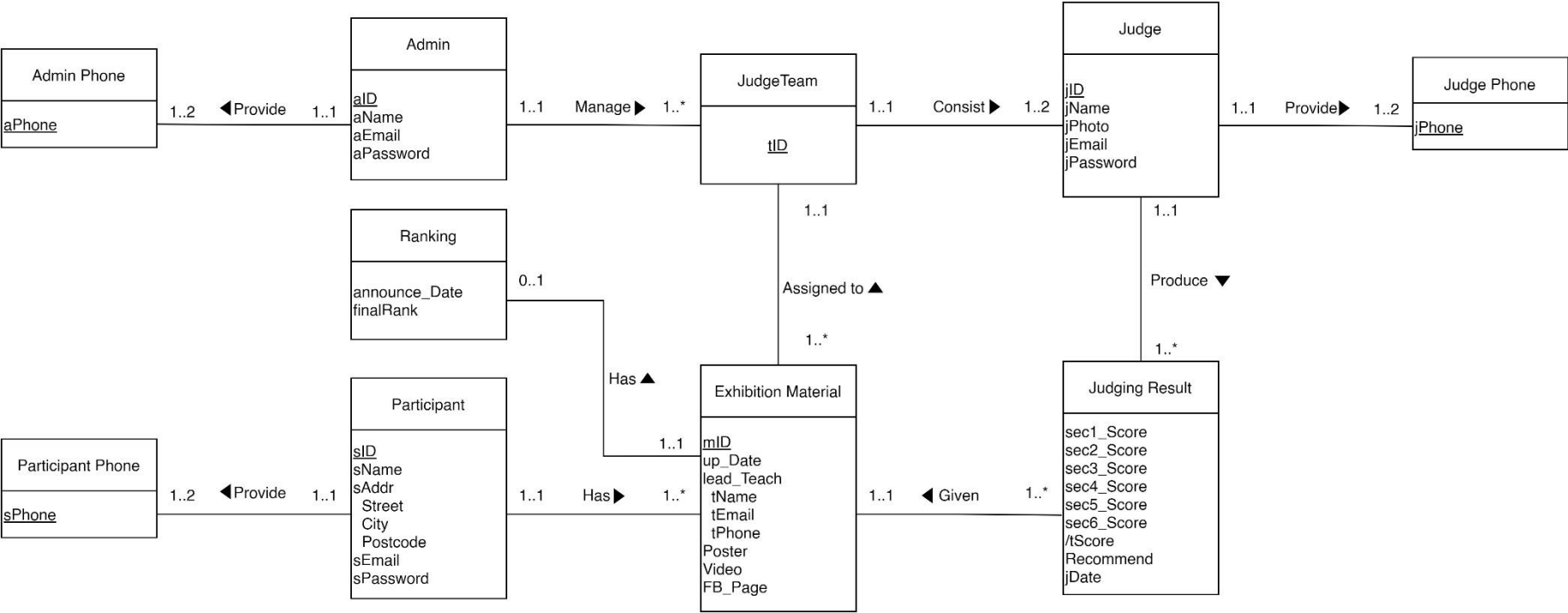


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Logical Entity Relationship Diagram (ERD)



Relational Schemas

First Normal Form (1NF)

Relational Schema
Admin(<u>aID</u> , aName, aEmail, aPassword) Primary Key: aID
Admin Phone(<u>aPhone</u> , aID) Primary Key: aPhone Foreign Key: aID REFERENCES Admin(aID)
JudgeTeam(<u>tID</u> , aID) Primary Key: tID Foreign Key: aID REFERENCES Admin(aID)
Judge(<u>jID</u> , jName, jPhoto, jEmail, jPassword, tID) Primary Key: jID Foreign Key: tID REFERENCES JudgeTeam(tID)
Judge Phone(<u>jPhone</u> , jID) Primary Key: jPhone Foreign Key: jID REFERENCES Judge(jID)
Participant(<u>sID</u> , sName, Street, City, Postcode, sEmail, sPassword) Primary Key: sID
Participant Phone(<u>sPhone</u> , sID) Primary Key: sPhone Foreign Key: sID REFERENCES Participant(sID)
Exhibition Material(<u>mID</u> , up_Date, tName, tEmail, tPhone, Poster, Video, FB_Page, sID, tID) Primary Key: mID Foreign Key 1: sID REFERENCES Participant(sID) Foreign Key 2: tID REFERENCES JudgeTeam(tID)
Ranking(<u>mID</u> , announce_Date, finalRank) Primary Key: mID Foreign Key: mID REFERENCES Exhibition Material(mID)
Judging Result(jID, mID, sec1_Score, sec2_Score, sec3_Score, sec4_Score, sec5_Score, sec6_Score, tScore, Recommend, jDate) Primary Key: jID, mID Foreign Key 1: jID REFERENCES Judge(jID) Foreign Key 2: mID REFERENCES Exhibition Material(mID)

Second Normal Form (2NF)

2NF is the same as 1NF as there exist no partial dependency in the schema.

Relational Schema
Admin(<u>aID</u> , aName, aEmail, aPassword) Primary Key: aID
Admin Phone(<u>aPhone</u> , aID) Primary Key: aPhone Foreign Key: aID REFERENCES Admin(aID)
JudgeTeam(<u>tID</u> , aID) Primary Key: tID Foreign Key: aID REFERENCES Admin(aID)
Judge(<u>jID</u> , jName, jPhoto, jEmail, jPassword, tID) Primary Key: jID Foreign Key: tID REFERENCES JudgeTeam(tID)
Judge Phone(<u>jPhone</u> , jID) Primary Key: jPhone Foreign Key: jID REFERENCES Judge(jID)
Participant(<u>sID</u> , sName, Street, City, Postcode, sEmail, sPassword) Primary Key: sID
Participant Phone(<u>sPhone</u> , sID) Primary Key: sPhone Foreign Key: sID REFERENCES Participant(sID)
Exhibition Material(<u>mID</u> , up_Date, tName, tEmail, tPhone, Poster, Video, FB_Page, sID, tID) Primary Key: mID Foreign Key 1: sID REFERENCES Participant(sID) Foreign Key 2: tID REFERENCES JudgeTeam(tID)
Ranking(<u>mID</u> , announce_Date, finalRank) Primary Key: mID Foreign Key: mID REFERENCES Exhibition Material(mID)
Judging Result(jID, mID, sec1_Score, sec2_Score, sec3_Score, sec4_Score, sec5_Score, sec6_Score, tScore, Recommend, jDate) Primary Key: jID, mID Foreign Key 1: jID REFERENCES Judge(jID) Foreign Key 2: mID REFERENCES Exhibition Material(mID)

Third Normal Form (3NF)

The school address attributes (Street, City, Postcode) in Participant entity and the lead teacher attributes (tName,tEmail, tPhone) in the Exhibition Material entity portrait transitive functional dependency. Hence, 2 new entites was created which are AdvisorTeacher and District.

Relational Schema
Admin(<u>aID</u> , aName, aEmail, aPassword) Primary Key: aID
Admin Phone(<u>aPhone</u> , aID) Primary Key: aPhone Foreign Key: aID REFERENCES Admin(aID)
JudgeTeam(<u>tID</u> , aID) Primary Key: tID Foreign Key: aID REFERENCES Admin(aID)
Judge(<u>jID</u> , jName, jPhoto, jEmail, jPassword, tID) Primary Key: jID Foreign Key: tID REFERENCES JudgeTeam(tID)
Judge Phone(<u>jPhone</u> , jID) Primary Key: jPhone Foreign Key: jID REFERENCES Judge(jID)
Participant(<u>sID</u> , sName, lotNo, sEmail, sPassword) Primary Key: sID Foreign Key: lotNo REFERENCES District(lotNo)
District(<u>lotNo</u> , Street, City, Postcode) Primary Key: lotNo
Participant Phone(<u>sPhone</u> , sID) Primary Key: sPhone Foreign Key: sID REFERENCES Participant(sID)
Exhibition Material(<u>mID</u> , up_Date, advisorID, Poster, Video, FB_Page, sID, tID) Primary Key: mID Foreign Key 1: sID REFERENCES Participant(sID) Foreign Key 2: tID REFERENCES JudgeTeam(tID) Foreign Key 3: advisorID REFERENCES AdvisorTeacher(advisorID)
AdvisorTeacher(<u>advisorID</u> ,tName, tEmail, tPhone) Primary Key: advisorID
Ranking(<u>mID</u> , announce_Date, finalRank) Primary Key: mID Foreign Key: mID REFERENCES Exhibition Material(mID)

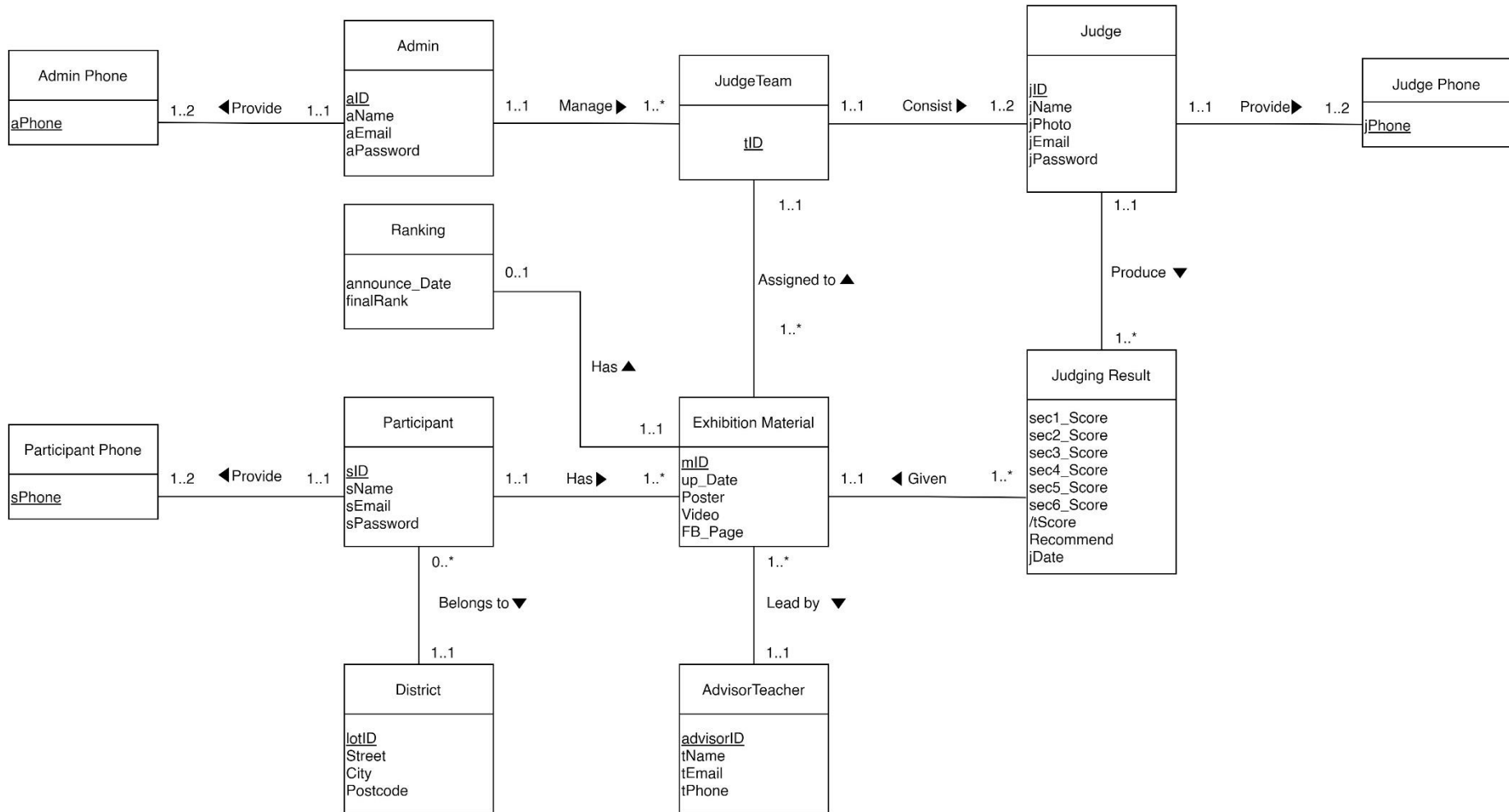
Judging Result(jID, mID, sec1_Score, sec2_Score, sec3_Score, sec4_Score, sec5_Score, sec6_Score, tScore, Recommend, jDate)

Primary Key: jID, mID

Foreign Key 1: jID REFERENCES Judge(jID)

Foreign Key 2: mID REFERENCES Exhibition Material(mID)

Revised Logical Entity Relationship Diagram (ERD)



Data Dictionary

Attributes

Entity Name	Attributes	Description	Data Type & Length	Nullity
Admin	aID {PK}	Unique ID for admin login	varchar(8)	No
	aName	Name of admin	varchar(50)	No
	aEmail	Email	varchar(50)	No
	aPassword	Login password of admin	varchar(15)	No
Admin Phone	aPhone {PK}	Phone number	number(11)	No
Ranking	announce_Date	Announce date of winner	Date	No
	finalRank	The final ranking of participants	number(2)	No
Participant	sID {PK}	Unique ID for student login	varchar(8)	No
	sName	Name of student	varchar(50)	No
	sEmail	Email	varchar(50)	No
	sPassword	Login password of student	varchar(15)	No
Participant Phone	sPhone {PK}	Phone number	number(11)	No
District	lotID {PK}	Unique ID for participant's district	varchar(8)	No
	Street	Address of participant's school	varchar(20)	No
	City	City of participant's school	varchar(15)	No
	Postcode	Postcode of participant's school	varchar(5)	No
AdvisorTeacher	advisorID {PK}	Unique ID for advisor teacher	varchar(8)	No
	tName	Name of advisor teacher	varchar(50)	No
	tEmail	Email of advisor teacher	varchar(50)	No
	tPhone	Phone number of advisor teacher	number(11)	No
Judge	jID {PK}	Unique ID for judge login	varchar(8)	No
	jName	Name of judge	varchar(50)	No
	jPhoto	Photo of judge		No
	jEmail	Email	varchar(50)	No
	jPassword	Login password for judge	varchar(15)	No
Judge Phone	jPhone{PK}	Phone number	number(11)	No
JudgeTeam	tID {PK}	ID of assigned judge team to evaluate which materials	varchar(10)	No
Exhibition Material	mID{PK}	Unique ID assigned to material(s) of exhibition	varchar(5)	No
	up_Date		Date	No

	Poster Video FB_Page	Upload date that the material was sent into the system Poster to be judged Video to be judged Social media page-to judge number of likes		No No No
Judging Result	sec1_Score sec2_Score sec3_Score sec4_Score sec5_Score sec6_Score /tScore Recommend jDate	Cumulative score Cumulative score Cumulative score Cumulative score Cumulative score Cumulative score Score Recommendation Judging date	number(3) number(3) number(3) number(3) number(3) number(3) int(2) Date	No No No No No No No No No

Entity Relationship

Entity Name	Multiplicity	Relationship	Entity Name 2	Multiplicity
Admin	1..1	Provide	Admin Phone	1..2
Admin	1..1	Manage	JudgeTeam	1..*
JudgeTeam	1..1	Consist	Judge	1..2
ExhibitionMaterial	1..*	Assigned to	JudgeTeam	1..1
Judge	1..1	Provide	Judge Phone	1..2
Judge	1..1	Produce	ExhibitionMaterial	1..*
ExhibitionMaterial	1..1	Has	Ranking	0..1
Judging Result	1..*	Given	ExhibitionMaterial	1..1
ExhibitionMaterial	1..*	Lead by	AdvisorTeacher	1..1
Participant	1..1	Has	Exhibition Material	1..*
Participant	0..*	Belongs to	District	1..1
Participant	1..1	Provide	Participant Phone	1..2

References

- Connolly, T. (2014). *Database Systems A Practical Approach to Design, Implementation, and Management*. London: Cengage Publishing Services.
- Linstedt, D. (2016, January 15). *Advanced Data Vault Modeling*. Retrieved from Science Direct: <https://www.sciencedirect.com/topics/computer-science/reference-table>