Assignment 1 - Solution

Total: Max 40 marks

Question 1 **Glossary** [8 marks]

Problems: (4 marks)

Problem 1: At a bank, a customer can have several accounts; chequing, savings, credit lines. We wouldn't want to duplicate the customer information (name and address) for each bank account. We would also want the customer to be able to see all of their accounts, not just one by one. So we need to separate the notion of customer account used for web banking and bank account.

Problem 2: When paying bills, we have to identify the customer to the utility, so that Joe doesn't end up paying Sarah's cable bill. But the bank's customer identifier is not the same as the utility's customer identifier. Instead, we also need to clearly discern between the bank's accounts and the utility accounts.

(Related) Problem 3: When we pay a customer's cable bill, we don't actually send the money to the cable company: We send the money to the cable company's bank where, of course, the cable company is a customer that has bank accounts.

Glossary Entries

- Bank: Represents the existing banking system for the financial institution with which the web-banking system will interact to access its suite of existing financial services (monthly reports, bank transfers, automatic deductions) via the Internet.
- Customer: Is a person who has money in the bank and requires services to access that money. Each customer is uniquely identified by a customer (eg., card) number.

Suggested glossary entries [4 marks]

- Web Customer: A customer who uses the web to pay bills from his/her accounts.
- Customer Account: Is the representation within the system of a customer, providing all personal information about that particular customer and their bank accounts.
- Bank Account: Is a holding of money at a bank on behalf of a customer to which the customer may deposit or withdraw. Customers may have more than one bank account; conversely, one bank account may be held by more than one customer.
- Utility: Is a company that provides services to the customer for which the customer must pay. The utility is external both to the bank and the web-banking system. The system interacts with the utility to pay bills on behalf of a customer; specifically, the utility must provide a utility bank account (in which money will be deposited from the customer) and a utility account (so that the money is credited to the customer).

- Utility Account: Represents the customer to the utility. It is part of the utility, and its only interface to this system is a utility account number that is linked with the customer that is common to both the utility and the bank.
- Utility Bank Account: Is a bank account in any bank for which the utility is the customer.

Question 2 **Functional Requirements** [26 marks]

a) [3 marks]

- <<Include>> makes sense if we want to convey that this is a normal function (a natural outcome or extension) done every time when viewing upcoming payments, if the activity may be re-used elsewhere (avoiding duplication) or if extracting it out makes the use-cases easier to digest.
- <<Extend>> makes sense if we consider that cancelling seldom occurs or is exceptional (out of the ordinary). While cancelling is optional and does not occur very often, extend is a better fit.

b) [2 marks] Viewing transactions on bank accounts is not needed for the setup of bills or their payment. However, viewing the current balance would be important to allow the Web Customer to decide from which account to pay a bill (to avoid overdrafts). On the other hand, viewing transactions is a "comfort" to the Web Customer, a natural response being to want to check out whether a post-dated bill payment actually went through as scheduled. It allows the Web Customer to check up on things, thereby affording them more confidence in the system.

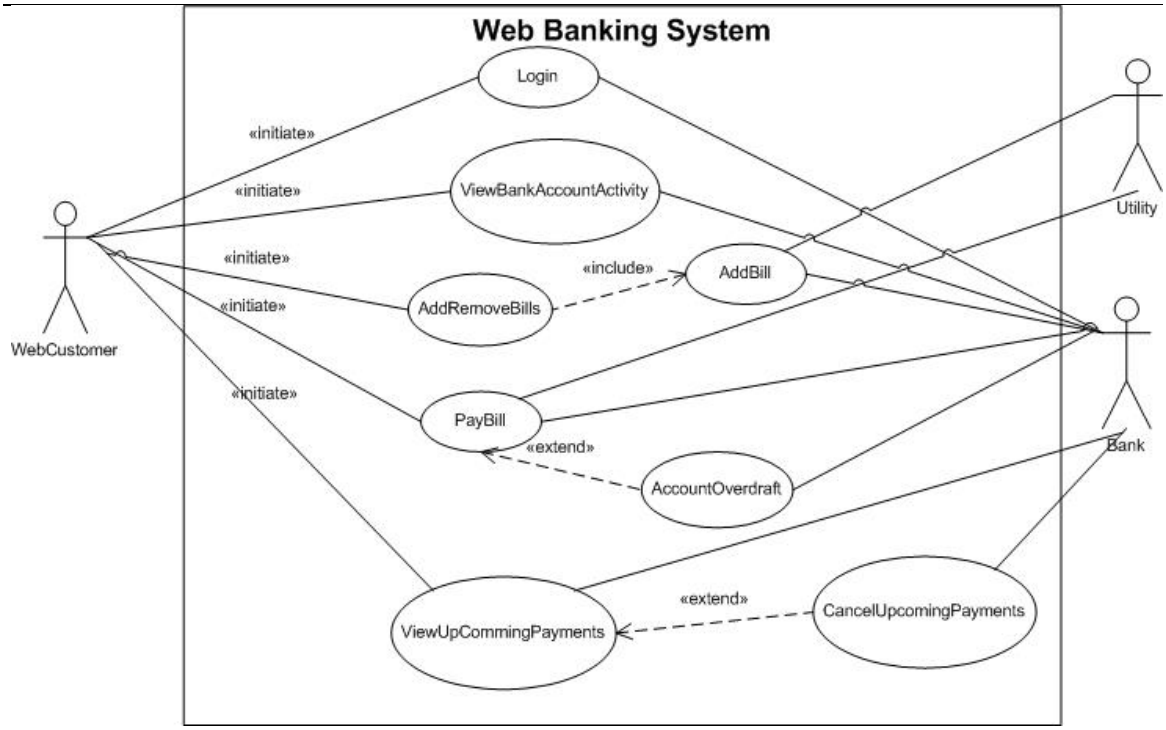
c) [5 marks] Complete and fix any errors on the use-case diagram to match the system description.

- Add relationship between:
  - Login and Bank (or WebAccountDB, if decided to maintain web accounts separately, with links between web accounts and customer accounts.)
  - AddRemoveBills and Bank
- Change direction of <<include>> arrows between AddRemoveBills and AddBill, and make it dashed, not solid
- Change relationship between PayBill and AccountOverdraft from <<include>> to <<extend>>.
- Fix the scope of the system to sync with the data definition of Bank

  Removed UtilityBank actor with relationship from PayBills : Bank already handles inter-bank transfers.

  Removed Timer actor and use-case PayPostdatedFunds.: Bank already handles automatic deductions.

The following use case diagram is the result of applying the changes discussed above:



d) [8 marks] Complete the use-descriptions given below.

Use Case Name	AddRemoveBills
Participating Actor(s)	Initiated by WebCustomer Communicates with Bank
Entry Condition	The WebCustomer is logged on and selects the "Add/Remove" option.
Flow of Events	1. The system displays the Add/Remove Page containing the list of all registered bills and the two options: Add or remove. 2. To remove, the Web Customer selects one or more of the registered bills and requests their removal. To add, the Web Customer selects the add option. 3. If a bill is to be removed, the system removes the selected bill(s) from the database of registered bills in the Bank. If a bill is to be added, the system adds the bill to the Bank: AddBill use-case is invoked. 4. The system displays a message informing the successful addition/removal of the bill(s) and updates the displayed list of registered bills. 5. If the Web Customer provides additional selections, the system performs each addition and removal in turn. 6. The Web Customer terminates (leaves) the add/remove page.
Exit Condition	The system displays the Account Summary Page

Exceptions	

Use Case Name	AddBill
Participating Actor(s)	Initiated by Web Customer Communicates with Utility, Bank
Entry Condition	The Web Customer wants to add a bill.
Flow of Events	1. The system requests the name of the utility for which the Web Customer wishes to pay bills. 2. The Web Customer supplies a name. 3. The system performs a search of known utility servers. If not found, the system displays a failure notice and re-prompts the web user for another name. 4. After finding the named utility's server, the system prompts the user for their utility account number. 5. The Web Customer enters their utility account number. 6. The system requests the Utility to confirm the existence of the given utility account number. If not found, the system displays a failure notice and re-prompts the web user to correct the account number. 7. The system adds the bill to the Bank, providing the utility and the utility account number.
Exit Condition	The Bank contains the new bill.
Exceptions	The user may cancel at any time, for instance if the utility server cannot be found or if the utility account number cannot be confirmed. The system returns to the Add/Remove Page.

e) [8 marks]

Use Case Name	ViewUpcomingPayments
Brief Description	The Web Customer is presented a summary of his upcoming payments
Precondition	The Web Customer is logged on and selects the “View Upcoming Payments” option.
Primary Actor	Web Customer
Secondary Actors	Bank
Dependencies	N/A
Basic Flow	1. The system requests the list of the Web Customer's upcoming payments from the Bank. 2. The system displays a list of upcoming payments with an option to cancel each one. 3. IF the Web Customer clicks cancel on one of the upcoming payments THEN EXTENDED BY USE CASE CancelUpcomingPayment ENDIF. 4. The Web Customer terminates (leaves) the View Upcoming Payments page. Post Condition: The system displays the Account Summary Page.
Specific Alternative Flow	RFS Basic Flow 1 1. The system displays an apology message. 2. ABORT. Post condition: The system displays the Account Summary Page. No changes to the Web Customer's account is made.
Global Alternative Flow	N/A
Bounded Alternative Flow	N/A

Use Case Name	CancelUpcomingPayment
Brief Description	The Web Customer cancels an upcoming payment
Precondition	The Web Customer is logged on and selects the “Cancel” option on an upcoming payment.
Primary Actor	Web Customer
Secondary Actors	Bank
Dependencies	Extends use case ViewUpcomingPayments
Basic Flow	1. The system prompts the Web Customer for cancellation of the upcoming payment. 2. The system requests the Bank cancel the upcoming payment 3. The system receives confirmation from the Bank of the cancellation. Post Condition: The system displays a confirmation message. The upcoming payment has been removed from the Bank.
Specific Alternative Flow	RFS Basic Flow 1 1. ABORT. Post Condition: The upcoming payment has not been cancelled. The system displays the Account Summary Page.
Specific Alternative Flow	RFS Basic Flow 3 1. The system displays an error message. 2. ABORT. Post Condition: The upcoming payment has not been cancelled. The system displays the Account Summary Page.
Global Alternative Flow	N/A
Bounded Alternative Flow	N/A

Question 3 [6 marks] **Nonfunctional Requirements**

a) [2 marks]
Non verifiable: No precise definition of "usable"
Verifiable
Verifiable, assuming sufficient resources
Non verifiable: No precise definition of "easily trained"

b) [4 marks]

Performance: The system should be capable of handling 300 simultaneously connect users and 1000 user interactions (events originating from user) per minute

Performance: When the user is connected over the minimal connection speed of 64 K, the system shall respond with complete responses to all inputs within 3 second at peak system load

Availability: The system has to be available 99.9 % of the time, with no period of down time exceeding 30 minutes.

Maintainability: The system shall provide consistent views for all major browsers that offer 128-bit encryption, including IE v6.x+, Netscape v4.7+ and Mozilla v1.4+.

Security: The system shall 128-bit encryption to communicate securely over the Internet.
Security: The system shall maintain logs of all transactions for an account for 7 years.

Usability: The system shall be navigable for the basic consumer user, requiring only standard knowledge of browsing menus.

Usability: The system shall provide on-line help for each operation, a beginning tutorial and contacts for both phone and email consultations.