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AL AKHAWAYN UNIVERSITY

ALUMINIUM IDRISSI

CDMs and Final Requirements Document

Project Name:

- Internal Control Technology System

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Introduction:

Requirement engineering is a critical stage in developing software that meets the demands of customers within the limits of the software engineer's skills. This stage focuses on bridging the gap between these two components and achieving an ideal software system through three primary steps:

The first step is the **User and System Requirements**. A step during which we had numerous meetings with our client with the sole purpose of elicitation. The reason behind the frequency of our meeting with our client is that we actively worked on removing the linguistic ambiguities from her statement and inquire with questions to gain a deeper understanding of the requirements.

The second step is the **Conceptual Process Modelling** step, a step which was conducted in order to analyze and rationalize the business processes and data. We deemed this important as it showed how processes, data and end-users interact and are linked to each other. We met with our client to clarify her business' processes, and users in the information system and the interactions between them.

And finally, the last part, which is the **Conceptual Data Modelling** step, which is which is a model that organizes data description, data semantics, and data consistency requirements. Instead of focusing on what operations will be performed on data, the data model focuses on what data is required and how it should be organized. A data model is similar to a blueprint for a building, and it aids in the creation of conceptual models and the establishment of relationships between data objects.

So, the steps of requirements engineering, as well as their accompanying diagrams, are included in this deliverable. The creation of this delivery allowed us to go back and review our earlier deliverables, updating them as our understanding grew. We were able to verify that our findings are thorough, precise, and consistent by iteratively moving between the different sub stages, meeting with our client, and addressing our graphics.

I- Elicitation and User System Requirements

A. First Meeting:

1. Statement of requirements:

Mr. Idrissi, our client, indicated during our first meeting, since he was the one that should be doing all the tasks that have to be done and to fix all the problems he was facing manually, that he wanted a good system that will help him to automate his inventory management, a software that shouldn't very well designed it has just to be easy and flexible to use.

Mr. Idrissi's inventory management software should keep track of the products he has in stock as well as the orders he's waiting on from suppliers. Mr. Idrissi further mentioned that the program should have and be able to distinguish between the products he sells (aluminum, glass, designs etc…). Our customer would also want to have some control over the system and be able to perform some simple modifications in case he started considering new products to work with.

Moreover, since our client allows to be paid by debts too, Mr. Idrissi also suggested that the program maintain track of credited goods that his customers have yet to pay for and alert him when the payment deadline approaches. In addition to, calculate the bills after every sell,

When it comes to the timeline, Mr. Idrissi indicated that he hopes to have the program completed by the end of this year, so that he may start utilizing it for stock management starting the beginning of the next year

And regarding security, our client, since he doesn't trust too much his employees, insisted that the software should have a password and that he receives an email each time someone enters a wrong one, and that he should be able to change it whenever he wants.

By the end of our meeting, Mr. Idrissi allowed us to use our preferred technological tools to complete our project. He was really enthusiastic about this initiative and as stated before hopes to get it up and running soon so that she may develop her business and reach out to new customers.

2. Team discussion:

Following our initial meeting with our customer, our team held in-depth conversations to collect valuable assumptions and identify ambiguities that our client should clarify in the next meeting. Furthermore, we made a list of questions to ask Mr. Idrissi at the next meeting so that we could

have a better sense of what she considers to be a "good" system, what needs to be automated, and what needs to be manually managed. We created a first List Like Text (LLT) draft based on the informed assumptions we made to define the building blocks.

3. Linguistic ambiguities:

As stated before, we discovered a list of linguistic ambiguities in the report that needed to be clarified. And, in order to better grasp the needs communicated by our customer, we created a set of questions based on the elicitation method discussed in class for each of these situations of language ambiguity to be asked to him in the next meeting.

These linguistic ambiguities are:

- "...since he was the one that should be doing all the tasks that have to be done and to fix all the problems he was facing manually…"
- "…that he wanted a good system that will help him to automate his inventory management"
- "a software that shouldn't very well designed it has just to be easy and flexible to use."
- "…software should keep track of the products he has in stock as well as the orders he's waiting on from suppliers."
- "…and be able to perform some simple modifications in case he started considering new products to work with."
- "…Mr. Idrissi indicated that he hopes to have the program completed by the end of this year"
- "…And regarding security, our client, since he doesn't trust too much his employees"
- "…insisted that the software should have a password"
- "…and that he should be able to change it whenever he wants."

4. Questions and clarifications:

"...since he was the one that should be doing all the tasks that have to be done and to fix all the problems he was facing manually…"

• what are the tasks that you are dealing with?

• what are exactly the problem that you are facing and what do you mean by "fix" them

"…that he wanted a good system that will help him to automate his inventory management"

• how do you define a "good system"?

• what kind of automation are you looking for?

"a software that shouldn't very well designed it has just to be easy and flexible to use."

• why did you say that the software "shouldn't be very well designed?

• what are your exact requests when you say "easy and flexible"

"…software should keep track of the products he has in stock as well as the orders he's waiting on from suppliers."

• how should the system track the products you have in stock and the orders from the suppliers? Using which characteristics?

"…and be able to perform some simple modifications in case he started considering new products to work with."

• what kind of modification should the user be able to perform?

• what do you mean by "in case he started considering new products to work with."

"…Mr. Idrissi indicated that he hopes to have the program completed by the end of this year"

• can you give us an exact date?

"…And regarding security, our client, since he doesn't trust too much his employees"

• how can our software help you with your trust problem?

5. **First LLT draft**:

We had a broad concept of what the system should feature after recognizing the linguistic ambiguities and developing the associated questions. In general, we separated our system's building components into functional and non-functional requirements.

- Functional requirements:
  - Manage user.

- Manage the stock.
- Manage the sales.
- Manage the orders.

Under these main blocs, we have different sub-blocs:

- Keep track of the items in the stock
- Keep track of the sold products and update inventory
- Keep track of the ordered products and update inventory
- Enable modification operations for the previous lists.
- Display the previous lists in the user interface.
- Allow the user to search and navigate through the products
- Notify the user when a product is understocked.
- Allow to add new products to the stock

- Non-Functional requirements:

- The deadline: we only have roughly two months to create a functional product.
- Mr. Idrissi emphasized on the ability to improve the program by adding new features while still having a functional system available at all times.
- The system should be able to function on a standard or low performing PC.
- A choice of French and Arabic versions of the system should be available.

B- Second meeting:

1. Statement of requirements:

We had a second meeting with our client to address all of our concerns and misunderstandings. He said that a good management system, in his opinion, is one that is straightforward and easy to use and has all of the aforementioned functions. And he implies that the language used should not be technical, and that the training time required should not take long time.

For example, he wants a "Add new product" button instead of something more complicated to add a product. To put it another way, he wants us to utilize a basic terminology that everybody can understand.

Moreover, Mr. Idrissi, through the system, would like to be able to control and change the following information:

· Available products.

· Add/Delete/Modify type of aluminum product.

· Add/Delete/Modify type of glass product.

- …

2. Team Discussion:

Following our second meeting with Mr. Idrissi, the five members of our team gathered to review our client's responses to our concerns and to clarify any ambiguity or questions we had following our initial meeting. We began working on our final LLT after thoroughly evaluating the responses we received. We collaborated during this process to come up with as many functions and services as possible for each building component. Overall, we gained a better grasp of the needs. As a result, we were able to determine that there will primarily be five building components in this system.

- User management.
- Manage Inventory
- Manage Sales
- Manage Orders
- Manage bills

3. Final LLT Draft:

I. Functional requirements:

i. User management:

a. Function login.
b. Function logout
c. Function shut down system
d. Function change password

e. Function notify when wrong password is entered

ii. Manage Inventory

a. Function add product
b. Function delete product
c. Function modify product
d. Function search product
e. Function display list products
f. Function to notify when a product is no more available in the stock

iii. Manage sales

a. Function add sale
b. Function search sale
c. Function modify sales
d. Function delete sale
e. Function sort sales
f. Function display sales for the day / month / all of them
g. Function to notify when a client exceeds the deadline of payment.

iv. Manage orders

h. Function add order
i. Function search order
j. Function modify order
k. Function sort orders
l. Function delete order
m. Function display orders for the day / month / all of them

v. Manage bills

a. Function calculate bill
b. Function modify bill
c. Function display bill
d. Function print bill
e. Function delete bill

II. Non-Functional requirements:

i. The deadline: we only have roughly two months to create a functional product.
ii. Mr. Idrissi emphasized on the ability to improve the program by adding new features while still having a functional system available at all times.
iii. The system should be able to function on a standard or low performing PC.
iv. A choice of French and Arabic versions of the system should be available.

4. Pending issues:

Despite the fact that we were able to identify each construction piece and establish their roles, we are still unable to completely comprehend the global system. We still can't break down the building blocks into smaller pieces or see the relationships between them properly. In addition to the fact that not all the team members are not familiar with all the programing languages we need to work with, since the client is asking for a machine learning code.

II- Analysis and Modeling

Introduction:

After the elicitation step, where we were able to generate the final version of the LLT that clearly states the functional, non-functional, and domain requirements in a manner that is free of linguistic ambiguities or inconsistencies. We are in the analysis and modeling phase of the requirements engineering process. This phase is broken down into several steps. The data, procedures, and users must all be modelled independently. We'll have a series of diagrams, each representing a different component of the processes obtained from the User and System Requirements Document (USRD) we created during the elicitation phase.

In this phase We want to gain a comprehensive, precise, and consistent grasp of the system's functions. Despite the fact that our focus is on processes, we will identify strong connections with data and users. In reality, all conceptual process models (CPMs) depict the user-controlled flow of data between processes.

Specifications Update:

1. **User management:**
    a. Login.
    b. Log out.
    d. Change password.

e. Notify when wrong password is entered.

2. **Manage Inventory:**

a. Add product.

b. Delete product.

c. Modify product.

d. Search product.

e. Display list products.

f. Notify when a product is no more available in the stock.

3. **Manage sales:**

a. Add sale.

b. Search sale.

c. Modify sales.

d. Delete sale.

e. Sort sales.

f. Display sales

g. Notify when a client exceeds the deadline of payment.

h. Compute Sale

4. **Manage orders:**

a. Add order.

b. Search order.

c. Modify order.

d. Sort orders.

e. delete order.

f. display orders.

5. **Manage bills:**

a. Compute bill.

b. Modify bill.

c. Display bill.

d. Print bill.

e. Delete bill.

6. **Manage Provider**

a. Add Provider

b. Delete Provider

c. Modify Provider

d. Search Provider

e. View Provider's Details

7. **Manage Client**

a. Add Client

b. Delete Client

c. Modify Client

d. Search Client

e. View Client's Details

Magic Matrix:

We must guarantee that the elements of date, users, and processes are consistent, full, and precise during the analysis and modeling phase. Following our discussions with our client, we decided to use the magic matrices to assess our progress and determine which components of our system are weak, as well as our own flaws and strengths.

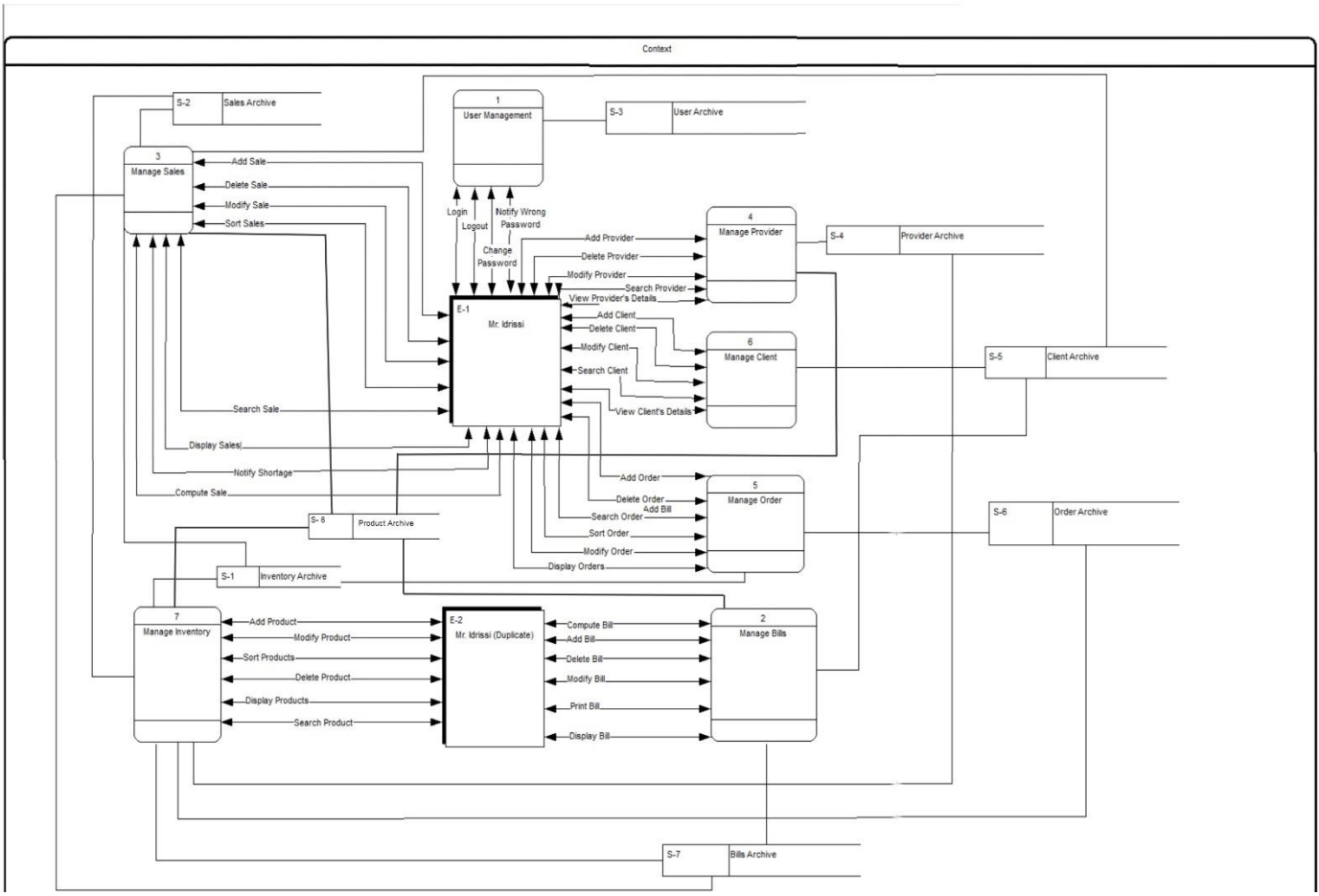
The matrices below show a percentage estimate that represents our current understanding:

	Data	**Processes**	**Users**
Precision	85%	90%	90%
Completeness	80%	95%	90%
Consistency	90%	90%	90%

We can go forward to modeling after the Magic Matrix demonstrates a thorough knowledge of data, process, and users. We employ models to represent the many components and their relationships, which are represented through symbols that is expanded with semantics.

Context Diagram:

We moved on to the analysis and modeling process using the LLT we had already created. In this step of the requirements engineering, information, behavior, and functions of the system are defined and translated into the architecture, component, and interface level design in the design modeling. The context diagram is used at this step to offer a high-level depiction of the system that will be constructed, showing the flow of data, users, and processes.



Description

- ✓ User: according to our customer, one person can only use the system: Mr. Idrissi will be the system's lone user, with complete control over all processes. In the context diagram, the entity representing Mr. Idrissi was featured twice simply for readability.
- ✓ Data stores: The system will have four datastores (inventory, sales, orders, and bills).

The system is made up of seven primary processes, the most important are:

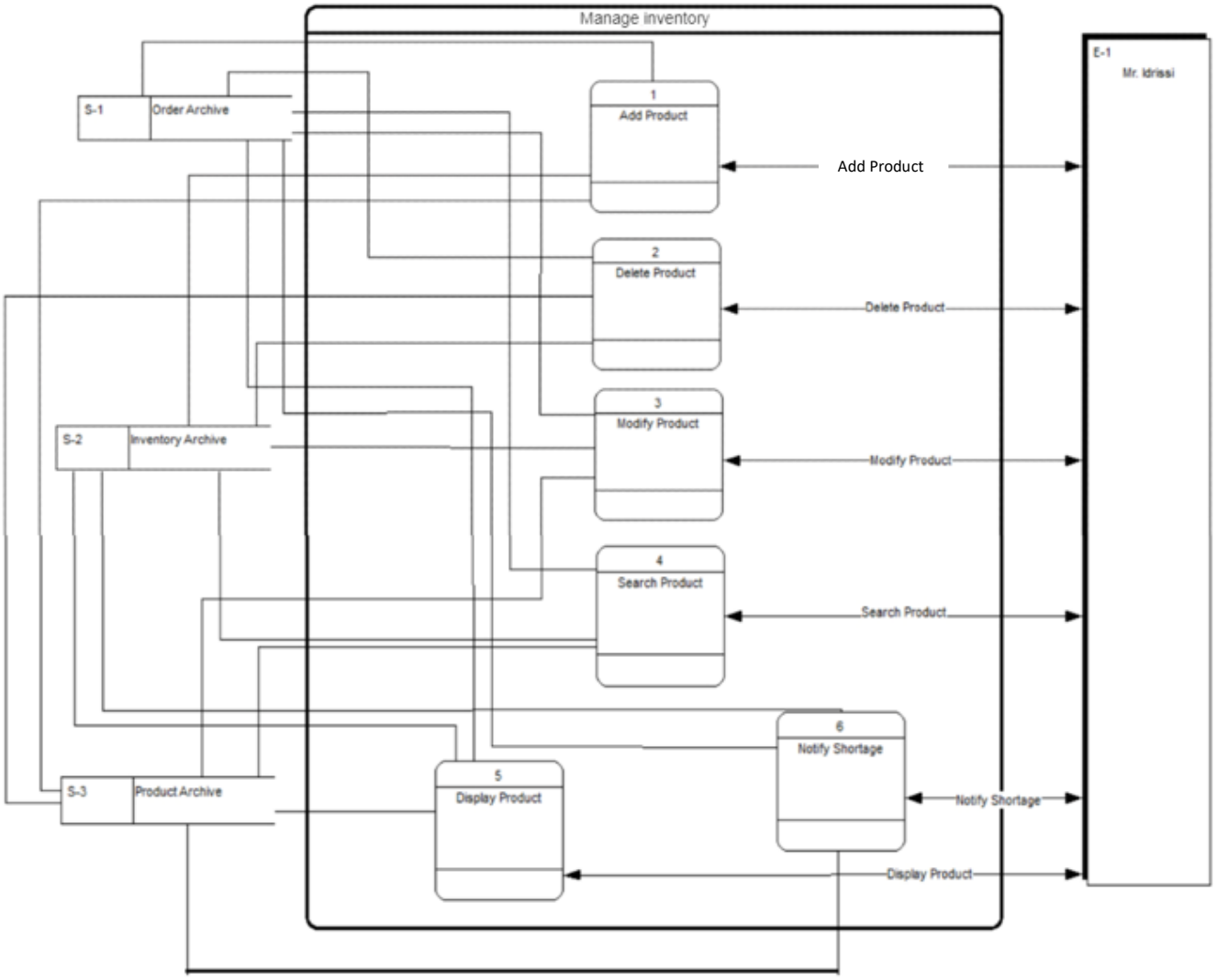
- Manage inventory: this process includes Add, delete, modify operations on the inventory, as well as the functionality of search, display and notify when a product is no more available in the stock. It is linked to both the inventory and orders data stores.
- Manage user: this process is responsible for login/logout and change credentials operations.

- Manage sales: this process includes Add, delete, modify operations, as well as the functionality of search, display, sorting and notify when the client exceeds the deadline of payment. It is related to both the sales, bills and inventory data stores.
- Manage orders: This process keeps track of the orders through Add, delete, modify operations, as well as the functionality of search, display. It is related to the orders and inventory data stores.
- Manage Bills: this process is responsible for calculating the bills, display, delete, modify and generating ready to print reports. It is related to the orders and bills data stores.
- Manage Client: this process helps Mr. Idrissi to keep track of his clients by adding, delete, modify, and search a client, in addition to view more details about him.
- Manage Provider: this process helps Mr. Idrissi to keep track of his clients by adding, delete, modify, and search a Provider, in addition to view details about him.

Conceptual process models:

A conceptual model is a system's representation. It is made up of ideas that are used to assist people learn about, understand, or imitate the subject that the model represents. It's also a collection of ideas.

- **Manage Inventory:**



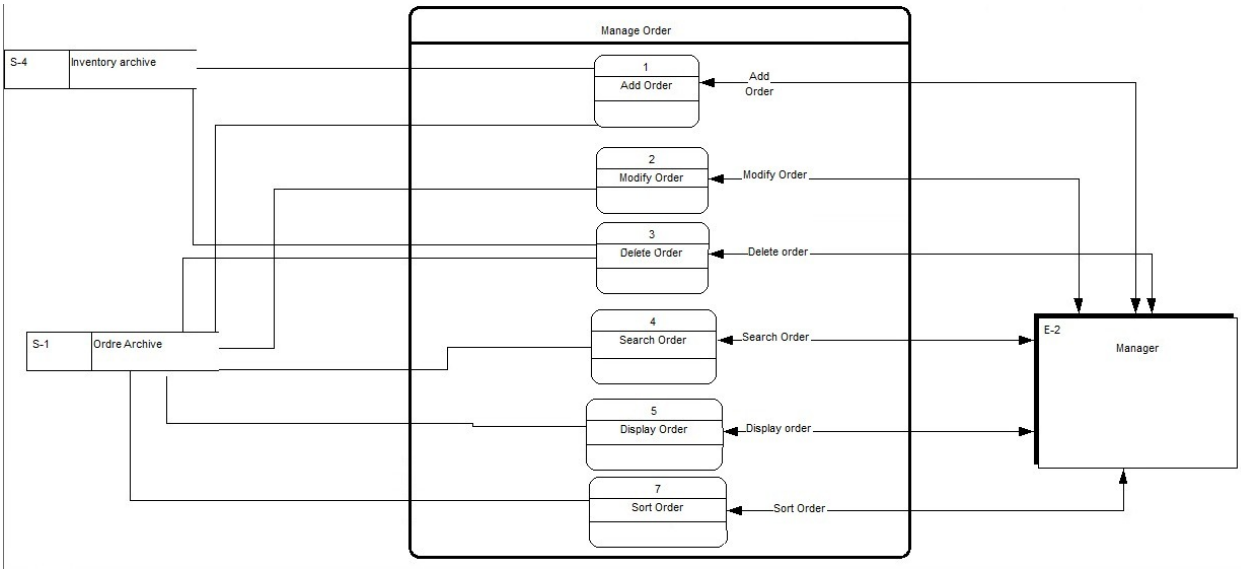
Description:

Manage inventory is comprised of 6 subprocesses:

- Add product: this process adds a product to the stock. It is related to the orders archive, and the Inventory archive.
- Delete Product: this process deleted an item from the stock. It is linked to the inventory archive.

- Search product: searches for a specific product in the stock, related to the inventory archive.
- Modify product: modifies information related to a specific product in the stock, linked to inventory archive.
- Sort product: sorts products in the stock, linked to the inventory archive.
- Notify: when a product is no more available in the stock, this subprocess generates a notification. It is linked to the inventory archive.

- **Manage orders :**

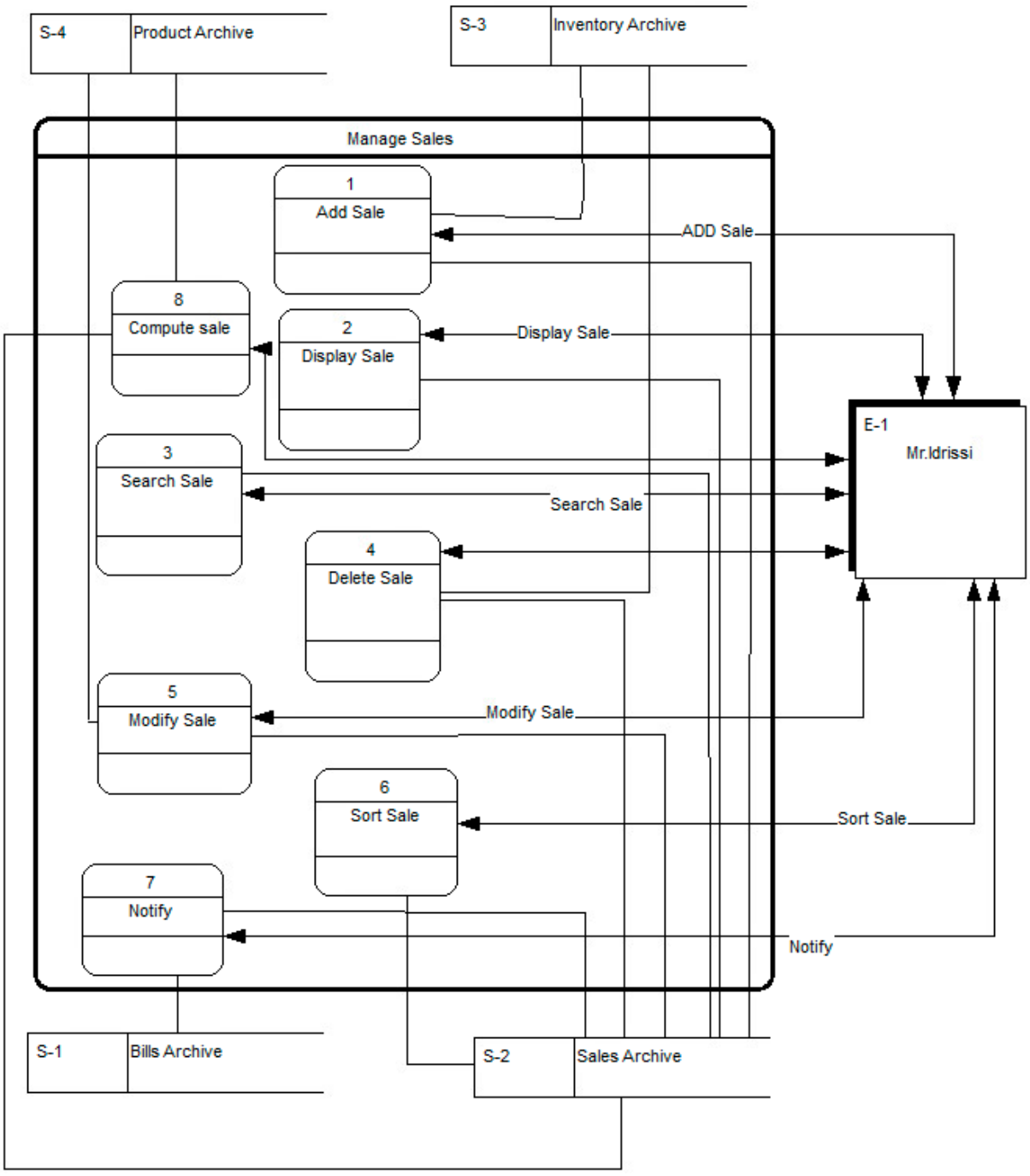


Description:

Manage orders encapsulates 6 subprocesses:

- Add order: Adds an order to the archive. It is related to inventory archive and the orders archive.
- Delete order: Deletes a specific order. It is related to orders archive.
- Search order: Searches for a specific order. Related to orders archive.
- Sort order: Sorts the list of orders. Related to orders archive.
- Modify order: Modifies a specific order. It is related to orders archive.
- Display order: Display a list of orders for the day/month/all of them. Related to orders archive.

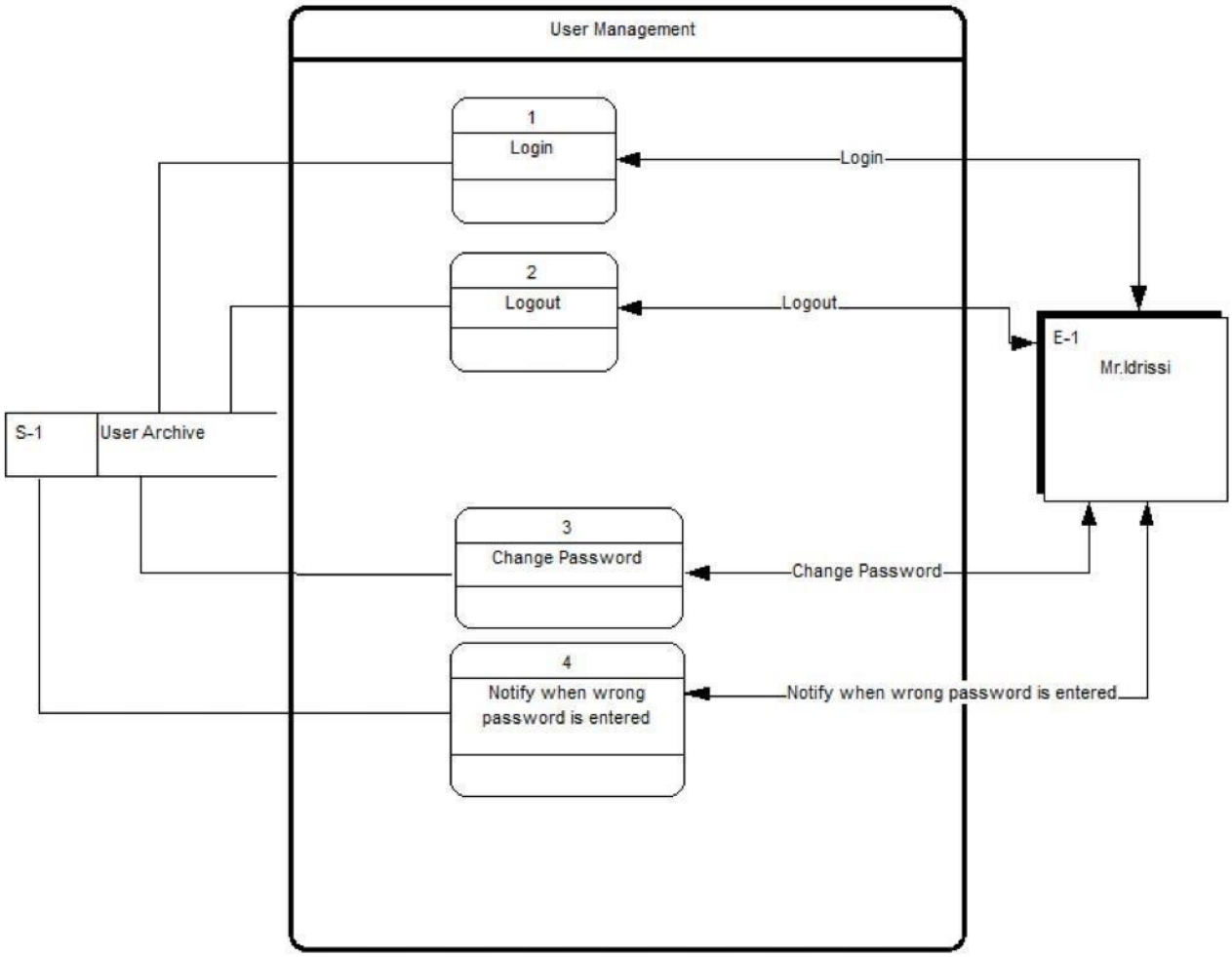
- **Manage Sales:**



Description:

Manage sales is comprised of 8 subprocesses:

- Add sale: adds a sale to the system. It is related to the inentory archive and the sales archive.
- Delete sale: deletes a sale from the system. It is related to the inventory archive (because the item is returned to the stock) and the sales archive (removed from the sales).
- Search sale: searches for a particular sale. Linked to sale archive.
- Sort sales: sorts the list of sales. Linked to sales archive.
- Modify sale: modifies information related to a specific sale. Linked to sales archive.
- Display: displays sales for the day/ month / all of them. Related to sales archive.
- Notify: when client exceeds the deadline of payment, a notification is sent to Mr. Idrissi. Linked to sales archive.
- Compute Sale: it computes the sales. It is related to product, sales and bills archive
  - **Manage User:**

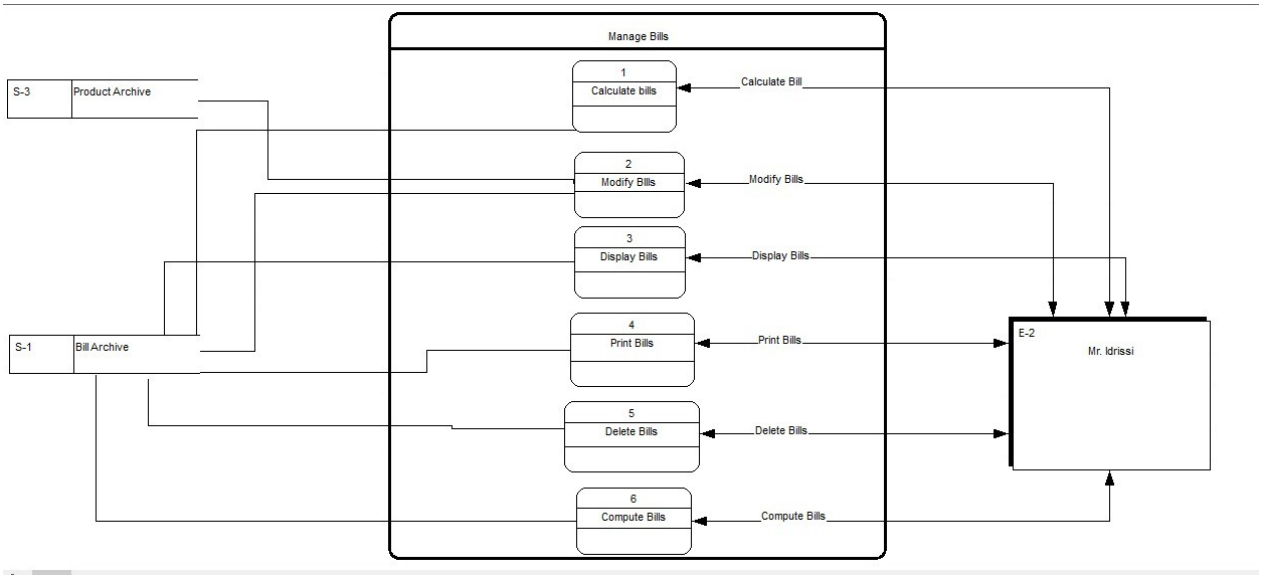


Description:

User Management encapsulates 4 subprocesses:

- Login: Gives the user the ability to login into the system. It is related to User archive.
- Logout: Gives the user the ability to logout into the system. It is related to User archive.
- Change password: Changes the user's password. It is related to User archive.
- Notify: Notifies the user when a wrong Password is entered: It is related to User archive.

- **Manage Bills:**

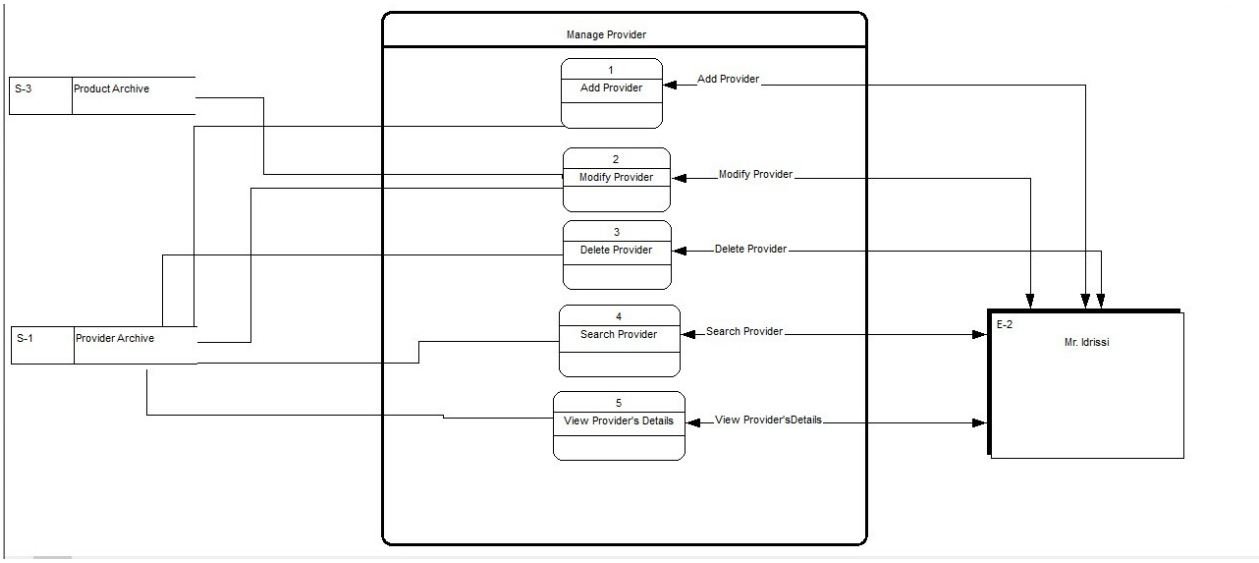


Description:

Manage bills encapsulates 5 subprocesses:

- Compute Bill: Computes some calculations in order to calculate the bill. It is related to Bills archive and order archive.
- Modify Bill: Makes modifications when required by the user. It is related to Bills archive.
- Display Bill: Display a list of Bills (day/month/year/all). It is related to Bills archive.
- Print Bill: it is related to both Bills and order archives.
- Delete Bill: deletes a specific bill. It is related to bills archive.

- **Manage Provider**



Description:

Manage client is formed of 5 subprocesses:

-add client: this process adds a client to our database. It is linked to the client archives.

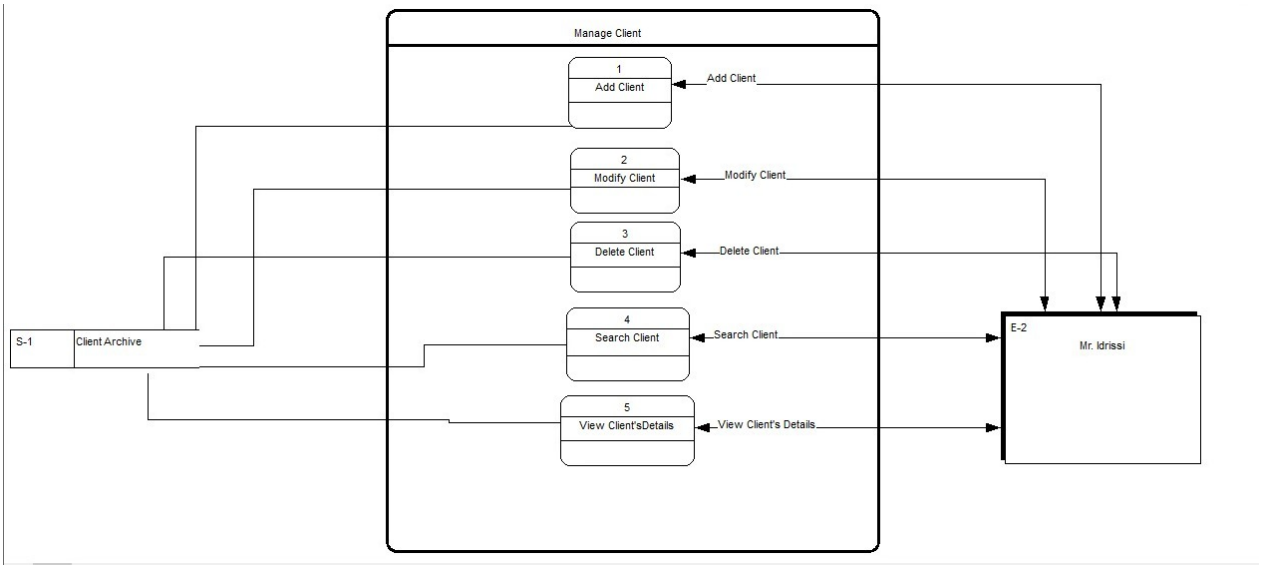
-delete client: this process deletes a client to our database. It is linked to the client archives.

-modify client: this process modifies a client in our database. It is linked to the client archives.

-Search client: this process permits us to search for a specific client in our database. It is linked to the client archives.

-View client's details: this process permits you to look in the details of a specific client in our database. It is linked to the client archives.

- **Manage Client**



Description:

Manage client is formed of 5 subprocesses:

-add client: this process adds a client to our database. It is linked to the client archives.

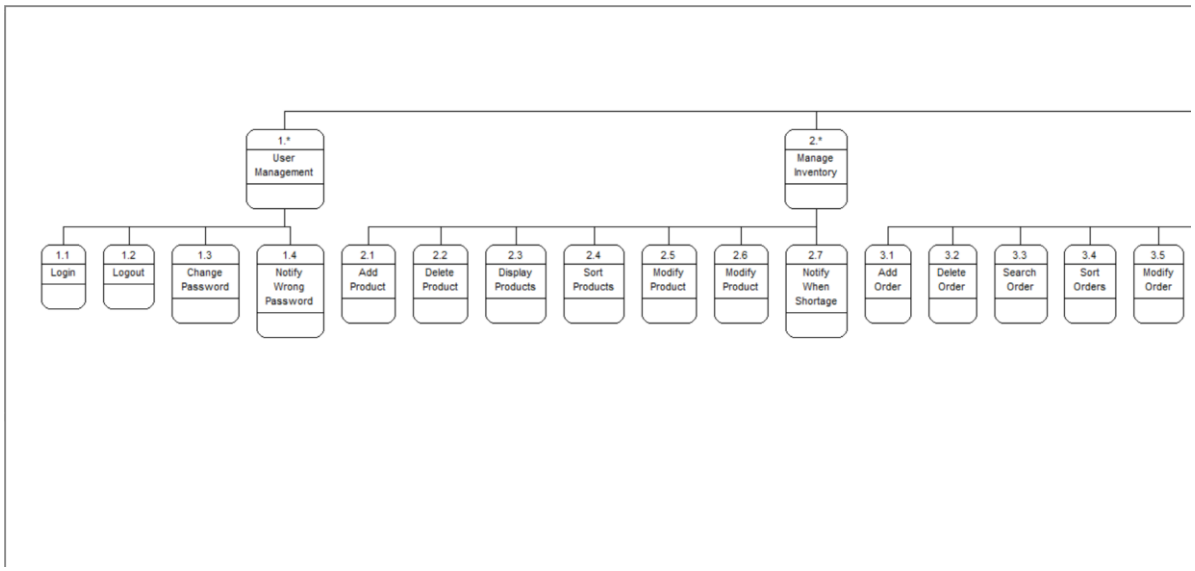
-delete client: this process deletes a client to our database. It is linked to the client archives.

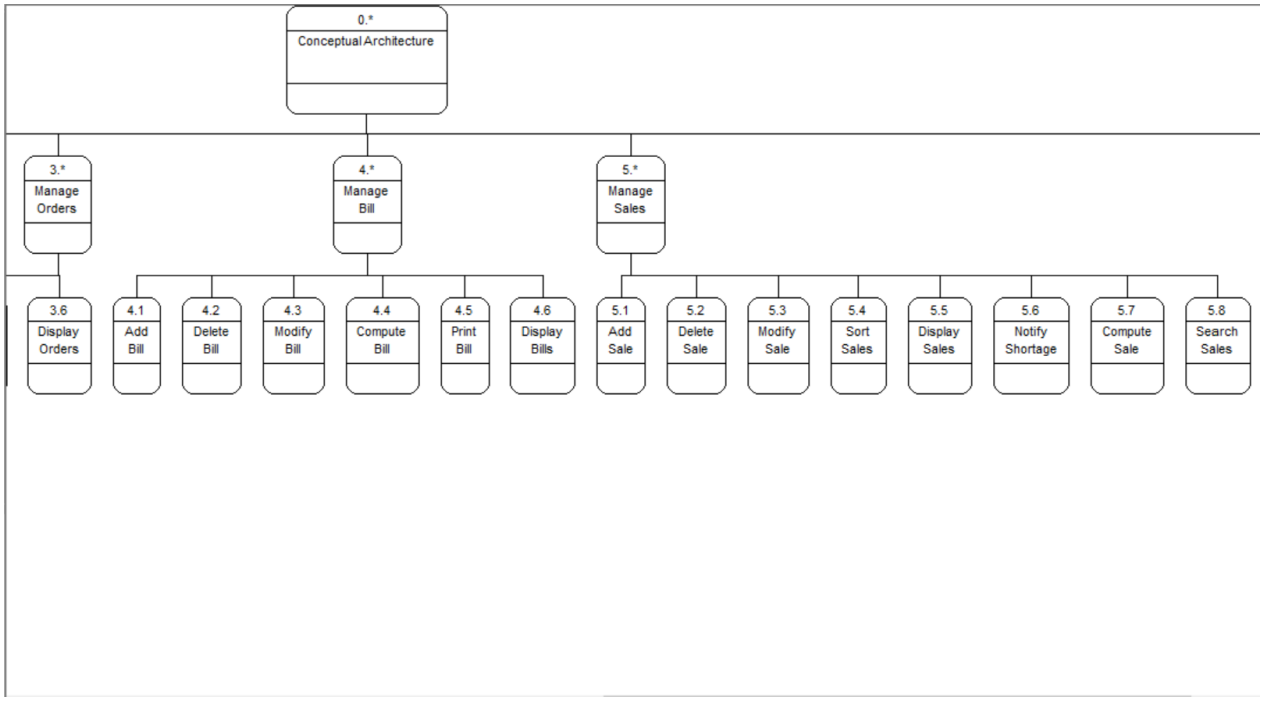
-modify client: this process modifies a client in our database. It is linked to the client archives.

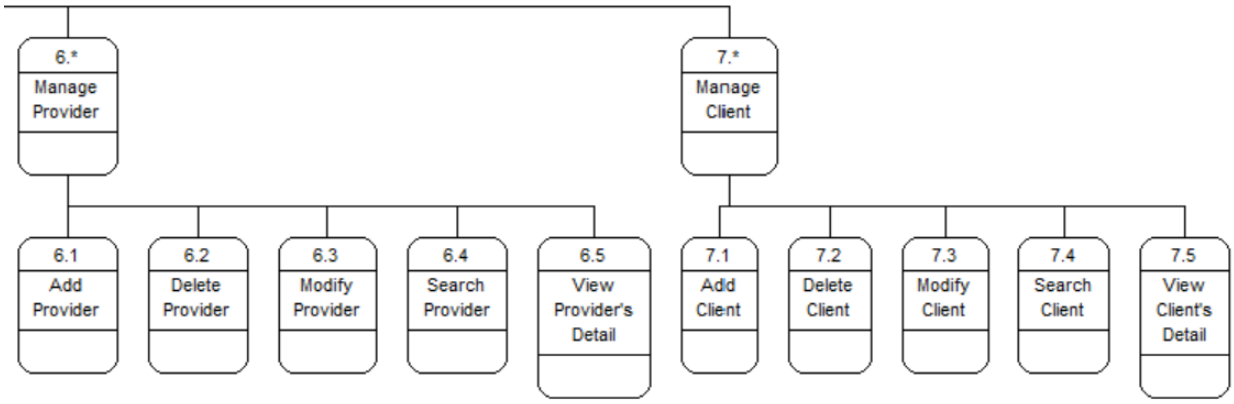
-Search client: this process permits us to search for a specific client in our database. It is linked to the client archives.

-View client's details: this process permits you to look in the details of a specific client in our database. It is linked to the client archives.

Conceptual Architecture:


1.*
User Management
2.*
Manage Inventory
1.1
Login
1.2
Logout
1.3
Change Password
1.4
Notify Wrong Password
2.1
Add Product
2.2
Delete Product
2.3
Display Products
2.4
Sort Products
2.5
Modify Product
2.6
Modify Product
2.7
Notify When Shortage
3.1
Add Order
3.2
Delete Order
3.3
Search Order
3.4
Sort Orders
3.5
Modify Order


0.*
Conceptual Architecture
3.*
Manage Orders
4.*
Manage Bill
5.*
Manage Sales
3.6
Display Orders
4.1
Add Bill
4.2
Delete Bill
4.3
Modify Bill
4.4
Compute Bill
4.5
Print Bill
4.6
Display Bills
5.1
Add Sale
5.2
Delete Sale
5.3
Modify Sale
5.4
Sort Sales
5.5
Display Sales
5.6
Notify Shortage
5.7
Compute Sale
5.8
Search Sales



Description:

Conceptual architecture is a type of architecture that employs conceptualism, which is defined by the incorporation of ideas or concepts from outside the field of architecture, usually as a means of broadening the scope of the discipline. As shown, our system is made up of seven processes, each containing multiple subprocesses consisting of ready for automation actions:

Final Specification's List:

1. User management:
    a. Login.
    b. Log out.
    d. Change password.
    e. Notify when wrong password is entered.

2. Manage Inventory:
    a. Add product.
    b. Delete product.
    c. Modify product.
        - Modify Price
        - Modify Units
    d. Search product.
        - By Category
        - By Name
    e. Display list products.
        - By Category
        - By Name
    f. Notify when a product is no more available in the stock.

3. Manage sales:
    a. Add sale.
    b. Search sale.
        - By Category
        - By Name
    c. Modify sales.
        - Modify Product
        - Modify Units
    d. Delete sale.
    e. Sort sales.
        - By Date
    f. Display sales for the day / month / all of them.
    g. Notify when a client exceeds the deadline of payment.
    h. Compute Sale

4. Manage orders:
    a. Add order.

b. Search order.

- By Date
- By Products

c. Modify order.

- Modify Product
- Modify Units

d. Sort orders.

- By Date

e. delete order.

f. display orders for the day / month / all of them.

5. Manage bills:
    a. Compute bill.
    b. Modify bill.
        - Modify Product
        - Modify Price
    c. Display bill.
    d. Print bill.
    e. Delete bill.
6. Manage Provider
    a. Add Provider
    b. Delete Provider
    c. Modify Provider
    d. Search Provider
    e. View Provider's Details
7. Manage Client
    a. Add Client
    b. Delete Client
    c. Modify Client
    d. Search Client

e. View Client's Details

III- Conceptual Data Modeling:

1- Client Statement

During our recent meeting with Dr. Idrissi, he gave us the documents he uses to bill consumers, accept payment from departments, and get supplies from providers. Our purpose in this step is to collect data from the many sources offered by our client. We choose to approach the data collection portion of our research deductively, relying on the forms and documents described previously.

2- Data Sources Description

i- Form 1:

Invoice Form: This form is used after every purchase to record the purchases of the clients.
And this form contains the information about each client which is the client's Name, phone number, address and email.
In addition, besides the facture number, this form contains the information about the purchase which is the purchased product
The diameter, the quantity, the unit price and the total amount of that product.
Finally, we have the total amount that should be paid, and the client's banking details this later is willing to pay using the credit card.

ii- Form 2

Deferred Payment Form: This form is used when the client is willing to pay with the deferred payment method.
This form contains at first the information about the client which is the full name, phone number, address, and the day of the purchase.
After the facture's number, we find the products the client's purchased and the total amount then the net total amount the client should pay, the amount he paid and the date he did, then the rest amount he should pay later and the deadline date to pay the rest.
And finally, the percentage he should pay in addition if he doesn't pay in time.

iii- Form 3

Provider's Form: This form is used when Mr. Idrissi wants to get supplies and buy the productions that are not available anymore in the inventory from provider.

And this form contains the name of the provider, address, phone number and the location along with the postal code.

After that we find the date, the reference, the responsible if the provider is a company, then the TVA.

Then it comes the reference of the purchased products, quantity, description, code, unit price, and the total amount of the product.

Finally, we have the

3- Data Dictionary (1st Draft)

Reference	Identifier	Countable / Non-Countable	Description	Notes
Form 1: Invoice	Nom	NC	Full name of the client	
	CIN	NC	National ID Card Code	
	Adresse	NC	Client's address	
	Tel	NC	Client's phone number	
	Email	NC	Client's email	
	Facture num	C	Facture number	
	Produits	NC	The name pf the product	
	Diametre	NC	The diameter of the product	
	Quantite	NC	The quantity of the product	
	Prix Unitaire	C	Unite price of the product	This is the price of a unite of the product

	Montant	C	The amount of that specific product	This is the quantity x the unit price of the product
	Montant total	C	Total amount of all the products	This is the sum of all the amounts computed
	Code	C	Client ID	
	Net a payer	C	Net total amount	Amount + tax
	Signature	NC	Client's signature	
	Date	NC	Date of the purchase	
	Cachet du paiement	C	Company's stamp	
Form 2: Deferred payment form	Nom	NC	Client's name	
	Tel	NC	Client's phone number	
	Adresse	NC	Client's address	
	Le	NC	Date of purchase	
	CIN	NC	National ID Card Code	
	Numero de Facture	C	Facture number	

	Marchandise	NC	The purchased products	The products
	Net TTC	NC	Net total amount	Total amount + tax
	A deduire	NC	Deduced amount	The first paid amount
	Avance payee le	NC	Date of payment of deduced amount	
	Net a payer au	NC	Deadline date to pay the rest of amount	
	signature	NC	Client's signature	
	Cachet du paiement	C	Company's stamp	
Form 3: Provider's Form	Nom	NC	Provider's name	
	Adresse	NC	Provider's address	
	Code postal	C	Postal code	
	Telephone	NC	Provider's phone number	
	Localite	NC	Provider's location	
	Date	NC	Date of purchase	
	Reference	NC	Reference	
	Responsable	NC	Responsible	

	CIN	NC	National ID Card Code	
	TVA	NC	value added tax	
	Reference	NC	Product reference	
	Quantite	NC	Quantity of the product	
	Description	NC	Description of the product	Type of the product
	Code	C	Product ID	
	P.U	NC	Unit price	Unite price of the product
	Montant	C	Price of the product	Quantity x unite price
	Net a payer	C	Total net price	Total amount + tax
	Signature	NC	Provider's signature	
	Cachet	C	Provider's stamp	
	Le	NC	Date of purchase	

4- Analysis Of the Data Dictionary

Now that we've created our basic Data Dictionary, it's time to examine it and eliminate any anomalies that may be affecting our data.

We'll begin by completing the Ill identification process. The following properties have been detected as being poorly identified in this step:

- Nom
- Tel
- Address
- Signature
- Le
- CIN
- P.U
- A deduire
- Localite
- Responsible
- Reference
- Cachet

The names of these attributes above which are Ill identified will be described as follows:

- Nom du client / du fournisseur
- Téléphone du client / du fournisseur
- Adresse du client / du fournisseur
- Signature du client / du fournisseur
- Dare du paiement
- Code d'identitee nationale
- Prix unitaire
- Montant a deduire
- Localite du fournisseur
- Responsable d'entreprise
- Reference du fournisseur
- Cachet du fournisseur

After that, we'll look for homonyms. The following IDs indicate the homonymies we discovered using the initial draft of our data dictionary:

- Nom
- Code
- Adresse
- Telephone

- Date

Once we've identified and comprehended the nature of these homonymies, we'll repair them and change them to the following forms in the final draft:

- Nom
    - Nom du client
    - Nom du fournisseur

- Code
    - Code du Client
    - Code du produit
- Adresse
    - Adresse du client
    - Adresse du fournisseur
- Date
    - Date du paiement
    - Date de l'achat
- Telephone
    - Telephone du client
    - Telephone du fournisseur
- Reference
    - Reference du client
    - Reference du fournisseur

After that, we checked for any synonymies, which we didn't find in the first draft of the Data Dictionary.

Last but not least, we looked for redundancies, which were immediately obvious upon first inspection of the Data Dictionary.e

5- Data Dictionary (2nd Draft)

Reference	Attributes	Countable / Non-Countable	Description	Notes
Form 1: Invoice	Nom du client	NC	Full name of the client	
	CIN du client	NC	National ID Card Code	
	Adresse du client	NC	Client's address	
	Telephone du client	NC	Client's phone number	
	Email du client	NC	Client's email	
	Facture num	C	Facture number	
	Produits	NC	The name pf the product	
	Diametre	NC	The diameter of the product	
	Quantite	NC	The quantity of the product	
	Prix Unitaire	C	Unite price of the product	This is the price of a unite of the product
	Montant	NC	The amount of that specific product	This is the quantity x the unite price of the product
	Montant total	NC	Total amount of all the products	And this is the sum of all the amounts computed

	Code du client	C	Client ID	
	Net a payer	NC	Net total amount	The total amount + tax
	Signature du client	NC	Client's signature	
	Date d'achat	NC	Date of the purchase	
	Cachet du paiement	C	Company's stamp	
Form 2: Deferred payment form	Nom du client	NC	Client's name	
	Telephone du client	NC	Client's phone number	
	Adresse du client	NC	Client's address	
	Date du paiement	NC	Date of purchase	
	CIN du client	NC	National ID Card Code	
	Numero de Facture	C	Facture number	
	Marchandise	NC	The purchased products	The products
	Net TTC	NC	Net total amount	Total amount + tax
	Montant a deduire	NC	Deduced amount	The first paid amount

	Avance payee le	NC	Date of payment of deduced amount	
	Net a payer au	NC	Deadline date to pay the rest of amount	
	Signature du client	NC	Client's signature	
	Cachet du paiement	C	Company's stamp	
Form 3: Provider's Form	Nom du fournisseur	NC	Provider's name	
	Adresse du fournisseur	NC	Provider's address	
	Code postal	C	Postal code	
	Telephone du fournisseur	NC	Provider's phone number	
	Localite du fournisseur	NC	Provider's location	
	Date d'achat	NC	Date of purchase	
	Reference d'achat	NC	Reference	
	Responsable du fournisseur	NC	Responsible	
	CIN du responsable	NC	National ID Card Code of the responsible	
	TVA	NC	value added tax	

	Reference d'achat	NC	Product reference	
	Quantite	NC	Quantity of the product	
	Description	NC	Description of the product	Type of the product
	Code du produit	C	Product ID	
	Prix unitaire	NC	Unit price	Unite price of the product
	Montant	NC	Price of the product	Quantity x unite price of the product
	Net a payer	NC	Total net price	Total amount + tax
	Signature du client	NC	Provider's signature	
	Cachet du fournisseur	C	Provider's stamp	
	Date de paiement	NC	Date of purchase	

6- Entities Identification

We structured the attributes and arranged them into the following entities after constructing the dictionary.

- **Fournisseur:**

  Prénom du fournisseur

  Nom du fournisseur

  CIN du fournisseur

  Adresse du fournisseur

  Numéro de téléphone du fournisseur

Courriel du fournisseur

Localité du fournisseur

Code postal du fournisseur

- **Client:**

  Prénom du client

  Nom du client

  CIN du client

  Adresse du client

  Courriel du client

  Numéro de téléphone du client

- **Paiement:**

  Type de paiement

  Le montant totale à payer

  Date de paiement

- **Produit:**

  Nom de produit

  Reference de produit

  Quantité de produit

  Description de produit

  Type de produit

- **La demande:**

  Date de la demande

  La réference de la demande

  TVA de la demande

  Adresse de la demande

- **Vendeur:**

  Nom et prénom du vendeur

Addresse du vendeur

Courriel du vendeur

Numéro de téléphone du vendeur

CIN du vendeur

- **Facture d'achat:**

  Numéro de facture

  Informations du vendeur

  Informations du client

  Informations de produit

  Acompte

  Totale HT

  Net à payer

  Signature

- **Contrat de crédit:**

  Numéro du contrat

  Information de client

  Marchandise

  TVA

  Net TTC

  Le montant à déduire

  La date de versée l'avance

  La date à payer le Net

  Signature du client

This Entities/attributes can be expressed in English as follow:

- **Provider:**

  Provider first name

  Provider last name

Provider CIN
Provider address
Provider phone number
Provider email
Provider location
Provider postal number

- **Client:**
  Client first name
  Client last name
  Client CIN
  Client address
  Client email
  Client phone number

- **Payment:**
  Payment type
  The total amount to pay
  Payment date

- **Product:**
  Product name
  Product reference
  Product quantity
  Product description
  Product type

- **Order:**
  Order date
  Order reference
  Order TVA

Order address

- **Seller:**

  Seller first and last name

  Seller address

  Seller email

  Seller phone number

  Seller CIN

- **Purchase invoice:**

  Bill number

  Seller information

  Client information

  Product information

  Advance payment

  Total HT

  Net to pay

  Signature

- **Credit contract:**

  Contract number

  Client information

  Merchandise

  TVA

  Net TTC

  The amount to be deducted

  The date of payment in advance

  The date to pay the Net

  Client signature

7- Cardinalities

Seller:

Seller can have one to many providers (1 ... n)

Seller can have none to many clients (0 ... n)

Seller can sell none to many product (0 … n)

Provider:

Provider can have one to many seller (1 … n)

Provider can have one to many products (1 … n)

Client:

Client can buy none to many product (0 … n)

Client can have one to many payments (1 … n)

Client can place none to many orders (0 …. n)

Client can buy from one seller (1 … 1)

Client can have none to one credit contract (0 … 1)

Client can have none to many purchases invoice (0 … n)

Order:

Can be one to many products in an order (1 … n)

Order can be just for one client (1 … 1)

Order can have one to many payments (1 … n)

Product:

Product can have one provider (1 … 1)

Product can have one seller (1 … 1)

Product can be sold to one or many client (1 … n)

8- Process Models Confrontations

After completing the conceptual date model and conceptual process model, we must compare them to see if they are compatible. To do so, we must check whether all of the entities in our CDM are used in at least one of our processes. This is a critical stage because it will serve as the foundation for our system.

Attributes	Process
Provider first name	Manage provider
Provider last name	Manage provider
Provider CIN	Manage provider
Provider address	Manage provider
Provider phone number	Manage provider
Provider email	Manage provider
Provider location	Manage provider
Provider postal number	Manage provider

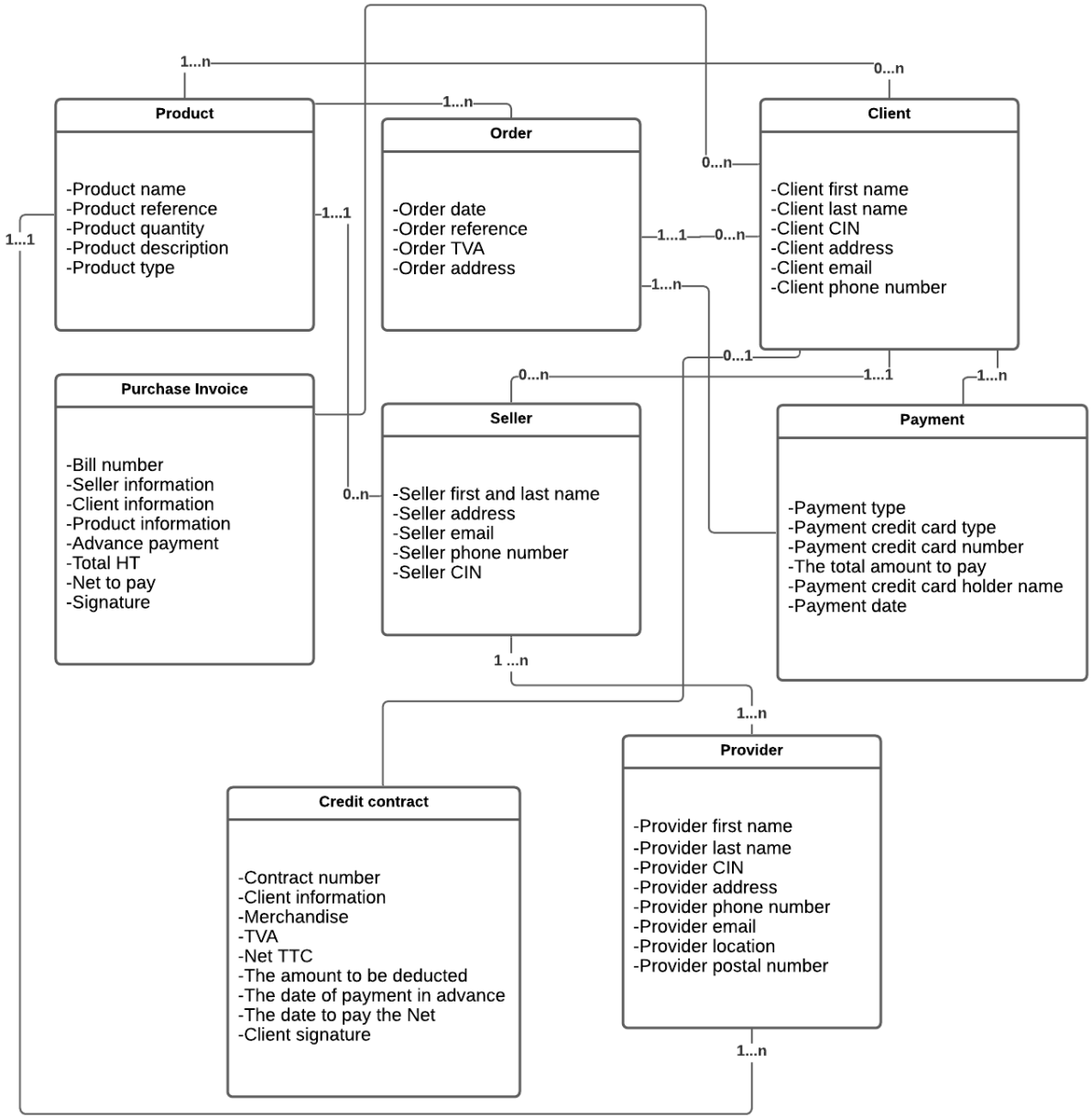
Client first name	Manage clients
Client last name	Manage clients
Client CIN	Manage clients
Client address	Manage clients
Client email	Manage clients
Client phone number	Manage clients
Payment type	Manage bills
The total amount to pay	Manage bills
Payment date	Manage bills
Product name	Manage Product
Product reference	Manage product

Product quantity	Manage product
Product description	Manage product
Product type	Manage product
Order date	Manage order
Order reference	Manage order
Order TV	Manage order
Order address	Manage order
Seller first and last name	User management
Seller address	User management
Seller email	User management
Seller phone number	User management

Seller CIN	User management
Bill number	Manage bills
Seller information	Manage bills
Client information	Manage bills
Product information	Manage bills
Advance payment	Manage bills
Total HT	Manage bills
Net to pay	Manage bills
Signature	Manage bills
Contract number	Manage bills

Client information	Manage bills
Merchandise	Manage bills
TVA	Manage bills
Net TTC	Manage bills
The amount to be deducted	Manage bills
The date of payment in advance	Manage bills
The date to pay the Net	Manage bills
Client signature	Manage bills

9- Entity Relationship Model



Description of the CDM:

This CDM represents the entities of our system as well as the relations between them. In total, the CDM contains eight entities:

1- Seller: Its attributes are: First and Last name, address, email, phone number, CIN

2- Order: Its attributes are: Date, reference, TVA, address

3- Product: Its attributes are: name, reference, quantity, description, type

4- Purchase invoice: Its attributes are: number, seller information, client information, product information, advance payment, HT, Net to pay, signature.

5- Credit contract: Its attributes are: contract number, client information, merchandise, TVA, Net TTC, the amount to be deduced, the date of payment in advance, the date to pay the Net, Client signature.

6- Provider: Its attributes are: First and last name, CIN, address, phone number, email, location, postal number.

7- Payment: Its attributes are: type, card type, card number, the total amount to pay, credit card holder name, date

8- Client: first client, last name, CIN, address, email, phone number

V- Conclusion

When it comes to understanding the client's requirements and creating a precise and thoroughly researched specs list for our information system, the Requirements Engineering process has shown to be vital and necessary. The Requirements Engineering stage was broken down into three independent yet interconnected steps that worked together to offer us the most accurate picture of our project's specifications.

The User and System Requirements was the first stage in this procedure. We had multiple meetings with our client for the sole aim of elicitation during this step. Because we actively worked on removing language ambiguities from her statement and inquiring with questions to acquire a deeper grasp of the requirements, we met with our client on a regular basis. After that, we generated a first LLT (List Like Text) draft. Later, we were able to identify all of the system's building blocks. We also finished with a stable and final version of the LLT, which included the functional, non-functional, and domain requirements that we must follow, as well as a list of open issues that were quickly resolved.

The Conceptual Process Modelling stage was the next step, which was used to examine and rationalize the business processes and data. This was significant because it demonstrated how processes, data, and end-users interact and are interrelated. We visited with our client to discuss her company's procedures, as well as the users of the information system and their interactions. We quickly created the system's Context Diagram (CD), Conceptual Process Models (CPM), and Conceptual Architecture (CA).

Last but not least, we moved on to the Conceptual Data Modelling stage, which was required when we had a thorough understanding of the system's processes. We began by

collecting data inductively through forms such as the Client Information Form and the Booking Request Form, as well as inductively through a second formal interview with our client. The data from the forms and the interview was then organized in a first draft of a data dictionary. This first draft has been examined for any common anomalies that may have occurred, and then finalized once those anomalies have been eliminated. The data dictionary's final draft came in handy when it came to identifying the current entities and their attributes. We then confronted the data with the procedures to confirm that our data and processes were not in sync and correlated with one another. We next proceed to develop the entity relationship model, which is the final step in conceptual data modelling, after determining the cardinalities.

At this point in our project, it's evident that the requirements engineering document has facilitated a smooth transition into the design phase, since we now have a firm grasp on the system's requirements. Then we'll go on to the final step of our project, the design and implementation phase, when we'll create a software product that meets all of our client's needs.

VI- Annex

Form 1:

Facture d'achat

Société Aluminium Idrissi

Av Kahira Né 5, Touable II, Tétouan

05 39 998 995

Contact@aluminiumidrissi.com

Informations du client :

Nom:
CIN:
Adresse:
Telephone:
Date:

Facture n° 540173

Produits	Diamètre	Qté	P.unitaire	Montant

Total HT :

Net a payer :

Signature : _____

Cachet:

Form 2:

Société Aluminium Idrissi

Av Kahira Né 5, Touable II, Tétouan

05 39 998 995

Contact@aluminiumidrissi.co

Nom:
CIN:
Adresse:
Telephone:
Le:

Facture N° VT357

Marchandises	
Net TTC	
A déduire :	
Avance versée le	
Net à payer au	

Escompte de 3 % en cas de paiement sous huitaine

Cachet:

Signature : _____

Form 3:

Société Aluminium Idrissi

Av Kahira Né 5, Touable II, Tétouan

05 39 998 995

Contact@aluminiumidrissi.com

Facture n°:

FACTURE

Information Du Fournisseur:

Nom		Date	
Adresse	CIN	Référence	
Code postal	Localité	Responsable	
Téléphone		TVA	

Référence	Quantité	Description	Code	P.U.	Montant

Signature : _____ Cachet: