

## **Database CSC675 -03 Spring 2021**

### **SW COMPANY DATABASE SYSTEM**

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### **History Table**

Milestone	Date
M1V1	03/09/2021

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## Section I: Project Description:

### Executive Summary:

We started by asking questions. Why are enterprise softwares very complicated and hard to use? What do businesses need to support change and how can software help companies get more time back for what it really matters?

**Hubber** is a startup software company which aims to revolutionize the way companies manage their business. It aims to deliver an easy to use platform which can be integrated at a reasonable price and a minimal overhead. Hubber's vision is to create the finest and scalable ecommerce software for business of any kind.

**The Market:** Hubber has identified four distinct business segments that will be interested in its software product. These segments are the most likely consumer of the software. The segments are as follows:

- ***Finance:*** It's essential for any business to keep track of their Finance. After all, the main goal of any business is to have a solid database to keep track of every penny.
- ***Human Resources:*** A business needs to keep record of its employees, their positions, hire date and their overall information. A successful business shall be able to keep track of all the inner workings of its employees, assign projects, and keep their records. It needs to be able to inform its employees about company policies, aim and goal.
- ***Inventory:*** Inventory management is a key part of the business. Therefore, a company needs to be able to manage its inventory and contact suppliers/vendors on time in order to keep the business functioning without encountering any problems.

- **Insurance:** A good business takes care of its employees. A database is needed for a business to have all the information about its beneficiaries who are covered for being a part of the company.

**Key Feature:** Hubber aims to be a great tool for business owners, managers and executives to manage business finance, human resources, sales and inventory in a *single platform*. It provides Software solutions for managing business and monitoring everyday activity of the business.

### **Competitive Edge**

There are several companies on the market selling software products for this target segment. Hubber will leverage their competitive edge by incorporating an easy to use, scaleable , ***Single platform*** which has a low cost overhead to a business. Hubber is convinced that when companies enjoy what they are doing they are likely to use the product instead of having to be forced to use it.

### **Keys to Success**

- Develop scalable software that is constructive and easy to use. If it is not easy and efficient, it likely will not be used.
- Implement a strong marketing campaign to develop awareness of the software and its benefits.
- Design strict financial controls for the organization.

### **Objectives**

- Increase sales by triple for the first three years.
- Achieve 10% market penetration by year two.

## Section II: Use Cases:

### Use case #1:

Title:	Company Policy
Actors:	Alex, Sam ,Tim
Description:	Alex is the new Ceo of the Company. Alex is also a member in the board of directors. Sam is a Client of the company. Tim is the Employee working for the comapny. Alex comes up with new ideas that will benefit the company. He plans to change some company policies and also post the company's goal to boost sales for next year in the message board. Sam and Tim can now see the changes in the company policies and the date posted.

**Use case #2:**

Title:	Departments/Branch
Actors:	Bob,Lily,Sam, Company
Description:	<p>Company keeps track of the startdate of all of its employees.Bob and Sam and Lily work for the same company. Bob is a manager, Lily is an Engineer and Sam is a Technician. Bob is a full time employee. Lily is a contract worker and Sam is working part time. Company can assign projects to its employees. Bob being a full time employee and also a manager has to keep track of the company projects. He is also responsible for managing other employees for specific projects and reporting the progress to the company.</p>

**Use case #3:**

Title:	Sales
Actors:	Bob,Sam, Tina, Company
Description:	Bob is a manager of a company. Sam is an employee. Tina is a client of the company. She wants to purchase products or services. Company receives the order from Tina.Company assigns the project to its employees. Bob knows that the project is completed and is ready to be delivered. Bob assigns Sam to make the Sale. Sam contacts Tina and makes the transaction complete the transaction.

**Use case #4:**

Title:	Supervisor
Actors:	Bob, Sam, Tina
Description:	Bob is a supervisor at a company. Sam is a manager working for Bob. Sam is able to track his supervisor and projects. Bob can assign projects to Sam. Tina is another employee working at the company. Tina is a contract worker. Bob hires Tina and gives a project for Tina. Tina can see the project deadline and immediately starts working. Bob knows there is a short deadline so assign Sam and Tina to work in the same project.

**Use case #5:**

Title:	Project Management
Actors:	Bob, Sam, Shawn, Company
Description:	Company receives 2 projects from its client. Bob is manager at a company. Sam is a part time worker. Shawn is a contractor. Bob hires Sam for the project 1. Sam can access the Project and see the due date. Sam can update the number of Projects. Bob hires Shawn for Project 2.

**Use case #6:**

Title:	Project Orders
Actors:	Sam, Tom, Jon
Description:	Sam works for a company. Tom is a customer at a company. Sam has Staff privileges. Tom is a customer. Tom can place an order for the project.. Sam can access Tom's order. Sam can assign John to work on the project.. If the requested order is completed John can let Sam know about the status of completion.



**Use case #7:**

Title:	Asset Maintenance
Actors:	Bob, Sam, Vendor
Description:	<p>Bob is manager at a company. Sam works for Bob at the same company.</p> <p>Bob and Sam can view the status of the property and see if the property is in operation. Bob can assign the status to the property. He can assign tasks to vendors for maintenance. Sam can put a request for maintenance of assets/property. Sam may send a detailed description. Bob can view the Maintenance request. Bob can approve Sam's request.</p>

**Use case #8:**

Title:	Assign Task
Actors:	Bob, Sam
Description:	<p>Bob is manager at a company. Sam is a part time employee. Bob can assign projects to Sam. Sam can work in the project. Sam and Bob can see the hours Sam worked in the project.</p>

**Use Case #9**

Title:	Create Customer Account
Actors:	KT, John
Description:	KT is a customer of a company. John is another customer. She can create a customer account. She can login to her account. She can place a project order to the company. Once the company has her project ready, she can purchase the final product from the company. She can update her information. She can transfer/trade products/services with John.

**Use Case #10**

Title:	Pay Employee
Actors:	Bob, KT, Company
Description:	Bob and KT are employees of a Company. Bob is a manager in a Company. KT is a part time employee. Bob can see the company projects. Bob assigns projects to KT. KT works on the project. Bob and KT can see the number of hours KT worked on the project. Bob can add more hours for KT if she needs an extension. KT can let Bob know about the status of the project. Bob sells the project to the customer. KT is paid by the Company after the project is completed.

## Section III: Database Requirements (Business Rules)

### List of Main Entities and Attributes

1. **General User:** A user who has the basic privileges and generally has primitive permission to use website features.
2. **Registered User:** A user who has the most privilege to use the website features. This user will also have an account registered with his/her information stored for future purpose.
3. **Account:** Every Registered User will have an Account.
4. **UserId:** Every Registered User shall have an account id .
5. **Profile:** Every registered user will have a profile. Profile shall have general information about the registered user.
6. **Address:** All users shall have an address with their street,city state and zip code.
7. **Admin:** A registered User with access to all top tier priorities and control.
8. **Staff:** A registered user with limited access to the system and is employed by a company.
9. **Client:** A general user that does not have an account but can view the products and services.A user that does not have an account but can search available inventor
10. **Registered Customer:** A registered customer with an account and a profile.
11. **Projects:** An item that is sold and bought.
12. **Payment Type:** A way to pay for a transaction.
13. **Receipt:** A proof-of-purchase document after completion of transaction.
14. **Tasklist:** Admin created a list that needs to be completed by Staff.
15. **Project:** Company getes projects from customers and assigns Projects to its employees.
16. **Department:** Different branches of a company. Ex: Account, Maintaines, Engineering etc.
17. **Employee:** A registered user working who is a staff member.
18. **EmployeeID:** EmployeeID shall be assigned to all the employees working for the company.
19. **Vendor:** A third party Staff Hired by the company to maintain the property.
20. **Salary:** An income earned by employees.
21. **Sales:** Total Price of goods/service sold to customers.
22. **Position:** A staff with a rank in the department.
23. **Status:** A status refers to complete or incomplete work.

- ❖ Registered User
- ❖ Profile
- ❖ Client
- ❖ Account
- ❖ Credentials
- ❖ Address
- ❖ Company
- ❖ Board of Directors
- ❖ Company Descriptions
- ❖ Message Board
- ❖ CEO
- ❖ Task
- ❖ Company Project
- ❖ Status:
- ❖ Employee
- ❖ Manager
- ❖ Hire Date
- ❖ Company Devices

## List of Functional Requirements

### General User;

1. A general user shall have a first name.
2. A general user shall have a last name. .
3. A general user shall be a general user.
4. A general user shall be a registered user.
5. A general user shall have an account id.
6. A general user shall have a date created.
7. A general user can create only one account with a unique email.
8. A general user shall have a user id.
9. A general user shall be able to create an account.

### Registered User:

10. A registered user shall be able to create an account.
11. A registered user shall have a first name.
12. A registered user shall have a last name.
13. A registered user shall have a date of birth.
14. A registered user shall have a user id.
15. A registered user shall be able to access the website.
16. A registered user shall be able to be an admin.
17. A registered user shall have a profile.
18. A registered user shall be a staff.
19. A registered user shall be an Employee.
20. A registered user shall have an employeeid.
21. A registered user shall be a registered customer.
22. A registered user shall be a vendor.
23. A registered user shall be able to view the receipt.
24. A registered user shall be able to make a payment
25. A registered user shall be able to view the tasklist.
26. A registered user shall be able to view the schedule.
27. A registered user shall be able to view the department.
28. A registered user shall be able to view the product.
29. A registered user shall be able to buy the product/services.
30. A registered user shall be able to receive a salary.
31. A registered user shall have a start date.
32. A registered user shall have an end date.
33. A registered user shall have a department.
34. A registered user shall have a position.
35. A registered user shall access company devices.

### Profile:

- 36. A profile shall have an avatar
- 37. A profile shall have a profile id
- 38. A profile shall have an alias.

**Client**

- 39. A client shall have client id.
- 40. A client shall have an account
- 41. A client shall be able to assign projects to a company.
- 42. A client shall have a project id.

**Account**

- 43. An account shall have an account id.
- 44. An account shall have credentials
- 45. An account shall have profile
- 46. An account shall have a branch.
- 47. An account shall have an address
- 48. An account shall have a date created.
- 49. An account shall be a general user.
- 50. An account shall comply with the company description.

**Credentials:**

- 51. A credential shall have an account id.
- 52. A credential shall have a password.
- 53. A credential shall have a valid email.

**Address:**

- 54. An address shall have a street.
- 55. An address shall have a city.
- 56. An address shall have a state.
- 57. An address shall have a zip code.
- 58. An address shall have a user.
- 59. An address shall have an employee.
- 60. An address shall have a country.
- 61. An address shall have an address id.
- 62. An address shall have a company.

**Company:**

- 63. Company shall have an address.
- 64. Company shall have an employee.
- 65. Company shall have a company id.
- 66. A company shall have a general user.

- 67. A company shall have assigned projects.
- 68. Company shall have a Ceo
- 69. A company shall have a board of directors.
- 70. A company shall have a Company Description.
- 71. A company shall have a Message Board.

**BoardOfDirectors:**

- 72. A board of directors shall have ceo
- 73. A board of directors shall have company.
- 74. A board of directors shall have a message board.
- 75. A board of directors shall have company descriptions.

**Company Description:**

- 76. Company Description shall have privacy policy.
- 77. Company Description shall have terms of use.
- 78. Company Description shall have a date posted.

**Ceo:**

- 79. A Ceo shall have an address.
- 80. A Ceo shall have a company.
- 81. A Ceo shall have a board of directors.
- 82. A Ceo shall have an email.
- 83. A Ceo shall have a valid phone number

**Task:**

- 84. A task shall have job id.
- 85. A task shall have a work id.
- 86. A task shall have a manager.
- 87. A task shall have a contract.
- 88. A task shall have a full time position.
- 89. A task shall be done by a part time employee.
- 90. A task shall have an employee.
- 91. A task shall have a company project

**Company Project:**

- 92. A Company Project shall have a project id.
- 93. A Company Project shall be assigned by the company.
- 94. A Company Project shall have a job id.
- 95. A Company Project shall have a work id.
- 96. A Company Project shall have a manager id.
- 97. A Company Project shall have a status.

**Status:**

- 98. A status shall have project id.
- 99. A status shall have a complete date.
- 100. A status shall be incomplete by default.

**Manager:**

- 101. A manager shall have manager id.
- 102. A manager shall be an employee.
- 103. A manager shall have an employee id.
- 104. A manager shall manage company projects.
- 105. A manager shall have a task.

**Employee:**

- 106. An employee shall have employee id.
- 107. An employee shall have first name
- 108. An employee shall have a last name.
- 109. An employee shall have a middle name.
- 110. An employee shall have a salary.
- 111. An employee shall have a manager
- 112. An employee shall have a supervisor.
- 113. An employee shall have a project id.
- 114. An employee shall have a work id
- 115. An employee shall belong to a company.
- 116. An employee shall work on multiple projects.
- 117. An employee shall be a registered user.
- 118. An employee shall have access to company devices.
- 119. An employee shall be able to process payments.
- 120. An employee shall have an hire date.
- 121. An employee shall be a part of the company.

**Payment Type;**

- 122. A payment type shall be a debit card.
- 123. A payment type shall be a credit card.
- 124. A payment type shall have a valid expiration date.
- 125. A payment type shall have a valid name.

**Company devices:**

- 126. A company device shall have a device id.
- 127. A company device shall be able to process payments.
- 128. A company device shall have a project id.
- 129. A company device shall have a project status.



## **Non-Functional Requirements**

### **Security:**

- 1) Verification of email and phone number shall be required upon sign in.
- 2) Username, password, and email shall be required to create an account.
- 3) The passwords shall be saved as encrypted.
- 4) To post a textbook a user shall be registered with an account.
- 5) Photos shall be saved as binary.

### **Privacy:**

- 6) User personal information such as passwords, email, phone number, transactions shall be private.
- 7) Registered user's password shall be saved into the MySQL database.
- 8) Registered user's email shall be saved into the MySQL database.
- 9) Registered user's phone numbers shall be saved into the MySQL database.
- 10) Posted textbooks shall be available to all users.
- 11) Inquiries about the textbook post shall be saved into the MySQL database.

### **Performance:**

- 12) Everytime a user requests something on the website, the requests should be completed within 10 seconds.
- 13) The website should load within 5 seconds.
- 14) The inquiries between buyer and seller shall be in real time.
- 15) The selected textbooks shall stay in the cart upon page refresh.
- 16) The website shall be able to display textbooks within 5 seconds upon appropriate search.

### **System Requirements:**

- 17) Technologies implemented in the website shall adhere to the CTO guidelines and implement all the technologies listed.
- 18) Website shall support Google chrome.
- 19) Website shall support Firefox.
- 20) Website shall support Safari and Internet Explorer.
- 21) Website shall be simple and user friendly.
- 22) Website shall support mobile devices.
- 23) Websites shall be responsive to all devices.

### **Marketing:**

- 24) Each www page shall display the website logo.
- 25) Each www page shall have a contact section at the bottom.

26) Each www page shall have social media links about the website.

**Content:**

- 27) A navigation bar shall be present and shall be stuck to the top of the website.
- 28) A search bar shall be present within the navbar.
- 29) The website logo shall be present to the leftmost on the navigation bar.
- 30) The textbooks categorized shall be displayed in the center of the landing page.
- 31) The website shall have pleasant colors.
- 32) The website shall have trending books listed above textbook categories.
- 33) Login and Signup pages shall be accessible from the navbar.
- 34) The website shall have separate pages for each textbook category.
- 35) Each textbook category page shall have a textbooks posting feature.
- 36) Posted textbooks shall have an appropriate image size.
- 37) A website footer shall be present in all pages at the bottom.

**Functionality:**

- 38) The website shall be deployed to Amazon Cloud Service.
- 39) The website shall be allowing the users to interact in real time.
- 40) The website shall be easy to use and easy to navigate.
- 41) The website shall have a usage page.
- 42) The website shall do efficient and quick searching for the textbooks.
- 43) The website shall be allowing users to post many books.

**Availability :**

- 44) The textbooks shall be available upon appropriate searches.
- 45) Upon unsuccessful search, the page should display an error message.
- 46) The website should be accessible to any browser.
- 47) All the options to buy and sell textbooks shall be visible clearly.
- 48) The links to different pages shall be easily tracked.
- 49) Checkout should only be accessible when a user is successfully registered.

**Fault Tolerance:**

- 50) The website shall be able to handle the display errors.
- 51) The website shall load all the content upon refresh on an error.

**Storage:**

- 52) The textbooks posts shall be saved into the database without being overloaded.
- 53) The textbook posts shall be updated in the database.

- 54)The textbook posts shall be deleted from the database.
- 55)The general users shall be stored into the database.
- 56)The registered users shall be stored into the database.
- 57)The registered user's account shall be updated into the database.
- 58)The registered user's account shall be deleted from the database.
- 59)The registered user's email shall be saved into the database.
- 60)The registered user's password shall be saved into the database.
- 61)The registered user's phone number shall be saved into the database.
- 62)The textbook's name shall be stored into the database.
- 63)Textbook images shall be saved into the database.
- 64)Textbook titles shall be saved into the database.
- 65) Textbook conditions shall be saved into the database.
- 66) Textbook price shall be saved into the database.
- 67)All the inquiries about the textbook posts shall be saved into the database.
- 68)The department names shall be stored into the database.
- 69)The login user's cookie session shall be saved into the database.

**Legal:**

- 70)The copyright content policy shall be written explicitly at the bottom on all pages.
- 71)A link to terms and conditions shall be present at the bottom on all pages.
- 72)The website privacy policy shall be clearly visible at the bottom.
- 73)The contact information shall be visible to give feedback.

**Environmental:**

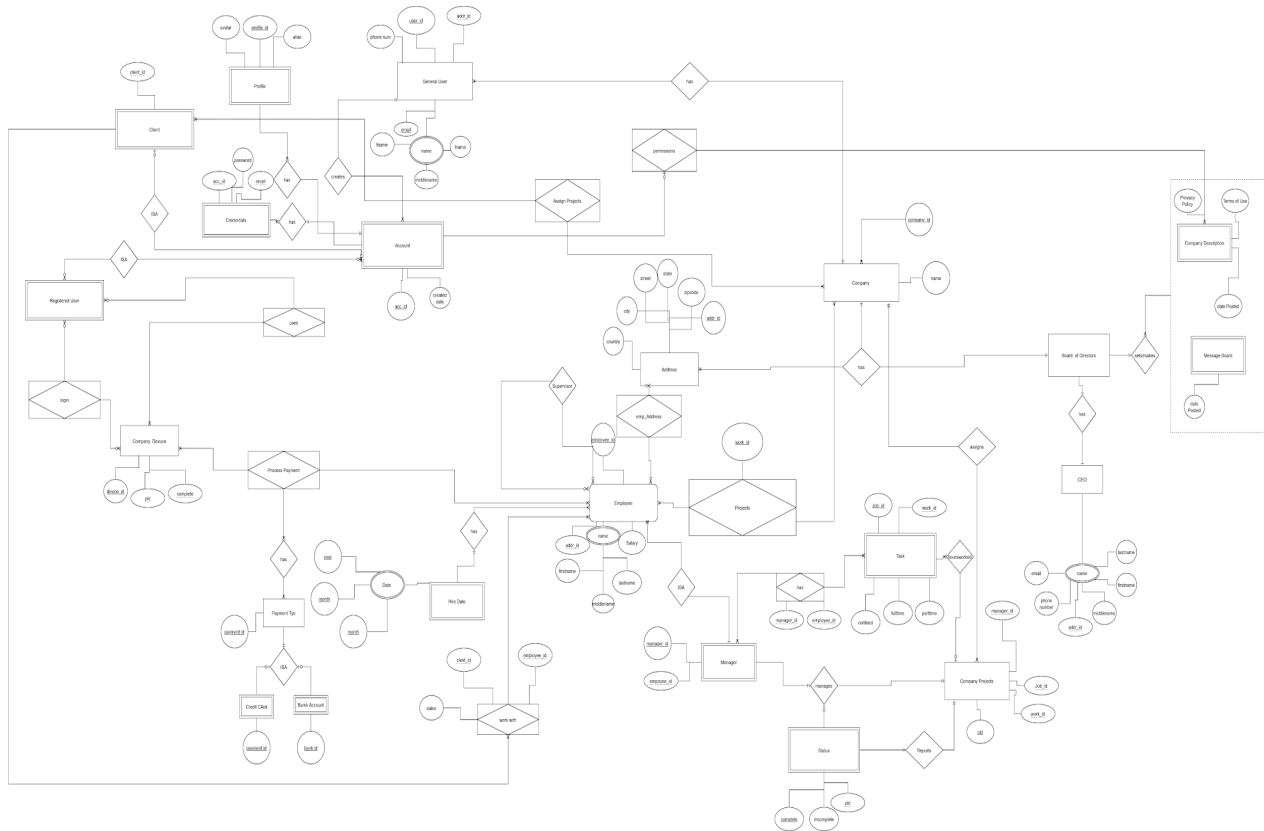
- 74)Final application code shall be sitting in the master branch.
- 75)A develop branch shall act as a mock master branch.
- 76)All contributed code shall be done on each member's branch.
- 77)The code shall be peer reviewed before merging to the develop branch.
- 78)The application shall be run and tested from the develop branch.
- 79)The application shall be deployed from the master branch on to Amazon Cloud Service.

## Section IV: Detailed List of Main Entities, Attributes and Keys

- ❖ General User (Strong):
  - Phone number: Numeric
  - User id: key, numeric
  - Address id : derived key, numeric
- ❖ Registered User:(Weak)
- ❖ Profile (Weak)
  - Avatar: Image, Text
  - Profile id: key, numeric
  - Alias : Alphanumeric
- ❖ Client (Weak):
  - Client id: numeric
- ❖ Account (Weak):
  - Account id: numeric
  - Created date: numeric, YYYY/MM/DD
- ❖ Credentials (Weak):
  - Account id: derived key, numeric
  - Password: Alphanumeric
  - Email: derived key, Alphanumeric
- ❖ Address (Strong):
  - Country: Alphabet, text
  - City: Alphabet, text
  - Street; Alphanumeric
  - State: Alphabet, text
  - Zip Code; numeric
  - Address id: key; numeric
- ❖ Company(Strong);
  - Company id: key: numeric
  - Name: alphabetic text
- ❖ Board of Directors(strong)
- ❖ Company Descriptions(Weak):
  - Privacy Policy: text, pdf document
  - Terms of use: text, pdf document
  - Date posted; alphanumeric, YYYY/MM/DD
- ❖ Message Board(Weak):
  - Date posted; alphanumeric, YYYY/MM/DD
- ❖ CEO (Strong):
  - Name; alphabet

- Email; Alphanumeric
- Address id: numeric
- Phone number: numeric
- First name; text, alphabetic
- Middle name; text, alphabetic
- last name: text, alphabetic
- ❖ Task:(Weak);
  - Jobid: key, numeric
  - Workid; derived key, numeric
  - Contract: text
  - Fulltime; text
  - Part time: text
- ❖ Company Project(strong):
  - Pid: key,numeric
  - Jobid: key, numeric
  - Workid; derived key, numeric
  - managerid; derived key, numeric
- ❖ Status:(weak):
  - Pid: key,numeric
  - Complete: key, alphanumeric
  - Incomplete; alphanumeric
- ❖ Employee(Strong);
  - Addr\_id: derived key,numeric
  - Firstname: text, alphabetic
  - Last Name: text, alphabetic
  - Middle Name: text, alphabetic
- ❖ Manager:(weak):
  - Managerid: derived Key, numeric
  - Employee id : derived key, numeric
- ❖ Hire Date(weak):
  - Date alphanumeric, YYYY/MM/DD
- ❖ Company Devices: (strong):
  - Device id(key) :numeric
  - Pid: derived key, numeric
  - Complete; derived key, alphanumeric

## Section V: Entity Relationship Diagram (ERD)



## Section VI: Testing Table

Rule	Entity A	Relation	Entity B	Cardinality	Pass/Fail	Error Description
1.	General User	Creates	Account	One to Many	Pass	
2.	General User	Has	Company	One to One	Pass	
2.	Registered User	uses	Company devices	One to Many	Pass	
3.	Profile	has	Account	One to One	Pass	
4.	Client	ISA	Registered User	Zero or One	Fail	Client shall not be a registered user.
5.	Client	Assigns Project	Company	1 or Many	Pass	
6.	Client	Works with	Employee	1 or Many	Pass	
5.	Account	Permission	Company Description	1 or Many	Pass	
6.	Account	Creates	General	One and only one	Pass	
7.	Account	ISA	Registered User	0 or 1	Pass	
8.	Account	Login	Company Device	0 or many	Fail	Account shall not log into company devices
9.	Credentials	has	Account	1 and only 1	Pass	
10.	Address	Has	Employee	0 or many	Pass	
11.	Address	has	Board of Directors	1 and only 1	Pass	
12.	Company	Has	Projects	1 or many	Pass	
13.	Company	Has	Address	1 or many	Pass	

14.	Company	Has	Clients	1 or many	Pass	
15.	Company	Has	General user	1 or many	Pass	
16.	Company	assigns	Company Projects	1 or many	Pass	
12.	Ceo	Has	Board of directors	1 and only one	Pass	
13.	Task	has	Manager	1 or many	Pass	
14.	Task	has	Company Project	0 or 1	Pass	
15.	Company Projects	reports	Status	1 and only 1	Pass	
	Board of Directors	has	Company Policy	Aggression	Pass	
15.	Status	Has	Manager	1 and only 1	Pass	
16.	Manager	ISA	Employee	1 or many	Pass	
17.	Employee	Has	Supervisor	Recursion	Pass	
18.	Hire Date	has	Employee	1 and only 1	Pass	
19.	Payment Type	ISA	Credit Card	Zero or 1	Pass	
20.	Credit Card	ISA	Payment Type	1 and only 1	Pass	
21.	Bank Account	ISA	Payment Type	1 and only 1	Pass	
22.	Company Device	uses	Registered User	Zero or many	Pass	