Concordia University

SOEN-6481 SOFTWARE SYSTEMS REQUIREMENTS SPECIFICATION(FALL 2019)

TICKET VENDING MACHINE

DELIVERABLE 2 (D2)

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Submitted To:

Prof. Pankaj Kamthan

GitHub - https://github.com/m3hrn4z/SRS

November 27, 2019

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Deliverable - 2

1.1 Problem 5: Personas [2]

1.1.1 Student

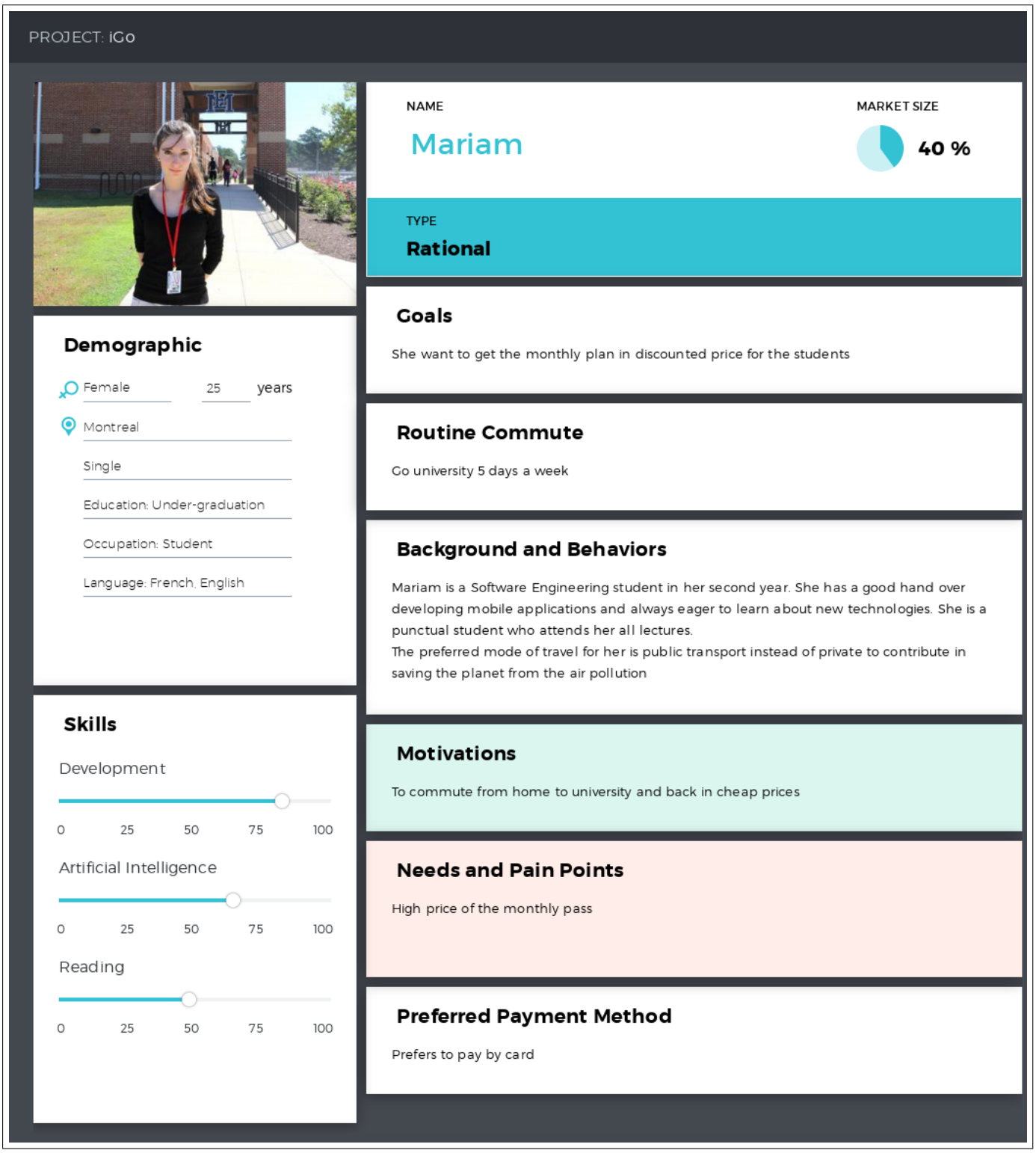

Figure 1.1: Persona: Student

1.1.2 Professional

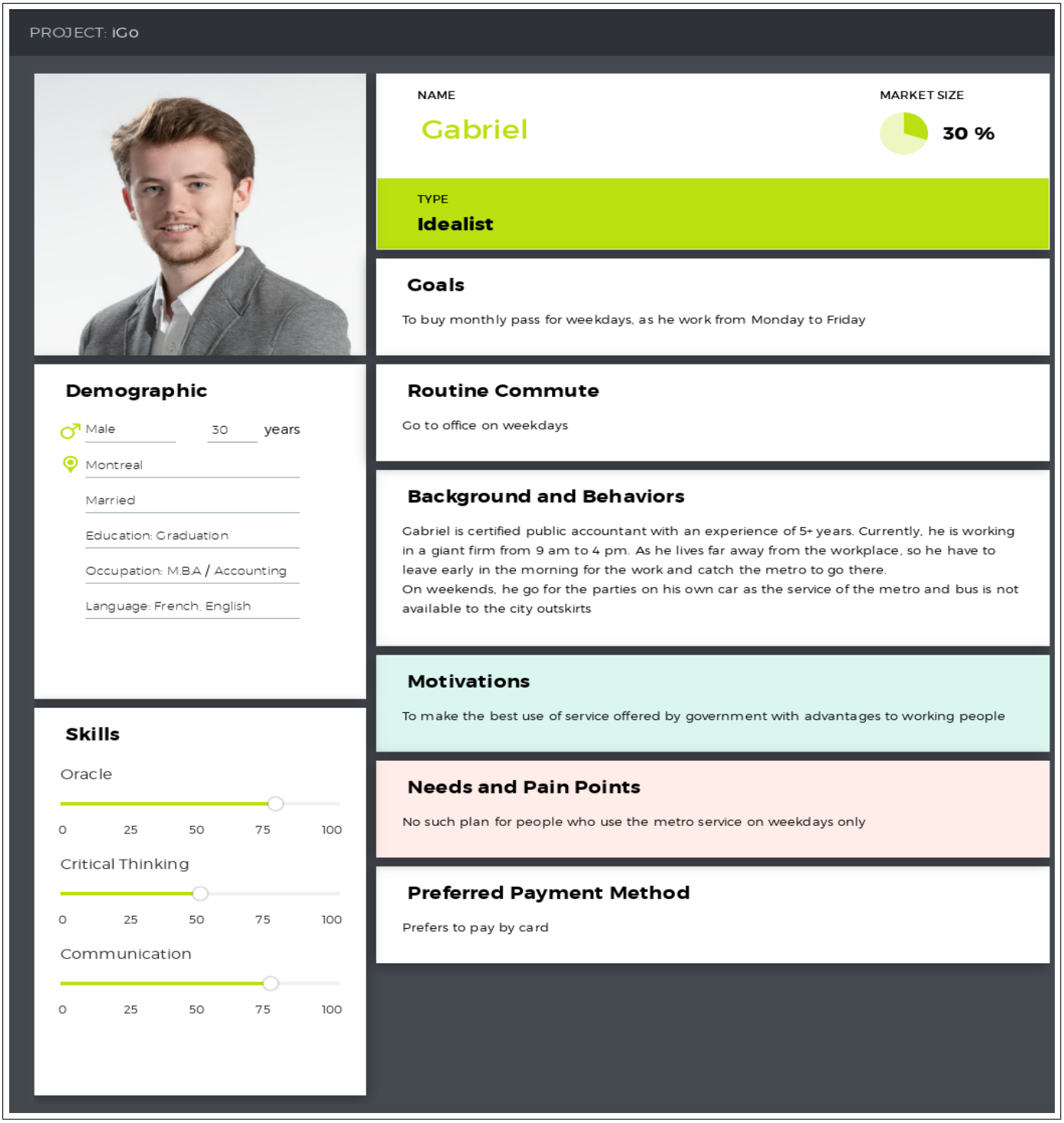

Figure 1.2: Persona: Working Professional

1.1.3 Senior Citizen

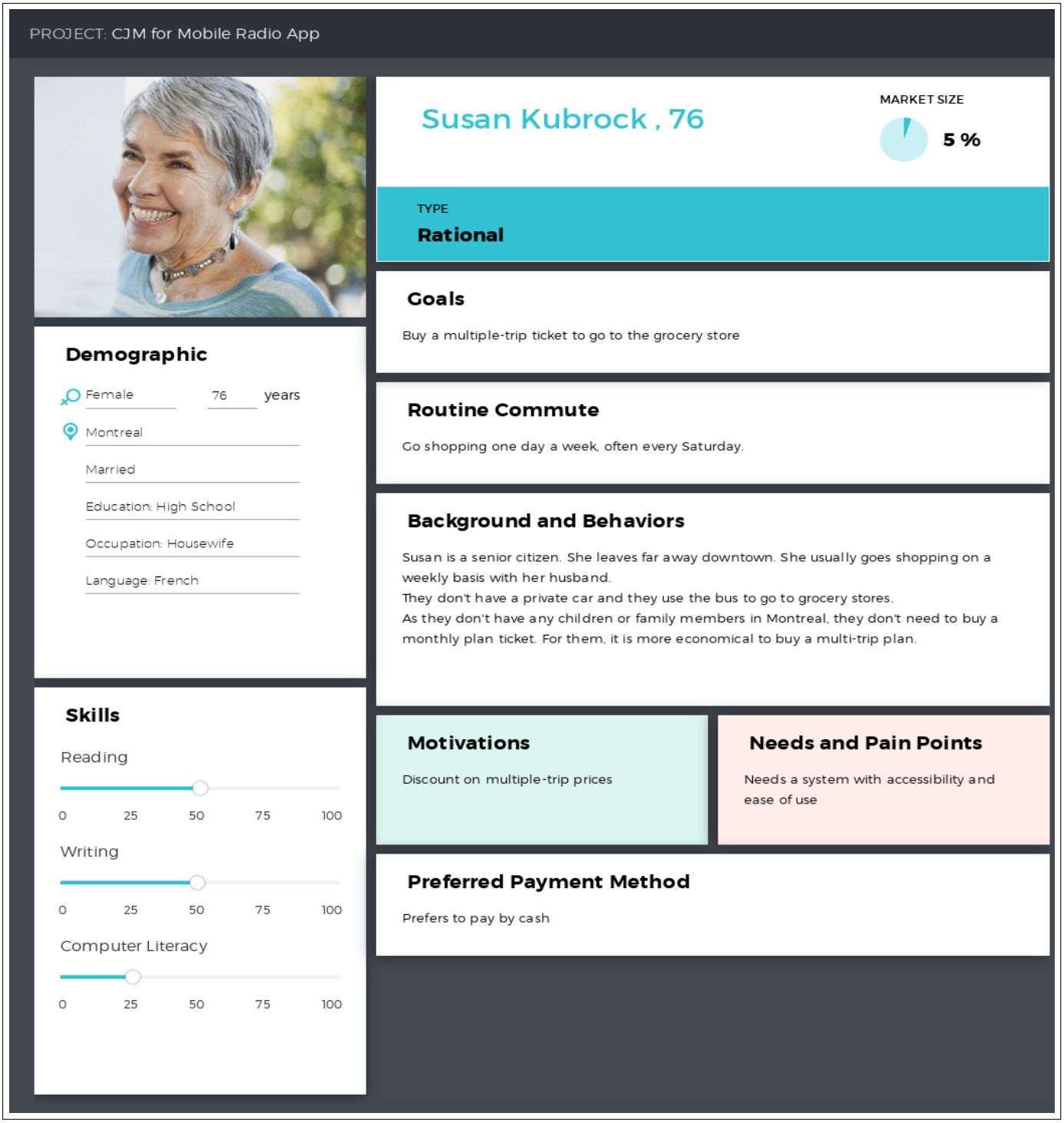

Figure 1.3: Persona: Senior Citizen

1.1.4 Occasional traveller

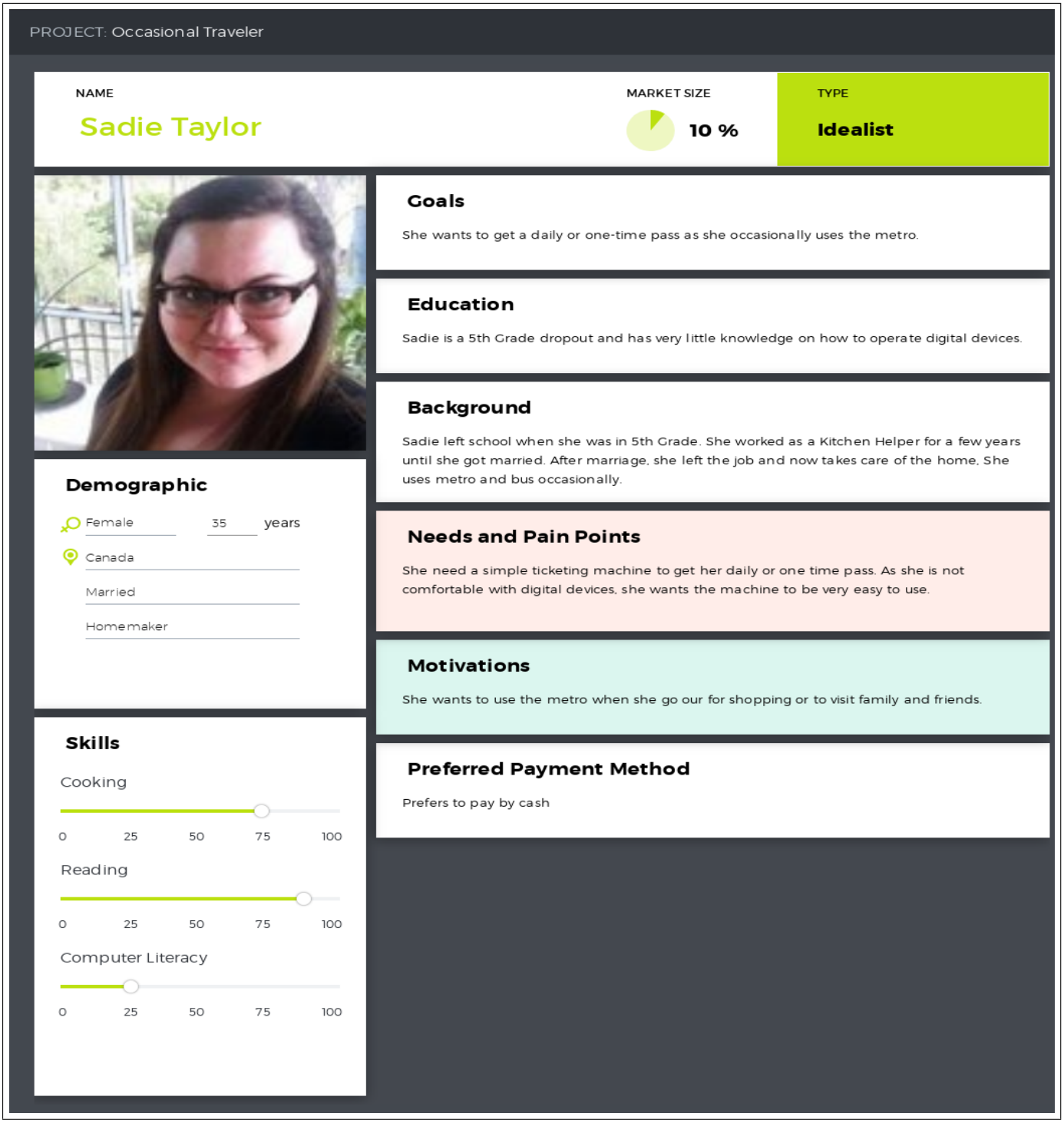

Figure 1.4: Persona: Occasional Traveller

1.1.5 Frequent Traveller

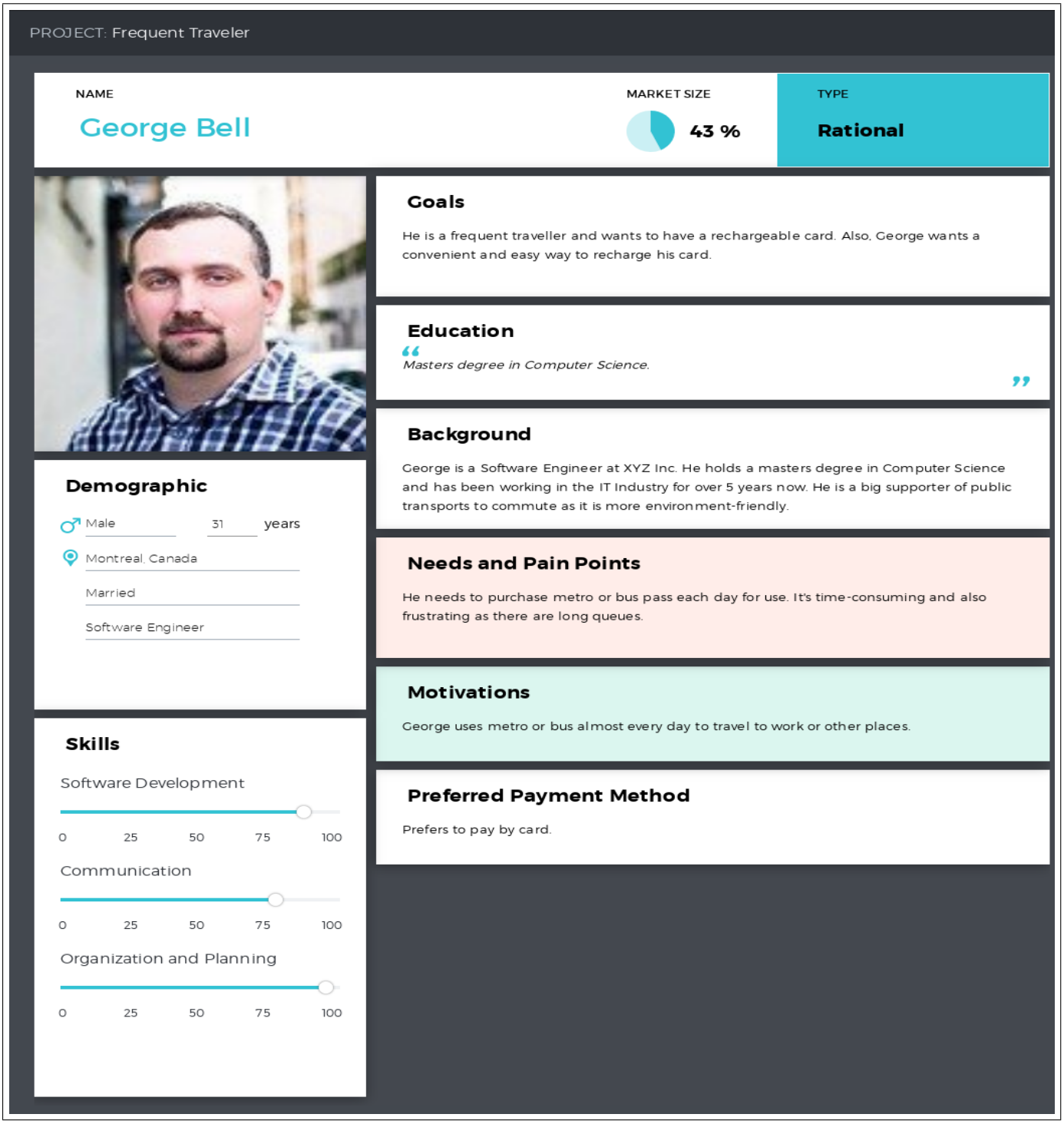

Figure 1.5: Persona: Frequent Traveller

1.1.6 Visually Impaired

Figure 1.6: Persona: Visually Impaired

1.1.7 Differently Abled

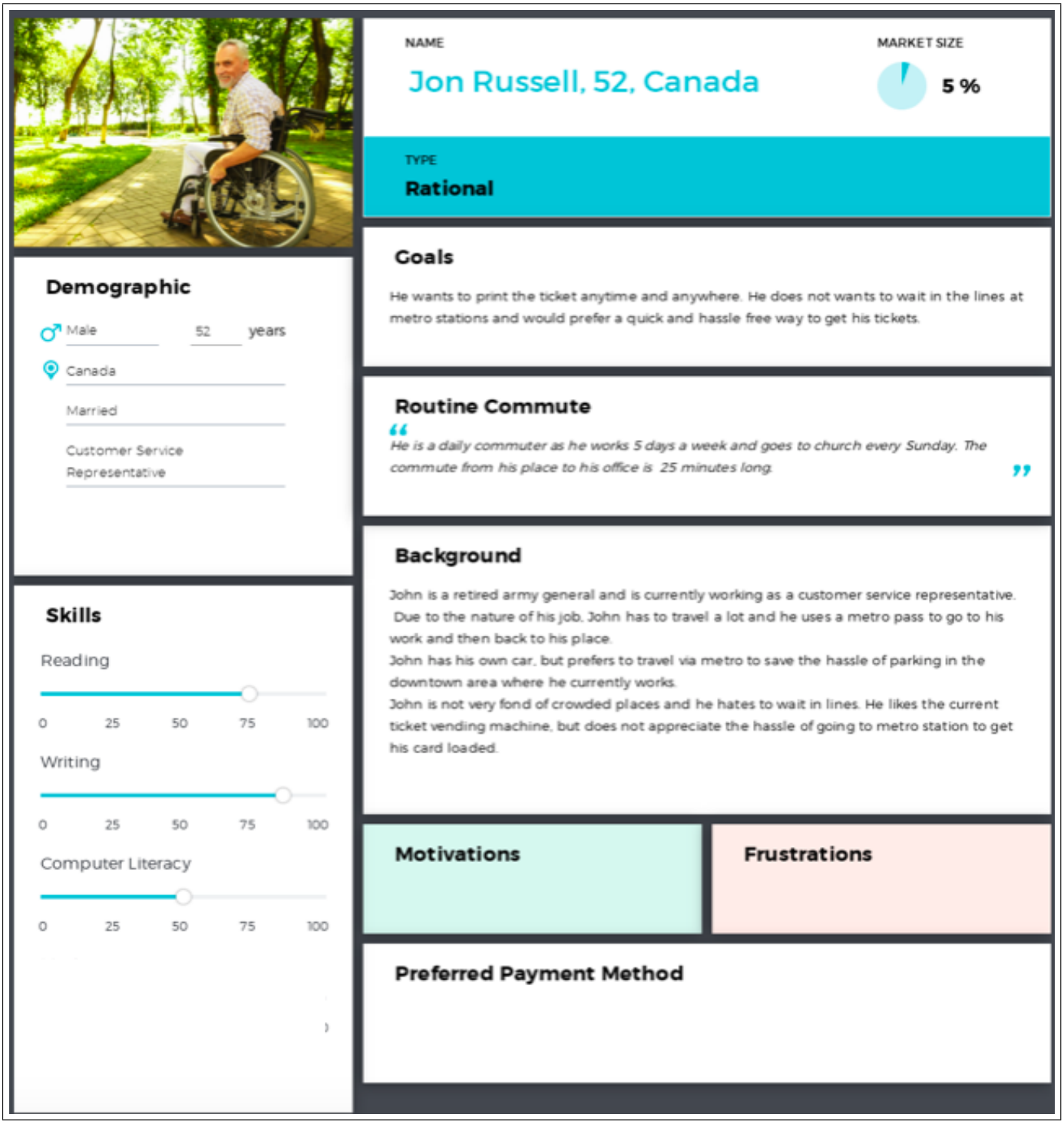

Figure 1.7: Persona: Differently Abled

1.1.8 Negative User

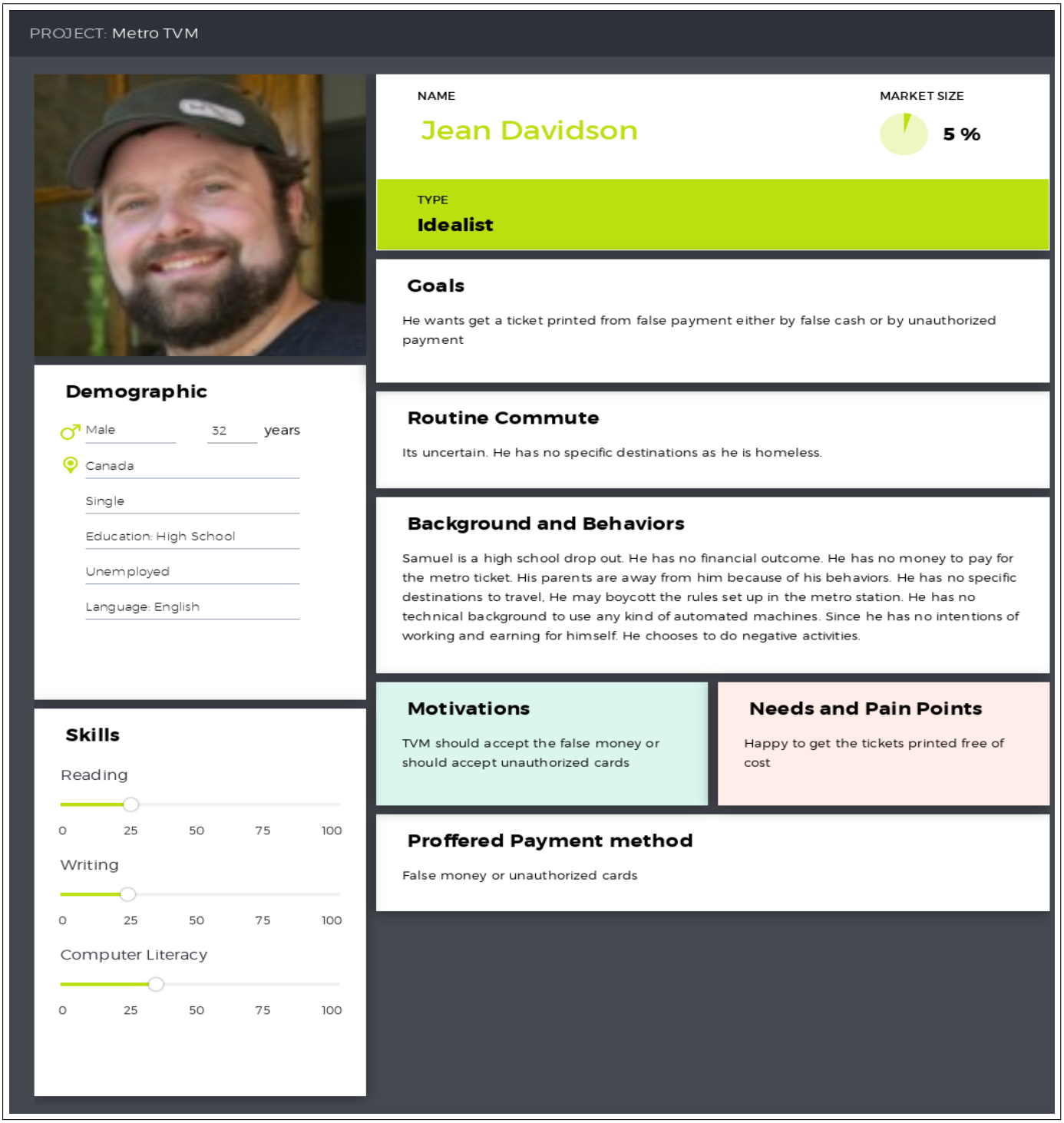

Figure 1.8: Persona: Negative Persona 1

1.1.9 Negative User: Hacker

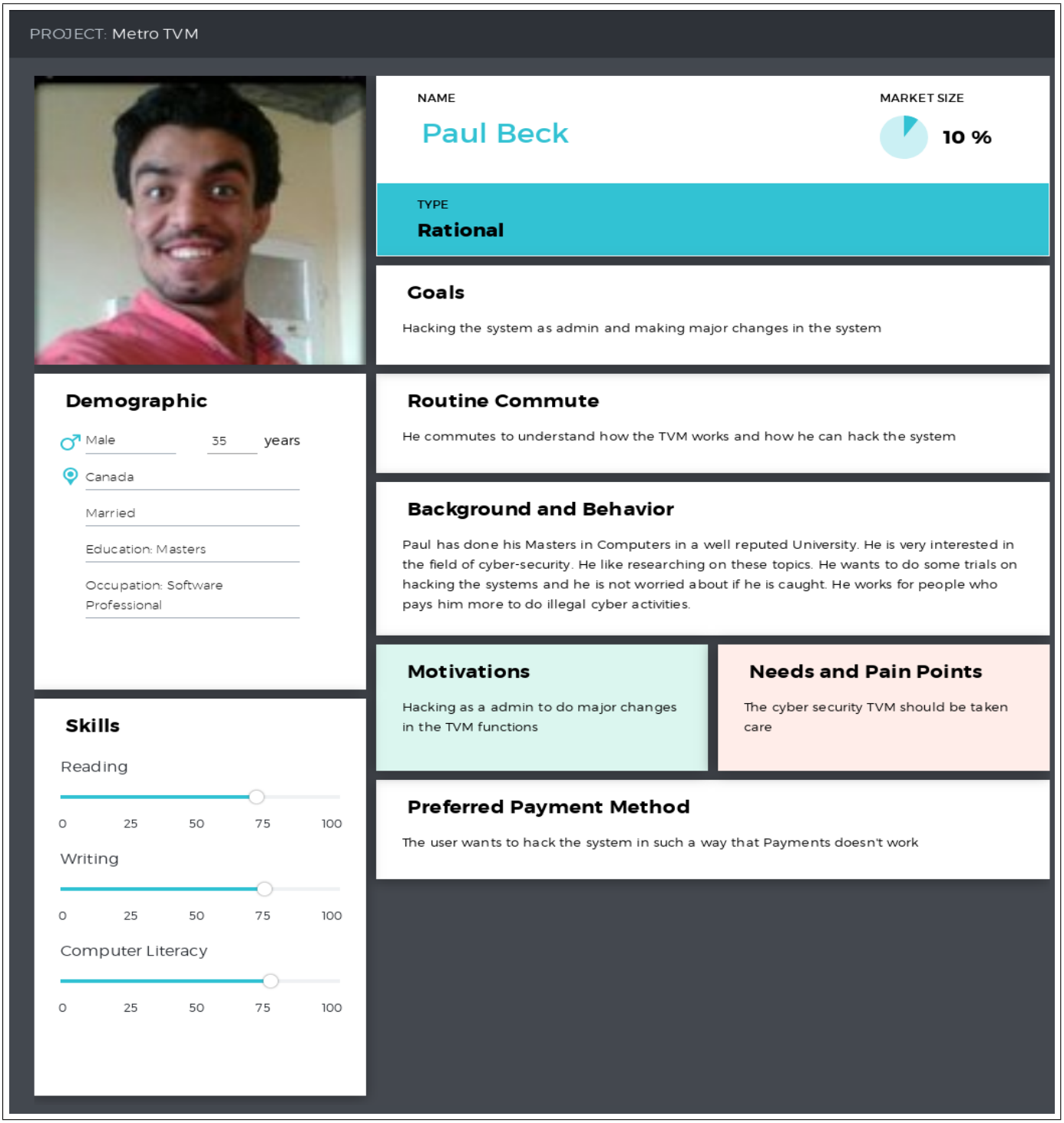

Figure 1.9: Persona: Negative Persona: Hacker

1.2 Problem 5: Global Constraints

ID	Constraint
Performance-G-01	From the time user selects to interact with the system, it takes less than or equal to 5 seconds on average for the system to display the result to that user.
Usability-G-01	User is able to go back to previous step and modify the request.
Accessibility-G-01	Ticket Vending Machine is accessible by users with different backgrounds and abilities by using a screen reader for vision impaired users or people who cannot read/write.
Maintainability-G-01:	Admin can modify system parameters and make changes later, without effecting current functionality of the system
Security-G-01	The server on which the system resides has its own security to prevent unauthorized read and wirte and delete access.
Privacy-G-01	The information regarding bank card is not saved on the server.
Privacy-G-02	Personal information of registered users is accessible only by authorized people.

1.3 Problem 5: User Stories [4]

Quality of User Stories [1]

Systematic scheme: We have a framework for user stories within the team to describe the user stories. The user story framework gives details about the constraints to be followed, list of acceptance tests and also the inspired user roles and personas.

Characteristics of user stories considered:
I-Investable — User stories are written in such a way that a team should be able to invest their time and resources.
N-Negotiable — Team members are able to discuss around its impacts, edge cases and expected behaviour.
V-Valuable — User stories are with significant business/ technical value into the product.
E-Estimable — User story points are assigned to each user stories based on their effort of development
S-Small — user stories are small enough that a scrum team can deliver within a sprint length.
T-Testable — written acceptance test cases for each user stories, which means they are testable

Individually as well as communally: User stories are independent, we will be are able to implement user stories individually. They are communal, which means they are following the same format of description, they are having the same characteristics but different implementations. They are Modular so that they can be integrated and very easy for maintenance.

1.3.1 User Story : Customer Login

Title: Customer Login **ID: TVM-01**	**Priority:** High	**Estimate:** 3 (story points)
As a Quality Commuter **I want to** login to the TVM system **So that I can** view my ticket plans		
Constraints: **Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02**		

Usability-1: Login credential text boxes should be prominently visible on the screen

Acceptance criteria:

Given a commuter interacting with TVM to view ticket plans
When user select the button to login
Then system displays to select a language, and response time is less than 5 seconds

Usability-Test-1: User should find the fields easily to enter credentials
Performance-G-01-Test-1: User interacts with TVM with speed and ease-of-use. Response time should be acceptable (less than 5 seconds).

Accessibility-G-01-Test-1: A user can hear the voice asking for TVM login

Relevant Persona(s) / User(s):
Unregistered Commuter, Registered Commuter includes: Regular User, Student, Senior Citizen, Negative user

Personas: George Bell, Susan Kubrock, Sadie Taylor, Jean Davidson

1.3.2 User Story : Select Language

Title: Select Language	**Priority:**	**Estimate:**
ID: TVM-02	Medium	2 (story points)

As a commuter
I want to select language
So that I can interact with TVM system

Constraints:

Performance-G-01, Accessibility-G-01, Maintainability-G-01

Usability-1: User should be given list of language options to choose

Acceptance criteria:

Given a commuter interacting with TVM to select known language
When selects the known language
Then system displays the next information in selected language, and response time is less than 5 seconds

Usability-1-Test-1: User should be able to easily select the option in the list
Performance-G-01-Test-1: User interacts with TVM with speed and ease-of-use. Response time should be acceptable (less than 5 seconds).

Accessibility-G-01-Test-1: A user can hear the voice asking for language selection

Maintainability-G-01-Test-1: A user should get the newly added language options to choose

Relevant Persona(s) / User(s):
Unregistered Commuter, Registered Commuter includes: Regular User, Student, Senior Citizen

Personas: George Bell, Susan Kubrock, Sadie Taylor

1.3.3 User Story : Select Ticket Type

Title: Select Ticket Type **ID: TVM-03**	**Priority:** High	**Estimate:** 3 (story points)

As a commuter
I want to select ticket types (Rechargeable card or Non-rechargeable ticket)
So that I can either reload Non-rechargeable card or buy a Rechargeable ticket

Constraints:

Performance-G-01, Accessibility-G-01, Maintainability-G-01

Usability-1: All ticket types should be displayed on the screen at the same time

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Acceptance criteria:

Given a commuter interacting with TVM to select ticket types
When user enter the system to buy a ticket or view ticket plans
Then system displays ticket types for user to select among them

Usability-1-Test-1: A user enters the system and all ticket types will be displayed on the screen for the user to select among them
Performance-G-01-Test-1: A user enters the system and the ticket types will be displayed in less than or equal to 5 seconds for the user to select among them

Accessibility-G-01-Test-1: A user can hear the voice for each text displayed on the output device.

Maintainability-G-01-Test-1: A system Administrator adds a new ticket type without effecting the current functionality of the system

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Relevant Persona(s) / User(s):
Unregistered Commuter, Registered Commuter includes: Regular User, Student, Senior Citizen

Personas: Personas: George Bell, Susan Kubrock, Sadie Taylor

1.3.4 User Story : View Ticket Plans for Rechargeable card

Title: View Ticket Plans for Rechargeable card	**Priority:**	**Estimate:**

ID: TVM-04	High	5 (story points)

As a commuter
I want to view ticket plans on selecting rechargeable card with details and fares
So that I can decide what plan is suitable for me to buy

Constraints:

Performance-G-01, Accessibility-G-01, Maintainability-G-01

Usability-1: All the plans should be displayed on the screen so that user can compare them together.
Usability-2: Information displayed on the screen should be sorted ascending according to fare.

Acceptance criteria:

Given a commuter interacting with TVM to view ticket plans
When user select to display ticket plans
Then system will display different plans of ticket along with their details and fares

Usability-1-Test-1: A user select to view ticket plans and all plans will be displayed on the screen
Usability-2-Test-1: A user select to view ticket plans and all plans will be displayed on the screen on ascending order according to ticket fares

Performance-G-01-Test-1: A user select to view ticket plans and the result will be displayed in less than or equal to 5 seconds

Accessibility-G-01-Test-1: A user can hear the voice for each text displayed on the output device.

Maintainability-G-01-Test-1: A system administrator adds a new ticket plan without effecting the current functionality of the system

Relevant Persona(s) / User(s):
Registered Commuter includes: Regular User, Student, Senior Citizen

Personas: Personas: George Bell, Susan Kubrock

1.3.5 User Story : View Ticket Plans for Non-Rechargeable card

Title: View Ticket Plans for Non-Rechargeable card **ID: TVM-05**	**Priority:** High	**Estimate:** 5 (story points)

As a commuter
I want to view ticket plans on selecting non-rechargeable ticket with details and fares
So that I can decide what plan is suitable for me to buy

Constraints:

Performance-G-01, Accessibility-G-01, Maintainability-G-01
Usability-1: All the plans should be displayed on the screen so that user can compare them together.
Usability-2: Information displayed on the screen should be sorted ascending according to fare.

Acceptance criteria:

Given a commuter interacting with TVM to view ticket plans
When user select to display ticket plans
Then system will display different plans of ticket along with their details and fares

Usability-1-Test-1: A user select to view ticket plans and all plans will be displayed on the screen
Usability-2-Test-1: A user select to view ticket plans and all plans will be displayed on the screen on ascending order according to ticket fares
Performance-G-02-Test-1: A user select to view ticket plans and the result will be displayed in less than or equal to 5 seconds

Accessibility-G-01-Test-1: A user can hear the voice for each text displayed on the output device.

Maintainability-G-01-Test-1: A system administrator adds a new ticket plan without effecting the current functionality of the system

Relevant Persona(s) / User(s):
Registered Commuter includes: Regular User, Student, Senior Citizen

Personas: Personas: George Bell, Susan Kubrock, Gabriel, Mariam

1.3.6 User Story : Select Payment Method

Title: Select Payment Method **ID: TVM-06**	**Priority:** High	**Estimate:** 5 (story points)

As a commuter
I want to have the option to pay either using cash or card
So that I can move ahead to proceed my transaction

Constraints:

Performance-G-01, Accessibility-G-01, Maintainability-G-01

Usability-1: Both methods should be displayed on the screen so that user can choose according to his convenience.

Security-1: The payment should be secured and ask for authorization each time to make sure user's card details are secured and not misused, in case of card payment.

Acceptance criteria:

Given a commuter interacting with TVM to pay for his/her ticket
When user select the button to pay for ticket

Then system displays different payment methods it accepts, and user should be able to pay using any one of them.

Usability-1-Test-1: A user enters the system and both payment methods will be displayed on the screen for the user to select among them
Security-1-Test-1: A user select the card payment method and the system will secure it by asking for authorization each time, making sure the user's card details are secured and not misused

Performance-G-02-Test-1: A user select the payment method and the result will be displayed in less than or equal to 5 seconds

Accessibility-G-01-Test-1: A user can hear the voice for each text displayed on the output device.

Maintainability-G-01-Test-1: A user should newly added methods to choose

Relevant Persona(s) / User(s):
Registered Commuter includes: Regular User, Student, Senior Citizen

Personas: George Bell, Susan Kubrock, Mariam, Gabriel

1.3.7 User Story : Make Cash Payment

Title: Make Cash Payment	**Priority:**	**Estimate:**
ID: TVM-07	High	5 (story points)

As a commuter
I want to be able to make a payment using cash
So that I can purchase ticket and get confirmation receipt

Constraints:

Performance-G-01, Accessibility-G-01, Maintainability-G-01

Usability-1: System should display information on type of cash denomination accepted and how to enter cash.
Usability-2: The system should dispense the cash back if ticket purchase fails.

Security-1: The payment should be secured and validation of currency and denomincations of the cash received should be done.

Acceptance criteria:

Given a commuter interacting with TVM to pay for his/her ticket
When user select the button to make cash payment
Then system displays instruction on how to make a cash payment, validate the currency and denomination and process the cash payment.

Usability-1-Test-1: A user enters cash of correct currency and denomination using cash acceptor. System also displays information on how to make cash payment.
Usability-2-Test-1: System dispenses the money back to user if the transaction fails.
Performance-G-01-Test-1: A user insert cash and the system validates the currency and denominations in less than or equal to 5 seconds
Security-1-Test-1: System validates currency deposited by the user using cash acceptor. System also identifies the fake currency.

Accessibility-G-01-Test-1: A user can hear the instructions on how to make a cash payment.

Maintainability-G-01-Test-1: A system administrator adds functionality to process different types of denominations and currency.

Relevant Persona(s) / User(s):
Unregistered Commuter, Registered Commuter includes: Regular User, Student, Senior Citizen, Negative user

Personas: George Bell, Susan Kubrock, Sadie Taylor, Jean Davidson

1.3.8 User Story : Make Card Payment

Title: Make Card Payment **ID: TVM-08**	**Priority:** High	**Estimate:** 5 (story points)

As a commuter
I want to be able to make a payment using card
So that I can purchase ticket and get confirmation receipt

Constraints:

Performance-G-01, Accessibility-G-01, Maintainability-G-01
Usability-1: System should display information on each step of a card payment.

Security-1: The payment should be secured and ask for authorization each time to make sure user's card details are secured and not misused, in case of card payment.

Acceptance criteria:

Given a commuter interacting with TVM to pay for his/her ticket
When user select the button to make card payment
Then system displays instruction on how to make a card payment, authenticate and process the card payment.

Usability-1-Test-1: A user enters card and pin number and system should authenticate and process the payment and each steps information should be shown on the TVM.
Performance-G-01-Test-1: A user insert card and enter pin and the system authentication the payment in less than or equal to 5 seconds
Security-1-Test 1: A user insert the card and the system will security read the card details and ask for pin to authorize. Card information should be processed by system securely using encryption.

Accessibility–G-01-Test-1: A user can hear the instructions on how to make a card payment.

Maintainability-G-01-Test-1: A system administrator adds functionality to process different types of cards.

Relevant Persona(s) / User(s):
Unregistered Commuter, Registered Commuter includes: Regular User, Student, Senior Citizen, Negative user

Personas: George Bell, Susan Kubrock, Sadie Taylor, Jean Davidson

1.3.9 User Story : Cancel Seleted Plan

Title: Cancel Seleted Plan	**Priority:**	**Estimate:**
ID: TVM-09	High	5 (story points)

As a commuter
I want to cancel the selected plan when I change my mind before payment processing
So that I am not charged for cancelling the plan.

Constraints:

Global Constraints
Usability-G-01, Usability-G-02, Accessibility-G-01, Maintainability-G-01

Local Constraints
Usability-01: There should be a cancel button on the screen.

Acceptance criteria:

Given a commuter interacting with TVM to select ticket and pay for the selected ticket.
When user presses a cancel or go to previous menu just before payment processing
Then system takes the user back o previous page without charging the user.

Usability-1-Test-1: A user decides to buy another ticket then system should show a cancel or go to previous many button.

Performance-G-01-Test-1: A user presses the cancel or go to previous menu it takes less than or equal to 5 seconds on average for the system to take user back to the previous menu or cancel the transaction.

Accessibility-G-01-Test-1: A user can hear the voice for each text displayed on the output device.

Maintainability-G-01-Test-1: A system administrator adds a new ticket type without effecting the current functionality of the system

Relevant Persona(s) / User(s):
Unregistered Commuter, Registered Commuter includes: Regular User, Student, Senior Citizen

Personas: George Bell, Susan Kubrock, Sadie Taylor

1.3.10 User Story : Print Receipt

Title: Print Receipt	**Priority:**	**Estimate:**
ID: TVM-10	High	5 (story points)

As a commuter
I want to get a receipt printed after every transaction I complete
So that I have a proof of the transaction with me.

Constraints:

Global Constraints
Usability-G-01, Usability-G-02, Accessibility-G-01, Maintainability-G-01

Local Constraints
Usability-01: There should be a print receipt button on the screen.

Acceptance criteria:

Given a commuter has bought a ticket from the TVM
When gives command to get printed receipt for the transaction
Then system gives user a printed receipt.

Usability-1-Test-1: A user decides to get a printed receipt for competed transaction.
Performance-G-01-Test-1: A user presses the print receipt button and it takes less than or equal to 5 seconds on average for the system to give user a printed ticket

Accessibility-G-01-Test-1: A user can hear the voice for each text displayed on the output device.

Maintainability-G-01-Test-1: A system administrator adds a new ticket type without effecting the current functionality of the system

Relevant Persona(s) / User(s):
Unregistered Commuter, Registered Commuter includes: Regular User, Student, Senior Citizen

Personas: George Bell, Susan Kubrock, Sadie Taylor

1.3.11 User Story : Card Payment Fraud

Title: Check for payment card authorization	**Priority:**	**Estimate:**
ID: TVM-11	High	8 (story points)

As a fraud
I want ot use debit or credit cards with fake account and fake balance
So that payments are accepted

Constraints:

Performance-G-01, Maintainability-G-01

Security-1: Card inserted to the TVM by the commuter should be checked for validity with the bank
Security-2: Security Pin entered by the commuter should be checked whether it is valid with the bank database

Usability-1-Test-1: The payment approval should be within 10 seconds soon after the user enter the pin

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Acceptance criteria:

Given that commuter inserts bank card
When user enters amount and security pin
Then system will check bank card validity and displays result to the user

Security-1-Test-1: User can see the message of payment authorization from the bank
Performance-G-01-Test-1: If the pin is correct the payment approval result will be displayed in less than or equal to 5 seconds

Usability-1-Test-1: The payment approval should be within 10 seconds soon after the user enter the pin

Maintainability-G-01-Test-1: A system administrator adds a new card payment constraint without affecting the current functionality of the system

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Relevant Persona(s) / User(s):
Registered Commuter includes: Regular User, Student, Senior Citizen

Personas: George Bell, Susan Kubrock, Paul Beck, Jean Davidson

1.3.12 User Story : Hacking TVM admin login

Title: Hacking TVM admin login	**Priority:**	**Estimate:**
ID: TVM-12	High	8 (story points)

As a hacker
I want to be able to login as admin by stealing admin credentials
So that admin rights are hacked

Mitigation Constraints:

Maintainability-G-01:

Security-1: The URL used for the admin login will be different
Security-2: The admin login will be with security questions before login

Acceptance criteria:

Given that Admin visits the admin login URL
When admin answers all the security questions
Then admin will be allowed to login to the TVM admin system

Security-1-Test 1: Admin login should not be found or linked with in any of the commuters TVM
Performance-G-01-Test-1: If the security questions are answered right the admin login page will be displayed in less than or equal to 5 seconds

Maintainability-G-01-Test-1: Any constraints added to the admin login should be reflected during admin login

Relevant Persona(s) / User(s):
Registered Commuter includes: Regular User, Student, Senior Citizen

Personas: George Bell, Susan Kubrock, Paul Beck, Jean Davidson

1.4 Problem 6: Traceability Matrix [3]

1.4.1 Traceability Matrix

User Story ID	**User Story Title**	**User Story**	**Use Case**	**Constraint**
TVM-US-01	Login to TVM	TVM-US-12	TVM-UseCaseModel	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02 Usability-1"
TVM-US-02	Select Language		TVM-UseCase-1: Change Language	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02 Usability-1"
TVM-US-03	Select Ticket Type		TVM-UseCaseModel	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02, Usability-1"

TVM-US-04	View Ticket Plans for Rechargeable card	TVM-US-03	TVM-UseCase-2: View Ticket Plans	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02, Usability-1, Usability-2"
TVM-US-05	View Ticket Plans for Non-rechargeable ticket	TVM-US-03	TVM-UseCase-2: View Ticket Plans	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02, Usability-1, Usability-2"
TVM-US-06	Select Payment Method		TVM-UseCase-4: Make a payment	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02, Usability-1, Security-1"
TVM-US-07	Make a Cash Payment	TVM-US-06	TVM-UseCase-4: Make a payment	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02, Usability-1, Usability-2, Security-1"

TVM-US-08	Make a Card Payment	TVM-US-06	TVM-UseCase-4: Make a payment	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02, Usability-1, Security-1"
TVM-US-09	Cancel Selected Plan	"TVM-US-03	TVM-US-11"	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02, Usability-1"
TVM-US-10	Print Ticket and Receipt	TVM-US-07, TVM-US-08	TVM-UseCaseModel	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02, Usability-1"
TVM-US-11	Card payment fraud	TVM-US-03	TVM-UseCase-4: Make a payment	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02, Security-1, Security-2"

TVM-US-12	Hacking TVM admin login	TVM-US-01	TVM-UseCaseModel	"Performance-G-01, Usability-G-01, Accessibility-G-01, Maintainability-G-01, Security-G-01, Privacy-G-01, Privacy-G-02, Security-1, Security-2"

1.4.2 Traceability Matrix(Extended)

User Story ID	**Domain Model**	**Interview**
TVM-US-01	Registered Commuter	"Neerajpreet Kaur - Q6, Smitha Patil - Q6, Sahana Anatha - Q6"
TVM-US-02	Language	Smitha Patil - Q3
TVM-US-03	"Ticket: Rechargable Card, Non-Rechargable Card"	
TVM-US-04	Fare: Regular, Reduced	
TVM-US-05	Fare: Regular, Reduced	
TVM-US-06	Payment: Cash, BankCard	"Neerajpreet Kaur - Q7, Smitha Patil - Q7, Sahana Anatha - Q7"

TVM-US-07	Cash	Sahana Anatha - Q7
TVM-US-08	BankCard	"Neerajpreet Kaur - Q7, Smitha Patil - Q7, Sahana Anatha - Q7, Amandeep Kaur - Q3"
TVM-US-09		"Neerajpreet Kaur - Q4, Q5, Q12, Smitha Patil - Q12, Sahana Anatha - Q11, Q12"
TVM-US-10	Printer, NonRechargeableTicket, Receipt, PaperReceipt	Amandeep Kaur - Q4
TVM-US-11	BankCard	
TVM-US-12	Registered Commuter	

1.4.3 Traceability Matrix(Other Resources)

User Story ID	**Other Systems**
TVM-US-01	Current STM System "http://www.stm.info/en/info/fares/opus-cards-and-other-fare-media/registered-opus-card"
TVM-US-02	"Current STM System http://www.stm.info"
TVM-US-03	"Current STM System http://www.stm.info/en/info/fares"
TVM-US-04	"Current STM System http://www.stm.info/en/info/fares"

TVM-US-05	"Current STM System http://www.stm.info/en/info/fares"
TVM-US-06	"Current STM System http://www.stm.info"
TVM-US-07	"Current STM System http://www.stm.info"
TVM-US-08	"Current STM System http://www.stm.info"
TVM-US-10	"Current STM System http://www.stm.info"

1.5 Problem 7: Implementation Document

1.5.1 Implementations - User Story: TVM-US-01

As a Commuter, I want to be able to Login to TVM to buy a ticket.

Implementation

Instructions of Use

- Extract the Zip folder.
- Click on the Login.html page
- It will take you to the login page.
- Since we don't have a database access so the user can enter any name and password, but cannot leave them empty
- So please use any name and password to login.
- After logging in, it will take you to the Welcome Page.

Figure 1.10: User Story: TVM-US-01

DOM: The implementation is done using the document object model of various HTMl elements. Elements are logically connected with each other and pass the values to verify the sequential alignment of all the elements and their corresponding functions.

Data Structures: The user is able to login into the system with a given username and password Since we are not considering any database for the TVM application back end. The user will be able to login with a one user name and password only.

Programming Platform: HTML 5 and Javascript
User Interface: Textual
Constraints covered: Usability-G-01

1.5.2 Implementations - User Story: TVM-US-03

As a Commuter, I want to be able to select ticket types (Rechargeable card or Non-rechargeable ticket), so that I can either reload Non-rechargeable card or buy a Rechargeable ticket.

Implementation

Instructions of Use The TVM simulator for selecting ticket type will begin with the login and the displaying the ticket plans. Then the user is asked to select ticket types (Rechargeable card or Non-rechargeable ticket). If user inputs 1, Rechargable card is selected, if user selects 2 a Non-Rechargable ticket is selected.

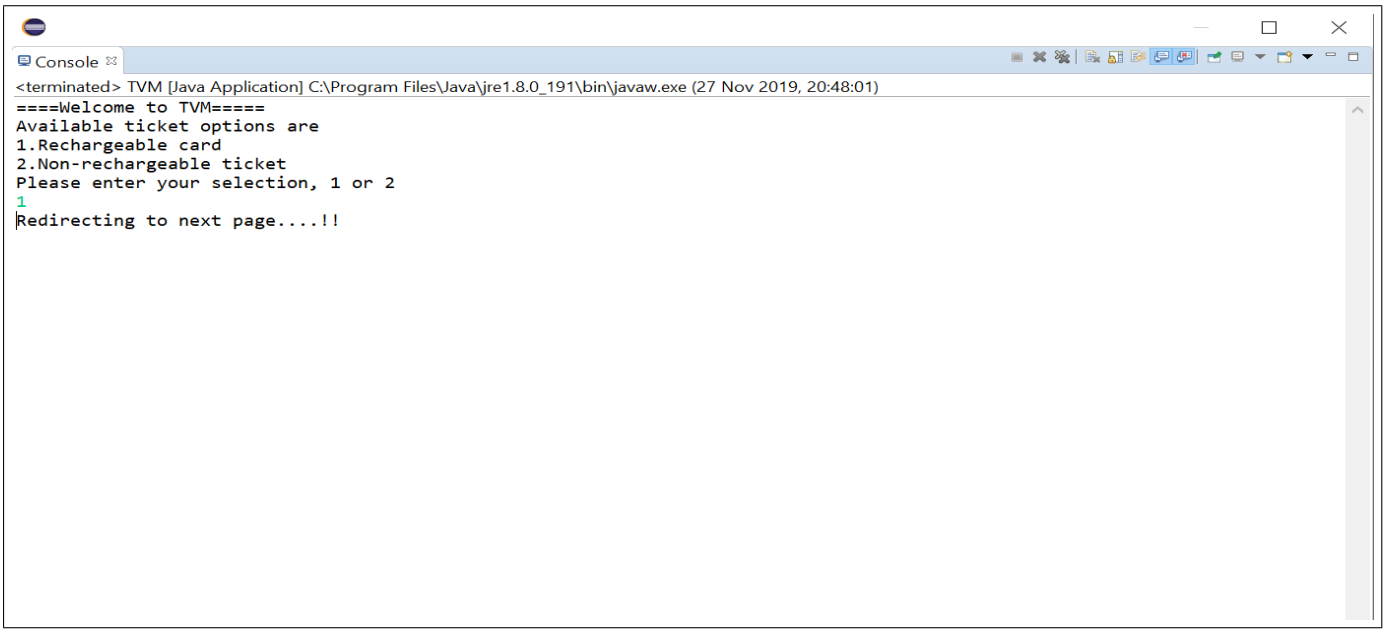

Figure 1.11: User Story: TVM-US-03

DOM: Since we are not considering any database for the TVM application back end. Basic data structures available in Java are taken. Ticket types are stored in an ArrayList.

Data Structures: The user is able to login into the system with a given username and password Since we are not considering any database for the TVM application back end. The user will be able to login with a one user name and password only.

Programming Platform: Java Enterprise Edition
User Interface: Textual
Constraints covered: Performance-G-01

User Error Protection: It will be made sure that user provides the right input in required format.

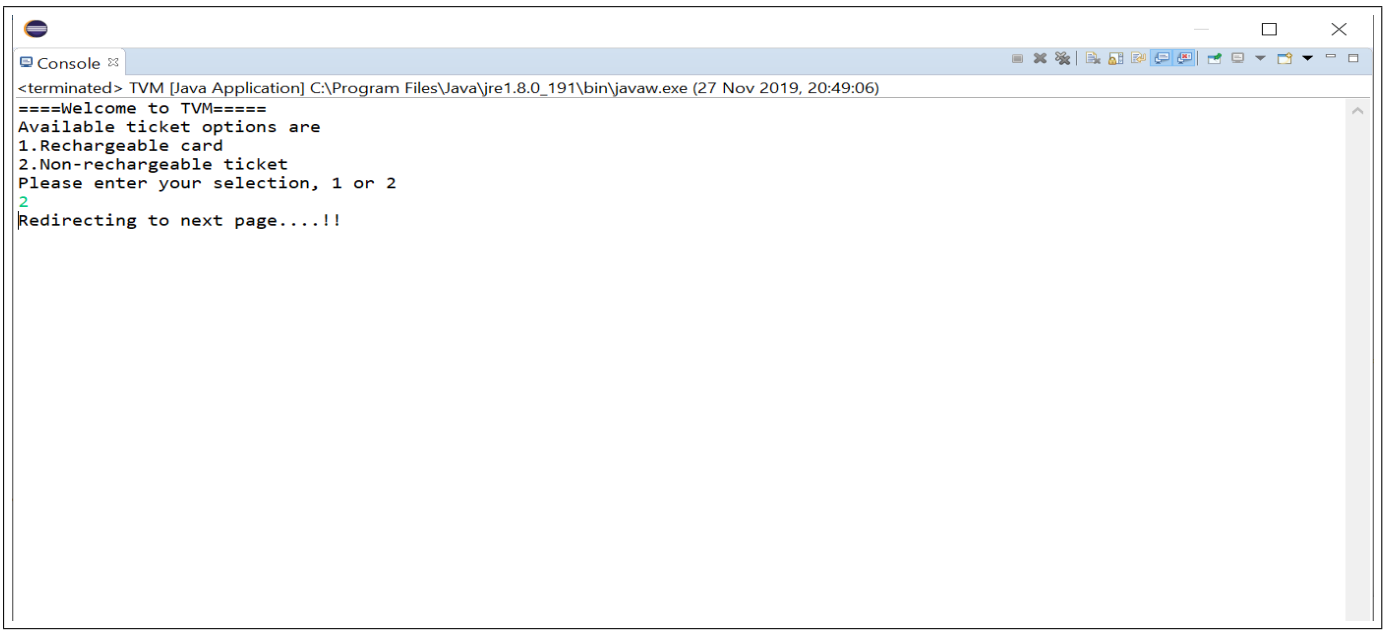

Figure 1.12: User Story: TVM-US-03

Maintainability: Data structures selections are in such a way that any changes to the ticket types can be done.
Learnability: New users will get to know that there are two types of tickets available i.e Rechargeable card or Non-rechargeable ticket

1.5.3 Implementations - User Story: TVM-US-05

As a Commuter, I want to be able to view ticket plans on selecting Non-rechargeable ticket with details and prices, so that I can decide what plan is suitable for me to buy.

This user story is implemented using Java with textual user interface. Since there is not a database so that system can read ticket information from a DB, a HashMap data structure is used to save the information about different ticket plans. Using console input/output user can communicate with the system.

Instruction of Use This program is a Ticket Vending Machine simulator and displays ticket plans with details and fares to TVM user upon selecting Non-rechargeable ticket plans. When user selects the ticket type as "Non-rechargeable ticket" and selects to view ticket plans, this program displays the ticket plans and details to the user. First, the program description and the instruction are displayed to the user, then the list of ticket types is displayed to the user as shown in 1.13

Quality Attribute Constraints [1]

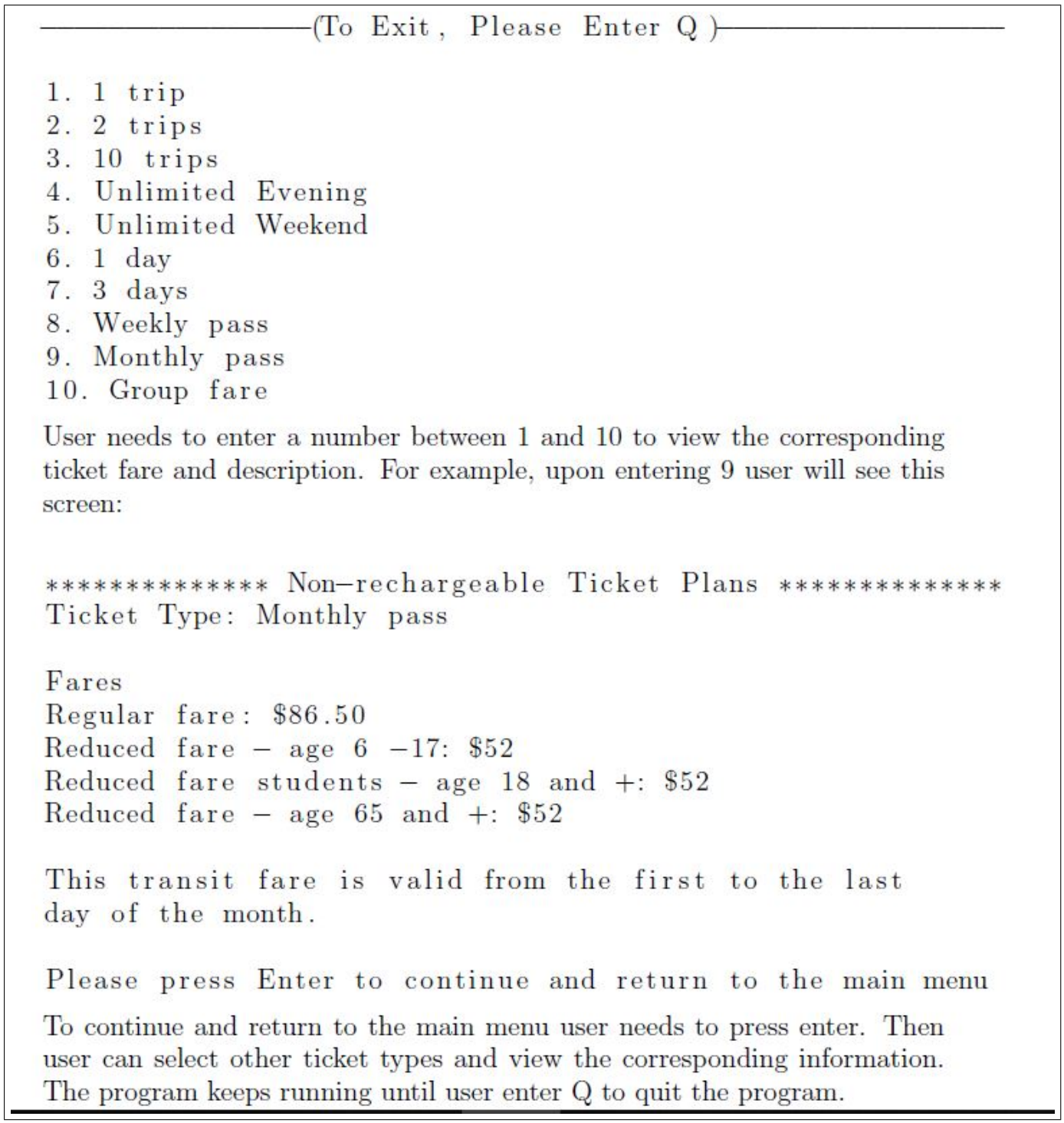

Figure 1.13: User Story: TVM-US-05

Usability: To increase user satisfaction usability quality attribute is considered as follow.

Data Structures: The user is able to login into the system with a given username and password Since we are not considering any database for the TVM application back end. The user will be able to login with a one user name and password only.

Programming Platform: Java Enterprise Edition
User Interface: Textual
Constraints covered: Performance-G-01

User Error Protection: The input is validated and if it is not a number an error message is displayed to user to correct the input. Also the input is verified to be in the correct range which is between 1 and 10, and if it is not in the valid range, an error message is displayed to the user as follow and user is asked to re-enter the input.
Usability: To increase user satisfaction usability quality attribute is considered as follow.
Maintainability: To increase maintainability, a HashMap data structure is de
ned which saves different ticket types and fares and details. With this implementation, if new plan needs to be added later, it can be added to the data structure with minimal modi
cation.
Learnability: At the beginning of the program, the type of program and its purpose is displayed to the user and a user manual about how to use the system is displayed as well.
Operability: To make the system operable, system keeps running until user enter "Q" to quite the program. Otherwise user can return to the main menu and view the detail for different ticket types. Also, to make the system understandable for the user, after showing the result of his/her request, the system freezes so that user can see the result. User asked to press enter to continue and return to the main menu.
Accessiblity: In this project it is not possible to implement accessibility constraint which is using a screen reader as it needs hardware equipment which is not possible to prepare.

1.5.4 Implementations - User Story: TVM-US-07

As a commuter, I want to be able to make a payment using cash, So that I can purchase ticket and get confirmation receipt.

Implementation The user story is implemented by using primitive types in which bill is displayed on the screen and user is asked to enter the amount for the cash. Then the user is requested to collect the balance and receipt.
Instructions of Use The TVM simulator for payment by cash begins with displaying the bill. Then the user is asked to enter the amount for the payment. After the successful payment, the user is again asked to collect the balance and if he needs the transaction receipt. The receipt is printed based on the response of the user.

Programming Platform: Java Enterprise Edition
User Interface: Textual

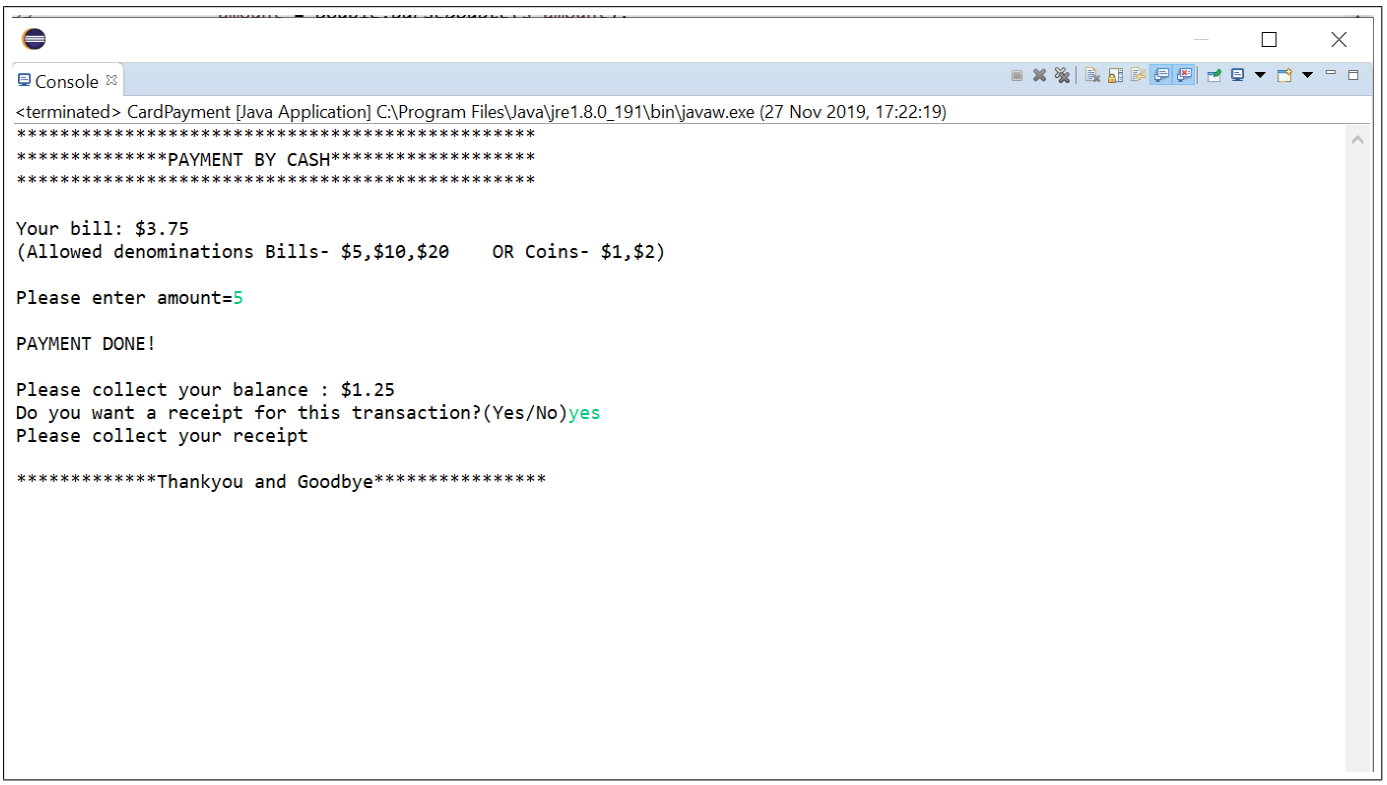

Figure 1.14: User Story: TVM-US-07

Constraints covered: Performance-G-01

User Error Protection: It will be made sure that user provides the right input in required format.
Accessiblity: In this project it is not possible to implement accessibility constraint which is using a screen reader as it needs hardware equipment which is not possible to prepare.

1.5.5 Implementations - User Story: TVM-US-09

As a commuter, I want to be able to cancel selected plan, So that I won't get charged and I can make changes later if I want in my purchase.

Implementation The user story is implemented by using primitive types in which user selected plan is displayed to the user with options to "make a payment" or "cancel" the current transaction. Make a payment directs the user to the making a cash or card payment page while the cancel button directs user to homepage.

Instructions of Use

- Extract the Zip folder.
- Click on the PaymentPage.html file and open the file in browser.
- It will open a webpage for cancel functionality.
- The page will display two buttons – “cancel” and “make payment”.
- To make a payment for your selected plan click on “make payment” button and it will take you to the payment mode selection page
- To cancel a payment, click on “Cancel” button which will take you to the homepage of TVM.

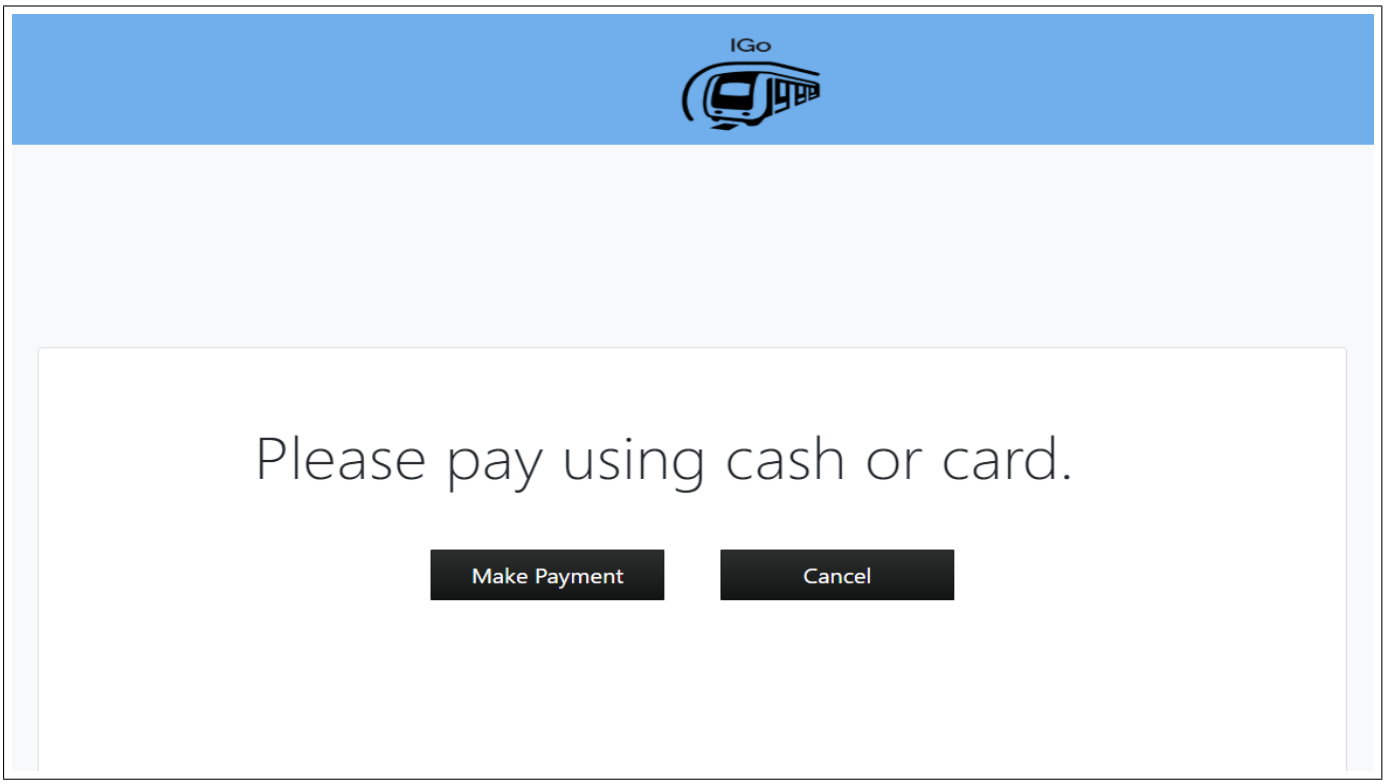

Figure 1.15: User Story: TVM-US-09

Programming Platform: HTML, CSS, Bootstrap
User Interface: Textual, Graphical
Constraints covered: Performance-G-01

Quality Attribute Constraints

User Error Protection: It will be made sure that user provides the right input. At this screen the system has only 2 active buttons on the GUI that is either move to payment screen or cancel the transaction. No other input from user will be considered.
Maintainability: The system does not depend on other modules for data and can easily me modified as per the future requirements.
Learnability: User will be displayed only the necessary interaction components on the GUI. By hiding irrelevant details on payment selection screen makes it easier for user to navigate to the other steps.
Acessiblity: In this project it is not possible to implement accessibility constraint which is using a screen reader. Also there will be a 3.5mm jack provided on the tvm for the visually impaired users which is also not possible to demonstrate here as it is hardware dependent.

References

[1] Pankaj Kamthan. *Introduction to Software Product quality*. 2019.

[2] Pankaj Kamthan. *Introduction to User Modeling*. 2019.

[3] Pankaj Kamthan. *Traceability in Software Requirements*. 2019.

[4] Pankaj Kamthan. *User Stories in Context*. 2019.

Glossary

Administrator Electronic Method of Payment. 17

Modular Is a approach that subdivides a system into smaller parts called modules. 14

Non-Rechargable Card One time use and throw card.. 32

Quality Commuter Someone who is using the transport service to travel. 14

Rechargable Card A card that can be recharged to be used monthly, weekly.. 32

Ticket Vending Machine Ticket Vending Machine. 13

A Appendix

A.1 Interviews

Users are Interviewed and the results are accessable at: https://github.com/m3hrn4z/SRS