

ANALYSIS AND DESIGN OF INFORMATION SYSTEMS



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DEPARTMENT OF INFORMATION AND COMPUTER ENGINEERING

PART A STUDY OF BANK TRANSACTION PROCEDURE "RECEPTION OF CASH"

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STUDENT PHOTO:



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A1 . Verbal analysis

The process of the "Cash Withdrawal" banking transaction is based on the protocol followed by the respective bank, in order to serve the customer's desire to withdraw an amount of money from his bank account. The purpose of this process is to ensure the system followed by the bank and this is achieved by the reliability control of the customer's actions and the adjustment of his requirements based on the specifications he is required to comply with (e.g. he cannot withdraw more than money from what he has in his account). The elements of the system are the " client " and the " teller ". The process is described in detail in the subsections below, where the data flow of the process is also.

Client Arrives

The process starts with the arrival of the customer at the bank premises.

Client makes request

The first action of the customer is the request for service from a competent employee (teller).

Teller Asks for ID

The baton goes to the employee, who in his first action, asks for the customer's " ID ", that is, his identity.

Valid ID ?

This is where a check is made for the validity of the customer's ID so that the employee can proceed to one of the two sub-actions, this valid ID or this invalid ID.

No

The client ID is invalid.

Reject

The employee rejects the customer's request due to the invalidity of his identity.'

Yes

The client ID is invalid.

Check Balance

The employee proceeds to check the customer's account balance from the bank's database.

Balance okay ?

Here, a check is made on the customer's account balance and its response to the amount requested by him, in order for the employee to proceed with one of the two sub-actions, that of sufficient balance or that of insufficient balance.

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No

The cash balance is not sufficient to withdraw the amount requested by the customer.

Reject

The employee rejects the customer's request due to the inability of the customer's balance to match the requested amount.

Yes

The cash balance is sufficient to withdraw the amount required by the customer.

Check Policy

The employee proceeds with the action of checking from the bank's database whether the customer's request follows the bank's system policy.

Within Policy ?

Here a check is made for the correspondence of the customer's request with the policy of the banking system, in order for the employee to proceed to one of the two sub-actions, the in-policy one or the out-of-policy one. For example, a bank's system does not support withdrawing a large amount without performing more processes and verifying more information from the customer.

No

The customer's request does not follow the bank's system policy.

Reject

The employee rejects the customer's request due to the impossibility of matching the customer's request with the policy of the banking system.

Yes

The customer's request follows the bank's system policy.

Log Transaction

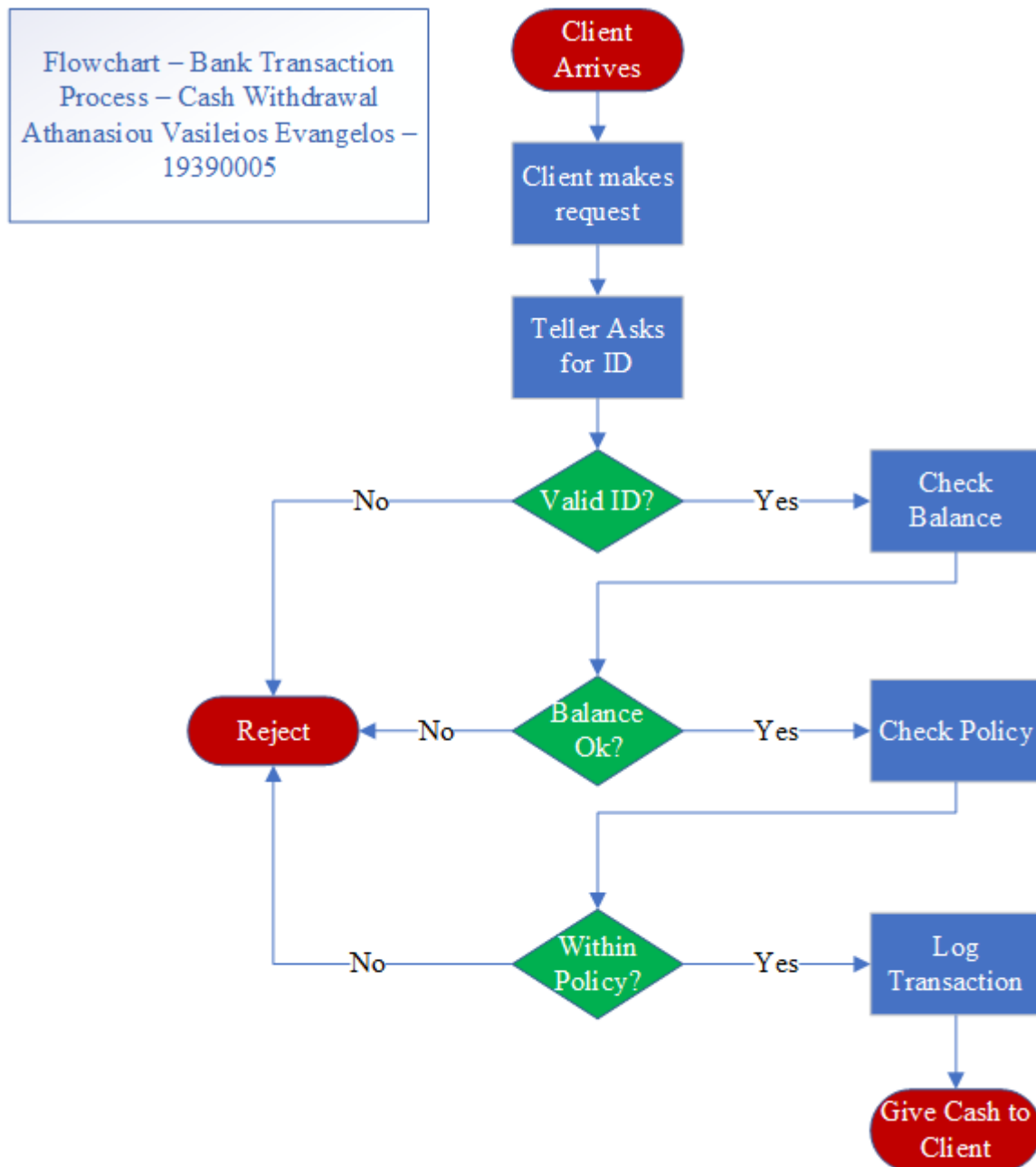
The clerk records the transaction.

Give Cash that Client

The employee withdraws the cash requested by the customer and gives it to him.

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A 2. Diagram Flowchart



A 2.png

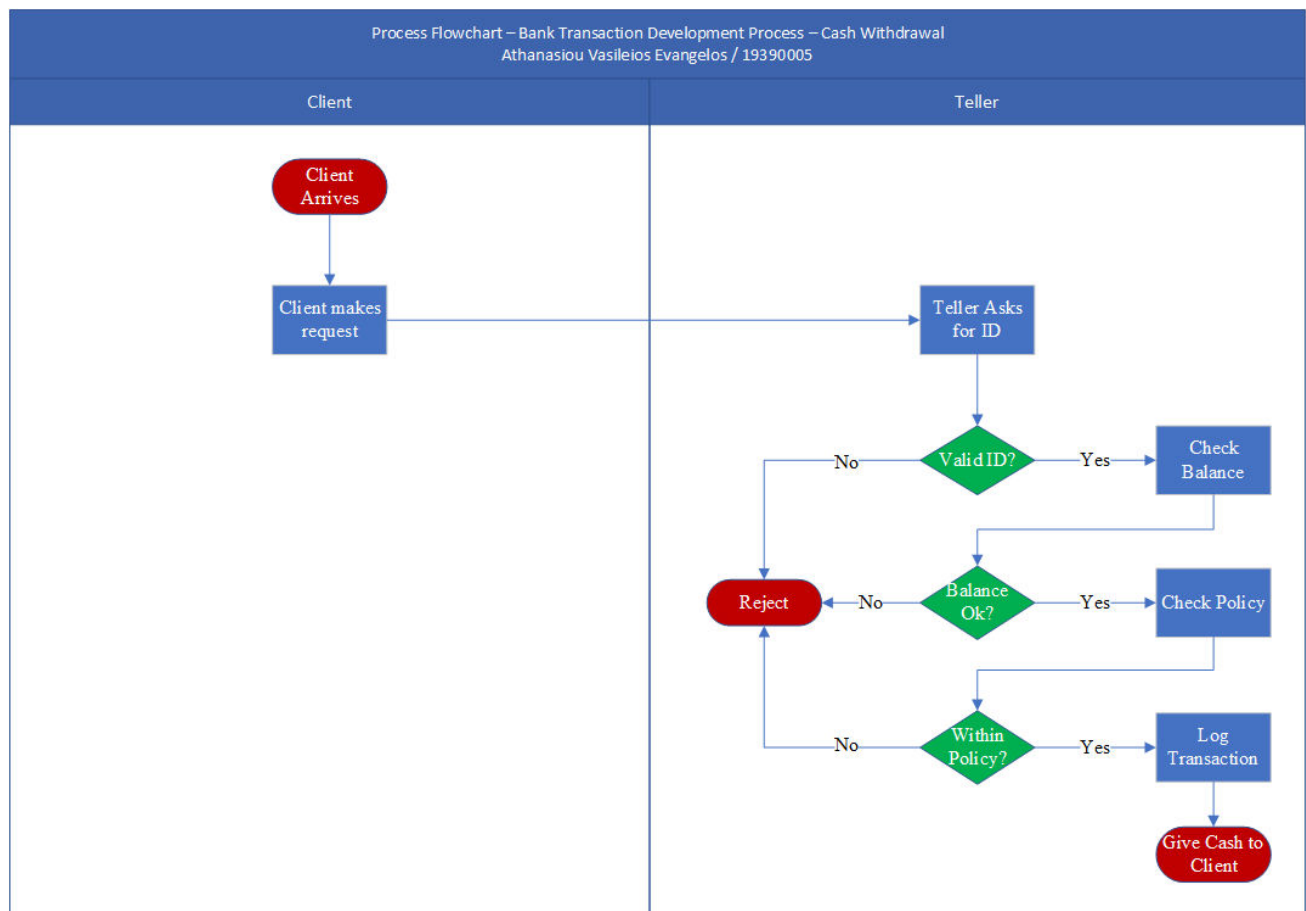
In the image "A2. png " shows the flow chart (Flowchart) of the bank transaction - cash receipt process, as verbally analyzed in the section "A1. Verbal analysis" (pages 4 –

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5). First of all, it should be noted that the title of the diagram (Banking Transaction - Cash Receipt Flow Diagram), the name of the student (Athanasios Vassilios Evangelos) and the student's registration number (19390005) are written in the upper left box.

The red ovals mark the start or end of the process (**Client Arrives** , **Reject** , **Give Cash that Client**), the blue rectangular boxes mark an action of a system component (**Client makes request** , **Teller Asks for ID** , **Check Balance** , **Check Policy** , **Log Transaction**) and the green diamonds indicate a decision to continue the process in one of two or more scenarios (**Valid ID ?** , **Balance OK ?** , **Within Policies ?**).

A3. Development Flow Chart (Deployment flowchart)



A3. png

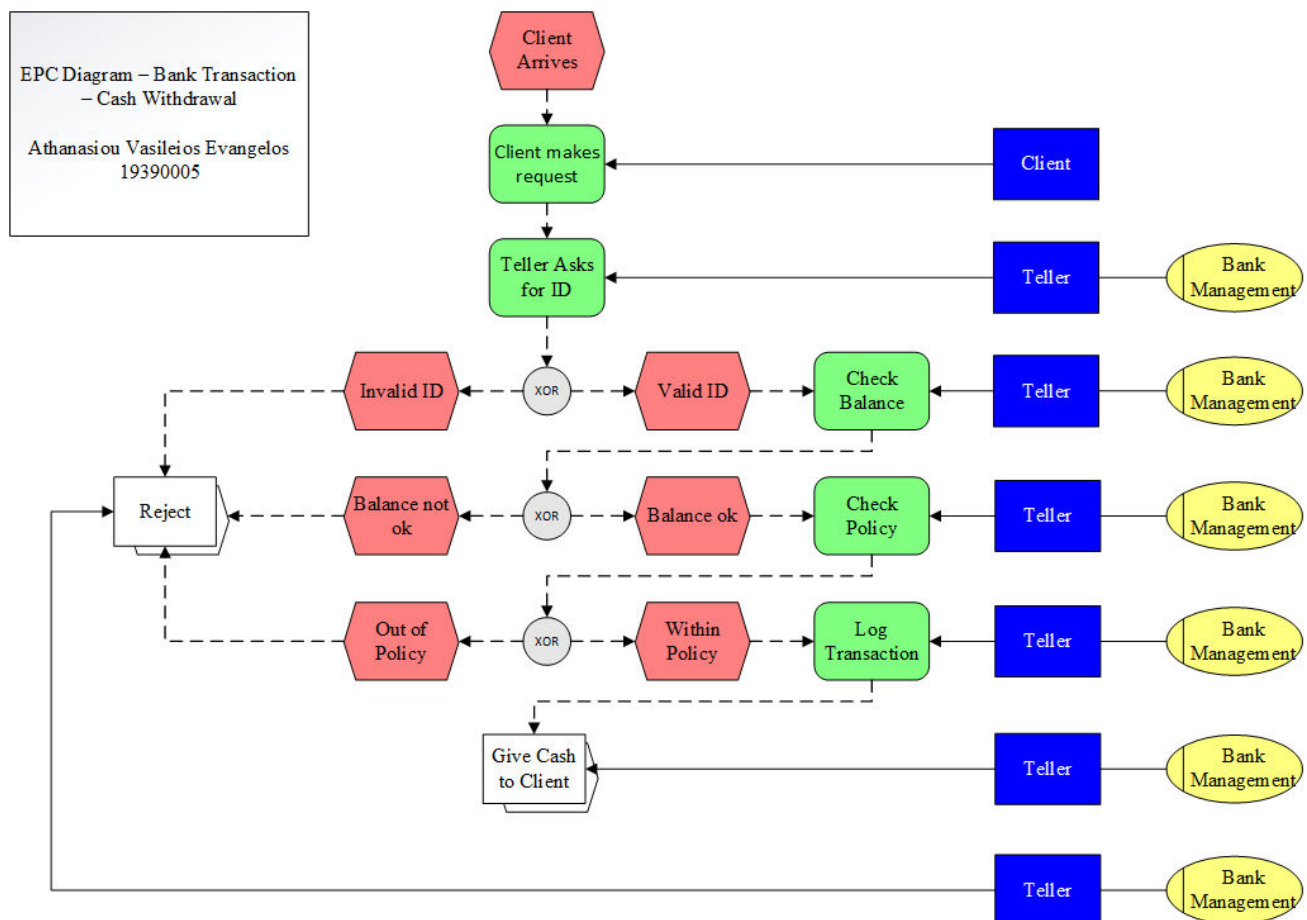
In the image “A3. png » the deployment flow chart (Deployment Flowchart) of the bank transaction – cash receipt process, as verbally analyzed in section “A1. Verbal analysis' (pages 4 – 5). First of all, it should be noted that the title of the chart (Banking Transaction Development Flow Chart – Cash Receipt), the student's name (Athanasios Vassilios Evangelos) and the student's registration number (19390005) are written in the upper left box.

The sequence of actions and situations is the same and the way of presenting it is similar to

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the one in section "A2 . Flow Chart" (pages 6 – 7). The diagram adopts the " swim lane ", that is, each action-event-decision is placed in the lane, where the corresponding element of the system actively participates. Therefore, in the development flow chart, the actions of each role or the events it participates in or the decisions it is called upon to make are clearly distinguished. The roles distinguished in the diagram are the client and the teller .

A4. EPC chart



A4. png

In the image "A4. png » shows the EPC diagram (Event - drive Process Chain) of the process of the bank transaction – receiving cash, as verbally analyzed in the section “A1. Verbal analysis' (pages 4 – 5). First of all, it should be noted that the title of the diagram (EPC Banking Transaction - Cash Receipt Diagram), the student's name (Athanasios Vasileios Evangelos) and the student's registration number (19390005) are written in the upper left box.

This diagram clarifies what events the process can proceed to depending on each action performed. In more detail, the red hexagons (e.g. **Client Arrives** , **Valid ID** etc) indicate a fact that is a passive element of the system, the green boxes (e.g. **Client makes request** , **Teller asks for ID** etc) denote action where it is observed

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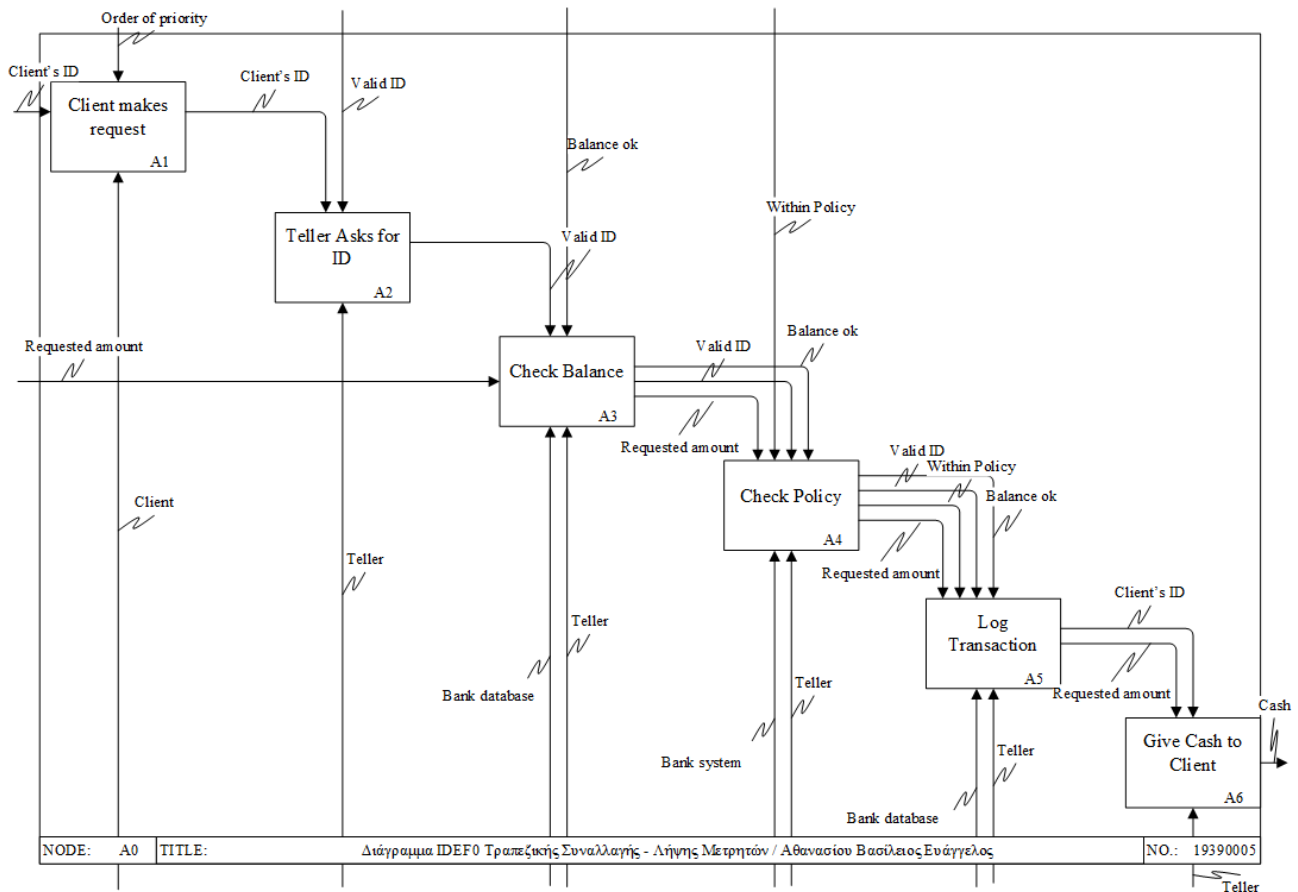
that some of them are connected with a logical operator " XOR " that separate the continuation of the process into two events. Depending on the information

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received by the action associated with the operator, the process proceeds to one of two events (eg **Teller Asks for ID** → **Valid ID** OR **Invalid ID** etc). The blue boxes are the roles that participate in the process (e.g. **Client** , **Teller** etc) and the actions they perform are distinguished by connections (e.g. **Client** – **Client makes request** etc). Finally, the yellow oval shape is the organizational entity (**Bank Management**) which decides which role is responsible for each action and its effect is distinguished by its connections with the corresponding roles (e.g. **Teller** – **Bank Management**).

Because the EPC diagram must start with an event and end with an event, the " Reject " action is in the " Process" diagram Path " which essentially guides the process of receiving cash in the case of rejection, to further actions that are not listed. The same is true for the other final action " Give Cash that Client '.

A5. IDEF0 diagram



A 5. png

In the image "A5. png » IDEF diagram 0 (Integration Definition) of the process of the bank transaction - receiving cash, as verbally analyzed in the section "A1. Verbal analysis' (pages 4 – 5). First of all, it should be noted that in the blue frame of the main process (A0) which includes sub-processes (A1...A6) the title of the diagram (IDEF 0 Diagram of Bank Transaction - Cash Receipt) is written in the column " TITLE " together with the name and surname of student (Athanasίου Vasilios Evangelos), in the " NODE " column the identifier of the main process (A0) and

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in the " NO " column the student's registration number (19390005).

In this diagram the main process with identifier "A0" is divided into 6 sub-processes with identifiers from "A1" to "A6". Each sub-process, like the main one, can include at least one input and output unit, as well as at least one control unit and mechanism unit. In detail we have:

A0 Banking Transaction – Cash Withdrawal

Inputs:

- 1) The client's ID (Client ' s ID)
- 2) The requested amount of the client (Requested amount)

Controls:

- 1) Compliance with the order of priority for service at the cash register (Order of priority)
- 2) The customer ID must be valid (Valid ID)
- 3) The customer's bank account balance is sufficient for the requested amount (Balance ok)
- 4) The customer's request to meet the policy of the banking system (Within Policy

Mechanisms:

- 1) The client (Client)
- 2) The teller
- 3) The bank's database (Bank database)
- 4) The banking system (Bank system)

Outputs:

- 1) Cash

A1 The client makes a request (Client makes request)

Inputs:

- 1) The client's ID (Client ' s)

Controls:

- 1) Compliance with the order of priority for service at the cash register (Order of priority)

Mechanisms:

- 1) The client (Client)

Outputs:

- 1) The ID of the client (Client ' s)

A2 The employee asks for the customer's ID (Teller Asks for)

Checks:

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- 1) The client's ID (Client ' s)
- 2) The customer ID must be valid (Valid ID)

Mechanisms:

- 1) The employee (Teller)

Outputs:

- 1) The customer's ID must be valid (Valid)

A3 Balance check (Check Balance)

Inputs:

- 1) The customer's requested amount (Requested amount)

Checks:

- 1) The customer's ID must be valid (Valid)
- 2) The customer's bank account balance must be sufficient for the requested amount (Balance ok)

Mechanisms:

- 1) The employee (Teller)
- 2) The bank's database (Bank database)

Outputs:

- 1) The customer ID must be valid (Valid)
- 2) The customer's bank account balance must be sufficient for the requested amount (Balance ok)
- 3) The customer's requested amount (Requested amount)

A4 Policy check (Check policy)

Checks:

- 1) The customer's requested amount (Requested amount)
- 2) The customer ID must be valid (Valid)
- 3) The customer's bank account balance must be sufficient for the requested amount (Balance OK)
- 4) The customer's request must comply with the policy of the banking system (Within Policy)

Mechanisms:

- 1) The employee (Teller)
- 2) The banking system (Bank system)

Outputs:

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- 1) The customer's requested amount (Requested amount)
- 2) The customer ID must be valid (Valid)
- 3) The customer's bank account balance must be sufficient for the requested amount (Balance OK)
- 4) The customer's request must comply with the policy of the banking system (Within policy)

A5 Recording of the transaction (Log Transaction)

Checks:

- 1) The requested amount of the customer (Requested amount)
- 2) The customer ID must be valid (Valid)
- 3) The customer's bank account balance must be sufficient for the requested amount (Balance OK)
- 4) The customer's request must comply with the policy of the banking system (Within Policy)

Mechanisms:

- 1) The employee (Teller)
- 2) The bank's database (Bank database)

Outputs :

- 1) The ID of the client (Client ' s ID)
- 2) The requested amount of the client (Requested amount)

A6 Delivery of the cash to the customer (Give Cash that Client)

Checks :

- 1) The ID of the client (Client ' s ID)
- 2) The requested amount of the customer (Requested amount)

Mechanisms:

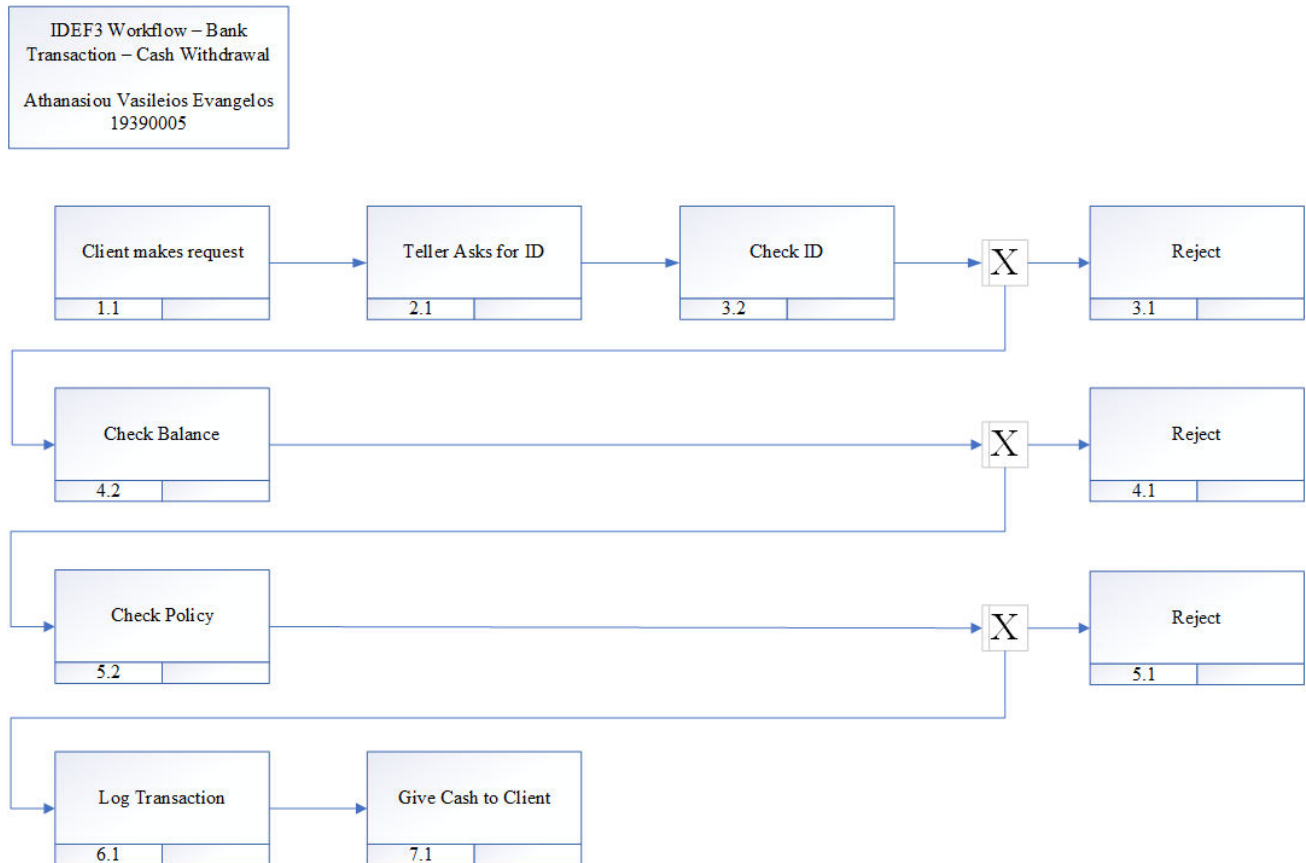
- 1) The employee (Teller)

Outputs:

- 1) Cash

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A6. IDEF3 Workflow diagram



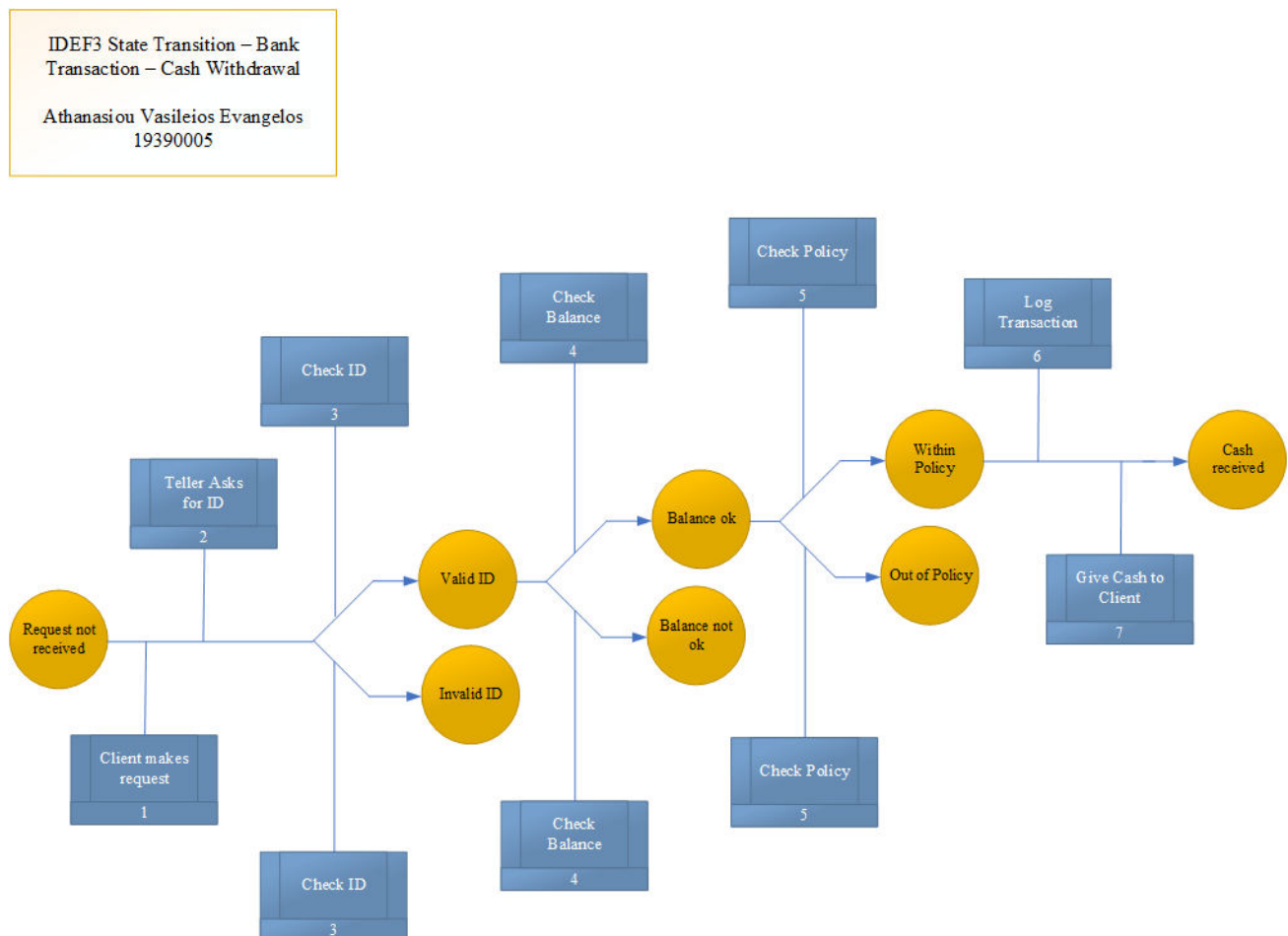
A6. png

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In the image "A6. png » the IDEF 3 Workflow diagram (Integration Definition) of the process of the bank transaction - receiving cash, as verbally analyzed in the section "A1. Verbal analysis' (pages 4 – 5). First, it should be noted that the title of the diagram (IDEF 3 Workflow Bank Transaction - Cash Receipt Diagram), the student's name (Athanasios Vassilios Evangelos) and the student's registration number (19390005) are written in the upper left box.

This diagram shows the sequence of actions to carry out the process. Each action is depicted in a rectangular parallelogram with two numbers that specify the order of execution of the action (first number) and how many further actions an action can be analyzed into (second number). For example, the action “ Check ID ” has the number 3.2 which means that it will be performed third (from the first number 3) and that it can be broken down into two actions (from the second number 2), the action " Check Balance » (4.2) or the action « Reject » (3.1). Those actions that can be broken down into more actions are connected with an " XOR " operator, where depending on the data the process proceeds to one of the two.

A7. IDEF3 State Transition diagram



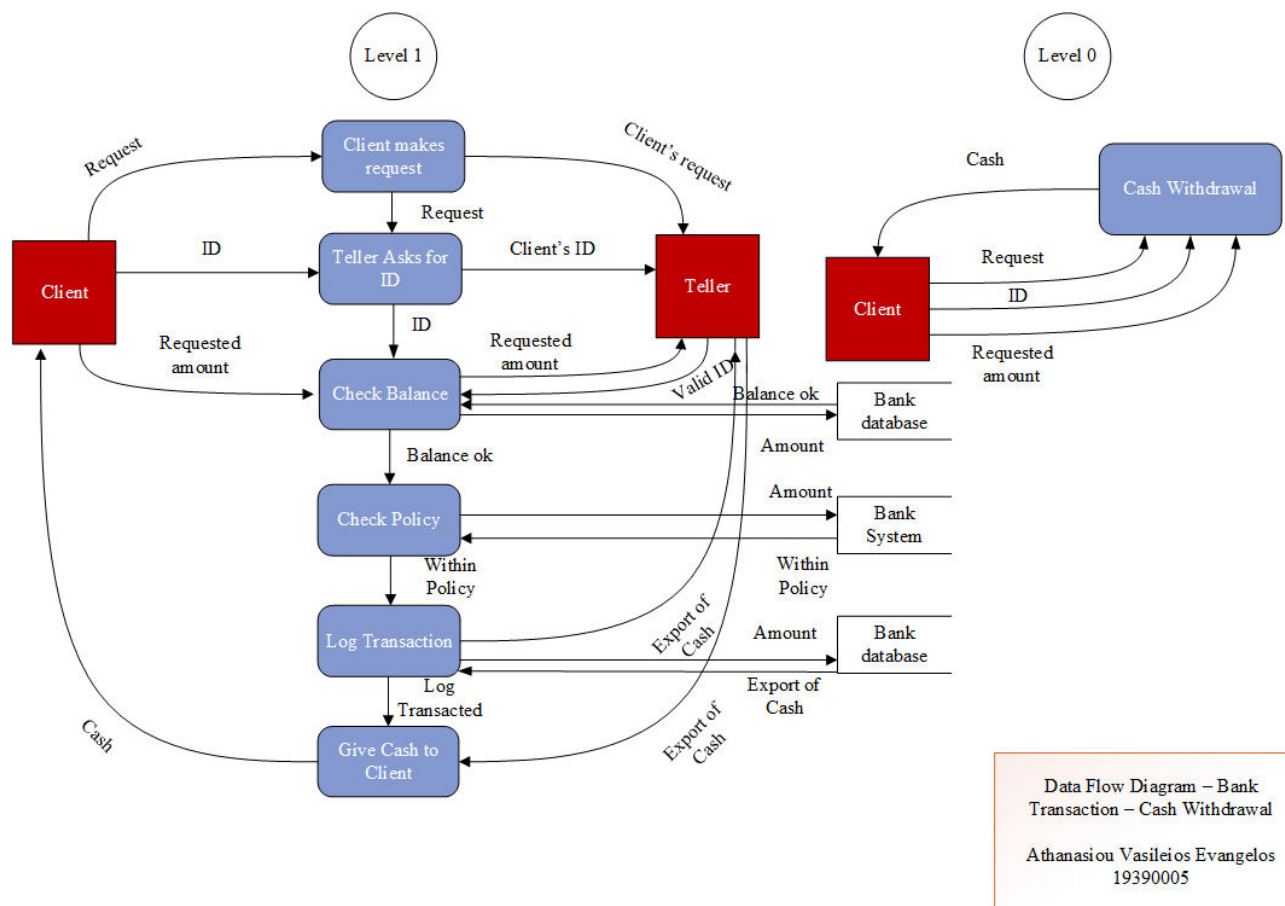
A7. png

In the image “A7. png » the IDEF 3 State diagram is presented Transition (Integration Definition) of the process of the bank transaction - receiving cash, as verbally analyzed in the section "A1. Verbal analysis' (pages 4 – 5). First, it should be noted that the title of the diagram is written in the upper left box (IDEF 3 State Diagram Banking Transaction – Cash Withdrawal Transition),

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the student's full name (Athanasios Vasilios Evangelos) and the student's registration number (19390005). In this diagram states and actions of the process are depicted and to which state the process is transferred through an action. The states are depicted in the yellow circles and the actions in the blue rectangular parallelograms. It is worth noting that the actions are numbered with a sequence of execution (eg the action " Teller Asks for ID » has the number 2 which means it will be executed second). The transition from one state to another cannot take place without the intervention of at least one action. It is observed that some transitions branch into two substitutions with the intervention of the same energy. For example, to go from the " Request not received " two actions intervene the " Client makes request " with sequence number 1 (ie, run first) and " Teller Asks for ID " with sequence number 2. Then the process branches in two so it will go to one of the two states " Valid ID » or « Invalid ID '. The same action " Check ID ', hence the reason it has the same serial number (4).

A8. Data Flow Diagram (Dataflow diagram)



A8. png

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In the image "A8. png » shows the data flow diagram (Dataflow diagram) of the process of the bank transaction – receiving cash, as verbally analyzed in the section “A1. Verbal analysis' (pages 4 – 5). First of all, it should be noted that the title of the diagram (Banking Transaction - Cash Receipt Data Flow Diagram), the student's full name (Athanasios Vassilios Evangelos) and the student's registration number (19390005) are written in the lower right box.

This diagram shows the flow of data between entities, processes and storage units. The process that transforms the data it receives (*Cash Withdrawal* , *Check Balance* etc.), with a red square shape the external entity that accepts as input and outputs data flows (*Client* , *Teller*) is depicted, with a black and white sideways shape that looks like a "P" the storage units that accept and produce information (e.g. x . *Bank Database* , *Bank System*) and finally the arrows are the data streams (eg *Balance ok* , *Within Policy* etc).

The chart as seen is divided into two levels " Level 0" on the right and " Level 1" on the left. " Level 0" depicts the main process "Receive Cash" (*Cash Withdrawal*) and the data flow that is transferred with the entity, that is, the client (*Client*). As input, the process accepts the " ID " of the customer (*ID*), the customer's request (*Request*) and the requested amount he wants to receive (*Requested amount*). As an output, the process produces the receipt of cash to the customer (*Cash*).

" Level 1" depicts the process of receiving cash in sub-processes that are executed in order to produce the requested data stream (*Cash*) to the client (*Client*). Specifically, 6 sub-processes are displayed (*Check Balance* , *Check Policy* etc.) and in order for there to be a correct flow of data, another external entity intervenes, the employee (*Teller*), as well as two storage units, the bank's database (*Bank database*) and the banking system (*Bank System*). The client produces its request in the sub-process "Client makes request" (*Client makes request*) which the employee (*Teller*) receives as input. The same is repeated in the sub-process "The employee requests the ID " (*Teller Asks for ID*), with the teller *receiving* the customer's ID . Then the employee (*Teller*) produces the information that the ID is valid (*Valid ID*) and transfers it as input to the "Balance Check" sub-process (*Check Balance*) together with the requested amount (*Requested amount*) from the client (*Client*). For this sub-process, the intervention of the storage unit, the bank's database (*Bank database*), to check that the customer's account balance is sufficient (*Balance ok*) for the requested amount (*Amount*). It produces it as information and is transferred to the next sub-process "Policy Check" (*Check Policy*). With the storage unit, banking system (*Bank System*) is checked if the requested amount (*Amount*) is within the bank's policy (*Within Policy*). It produces it as information and is transferred to the next sub-process "Transaction Log" (*Log Transaction*). The storage unit, database of the bank (*Bank database*) accepts as input the requested amount (*Amount*) and produces in the same sub-process the export of the amount (*Export of cash*). The export of the amount (*Export of cash*) is then transferred to the clerk (*Teller*) via the sub-process that received it from the database (*Bank database*) and finally the employee (*Teller*) in the sub-process "Give the cash to the customer" (*Give Cash that Client*) transfers the cash to the client (*Client*).

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Thank you for your attention.

