Bank Management Application

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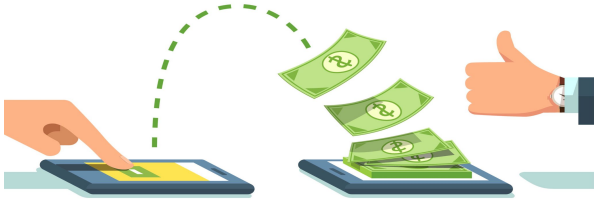
Introduction:

The role of bank management is multi-faceted and involves a wide range of responsibilities to ensure that the bank is running efficiently and effectively.Our basic idea behind the Bank Management Help Application is to perform the basic applications of a banking system such as:

1. Creation of account
2. Payment
3. Money Transactions
4. Viewing balance
5. Authorization and etc.

Withdrawing Money



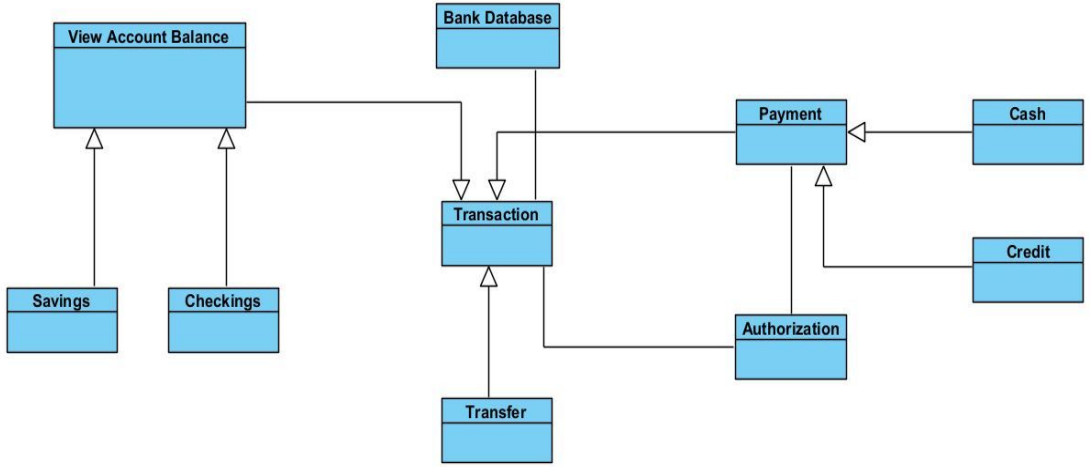
Bank Money Transfers

CHASE

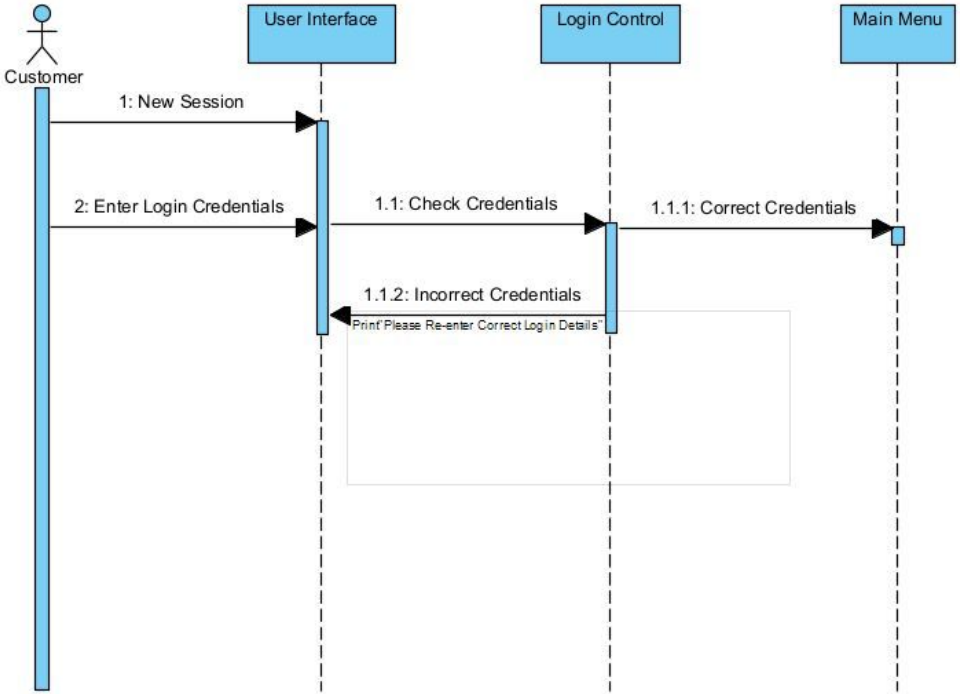
WELLS FARGO

Class Diagram:

As you can see from the class diagram below are user interface will consist of function where you can view the account balance depending on the type of account you have either savings or checking accounts. This then takes us to the transaction section from where you can either transfer money from one account to another or get payment in the form of cash or credit but before this is done the system needs to authorize the transaction based on the bank database

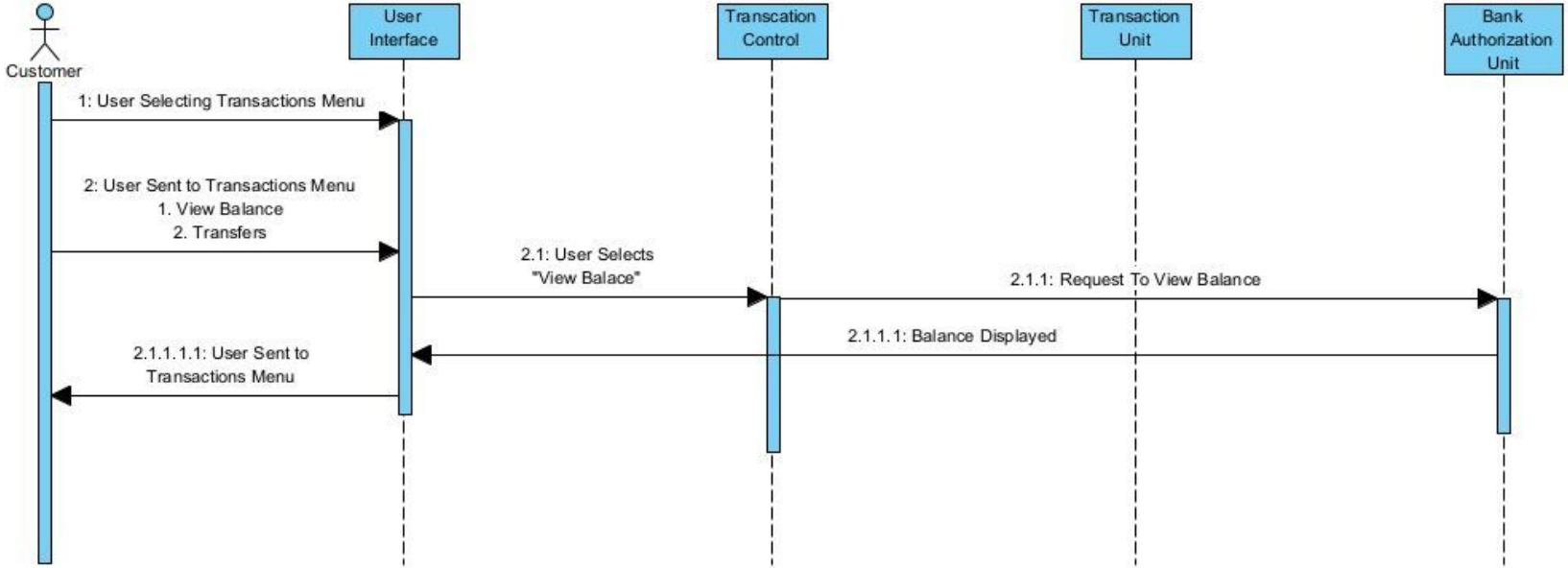


Sequence Diagrams:



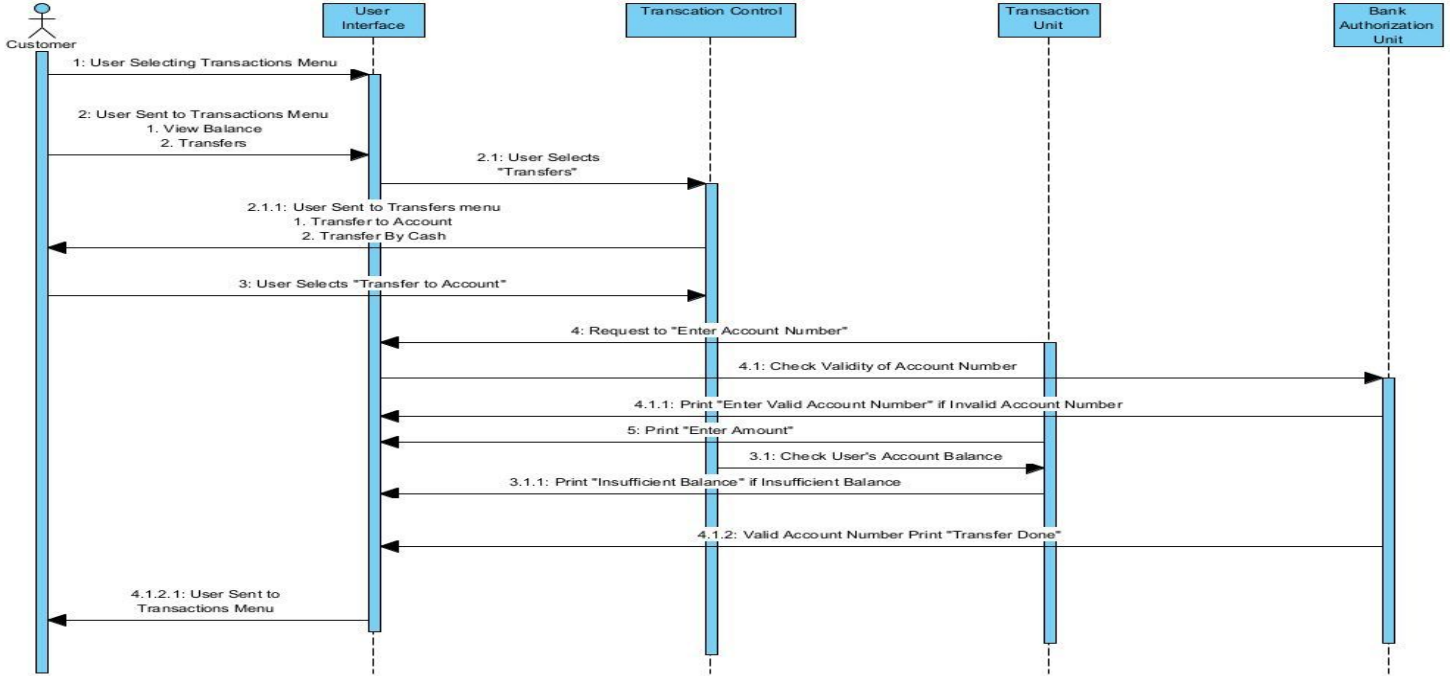
Sequence for Login

This diagram is the Sequence of how Login takes place. The Flow is where a new session is created for the user and the user enter their credentials which is they enter their account number and password. And the server verifies the credentials and the user is directed to the Main Menu if the credentials are correct. If the credentials are not correct it’s rerouted to Login page.



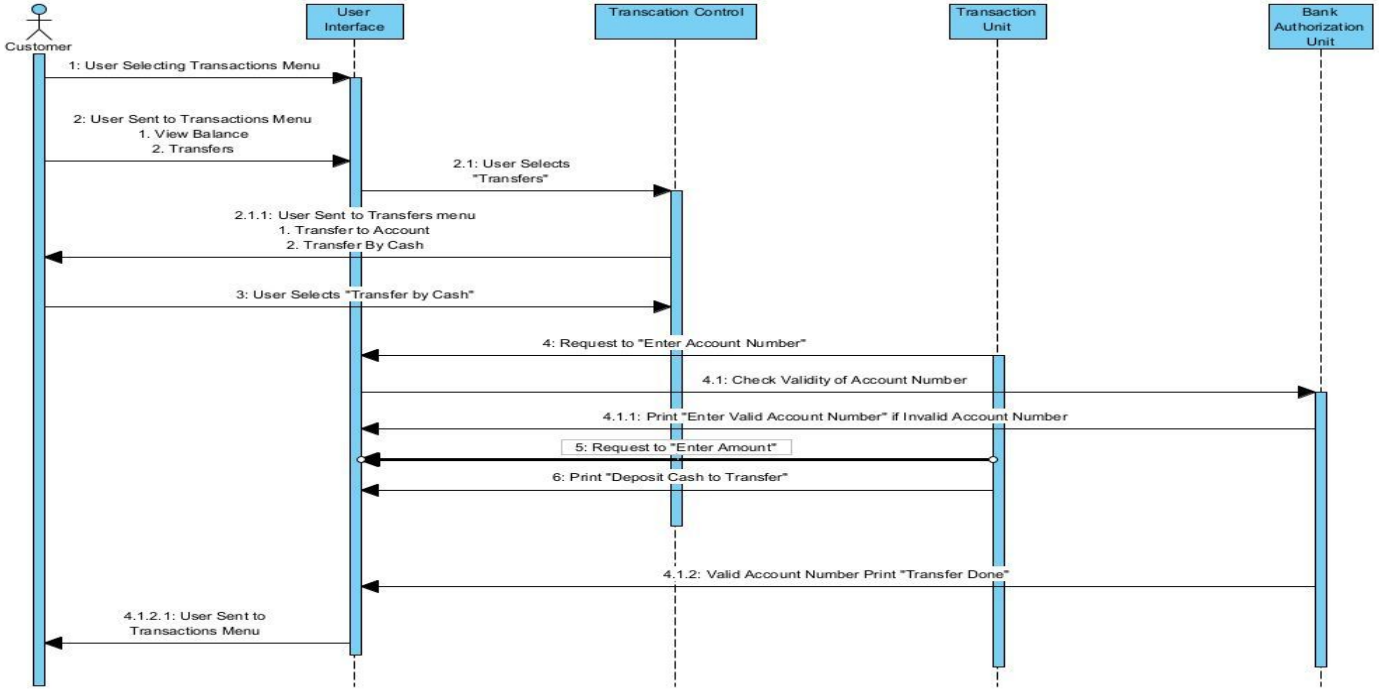
Sequence for Transactions-View Balance

This diagram is the sequence of Transaction menu and the sub part of View Balance. User Selects the Transactions menu and user is directed to Transactions menu which has two options 1. View Balance and 2.Transfers. When the user selects “View Balance”. Balance is retrieved from the server and displayed in the user screen.



Sequence for Transaction-Transfer by Account Number

This diagram is the sequence of Transaction menu and the sub part of Transfers. The Transfer option has two options which are 1.Transfer to Account and 2. Transfer by cash. The diagram displays the flow of Transfer to Account. User selects Transfer to Account. Where the user enters transferee’s account number and server verifies the account number if valid user enters the amount to be transferred if not user is prompted to enter valid account number and the server checks for the balance and the transfer is done if the balance is sufficient if not user is prompted with “Insufficient Balance”.



Sequence for Transactions-Transfer by Cash

This diagram is the sequence of Transaction menu and the sub part of Transfers. The Transfer option has two options which are 1.Transfer to Account and 2. Transfer by cash. The diagram displays the flow of Transfer to Account. User selects Transfer to Account. Where the user enters transferee’s account number and server verifies the account number if valid user enter the amount to be transferred and deposit the cash to be transferred if not user is prompted to enter valid account number. And the transfer is done.

Code Snippets

```cpp
void bankEnterScreen(tm* tPtr, int& opt)
{
    cout << "\n\n\n\t\t\t Date: " << (tPtr->tm_mday) << "/" << (tPtr->tm_mon) + 1 << "/" << (tPtr->tm_year) + 1900 << endl;
    cout << "\t\t\t Time: " << (tPtr->tm_hour) << ":" << (tPtr->tm_min) << endl;

    cout << "\t\t\t #########################################################################################################################" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t Cybertech's Bank Management Application\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t   Choose an option:\t\t\t\t\t\t          #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t    1) Enter Bank\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t    2) Enter ATM\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t    3) Admin Login\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t    4) Exit\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #" << "\t\t\t\t\t\t\t\t\t\t\t\t\t\t\t  #" << endl;
    cout << "\t\t\t #########################################################################################################################" << endl;
    cout << "\t\t\t Enter Option: ", cin >> opt, cout << endl;
}
```

Main UI Interface

```
void enqueue()
{
    withdrawDepositNode* temp = new withdrawDepositNode();

    int opt = 0;
    string flag = "";

    cout << "\t\t\t\t Kindly choose from the following two options: 1) Withdraw Cash (cheque) or 2) Deposit Cash -> ";
    cin >> opt;

    if (opt == 1)
    {
        temp->withdrawCash = true;
        temp->depositCash = false;
        flag = "Withdraw Cash";
    }
    else if (opt == 2)
    {
        temp->depositCash = true;
        temp->withdrawCash = false;
        flag = "Deposit Cash";
    }
    else
    {
        cout << "\t\t\t\t Wrong option entered, press any key to return to menu." << endl;
        _getch();
        return;
    }

    char confirmation;

    cout << "\t\t\t\t Kindly write down the 10 digit Account Number -> ";
    cin >> temp->accountNumber;
    cout << "\t\t\t\t Kindly write down the cash amount -> ";
    cin >> temp->cashAmount;
    cout << "\t\t\t\t----------" << endl;
    cout << "\t\t\t\tAccount#: " << temp->accountNumber << endl;
    cout << "\t\t\t\tCash: " << temp->cashAmount << endl;
    cout << "\t\t\t\tTransaction Type: " << flag << endl;
    cout << "\t\t\t\t----------" << endl;
    cout << "\t\t\t\t Press 'Y' to confirm, or 'N' to exit" << endl;
    cout << "\t\t\t\t ", cin >> confirmation;
    temp->next = NULL;

    if (confirmation == 'y' || confirmation == 'Y')
    {
        if (isEmpty())
        {
            temp->prev = NULL;
            front = rear = temp;
            cout << "\t\t\t\t Transaction Completed." << endl;
        }
        else
        {
            temp->prev = rear;
            rear->next = temp;
            rear = temp;
            cout << "\t\t\t\t Transaction Completed." << endl;
        }
    }
    else if (confirmation == 'n' || confirmation == 'N')
    {
        temp = NULL;
        cout << "\t\t\t\t Transaction not Completed." << endl;
    }
    else
    {
        cout << "\t\t\t\t ERROR ERROR ERROR!!! Wrong input entered, transaction failed!" << endl;
        temp = NULL;
    }

    cout << "\t\t\t\t Press any key to return to Bank Menu" << endl;
    _getch();
}
```

Enqueue

This code defines the function enqueue(), which adds a new node to the end of a linked list. The linked list represents a bank queue for customers who want to deposit or withdraw cash.

The function starts by creating a new withdrawDepositNode object, which contains information about the transaction, such as the account number, cash amount, and transaction type.

```
void dequeue()
{
    withdrawDepositNode* temp = front;

    if (isEmpty())
    {
        cout << "\t\t\t\t Withdraw/Deposit Queue is empty, nothing left to process" << endl;
        cout << "\t\t\t\t Press any key to return to Bank Menu" << endl;
        _getch();
        return;
    }
    else if (front == rear)
    {
        cout << "\t\t\t\t----------" << endl;
        cout << "\t\t\t\t " << temp->accountNumber << endl;
        cout << "\t\t\t\t " << temp->cashAmount << endl;
        cout << "\t\t\t\t----------" << endl;
        cout << "\t\t\t\t Transaction has been done." << endl;
        front = rear = NULL;
    }
    else
    {
        front = front->next;
        cout << "\t\t\t\t----------" << endl;
        cout << "\t\t\t\t " << temp->accountNumber << endl;
        cout << "\t\t\t\t " << temp->cashAmount << endl;
        cout << "\t\t\t\t----------" << endl;
        cout << "\t\t\t\t Transaction has been done." << endl;
    }
    delete temp;
    cout << "\t\t\t\t Press any key to return to Bank Menu" << endl;
    _getch();
}
```

Dequeue

This code implements a queue data structure for a banking system that can handle withdrawal and deposit transactions. The enqueue() function is used to add a transaction to the back of the queue and the dequeue() function is used to remove the transaction from the front of the queue. The displayWithdrawDepositQueue() function is used to display all transactions currently in the queue.

```
}
void processAccounts()
{
    newAccountNode* temp = head;

    if (head == NULL)
    {
        cout << "\t\t\t\t Account Database is empty" << endl;
        cout << "\t\t\t\t Press any key to return to Bank Menu" << endl;
        _getch();
        return;
    }

    int count = 1;
    int opt;

    while (temp != NULL)
    {
        if (temp->accountStatus == "In Process")
        {
            cout << "\t\t\t\t---------- #" << count++ << " ----------" << endl;
            cout << "\t\t\t\t----------" << endl;
            cout << "\t\t\t\tFirst Name: " << temp->firstName << endl;
            cout << "\t\t\t\tLast Name: " << temp->lastName << endl;
            cout << "\t\t\t\tCNIC: " << temp->CNIC << endl;
            cout << "\t\t\t\t ---Address--- " << endl;
            temp->homeAddress.displayAddress();
            cout << "\t\t\t\t ----------" << endl;
            cout << "\t\t\t\tUsername: " << temp->username << endl;
            cout << "\t\t\t\tPassword: " << temp->password << endl;
            cout << "\t\t\t\t---------- #" << count << " ----------" << endl << endl;
            cout << "\t\t\t\t Do you want to process this account or not? Yes(1) No(0)" << endl;
            cin >> opt;

            if (opt == 1)
            {
                temp->accountStatus = "Completed";
                temp->accountNumber = generateAccountNumber();
            }
            else if (opt == 0)
            {
                temp->accountStatus == "Declined";
            }
            else
            {
                cout << "\t\t\t\t Wrong option entered, account not completed nor declined." << endl;
            }
        }
        temp = temp->next;
    }
    cout << "\t\t\t\t Press any key to return to Bank Menu" << endl;
    _getch();
}
```

Account Processing

This code implements a queue data structure for a banking system that can handle withdrawal and deposit transactions. The enqueue() function is used to add a transaction to the back of the queue and the dequeue() function is used to remove the transaction from the front of the queue. The displayWithdrawDepositQueue() function is used to display all transactions currently in the queue.

```
class bankAccountsDatabase
{
public:
    newAccountNode* head, * tail;

public:
    bankAccountsDatabase()
    {
        head = tail = NULL;
    }
    void insertNewAccount()
    {
        newAccountNode* temp = new newAccountNode();

        char confirmation;
        int debitCardOpt = 0;
        int chequeBookOpt = 0;
        time_t t = time(NULL);
        tm* tPtr = localtime(&t);

        cout << "\t\t\t\t Kindly write down your First Name -> ";
        cin >> temp->firstName;
        cout << "\t\t\t\t Kindly write down your Last Name -> ";
        cin >> temp->lastName;
        cout << "\t\t\t\t Kindly write down your Email Address -> ";
        cin >> temp->emailAddress;
        cout << "\t\t\t\t Kindly write down your Home Address -> " << endl;
        temp->homeAddress.setAddress();
        cout << "\t\t\t\t Kindly write down your Phone Number -> ";
        cin >> temp->phoneNumber;
        cout << "\t\t\t\t Kindly write down your CNIC -> ";
        cin >> temp->CNIC;
        cout << "\t\t\t\t Do you want to get a Debit Card: write Yes(1) or No(0)-> ";
        cin >> debitCardOpt;

        if (debitCardOpt == 1)
        {
            temp->debitCard = true;
            cout << "\t\t\t\t Kindly write down your Debit Card PIN (4 Digits) -> ";
            cin >> temp->debitCardPin;
        }
        else if (debitCardOpt == 0)
        {
            temp->debitCard = false;
            temp->debitCardPin = 0;
            cout << "\t\t\t\t Debit card is set as No(0)" << endl;
        }
        else
        {
            temp->debitCard = false;
            temp->debitCardPin = 0;
            cout << "\t\t\t\t Invalid Option entered, debit card is set as No(N)" << endl;
        }

        cout << "\t\t\t\t Do you want to get a ChequeBook: write Yes(1) or No(0)-> ";
        cin >> chequeBookOpt;
        if (chequeBookOpt == 1)
        {
            temp->chequeBook = true;
        }
        else if (chequeBookOpt == 0)
        {
            temp->chequeBook = false;
        }
        else
        {
            cout << "\t\t\t\t Invalid Option entered, cheque book is set as No(N)" << endl;
        }
```

Database

This code seems to be a part of a larger program for managing bank accounts. The class `bankAccountsDatabase` represents a database of bank accounts and has a `newAccountNode` as a nested class that represents a node of the linked list that will hold the bank accounts.

After initializing the node, the function prints out the details of the new account and prompts the user to confirm the details. If the user confirms, the function adds the new node to the linked list. If the linked list is empty, the new node becomes the head of the list.

OOPS Concepts Used in the Code:

Encapsulation -

billPaymentQueue,payBillNode,withdrawDepositQueue,newAccountNode,BankQueue

The code uses classes to encapsulate related functions and data together, such as the BankQueue class and the Address class.he code defines two classes, billPaymentQueue and withdrawDepositQueue, which encapsulate the properties and behavior of a queue for bill payments and withdraw/deposit transactions, respectively.

```
12  struct payBillNode
13  {
14      string billType;
15      long billInvoiceNumber;
16      long double billAmount;
17
18
19
20      payBillNode* next;
21      payBillNode* prev;
22  };
```

```
24  class billPaymentQueue
25  {
26  private:
27      payBillNode* front;
28      payBillNode* rear;
29  public:
30      billPaymentQueue()
31      {
32          front = rear = NULL;
33      }
34      bool isEmpty()
35      {
36          if (rear == NULL && front == NULL)
37          {
38              return true;
39          }
40          else
41          {
42              return false;
43          }
44      }
```

```
180 class withdrawDepositQueue
181 {
182 private:
183     withdrawDepositNode* front;
184     withdrawDepositNode* rear;
185 public:
186     withdrawDepositQueue()
187     {
188         front = rear = NULL;
189     }
190     bool isEmpty()
191     {
192         if (rear == NULL && front == NULL)
193         {
194             return true;
195         }
196         else
197         {
198             return false;
199         }
200     }
```

OOPS Concepts Used in the Code

Inheritance : billPaymentQueue and bankAccountsDatabase are in a parent and child relationship, where billPaymentQueue inherits functions and data from bankAccountsDatabase. Its a single inheritance. In single inheritance, a class is allowed to inherit from only one class. i.e. one subclass is inherited by one base class only.

```
class billPaymentQueue : public bankAccountsDatabase
{
private:
    payBillNode* front;
    payBillNode* rear;
public:
    billPaymentQueue()
    {
        front = rear = NULL;
    }
    bool isEmpty()
    {
        if (rear == NULL && front == NULL)
        {
            return true;
        }
        else
        {
            return false;
```

OOPS Concepts Used in the Code

Polymorphism - isEmpty()(uses function overloading)

The code does not explicitly use polymorphism, but it does use function overloading, which is a form of polymorphism. For example, the isEmpty() function is overloaded in both the billPaymentQueue and withdrawDepositQueue classes to provide different behavior based on the queue type.

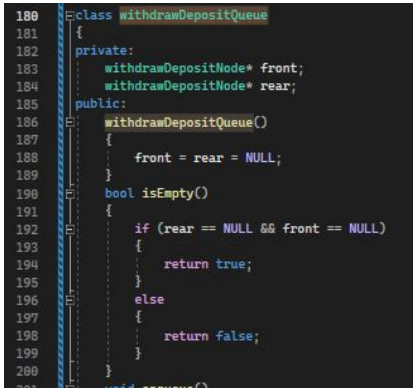
```
34      bool isEmpty()
35      {
36          if (rear == NULL && front == NULL)
37          {
38              return true;
39          }
40          else
41          {
42              return false;
43          }
44      }
```

```
if (isEmpty())
{
    cout << "\t\t\t\t Bill Payment Queue is empty, nothing left to process" << endl;
    cout << "\t\t\t\t Press any key to return to Bank Menu" << endl;
    _getch();
    return;
}
```

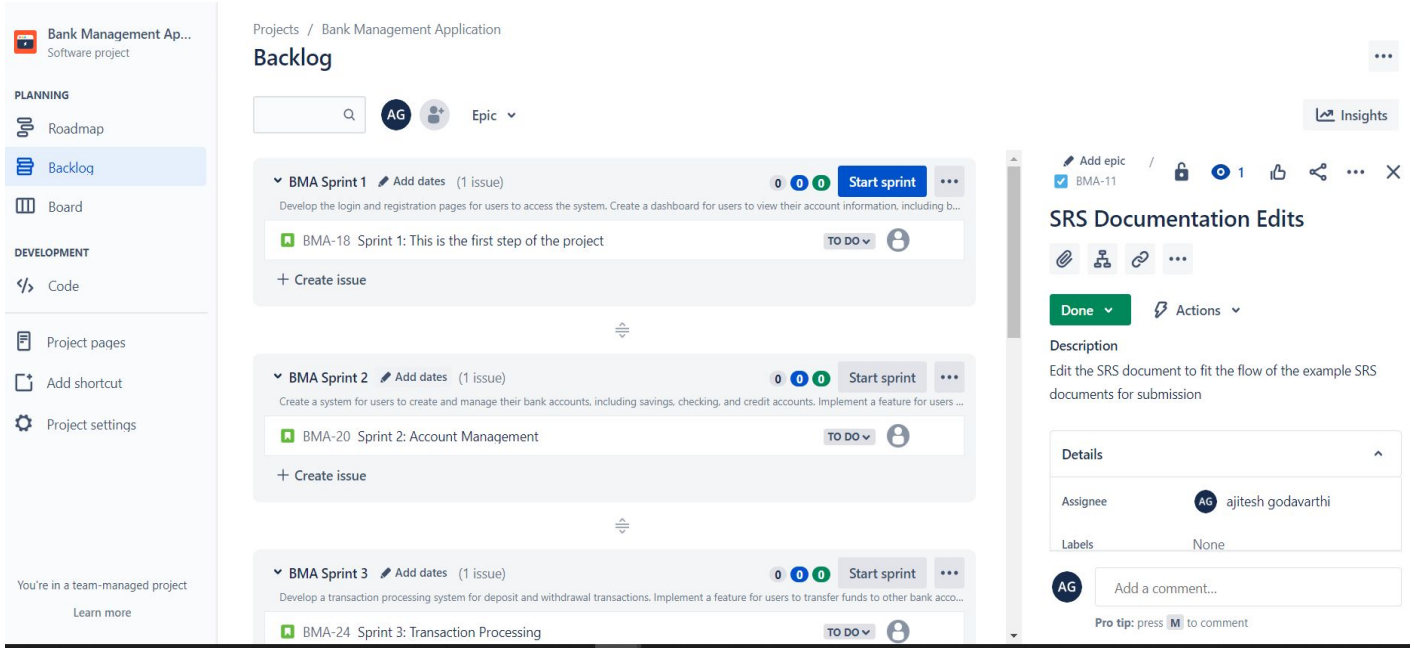
OOPS Concepts Used in the Code

Abstraction - billPaymentQueue,withdrawDepositQueue,newAccountNode,BankMenu,enqueue(),dequeue()

The code creates instances of the billPaymentQueue and withdrawDepositQueue classes using the new keyword to allocate memory dynamically. The instances are then manipulated using member functions, such as enqueue() and dequeue(), to perform operations on the queues.



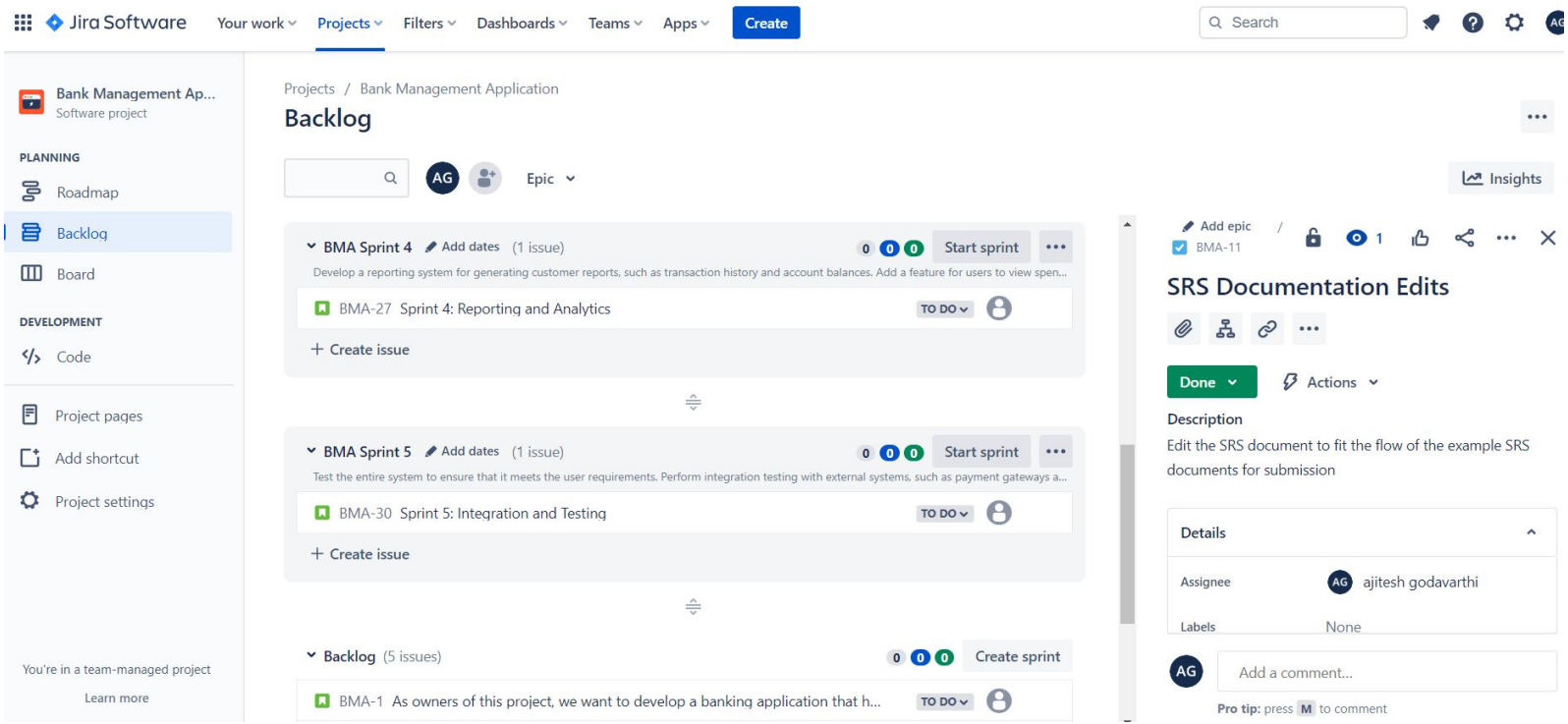
JIRA Snippets



Sprint 1: First step of project

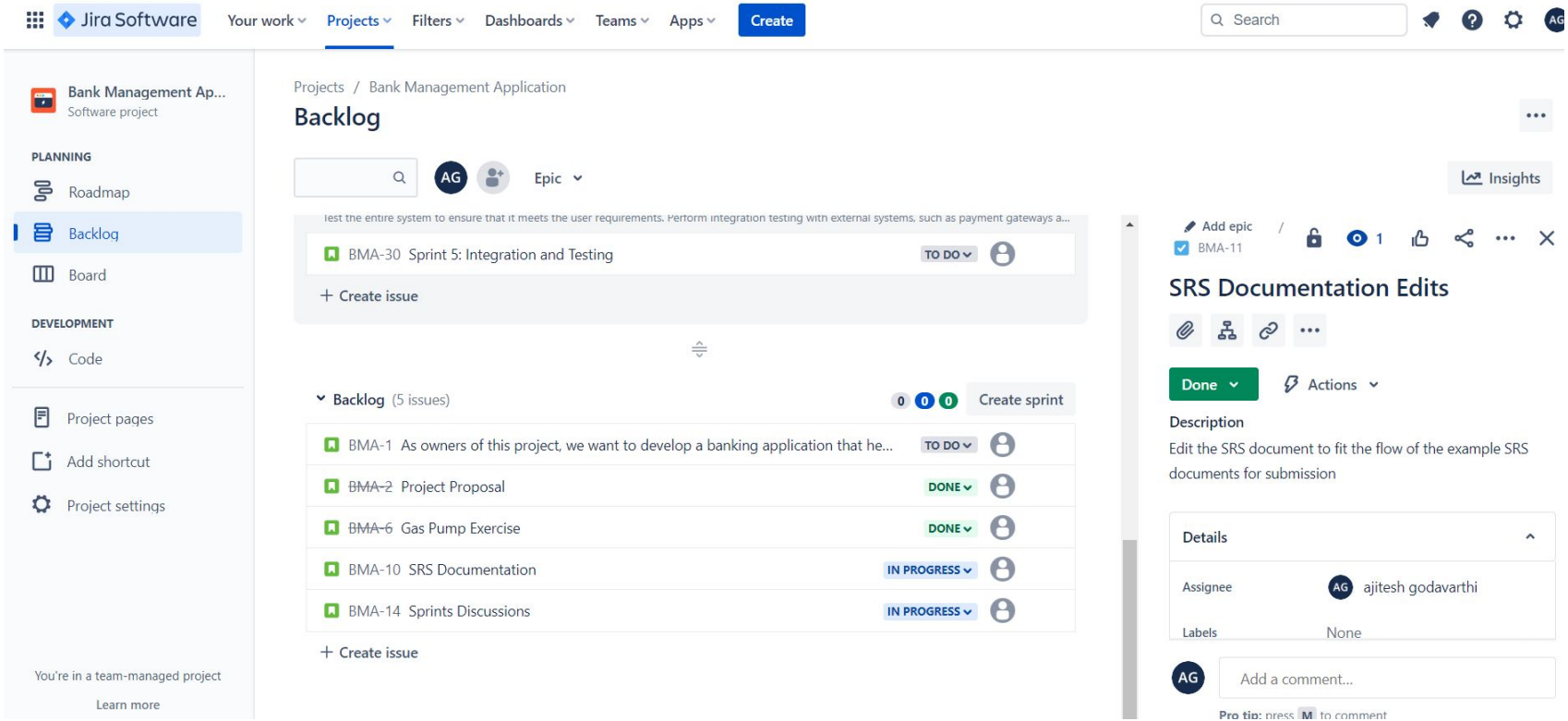
Sprint 2: Account Management

Sprint 3: Transaction Processing

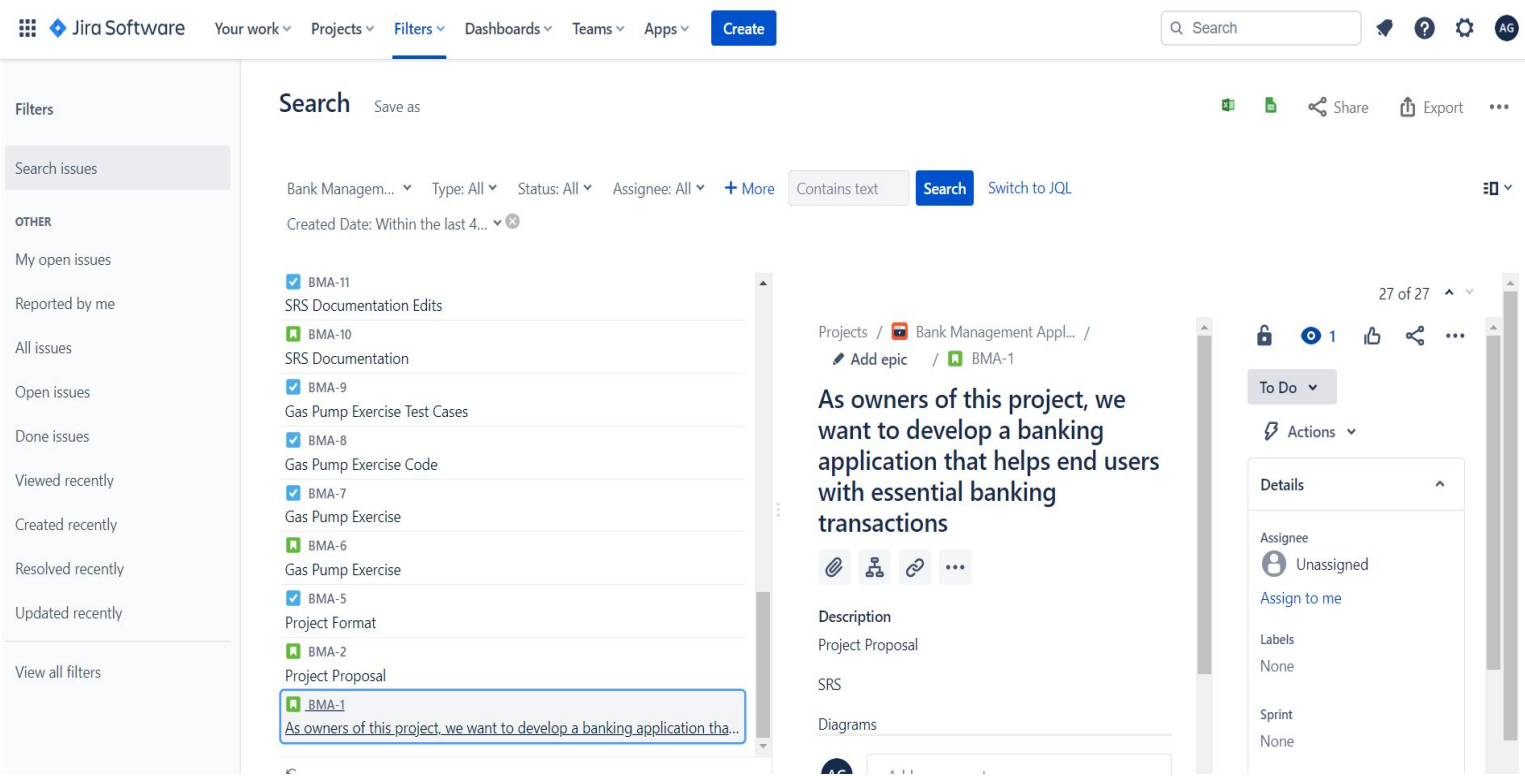


Sprint 4: Reporting and Analytics

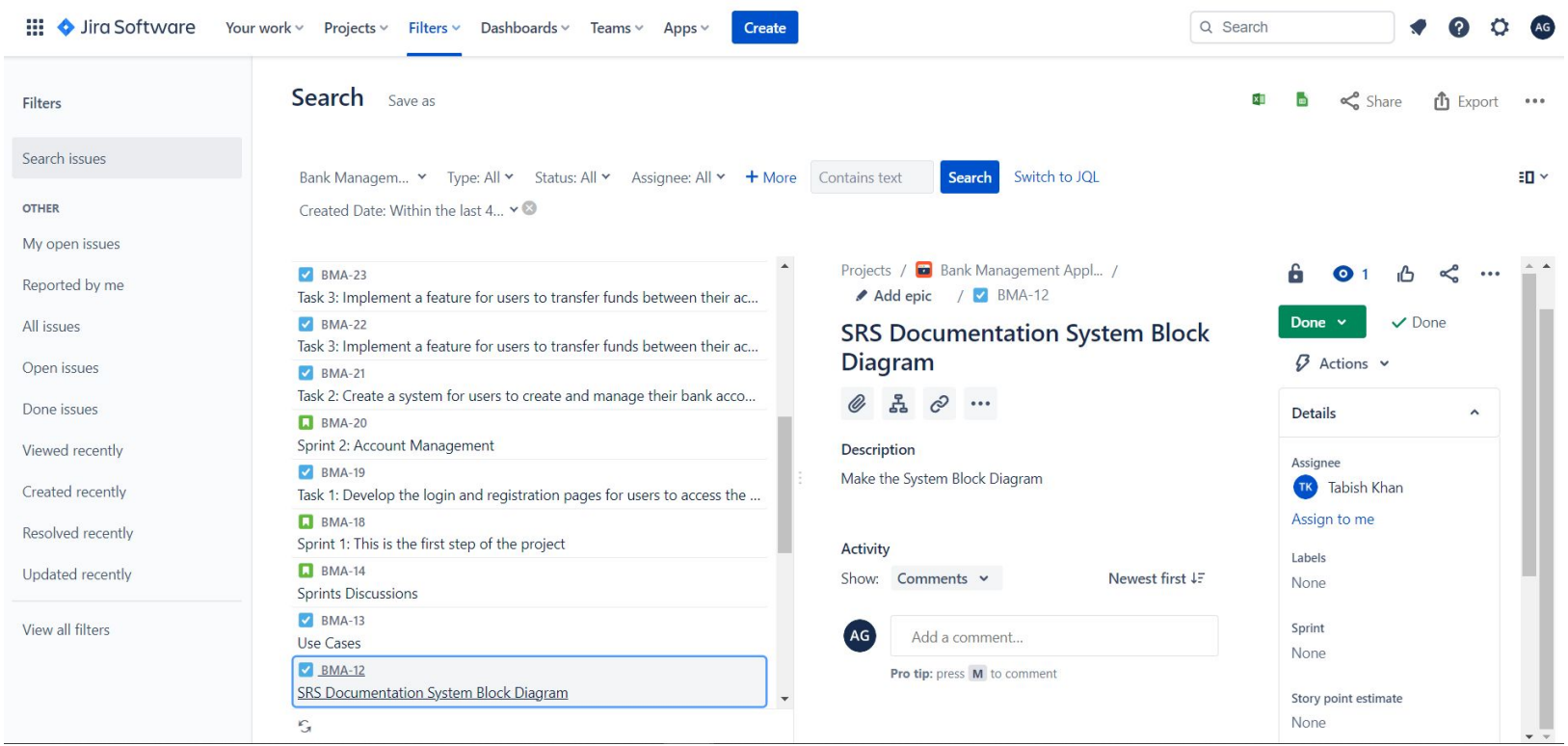
Sprint 5: Integration and Testing



Other Stories



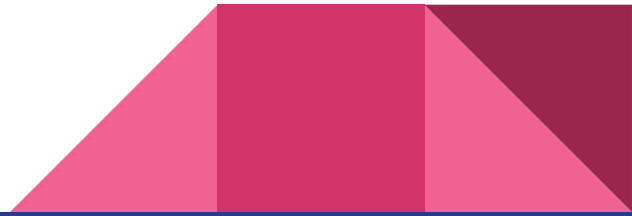
Stories and Tasks in order

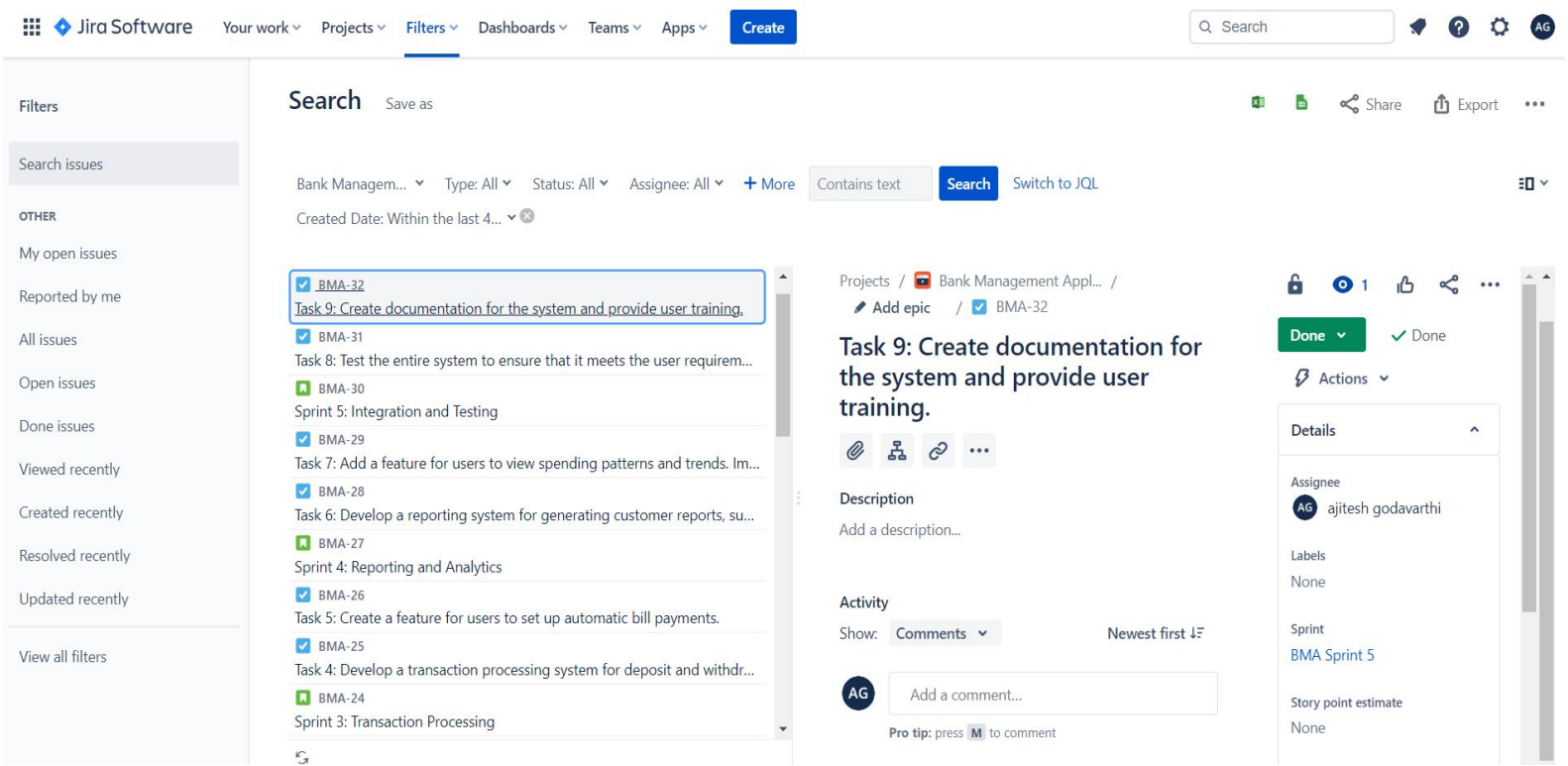


Sprint 1: Task 1: Develop the login and registration pages for users to access the system. Create a dashboard for users to view their account information

Sprint 2: Task 2: Create a system for users to create and manage their bank accounts, including savings, checking, and credit accounts.

Sprint 2: Task 3: Implement a feature for users to transfer funds between their accounts. Add the ability for users to view and download their account statements.





Sprint 3: Task 4: Develop a transaction processing system for deposit and withdrawal transactions. Implement a feature for users to transfer funds to other bank accounts.

Sprint 3: Task 5: Create a feature for users to set up automatic bill payments.

Sprint 4: Task 6: Develop a reporting system for generating customer reports, such as transaction history and account balances.

Sprint 4: Task 7: Add a feature for users to view spending patterns and trends. Implement a system for detecting fraud and suspicious activity.

Sprint 5: Task 8: Test the entire system to ensure that it meets the user requirements. Perform integration testing with external systems, such as payment gateways and credit bureaus.

Sprint 5: Task 9: Create documentation for the system and provide user training.

Any Questions?