



DATABASE DESIGN FOR A NEWSPAPER

PHASE I

By

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Report submitted to: **Dr. Ramzi Haraty**

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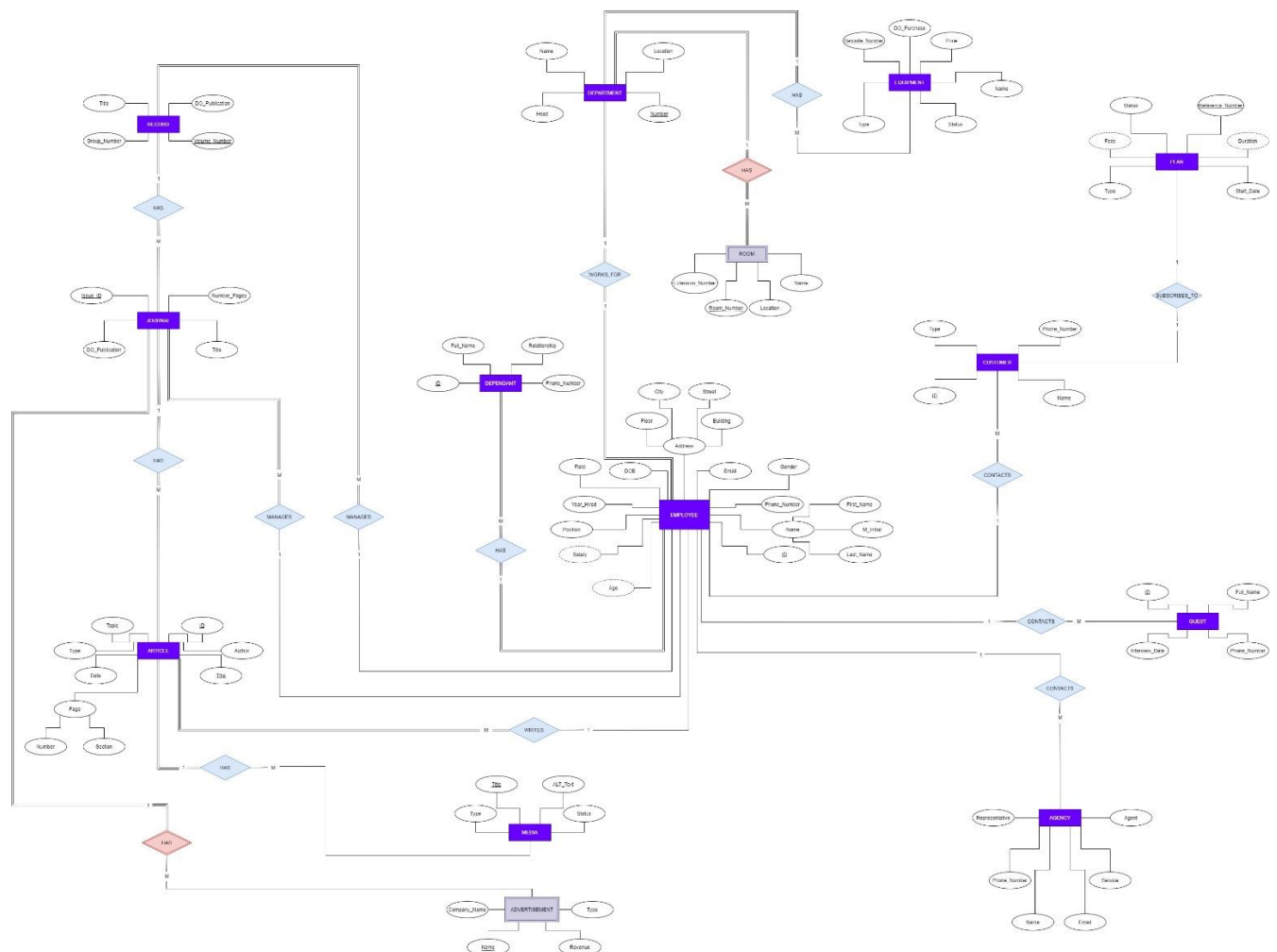
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Introduction

Our team, named “The SQL Squad”, are delighted to submit our report detailing the thought process and design choice justifications for our hypothetical newspaper organization. Our members have visited “Al Nahhar” Newspaper HQ located in Downtown, Beirut in order to inquire about their Database outline and implementation techniques, as well as their organizational management. The experience working as a team as well as going through a creative process has proven to be an undeniably helpful asset in each of our members’ repertoire.

This report will go over our work process, with a thorough dive into our reasoning behind every design choice as well as their function in the overall final project. Regarding software, our team has opted to use “Draw.io”, an ER-Diagram modeling software freely provided by Diagrams.net.

ER Diagram for the newspaper



System Description

In the digital age, man seldom feels the warmth of freshly printed newspapers chock full of today's latest news and events. Previously one of the few and most common ways to acquire information, newspapers have since been overshadowed by their digital counterparts, which offer a faster, cheaper, more convenient way of catching up on the daily. Nevertheless, newspapers remain journalists' and political and economic figures main way of influence and are a staple in many people's morning routine.

Our employees are split into multiple specializations that interact with each other to deliver a quality final product. The organization is split into departments, with each employee working in a specific department equipped with its own tools and resources specific to its own function. Each department has a name, location, number and head. Each department has specific rooms as well as its own equipment specific to its function. Employees contact customers, agencies, and guests. Most importantly, employees produce journals, which are the core of the newspaper and an integral part in our project.

Journals are the newspaper itself, a collection of pages and information neatly organized and decorated. Journals consist of pages, of which can be articles, different types of media, and advertisements. A record of a journal is kept and stored in an archive along with other information.

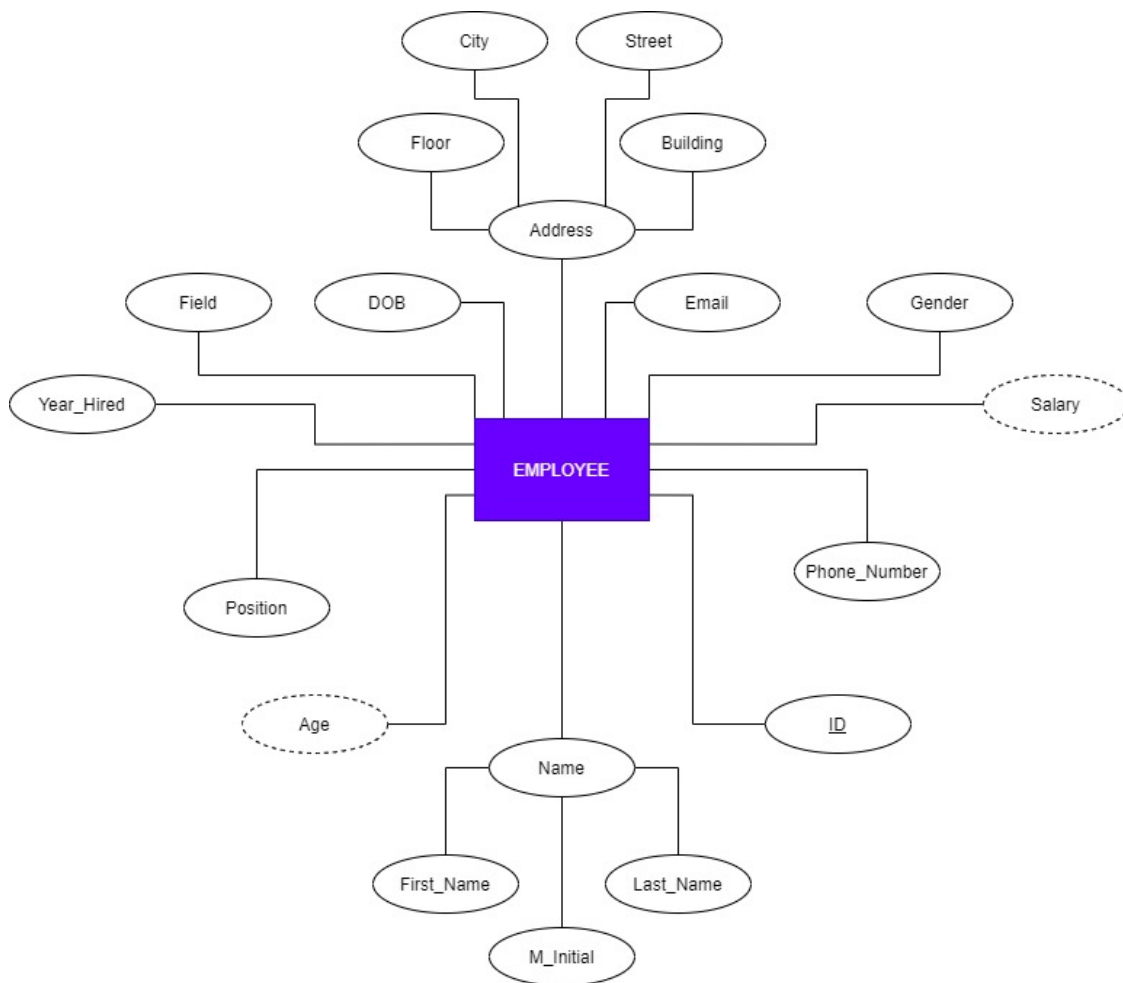
Employee types and responsibilities include photography, editing, writing, illustrating, and other miscellaneous jobs. Employees have equipment they use that either belongs to them or the studio, with each piece of equipment being exclusive to a certain job. Employees have dependents they rely on for emergency contact, or if the employee couldn't be reached.

Of course, no newspaper is complete without its foreign agents: Customers, agencies, and guests. They are the outside forces that act on the newspaper and influence its profits and influence. Customers form the main source of revenue for the newspaper, and they could be of any type or quantity. Agencies are a way for the newspaper to get media and news, as well as any other service it might need. Guests are often invited to provide insight on topics, to be held interviews with, and to have their work showcased.

Without further ado, we, "the SQL squad", present to you our diagram, containing our entities and relationships, for our hypothetical newspaper.

Entities:

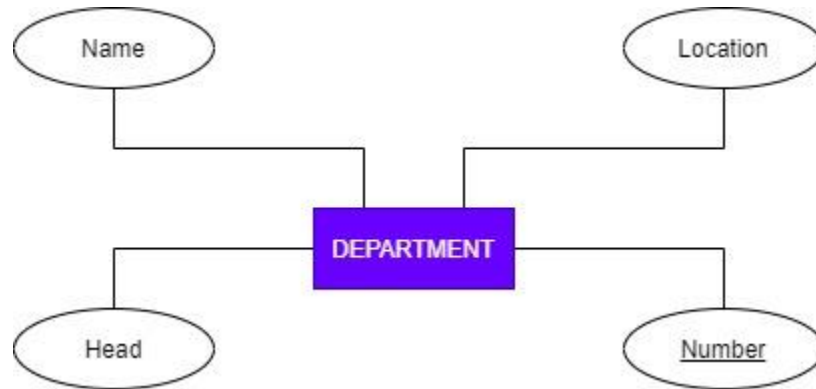
1- Employee



Employees are the most important customers given that they can provide crucial insights into the overall customer experience, although they are often overlooked or neglected. An employee is identified by a unique **ID** which is considered the key in this entity. Every doctor has a name (composite attribute) which is divided into last name, first name, and middle initial. Each employee has also other attributes that describe them, including gender, date of birth, age which is derived from the latter, phone number including the country code then the n-digit number. Each employee has other attributes like email, year hired, and field which indicates what he works as, position indicating the level he has reached in his field, and composite address of the employee's residence. There are multiple departments that an employee can work for, that is why a field is provided. The phone number of the employee is provided to ensure contact

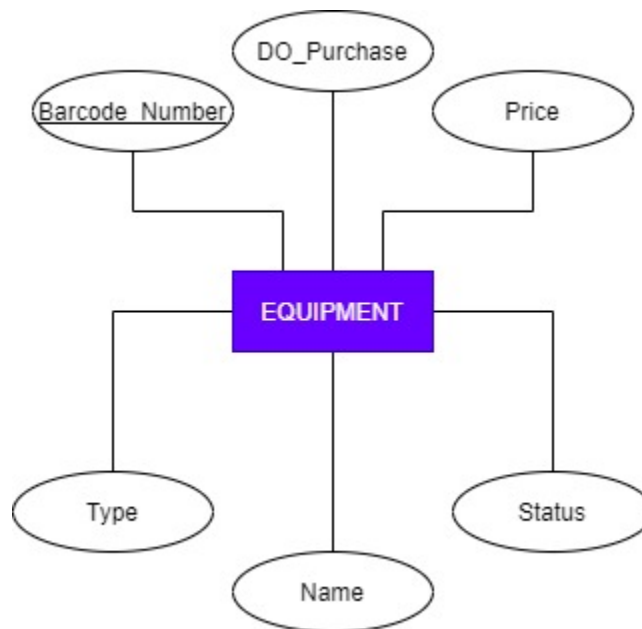
in case of any ordeal faced. The salary is a derived attribute that is provided from both the field and level reached of each employee.

2- Department



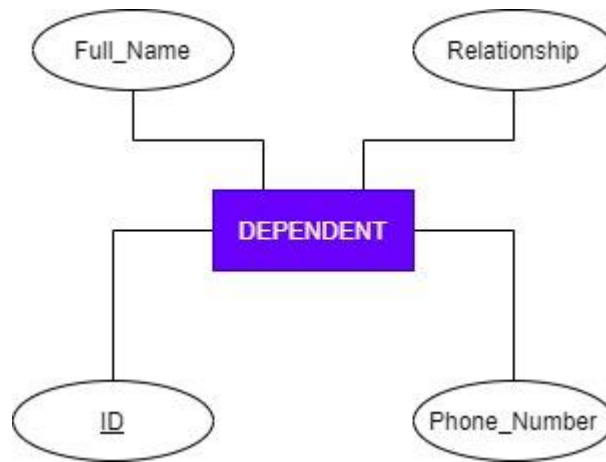
A newspaper has several departments that are always active and efficient, much like a beehive. In a newspaper, we may have many departments that specialize in a specific domain like Finance, Human Resources, Information Technology, Administrative, Printing, Editorial or Advertising. Each department is represented by its head and has as key a number, a name, a phone number as well as an email to contact each department, and a location for easier navigation.

3- Equipment



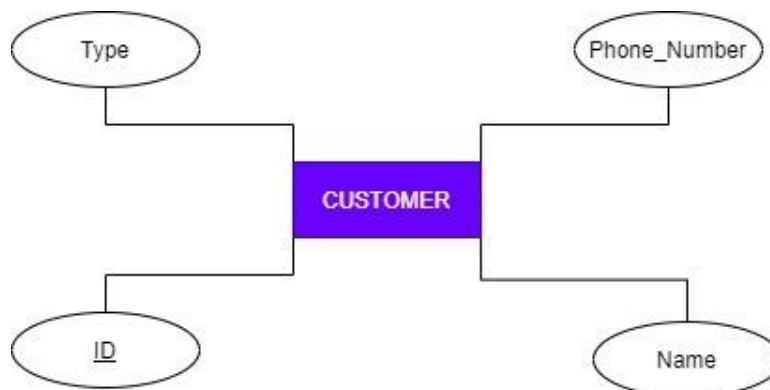
Every newspaper company needs equipment like printers, cameras, and computers to facilitate the work of the reporters, photographers, journalists and the rest of employees. Every piece of equipment has its barcode number for references of the product (key), a type (Camera, Microphone, Light, Wallpaper, etc...) and has a date of purchase to know when the product was bought as well as a price that informs us how much each piece of material cost. Every piece of equipment has a status indicator indicating whether it's in use, free, stockpiled, in repair, sold, in transit, etc...

4-Dependent



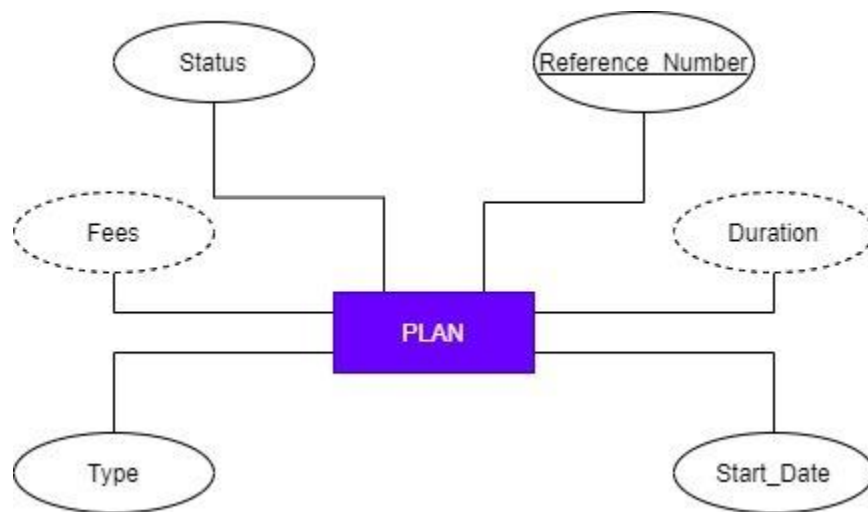
Dependents are the emergency contacts employees depend on in case of an emergency or the organization loses contact with staff. They have very simple attributes such as the key ID, a name, phone number, email and their relationship with the employee. It is important to have someone as a backup in case something goes awry.

5-Customer



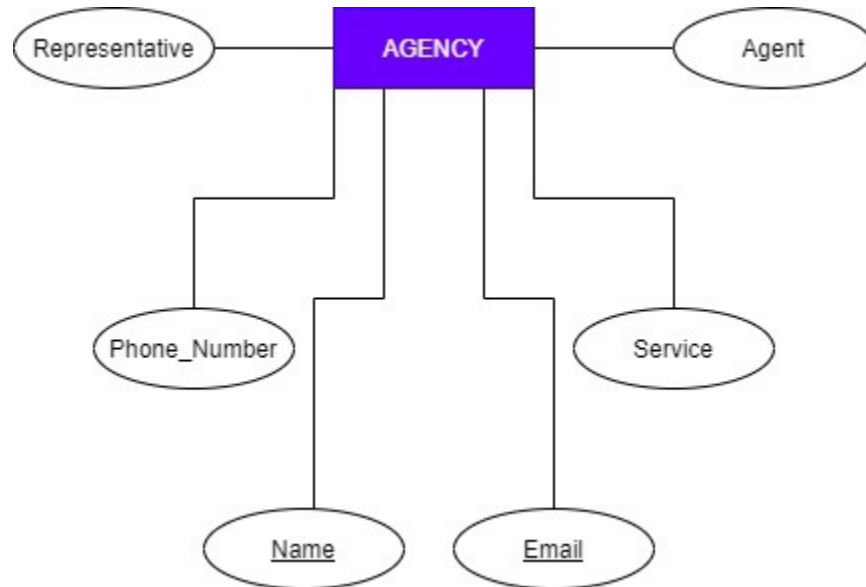
A customer is any individual or organization that wishes to subscribe to the newspaper and receive weekly, biweekly or monthly journals. Every customer is contacted and contacts an employee in order to manage their subscription (or set up one.). Customers have a name, ID as a key for storage, phone number for contact, and a type. Customers can be individual people, retailers, or any other entity. They subscribe to a plan that dictates how often and how they receive newspapers. Customers form the vast majority of income for the organization and are a key component to keep track of in order to maximize profit and engagement.

6- Plans



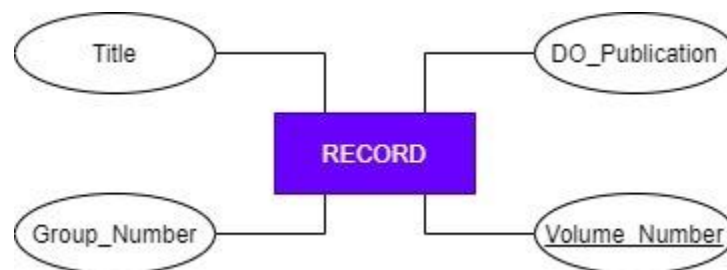
Plans are the structure in which the product gets delivered and sold. They are the basis for which our customers receive their promised newspapers. Plans have a type, with differing perks and pricing for each type, as well as fees such as subscription and delivery fees (derived from the type of plan subscribed to). Plans have a start date and continue up until they are terminated with the derived attribute, duration. They are referenced by a reference number as a key and have a status that indicates whether the plan is active, inactive, or on hold.

7- Agency:



Agencies are the other major organization that the newspaper will be making contact with. They are most often a larger source of media and content used in the papers themselves. Agencies have a representative, i.e., a person that the newspaper will be regularly contacting for sales, meetings, and such. Not to be confused with representatives, agents are agency staff that deliver the product and services: They are managed by the representative and instructed to provide services and products to the newspaper in accordance with the contract. Agencies have a name as primary key as well as an email as secondary key and phone number for contact. Every agency provides a specific service, such as photo delivery, information gathering, investigative work, etc....

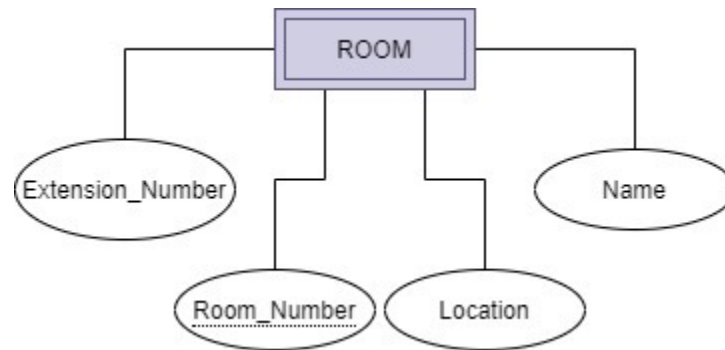
8-Record



It is crucial for journals to have records kept in case a recall, revision, or review is needed. Records act as symbolic monuments for the newspaper as well, indicating its history and past successes and

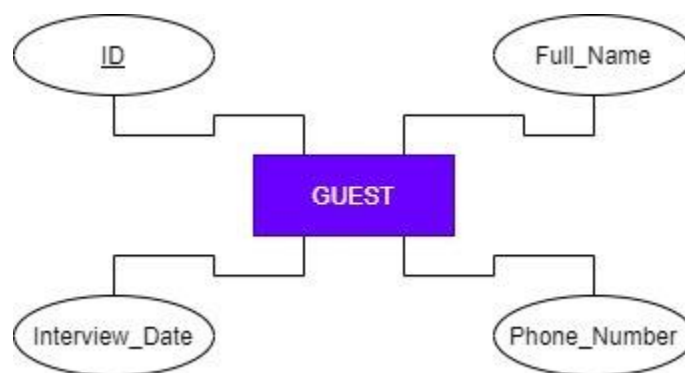
failures. “History repeats itself” as they say. Records have a title, a date of publication, and are stored in groups. These groups can be categorized into time, topic, political events, or other criteria. Records have a volume number as key to identify them within these groups.

9-Room



A room can be simply defined as the area in which productive activity takes place or where other miscellaneous affairs are held. A room has a name for quick identification, an extension number for people to call, a room number to distinguish rooms as a weak key implying a weak entity of room, and a location for easier navigation to know in which building or area it is located. It is very important for an organization to have organized rooms, to be able to maintain a study workflow free of disruptions.

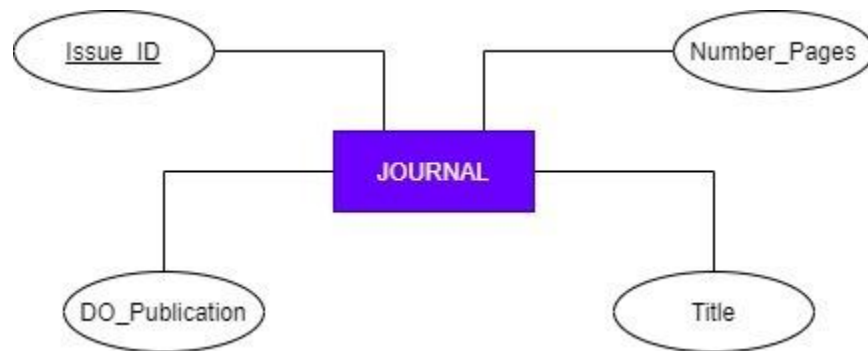
10-Guest



A guest is a person who would come to the newspaper for specific reasons that are of value for the newspaper or personal reasons. That’s why each guest has a Motif, i.e., a reason for coming, an ID as key to keep track of every guest, a name, and a phone number. Guests constantly show up for news coverage,

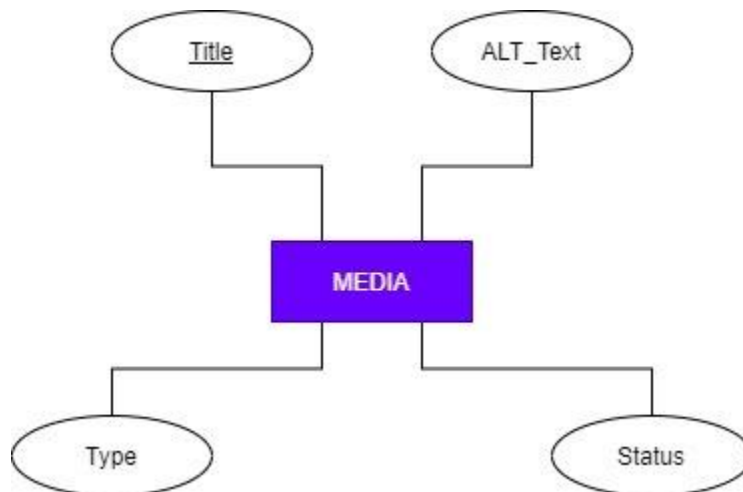
interviews, a speech or a presentation. Guests are kept track of incase they are recurring, or if media with guests needs to be found.

11- Journal



A journal is any one issue of a newspaper. It is every instance of the collective media and news produced on any given day. A journal has a date of publication, a key which is the issue ID, a title, and number of pages. Journals are the core product of a newspaper, with all productive efforts being concentrated onto their production and distribution, as well as upholding a minimum standard of quality. In fact, journals are so important that records are kept of every journal.

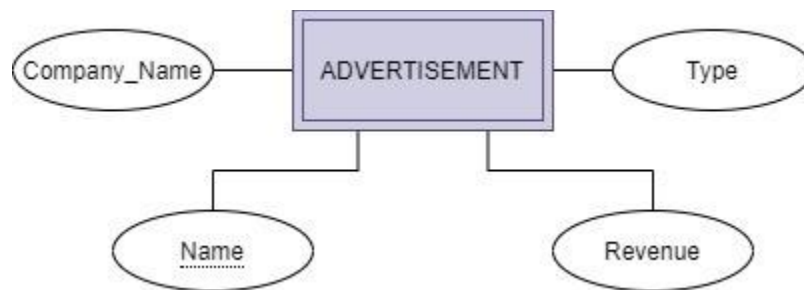
12- Media



Media refers to the collective imagery and audio used in day-to-day issues to represent abstract ideas or concrete objects. Seeing something is different from reading about it, so it is highly important a large

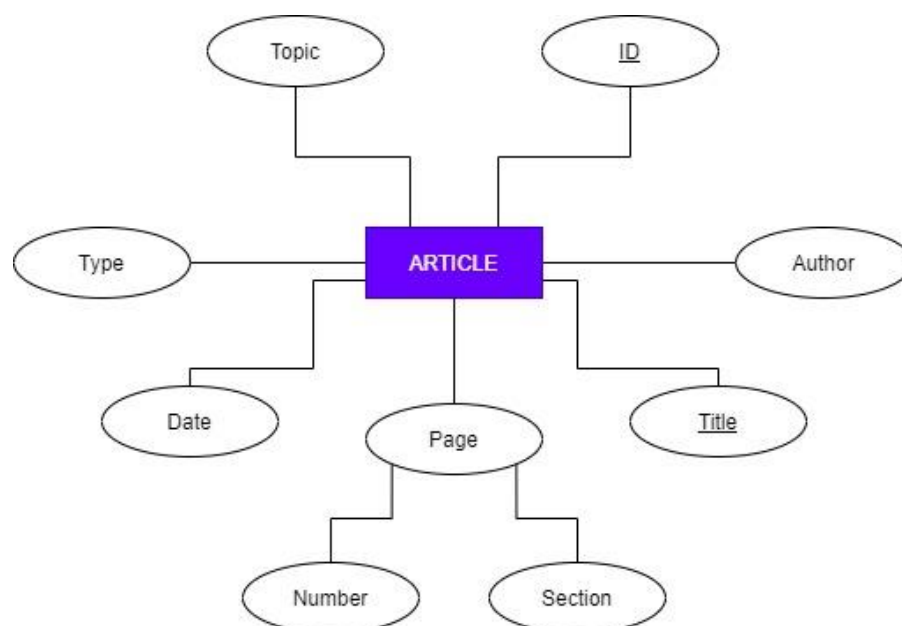
supply of media is constantly being refreshed and kept up to date. Every piece of media has a type (Photo, Video, Drawing, Audio, etc...), as well as a key, a [title](#). The status refers to the state the piece of media is in, as it could be in use, inactive or archived. Alt-text refers to a small piece of text to quickly give whoever wishes to access it a quick brief description.

13- Advertisement



Advertisements are another source of income for the newspaper. They are placed by advertisers and could be of multiple types. Advertisements have a [name](#) as a weak key (rendering the advertisement entity as weak) to describe the advertisement itself (e.g., 2004 Ford for sale) as well as the seller's name and the amount of revenue retrieved from the advertisement itself. Advertisements constitute a small to medium portion of the journal.

14- Article



Articles are the core of newspapers considering that these articles can provide a useful source of information about historical and current events. Each article has an ID (key), a specific topic, an author who is an employee in this newspaper company, date of writing this article, a title which is a secondary key, and pages which is a composite attribute consisting of the page number and section of group of pages.

Relationships:



Each **RECORD** has journals saved in the database of newspaper company annually. Thus, a “**HAS**” relationship is created between **RECORD Entity** and **JOURNAL Entity**. The relationship is 1/Many since each record can have multiple journals. The participation is total on both sides since every record has multiple journals and every journal exists in some record. Every record has multiple journals, yet each journal is that of a specific single record.



Each **EMPLOYEE** manages journals saved in the database of newspaper company. Thus, a “**MANAGES**” relationship is created between **EMPLOYEE Entity** and **JOURNAL Entity**. The relationship is 1/Many since each employee can manage multiple journals. The participation is total on journal side since every journal is managed by some employee, yet it is partial on employee side since not all employees take care of managing journals.



Each **EMPLOYEE** manages records saved in the database of newspaper company. Thus, a “**MANAGES**” relationship is created between **EMPLOYEE Entity** and **RECORD Entity**. The relationship is 1/Many since each employee can manage multiple records. The participation is total on record side since every record is managed by some employee, yet it is partial on employee side since not all employees take care of managing records.



Each **JOURNAL** has articles saved in the database of newspaper company. Thus, a “**HAS**” relationship is created between **JOURNAL Entity** and **ARTICLE Entity**. The relationship is 1/Many since each journal can have multiple articles. The participation is total on both sides since every journal has multiple articles and every article exists in some journal. Every journal has multiple articles, yet each article is that of a specific single journal.



Each **JOURNAL** has advertisements saved in the database of newspaper company. Thus, a “**HAS**” identifying relationship is created between **JOURNAL Entity** and **ADVERTISEMENT Weak Entity**. The relationship is 1/Many since each journal can have multiple advertisements. The participation is total on journal side since every journal has multiple advertisements, yet it is partial on advertisement side since each advertisement is that of a specific single journal. Every journal has multiple advertisements, yet not all advertisements exist in a journal



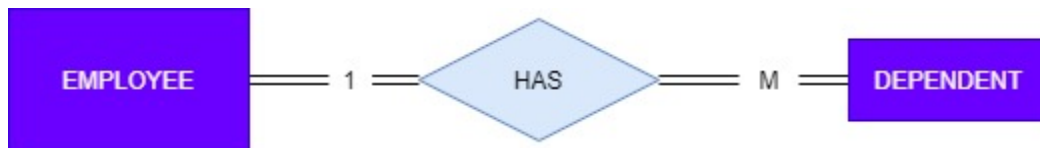
Each **ARTICLE** has media saved in the database of newspaper company. Thus, a “**HAS**” relationship is created between **ARTICLE Entity** and **MEDIA Entity**. The relationship is 1/Many since each article can have multiple medias. The participation is total on article side since every article has multiple different medias, yet it is partial on media side since not all medias exist in an article. Every article has multiple medias, yet each media is that of a specific single article.



Each **EMPLOYEE** writes articles saved in the database of newspaper company. Thus, a “**WRITES**” relationship is created between **EMPLOYEE Entity** and **ARTICLE Entity**. The relationship is 1/Many since each employee can write multiple articles. The participation is total on article side since every article is written by some employee, yet it is partial on employee side since not all employees take care of writing articles.



Each **EMPLOYEE** works in a certain field in the newspaper company under a certain department. Thus, a “**WORKS_FOR**” relationship is created between **EMPLOYEE Entity** and **DEPARTMENT Entity**. The relationship is 1/1 since each employee can work for a single department only. The participation is total on both sides since every employee works in a department and every department is worked in. Every employee works in exactly a single department and every single department has specific employees that work in it.



Each **EMPLOYEE** has dependents saved in the database of newspaper company so that if by any chance an accident occurs the department employees would be able to contact their emergency contacts. Thus, a “**HAS**” relationship is created between **EMPLOYEE Entity** and **DEPENDENT Entity**. The relationship is 1/Many since each employee can have many dependents. The participation is total on both sides since every employee has a dependent and every dependent in the database is that of an employee. Every employee has multiple dependents, and each dependent is that of a specific single employee.



Each **EMPLOYEE** contacts agencies in case the newspaper company needs any external resources. Thus, a “**CONTACTS**” relationship is created between **EMPLOYEE Entity** and **AGENCY Entity**. The relationship is 1/Many since each employee can contact many agencies. The participation is partial on both sides since not all employees are required to contact agencies, and not all agencies are contacted by employees. Every employee contacts multiple agencies, and each agency is contacted by a single employee.



Each **EMPLOYEE** contacts guests for interviews, collaboration or meetings. Thus, a “**CONTACTS**” relationship is created between **EMPLOYEE Entity** and **GUEST Entity**. The relationship is 1/Many since each employee can contact many guests. The participation is partial on both sides since not all employees are required to contact guests, and not all guests are contacted by employees. Every employee contacts multiple guests, and each guest is contacted by a single employee.



Each **EMPLOYEE** contacts customers to review subscription to plans. Thus, a “**CONTACTS**” relationship is created between **EMPLOYEE Entity** and **CUSTOMER Entity**. The relationship is 1/Many since each employee can contact many customers. The participation is partial on both sides since not all employees are required to contact customers, and not all customers are contacted by employees. Every employee contacts multiple customers, and each customer is contacted by a single employee.



Each **CUSTOMER** can subscribe to specific plans offered by the newspaper company. Thus, a “**SUBSCRIBES_TO**” relationship is created between **CUSTOMER Entity** and **PLAN Entity**. The relationship is 1/1 since each customer can subscribe to one plan only. The participation is partial on both sides since not all customers subscribe to plans, and not all plans can be subscribed to at the same time. Every customer subscribes to a single plan, and each single plan is subscribed by a single customer.



Each **DEPARTMENT** has rooms in some location of newspaper company. Thus, a “**HAS**” identifying relationship is created between **DEPARTMENT Entity** and **ROOM Weak Entity**. The relationship is 1/Many since each department can have multiple rooms. The participation is total on both sides since every department has multiple rooms, and all rooms exist in a certain department



Each **DEPARTMENT** has equipment needed by the employees to perform their tasks. Thus, a “**HAS**” relationship is created between **DEPARTMENT Entity** and **EQUIPMENT Entity**. The relationship is 1/Many since each department can have much equipment. The participation is total on department side since every department has equipment, yet is partial from equipment side since not all equipment is found in a certain department.

Conclusion:

For an organization as complex and fast-paced as a newspaper agency, it is crucial for a database to be functioning reliably and efficiently in order to keep track of the hundreds of employees, transactions and journals that are in circulation every day. Our database models effectively give an organization the structure it needs to maintain this reliability and efficiency while considering many factors that could be overlooked. But like all things, there is much room for improvement that we are sure Professor Ramzi Haraty will provide in detail. Overall, we believe our system and its organization has its strengths and could prove a viable solution for organizations everywhere.