ANALYSIS AND DESIGN OF INFORMATION SYSTEMS

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STUDENT PHOTO:

ANALYSIS AND DESIGN OF INFORMATION SYSTEMS

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B1. Verbal analysis

Import

The wording of the information system to support the operation of a real estate agency is presented in three subsections:

1. Business objective
2. System details
3. Sequence of actions

1. Business objective

The system aims to provide the best possible service to the client and to guide him in the prescribed bureaucratic procedures that he should consistently follow, in order to fulfill his desire for one or more real estate purchases. The business objective is for the real estate agency to collect the maximum amount of fee from a successful completion of the purchase and sale of a property, where it is calculated as a percentage of the sale price of the property. The maximum amount of remuneration covers the salaries of the service employees who at regular intervals receive a monetary commission as a percentage of the total value of the properties, the sale of which they successfully managed.

2. System details

The elements of the system can be persons or sets of people, where with their actions they contribute to support the operation of an information system. The elements of the property buying and selling system are as follows:

1. Customer
2. Real estate department
3. Service employee
4. Legal department
5. Property owner
6. Transfer department
7. Buyer's attorney
8. Seller's attorney
9. Notary
10. Tax Office
11. Real estate office secretariat
12. Treasurer

3. Sequence of actions

In the sections "3.1 Buying a property" and "3.2 Selling a property" the individual sub-functions, capabilities and limitations of the system are presented with technical clarity and completeness, as well as the way the requirements are covered.

3.1 Purchase of property

In the subsections “1. Customer's request (Customer - Real estate department) ... 28. Receipt of the receipt of payment of the brokerage fee amount (Customer - Treasurer)" presents the processes that are carried out in the event that the customer wishes to purchase one or more properties. The structure of the title of each sub-section is “X .Y. z » Process title (Participating system elements)', where ' X ' is the number of the sequentially executable process , ' Y ' is the number of one of the most sub-processes resulting from the immediately preceding process. " z " the number of one of the most sub-sub-processes resulting from the immediately preceding sub-process . The customer role refers to the prospective buyer of a property.

1. Customer request (Customer – Real Estate Department)

The customer comes to the real estate department and submits the request for the purchase of one or more properties.

2. Deposit of the customer's personal details (Customer – Service employee)

The customer submits their personal information to a service employee.

3. Signing a cooperation agreement (Customer – Service employee – Legal department)

The service employee leads the customer to the legal department to sign a cooperation agreement.

4. Display of property details (Customer – Service Officer)

The service worker and the customer return to the real estate department, where the former shows the latter the details of the properties available for purchase (photos, feature sheet).

5. Choice of action (Customer – Service employee)

The customer selects a property and the service agent takes them to it to view it.

6.1 Interest in purchasing the property (Customer – Service Employee)

The customer expresses his interest in the property and asks the service agent for his willingness to negotiate with the owner of the property.

6.2 Indifference to the purchase of the property (Customer – Service Employee)

The customer expresses his disinterest in the property to the service employee and the process proceeds to one of the two sub-actions " 6 .2.a Show another property " or " 6 .2. b Abandoning the process . '

6.2.a Demonstration of another property (Customer – Service Employee)

The customer requests the service employee to show details of another property available for purchase (Return to action " 4 Show property details")

6.2 . b Abandon the process (Customer)

The customer does not wish to see another property and thus abandons the process.

7. Assigning the customer's details to the database of potential buyers of the property (Service Officer)

The employee assigns the customer's information to the database of prospective buyers of the selected property, in order to summarize with statistical data, the picture of the demand for the specific property for its better management.

8. Property Negotiations (Client – Property Owner)

The customer contacts the property owner and negotiates the price of the property, the schedule and payment terms.

9. Pricing (Property Owner)

The owner determines the price he wishes to receive from the customer for the purchase of his property.

10. Scheduling (Property Owner)

The owner determines the schedule he wants, that is, the deadline for paying off the entire amount of the purchase of the property from the customer.

11. Determination of payment terms (Property Owner)

The owner determines the terms of payment he wishes, that is, the method of payment (cash, bank check), the possibility of paying the amount in installments, etc.

12.1 Agreement in the negotiations for the purchase of the property (Customer – Property owner – Service employee)

The client in his negotiations with the owner of the property reaches an agreement regarding the price of the property and thus the process proceeds according to the instructions given to him by the service employee from the real estate agency .

12.2 Disagreement in the negotiations for the purchase of the property (Customer – Property owner – Service employee)

The customer in his negotiations with the owner of the property does not reach an agreement regarding the price of the property and thus the process proceeds to one of the two sub-actions " 6 .2.a Demonstration of another property " or " 6 .2. b Abandoning the process . '

13. Receipt of legal documents property documents (Client – Transfer Department)

The customer addresses the transfer department and requests the legal documents of the property (contracts, cadastral).

14. Check of the property titles (Client - Buyer's lawyer)

The client-buyer gives his lawyer the legal documents of the property and he in turn checks them.

15. Obstacle to checking the legal documents of the property (Buyer's lawyer - Client)

The buyer's lawyer finds an obstacle in the control of the property's legal documents and thus the procedure proceeds to one of the two sub-actions " 6 .2.a Demonstration of another property " or " 6 .2. b Abandoning the process . '

16. Validity in the control of the legal documents of the property (Buyer's lawyer - Client)

The buyer's lawyer finds no obstacle in checking the legal documents of the property and so the process proceeds with the drawing up of the contracts at the notary office of the buyer's choice .

17. Drafting of contract (Notary – Buyer's lawyer – Seller's lawyer)

The notary will draw up the final contract, in collaboration with the buyer's and seller's lawyers, where all information about the property will be specified .

18. Declaration signature (Notary public – Customer – Property owner)

Before the final contract is signed, a declaration is signed by the notary and the parties , that is, the customer-buyer and the owner-seller.

19. Calculation of the transfer tax (Notary - Client)

The notary calculates the final amount of the transfer tax, which is included in the declaration signed by him and the parties and this amount becomes payable. The customer receives the statement with the transfer tax and is taken to the Tax Office.

20. Payment of the transfer tax (Customer – Tax Office)

The customer submits to the tax office the transfer tax statement drawn up by the notary and the bank check equal to the amount of the transfer tax.

21. Receipt of transfer tax payment receipt (Customer – Tax Office)

The customer- buyer receives the proof of payment of the transfer tax from the transport company .

22. Presentation of the proof of payment of the transfer tax (Customer – Notary)

The client - buyer hands over the proof of payment of the transfer tax to the notary to complete the process.

23. Contract signing (Notary – Customer – Property owner)

The notary reads the contract, which he and the parties to the contract co-sign , that is, the customer-buyer and the owner-seller.

24. Transfer of property (Client – Property owner)

The customer- buyer pays the owner- seller by bank check, equal to the amount for the purchase of the property , and the latter presents the titles of the property to the former.

25. Calculation and payment of the fees of the notary and the lawyer (Client – Notary – Lawyer of the buyer)

Upon completion of the transfer process, the notary's and lawyer's fees are calculated and paid by the client-buyer.

26. Presentation of the property documents (Customer – Secretariat of the real estate office)

The client - buyer submits all the documents to the secretariat of the real estate agency (property titles, contract, cooperation agreement, details of the service employee) in order to store the details of the real estate purchase in the database of the real estate agency.

27. Calculation and payment of the fee amount of the brokerage office (Customer - Cashier - Secretariat of the brokerage office)

The secretariat calculates the brokerage fee amount to be paid by the customer-buyer, who in turn goes to the cashier and pays the fee amount. The treasurer stores the fee amount resulting from the percentage of the sale of the property, in the database of the real estate agency, in order to calculate the monthly salary of the service employees as a percentage of the total value of the properties, the sale of which was successfully managed by each of of these.

28. Receipt of the receipt of payment of the fee amount of the brokerage office (Client – Treasurer)

The client receives the receipt of payment of the brokerage fee amount and leaves.

3. 2 Sale of property

Regarding the case of the sale of property, the actions are similar to the procedure "3.1 Purchase of property" with the following differences and adjustments:

1. The role of the customer refers to the seller-owner of the property who wishes to put one or more properties of his possession for sale.
2. The customer submits the legal documents of the property for sale to the conveyancing department.
3. The client expects interest from potential buyers who agree in the negotiations they do for the purchase of their property.
4. If there is an obstacle in the control of the legal documents of the property by the lawyer of the prospective buyer, then the process of selling the property is abandoned and the lawyer of the customer-seller proceeds to expand the documents.
5. The customer-seller bears only his attorney's fees.

B2. Use Case Analysis (UML Use cases)

The image " B 2. png " shows the use case diagram (UML Use Cases) of the process of buying and selling real estate, as verbally analyzed in the section "B1. Verbal analysis' (pages 4 – 8). First, note that in the upper part of the frame in green letters, the title of the diagram (UML Diagram Use Real Estate Sales Cases), the name of the student (Athanasiou Vasilios Evangelos) and the student's registration number (19390005).
Use case analysis is based on scenarios of the information system based on how an external entity sees them . In the large green box are presented the scenarios – use cases of the system, which are connected with a blue line to the external entities presented in the form of people outside the box. The blue line indicates the behavior of the system observed by the entity. The external entities are the following:

1. Customer
2. Service employee
3. Property owner
4. Buyer's attorney

5. Seller's attorney
6. Notary
7. Real estate office secretariat
8. Treasurer

The scenarios - use cases are presented with the structure "Title of the use case (External entities that observe)" and the actions of each entity in each scenario - use case are written exactly, as shown in the diagram of the image "B2. png » (Text of the blue lines) and are the following :

Signing a cooperation agreement (Customer – Service employee)

Sign partnership agreement – Takes the client to the legal department to sign the partnership agreement.

Display of property details (Customer – Service Officer)

He is shown the details of the properties to be purchased – Shows the client the details of the properties to be purchased.

*Property selection (Customer – Service employee)

Selects a property – Takes the customer to the property of their choice to view.

*Negotiations (Client – Property Owner)

Negotiate with the property owner – Negotiate with the prospective buyer.

** Check of the property titles (Client – Buyer's lawyer)

Gets the legal documents of the property from the conveyancing department and gives them to his lawyer – Conducts a review of the legal documents of the property given to him by the client.

Drafting of contract (Notary – Buyer's lawyer – Seller's lawyer)

Draws up the contract in collaboration with the parties – Works with the notary and the seller's lawyer – Works with the notary and the buyer's lawyer.

Declaration signature (Customer – Property owner – Notary public)

He signs the transfer tax return – He signs the transfer tax return – He signs the transfer tax return.

Payment of transfer tax (Customer – Notary)

Pays the transfer tax to the Ephorate and gives the receipt to the notary public – Calculates the transfer tax and gets the payment receipt from the customer.

Contract signing (Notary – Client – Property owner)

Reads the contract to the parties – Signs the contract – Signs the contract.

Payment of the sale amount of the property (Customer – Property Owner)

Pays the sale amount of the property – Receives the amount from the buyer .

Payment of fees (Customer - Buyer's lawyer - Notary public - Treasurer)

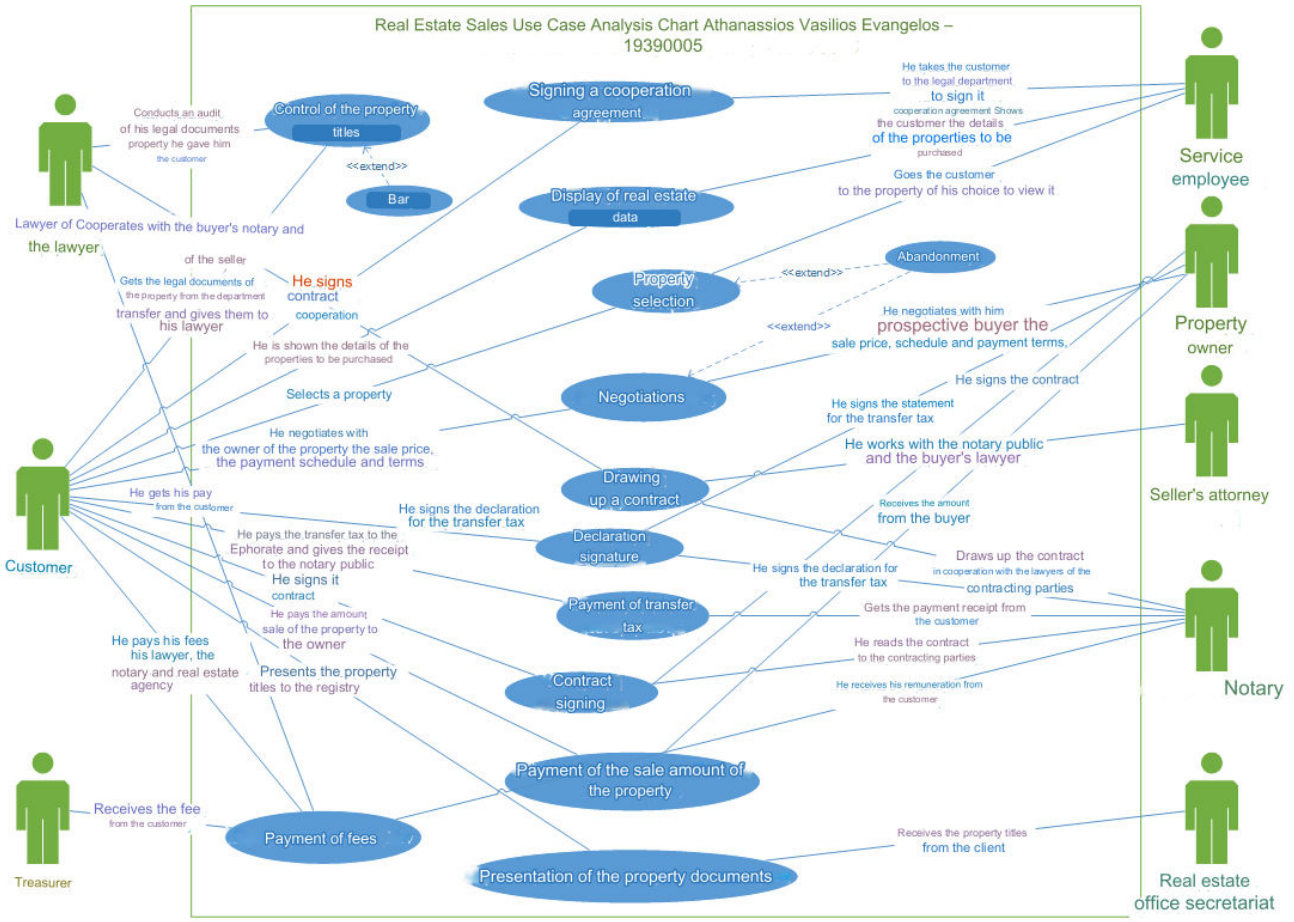
He pays the fees of his lawyer, notary and realtor – Receives his fee from the client – Receives his fee from the client – Receives the fee from the client .

Presentation of the property documents (Customer – Secretariat of the real estate office)

Presents the property titles to the registry – Receives the property titles from the client .

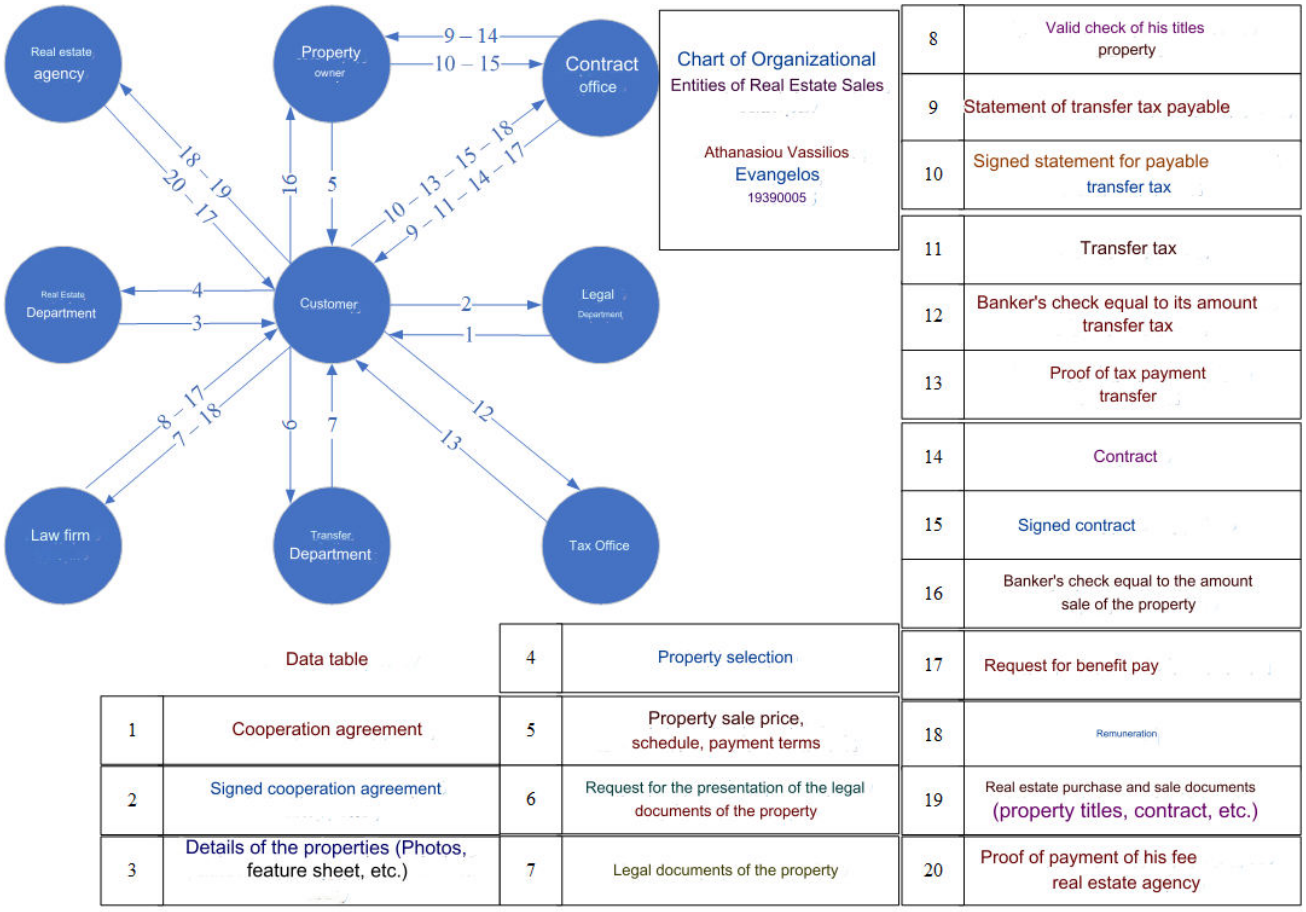
* The "Property Selection" and "Negotiations" use case can be extended to the "Abandon" use case for the case that the customer does not wish to continue the process. The extension is represented by an arrow (" extend " label) pointing towards the use case being extended.

** The "Property Titles Check" use case can be extended to the "Obstruction" use case in case the buyer's lawyer detects irregularities in the property's legal documents. The extension is represented by an arrow (" extend " label) pointing towards the use case being extended.



B2. png

B 3. Organizational entities (OUs)



B3. png

The image " B 3. png " shows the diagram of organizational entities (OO) of the process of buying and selling real estate, as verbally analyzed in the section "B1. Verbal analysis' (pages 4 – 8). First, it should be noted that in the upper part, the title of the diagram (Diagram of Organizational Entities of Real Estate Sales), the name of the student (Athanasiou Vasilios Evangelos) and the student's registration number (19390005) are written in a box.

The organizational entity diagram shows the roles of the system and the data that is transferred. The organizational entities are shown in the blue circles, while the transferred data is detailed in the Numbered Data Table. The numbered arrows indicate the data transferred from the sender entity to the receiver entity, with the numbering indicating the data transferred from the Data Table. In more detail, the circulation of data from the organizational entities of the system is as follows:

- Customer

  Legal Department:

  – **Receives** the cooperation agreement (1) and **sends it** signed (2).

  Real Estate Department:

- **It receives** the details of the properties to be purchased (3) and **sends** its selection (4).

Property owner:

- **Receives** the sale price of the property, schedule and payment terms (5) and **sends** the bank check equal to the sale amount of the property (16).

Transfer Department:

- **Sends** the request for the production of the legal documents of the property (6) and **receives** the legal documents of the property (7).

Law firm:

- **Sends** the legal documents of the property (7) and **receives** confirmation of their validity (8).
- **Receives** the request for the beneficiary fee (17) and sends the fee (18).

Notary office:

- **Receives** the statement for the transfer tax payable (9) and **sends** the statement signed (10).
- **Receives** the transfer tax (11) and **sends** its payment receipt (13).
- **Receives** the contract (14) and **sends it** signed (15).
- **Receives** the request for the beneficiary fee (17) and **sends** the fee (18).

Tax Offices:

- **Sends** a check equal to the transfer tax (12) and **receives** proof of payment (13).

Real estate agency:

- **Sends** the purchase and sale documents of the property (19) and **receives** the request for the benefit fee (17).
- **Sends** the fee (18) and **receives** the brokerage fee payment receipt (20).

- Property owner

Customer:

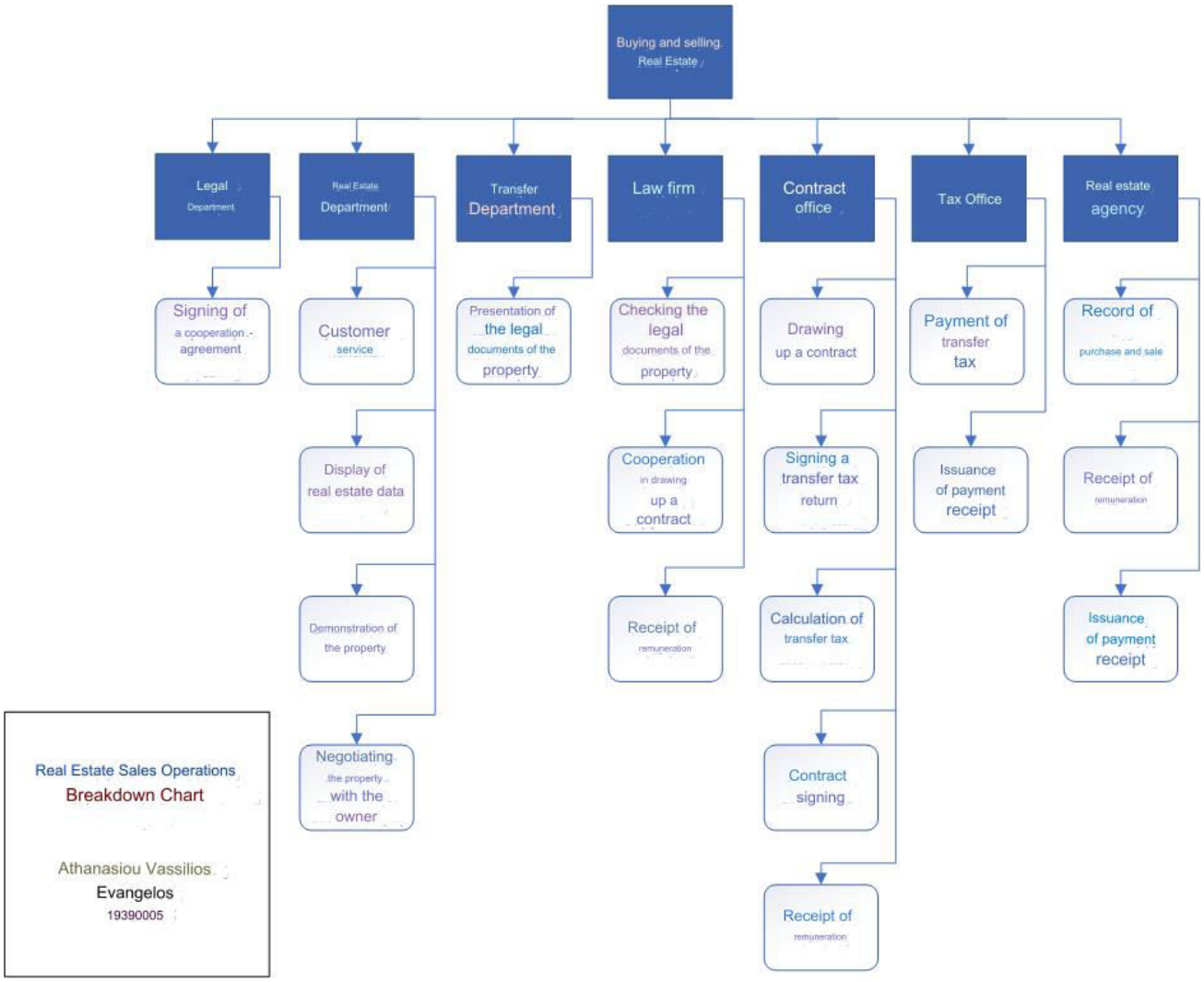
- **Sends** the sale price of the property, schedule and terms of payment (5) and **receives** the bank check equal to the sale amount of the property (16).

Notary office:

- **Receives** the transfer tax return (9) and **sends it** signed (10).

- **Receives** the contract (14) and **sends it** signed (15).

B4. Deconstruction Functional decomposition

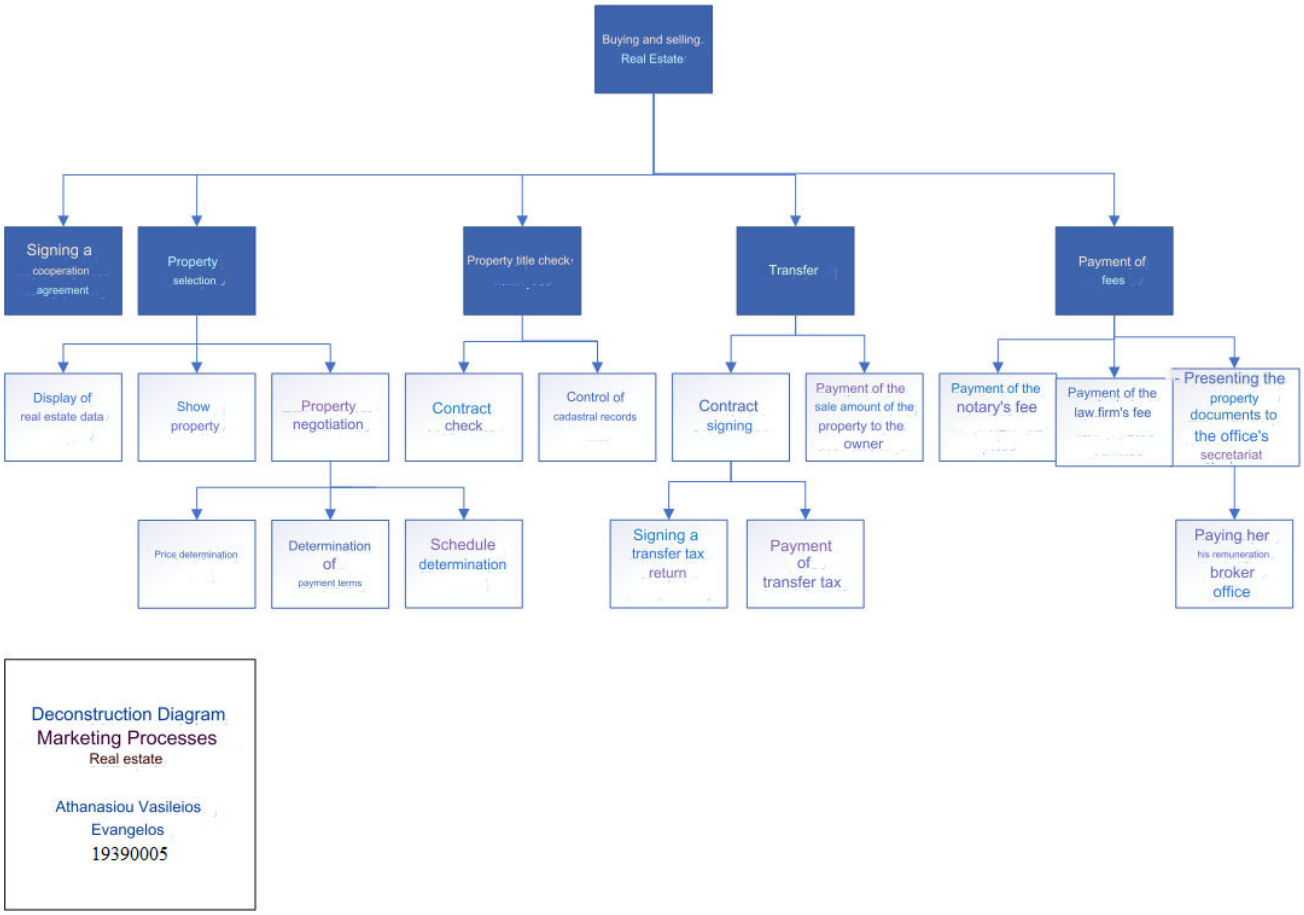


B4. png

In the image " B 4.png " the functional decomposition diagram (Functional decomposition) of the process of buying and selling real estate, as verbally analyzed in the section "B1. Verbal analysis' (pages 4 – 8). First, it should be noted that at the bottom, the title of the diagram (Decomposition Diagram of Real Estate Sales Operations), the student's name (Athanasiou Vasilios Evangelos) and the student's registration number (19390005) are written in a box.

The function breakdown diagram is intended to depict the functions performed by each organizational entity that contribute to the operation of the system. The first dark blue frame depicts the system under study (Property Sales), while the remaining dark blue frames depict the organizational entities (e.g. Legal Department, Real Estate Department, etc.), where the functions performed by each are depicted in ' a blue open box below the box indicating the entity that performs it (e.g. Real Estate Department → Customer Service etc.). The order of placement of the functions is independent of the time sequence of the functions in the system.

B5. Deconstruction Process decomposition

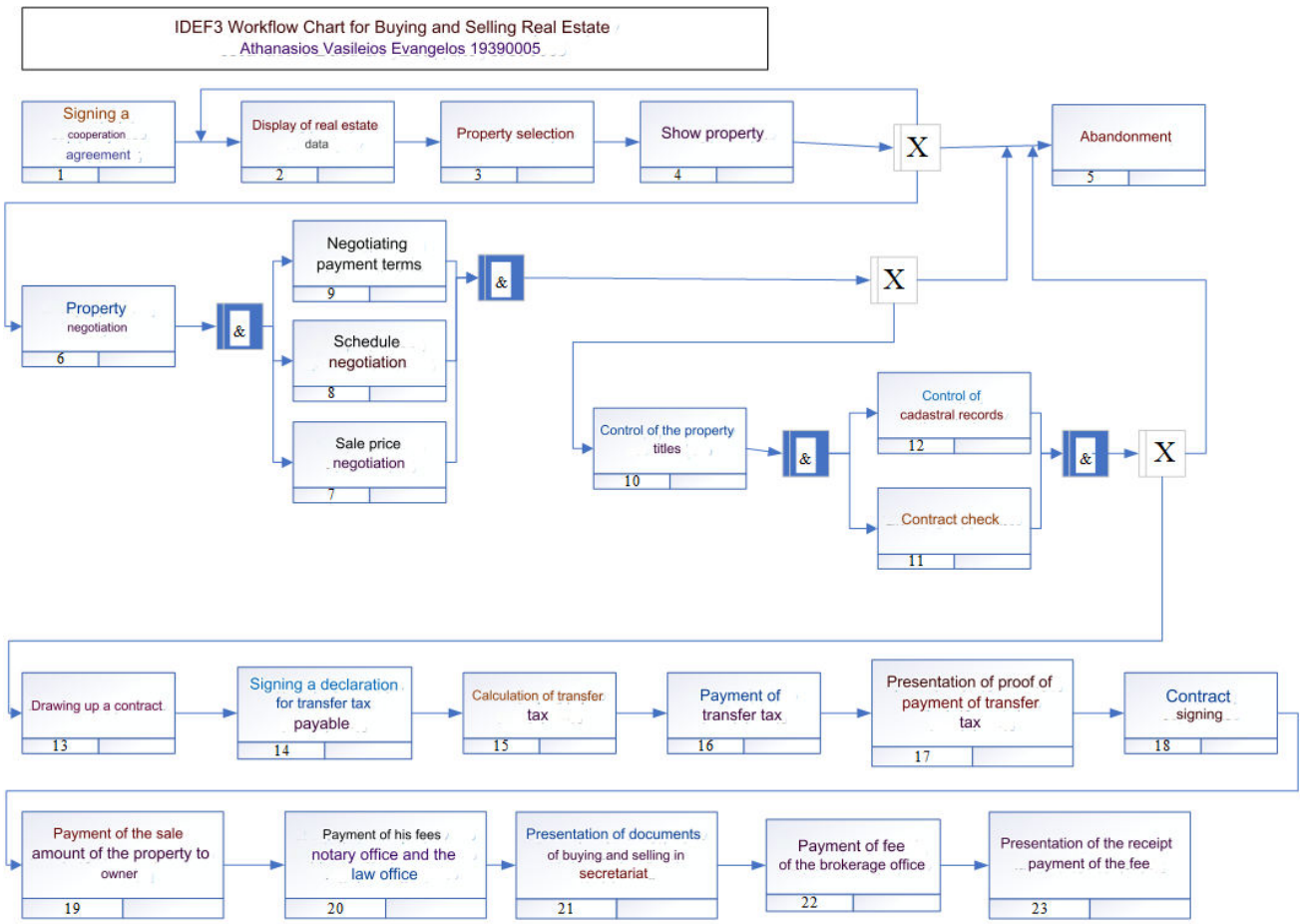


B5. png

In the image " B 5.png " the function decomposition diagram (Functional decomposition) of the process of buying and selling real estate, as verbally analyzed in the section "B1. Verbal analysis' (pages 4 – 8). First, it should be noted that at the bottom, the title of the diagram (Decomposition Diagram of Real Estate Sales Operations), the student's name (Athanasiou Vasilios Evangelos) and the student's registration number (19390005) are written in a box.

The process decomposition diagram is intended to relate the processes that contribute to the operation of the system. In fact, each main process depicted in a dark blue frame is deconstructed and depends on its sub-processes depicted in light blue frames. At the top is the system under study (Property Purchase and Sale) and below the three main processes that reflect its operation (Property Selection, Property Title Check, Transfer, Payment of Fees). The three processes are deconstructed into sub-processes, where some sub- processes are deconstructed into sub-sub-processes (eg Select Property → Negotiate Property → Set Price etc.).

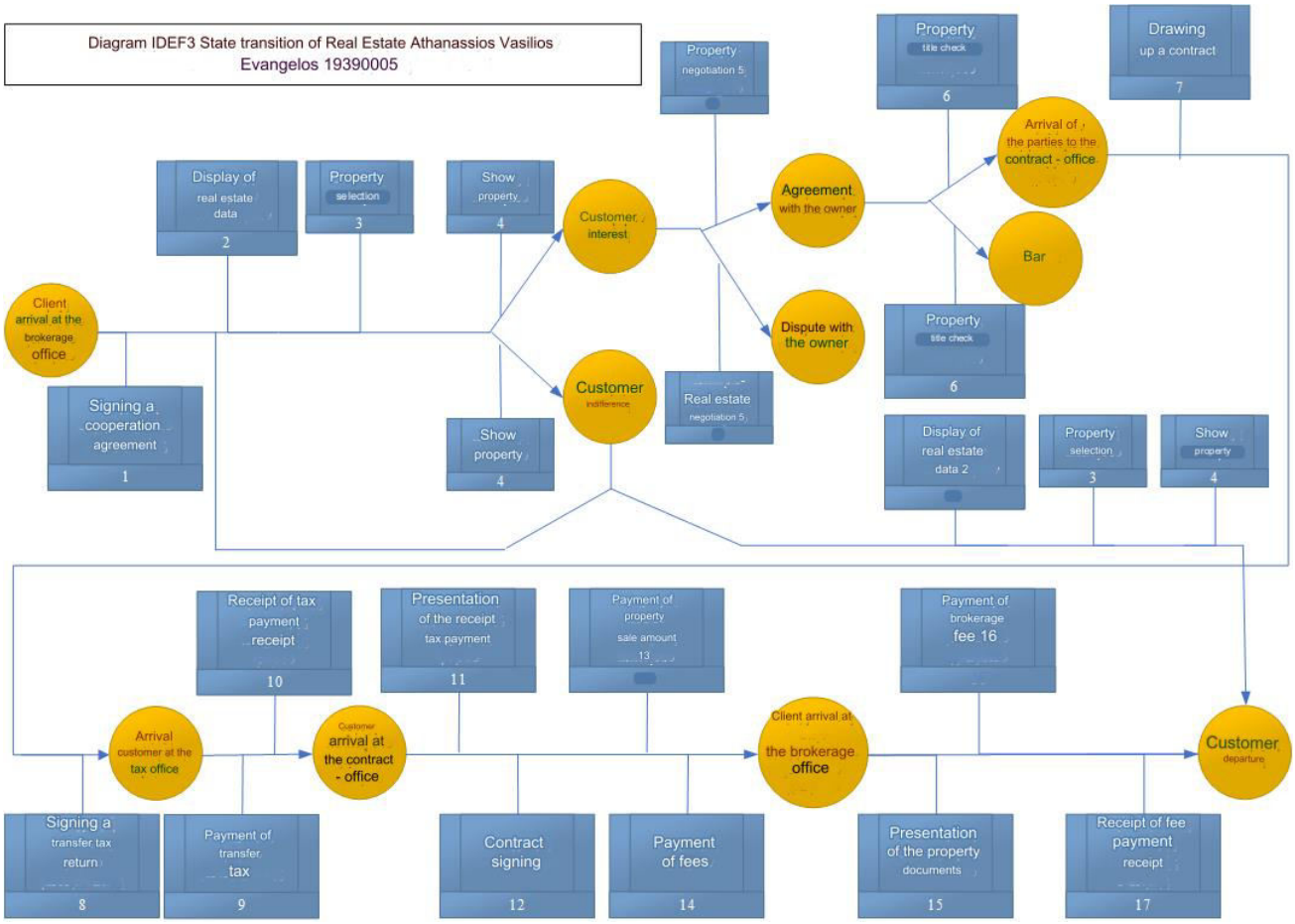
B6. IDEF3 Workflow



B6. png

The image " B 6. png " shows the IDEF 3 Workflow diagram of the process of buying and selling real estate, as verbally analyzed in the section "B1. Verbal analysis' (pages 4 – 8). First, it should be noted that in the upper part, the title of the diagram (IDEF 3 Workflow Real Estate Sales Diagram), the student's name (Athanasiou Vasilios Evangelos) and the student's registration number (19390005) are written in a box .
This diagram shows the sequence of actions to carry out the process. Each action is depicted in a rectangular box with a number that identifies the order of execution of the action. For example, the Select Property action has the number 3 which means it will be executed third. There are actions associated with an " XOR " operator, where depending on the data and condition the process proceeds to one of two or even three output actions. For example, after the action “4. Show property" connected to an " XOR " operator, the process proceeds to one of three actions "2. Demonstration of real estate data", "5. Abandonment', '6. Property negotiation". Some actions are broken down into more sub-actions by connecting them with an " AND " operator. For example, the action “6. Property Negotiation' linked by an ' AND ' operator, is broken down into sub-actions '7. Sale price negotiation", "8. Schedule negotiation', '9. Negotiating payment terms'.

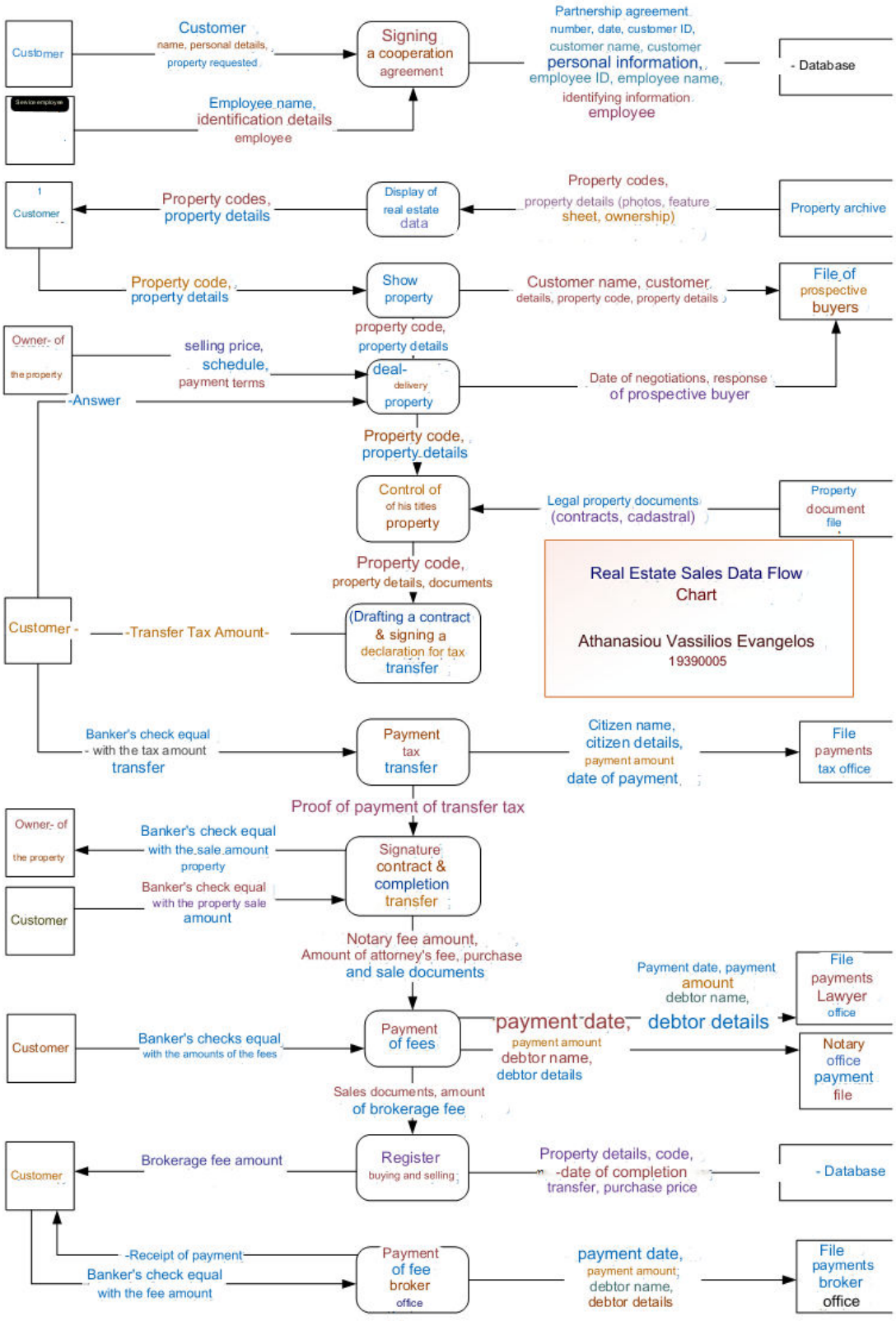
B7. IDEF 3 States transition



B7. png

IDEF 3 State diagram is shown in the image " B 7.png " . transition of the real estate buying and selling process, as verbally analyzed in the section "B1. Verbal analysis' (pages 4 – 8). First, it should be noted that in the upper part, the title of the diagram (IDEF 3 Workflow Real Estate Sales Diagram), the student's name (Athanasiou Vasilios Evangelos) and the student's registration number (19390005) are written in a box .
This diagram shows the transition from one state to another with the intervention of one or more actions. States are represented by yellow circles and actions by blue rectangles. It is worth noting that the actions are numbered in an order of execution (eg the action " Signing a cooperation agreement" has the number 1 which means it will be executed first). It is observed that some transitions branch into two substitutions with the intervention of the same energy or energies. For example, the transition from the state "Interested customer" can be made to the state "Agreement with the owner" or to the state "Disagree with the owner" by intervention of the action "5. Property negotiation".

B8. Data Flow Diagram (Dataflow diagram)



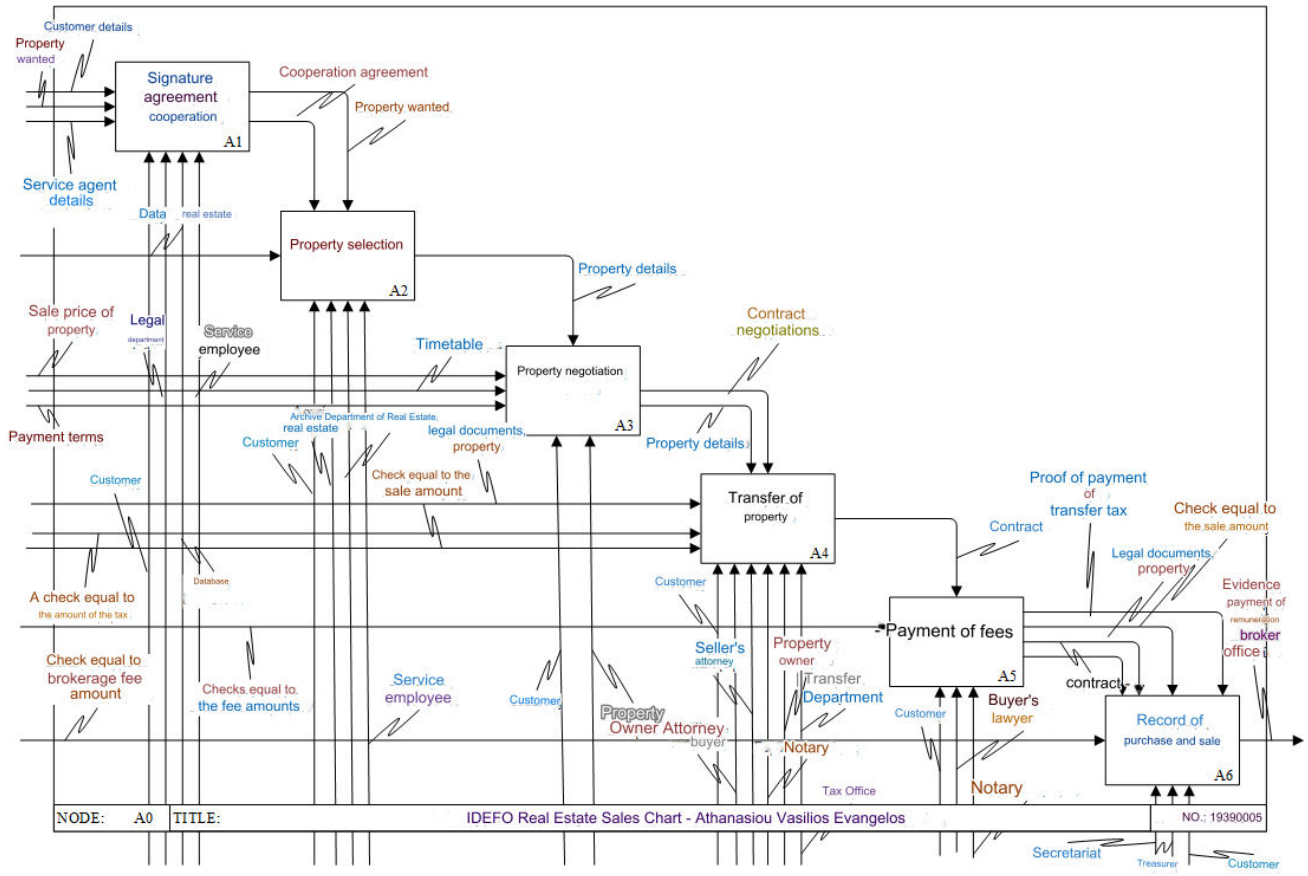
B8. png

The image " B 8. png " shows the data flow diagram (Dataflow diagram) of the process of buying and selling real estate, as verbally analyzed in section "B1. Verbal analysis' (pages 4 – 8). First, it should be noted that in the upper part, the title of the diagram (Real Estate Sales Data Flow Diagram), the student's name (Athanasiou Vasileios Evangelos) and the student's registration number (19390005) are written in a box.

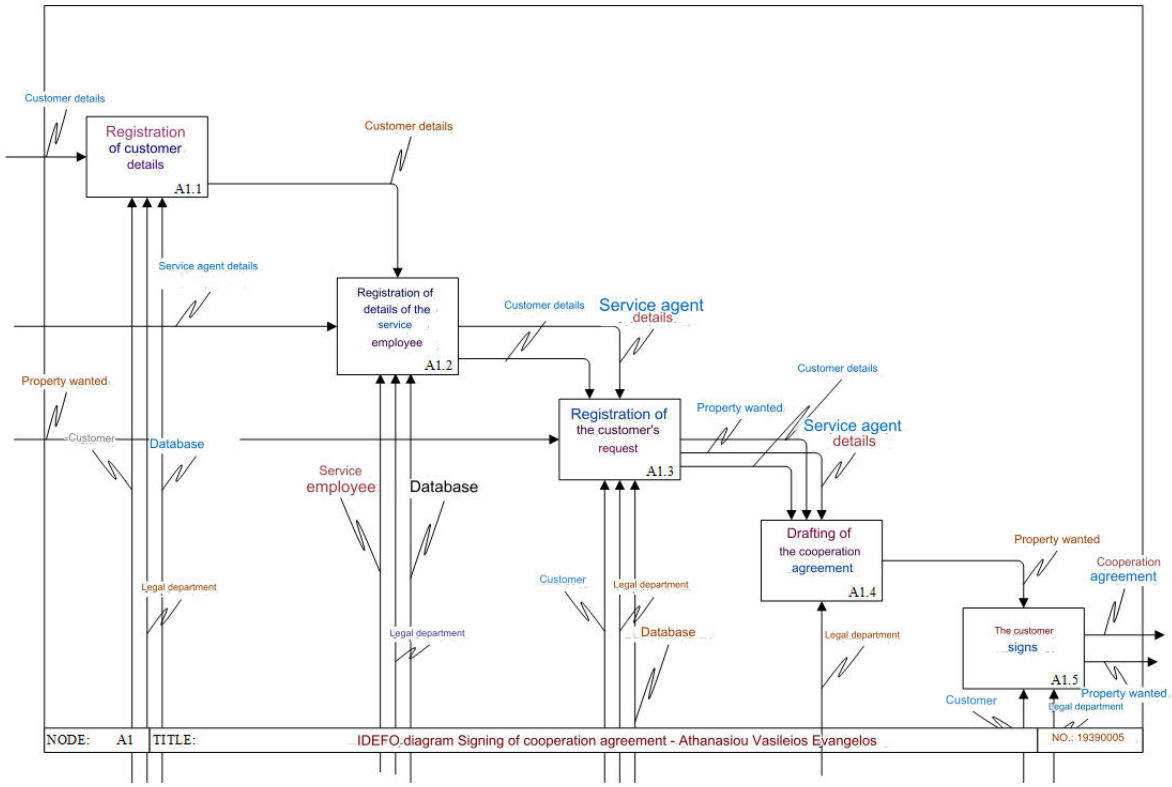
The diagram shows the representation of the system through data flows. Each process processes data that it draws from one or more entities or from one or more storage units or from other processes. The data produced by the process is drawn by one or more entities or storage units or processes. Entities are represented by a square shape, processes by a rectangle, storage units by an italic "P" and data streams by arrows.

For example, the process "Signing a partnership agreement" pulls data from the "Customer" and "Service Agent" entities. From the first entity it derives the data "Customer name", personal information" and "requested property", while from the second "Employee name" and "employee identification information". The process processes the data without reference to the process mode and registers the output data " Collaboration agreement number", "date", " customer ID ", "customer name", "customer personal information", " employee ID ", "name employee", "employee identification details " in the "Database" storage unit.

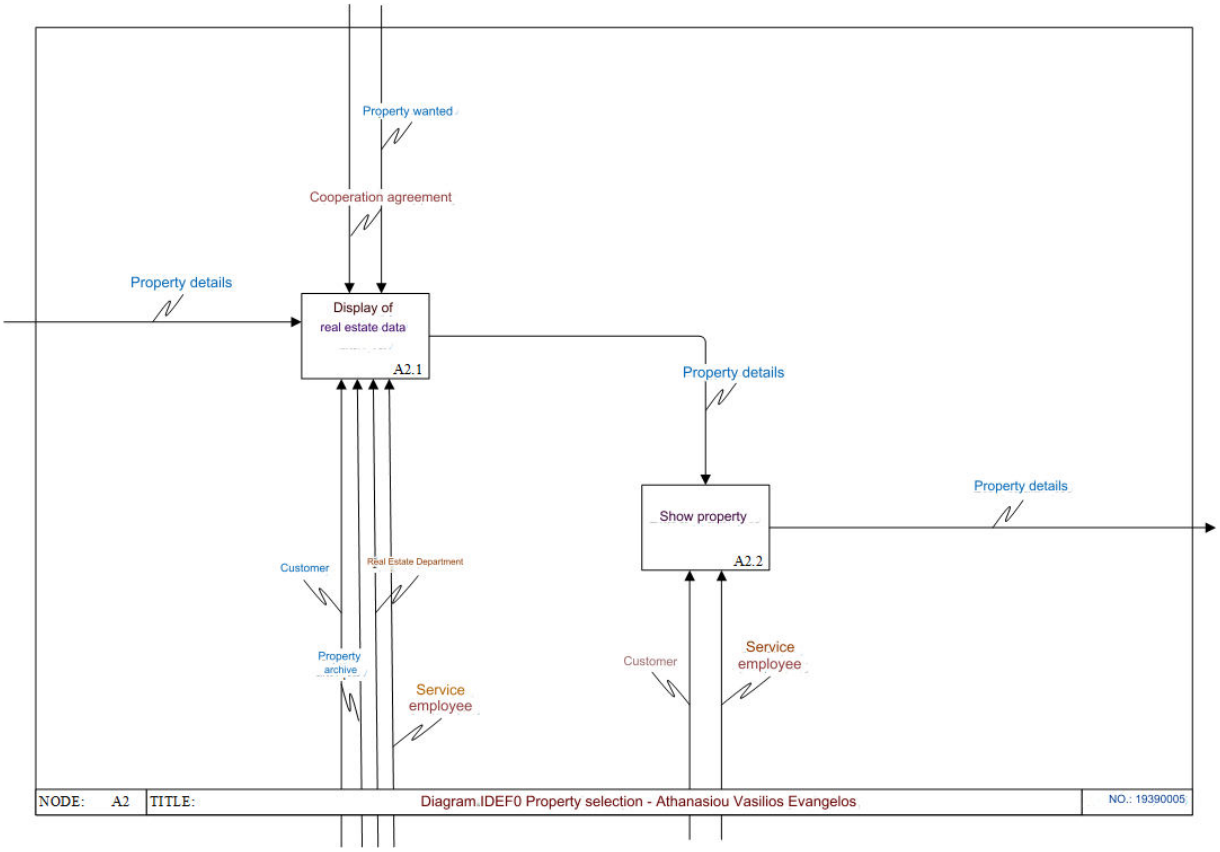
B9. IDEF0



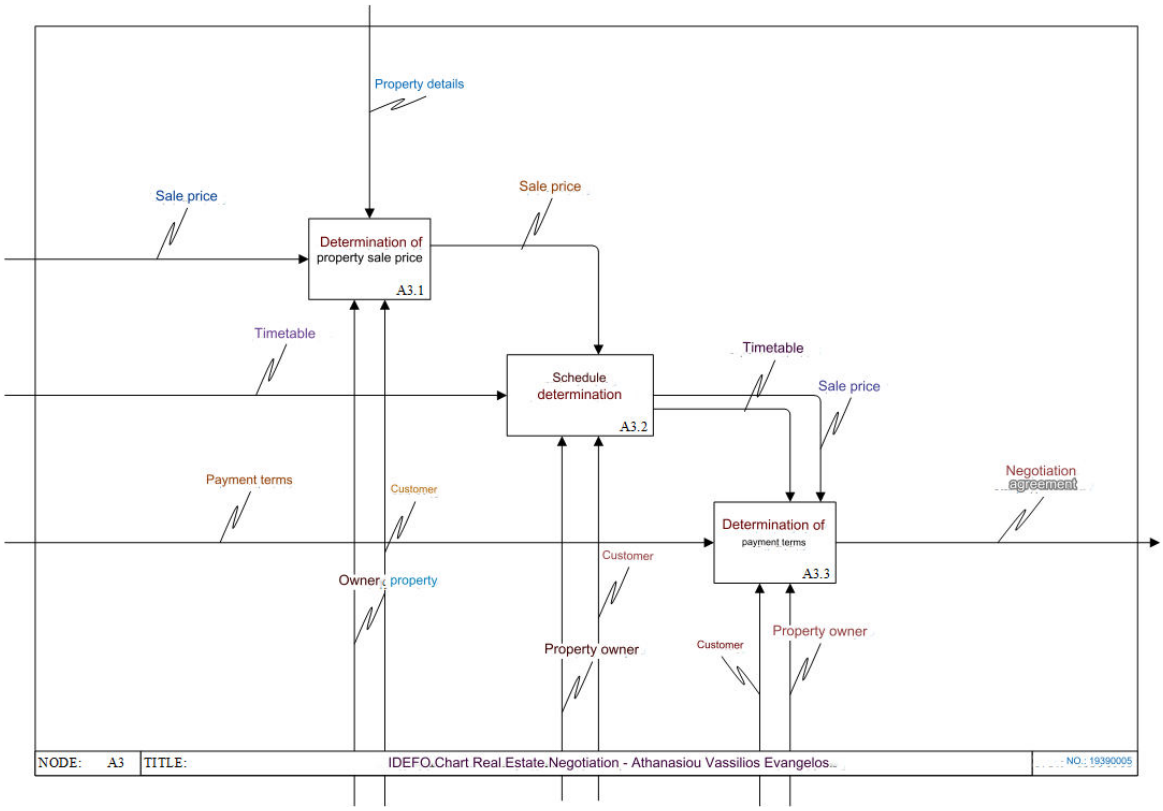
B9.A0.png



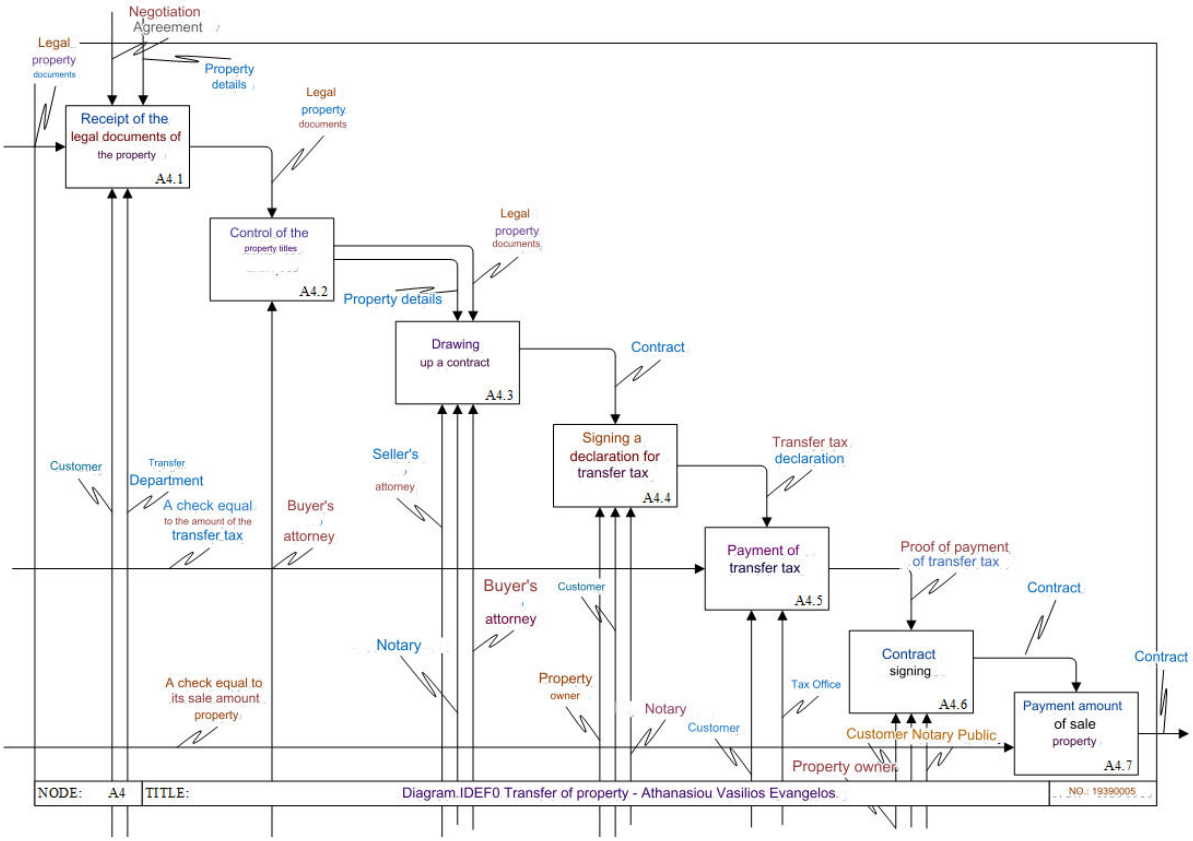
B9.A1.png



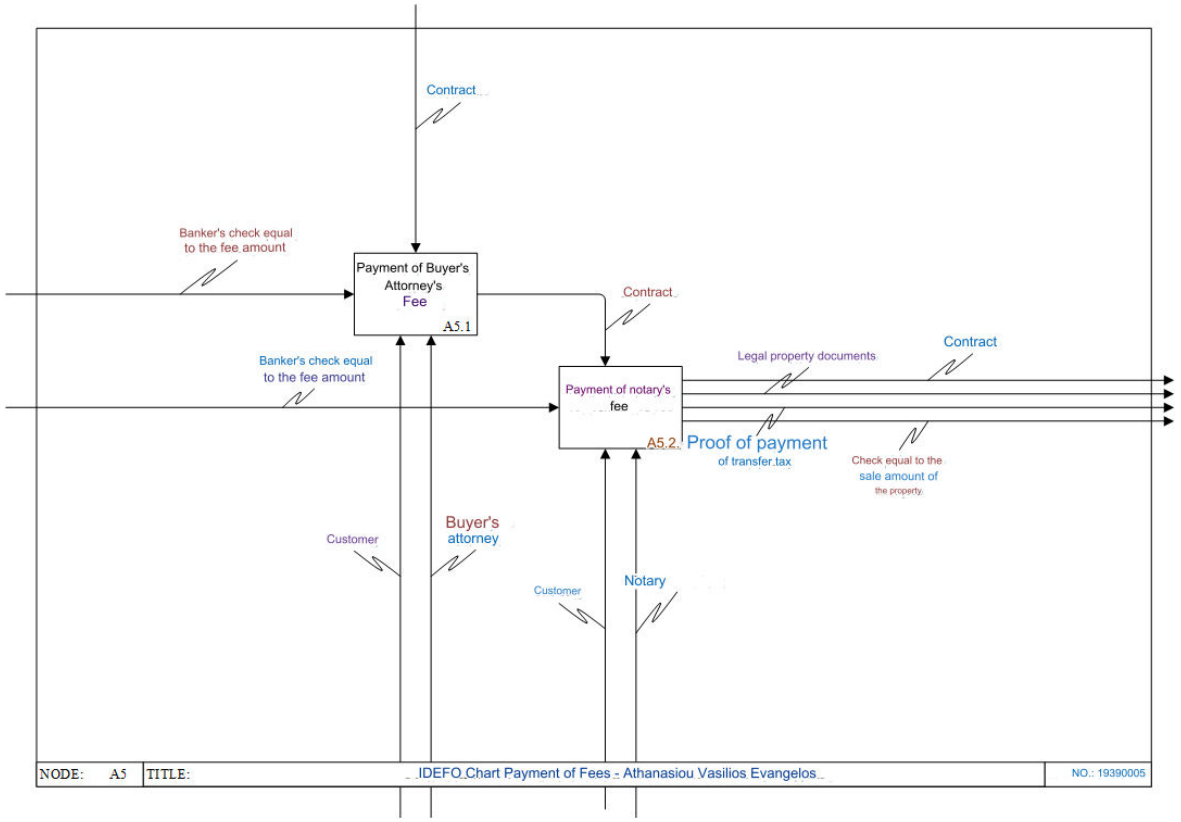
B9.A2.png



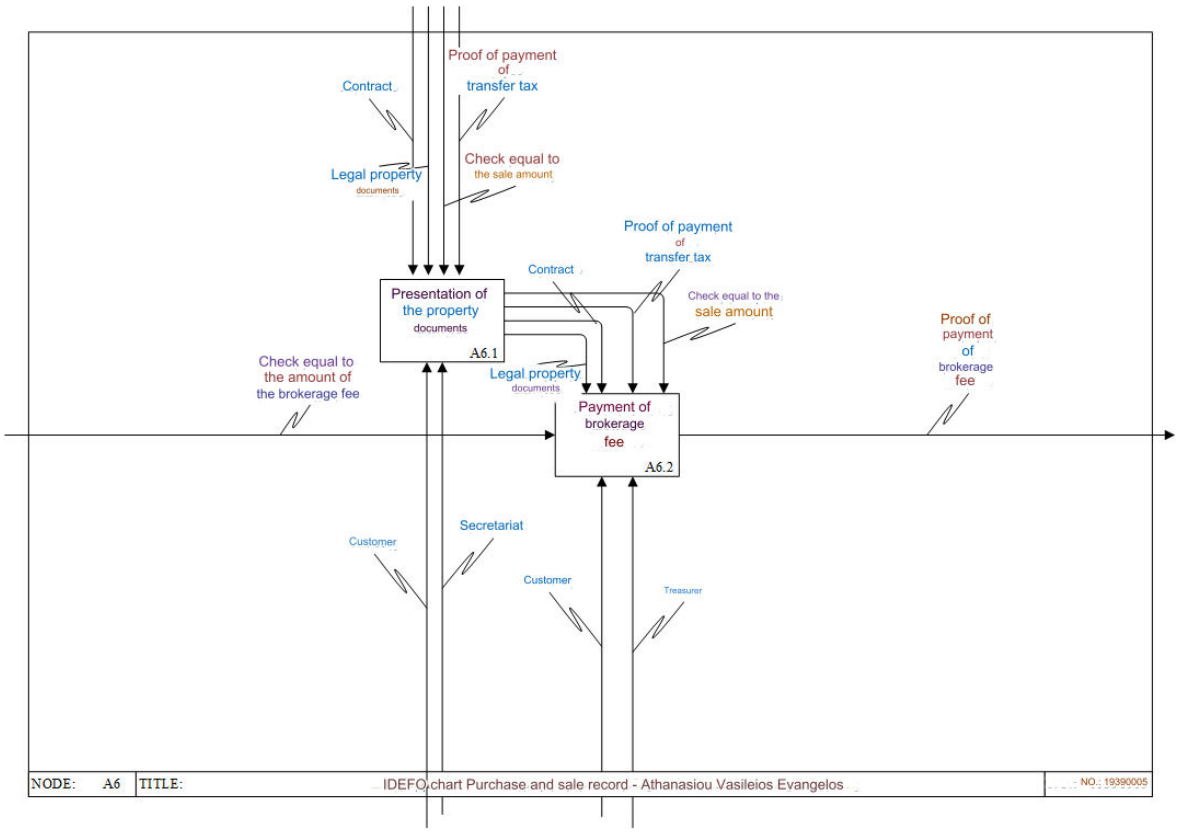
B9.A3.png



B 9.A4.png



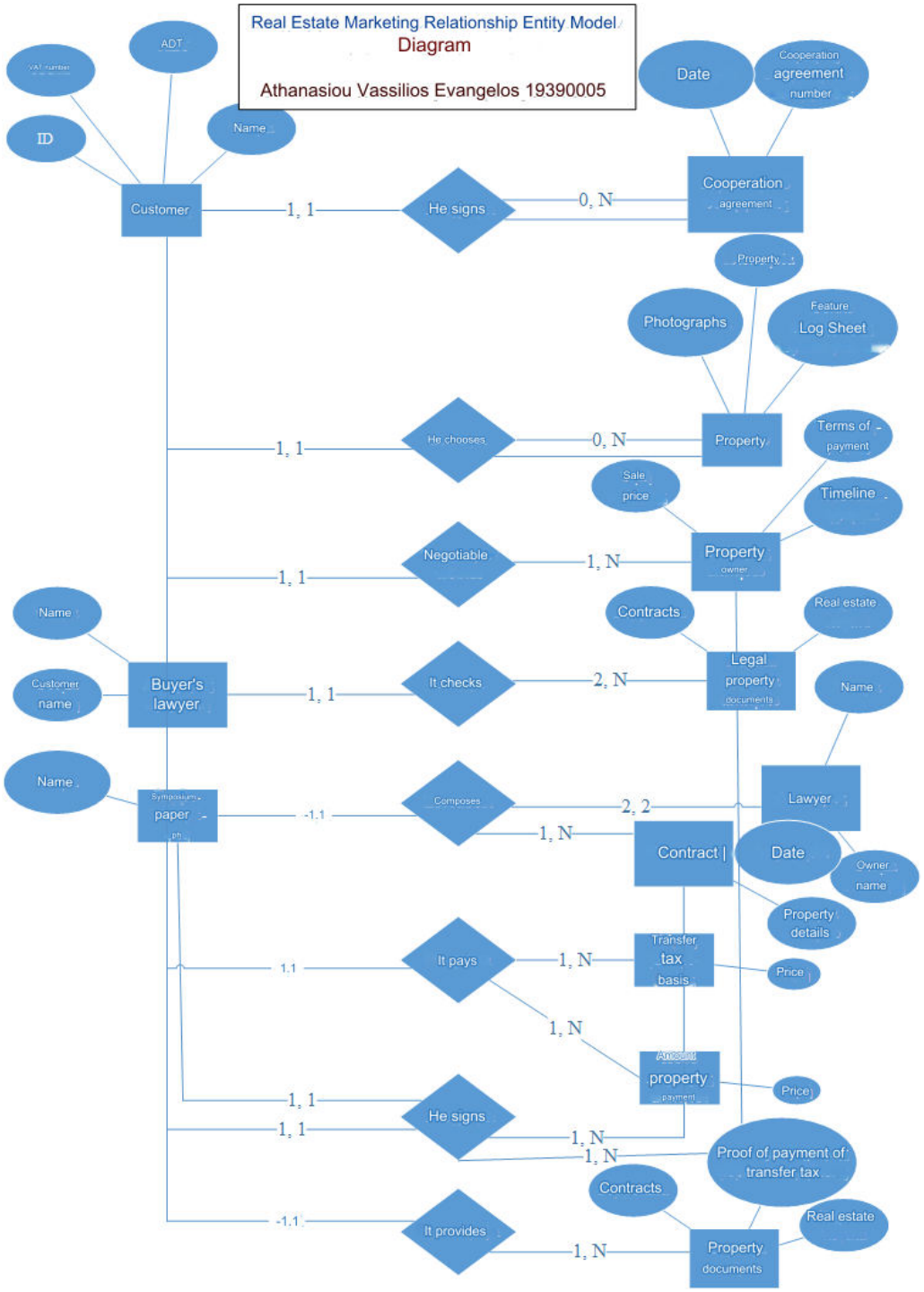
B9.A5.png



B9.A6.png

In the image " B9.A0. png » IDEF diagram 0 (Integration Definition) of the process of buying and selling real estate, as verbally analyzed in section "B1. Verbal analysis". In the images "B9.A1. png ", "B9.A2. png ", "B9.A3. png ", "B9.A4. png ", "B9.A5. png ", "B9.A6. png ", the IDEF 0 diagrams of the sub-processes of the main process of the image "B9.A0. png » with their sub-sub-processes.

B10. Entity Relationship Model (E - R models)



B10 . png

Thank you for your attention.