SCHOOL OF SCIENCE AND ENGINEERING
AC51003 - Software Engineering (SEM 2 22/23)

Assessment one: Vending Machine System Analysis Model
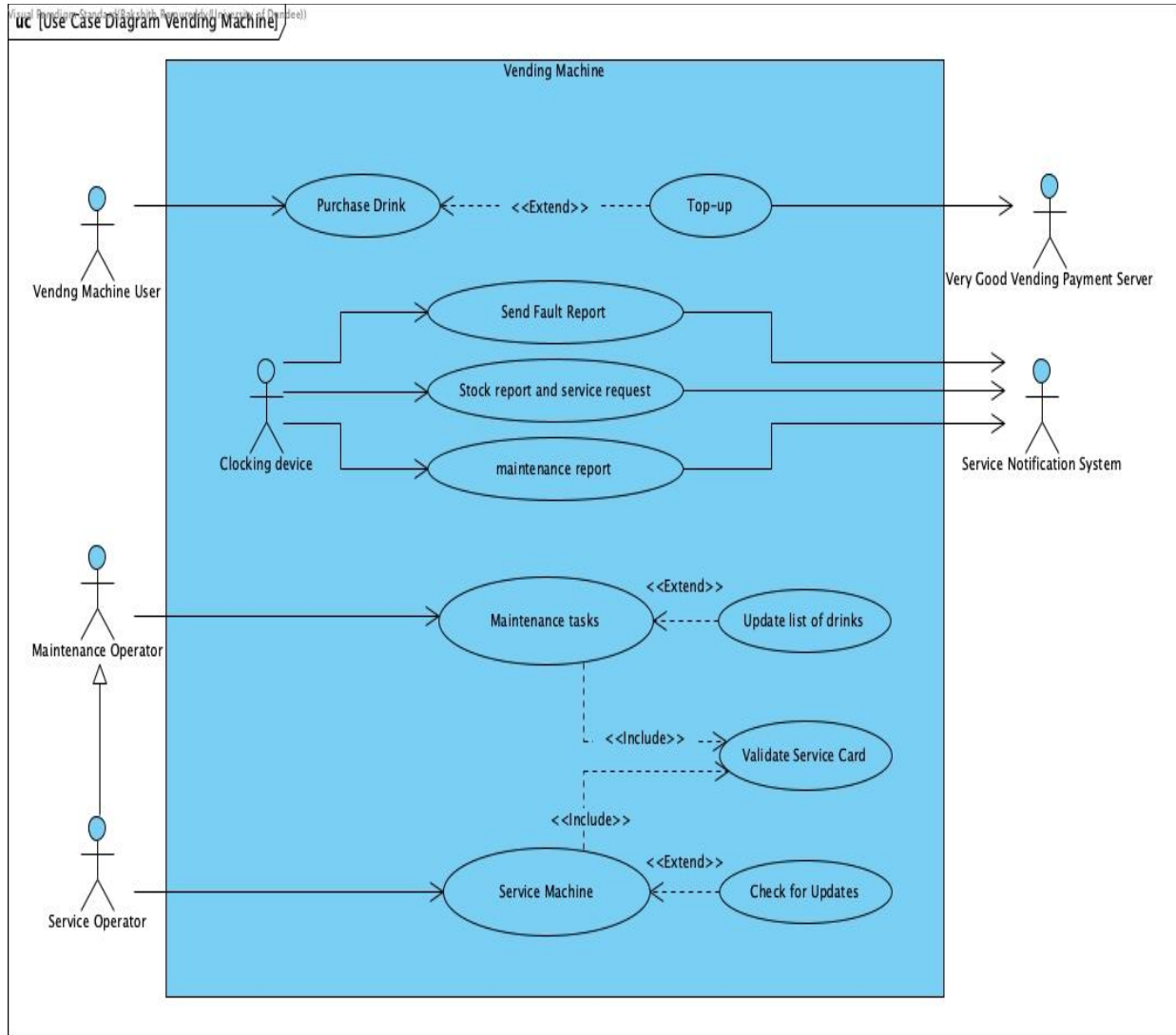
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Spoofing: An attacker could create a fake version of the vending machine software that appears identical to the legitimate software. They could then use this fake software to gain unauthorized access to the vending machine's backend system and steal customer credit card information. A mitigation strategy could include implementing two-factor authentication or biometrics to ensure that only authorized individuals have access to the system.
Tampering: Tampering with the vending machine software or data could lead to incorrect vending machine behaviour, such as dispensing the wrong product or overcharging customers. Mitigation strategies could include implementing secure data storage and communication protocols, such as encryption, to protect the data from being tampered with.
Repudiation: It is difficult to hold someone accountable if they deny making a purchase or tampering with the vending machine software. The mitigation strategy could involve logging all actions taken on the system, including purchases and software modifications, to provide a clear record of what happened.
Information Disclosure: Identity theft and other malicious activities could occur if unauthorised access is granted to sensitive information, such as credit card numbers or vending machine inventory, for example, an attacker could install malware on the vending machine that captures customer credit card information and sends it to a remote server. Mitigation strategies could include implementing data protection and privacy measures, such as encryption and access controls, to limit who can access sensitive information.
Denial of Service: An attacker could prevent the vending machine from functioning properly, resulting in a denial of service for legitimate customers. For example, an attacker could overload the vending machine's network connection with traffic, causing it to become unresponsive. Mitigation strategies could include implementing backup systems or redundancy to ensure that the vending machine can continue to function even if one component fails.
Elevation of Privilege: An attacker could gain elevated privileges, such as the ability to add products to the vending machine inventory or modify prices. For example, an attacker could gain access to the vending machine's backend system and change the price of a product, potentially leading to financial losses for the vending machine company. Mitigation strategies could include implementing role-based access controls, such as granting different levels of privileges to different individuals based on their role, to limit who can perform certain action. Vending machine can also be programmed to send report of the file with the list of drinks and their respective prices as and when they are updated. Vending Machine Company can then cross verify the file with the one on their database to check for similarity.

III. USE CASE SPECIFICATIONS

Use case main flow and alternative flow of events are shown below:

A. Drink Purchase

Basic flow of event:

The use case begins when the vending machine approaches the vending machine and wants to purchase a drink.

Customer	Insert the vending card
System	Identify when the card has been entered. Read the amount of credit available on the card and display this amount to the customer. At the same time, display drinks that are available and affordable based upon credit inserted (A5), and the option to top-up the vending card. Display the drink options and their price in order from 1 to 9.
Customer	The user selects the desired choice of drink (A1)
System	Release a serving of the chosen powdered beverage from the correct chute in the machine and onto the dispensing tray (A2)
System	Provide water at the appropriate temperature into the cup according to whether the beverage is meant to be served hot or cold. (A3) (A4)
System	Deduct the cost of the beverage from the customer's vending card, return the card to the customer. Wait for the user to remove their card
Customer	Remove their vending card
System	Detect the removal of the card. Provide a notification to inform the customer that their drink is ready to collect.
Customer	Collect their drink
System	Detect the removal of the vending card, display the notification to thank customer for using the service. Reset the system to the main customer menu.

Alternative flow of event:

A.1 Cancel option selected

The user changes their mind and stop purchasing drink.

System	Return the card to the customer. Wait for the user to remove their card.
Customer	Remove their vending card
System	Detect the removal of the vending card, display the notification to thank customer for using the service. Reset the system to the main customer menu.

A.2 Response time too long

The vending machine is loading for a long period and not response within the expected time (10 seconds)

System	If the loading fails, request the customer to retry (A.2.1)

A.2.1 Response time too long more than 3 time

The vending machine is loading for a long period and not response more than 3 time.

System	After all attempts failed up to three times, the vending machine show the notification as no service. Show the "cancel" option
User	Select cancel the service
System	Return the vending card to the customer. The system prepares the fault report and send to Service Server (See Use Case B. Sending Fault Report)

A.3 Cold drink selected

The user wants to take cold drink to their personal drink container. The charge for cold water is 0.

System	Display the notification to inform customer to prepare their own container. Show the option "Start" and "Stop" and "Complete" and "Cancel" (A.3.1)
Customer	Choose the option "Start"
System	Release the cold water. Wait the customer to choose the option "Stop" (A.3.2)
Customer	Choose the option "Stop"
System	Stop release the cold water. Display all options. Wait for the customer to choose "Complete" (A.3.3)
Customer	Choose Complete
System	Display the notification informing the user to remove their card. Return the card to customer without deduct any money.
Customer	Remove the card
System	Detect the removal of the vending card, display the notification to thank customer for using the service. Reset the system to the main customer menu.

A.3.1 User Cancel

The user chooses the option "Cancel" without deduct any cold water.

System	Reference Main flow (A). display drinks that are available and affordable based upon credit inserted. Display the drink and price in order from 1 to 9.

A.3.2 Customer doesn't response/timeout.

The user let the cold water running for more than 10 seconds.

The System	After 10 seconds of dispensing cold water, the vending machine will automatically stop. Display the notification to request the user's response if they want more cold water. Display options "Yes" and "Complete" (A.3.2.1)

Customer	The user chose the option "Yes"
System	Keep dispensing the water. Wait the user to choose "Stop". After 10 seconds, return to the process.

A.3.2.1 The user end process
The user achieves the desired amount of cold water and want to complete the process.

Customer	Choose Complete
System	Display the notification informing the user to remove their card. Return the card to customer without deduct any money.
Customer	Remove the card
System	Detect the removal of the vending card, display the notification to thank customer for using the service. Reset the system to the main customer menu.

A.3.3 System functionality
The user has not achieved the desired amount of water and want to get more.

System	Return to the flow, see the use case A.3 "User select cold drink"

A.4 Hot drink selected

The user intent to purchase either Coffee or Tea

System	Display a notification that free additional condiments are available in the drawer beside the machine. Return to the main flow (A).

A.5 Low credit detected
The user inserts low credit vending card and there is no affordable drink shown except free cold water.

System	Display the option free drink cold water, and the option to top-up card (A.5.1). Besides, provide the "Cancel" option. (A.5.2)
Customer	Select "top-up card"
System	Require customer to insert the information of their credit card including card number, expiry date, and three CVC digit. Additionally, display a range of amount that user want to top-up including £5, £10, £15, £20, £30, and the option "confirm" to complete the process.
Customer	Insert the card information (A.5.3) and select the top-up amount option (A.5.4)
System	Read the input information and transfer the data to the Very Good Machine Payment Server (A.5.5). The Server request verification from the user bank, and authorize the transaction, process the payment, and return the confirmation (A.5.6). Once the system receives the confirmation of payment, show the notification to inform the user that the payment has gone through, and top-up process has been successful. Request customer to confirm

Customer	Confirm
System	Return to the Use Case main flow, (see A. Purchase Drink)

A.5.1 Cancel option selected

The user changes their mind and stop purchasing drink.

System	See the Use case A.1 Cancel option selected

A.5.2 Incorrect card information entered

The customer inserts a wrong data, any of the required information including Card Number, Expiry Date and/or CVC code.

Customer	Insert wrong information
System	Display the notification inform the user that they have incorrectly entered the information and to try entering it again

A.5.3 Amount of top-up is not clarified

The user does not enter the amount of credit that they want to top-up to their vending card.

System	Display a message to the customer to confirm that they have not choose the amount of top-up, and to try it again. Return to the stage (A.5 Low credit detected) where the number is being entered.

A.5.4 The Payment Server does not response

The Payment Server keeps loading and does not response within an expected time of 20 seconds.

System	Display the notifications to inform the user that the server is unavailable and inform the user to try again or cancel the process (A.5.5.1) (A.5.5.2)

A.5.4.1 The Payment Server does not response 3 times

The Payment Server keeps loading and does not response within an expected time of 20 seconds 3 times.

System	Upon the failure of 3 times, send the message that the sever is out of service, and send the Fault Report (See Use Case B. Sending Fault Report). Return to the main menu.

A.5.4.2 Cancel option selected

The user changes their mind and stop purchasing drink.

System	See the Use case A.1 Cancel option selected

A.5.5 Verification failed

The Payment Server has rejected the top-up request due to the low balance in the user bank account.

System	Receive the reject from Payment Sever. Display a message that the top-up process has not been completed. Allow the user to try again or cancel the process.
Customer	Try again (A.6.1)
System	Return to the Use Case A.5 Low credit detected where the number is entered.

A.5.5.1 Cancel option selected
The user changes their mind and stop purchasing drink.

System	See the Use case A.1 Cancel option selected

B. Sending Fault Report
The use case begins when the vending machine system is not functioning as usual and/or some faults have been detected in the system by the clocking device.
Basic flow of event:

Clocking device	Detect the fault in the system and locate the component(s) that does not responds or does not work as normal. Prepare a fault report with following information: Component(s) name, Vending Machine's ID, and the date and time when the fault taken place. Send the report to the Service Company.
System	Return to the main menu

Alternative flow:
B.1 Fault taken place in Clocking Device
The Clocking Device fails to detect fault and prepaid report.

The System	Display the notification that the Vending machine is out of service. Return to main menu.
Customer	Cannot use the service. Cancel the process (See the Use case A.1 Cancel option selected)

C. Sending stock report.
Main flow of the event
The use case begins when one or some of the product in Vending Machine are out of stock.

Clocking Device	Conduct the stock check at regular intervals. Detect the shortage of product and prepare the stock report (C.1). Ensure the SIM is working (C.2). Use the Service Company Interface to send the report to Service Notification System with following information: The current stock level of every product, the Vending Machine's ID, the date, and time when the report is made. Send the request for manual restock
System	Remove the out-of-stock drink out of main menu.

Alternative Flow

C.1 Fault taken place in Clocking Device

The Clocking Device fails to detect the out-of-stock drink and the vending machine is left empty.

The System	Remove all the shortage drink from the main menu. The machine can only serve cold water (C.1.2).

C.1.2 Cold drink selected

The user wants to take cold drink to their personal drink container. The charge for cold water is 0.

Customer	Select the "cold water"
System	Dispense the cold drink, (see Use Case "A3 Cold drink selected"

C.2 Network Disconnected

The Mobile Network is not responding. The SIM might not be supported or damaged.

Clocking Device	Attempt to resend the report every 10 minutes (C.2.1)

C.2.1 Disconnected network more than 30 minutes

Clocking Device	Upon 3 failures, repair the fault report for SIM and Mobile network components (See Use Case B. Sending Fault Report)
System	Remove all the shortage drink from the main menu

D. Send the maintenance report.

The Use Case begins when the maintenance operator has completed the maintenance task and close the front door of the Vending Machine.

Main flow of the event

Clocking Device	Receive the notification that the maintenance tasks have been completed. Ensure the SIM is working as normal (D.1). Start conducting the maintenance report with following information: Maintenance Operator's ID, Vending Machine ID, the current date, and time when the maintenance tasks have been completed, the current stock of every drink. Send the report to service notification system.
The System	Return to the main menu and wait for next customer.

Alternative Flow

D.1 Disconnected network

The Mobile Network is not responding. The SIM might not be supported or damaged.

Clocking Device	Attempt to resend the report every 10 minutes (D.1.1)

D.1.1 Disconnected network more than 30 minutes
The Mobile Network is not responding for more than 30 minutes. The SIM might not be supported or damaged.

Clocking Device	Upon 3 failures, repair the fault report for SIM and Mobile network components (See Use Case B. Sending Fault Report)

E. Maintain Vending Machine

Main Flow of the event
The Use Case begins when the maintenance operator visits the Vending Machine in their periodic check, and/or they receive the restock request.

Maintenance Operator	Insert the service card
System	Identify the card has been entered. Obtain the information on service card and identify the following data: Operator's name, Operator's ID (E.1). Change the display in the touch screen and require the operator to insert the 4-ditgit Personal Identification Number (PIN) (E.2) and the Access level number (level 1 and level 2) (E.3). Wait for the operator to enter the information
Maintenance Operator	Enter the required information (E.4)
System	Ensure the corresponding of input data and the card. Automatically unlock the front door of the machine, which allow access to internal area and cup dispenser.
Maintenance Operator	Access to the internal area to perform the maintenance (E.5) and restock the drink. Complete the tasks and close the front floor.
System	Detect the closure of the front door. Display a notification that the maintenance tasks have been completed and request the operator to remove the service card. Wait for the operator to remove their card.
Maintenance Operator	Remove the service card.
System	Detect the removal of service card, send a notification to thank the operator. Return to the main menu and wait for the next customer. Trigger the Clocking Device to conduct the maintenance report, and send the maintenance report to Service Notification System (See the Use Case D. Send the maintenance report) (E.6)

<u>Alternative flow of the event</u>

E.1 Incorrect PIN entered

The maintenance operator enters the wrong PIN.

The System	Display the notification that the PIN is not correct and request the operator to try again.
Maintenance Operator	Try again
The System	Return to the stage in the Use Case E. Maintain Vending Machine where the PIN is being inserted.

E.2 Operator does not response

The operator does not response the required information in an expected time of 30 seconds

The System	Return to the main menu

E.3 Disk Files Updated

The Vending Machine system detect the change in the drink file.

The system	Running the Drink File Version check. Detect the change in the modification of Dink Files in the Hard Disk. Reread the new input and updated information in new files. Ensure the correct and up-to-date information has been loaded and displayed.

F. Software Maintain Vending Machine

The Use Case begins when the service operator visits the Vending Machine in their periodic check, and/or they receive the restock request.

<u>Main Flow of the event</u>

Service operator	Insert the service card
The system	Identify the card has been entered. Obtain the information on service card and identify the following data: Operator's name, Operator's ID. Change the display in the touch screen and require the operator to insert the 4-ditgit Personal Identification Number (PIN) (F.1) and the Access level number (level 1 or level 2). Wait for the operator to enter the information
Service Operator	Enter the PIN the Level Access 2 (F.2)
System	Ensure the corresponding of input data and the card, validates the PIN and grants access to provide the full access to the hardware and software vending machine system.
Service Operator	Access to the systems and perform the modification. Perform the fault check and/or Update Check (F3)
System	Reboots and does a start-up check on the component to make sure they are responsive. Display "READY" (F.4) message to confirm that the fault issues

	have been sorted out. Request the operator to remove the service card and wait for the response (F.5)
Service Operator	Remove the service card
The system	Display the notification to thank the operator. Return to the main menu and wait for the next customers.

Alternative Flow of Events

F.1 Incorrect PIN entered
The maintenance operator enters the wrong PIN.

The System	Display the notification that the PIN is not correct and request the operator to try again.
Maintenance Operator	Try again
The System	Return to the stage in the Use Case E. Maintain Vending Machine where the PIN is being inserted.

F.2 Operator does not response
The operator does not response the required information in an expected time of 30 seconds

The System	Return to the main menu

F.3 Check for Update
The operator requires the system to do the new version check.

The System	Obtain current version number of the vending machine. Ensure the SIM is working as normal (F.3.1). Send the version number to the Service Notification System and request the newest version of the available software. Download the new version to the system (F.3.2). Display the notification that the service operator should restart the machine.
Service Operator	Restart the system.
The system	Reboots and does a start-up check on the component to make sure the system is responsive and working as normal. Return to the main menu and wait for the next customers.

F.3.1 Disconnected network
The Mobile Network is not responding. The SIM might not be supported or damaged.

Clocking Device	Attempt to resend the report every 10 minutes (C.3.1.1)

F.3.1.1 Disconnected network more than 30 minutes
The Mobile Network is not responding for more than 30 minutes. The SIM might not be supported or damaged.

Clocking Device	Upon 3 failures, repair the fault report for SIM and Mobile network components (See Use Case B. Sending Fault Report)
The System	Remove all the shortage drink from the main menu

F.4 No newer version found

The Service Notification System response with no newer version found.

The System	Display the message that there is no newer version available. Return to the Use Case F. Software Maintain Vending Machine where the system displays the "READY" notion.

F.5 "ERROR" message displayed

The System	Display the message the Faults have not been sorted yet. Return to the Use Case F. Software Maintain Vending Machine where the system grants the full access.

Requirements conformance statement

The following keywords are used to differentiate between different levels of requirements and optionality, as defined in IEEE Std 100-1992 [RD11].

Shall: indicates a mandatory requirement. To ensure interoperability with other products conforming to this standard, all mandatory requirements must be followed strictly with no deviation.

Should: indicates a recommended but not mandatory requirement. Allows flexibility of choice between several possible alternatives while indicating a strongly preferred alternative. Indicates that a certain course of action is desirable but not mandatory or indicates that a certain course of action is deprecated but not prohibited.

May: indicates a suggested course of action without implying preference over any other possible course of action.

IV. SUPPLEMENTARY REQUIREMENTS

This document specifies the requirements for a software system to control a Vending Machine. The Vending Machine is made up of the following components:

- Touch Screen Display panel for displaying status information.
- A Card Reader for receiving vending cards and service cards.
- Drink Dispenser for dispensing cup and water for hot or cold drinks.
- Cup Dispenser which is made up of several chutes that contain cups for different drinks.
- A water dispensing component for dispensing water and regulating water temperature.
- A dispensing tray, onto which the cup containing the drink is dispensed and then removed by the user.

Performance and Security

R1 Query Times

- The software shall implement cup dispensing in less than 0.5 seconds.
- Hot water shall be dispensed after 0.5 seconds.
- The system shall be able to dispense a drink within 30 seconds of the user selecting the drink.

Rationale: Users will become frustrated if the vending machine isn't responsive.

R2 Temperature Controlled

- Hot water shall be dispensed when it's between 72°C and 80°C.

Rationale: This is the optimal temperature range for customer satisfaction.

R3 Sleep Mode

- At periodic intervals, the system shall ascertain if it has been idle. In such an event, the system shall initiate a sleep mode.

Rationale: This is to ensure that the system is energy efficient. There could be large parts of the day where the system is not being used.

R3.1 Idle Interval

- The intervals at which the system shall determine if it has been idle or not, shall be every 60minutes.

Rationale: A reasonable time span must be used so that the system is not continuously checking and going to sleep unnecessarily. At the same time, the time span should be limited, to ensure energy savings where possible.

R4 Security

- Service card contains operator name, employee ID 4 Digit PIN and access level.
- Software scans the card and changes the display for operator to enter PIN. Software verifies and unlocks the door.
- The system shall be able to detect and prevent fraudulent vending cards or service cards.

Rationale: Unauthorized personnel can gain access and update the prize list and install software if proper security measures are equipped.

Usability

R5 Cup Dispenser
- The system shall dispense the cup for the selected drink from the appropriate chute in the Cup Dispenser.
- Vending Machine shall have anywhere between 4 and 8 chutes available within them.
- The system shall record which drinks are available and which chutes in cup dispenser to dispense them from.

Rationale: This is to ensure that no other drink is dispensed other the one that is selected.

R6 Drink Dispenser
- Software shall equip the following steps to dispense a drink:
    - Dispense a cup containing the selected drink (in powdered form) from appropriate chute in the machine onto the dispensing tray.
    - Dispense water of the correct temperature into the cup, depending on whether it is hot or cold drink. (
    - Notify the customer that their drink is ready.
    - Deduct the cost of the drink from the customer's vending card and return their card to them.

Rationale: Steps that the vending machine should take when a drink is selected.

R7 Ease of Payment
- The system shall allow the user to add credit to their card by allowing them to enter Bank/credit card details using the Touch Screen Display panel.

Rationale: *To provide something more interesting to look at while the time passes*.

R8 Storage

- The vending machine shall have a small hard disk and this disk shall be used to store a file that records details of which drink has been placed within the chutes in the machine.

Rationale: *To ensure that he the list of drinks can be updated just by entering the details of the drink in a file and rather not have an entire new software created every time we need to add a new drink.*

R9 Communication

- The vending machine shall be equipped with a SIM card that enables it to access the mobile network.

Rationale: Have a SIM ensure that the communication to external system like Service Notification System and payment server is always connected and the system doesn't have to rely on any Wi-Fi interface with outside world.

R10 Prospects

- In the future, the Vending machine shall be capable of using different endpoints and sending reports.

Rationale: Stock reports are being sent to Service company and a maintenance personnel will be sent to restock. But we can change that. In future, the notification can be sent to private email or private twitter account and maintenance operator can visit and do the necessary maintenance.

R11 Implementing functions

- Software shall implement functions that will be able to do the following:
  - o Obtain reading from each hardware component.
  - o To issue commands to components
  - o To query the component for status information
  - o To receive notification from the components for status information

R12 Sending Report

- **Stock Report**: This report shall include the following:
  - o Each Drink in the Machine
  - o Name and Current Stock level
  - o Date and Time
  - o ID of the Vending Machine

- **Maintenance Report**: This report shall include the following:

- o Employee ID of the Maintenance operator
- o Vending Machine ID
- o Current Date and Time
- o Current Stock level for each drink

- **Fault Report:** This report shall include the following:
  - o Name(s) of the Component(s) that has been detected as faulty.
  - o Machine ID
  - o Date and Time

Rationale: Reports are sent to Vending Machine Service Notification System so that necessary action can be taken, and the system runs smooth and efficiently.

R13 Cards
- Two kinds of cards shall be implemented in this system:
  - o Service Card
  - o Vending Card
- These Cards shall have various information on them. The list of details available on the card is as shown below:
  - o Service Card
    - Operator Name
    - Employee ID
    - 4-digit Personal Identification Number (PIN)
    - Access Level (Level 1 = Maintenance Operator, Level 2 = Service Operator)
  - o Vending Card
    - Card ID
    - Credit on Card

V.   LARMAN'S CONCEPTUAL CLASS CATEGORIES

Conceptual class category	Examples
Physical things	Vending Machine, Vending Card, Sim Card, Screen, Service Cards, Hard Disk, Control Panel, Vending machine interface
Types of people, places, or organizations	User, Service operator, Maintenance operator
Catalogues	DrinksName, TopupAmount, ButtonOptions
Containers of things	Vending Machine, Water Dispenser, Cup Dispenser (chutes), Hard Disk, Drink Dispenser, Dispensing tray
Transactions	Credit/bank Card Transaction, Payment Server Authorization, Fault Report, Stock Levels, Maintenance Report.
Product or service related to a transaction	Drinks, Top-up, Clocking Device, Maintenance, and service
Descriptions /specifications of things	InstructionDisplay
Other systems we need to integrate with	Service Notification System, Payment Server, Bank, Sim Card System
Records of finance, work, contracts, or legal matters	Credit Balance, New Drink Update list
Schedules, manuals, documents that are referred to perform work	Annual service, Periodic maintenance

VI. NOUN ANALYSIS

	Noun List	Keep/Reject	Reason to keep or reject
1	Vending Machine	Keep	Keep - A Control Class
2	Vending Machine touch screen	Keep	Keep - A Control Class
3	Vending Machine Hardware	Keep	Keep - A Control Class
4	Programmer	Reject	Reject - Vague, Irrelevant or Redundant
5	Hacker Harry	Reject	Reject - Vague, Irrelevant or Redundant
6	Managing Director	Reject	Reject - Vague, Irrelevant or Redundant
7	Product Development Manager	Reject	Reject - Vague, Irrelevant or Redundant
8	Maintenance Operator	Keep	Keep - A type of person, place, or Location
9	Card Reader	Keep	Keep - A Boundary Class
10	Drink Selection	Keep	Keep - A Control Class
11	Cup Dispenser	Keep	Keep - A Control Class
12	Water Dispensing Component	Keep	Keep - A Control Class
13	Vending Card	Keep	Keep - A Boundary Class
14	Employees	Reject	Reject - Vague, Irrelevant or Redundant
15	Tea or Coffee	Reject	Reject - A field of Attribute
16	Service company's Service Notification System	Keep	Keep - A Control Class? (Interface)
17	SIM Card	Keep	Keep - A Boundary Class
18	Mobile Network	Reject	Reject - Vague, Irrelevant or Redundant
19	Very Good Vending Payment Server	Keep	Keep - A Control Class? (Interface)
20	Service Operator	Keep	Keep - A type of person, place, or Location
21	Vending Machine User	Keep	Keep - A type of person, place, or Location
22	Staff	Reject	Reject - Vague, Irrelevant or Redundant
23	Visitor	Reject	Reject - Vague, Irrelevant or Redundant
24	Hard Disk	Keep	Keep - A Boundary Class
25	Very Good Vending Company	Reject	Reject - Vague, Irrelevant or Redundant
26	software	Reject	Reject - Vague, Irrelevant or Redundant
27	Hardware Components	Reject	Reject - Vague, Irrelevant or Redundant

28	*Prototype System*	Reject	Reject - Vague, Irrelevant or Redundant
29	*Code*	Reject	Reject - Vague, Irrelevant or Redundant
30	*Development team*	Reject	Reject - Vague, Irrelevant or Redundant
31	*Chutes*	Reject	Reject - A field of Attribute
32	*Hardware Team*	Reject	Reject - Vague, Irrelevant or Redundant
33	*Types of Drinks*	Reject	Reject - A field of Attribute
34	*Software Specialists Scotland Ltd*	Reject	Reject - Vague, Irrelevant or Redundant
35	*Machine*	Reject	Reject - Vague, Irrelevant or Redundant
36	*Drinks*	Keep	Keep - An Entity, Record or Transaction
37	*Condiments*	Reject	Reject - Vague, Irrelevant or Redundant
38	*Dispensing Tray*	Keep	Keep - A Boundary Class
39	*Clocking Device*	Keep	Keep - A Control Class
40	*Cups*	Reject	Reject - A field of Attribute
41	*Service Company*	Reject	Reject - A field of Attribute
42	*Stock Report*	Keep	Keep - An Entity, Record or Transaction
43	*Maintenance Report*	Keep	Keep - An Entity, Record or Transaction
44	*Fault Report*	Keep	Keep - An Entity, Record or Transaction
45	*Date and time*	Reject	Reject - A field of Attribute
46	*Serial number*	Reject	Reject - A field of Attribute
47	*Drink Dispenser*	Keep	Keep - A Boundary Class
48	*Cooling or heating Sensor*	Keep	Keep - A Boundary Class
49	*A mains Water supply*	Reject	Reject - Vague, Irrelevant or Redundant
50	*Amount*	Reject	Reject - Vague, Irrelevant or Redundant
51	*Stock levels*	Reject	Reject - A field of Attribute
52	*Access Level*	Reject	Reject - A field of Attribute
53	*Operator's Name*	Reject	Reject - A field of Attribute
54	*Employee ID*	Reject	Reject - A field of Attribute
55	*Service Card*	Keep	Keep - An Entity, Record or Transaction
56	*Endpoints*	Reject	Reject - Vague, Irrelevant or Redundant
57	*Repairs*	Reject	Reject - Vague, Irrelevant or Redundant
58	*Bank Card*	Reject	Reject - Vague, Irrelevant or Redundant
59	*Check for Update*	Reject	Reject - A field of Attribute
60	*File*	Keep	Keep - An Entity, Record or Transaction

VII. CLASS DIAGRAM