

PB007: Banking system

Jaroslav Cechak, Tomas Effenberger, Jiri Mauritz

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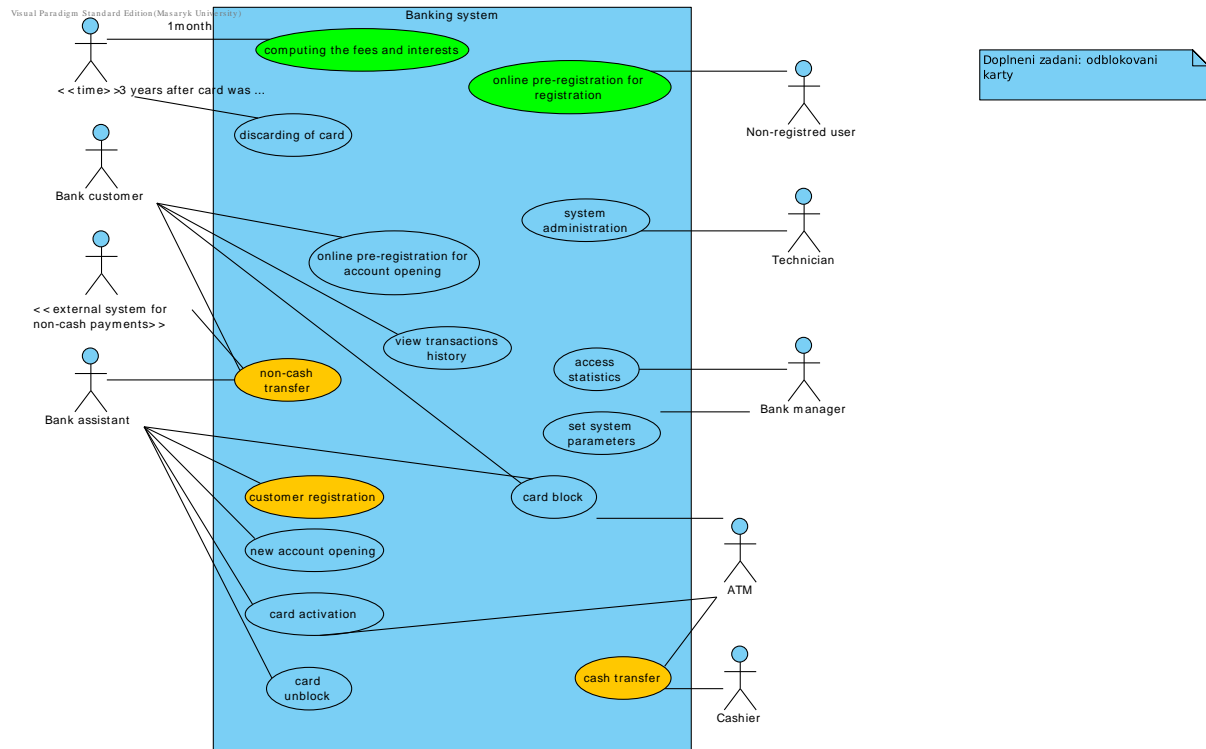
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
Use Case Diagram

Use Case Diagram



Summary

Name	Documentation
<<time>>	
Bank assistant	
Bank customer	
<<external system for non-cash payments>>	
ATM	
Cashier	
Non-registered user	
Technician	
Bank manager	
card unblock	
system administration	
N/A	Doplnění zadání: odblokování karty
cash transfer	
view transactions history	
set system parameters	
access statistics	

 discarding of card	
 computing the fees and interests	
 card activation	
 new account opening	
 customer registration	
 card block	
 non-cash transfer	
 online pre-registration for account opening	
 online pre-registration for registration	
 Banking system	

Documentation

Functional Requirements (F)

1. Bank customer
 - 1.1. Online pre-registration for account opening
 - 1.2. Money transfer
 - 1.2.1. Authorization
 - The authorization code can be entered at most three times (each time within 5 minutes from its delivery). If the code is entered three times unsuccessfully (wrong code or entered late), the whole transaction is canceled and the reserved money (for the transaction) is unblocked.
 - 1.3. See transactions history
 - 1.4. Card block
2. Bank manager
 - 2.1. Statistics (including future predictions)
 - 2.2. Set system parameters
 - 2.2.1. interest rates of savings accounts
 - 2.2.2. fees
3. Bank assistant
 - 3.1. Customer registration
 - 3.2. New account opening
 - 3.2.1. Checking account or savings account
 - 3.2.2. CZK or EUR
 - 3.3. Money transfer
 - 3.4. Card activation
 - 3.5. Card block
 - 3.6. Card unblock
4. Cashier
 - 4.1. Money deposit
 - 4.2. Money withdrawal
5. External system for non-cash payments
 - 5.1. Non-cash payment notification
6. Time
 - 6.1. Computing the fees and interests

- The computation is based on the priority of the customer, which is derived from how long the customer has been with the bank, and what has been the balance on his/her accounts in the past year.
- 6.2. Discarding of card
- 7. ATM
 - 7.1. Card activation
 - 7.2. Money withdrawal
 - 7.3. Card block
- 8. Technician
 - 8.1. system maintenance
 - 8.2. change the access rights of other users
- 9. Non-registered user
 - 9.1. Online pre-registration for registration

Non-functional Requirements (N)

1. Java platform
2. reliability
 - 2.1. backup of all actions (1 year)
 - 2.2. backup of all transactions (10 years)
 - 2.3. accessibility of online banking system 24/7 (99.5% a year)
 - 2.4. accessibility of ATMs 24/7 (98% a year)
3. performance of the online banking system (scalable)
4. security
 - 4.1. authorization via SMS
 - 4.2. use HTTPS for online banking

Details

 <<time>>

 **Bank assistant**

 **Bank customer**

 <<external system for non-cash payments>>

 **ATM**

 **Cashier**

 **Non-registered user**

 **Technician**

 **Bank manager**

card unblock

Use Case Descriptions

Use Case ID	14
Brief Description	UC14 unblocks a blocked card
Primary Actors	Bank assistant
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

system administration

Use Case Descriptions

Use Case ID	6
Brief Description	UC6 enables to update system version, change access rights and view system logs
Primary Actors	Technician
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

 N/A

cash transfer

Use Case Descriptions

Use Case ID	14
Brief Description	UC14 enables to withdraw or deposit cash
Primary Actors	Cashier, ATM
Secondary Actors	bank customer
Preconditions	-
Main Flow of Events	<ol style="list-style-type: none"> 1. UC begins when cashier or ATM requests new cash transfer. 2. IF (actor is ATM): <ol style="list-style-type: none"> 2.1. Actor inputs authentication details (card number and PIN)

	<p>2.2. IF (authentication details are not valid): 2.2.1. System dismisses the transfer.</p> <p>3. IF (actor is cashier): 3.1. System shows form for bank customer verification. 3.2. Actor verifies bank customer by card number and personal ID. 3.3. System shows form for cash transfer.</p> <p>4. Actor inputs cash transfer details (amount, which can be both positive (money deposit) or negative (money withdrawal)). 5. Actor chooses optional printing of receipt. 6. IF (required amount can not be allocated or is not present in cash): 6.1. Dismiss the transfer. 7. System updates customer's account balance.</p>
Alternative Flows	
Post-conditions	Customer's account balance is updated.

view transactions history

Use Case Descriptions

Use Case ID	4
Brief Description	UC4 Show history of transactions of the given bank customer
Primary Actors	Bank customer
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

set system parameters

Use Case Descriptions

Use Case ID	9
Brief Description	UC9 enables to set various parameters of the system
Primary Actors	Bank manager
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

access statistics

Use Case Descriptions

Use Case ID	8
Brief Description	UC8 enables to access statistics of the system for better overview of the system
Primary Actors	Bank manager
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

discarding of card

Use Case Descriptions

Main	
Use Case ID	5
Brief Description	UC5 disables card after expiration date
Primary Actors	<<time>>
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

computing the fees and interests

Use Case Descriptions

Main	
Use Case ID	1
Brief Description	UC1 Computing the fees and interest rates
Primary Actors	<<time>>
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

card activation

Use Case Descriptions

|--|--|

Use Case ID	13
Brief Description	UC13 activates new card
Primary Actors	Bank assistant, ATM
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

new account opening

Use Case Descriptions

Use Case ID	12
Brief Description	UC12 opens new account
Primary Actors	Bank assistant
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

customer registration

Use Case Descriptions

Use Case ID	11
Brief Description	UC11 registers new bank customer
Primary Actors	Bank assistant
Secondary Actors	-
Preconditions	-
Main Flow of Events	<ol style="list-style-type: none"> 1. UC begins when bank assistant selects "Customer registration" 2. System shows two options: "with pre-registration" and "without pre-registration" 3. IF (bank assistant selects "with pre-registration"): <ol style="list-style-type: none"> 3.1 Bank assistant fills email address 3.2 IF (pre-registration form with this email address does not exists): <ol style="list-style-type: none"> 3.2.1 Dismiss registration 3.3 Retrieve filled personal details from the form 4. ELSE: <ol style="list-style-type: none"> 4.1 Bank assistant fills contender's personal details 5. Bank assistant fills authentication details (ID, signature pattern) 6. Create new customer account

Alternative Flows	Interruptions of the process of customer registration because the person has already has an customer account or problem during providing details about the person.
Post-conditions	New customer account created.

card block

Use Case Descriptions

Use Case ID	10
Brief Description	UC10 blocks card and notifies customer about this event
Primary Actors	Bank customer, Bank assistant, ATM
Secondary Actors	Bank customer
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

non-cash transfer

Use Case Descriptions

Use Case ID	7
Brief Description	UC7 enables to execute non-cash transfer
Primary Actors	Bank customer, Bank assistant, <<external system for non-cash payments>>
Secondary Actors	-
Preconditions	-
Main Flow of Events	<ol style="list-style-type: none"> UC begins when Bank customer or assistant selects "Non-cash payment" or external system requests non-cash payment. Actor inputs non-cash transfer details (amount, receiver's account number) <ol style="list-style-type: none"> IF (actor is bank customer): <ol style="list-style-type: none"> System shows prompt to input SMS verification code. System sends SMS verification code and starts time countdown (5 minutes). Bank customer inputs the code and clicks "Submit the transfer" button. IF (the inputted code is not valid OR timeout expired): <ol style="list-style-type: none"> Dismiss the transfer. IF (actor is external system): <ol style="list-style-type: none"> Actor inputs authentication details (card number and PIN) IF (authentication details are not valid): <ol style="list-style-type: none"> Dismiss the transfer. IF (required amount can not be allocated): <ol style="list-style-type: none"> Dismiss the transfer System executes the transfer.

Alternative Flows	Bank customer may log out of the system anytime.
Post-conditions	Sender's and receiver's account balance is updated.

online pre-registration for account opening

Use Case Descriptions

Use Case ID	3
Brief Description	UC3 Enables to fill online pre-registration form for account opening
Primary Actors	Bank customer
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	
















online pre-registration for registration

Use Case Descriptions

Main	
Use Case ID	2
Brief Description	UC2 Enables to fill online pre-registration form for registration
Primary Actors	Non-registered user
Secondary Actors	-
Preconditions	
Main Flow of Events	
Alternative Flows	
Post-conditions	

Banking system

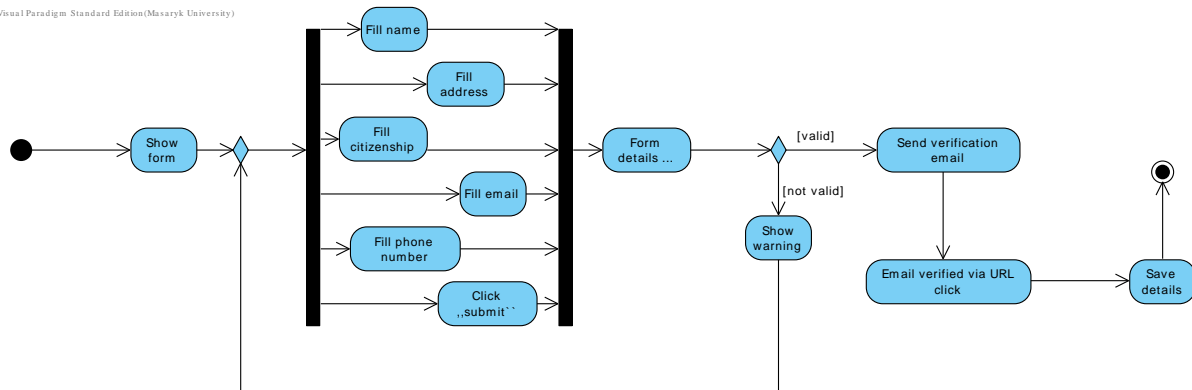
Children

Name	Documentation
 online pre-registration for registration	
 online pre-registration for account opening	
 non-cash transfer	
 card block	
 customer registration	
 new account opening	
 card activation	
 computing the fees and interests	
 discarding of card	
 access statistics	
 set system parameters	
 view transactions history	
 cash transfer	
 system administration	
 card unblock	

Activity Diagram

Online pre-registration for registration

Visual Paradigm Standard Edition (Masaryk University)



Summary

Name	Documentation
Show form	
Fill name	
Fill address	
Fill citizenship	
Fill email	
Fill phone number	
Click „submit”	
Form details validation	
Send verification email	
Email verified via URL click	
Save details	
Show warning	

Details

● N/A

Show form

N/A

N/A

Fill name

Fill address

 **Fill citizenship**

 **Fill email**

 **Fill phone number**

 **Click „submit“**

 **N/A**

 **Form details validation**

 **N/A**

 **Send verification email**

 **Email verified via URL click**

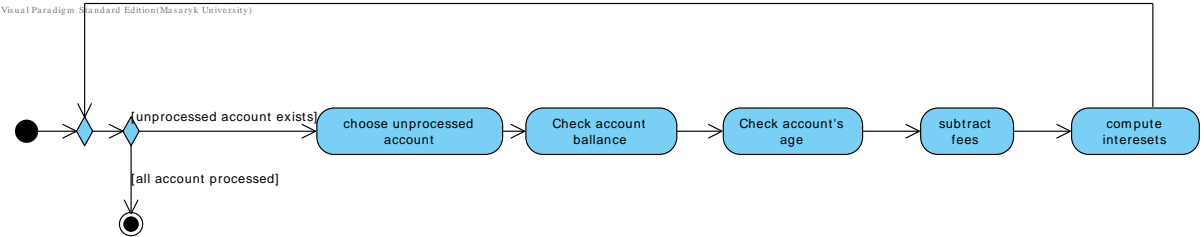
 **Save details**

 **N/A**

 **Show warning**

Activity Diagram

Computing interest rates and fees



Summary

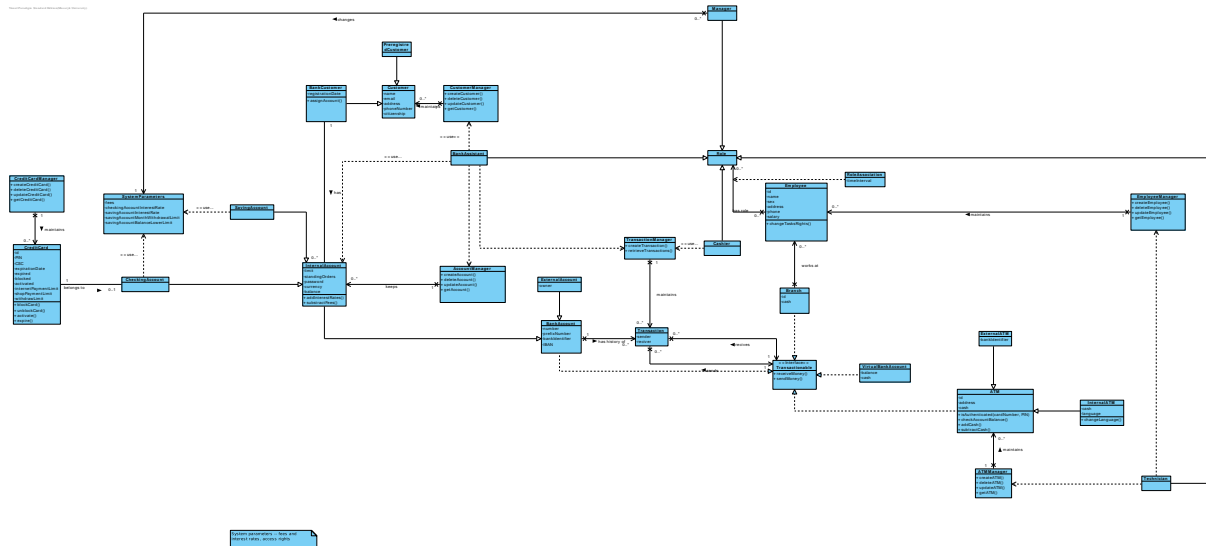
Name	Documentation
choose unprocessed account	
Check account ballance	
Check account's age	
subtract fees	
compute interesets	

Details

- N/A
- N/A
- N/A
- choose unprocessed account
- Check account ballance
- Check account's age
- subtract fees
- compute interesets
- N/A











Class Diagram

Analytic Class Diagram




























Summary

Name	Documentation
Manager	
PreregistredCustomer	
BankCustomer	
Customer	
CustomerManager	
BankAssistant	
Role	
RoleAssociation	
CreditCardManager	
Employee	
SystemParameters	
EmployeeManager	
SavingAccount	
TransactionManager	
Cashier	
CreditCard	
InternalAccount	
AccountManager	
CheckingAccount	
ExternalAccount	
Branch	

 BankAccount	
 Transaction	
 ExternalATM	
 Transactionable	
 VirtualBankAccount	
 ATM	
 InternalATM	
 ATMManager	
 Technician	
 N/A	System parameters -- fees and interest rates, access rights

Details

-  **Manager**
-  **PreregistredCustomer**
-  **BankCustomer**
-  **Customer**
-  **CustomerManager**
-  **BankAssistant**
-  **Role**
-  **RoleAssociation**
-  **CreditCardManager**
-  **Employee**
-  **SystemParameters**
-  **EmployeeManager**
-  **SavingAccount**
-  **TransactionManager**
-  **Cashier**
-  **CreditCard**

-  **InternalAccount**
-  **AccountManager**
-  **CheckingAccount**
-  **ExternalAccount**
-  **Branch**
-  **BankAccount**
-  **Transaction**
-  **ExternalATM**
-  **Transactionable**

Children

Name	Documentation
 Class4	

 **VirtualBankAccount**

 **ATM**

 **InternalATM**

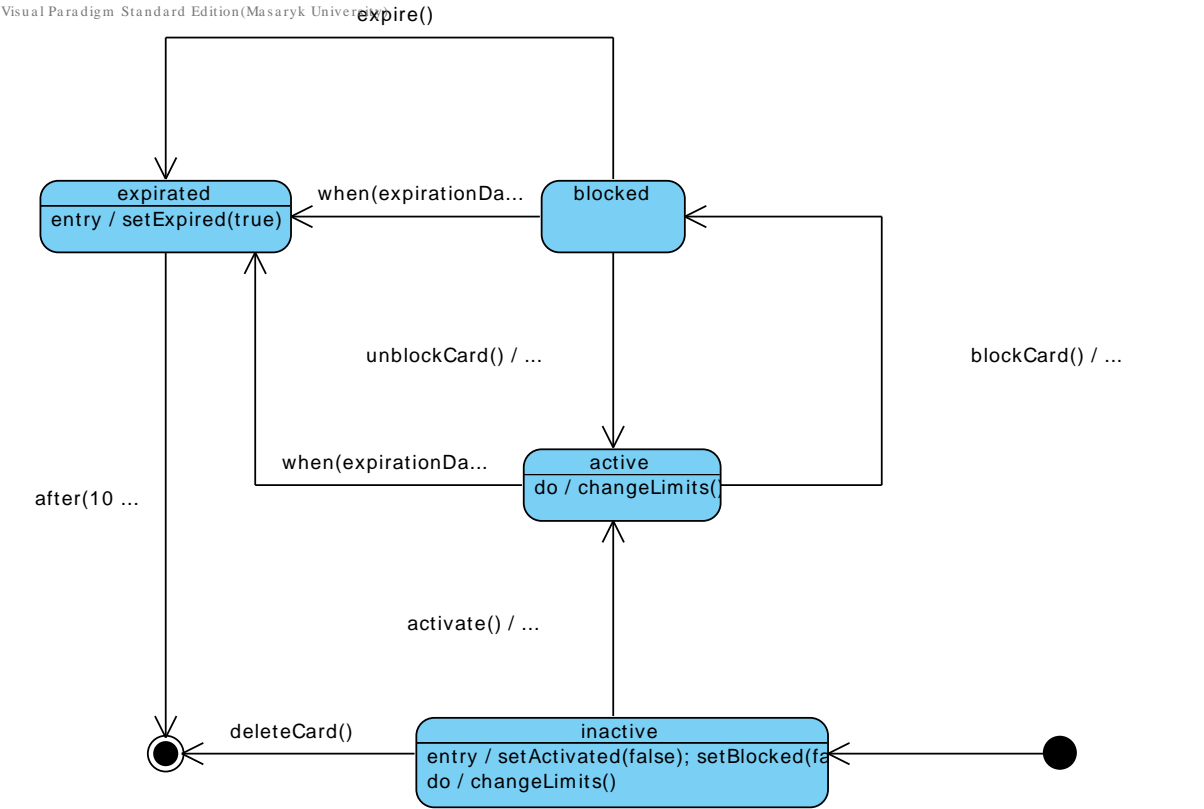
 **ATMManager**

 **Technician**





 **N/A**

State Machine Diagram

Card State Machine Diagram



Summary





Name	Documentation
 inactive	
 active	
 blocked	
 expired	

Details

 N/A

 inactive

Regions

Name	Documentation
 setActivated(false)	
 setBlocked(false)	
 setActivated(false); setBlocked(false)	
 changeLimits()	

active

Regions

Name	Documentation
 changeLimits()	

blocked

expired

Regions

Name	Documentation
 setExpired(true)	

N/A