

## 1. Name of The Project



## 2. Project Title

Advertisement Posting Management on Campus

## 3. Team

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## 4. Project Description

Create a database in which students, professors, staff in a college, and non-college-members can post advertisements on approved boards installed in various locations around the campus. If someone is not a member of the college, they must register into the database and enter their data. The main difference between college members and non-members is that members have a collegeID (staff ID, student ID, ...) and members are affiliated with a department.

We store information about the date of registration for non-members. People (non-college members, students, professors, and staff) can send a message to the person who posted the advertisement. These communications (sender name, receiver name, message, date, time, regarding post (post number and post title)) are also stored in the database.

- A college member is identified by a college ID number and is described by a name, phone number, email address, and affiliated department. Specific members have extra attributes. Students have a major field of study while staff and instructors do not have such an attribute. Staff and instructors have an office location and start date of employment. Staff has the attribute position title while professors do not have this attribute. Professor has the attribute Education Level.
- Advertisements are defined by a unique adID number, type (ad for private tutorship, rent a room, selling something, looking for a roommate, event advertisement...), postdate, duration, size dimension (width, length)
- all advertisements must be approved by a responsible person who is part of the staff (we store information of this person)
- Board location on campus identified by a board ID, and described by building, floor, and location on the floor.
- The database will store one phone number, one email, and one address for every person.
- The entity Advertisement has an attribute called end\_post, to know until what date the advertisement should be post. DAYS\_POSTED is a derived attribute.

## 5. Assumptions about Cardinality and Participations

RELATIONSHIPS, CARDINALITY and PARTICIPATION

1.

"PERSON" SENT "MESSAGE". Cardinality is M:N . Explanation: one person can send many messages related to a post because have many questions. 1 message can be received by many People.

PERSON -> SENT -> MESSAGE | PARTICIPATION: PARTIAL (NOT ALL PEOPLE SEND MESSAGES RELATED TO A POST)

MESSAGE -> SENT BY -> PERSON | PARTICIPATION: TOTAL (MESSAGES MUST HAVE BEEN SENT BY AT LEAST 1 PERSON)

2.

"PERSON" RECEIVE "MESSAGE". Cardinality is M:N. Explanation: one person can receive many messages. 1 message can be sent by many people.

PERSON -> RECEIVE -> MESSAGE | PARTICIPATION: PARTIAL (NOT ALL PEOPLE RECEIVE MESSAGES RELATED TO A POST)

MESSAGE -> RECEIVED BY -> PERSON | PARTICIPATION: TOTAL (MESSAGES MUST BE RECEIVED BY AT LEAST 1 PERSON)

3.

"SENDER" SENDS MESSAGE TO "RECEIVER". Cardinality is M:N. Explanation: One person/sender can send message to many receivers. One receiver can be sent messages by many senders.

4.

"PERSON" POST "ADVERTISEMENT". Cardinality is 1:M *M(ADVERTISEMENT SIDE)*. Explanation: one person can post many advertisements, One advertisement is posted only by one person.

PERSON -> POST ->ADVERTISEMENT| PARTICIPATION: PARTIAL (NOT ALL PEOPLE POST AN ADVERTISEMENT)

ADVERTISEMENT -> POSTED -> PERSON | PARTICIPATION: TOTAL (ADVERTISEMENT ARE ALWAYS POSTED BY ONE PERSON)

5.

"MESSAGE" IS RELATED TO "ADVERTISEMENT" . Cardinality: 1:M *M(MESSAGE SIDE)*. Explanation: One message is unique and is related to one advertisement. One advertisement can have multiple related messages.

MESSAGE -> IS RELATED TO -> ADVERTISEMENT | PARTICIPATION: TOTAL (ALL MESSAGES are RELATE TO ADVERTISEMENTS)

ADVERTISEMENT -> HAS RELATED -> MESSAGE | PARTICIPATION: PARTIAL (NOT ALL ADVERTISEMENT HAS A MESSAGE RELATED TO)

6.

"STAFF" APPROVED ADVERTISEMENTS "ADVERTISEMENT". Cardinality: 1:M *M(ADVERTISEMENT SIDE)*. Explanation: one responsible person manages multiple advertisements. One advertisement is managed by one person.

ADVERTISEMENT\_RESPONSIBLE -> APPROVED ADVERTISEMENTS -> ADVERTISEMENT | PARTICIPATION: PARTIAL (NOT ALL STAFF APPROVED ADVERTISEMENTS )

ADVERTISEMENTS -> ARE APPROVED -> ADVERTISEMENT\_RESPONSIBLE | PARTICIPATION: TOTAL (ALL ADVERTISEMENTS ARE ALWAYS APPROVED BY STAFF ADVERTISEMENT\_RESPONSIBLE)

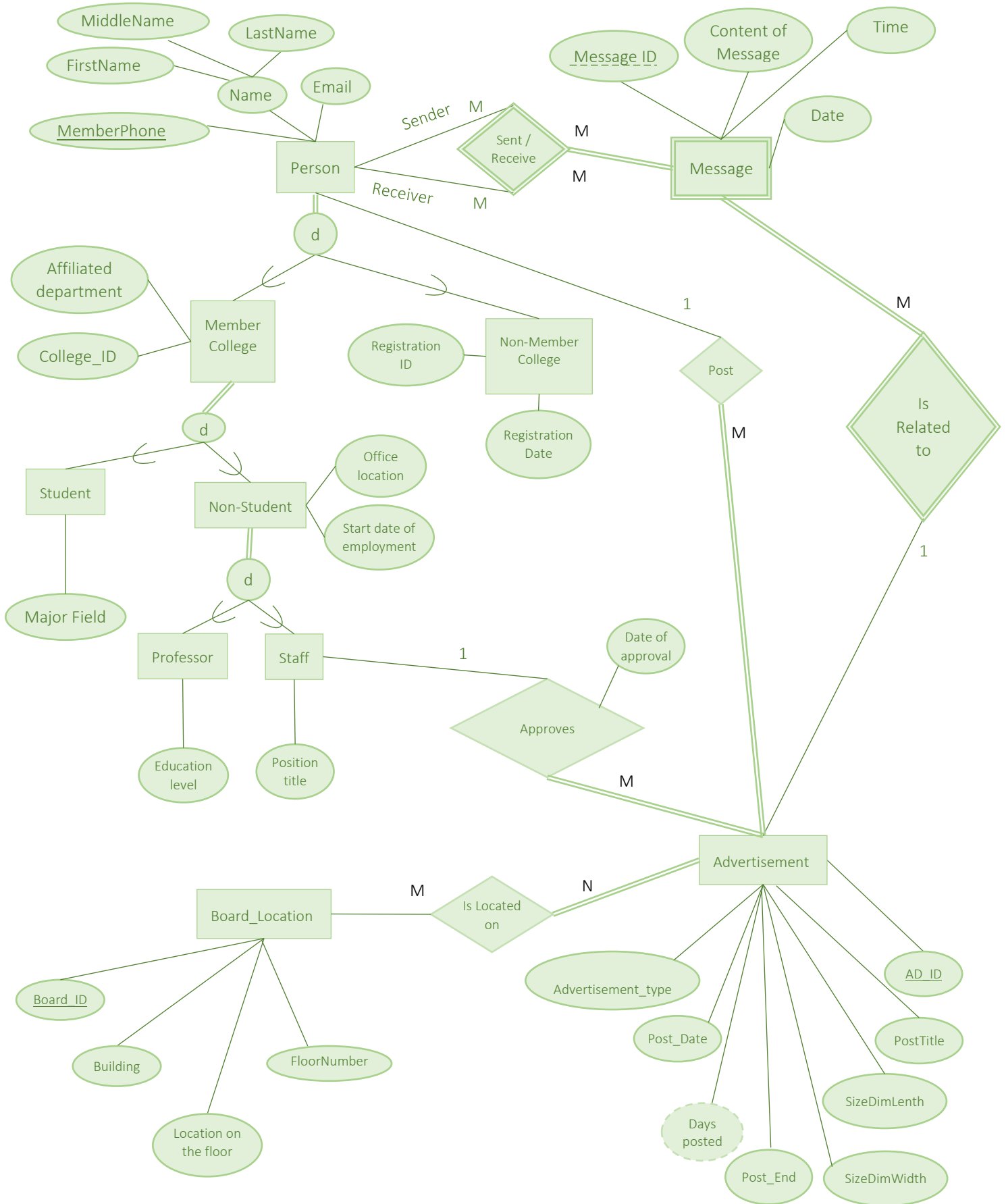
7.

"ADVERTISEMENT" IS LOCATED "BOARD LOCATION". Cardinality: M:N. Explanation: one advertisement can be located on many board\_locations. One board location can have many advertisements.

ADVERTISEMENT -> IS LOCATED -> BOARD LOCATION | PARTICIPATION: TOTAL (ALL ADVERTISEMENTS ARE LOCATED IN AT LEAST ONE BOARD LOCATION)

BOARD LOCATION -> HAS LOCATED -> ADVERTISEMENT | PARTICIPATION: PARTIAL (ONE BOARD COULD NOT HAVE ANY ADVERTISEMENT)

## 6. EER Modeling Diagram



## 7. ER-Model Mapping to Database Relational Schema

Person(MemberPhone, FirstName, MiddleName, Last Name, Email)

Advertisement(AdID, Advertisement\_Type, Post\_Date, Post\_End, SizeDimLength, SizeDimWidth, PostTitle, **MemberPhone**)

BoardLocation(Board\_ID, Building, FloorNumber, LocationOnFloor)

NonCollegeMember(**NonCollegeMemberPhone**, Registration\_ID, RegistrationDate)

StudentCollegeMember(**StudentPhone**, MajorField, Aff\_Dep, College\_ID )

ProfessorCollegeMember (**ProfessorPhone**, EdLevel, Aff\_Dep, College\_ID, OfficeLocation, EmploymentDate)

StaffCollegeMember (**StaffPhone**, PosTitle, Aff\_Dep, College\_ID, OfficeLocation, EmploymentDate)

Person\_Advertisement\_Message(**Sender Phone, Receiver Phone, AD\_ID, Message\_ID**, Content, MessageTime, MessageDate)

Staff\_Approves\_Advertisement(**AD\_ID**, **StaffPhone** , ApprovalDate)

Advertisement\_LocatedOn\_BoardLocation(**AD\_ID, Board\_ID**)

## 8. Normalization

1NF

Relation	Explanation
Person( <u>MemberPhone</u> , FirstName, MiddleName, Last Name, Email)	There isn't any Composite attribute, There isn't any Multivalued attribute, There isn't any nested relation
Advertisement( <u>AdID</u> , Advertisement_Type, Post_Date, Post_End, SizeDimLength, SizeDimWidth, PostTitle, <b>MemberPhone</b> )	There isn't any Composite attribute, There isn't any Multivalued attribute, There isn't any nested relation
BoardLocation( <u>Board_ID</u> , Building, FloorNumber, LocationOnFloor)	There isn't any Composite attribute, There isn't any Multivalued attribute, There isn't any nested relation
NonCollegeMember( <b><u>NonCollegeMemberPhone</u></b> , Registration_ID, DateOfRegistration)	There isn't any Composite attribute, There isn't any Multivalued attribute, There isn't any nested relation
StudentCollegeMember( <b><u>StudentPhone</u></b> , MajorField, Aff_Dep, College_ID )	There isn't any Composite attribute, There isn't any Multivalued attribute, There isn't any nested relation
ProfessorCollegeMember ( <b><u>ProfessorPhone</u></b> , EdLevel, Aff_Dep, College_ID, OfficeLocation, EmploymentDate)	There isn't any Composite attribute, There isn't any Multivalued attribute, There isn't any nested relation
StaffCollegeMember ( <b><u>StaffPhone</u></b> , PosTitle, Aff_Dep, College_ID, OfficeLocation, EmploymentDate)	There isn't any Composite attribute, There isn't any Multivalued attribute, There isn't any nested relation
Person_Advertisement_Message( <b><u>Sender Phone, Receiver Phone, AD_ID, Message_ID</u></b> , Content, MessageTime, MessageDate)	There isn't any Composite attribute, There isn't any Multivalued attribute, There isn't any nested relation
Staff_Approves_Advertisement( <b><u>AD_ID</u></b> , <b><u>StaffPhone</u></b> , ApprovalDate)	There isn't any Composite attribute, There isn't any Multivalued attribute, There isn't any nested relation
Advertisement_LocatedOn_BoardLocation( <b><u>AD_ID, Board_ID</u></b> )	There isn't any Composite attribute, There isn't any Multivalued attribute, There isn't any nested relation

Relation	Explanation
Person( <u>MemberPhone</u> , FirstName, MiddleName, Last Name, Email)	
Advertisement( <u>AdID</u> , Type of Advertisement, Post_Date, Post_End, Size_Dimension, <b>MemberPhone</b> )	
BoardLocation( <u>Board_ID</u> , Building, FloorNumber, LocationOnFloor)	
NonCollegeMember( <b><u>NonMemberPhone</u></b> , Registration_ID, DateOfRegistration)	
StudentCollegeMember( <b><u>StudentPhone</u></b> , MajorField, Aff_Dep, College_ID )	
ProfessorCollegeMember ( <b><u>ProfessorPhone</u></b> , EdLevel, Aff_Dep, College_ID)	
StaffCollegeMember ( <b><u>StaffPhone</u></b> , PosTitle, Aff_Dep, College_ID)	
Person_Advertisement_Message( <b><u>Sender Phone</u></b> , <b><u>Receiver Phone</u></b> , <b><u>AD ID</u></b> , Message_ID, Content, MessageTime, MessageDate)	<p>The full key (<b><u>Sender Phone</u></b>, <b><u>Receiver Phone</u></b>, <b><u>AD ID</u></b>, <b><u>Message ID</u></b>) is needed to determine the attribute Content</p> <p>The full key (<b><u>Sender Phone</u></b>, <b><u>Receiver Phone</u></b>, <b><u>AD ID</u></b>, <b><u>Message ID</u></b>) is needed to determine the attribute Time</p> <p>The full key (<b><u>Sender Phone</u></b>, <b><u>Receiver Phone</u></b>, <b><u>AD ID</u></b>, <b><u>Message ID</u></b>) is needed to determine the attribute Year, Month, and day</p>
Staff_Approves_Advertisement( <b><u>AD_ID</u></b> , <b><u>StaffPhone</u></b> , ApprovalDate)	
Advertisement_LocatedOn_BoardLocation( <b><u>AD_ID</u></b> , <b><u>Board ID</u></b> )	

There is no transitive functional dependency in any of the relations.

## 9. Determining Data Types (Domain) and Constraints

Field/Attribute	Data Type	Constraints
<b>PERSON</b>		
MemberPhone	CHAR(10)	PRIMARY KEY
FirstName	VARCHAR(20)	NOT NULL
MiddleName	VARCHAR(20)	
LastName	VARCHAR(25)	NOT NULL
Email	VARCHAR(50)	

<b>ADVERTISEMENT</b>		
AdID	NUMERIC(4)/INT	PRIMARY KEY
Adv_Type	CHAR(15)	NOT NULL
Post_Date	DATE	NOT NULL
Post_End_Date	DATE	OUTLINE CHECK CONSTRAINT (Post_End_Date > Post_Date)
SizeDim_Length	FLOAT	
SizeDim_Width	FLOAT	
Post_Title	VARCHAR(70)	NOT NULL
MemberPhone	CHAR(10)	FOREIGN KEY, ON DELETE SET NULL
<b>BOARDLOCATION</b>		
BoardID	NUMERIC(3)/INT	PRIMARY KEY
Building	CHAR(3)	NOT NULL
FloorNumber	NUMERIC(2)/INT	NOT NULL
LocationOnFloor	CHAR(5)	
<b>NONCOLLEGE MEMBER</b>		
NonCollegeMemberPhone	CHAR(10)	PRIMARY KEY, FOREIGN KEY, ON DELETE CASCADE
RegistrationID	NUMERIC(6)/INT	UNIQUE
Registration_Date	DATE	NOT NULL
<b>STUDENT_COLLEGE MEMBER</b>		
StudentPhone	CHAR(10)	PRIMARY KEY, FOREIGN KEY, ON DELETE CASCADE
MajorField	CHAR(4)	NOT NULL
Aff_Dep	VARCHAR(50)	NOT NULL
CollegelD	NUMERIC(7)/INT	UNIQUE
<b>PROFESSOR_COLLEGE MEMBER</b>		
ProfessorPhone	CHAR(10)	PRIMARY KEY, FOREIGN KEY, ON DELETE CASCADE
EdLevel	VARCHAR(4)	
Aff_Dep	VARCHAR(50)	NOT NULL
CollegelD	NUMERIC(7)/INT	UNIQUE
OfficeLocation	CHAR(5)	
EmploymentDate	DATE	
<b>STAFF_COLLEGE MEMBER</b>		
StaffPhone	CHAR(10)	PRIMARY KEY, FOREIGN KEY, ON DELETE CASCADE
PositionTitle	VARCHAR(20)	NOT NULL
Aff_Dep	VARCHAR(50)	NOT NULL
CollegelD	NUMERIC(7)/INT	UNIQUE
OfficeLocation	CHAR(5)	
EmploymentDate	DATE	
<b>PERSON_ADVERTISEMENT_MESSAGE</b>		
Sender_Phone	CHAR(10)	PRIMARY KEY, FOREIGN KEY, ON DELETE CASCADE
Receiver_Phone	CHAR(10)	PRIMARY KEY, FOREIGN KEY, ON DELETE CASCADE
AdID	NUMERIC(4)/INT	PRIMARY KEY, FOREIGN KEY, ON DELETE CASCADE
MessageID	NUMERIC(4)/INT	PRIMARY KEY
Content	VARCHAR(500)	NOT NULL
MessageTime	TIME	
MessageDate	DATE	NOT NULL

STAFF_APPROVES_ADVERTISEMENT		
AdID	NUMERIC(4)/INT	PRIMARY KEY, FOREIGN KEY, ON DELETE CASCADE
StaffPhone	CHAR(10)	FOREIGN KEY, ON DELETE CASCADE
ApprovalDate	DATE	NOT NULL
STAFF_APPROVES_ADVERTISEMENT		
AdID	NUMERIC(4)/INT	PRIMARY KEY, FOREIGN KEY, ON DELETE CASCADE
BoardID	NUMERIC(3)/INT	PRIMARY KEY, FOREIGN KEY, ON DELETE CASCADE