

# THT LOANS AND SHAREHOLDER MANAGEMENT SYSTEM

## REQUIREMENTS DOCUMENT

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### Main functional requirements

#### Shareholders & interests

| Requirement   | Status |
|---|--------|
| RQ 001. The system should allow the user to register shareholders.                                      |        |
| RQ 002. The system should allow the user to toggle (activate/deactivate) the shareholder.               |        |
| RQ 003. The system should allow the user to record shareholders (monthly) deposits.                     |        |
| RQ 004. The system should be able to calculate shareholder monthly interests based on the monthly rate. |        |
| RQ 005. The system should allow the user to view interests.   |        |
| RQ 006. The system should allow the user to claim interests.  |        |
| RQ 007. The system should allow the user to approve interest claims.                                    |        |
| RQ 008. The system should allow the user to pay interests.  |        |

#### Loan management

| Requirement  | Status |
|--|--------|
| RQ 009. The system should allow the user to record shareholders/customer loans.  |        |
| RQ 010. The system should allow the user (specific personal) to approve loans.   |        |
| RQ 011. The system should allow the user to mark a loan as paid/deposited.   |        |
| RQ 012. <b>Topping up (upcoming)</b> - (Top up: start new loan, full repayment of existing, without interest), (top up rate) |        |
| RQ 013. The system should be able to generate repayment schedule for a paid loan.  |        |
| RQ 014. The system should allow downloading of the approved & paid loan detail document (as specified).                      |        |
| RQ 015. The system should allow the downloading of the repayment schedule after loan depositing.                             |        |

#### Repayment management

| Requirement   | Status |
|---|--------|
| RQ 016. The system should allow the user to record repayments.                            |        |
| RQ 017. The system should be able to calculate and apply penalties on delayed repayments. |        |
| RQ 018. The system should allow loan full/partial prepayment.                             |        |

#### Reporting

| Requirement  | Status |
|--|--------|
| RQ 019. The system should be able to generate reports on loans activities, shareholder shares and interests. |        |
| RQ 020. The system should allow the user to view reports.  |        |

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| <b>RQ 021.</b> The system should allow the user to download reports. |  |
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## Requirement cards

| Requirements   | Business logic   |
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| <b>RQ 001.</b> The system should allow the user to register shareholders.                        | <ul style="list-style-type: none"><li>• Shareholders are registered with normal KYC (like any customer).</li><li>• Apart from the normal KYC, shareholder specific information: the initial capital and the resulting number of shares are also recorded.</li><li>• The user account information is recorded to allow logging in to the system.</li><li>• The number of shares is calculated based on the initial capital and the share value (recorded by the company).<br/><math>(NS=IC/SV)</math><ul style="list-style-type: none"><li>-NS: Number of shares</li><li>-IC: Initial capital</li><li>-SV: Share value</li></ul></li><li>• A share value is an amount of money assigned to each unit of share ownership and will be calculated and recorded in the system by the company.</li></ul> |
| <b>RQ 002.</b> The system should allow the user to toggle (activate/deactivate) the shareholder. | <ul style="list-style-type: none"><li>• The shareholder should also have a status to mention if one is active or not active depending on decision made by competitive personals in the company.</li><li>• On toggling between "activate" and "deactivate", the user account should be affected accordingly.</li></ul>  |
| <b>RQ 003.</b> The system should allow the user to record shareholders (monthly) deposits.       | <ul style="list-style-type: none"><li>• Upon recording deposits details, a bank deposit (or any payment) reference document must also be uploaded.</li><li>• A unique reference number for each deposit should be generated using a specific pattern and recorded.</li></ul>   |

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|   | <ul style="list-style-type: none"> <li>• With that reference number, a debit record (with the payment document) should also be added on the cashbook transactions.</li> <li>• A deposit official reference document should be generated and downloaded by the system.</li> </ul>   |
| <b>RQ 004.</b> The system should be able to calculate shareholder deposit monthly interest based on the monthly rate. | <ul style="list-style-type: none"> <li>• The shareholder may also receive a monthly interest on deposits based on the monthly interest rate recorded and updated in the system by the company.</li> <li>• The system fetches the last paid claim date and time (LCDT) for the deposit. If the deposit is fresh, then the LCDT is equal to the deposit date and time (DDT): <math>LCDT=DDT</math>.</li> <li>• The system computes the claimable months (CMs) using the LCDT and the current date and time (CDT).<br/> <math>CMs=(YEAR(CDT)-YEAR(LCDT))*12+(MONTH(CDT)-MONTH(LCDT))</math><br/>           Ensuring no incomplete month is considered<br/>           if <math>DAY(CDT)&lt;DAY(LCDT)</math>, <math>CMs=CMs-1</math><br/>           Ensuring no negative values:<br/> <math>CMs=MAX(CMs,0)</math>.</li> <li>• The system computes total deposit interest (TDI) using the deposit amount (DA), the monthly interest rate (MIR) and the claimable months (CMs).<br/> <math>TDI=((DA*MIR)/100)*CMs</math></li> </ul> |
| <b>RQ 005.</b> The system should allow the user to view total interests.  | <ul style="list-style-type: none"> <li>• The system repeats the computation of deposit interests (see RQ 004) for all shareholder deposits while summing up to produce total interests.</li> <li>• The system outputs the total interest and the detail list of resulted monthly interests.</li> </ul>   |
| <b>RQ 006.</b> The system should allow the user to claim interests.   | <ul style="list-style-type: none"> <li>• Upon claiming an interest on a deposit, a unique reference number for that claim is generated using a specific pattern.</li> <li>• The system calculates the interest amount (see RQ 004)</li> </ul>  |

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|   | <ul style="list-style-type: none"> <li>• An interest claim record is kept (with the date of the claim, the generated reference and the interest amount).</li> <li>• Upon claiming all interests, the system repeats the same process for all claimable interests (throughout the shareholder deposits).</li> </ul>  |
| <b>RQ 007.</b> The system should allow the user to approve interest claims. | <ul style="list-style-type: none"> <li>• A competent personal should be allowed to approve interest claims.</li> <li>• Upon approving a claim, all involved interest claims are marked as “approved”.</li> <li>• The approval date and time is kept.</li> </ul>   |
| <b>RQ 008.</b> The system should allow the user to pay interests.           | <ul style="list-style-type: none"> <li>• A competent personal should be allowed to pay approved interest claims.</li> <li>• All approved interest claims are payable.</li> <li>• Upon paying an approved interest claim, the payment reference document should be uploaded.</li> <li>• The claim is marked as “paid”.</li> <li>• The payment date and time is recorded.</li> <li>• A credit cashbook record is kept with the claim reference number and the payment reference document.</li> <li>• Upon paying the total shareholder interest, the system repeats the same process for all related deposits interest claims.</li> <li>• An official payment summary document is generated and a download is triggered automatically.</li> </ul> |

## Loan management

| Requirements   | Business logic   |
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| <b>RQ 009.</b> The system should allow the user to record shareholders/customer loans. | <ul style="list-style-type: none"> <li>• Shareholders as well as customers can both apply for a loan.</li> <li>• The system should not allow concurrent loans for the customer identified with NIN.</li> </ul> |

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|   | <ul style="list-style-type: none"> <li>• Upon starting a new application, the system should check if the customer already has an active loan.</li> <li>• After active loan detection, an option for full prepayment of the initial loan should be proposed. See RQ 019</li> <li>• Upon filling loan details, non-mandatory attachment of required documents should be allowed.</li> <li>• Upon submitting an application, a unique reference number should be generated.</li> <li>• The processing fee should be calculated and recorded.</li> <li>• A loan application record is kept with status “new”.</li> </ul>   |
| <b>RQ 010.</b> The system should allow the user (specific personal) to approve loans. | <ul style="list-style-type: none"> <li>• A loan is only paid after loan application approval by a competent personal in the company.</li> <li>• A record for the approver, the approval date and time is kept.</li> <li>• A loan application status changes to “approved”.</li> </ul>  |
| <b>RQ 011.</b> The system should allow the user to mark a loan as paid/deposited.     | <ul style="list-style-type: none"> <li>• A competent personal should deposit funds on the customer bank account.</li> <li>• Upon marking a loan as “paid”, customer bank account details (account number, holder names) and payment date and time (as on the payment reference document) should be required.</li> <li>• The system gathers information for confirmation prompt.</li> <li>• A payment reference document (ex: pay-in-slip) should be required.</li> <li>• After confirmation, a repayment schedule should be generated. (See RQ 013).</li> <li>• A full repayment due date and time is picked from the repayment schedule.</li> <li>• A payer, and repayment due date &amp; time record is kept.</li> <li>• The loan status changes to “paid”.</li> <li>• A credit transaction details with the reference document are kept in the cashbook records.</li> </ul> |

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|  | <ul style="list-style-type: none"> <li>The download of official documents (loan summary &amp; repayment schedule) should automatically be triggered. See RQ 014, RQ 015</li> </ul>  |
| <b>RQ 012.</b> The system should allow the user to top up an existing loan.              | <ul style="list-style-type: none"> <li>The system computes the repayment completion rate (RCR).<br/> <math>RCR = (NPR * 100) / TNR</math><br/>           NPR = number of paid repayment dues<br/>           TNR = total number of repayment dues</li> <li>The system continues only if the repayment completion rate (RCR) is greater than or equal to the TR (topping up rate) <math>RCR \geq TR</math>.</li> <li>For topping up retaining the same tenure (loan duration), The system updates the repayment schedule, adds the topping up amount to the loan balance and propagates recalculations from that offset to the end of the repayment schedule.</li> <li>For topping up with tenure (loan duration) extension, the loan balance at that offset is increased and the repayment schedule is continued (with the same repayment amount) until the loan balance is exhausted (is 0).</li> <li>For both cases, the customer loan statement balance is increased (a debit record may be required for auditability) and the flow of repayments follows the new schedule and the new balance.</li> <li>A credit record for additional (top up) amount is kept in the cashbook (requiring the payment reference document as usual).</li> <li>The customer loan details are updated accordingly.</li> <li>The new loan summary document and the repayment schedule document downloading is automatically triggered (see RQ 014, RQ 015).</li> </ul> |
| <b>RQ 013.</b> The system should be able to generate repayment schedule for a paid loan. | <ul style="list-style-type: none"> <li>The system performs the generation of the repayment schedule using the reducing balance (amortization) method.<br/> <math>GF = (1 + IR)^{LDU}</math><br/> <math>LB = LA</math> (initialized for first installment only)<br/> <math>RDT = CDT</math> (initialized for first installment only)</li> </ul>  |

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|   | $RA = (LB * (IR * GF)) / GF - 1$ $IA = LB * IR$ $RP = RA - IA$ $LB = LB - RP$ $RDT = RDT + RF$ <p>Carry RDT, LB (for next installment)</p> <p>GF=growth factor<br/> LB=loan balance<br/> LA=loan amount<br/> RDT=repayment date and time<br/> CDT=current date and time<br/> RA= repayment amount (installment)<br/> IA=interest amount.<br/> IR=interest rate (per repayment frequency).<br/> RP=repayment principal (without interest).<br/> RF=repayment frequency.</p> <ul style="list-style-type: none"> <li>The system repeats the same process LDU times while recording each step in the database.</li> </ul> |
| <b>RQ 014.</b> The system should allow downloading of the loan summary document.  | <ul style="list-style-type: none"> <li>The system collects required information and generates a PDF/Excel document.</li> </ul>  |
| <b>RQ 015.</b> The system should allow the downloading of the repayment schedule. | <ul style="list-style-type: none"> <li>The system collects required information and generates a PDF/Excel document.</li> </ul>  |

### Repayment management

| Requirements  | Business logic   |
|---|--|
| <b>RQ 016.</b> The system should allow the user to record repayments. | <ul style="list-style-type: none"> <li>Upon recording a repayment, the payment date as on (the pay-in-slip or any payment reference document) should be required.</li> <li>The system fetches all involved repayments (repayments before or during the payment date).</li> <li>The system automatically records delayed repayments in the repayment statement while applying penalties (RQ 017).</li> <li>The system computes the required payment amount for unpaid amount, penalty amount, and the current repayment amount and displays the details.</li> </ul> |

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|  | <ul style="list-style-type: none"> <li>• Upon confirming repayment, the paid amount, and the payment reference document should be required.</li> <li>• The user (a competent personal) reviews and confirms the repayment.</li> <li>• The system performs amortization (RQ 013) for the current repayment, if the payment exceeds, all the outstanding should be cleared (penalties, unpaid amount). If still exceeds, the remaining amount is partial-prepaid (RQ 019) (recorded and reduced from the balance).</li> <li>• The system generates the reference number using the specified pattern.</li> <li>• The system updates the customer repayment statement accordingly.</li> <li>• A debit record of the amount paid is kept in the cashbook.</li> <li>• The repayment is updated accordingly: status changes to “paid”</li> <li>• If the repayment is the last in the schedule and all repayment installments are paid, the loan status is also changed to “paid”.</li> <li>• Repayment summary official document download is triggered.</li> </ul> |
| <b>RQ 017.</b> The system should be able to calculate and apply penalties on delayed repayments. | <ul style="list-style-type: none"> <li>• The system checks if the repayment is not delayed [<math>RDT &lt; SRDT + GDs</math>], for RDT is the repayment date and time (as on the payment reference) and SRDT the scheduled repayment date and time (as in the schedule) and the GDs the number of grace days.</li> <li>• The system computes a penalty amount (PA) for any delayed repayment using the penalty rate (PR) and the repayment amount (RA)<br/> <math display="block">PA = (RA * PR) / 100</math> </li> </ul>   |
| <b>RQ 019.</b> The system should allow loan full/partial prepayment.                             | <ul style="list-style-type: none"> <li>• Prepayment is only allowed on the payment due dates only.</li> <li>• For partial prepayment, the normal amortization is applied except that the balance is reduced with the paid principle plus any extra amount. (See RQ 013)<br/> <math display="block">LB = LB - (RP + (TPA - RA))</math> <math display="block">TPA = \text{total paid amount}</math> </li> </ul>   |



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|  | <ul style="list-style-type: none"> <li>For full prepayment, the normal amortization is applied except that the total paid amount (TPA) always equals the Loan Balance (LB) plus the interest amount (IA) and/or any outstanding penalty amount (PA) and/or any unpaid amount (UA). And the repayment principle equals the loan balance (LB)</li> </ul> <p> <math>IA = (LB * IR) / 100</math><br/> <math>TPA = (LB + IA + PA)</math><br/> <math>PA = -PA</math> (clearing the penalty correctly)<br/> <math>UA = -UA</math> (clearing unpaid amount)<br/> <math>RP = LB</math> </p> |
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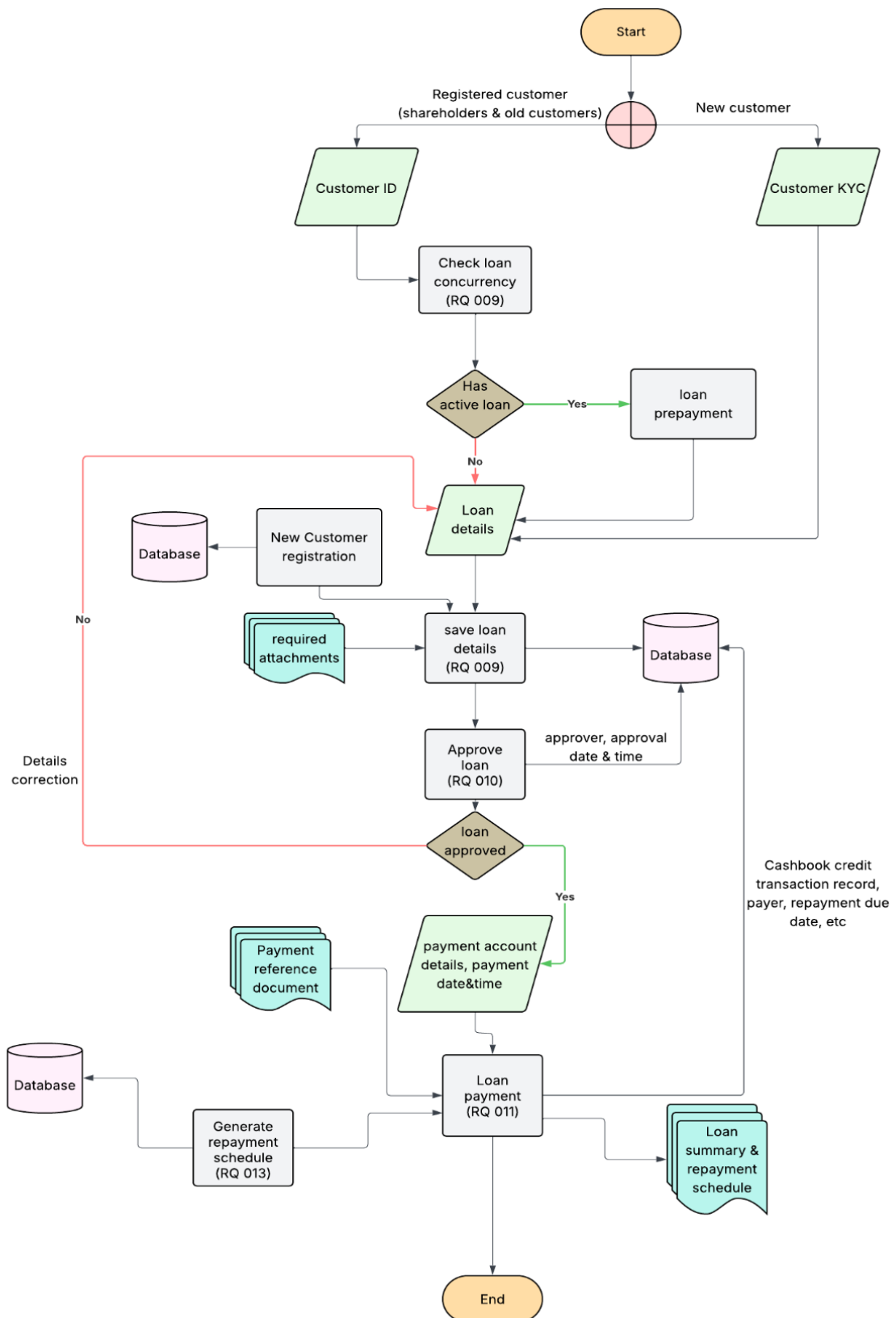
## Reporting

| Requirements  | Business logic  |
|---|---|
| <b>RQ 019.</b> The system should be able to generate reports on loans activities, shareholder shares and interests. | <ul style="list-style-type: none"> <li>The system collects and computes required information for required reports.</li> </ul>       |
| <b>RQ 020.</b> The system should allow the user to view reports.  | <ul style="list-style-type: none"> <li>The system displays reporting information in a web page.</li> </ul>                          |
| <b>RQ 021.</b> The system should allow the user to download reports.  | <ul style="list-style-type: none"> <li>The system collects and computes required information and generates a PDF report.</li> </ul> |

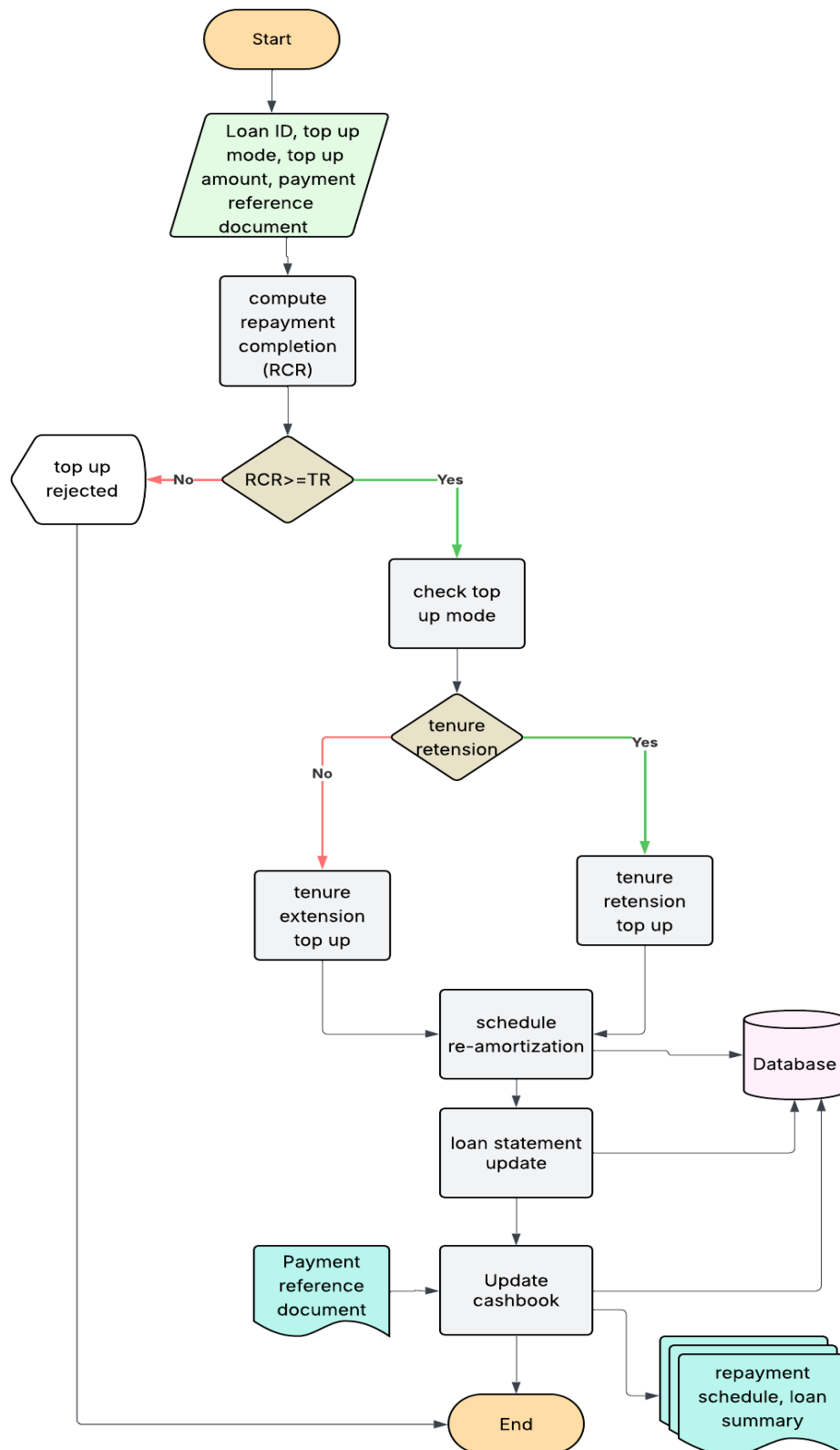
## Non-functional requirements

| Requirement  | Requirement card                                       | status |
|--|--|--------|
| RQ 022. The system shall operate correctly and consistently over time without failure.                     | Error handling, transaction integrity, fault tolerance |        |
| RQ 023. The system shall protect data and operations from unauthorized access, modification, or disclosure | Authentication, authorization, encryption              |        |
| RQ 024. The system shall be easy to learn and efficient to use for its intended users.                     | Intuitive UI, clear error messages, User experience    |        |
| RQ 025. The system shall be easy to modify, fix, and enhance over its lifetime.                            | Codebase clarity, good architectural design            |        |
| RQ 026. The system shall comply with applicable laws, standards, and regulations.                          | BOT regulations adherence, etc.                        |        |
| RQ 027. The system shall maintain sufficient logs and records to trace all critical operations.            | Record audit logs                                      |        |

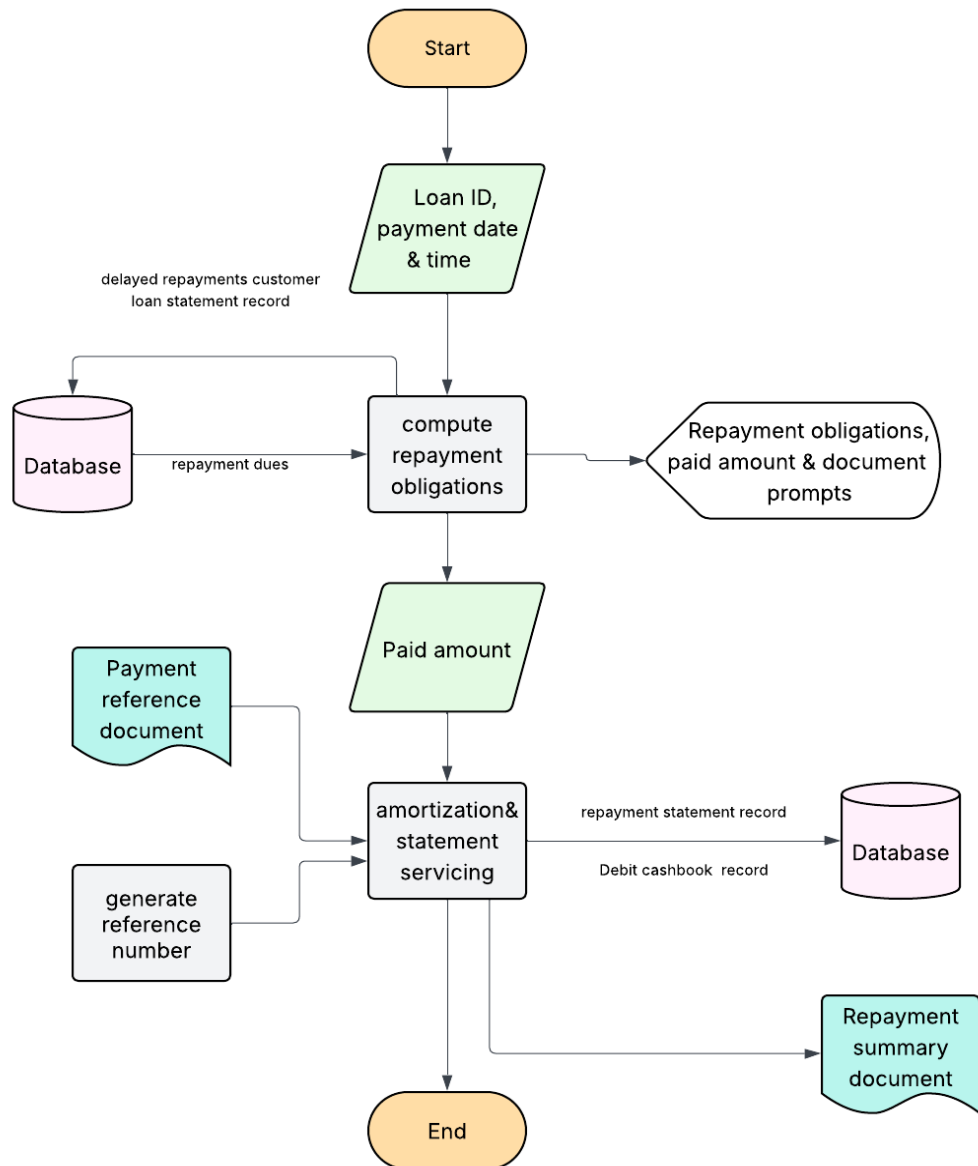
## Loan processing flowchart



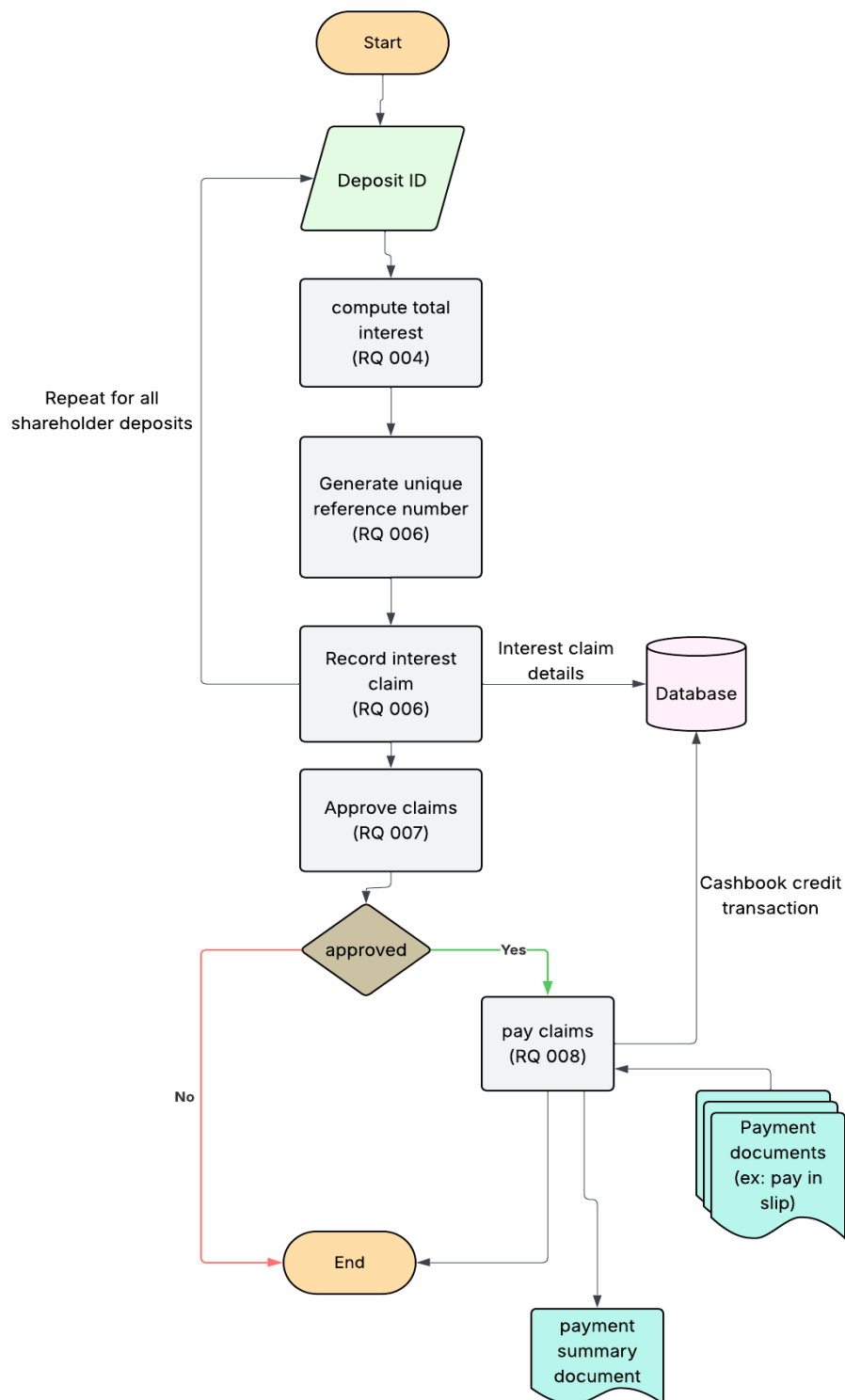
## Loan tops up processing flowchart



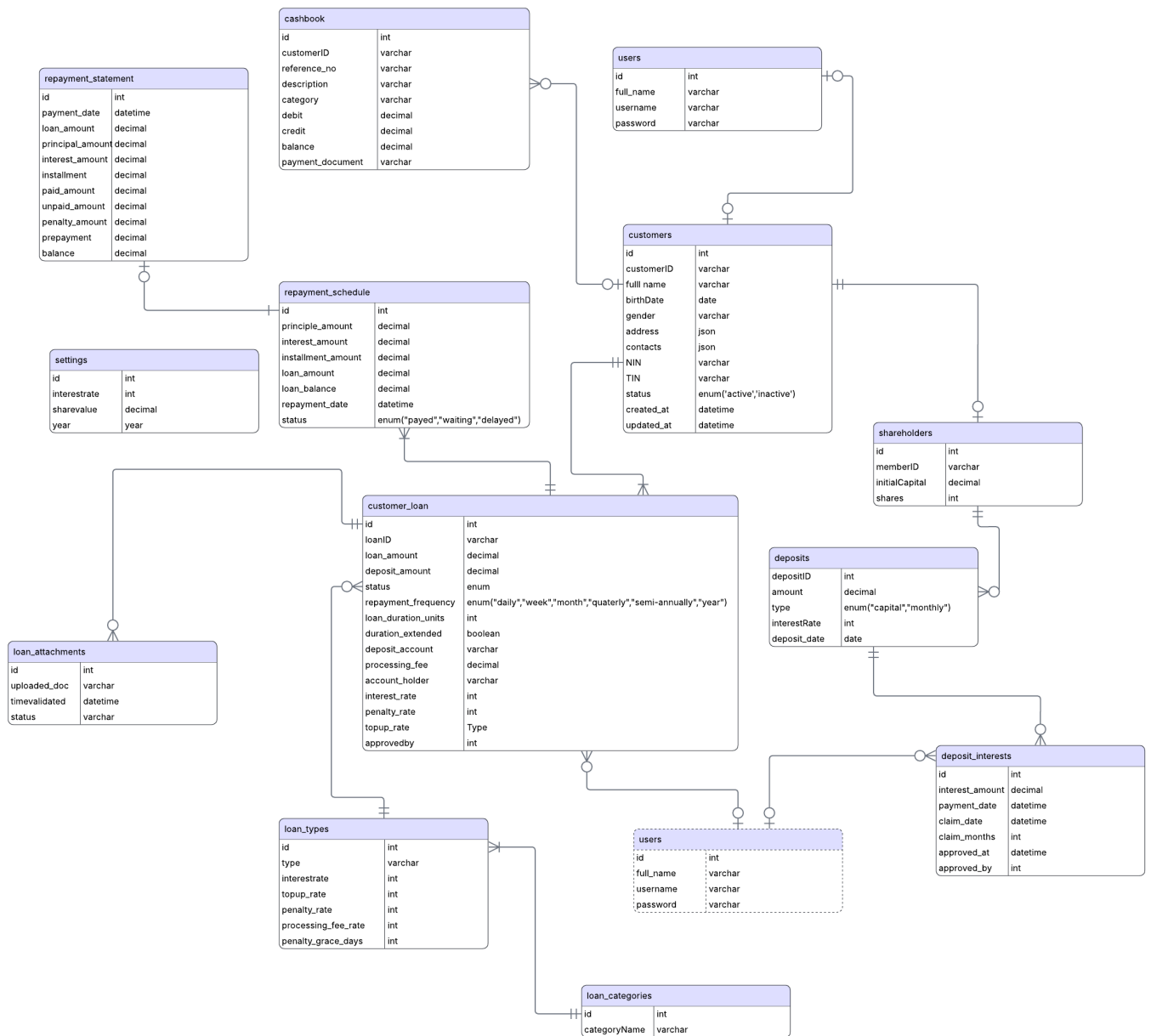
## Repayment processing flowchart



## Shareholder interest claiming flowchart



## Initial database structure (Entity Relationship Diagram)



## Module Hierarchy Diagram

