**Functional Requirements:**

1. **Ticket Purchase Functionality**
   * The ticket vendor machine shall allow users to select transportation destinations (e.g., Bus routes, MRT stations) from a user-friendly menu.
   * Users should be able to choose from multiple payment options including Credit Card, Digital Wallet (QR Code), and cash.
   * The machine must issue printed tickets with barcodes upon successful payment validation.
2. **Payment Processing**
   * The machine shall securely process credit card transactions in real-time, adhering to PCI DSS standards for data security.
   * For digital wallet payments, the machine should generate QR Codes for users to scan and complete transactions swiftly.
3. **User Interface and Feedback**
   * The user interface should be intuitive and responsive, providing clear instructions and feedback throughout the ticket purchasing process.
   * Error messages and prompts should be displayed promptly to guide users in case of payment failures or system errors.
4. **Maintenance and System Monitoring**
   * The machine should automatically notify maintenance personnel when components require servicing or replacement.
   * System logs and diagnostic tools should be available to monitor performance metrics and detect potential issues proactively.

**Non-Functional Requirements:**

1. **Reliability**
   * The ticket vendor machine must operate continuously without significant downtime, ensuring availability during peak hours.
   * The machine should have built-in redundancy mechanisms to minimize service disruptions and prevent data loss.
2. **Response Time**
   * The machine's response time for ticket purchase transactions should be within 5 seconds on average, including payment processing and ticket issuance.
   * User interactions (e.g., menu navigation, payment confirmation) should be responsive and seamless to enhance user experience.
3. **Security**
   * All transactions and communications must be encrypted using robust encryption protocols to protect sensitive payment information.
   * The machine should have physical security measures (e.g., tamper-resistant casing, surveillance) to prevent unauthorized access and tampering.

**Domain-Specific Requirements:**

1. **Transportation Integration**
   * The ticket vendor machine must integrate seamlessly with existing transportation systems (e.g., Bus networks, MRT infrastructure) to validate ticket purchases and support multi-modal journeys.
   * Compatibility with regional or national ticketing standards and protocols (e.g., interoperability with other transport ticketing systems) should be ensured.
2. **Regulatory Compliance**
   * The machine should comply with local regulations and standards governing ticketing and payment processing in public transportation environments.
   * Compliance with environmental standards (e.g., energy efficiency, recyclability) should be considered in the design and manufacturing of the machine.

**Use case Diagram:**

A diagram of a ticket vendor machine

Description automatically generated

**Use case Discription:**

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| **Use case name:** | * *Use Case: Purchase Ticket* |
| **Actors:** | * Users/Customers |
| **Preconditions:** | * The Ticket Vendor Machine is powered on and operational. * User has navigated to the ticket purchase screen. |
| **Postconditions:** | * A ticket is successfully issued to the user upon completing the payment process. |
| **Flow of Activities:** | 1. User selects "Purchase Ticket" option on the machine. 2. System presents a menu of available destinations. 3. User selects a destination from the menu. 4. System prompts user to choose a payment method (Credit Card, Digital Wallet, cash). 5. User selects the desired payment method. 6. If Credit Card:  * User inserts their credit card into the machine. * System processes the credit card transaction securely. * Upon successful validation, the machine prints the ticket.  1. If Digital Wallet:  * System generates a QR Code containing payment details. * User scans the QR Code using their mobile wallet app. * Upon successful payment confirmation, the machine prints the ticket.  1. Machine prints a ticket with journey details and a barcode. 2. User receives the printed ticket. |
| **Exceptions:** | * If there are network connectivity issues during payment processing, display an error message and prompt the user to retry or choose an alternative payment method. * If the credit card transaction fails (e.g., invalid card), inform the user and provide guidance on next steps. * If the digital wallet payment fails (e.g., QR Code cannot be scanned), prompt the user to try again or use a different payment method. |
| **Use case name:** | * *Use Case: Select Destination* |
| **Actors:** | * Users/Customers |
| **Preconditions:** | * User is at the ticket purchase screen of the Ticket Vendor Machine. |
| **Postconditions:** | * User has successfully selected a destination for ticket purchase. |
| **Flow of Activities:** | 1. System displays a menu of available destinations categorized by transportation mode (e.g., Bus routes, MRT stations). 2. User navigates through the menu using touch-screen interaction. 3. User selects a specific destination from the menu. |
| **Exceptions:** | * If the destination menu fails to load or display correctly, notify the user and prompt them to try again. |

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| **Use case name:** | * *Use Case: Process Credit Card Payment* |
| **Actors:** | * Users/Customers |
| **Preconditions:** | * User has chosen to pay for the ticket using a credit card. * User has entered valid credit card details into the machine. |
| **Postconditions:** | * Credit card transaction is successfully processed, and the ticket is issued. |
| **Flow of Activities:** | 1. User selects "Credit Card" as the payment method. 2. User inserts their credit card into the machine's card reader. 3. Machine securely communicates with the payment gateway to process the transaction. 4. Payment gateway validates the credit card details and authorizes the transaction. 5. Upon successful validation, the machine prints the ticket with a barcode for validation. |
| **Exceptions:** | * If the credit card is invalid or expired, display an error message and prompt the user to try again with a different card or payment method. * If the payment gateway communication fails, display an error message and advise the user to retry the transaction later. |

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| **Use case name:** | * *Use Case: Generate QR Code* |
| **Actors:** | * Users/Customers |
| **Preconditions:** | * User has chosen to pay for the ticket using a digital wallet (e.g., mobile payment app). |
| **Postconditions:** | * QR Code containing payment details is generated and displayed for user scanning. |
| **Flow of Activities:** | 1. User selects "Digital Wallet" as the payment method. 2. System generates a QR Code containing payment information (amount, transaction ID). 3. Machine displays the QR Code on the screen for the user to scan using their mobile wallet app. |
| **Exceptions:** | * If the QR Code generation fails, display an error message and prompt the user to retry or choose an alternative payment method. * If the user's mobile wallet app cannot scan the QR Code, provide instructions or troubleshooting tips to assist the user. |

A diagram of a flowchart

Description automatically generated**Activity Diagram (the process of passenger’s buying a ticket from ticket vendor machine)**

**Sequence Diagram:**

A diagram of a payment process

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**State Chart Diagram:**

**A diagram of a payment process

Description automatically generated**

**Class Diagram:**

**A diagram of a machine

Description automatically generated**

**Deployment Design:**

A diagram of a computer server

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**Architecture Design:**

**A diagram of a software company

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**Design an either wireframe:** [**https://www.figma.com/file/DEyYH7UIvYxmDzyIfFyioR/VendorTicket?type=design&t=9qY4VOyFddAfhXFc-6**](https://www.figma.com/file/DEyYH7UIvYxmDzyIfFyioR/VendorTicket?type=design&t=9qY4VOyFddAfhXFc-6)