



**Java Institute for Advanced Technology**

**DATABASE MANAGEMENT 1**

**H7DX 04**

**H7DX 04/AS/01**

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## 1. i. Evolution of Database Management Systems.

The main objective of the database is to confirm that information will be kept and retrieved simply and effectively. It's a compilation of knowledge (records) in a very structured approach. A database is kept in a very tabular type wherever data could or might not be interlinked. Therefore we tend to say that essentially info could be a compilation of info files and every info file is a group of records.

The written record order of the event of the software system is as follows.

### 1.Flat Files database (1970s-1990s) : -

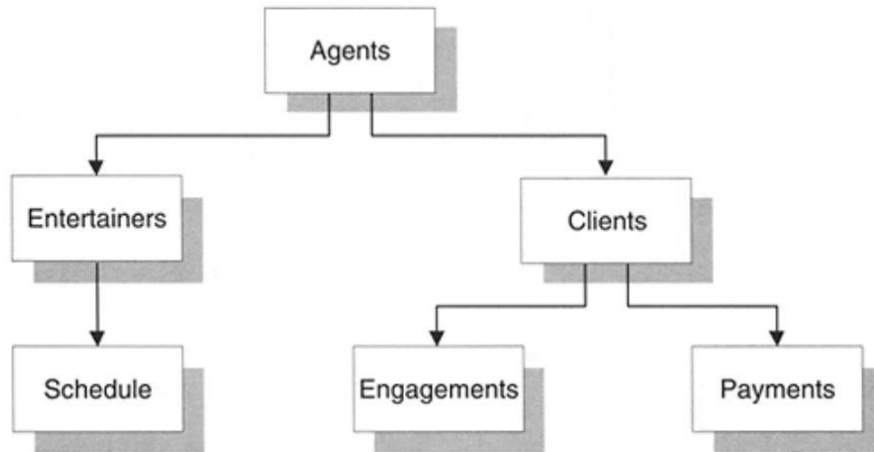
#### Flat File Model

	Route No.	Miles	Activity
Record 1	I-95	12	Overlay
Record 2	I-495	05	Patching
Record 3	SR-301	33	Crack seal

Flat files database may be info that stores info in a very single file or table. In a document, each line contains one record wherever fields either have mounted length or they're separated by commas, white spaces, tabs, or any records, and they cannot contain multiple tables furthermore.

## 2.Hierarchical database (1970s-1990s) :-

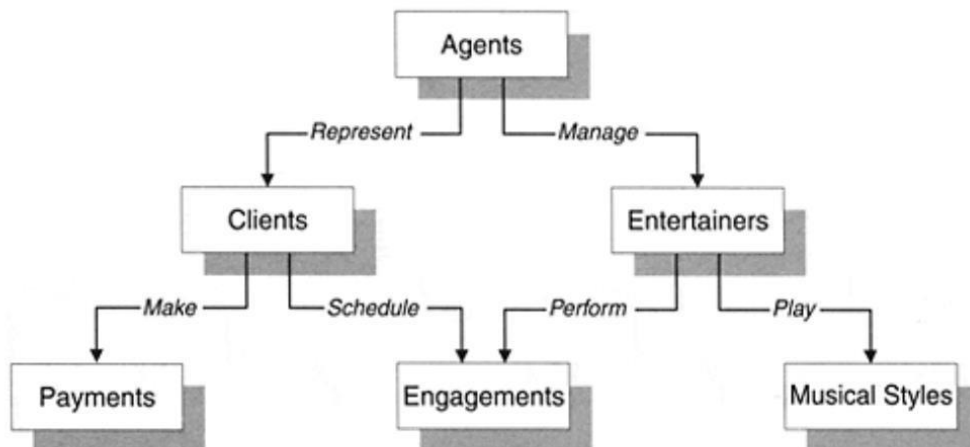
### Hierarchical Database model



As the name indicates, a hierarchic database contains knowledge in a very hierarchically-arranged knowledge. A lot of Perceptively it will parent will have several youngsters however one kid will solely have one parent i.e.; a one-to-many relationship. Its data structure contains levels or segments that are akin to the file system's record sort. All attributes of a selected record are listed below the entity sort.

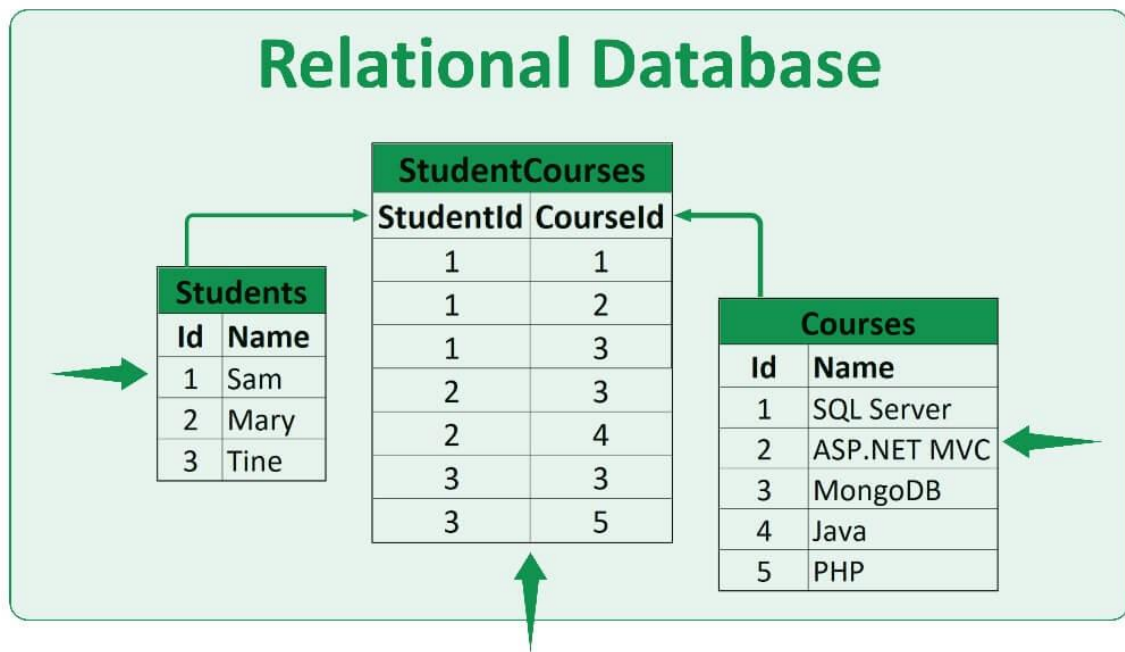
### 3. Network database (1970s -1990s) :-

## Network database model



The discoverer of the network model is Charles Bachmann. In contrast to the hierarchic database model, network info permits multiple parents and kid relationships i.e., it maintains several-to-many relationships. A network database is largely a graph structure. The network info model was created to attain 3 main objectives: To represent complicated knowledge relationships a lot effectively, to enhance the performance of the database, and to enhance commonplace.

#### 4. Relational database (1980s-present) : -



The relationship database model was planned by E. F. Codd. Once the hierarchic and network model the birth of this model was a large step ahead. It permits the entities to be connected through a typical attribute. Within the table, there are different keys. This property makes this model very versatile.

#### 5. Object oriented database (1990s -present) : -

##### Object-Oriented Model

**Object 1:** Maintenance Report

Object 1 Instance

Date	
Activity Code	
Route No.	
Daily Production	
Equipment Hours	
Labor Hours	

01-12-01
24
I-95
2.5
6.0
6.0

**Object 2:** Maintenance Activity

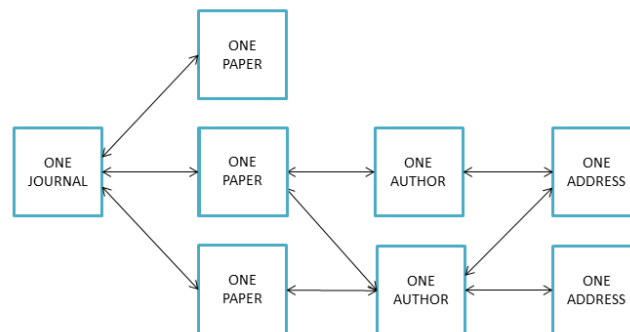
Activity Code	
Activity Name	
Production Unit	
Average Daily Production Rate	

An object-oriented database management system is a database system within which information is bestowed within the sort of objects, very similar to an object-Oriented artificial language. Moreover, object orienting software systems additionally facilitate the user by providing transportation support, language for varied queries, and categorization choices. Also, these database systems have the power to handle knowledge expeditiously over multiple servers. In contrast to relationship info computer database works within the framework of real artificial languages like JAVA or C++.

## 6. Object relationship database (1990s-present) : -

### Relational database

data in many tables linked by identifiers to core table(s)



Defined in easy groups, the associate degree object relationship management system shows a changed object-orienting user- display over the already enforced relationship management system. Once varied code move with this modified-management system, they'll typically operate in a very manner such knowledge is assumed to be saved as objects. The essential operating of this management system is that's translated the helpful knowledge into organized tables distributed in rows and columns, and from then onwards, it manages knowledge in the same approach drained s computer database

system. Similarly, once the information is to be accessed by the user, it's once more translated from processed to complicated type.

## ii. Advantages of the Database Management Systems approach vs. File Based Systems approach.

Database Management	File Based Systems
<p><b>Better Data Transfer:</b></p> <p>Database management makes it potential for users to access a lot of better-managed knowledge. As a result, end-users are going to be ready to take a fast check at their atmosphere and respond quickly to any changes.</p>	<p><b>Backup:</b> Data commands in files of computer-based systems are often secured a lot quickly and mechanically. pc systems offer options that will facilitate this. It's conjointly doable to form a custom application for this.</p>
<p><b>Better Data Security:</b></p> <p>As the range of users grows, the speed at that knowledge is transferred or shared grows likewise, raising the danger of information security. it's oft utilized in the company sphere, wherever organizations devote a big quantity of cash, time, and energy to assure knowledge security and correct use. A direction System (DBMS) helps corporations improve knowledge security by providing a more robust platform for knowledge privacy and security rules.</p>	<p><b>Compactness:</b> Data are often held on during a bit of house.</p>

<p>Data inconsistency is minimized:</p> <p>When varied versions of an equivalent knowledge seem in numerous places in distinct files. for instance, knowledge inconsistency happens once a student's name is saved as "Rahul Gupta" on a school's main laptop, however, an equivalent student's name is saved as "Gupta Rahul" on the teacher's registered system. knowledge inconsistency will be significantly decreased if the information is fittingly designed, therefore minimizing knowledge inconsistency.</p>	<p>Data Retrieval: Computer-based systems provide improved knowledge retrieval techniques that create it straightforward and economical to retrieve knowledge from files.</p>
<p>Better decision-making:</p> <p>Because of DBMS, we tend to currently have better-managed knowledge and improved knowledge access, permitting the United States to get higher-quality knowledge and, as a result, build higher judgments. Accuracy, validity, and therefore the time it takes to scan knowledge all improve with higher knowledge quality. though a direction system (DBMS) doesn't guarantee knowledge quality, it will offer a framework for up knowledge quality. the software provides associate degree choice to generate different types of reports that help in deciding.</p>	<p>Editing: Any info saved on computers within the variety of files is often simply amended. For this, bound application applications or pieces of writing tools are often utilized.</p>



<p>Increased end-user productivity:</p> <p>Data created accessible through a mixture of technologies that flip knowledge into valuable info permits end-users to create quicker, a lot wise, and higher choices that may be the distinction between success and failure within the world economy.</p>	<p>File Sharing: Data saved in computer-based system files are often shared by many users at constant times.</p>
<p>Simple:</p> <p>A direction system (DBMS) provides a logical and straightforward read of information. several activities, like file or knowledge insertion, deletion, or creation, square measure straightforward to hold out.</p>	
<p>Faster data access:</p> <p>The direction system (DBMS) aids in the production of speedy responses to information queries, letting quicker and a lot of correct knowledge access.</p>	



VS



## Disadvantages of the Database Management Systems approach vs. File Based Systems approach.

Database Management	File Based Systems
<p><b>High cost of hardware and software:</b></p> <p>This is a result of software needing a high-speed processor furthermore as a big quantity of memory. After all, in today's world, there's a huge volume of knowledge in each field that has got to be held on safely and firmly. the requirement for such a giant quantity of storage and a high-speed processor necessitates each dear hardware and package. That is, advanced hardware and packages are needed, implying that we tend should improve the technology that supports the file-based system.</p>	<p><b>Data Redundancy:</b></p> <p>It's doable that similar information is duplicated in several files. This leads to information redundancy and memory waste.</p>
<p><b>Staff Training Expenses:</b></p> <p>A good range is additionally needed for educated employees (database administrators, application programmers, information entry operations) United Nations agency maintains the management system. we'd like</p>	<p><b>Data Inconsistency:</b></p> <p>Accessing Data Is Difficult: Due to information redundancy, it's probable that information won't be consistent.</p>

<p>information system designers furthermore as application programmers to use. As a result, a big total of cash should be spent on package development.</p>	
<p><b>Data Migration Costs:</b></p> <p>We need to convert our information into a management system, that prices plenty of cash and adds to the management system's value. this is often a result of, so as to complete the conversion, we are going to have to be compelled to recruit information system designers for whom we are going to have to be compelled to pay a big total of cash, furthermore because of the services of a packed house.</p>	<p><b>Accessing Data Is Difficult:</b></p> <p>It's not easy to induce information out of a file management system. It isn't as convenient as it ought to be. once a user must access info, they need to run specialized code. as an example, we've got a graphical interface in our computers put in victimization that we tend to access the files hold on.</p>
<p><b>Database System Maintenance:</b></p> <p>It is vital to stay your system up thus far since potency, which is one of the foremost vital variables that's usually forgotten, should be optimized. As new threats emerge on a commonplace, all parts should be updated on an everyday basis. Databases, as they contain valuable and sensitive data, would like periodic maintenance and security updates to guard against any security vulnerability. additionally, security measures should be placed in situ. coaching prices have up</p>	<p><b>Limited Data Sharing:</b></p> <p>Data is distributed across multiple files. Moreover, separate files might have totally different formats, and these files could also be housed in many directories happiness to numerous departments. As a result of this information segregation, information sharing between applications is difficult.</p>

dramatically as information technology has advanced.	
Performance:  The previous classification system is meant for little businesses and specific applications, therefore performance is usually wonderful. However, thanks to its poor pace, the software doesn't perform well for little businesses. As a result, some apps can perform slower than they otherwise would. As a result, the software isn't counseled for little businesses.	

## 2. i. Data Administrator - The median of annual income is \$93,000.



Basically, data administrators store and organize information like monetary info and client records employing a specific software system. They are the people that ensure that information is accessible to relevant users and secured from unauthorized access.

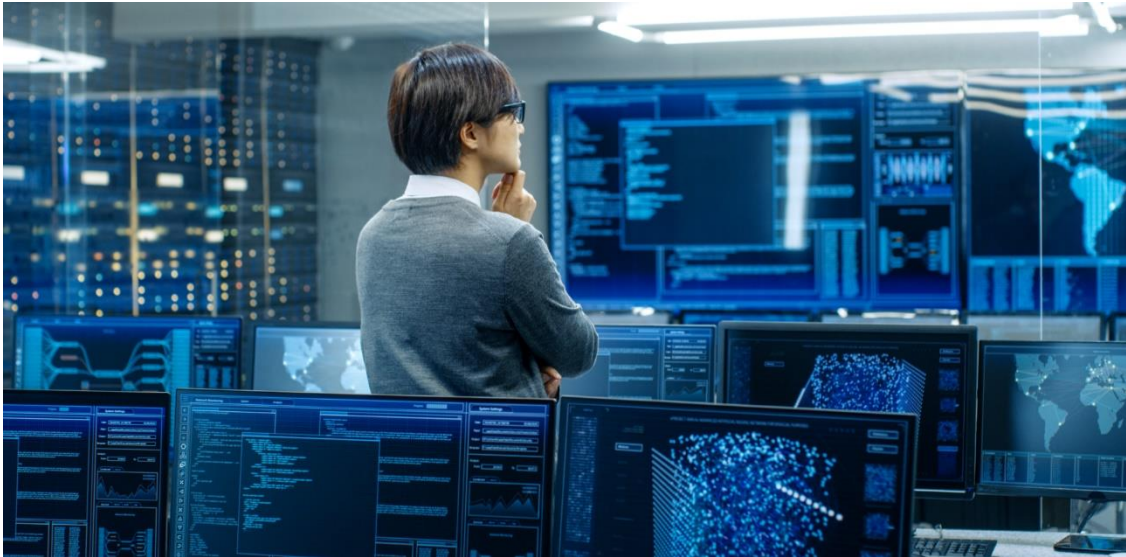
**Responsibilities:-**

- Ensure that the structure information square measure secure
- Database backup and recovery
- Maintaining and merging recent databases with new ones.
- Maintaining the performance and integrity of company databases.

**Skills:-**

- Analytical skills: administrators get info from varied sources. thus he/she ought to have an honest ability to observe the information performance and assess the complexness of data.
- Communication skills: Most DBAs need to work underneath groups. There square measure managers, developers, and staff. in order that they ought to communicate well with all and sundry.
- Detail-oriented: this is often the foremost necessary issue. DBAs ought to take into account each tiny detail once operating with databases. an easy mistake will result in immense losses and downside. thus each dba should have a pointy eye and mind.
- Problem-solving skill: generally, issues arise within the systems. Then they must be ready to troubleshoot them and resolve the matter.

ii. Database Administrator - The median of annual income is \$98,860.



Database administrator make sure that the databases run expeditiously and firmly. for instance, they produce or organize systems to store completely different knowledge varieties, like monetary data and client shipping records. They additionally make certain approved users will access this data once required.

### **Responsibilities:-**

- Build information systems of high accessibility and quality looking at every finished user's specialized role.
- Design and implement the information in accordance to finish the user's data desires and views.
- Define users and alter knowledge distribution to the correct user, in a very appropriate format, and in a timely manner.
- Use high-speed dealings recovery techniques and backup knowledge.

### **Skills:-**

- Proven operating expertise as an information Administrator.
- Hands-on expertise with information standards and user applications.

- Excellent data of information backup, recovery, security, integrity, and SQL.
- Familiarity with information style, documentation, and committal to writing.

iii. Database Designer - The average of annual income is \$58,000.



Database designers are the people that design, look at, and implement the information system. They use their data of Business method modeling, question languages, system theories, SDLC, internet programming, etc. The information designer is answerable for shaping the elaborate information design, together with tables, indexes, views, constraints, triggers, hold-on procedures, and alternative database-specific constructs required to store, retrieve, and delete persistent objects.

### **Responsibilities:-**

- Design information structure to fulfill user needs.
- Program databases in laptop languages like Structured source language (SQL).
- Provide information for the information.
- Test databases.

### **Skills:-**



- Manage database: Use question languages and direction systems to style and manage databases.
- Use markup languages: Should have the flexibility to manage a tongue like a markup language to develop interfaces.
- ICT knowledge: should have decent data on ICT so as for more analysis and usage.
- Defining technical requirements: Specify technical properties of products, materials, methods, processes, services, systems, software systems, and functionalities by characteristics and responding to the desires that square measured to satisfy client needs.

iv. Application Developer - The average of annual income is \$72,373.



A professional application developer is associated with impeccable ASCII text file creator of the code. supported the specialized field, application developers area unit concerned within the end-to-end code development life cycle. They produce, test, deploy, and facilitate upgrade code as per the need of shoppers. Also, developers work coherently with designers, analysts, and pc engineers to bring out the projected quality of code applications.



## **Responsibilities:-**

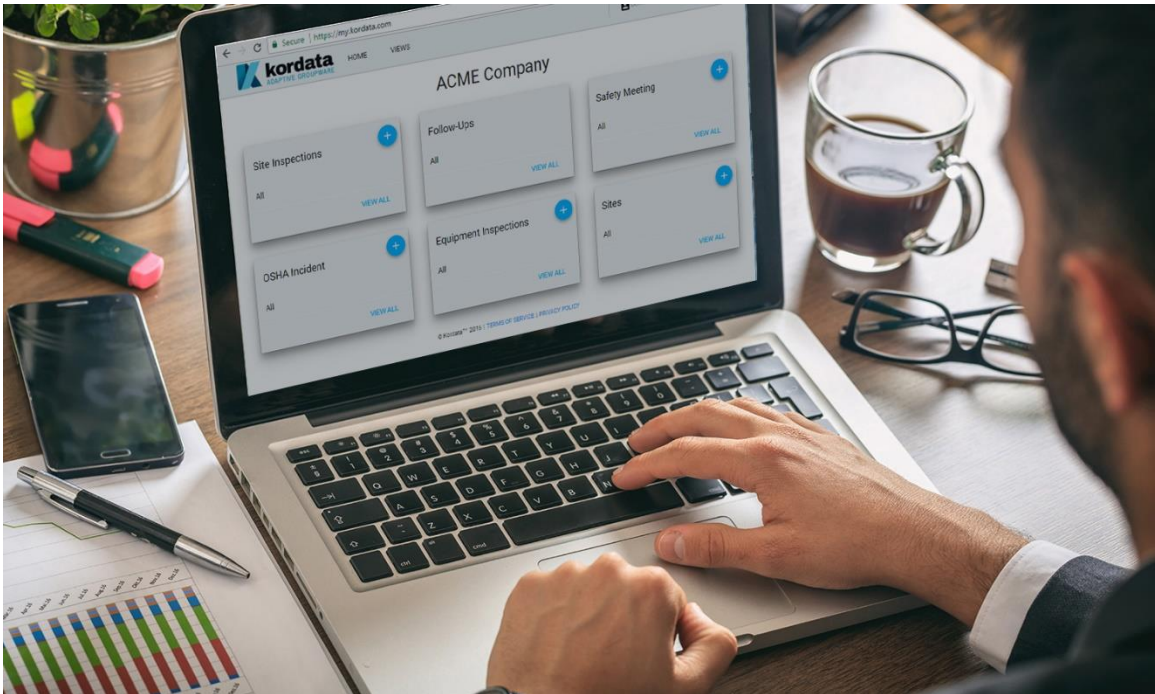
- Analyze the concepts, business models, and user needs to formulate a style strategy to hold out.
- Act as a tenant to prolong a practicable application style and cryptography parameters with the essential functionalities.
- Break down the method into multiple packets to distribute to different relevant technology project groups.
- Develop numerous method flow diagrams and dealing models to contour the method.

## **Skills:-**

- Software Development Life Cycle(SDCL): Skilled application developers totally break down the event method like analysis, study, design, coding, testing, launching, and support. Understanding the SDCL method helps developers to handle the complete development cycle and coordinate the mandatory services at the proper moment.
- UX/UI Expertise: The winning quotient of building associate applications is its receptivity among customers. computer program and User expertise area unit the key factors that verify the success rate of any client application code. Hence, possessing artistic application modeling skills and computer program cryptography techniques helps developers to square an opportunity.
- Algorithm and Data Structure: This is an essential part of programming. while not intense an excessive amount of time and knowledge, obtaining competence in knowledge structuring and optimized algorithmic rule building ultimately helps application developers to satisfy and surprise users.
- Programming Language: Comprehensive information on basic, yet high-level programming languages like PHP, Java, JavaScript, HTML5, C ++, Xcode, SQL, Objective-C, Swift, RUST, GO, and KOTLIN, maybe a counseled ability set.

However, developers will concentrate on any of them to support their field of interest. Yet, having an honest command of one or two of those languages may gain an expert advantage.

## v. End User



A pc system's information code acts as an efficient, secure repository for an organization's data. The end user of information generally never sees the code or its files and should be unaware of how the system works. As a result, she uses the appliance code that interacts with the information, however, the system technologist should build the setup to suit her wants. The technologist discusses the system's goals with the user and interprets them into an operating configuration.

Over time, the technologist could revise the system in response to user requests for brand new or reconfigured options. finish users could need that a code follows specific rules that represent the norms or enforce the prohibitions of a business, trade, or set of laws. The technologist sets up information rules that mechanically enforce these restrictions.

Database security should mirror users' structure roles. Information application configurations offer the flexibility to assure that info reaches solely those folks with the requirement and therefore the right to visualize it. as an example, an Associate in Nursing engineer receives full access to her components information, however, cannot scan records from the payroll information. Conversely, a personality's resources user could gain full access to payroll knowledge but lack the privileges necessary to succeed in the components information.

## Resources :

1. <https://www.google.com/>
2. <https://track2training.com/2021/07/26/the-evolution-of-database-management-system/>
3. <https://www.interviewbit.com/blog/file-system-vs-dbms/#:~:text=Advantages%20of%20File%20System,-Following%20are%20the&text=Compactness%3A%20Data%20can%20be%20stored,files%20can%20be%20easily%20edited.>
4. <https://resources.workable.com/database-administrator-job-description#:~:text=Database%20Administrators%20are%20responsible%20for,pieces%20of%20equipment%20are%20functional.>
5. <https://tharu-chamalsha.medium.com/job-roles-related-to-database-management-system-32f9f60b65a7>
6. <https://www.westagilelabs.com/blog/application-developer-roles-and-responsibilities/>
7. <https://www.techwalla.com/articles/what-is-the-role-of-the-end-user-in-the-database-development-process>
8. <https://www.payscale.com/>