

Database Project Phase 1

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Chapter 1

Introduction

1.1 About the Mini World

The chosen mini world for the project is that of a startup incubator. A business incubator is a company that helps new startup companies to develop by providing services. The incubator deals at both ends with the investing clients (investors) as well as the startups. The incubator will require various data of the startups and the investors (and other entities involved in the pipeline) for its proper functioning.

1.2 Purpose

The purpose of this database is to aid the entire functioning of a startup incubator by providing an organized and convenient platform for storing and managing the necessary data.

1.3 Intended Audience

The application is intended to be used by the system administrators working in the startup incubator, investors, startups, etc.

Types of users of our database:

- Casual User → Incubator management.
- Parametric / Naive User → System Administrators.
- Standalone Users → Investors, Startup Board of Directors.

Chapter 2

Database Requirements

2.1 Entity Types

2.1.1 INVESTOR

This particular entity type (or table) would store the data corresponding to every investor. Each investor would be entity of this entity type.

Attribute	Description
Investor Id	A unique number associated to each investor
Investor Name	A composite attribute composed of the two attributes first name and last name
Education Qualification	A composite and multi-valued attribute storing the educational information of the investors and composed of the degree, branch and year
DOB	The date of birth of the investor
Age	A derived attribute from DOB
Sex	The sex of the investor

The primary key of the entity type is: *Investor Id*

2.1.2 INDUSTRY

This particular entity type would store the information of the industries of the startups.

Attribute	Description
Industry Id	A unique number associated to each industry
Industry Name	The name of the industry
Industry Type	An attribute defining the type of the industry which can be used to form subclasses

The primary key of the entity type is: *Industry Id*

We can classify the entity type into 3 subclasses as:

- Primary Industry
- Secondary Industry
- Tertiary Industry

2.1.3 STARTUP

This particular entity type would store all the necessary information related to the startups currently being incubated.

Attribute	Description
Startup Id	A unique number associated to each startup
Startup Name	The name of the startup
Network	The network of the startup
Number of Employees	The number of employees of the startup
Number of Projects	A derived attribute from the Project Entity
Founders	A multi-valued attribute of the founders of the startup

The primary key of the entity type is: *Startup Id*

2.1.4 RESOURCE

This particular entity type would store all the necessary information related to the resources required, allotted, provided, etc.

Attribute	Description
Resource Id	A unique number associated to each resource
Resource Type	The type of the resource
Resource Value	The value of the resource

The primary key of the entity type is: *Resource Id*

2.1.5 LOCATION

This particular entity type would store all the necessary information related to the location of the startup or the investor.

Attribute	Description
Pincode	The unique postal code of the location
City	The name of the city of the location
Country	The name of the country of the location

The primary key of the entity type is: *Pincode*

2.1.6 EMPLOYEES

This particular entity type would store all the necessary information related to the employees working at the incubator.

Attribute	Description
Employee Id	A unique id associated to each employee
Employee Name	A composite attribute composed by the first name and the last name of the employee
Employee Dept	The department of the incubator in which the employee is working like HR, Legal, Finance, Marketing, etc.
Employee Salary	The salary of the employee
Sex	The sex of the employee

The primary key of the entity type is: *Employee Id*

2.2 Weak Entity Types

2.2.1 PROJECT

This particular entity type would store all the necessary information related to the projects of the startup. It is a weak entity because it is associated to a startup, and if the startup doesn't exist, the projects would not exist.

Attribute	Description
Project Name	The name of the project
Start Date	The start date of the project
Number of employees	The number of employees working on the project
Time Frame	The duration of the project

Being a weak entity this does **not** have a *primary key*, rather it is identified using the startup it is associated to.

2.2.2 DIRECTORS

This particular entity type would store all the necessary information related to the board of directors of the startups.

Attribute	Description
Director's Name	The name of the director
Director's Experience	The years of experience of the director
Sex	The sex of the director
Education	A composite attribute of the directors educational information of degree, branch and year

Being a weak entity this does **not** have a *primary key*, rather it is identified using the startup it is associated to.

2.3 Relationship Types

2.3.1 BASED_IN

- A m:n relationship type between STARTUP and LOCATION.
- STARTUP participation is total.
- Location participation is partial.

Each startup can be based in multiple locations and there can be many startups based in a particular location. Every startup must have at least one based location but every location need not have a startup.

2.3.2 LIVES_IN

- A n:1 relationship type between INVESTOR and LOCATION.
- INVESTOR participation is total.
- LOCATION participation is partial.

Each investor can be based in a single location and there can be many investors based in a particular location. Every investor must have exactly one based location but every location need not have an investor.

2.3.3 WORKS_ON

- A 1:n relationship type between STARTUP and PROJECT.
- STARTUP participation is total.
- PROJECT participation is total.

Each startup can have multiple projects, but each project can have only 1 startup. Every startup must have at least one project but every project must have exactly one startup.

2.3.4 DIRECTS

- A 1:n relationship type between STARTUP and DIRECTORS.
- STARTUP participation is total.
- DIRECTORS participation is total.

Each startup can have multiple directors, but each director must be based in exactly one startup. Every startup must have at least one director but every director must direct exactly one startup.

The relationship has an attribute starting date which is the day the director was employed to this startup.

2.3.5 PROVIDES

- A n:1 relationship type between EMPLOYEE and RESOURCE.
- EMPLOYEE participation is partial.
- RESOURCE participation is total.

Each employee can provide at max one resource, and each resource can be provided by multiple employees. Every resource must have at least one provider but every employee need not provide a resource.

2.4 4-ary Relationship

2.4.1 INVESTS

- A 4-ary relationship between INVESTOR, INDUSTRY, STARTUP, RESOURCE.
- It includes a relationship instance (*inv,res,ind,st*) where the INVESTOR *inv* invests in STARTUP *st* which belongs to INDUSTRY *ind* to provide RESOURCE *res*.
- INVESTOR participation is total.
- RESOURCE participation is total.
- INDUSTRY participation is total.
- STARTUP participation is total.
- It is a (n,m,p,q) relationship type.

The **start date** of the investment is an attribute of this relationship.

2.5 Industry Subclasses

The INDUSTRY entity type has 3 subclasses based on the industries' types. The subclasses are:

- Primary Industry
- Secondary Industry
- Tertiary Industry

Chapter 3

System Feature

3.1 Functional Requirements

3.1.1 INSERT

- AddInvestor():
Input – InvestorName, Sex, Education, Location
Output – If there is a new investor in the market, the system provides a field to enter the details of the investor. Upon entering, the system checks for error in any of the entries. If it is valid, then the system shall enter the data into the database.
- AddStartup():
Input – StartupName, ListOfProjects, BoardOfDirectors
Output – The system provides a field to enter the details of the startup. The system checks for error in any of the entries. If it is valid, then the system shall enter the data into the database.
- AddIndustryType():
Input – IndustryType, SubClass
Output – The system provides a field to enter the details of the industry type. The system checks for error in any of the entries. If it is valid, then the system shall enter the data into the database.
- AddEmployee():
Input – EmployeeName
Output – The system provides a field to enter the details of the employee. Upon entering, the system checks for error in any of the entries. If it is valid, then the system shall enter the data into the database.

3.1.2 MODIFY/UPDATE

- **modifyEmpSalary(Salary Id):** Provided the salary id, we may use this function to modify the salary of the associated employee.
Input: Salary Id
Output: The modified Employee Entity
- **modifyStartupWorth(Startup Id):** Provided the startup id, we may use this function to modify the networth of the associated startup.
Input – Startup Id
Output – The modified Startup Entity
- **UpdateStartup():**
Input – StartupPreviousValue, StartupNewValue
Output – The system provides a list of startups in the database. The user selects a startup to update. The system provides database information about that startup and user selects the value to be modified and enters it's updated value. If the entered value is valid, the data is updated into the database.
- **UpdateInvestors():**
Input – InvestorOldValue, InvestorNewValue
Output – The system provides a list of investors in the database. The user selects an investor to update. The system provides database information about that startup and user selects the value to be modified and enters it's updated value. If the entered value is valid, the data is updated into the database.

3.1.3 DELETE

- **deleteInvestor(Investor Id):** Provided the investor id, we may use this function to delete the associated investor once he has withdrawn from the incubator.
Input – Investors Id
Output – A confirmation response of the completion of the task
- **deleteEmployee(Employee Id):** Provided the employee id, we may use this function to delete the associated employee once he has withdrawn from the incubator.
Input – Employee Id
Output – A confirmation response of the completion of the task
- **deleteDirector(<Director>):** Provided the director entity information, we may unambiguously remove the provided director from the associated startup.

Input – All the details of the Director entity
Output – A confirmation response of the completion of the task.

3.1.4 REPORT GENERATION

- A periodic report can be generated for every investor regarding the total investments that he has made in various startups from various industries in that period.
- A report can be generated regarding which industry or which location has yielded the maximum number of startups.

At the end of every year the system will calculate the most performing startup. To realize this functionality we will be storing extra information such as: total customers, net profit, and customer satisfaction rating of every startup.