
Assignment 3**Exercise**

Develop an analysis model that covers the two use-cases provided next in this assignment: use case `PayBills` and use case `AccountOverdraft` (see below).

- a) [10 marks] Prepare a class diagram with only entity classes that show the major attributes and operations (don't show standard accessors/mutators – we will assume they exist for all attributes using the standard naming convention) and the annotated associations (with rolenames) between classes. Justify your decisions using the Abbott taxonomy. (You do not need to justify every single decision independently; you may group decisions that were made for similar reasons. Use your good judgment!)
- b) [10 marks] Complete your class diagram, adding in the boundary and control classes relevant to the two use-cases. To simplify the diagram, don't show any details (such as attributes and operations) for the entity classes (they are provided in the previous question). The diagram must be complete enough to support your sequence diagrams (see below), i.e., completing this question requires completing the next one.
- c) [5 marks] Draw a sequence diagram showing the successful payment of a bill. You may assume that the Web Customer is already logged on. Notice that you must make sure that the class diagram (previous question) and the sequence diagram are consistent.
- d) [5 marks] Select an operation of your choice used in the sequence diagram from (c) and express its contract in English and OCL. Do you need to make any changes to the sequence diagram in order to ensure that the contract is met?

Use case PayBills

Brief Description:	<i>Web Customer pays bills through the Bill Payment page of the system.</i>
Precondition	<i>Web Customer is logged on. Web Customer selects the "Pay Bills" option.</i>
Primary Actor	<i>Web Customer</i>
Secondary Actors	<i>Bank</i>
Dependency	<i>EXTENDED BY USE CASE AccountOverdraft</i>
Generalization	<i>None</i>

Basic Flow	
Step #	
1	<i>The system displays the Bill Payment page containing the list of registered bills and bank accounts of Web Customer .</i>
2	<i>Web Customer selects bills to be paid through the system.</i>
3	<i>Web Customer enters the amount to be paid through the system.</i>
4	<i>IF Web Customer does not want to pay the bills on the current date THEN Web Customer enters the date to pay the bills through the system ENDIF.</i>
5	<i>The system VALIDATES THAT the date of the entered bill payments are correct.</i>
6	<i>The system requests confirmation of the amount and date of the entered bill payments.</i>
7	<i>IF there are errors in the amount and date of the entered bill payments THEN Web Customer correct the amount and date of the entered bill payments ENDIF</i>
8	<i>Web Customer confirms the amount and date of the entered bill payments through the system.</i>
9	<i>DO</i>
	Step #
	1) <i>IF the payment date is immediate, THEN the system communicates with Bank to transfer the bill amount from the bank account of Web Customer to the utility's bank account ELSE the system asked Bank to add the bill payment to the list of upcoming payments of Web Customer ENDIF</i>
	<i>UNTIL all bill payments is processed.</i>
10	<i>The system receives a transaction record including a confirmation number to track the bill payment to from Bank.</i>
11	<i>The system displays the notification of successful bill payments showing the confirmation number of the transaction record for each payment.</i>
12	<i>Web Customer terminates the Bill payment page through the system.</i>
Postcondition:	<i>The system displays the Account Summary Page.</i>

Specific Alternative Flows:	
RFS	steps
RFS Basic Flow 5	Step #
	1) <i>The system rejects the entry.</i>
	2) <i>The system prompts Web Customer to re-enter a valid date.</i>
	3) <i>RESUME BACK TO 4</i>
Postcondition:	<i>None</i>

Assignment 3

Use case AccountOverdraft

Brief Description:	IF there is insufficient money in an account of Web Customer to complete the bill payment, THEN the system informs Web Customer to re-enter the amount, date or accounts fields ENDIF.
Precondition	There is insufficient money in an account of Web Customer to complete the bill payment.
Primary Actor	<i>None</i>
Secondary Actors	<i>Bank</i>
Dependency	<i>None</i>
Generalization	<i>None</i>

Basic Flow	
Step #	
13	<i>The system notifies Web Customer of the unsuccessful bill payment.</i>
14	<i>Web Customer edits the bill payment by entering a new value for the amount, date or accounts fields through the system.</i>
15	<i>The system re-tries the bill payment with the new values.</i>
Postcondition:	<i>The bill payment is completed.</i>

Global Alternative Flows				
Number	steps			
1	<i>IF Web Customer cancels the payment through the system THEN</i>			
	<table border="1"> <tr> <th>Step #</th> <th></th> </tr> <tr> <td>1)</td> <td><i>ABORT</i></td> </tr> </table>	Step #		1)
Step #				
1)	<i>ABORT</i>			
	<i>ENDIF</i>			
Postcondition:	<i>The bill payment is cancelled.</i>			