APPENDIX E: INPUT DATA FOR EVALUATION

The following scenario descriptions detail the behavior perceived in four systems used in the literature as baseline or referential specification to evaluate the accuracy of defect detection approaches in use cases or scenarios: Online Broker System [26], ATM use cases [56], Dlibra CRM [6] and Mobile News [6].

The highlighted words or phrases within internal scenario elements (Title, Goal, Context, Resource, Actor, Episodes, Alternatives), are defect indicators detected by the experts and the authors (manually and with the help of the C&L) from the documents, which act as the baseline for the evaluation of our automated analysis approach.

A defect within scenario element is detailed in a new line after the scenario element using the following format: (<Property> - (TP | FP | FN): <Detail>), where "Property" is the quality negatively impacted by the defect, "TP | FP | TN | FN" is the classification of the defect, and "Detail" gives a description of the defect for fixing.

A defect is:

- *True Positive (TP):* A defect identified by the approach that is consistent with expert decision (Defect occurs).
- *False Positive (FP):* A defect identified by the approach that is inconsistent with expert decision (Defect does not occur).
- *False Negative (FN):* A defect not identified by the approach that is inconsistent with expert decision (Defect occurs).

A. The Online Broker System

Table 1, 2 and 3 show the Unambiguity, Completeness and Consistency analysis results in scenarios (Title, Goal, Episodes, Exceptions) from Online Broker System.

TABLE 1
UNAMBIGUITY ANALYSIS OF ONLINE BROKE SYSTEM

Scenario	Vagueness			Subjectiveness			Optionalilty			Weakness			Multiplicity			Implicitly			Quantifiabilit y		
	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN
1	1			1																	
2																					
3																					
4																					
5													1			1					
6													2			1					
Total	**1**	**0**	**0**	1	**0**	**0**	0	**0**	**0**	0	**0**	**0**	3	**0**	**0**	2	**0**	**0**	0	**0**	**0**

TABLE 2
COMPLETENESS ANALYSIS OF ONLINE BROKE SYSTEM

ID Scenario	Atomicity			Simplicity			Uniformity			Usefulness			Conceptually Soundness			Integrity			Coherency			Uniqueness		
	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F
1				1						3			1											
2				1																				
3				1						1														
4																								
5				1						1			1									1		
6				2						1			1									1		
Total	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**

TABLE 3
CONSISTENCY ANALYSIS OF ONLINE BROKE SYSTEM

ID Scenario	Non-interferential			Boundedness			Liveness			Reversibility		
	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN
1	1											
2												
3												
4												
5	1											
6	1											
Total	3	**0**	**0**	0	**0**	**0**	0	**0**	**0**	0	**0**	**0**

TITLE: **Submit Order**
*(**Soundness - TP**: Title does not describe the Goal)*
GOAL: Allow customers to find the best supplier for a given order.
*(**Subjective - TP**: ambiguous indicator)*
CONTEXT:
PRE-CONDITION: The Broker System is online AND the Broker System welcome page is being displayed
ACTOR: Customer, Broker System
RESOURCE:
EPISODES:
*(**Usefulness - TP**: Too long scenario - Num. episodes > 10)*
1. The Customer loads the login page
2. The Broker System asks for the Customer's login information
3. The Customer enters her login information
4. The Broker System checks the provided login information
*(**Vagueness - TP**: ambiguous indicator)*
5. The Broker System displays an order page
6. The Customer creates a new Order
7. REPEAT the Customer adds an item to the Order WHILE the Customer has more items to add to the order
8. The Customer submits the Order
9. The Broker System broadcast the Order to the Suppliers
*(**Simplicity - TP**: Missing Action-Verb in Present Tense form)*
10. # LOCAL SUPPLIER BID FOR ORDER
(**Usefulness - TP**: *Actor mentioned in episode is not included in the Actor/Resource section*)
11. INTERNATIONAL SUPPLIER BID FOR ORDER #
(**Usefulness - TP**: *Actor mentioned in episode is not included in the Actor/Resource section*)
(**Non-interferential - FN**: *Simultaneous enabled* operations in Local Supplier and International Supplier)
12. PROCESS BIDS
ALTERNATE/EXCEPTION:
1a IF Customer is not registered THEN REGISTER CUSTOMER
2a. after 60 seconds
2a1. The Broker System displays a login timeout page
4a. The Customer login information is not accurate
4a1. GOTO Step 2.
8a. The Order is empty
8a1. The Broker System displays an error page

TITLE: **Register Customer**
GOAL: Register Customer
CONTEXT: login page loaded
PRE-CONDITION:
POST-CONDITION:
ACTOR: Customer, Broker System
RESOURCE:
EPISODES:
1. Customer selects registration operation
2. Broker System asks for Customer name, date of birth and address
3. Customer enters registration information
4. Broker System validates Customer information
5. Broker System generate login information for Customer
*(**Simplicity - TP**: Missing Action-Verb in Present Tense form)*
ALTERNATE/EXCEPTION:
4.a. Customer registration information is not valid
4.a.1. Broker System displays registration failure page

TITLE: **Process Bids**
GOAL: Process a bid
CONTEXT: Process a Bid for an Order
PRE-CONDITION: Local Supplier has submitted a bid OR International Supplier has submitted a bid
POST-CONDITION:
ACTOR: Customer, Broker System
*(**Usefulness** - **TP**: never participates in episodes)*
RESOURCE:
EPISODES:
1. Customer examines the bid
2. Customer signals the system to proceed with bid
3. HANDLE PAYMENT
4. System put an order with the selected bidder
*(**Simplicity** - **TP**: Missing Action-Verb in Present Tense form)*

TITLE: **Handle Payment**
GOAL: Handle Payment
CONTEXT: Handle payment for a Bid
PRE-CONDITION:
POST-CONDITION:
ACTOR: Customer, Broker System, Payment System
RESOURCE:
EPISODES:
1. The Broker System asks the Customer for Credit Card information
2. The Customer provides her Credit Card information
3. The Broker System asks a Payment System to process the Customer's Payment
4. The Broker System displays an acknowledgement message to the Customer
ALTERNATE/EXCEPTION:
3.a. The Customer Payment is denied
3.a.1. The Broker System displays a payment denied page

TITLE: **International Supplier bid for order**
*(**Soundness** - **TP**: Title does not describe the Goal)*
GOAL: Submit a bid
CONTEXT: Create a Bid for an Order
PRE-CONDITION: An Order has been broadcasted
POST-CONDITION: International Supplier has submitted a bid
*(**Non-interferential** - **TP**: Simultaneous enabled* operations in Local Supplier and International Supplier)
*(**Uniqueness** - **TP**: Local Supplier bid for order and International Supplier bid for order are potentially duplicated)*
ACTOR: International Supplier, Broker System
RESOURCE:
EPISODES:
1. International Supplier receives the Order and examines it
*(**Implicit** - **TP**: ambiguous indicator)*
*(**Multiple** - **TP**: ambiguous indicator)*
(**Simplicity** - **TP**: Contains more than one Action-Verb)
2. International Supplier submits a Bid for the Order
3. The Broker System sends the Bid to the Customer
*(**Usefulness** - **TP**: Actor/Resource mentioned in episode is not included in the Actor/Resource element)*
ALTERNATE/EXCEPTION:
1.a. The Order includes items restricted for exportation
1.a.1. International Supplier passes on the Order
1.b. The International Supplier cannot satisfy the order
1.b.1. International Supplier passes on the Order

TITLE: **Local Supplier bid for order**
*(**Soundness** - TP: Title does not describe the Goal)*
GOAL: Submit a bid
CONTEXT: Create a Bid for an Order
PRE-CONDITION: An Order has been broadcasted
POST-CONDITION: Local Supplier has submitted a bid
*(**Non-interferential** - TP: Simultaneous enabled* operations in Local Supplier and International Supplier)
*(**Uniqueness** - TP: Local Supplier bid for order and International Supplier bid for order are potentially duplicated)*
ACTOR: Local Supplier, Broker System
RESOURCES:
EPISODES:
1. Local Supplier receives the Order and examines it
*(**Implicit** - TP: ambiguous indicator)*
*(**Multiple** - TP: ambiguous indicator)*
(*Simplicity* - TP: Contains more than one Action-Verb)
2. Local Supplier determines the applicable taxes to the order and creates a bid
*(**Multiple** - TP: ambiguous indicator)*
(*Simplicity* - TP: Contains more than one Action-Verb)
3. Local Supplier submits a Bid for the Order
4. The Broker System sends the Bid to the Customer
*(**Usefulness - TP:** Actor/Resource mentioned in episode is not included in the Actor/Resource element)*
ALTERNATE/EXCEPTION:
2.a. Local Supplier can not satisfy the Order
2.a.1. Local Supplier passes on the Order

B. ATM System

Table 4, 5 and 6 show the Unambiguity, Completeness and Consistency analysis results in scenarios (Title, Goal, Episodes, Exceptions) from ATM use cases.

TABLE 5
UNAMBIGUITY ANALYSIS OF ATM SYSTEM

Scenario	Vagueness			Subjectiveness			Optionalilty			Weakness			Multiplicity			Implicitly			Quantifiabilit y		
	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN
1													1								
2																					
3																					
4																2					
5																					
Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0

TABLE 6
COMPLETENESS ANALYSIS OF ATM SYSTEM

ID Scenario	Atomicity			Simplicity			Uniformity			Usefulness			Conceptually Soundness			Integrity			Coherency			Uniqueness		
	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F
1				1			1			1														
2				2			1			1				1										
3				2																				
4																								
5				1										1										
Total	0	0	0	6	0	0	2	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0

TABLE 7
CONSISTENCY ANALYSIS OF ATM SYSTEM

ID Scenario	Non-interferential			Boundedness			Liveness			Reversibility		
	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN
1							1					
2							1					
3	1											
4	1											
5												
Total	2	0	0	0	0	0	2	0	0	0	0	0

TITLE: **ACCESS ATM**
GOAL: User access the ATM.
CONTEXT: User wants to use the ATM.
PRE-CONDITION: ATM in ready state for new User
POST-CONDITION: User access granted; PIN and card validated.
ACTOR: User, ATM
RESOURCE:
EPISODES:
1. User inserts card into ATM.
2. ATM asks for a PIN.
3. User types in the numbers of his PIN and presses the Enter button
*(**Multiple - TP**: ambiguous indicator)*
(***Simplicity - TP***: *Contains more than one Action-Verb*)
4. ATM asks for account type.
5. Customer selects account.
*(**Usefulness - TP**: Actor mentioned in episode is not included in the Actor/Resource section)*
6. ATM displays User options.
ALTERNATE/EXCEPTION:

4a. ATM rejects unidentifiable car
*(**Uniformity - TP**: Incomplete Cause)*
*(**Liveness - TP**: Never enabled operation)*

TITLE: **WITHDRAW CASH**
*(**Soundness - FP:** Title does not describe the Goal)*
GOAL: User wants to withdraw money.
CONTEXT: User wants to withdraw money.
PRE-CONDITION: User has already logged onto the ATM.
POST-CONDITION: ATM ready for next User.
ACTOR: User, Bank, ATM
RESOURCES:
EPISODES:
*(**Usefulness - TP**: Too long scenario - Num. episodes > 10)*
1. User selects WITHDRAW CASH.
2. ATM prompts for amount.
3. User enters amount.
4. ATM verifies with the Bank that the User has enough money in account.
4.1 If insufficient funds in her account,
*(**Simplicity - TP**: Nested Episode Sentence must be treated by a scenario)*
4.2 ATM returns card to User.
4.3 User takes card.
5. ATM releases cash.
6. User takes cash.
7. ATM releases card.
8. User takes card.
*(**Simplicity - TP**: Episode Sentence coincidence with episode "4.3")*
ALTERNATE/EXCEPTION:
7a. ATM eats card.
*(**Uniformity - TP**: Incomplete Cause)*
*(**Liveness - TP**: Never enabled operation)*

TITLE: **CHANGE PIN**
GOAL: User wants to change their PIN.
CONTEXT: User wants to change their PIN.
PRE-CONDITION: User already logged onto the ATM
POST-CONDITION: New PIN read to card and Bank account
ACTOR: User, ATM
RESOURCE:
EPISODES:
1. User selects CHANGE PIN.
2. ATM prompts her to enter new PIN.
*(**Implicit - TP**: ambiguous indicator)*
3. It enters new PIN.
*(**Implicit - TP**: ambiguous indicator)*
*(**Simplicity/Usefulness - TP**: Missing Subject/Undeclared Actor)*
4. ATM prompts User to re-enter new PIN.
5. User re-enters new PIN.
6. ATM displays New PIN Successful message.
7. ATM displays list of options.
ALTERNATE/EXCEPTION:
4e ATM refuses new PIN.

4.1e User asked to re-enter new PIN
*(**Simplicity** - **TP**: Missing Action-Verb in Present Tense form)*

TITLE: **CHECK BALANCE**
GOAL: The User wants to check their account balance before withdrawing money.
CONTEXT: The User wants to check their account balance before withdrawing money.
PRE-CONDITION: User already logged onto the ATM
POST-CONDITION: Balance no longer displayed; ATM ready for a transaction.
ACTOR: User, Bank, ATM
RESOURCES:
EPISODES:
1. User selects balance of account.
2. User selects On Screen option.
3. ATM displays current balance on screen.
4. Bank retrieves User's current balance from their account.
5. ATM prompts for new option.
ALTERNATE/EXCEPTION:
2a. User selects On Paper option.
2.1a ATM prints balance on receipt
2.2a User takes receipt

TITLE: **MAKE DEPOSIT**
*(**Soundness - FP:** Title does not describe the Goal)*
GOAL: The User wants to deposit cash into the ATM
CONTEXT: The User wants to deposit cash into the ATM
PRE-CONDITION: The User has logged onto the ATM
POST-CONDITION: ATM ready for a new transaction.
ACTOR: User, ATM
RESOURCE:
EPISODES:
1. User selects Deposit.
2. Selects envelope
*(**Simplicity** - **TP**: Missing Subject)*
3. ATM accepts deposit
4. User takes deposit receipt.
ALTERNATE/EXCEPTION:
3e. ATM rejects deposit envelope.
3.1e ATM signals User of rejection.

C. **dLibra CRM**

Table 7, 8 and 9 show the Unambiguity, Completeness and Consistency analysis results in scenarios (Title, Goal, Episodes, Exceptions) from dLibra use cases.

TABLE 7
UNAMBIGUITY ANALYSIS OF DLIBRA

Scenario	Vagueness			Subjectiveness			Optionalilty			Weakness			Multiplicity			Implicitly			Quantifiability		
	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN
1																			1		
2													1						1		
3													1								
4													1								
5										3											
6													1								
7										1			1			1	1		1		
8																					
9													1								
10										1			1				1				
11																					
12													1								
13																					
14										3											
15													1						1		
Total	0	**0**	**0**	0	**0**	**0**	0	**0**	**0**	8	**0**	**0**	9	**1**	**0**	1	**2**	**0**	4	**0**	**0**

TABLE 8
COMPLETENESS ANALYSIS OF DLIBRA

ID Scenario	Atomicity			Simplicity			Uniformity			Usefulness			Conceptually Soundness			Integrity			Coherency			Uniqueness		
	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F
1																								
2				2																				
3				2																				
4				4																				
5				4																				
6	1			3																				
7				2																				
8				1																				
9				3																				
10				2																				
11				1																				
12				3																				
13				2																				
14				4																				
15				6																				
Total	1	**0**	**0**	38	**1**	**0**	0	**0**	**0**	0	**0**	**0**	0	**0**	**0**	0	**0**	**0**	0	**0**	**0**	0	**0**	**0**

TABLE 9
CONSISTENCY ANALYSIS OF DLIBRA

ID Scenario	Non-interferential			Boundedness			Liveness			Reversibility		
	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN
1												
2												
3												
4	1											
5												
6												
7												
8												
9												
10												
11												
12												
13												

14												
15												
Total	1	**0**	**0**	0	**0**	**0**	0	**0**	**0**	0	**0**	**0**

TITLE: **Log in to the system**
GOAL: Log in to the system
CONTEXT: User LOG IN TO THE SYSTEM
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User selects login option.
2. User provides all required data.
(Quantifiable - TP: ambiguous indicator)
3. System verifies correctness of data.
4. System displays a main page.
ALTERNATE/EXCEPTION:
3.a. Data is incomplete or incorrect:
3.a.1 System asks for data again.
3.a.2 Back to step 2.

TITLE: **Add a new client**
GOAL: Add a new client
CONTEXT: user ADD A NEW CLIENT
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User select option for adding new clients.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
2. User fills all required personal client data forms.
(Quantifiable - TP: ambiguous indicator)
3. System verifies correctness of data.
4. System adds a new client to the database and informs user about it.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
ALTERNATE/EXCEPTION:
3.a. Data is incomplete or incorrect:
3.a.1 System informs user about problems.
3.a.2 User makes a correction to the data.
3.a.3 Back to step 3.
3.b. Client with same personal data already exists:
3.b.1 System informs user about that fact.
3.b.2 Back to step 1.
4.a. Client can't be added:
4.a.1 System informs user about reason why client can't be added.

TITLE: **Edit client data**
GOAL: Edit client data
CONTEXT: EDIT CLIENT DATA
PRE-CONDITION:
POST-CONDITION:

ACTOR: user, System
RESOURCE:
EPISODES:
1. User select option for editing clients.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
2. User modifies personal client data.
3. System verifies correctness of data.
4. System saves a new client data to the database and informs user about it.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
ALTERNATE/EXCEPTION:
3.a. Data is incomplete or incorrect:
3.a.1 System informs user about problems.
3.a.2 User makes a correction to the data.
3.a.3 Back to step 3.
3.b. Client with same personal data already exists:
3.b.1 System informs user about that fact.
3.b.2 Back to step 1.
4.a. Client data changes can't be saved:
4.a.1 System informs user about reason why client can't be modified.

TITLE: **Delete client**
GOAL: Delete client
CONTEXT: DELETE CLIENT
PRE-CONDITION:
POST-CONDITION:
ACTOR: User , System
RESOURCE:
EPISODES:
1. User select option for deleting clients.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
2. User delete chosen client.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
3. System verifies possibility to perform deleting.
4. System saves changes to the database and informs user about it.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
ALTERNATE/EXCEPTION:
3.a. Client can not be deleted:
3.a.1 System informs user about the conditions.
3.a.2 Use case ends.
(Simplicity - TP: does not finish the scenario in the last solution step)
3.a.3 Back to step 3.
(Non-interferential - TP: Simultaneous enabled operations: Use case ends or Back to step 3?)

TITLE: **Browse clients**
GOAL: Browse clients
CONTEXT: BROWSE CLIENTS
PRE-CONDITION:
POST-CONDITION:
ACTOR: user, System
RESOURCE:
EPISODES:

1. User select option for browsing clients.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
2. System displays the list of clients.
3. User may filter clients with specified criteria.
(Weak - TP: ambiguous indicator)
(Simplicity - TP: Missing Action-Verb in Present Tense form)
4. User may sort clients.
(Weak - TP: ambiguous indicator)
(Simplicity - TP: Missing Action-Verb in Present Tense form)
5. User may view details about selected client.
(Weak - TP: ambiguous indicator)
(Simplicity - TP: Missing Action-Verb in Present Tense form)
6. Use case ends when user logs out or selects different option.

ALTERNATE/EXCEPTION:
2.a. There are no clients to display:
2.a.1 System displays blank list.
2.a.2 Use case ends.

TITLE: **Search**
(Atomicity - TP: Missing Object)
GOAL: **Search**
CONTEXT: SEARCH
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User select option for searching.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
2. User selects subject of search (clients, contracts, installations).
3. System displays list of possible criteria.
4. User creates filter for searching.
5. System search the database and displays the results.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)

ALTERNATE/EXCEPTION:
4.a. Chosen criteria are invalid:
4.a.1 System warns user.
4.a.2 Back to step 3.
5.a. No records found:
5.a.1 System displays blank list.
5.a.2 Use case ends.

TITLE: **Add a new contract**
GOAL: Add a new contract
CONTEXT: ADD A NEW CONTRACT
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User select a client for whom new contract will be added.
(Simplicity - TP: Missing Action-Verb in Present Tense form)

*(**Implicit - FP:** ambiguous indicator)*
*(**Weak - TP**: ambiguous indicator)*
2. User chooses option for adding new contract.
3. System displays transaction form.
4. User fills all required data.
*(**Quantifiable - TP**: ambiguous indicator)*
5. System verifies information.
6. System saves contract and bounds it to the selected client.
*(**Simplicity - TP**: contains more than one Action-Verb)*
*(**Implicit - TP**: ambiguous indicator)*
*(**Multiple - TP**: ambiguous indicator)*
ALTERNATE/EXCEPTION:
5.a. Data is incomplete or incorrect:
5.a.1 System informs user about problems.
5.a.2 User makes a correction to the data.
6.a. contract can't be saved:
6.a.1 System informs user about that fact.

TITLE: **Edit contract**
GOAL: Edit contract
CONTEXT: EDIT CONTRACT
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User select a client.
*(**Simplicity - TP**: Missing Action-Verb in Present Tense form)*
2. User chooses option for editing an existing contract.
3. System displays transaction form.
4. User changes desired data.
5. System verifies information.
6. System saves changed contract.
ALTERNATE/EXCEPTION:
5.a. Data is incomplete or incorrect:
5.a.1 System informs user about problems.
5.a.2 User makes a correction to the data.
6.a. contract can't be saved:
6.a.1 System informs user about that fact.

TITLE: **Delete contract**
GOAL: Delete contract
CONTEXT: DELETE CONTRACT
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User select option for deleting contract.
*(**Simplicity - TP**: Missing Action-Verb in Present Tense form)*
2. User delete chosen contract.
*(**Simplicity - TP**: Missing Action-Verb in Present Tense form)*
3. System verifies possibility to perform deleting.
4. System saves changes to the database and informs user about it.

*(**Simplicity - TP**: contains more than one Action-Verb)*
*(**Multiple - TP**: ambiguous indicator)*
ALTERNATE/EXCEPTION:
3.a. Contract can not be deleted:
3.a.1 System informs user about problems.
3.a.2 User check possibility to perform deleting.
3.a.3 Back to step 3.

TITLE: **Add a new installation**
GOAL: Add a new installation
CONTEXT: ADD A NEW INSTALLATION
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User select a client for whom new installation will be added.
*(**Simplicity - TP**: Missing Action-Verb in Present Tense form)*
*(**Implicit - FP**: ambiguous indicator)*
*(**Weak - TP**: ambiguous indicator)*
2. User chooses option for adding new installation.
3. System displays installation form.
4. User fills required data.
5. System verifies information.
6. System saves installation and bounds it to the selected client.
*(**Simplicity - TP**: contains more than one Action-Verb)*
*(**Multiple - TP**: ambiguous indicator)*
ALTERNATE/EXCEPTION:
5.a. Data is incomplete or incorrect:
5.a.1 System informs user about problems.
5.a.2 User makes a correction to the data.
6.a. Installation can't be saved:
6.a.1 System informs user about that fact.

TITLE: **Edit installation**
GOAL: Edit installation
CONTEXT: EDIT INSTALLATION
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User select a client.
*(**Simplicity - TP**: Missing Action-Verb in Present Tense form)*
2. User chooses option for editing an existing installation.
3. System displays installation form.
4. User changes desired data.
5. System verifies information.
6. System saves changed installation.
ALTERNATE/EXCEPTION:
5.a. Data is incomplete or incorrect:
5.a.1 System informs user about problems.
5.a.2 User makes a correction to the data.

6.a. Installation can't be saved:
6.a.1 System informs user about that fact.

TITLE: **Delete installation**
GOAL: Delete installation
CONTEXT: DELETE INSTALLATION
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User select option for deleting installation.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
2. User delete chosen installation.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
3. System verifies possibility to perform deleting.
4. System saves changes to the database and informs user about it.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
ALTERNATE/EXCEPTION:
3.a. Installation can not be deleted:
3.a.1 System informs user about problems.
3.a.2 User check possibility to perform deleting.
3.a.3 Back to step 3.

TITLE: **Prepare a report**
GOAL: Prepare a report
CONTEXT: PREPARE A REPORT
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User select option for creating reports.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
2. System displays a list of possible fields in the report.
3. User selects fields to be included in the report and rules to filter values from database.
4. User order report generation.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
5. System asks for type and localisation of the output file with report.
6. User selects the type and localisation of the output file with report.
7. System generates a report.
ALTERNATE/EXCEPTION:
7.a. Report can't be saved in given location:
7.a.1 System displays information.
7.a.2 Back to step 5.

TITLE: **Browse information**
GOAL: Browse information
CONTEXT: BROWSE INFORMATION
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:

EPISODES:
1. User select option for browsing data.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
2. System displays the list of licences, keys, contracts and installations (grouping by type).
3. User may filter data with specified criteria.
(Weak - TP: ambiguous indicator)
(Simplicity - TP: Missing Action-Verb in Present Tense form)
4. User may sort data.
(Weak - TP: ambiguous indicator)
(Simplicity - TP: Missing Action-Verb in Present Tense form)
5. User may view details about selected element.
(Weak - TP: ambiguous indicator)
(Simplicity - TP: Missing Action-Verb in Present Tense form)
6. Use case ends when users logs out or select different option.
ALTERNATE/EXCEPTION:
2.a. There are no data to display:
2.a.1 System displays blank list.
2.a.2 Use case ends.

TITLE: **Request for licence**
GOAL: Request for licence
CONTEXT: REQUEST FOR LICENCE
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System, PCSS Team Participant
RESOURCE:
EPISODES:
1. User select option for requesting a new licence.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
2. System displays the list of user`s contracts.
3. User selects one contract for licence request.
4. System contact with dLibra server to obtain all necessary data.
(Vague - TP: ambiguous indicator)
(Quantifiable - TP: ambiguous indicator)
(Simplicity - TP: Missing Action-Verb in Present Tense form)
5. System validate given data.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
6. System store a request new licence and informs user about it.
(Simplicity - TP: contains more than one Action-Verb)
(Simplicity - TP: Missing Action-Verb in Present Tense form)
(Multiple - TP: ambiguous indicator)
7. PCSS Team Participant approve request for a new licence.
(Simplicity - TP: Missing Action-Verb in Present Tense form)
8. User downloads the licence file.
ALTERNATE/EXCEPTION:
2.a. There are no contracts:
2.a.1 System displays blank list.
2.a.2 Use case ends.
3.a. Selected contract can not have more licenses:
3.a.1 System informs user about that fact.
3.a.2 Back to step 2.
5.a. Data is not valid:
5.a.1 System informs user about incorrect data.
5.a.2 Back to step 2.

D. **Mobile News**

Table 32, 33 and 34 show the Unambiguity, Completeness and Consistency analysis results in scenarios (Title, Goal, Episodes, Exceptions) from Mobile News use cases.

TABLE 10
UNAMBIGUITY ANALYSIS OF MOBILE NEWS

Scenario	Vagueness			Subjectiveness			Optionalilty			Weakness			Multiplicity			Implicitly			Quantifiability		
	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN
1													1			1					
2													1								
3													1								
4	1												1			1					
5													2			2					
6																1					
7													1								
8	1																				
9																					
10													2			3					
11													1			1					
12																					
13	2												4			2					
14	1												2								
15	1												1			1					
Total	6	**0**	**0**	0	**0**	**0**	0	**0**	**0**	0	**0**	**0**	17	**1**	**0**	12	**0**	**0**	0	**0**	**0**

TABLE 11
COMPLETENESS ANALYSIS OF MOBILE NEWS

ID Scenario	Atomicity			Simplicity			Uniformity			Usefulness			Conceptually Soundness			Integrity			Coherency			Uniqueness		
	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F	T	F	F
1				1																				
2				1			1																	
3				3																				
4				4			1			1														
5				1						1														
6				1																				
7				1			1																	
8																								
9										1														
10				2						1														
11				1																				
12				1																				
13				6																				
14				2																				
15				1																				
Total	0	**0**	**0**	25	**1**	**0**	3	**0**	**0**	4	**0**	**0**	0	**0**	**0**	0	**0**	**0**	0	**0**	**0**	0	**0**	**0**

TABLE 12
CONSISTENCY ANALYSIS OF MOBILE NEWS

ID Scenario	Non-interferential			Boundedness			Liveness			Reversibility		
	TP	FP	FN	TP	FP	FN	TP	FP	FN	TP	FP	FN
1												
2							1					
3												
4							1					
5												
6												
7							1					
8												
9												
10												
11												
12												
13												

14												
15												
Total	0	**0**	**0**	0	**0**	**0**	3	**0**	**0**	0	**0**	**0**

TITLE: **Post a group message**
GOAL: Post a group message
CONTEXT: POST A GROUP MESSAGE
PRE-CONDITION:
POST-CONDITION:
ACTOR: Administrator, User
RESOURCE:
EPISODES:
1. Administrator logs on to the administration panel.
2. Administrator selects the Post group message option.
3. Administrator types the message and posts it.
*(**Simplicity - TP**: contains more than one Action-Verb)*
*(**Multiple - TP**: ambiguous indicator)*
*(**Implicit - TP**: ambiguous indicator)*
4. User receives the message when downloading new data.
ALTERNATE/EXCEPTION:

TITLE: **Configure the server**
GOAL: Configure the server
CONTEXT: CONFIGURE THE SERVER
PRE-CONDITION:
POST-CONDITION:
ACTOR: Administrator
RESOURCE:
EPISODES:
1. Administrator logs on to the administration panel.
2. Administrator selects the Configure option.
3. Administrator chooses and changes the desired settings.
*(**Simplicity - TP**: contains more than one Action-Verb)*
*(**Multiple - TP**: ambiguous indicator)*
4. Administrator saves configuration settings.
ALTERNATE/EXCEPTION:
4.a. Administrator cancels configuration changes.
*(**Uniformity - TP**: Incomplete Cause)*
*(**Liveness - TP**: Never enabled operation)*

TITLE: **Add a new channel group**
GOAL: Add a new channel group
CONTEXT: ADD A NEW CHANNEL GROUP
PRE-CONDITION:
POST-CONDITION:
ACTOR: Administrator, System
RESOURCE:
EPISODES:
1. Administrator logs on to the administration panel.
2. System displays administration options.
3. Administrator selects the Group and channel management option.
4. System displays a list of defined channel groups and an add/delete group menu.
5. Administrator types the name of a new group and selects Add group.
*(**Simplicity - TP**: contains more than one Action-Verb)*

*(**Multiple** - **TP**: ambiguous indicator)*
6. System checks if a group with the given name has not been already defined and if so, inserts the name of a new group into a database.
*(**Simplicity** - **TP**: involves a validation action and it is hard to understand and follow (contain structures like checks if / see whether))*
7. See step 4.
*(**Simplicity** - **TP**: Missing Subject)*
ALTERNATE/EXCEPTION:

TITLE: **Add a new channel**
GOAL: Add a new channel
CONTEXT: ADD A NEW CHANNEL
PRE-CONDITION:
POST-CONDITION:
ACTOR: Administrator, System
RESOURCE:
EPISODES:
*(**Usefulness** - **TP**: Too long scenario - Num. episodes > 10)*
1. Administrator logs on to the administration panel.
2. System displays administration options.
3. Administrator selects the Group and channel management option.
4. System displays a list of defined channel groups and an add/delete group menu.
5. Administrator chooses a group to which he wants to ADD A NEW CHANNEL.
*(**Implicit** - **TP**: ambiguous indicator)*
6. System displays a list of channels in the selected group and an add/delete menu.
7. Administrator types the name of the channel and the URL of the news service and selects Add channel.
*(**Simplicity** - **TP**: contains more than one Action-Verb)*
*(**Multiple** - **TP**: ambiguous indicator)*
8. System checks if a channel with the given name or URL has not been already defined and if so, inserts the channel information into a database.
*(**Simplicity** - **TP**: involves a validation action and it is hard to understand and follow (contain structures like checks if / see whether))*
9. System adds an information about the new channel to a group message.
10. See step 6.
*(**Simplicity** - **TP**: Missing Subject)*
11. Administrator selects the Finish option.
12. System posts a group message containing information about all new channels in the selected channel group.
ALTERNATE/EXCEPTION:
5.a. Administrator adds more channels. Proceed to step 7.
*(**Simplicity** - **TP**: contains more than one Sentence)*
*(**Uniformity** - **TP**: Incomplete Cause)*
*(**Vagueness** - **TP**: ambiguous indicator)*
*(**Liveness** - **TP**: Never enabled operation)*

TITLE: **Delete a channel**
GOAL: Delete a channel
CONTEXT: DELETE A CHANNEL
PRE-CONDITION:
POST-CONDITION:
ACTOR: Administrator, System
RESOURCE:
EPISODES:
*(**Usefulness** - **TP**: Too long scenario - Num. episodes > 10)*

1. Administrator logs on to the administration panel.
2. System displays administration options.
3. Administrator selects the Group and channel management option.
4. System displays a list of defined channel groups and an add/delete group menu.
5. Administrator chooses a group containing the channel he wants to delete.
(Implicit - TP: ambiguous indicator)
6. System displays a list of channels in the selected group and an add/delete menu.
7. Administrator selects the channel(s) he wants to delete and chooses the Delete option.
(Simplicity - TP: contains more than one Action-Verb)
(Implicit - TP: ambiguous indicator)
8. System deletes the selected channels from the database.
9. System posts a group message containing information about the deleted channels in the selected channel group to all users involved (subscribing the deleted channels).
10. System deletes all subscription information concerning the deleted channels.

ALTERNATE/EXCEPTION:

TITLE: **Delete a channel group**
GOAL: Delete a channel group
CONTEXT: DELETE A CHANNEL GROUP
PRE-CONDITION:
POST-CONDITION:
ACTOR: Administrator,System
RESOURCE:
EPISODES:
1. Administrator logs on to the administration panel.
2. System displays administration options.
3. Administrator selects the Group and channel management option.
4. System displays a list of defined channel groups and an add/delete group menu.
5. Administrator selects the group(s) he wants to delete and chooses the Delete option.
(Simplicity - TP: contains more than one Action-Verb)
(Implicit - TP: ambiguous indicator)
6. System asks for confirmation.
7. System deletes all channels from the selected groups (see: UC5, steps 8 to 10).

ALTERNATE/EXCEPTION:

TITLE: **Delete a user group**
GOAL: Delete a user group
CONTEXT: DELETE A USER GROUP
PRE-CONDITION:
POST-CONDITION:
ACTOR: Administrator, System
RESOURCE:
EPISODES:
1. Administrator logs on to the administration panel.
2. System displays administration options.
3. Administrator selects the Delete users option.
4. System displays the users deletion menu.
5. Administrator selects deletion options (i.e. date of users` last login).
6. Administrator confirms deletion request.
7. System finds all users matching deletion criteria and deletes found user accounts.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)

ALTERNATE/EXCEPTION:
6.a. Administrator cancels user deletion

(Uniformity - TP: Incomplete Cause)
(Liveness - TP: Never enabled operation)

TITLE: **Update news**
GOAL: Update news
CONTEXT: UPDATE NEWS
PRE-CONDITION:
POST-CONDITION:
ACTOR: Daemon, System
RESOURCE:
Episódios
1. Daemon sends a HTTP request to a defined news service.
2. System receives a RSS-like formatted news file.
3. System parses the received news file.
4. System assigns an expiry date and time to each incoming message.
5. System inserts appropriate parts of the news file into a news database.
(Vague - TP: ambiguous indicator)
ALTERNATE/EXCEPTION:

TITLE: **Delete news**
GOAL: Delete news
CONTEXT: DELETE NEWS
PRE-CONDITION:
POST-CONDITION:
ACTOR: System
RESOURCE:
EPISODES:
(Usefulness - TP: Too short scenario - Num. episodes < 3)
1. System queries the database for news messages, whose expiry date and time have passed.
2. System deletes all returned messages from the database.
ALTERNATE/EXCEPTION:

TITLE: **Register a new user**
GOAL: Register a new user
CONTEXT: REGISTER A NEW USER
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. System asks the user if he/she wants to register.
(Implicit - TP: ambiguous indicator)
2. User confirms he/she wants to register.
(Implicit - TP: ambiguous indicator)
3. System sends a registration request to the server.
4. Server creates a new user account and sends back a user ID.
(Usefulness - TP: undeclared actor)
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
5. System stores the user ID and instructs the user how to subscribe news channels or configure his/her preferences.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
ALTERNATE/EXCEPTION:

2.a. User refuses to register.
2.a.1 System displays an information that it cannot be used without prior registration.
(Implicit - TP: ambiguous indicator)
2.a.2 User confirms the message.
2.a.3 System terminates.

TITLE: **Download news**
GOAL: Download news
CONTEXT: DOWNLOAD NEWS
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, system, server
RESOURCE:
EPISODES:
1. User chooses to update locally stored news.
2. System sends a HTTP request to the Mobile News server.
3. Server sends all pending group messages.
4. Server sends separate news messages from all subscribed channels.
5. System receives news messages and stores them in a local database.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
(Implicit - TP: ambiguous indicator)
6. System displays a list of groups with subscribed channels and the number of new messages in each of them.
ALTERNATE/EXCEPTION:

TITLE: **Run the application**
GOAL: Run the application
CONTEXT: RUN THE APPLICATION
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User starts the application.
2. System checks for registration information.
3. If the user is already registered, the system automatically updates news messages from subscribed channels (refer to DOWNLOAD NEWS use case). If no, the system attempts to REGISTER A NEW USER (refer to Register a new user use case).
(Simplicity - TP: contains more than one Action-Verb)
ALTERNATE/EXCEPTION:

TITLE: **Subscribe/unsubscribe news channels**
GOAL: Subscribe/unsubscribe news channels
CONTEXT: SUBSCRIBE/UNSUBSCRIBE NEWS CHANNELS
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User chooses the Channel subscription option.
2. System requests for and downloads a list of available groups and channels.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
(Vague - TP: ambiguous indicator)

3. System displays a tree view of available groups and channels and marks those already subscribed by the user.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
(Vague - TP: ambiguous indicator)
(Implicit - TP: ambiguous indicator)
4. User selects the channels he/she wants to subscribe and/or deselects already subscribed channels to unsubscribe them and chooses the Change subscription options.
(Simplicity - TP: contains more than one Action-Verb)
(Implicit - TP: ambiguous indicator)
5. System sends the subscription configuration to the Mobile News server and waits for confirmation.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
6. Server alters the user`s subscription configuration in a database and sends a change confirmation.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
(Usefulness - TP: undeclared actor)
7. System receives the confirmation and displays it.
(Implicit - TP: ambiguous indicator)
(Simplicity - TP: contains more than one Action-Verb)
ALTERNATE/EXCEPTION:

TITLE: **Configure user preferences**
GOAL: Configure user preferences
CONTEXT: CONFIGURE USER PREFERENCES
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User chooses the Preferences option.
2. System displays a list of available options (i.e. font and colour settings, local news caching, etc..)
(Vague - TP: ambiguous indicator)
3. User configures the option according to his/her preferences and confirm the changes.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
4. System saves user preferences configuration and displays main application view.
(Simplicity - TP: contains more than one Action-Verb)
(Multiple - TP: ambiguous indicator)
ALTERNATE/EXCEPTION:

TITLE: **Read news**
GOAL: Read news
CONTEXT: READ NEWS
PRE-CONDITION:
POST-CONDITION:
ACTOR: User, System
RESOURCE:
EPISODES:
1. User chooses a news group from the Today menu.
2. System displays a list of topics of available messages in chosen group.
(Vague - TP: ambiguous indicator)
3. User chooses a topic.
4. System displays the message using user`s appearance preferences.
5. User reads the message and closes it or uses a hyperlink to go to the full message.

*(**Multiple** - **TP**: ambiguous indicator)*
*(**Simplicity** - **TP**: contains more than one Action-Verb)*
*(**Implicit** - **TP**: ambiguous indicator)*

6. System marks the message as Read.

ALTERNATE/EXCEPTION: