DELIVERY 1

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TEAM B

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GIT url: https://github.com/SriparnaChakraborty/SOEN-6481

Contents

0.1 Problem 1

BRIEF DESCRIPTION:

iGo is an electronic payment system that makes travelling on transit faster and easier by eliminating the need for tickets, tokens, passes and cash.It works across local transit services in Canada, making paying for your trip simple, convenient and secure.It also allows customers to travel seamlessly across multiple transit agencies with the one electronic fare card by tapping their card at stations and on buses.

It is actively investigating ways to enhance the customer experience such as self-service devices and mobile device applications. The system was designed to accommodate developments in fare payment technology. While iGo currently operates on a closed loop, its system is based on an open architecture, which supports multiple vendors and emerging technologies including contactless debit/credit, near-field communication (NFC) and enhanced online services.

With iGO, it is assumed that metro stations and buses have smartphones/tablets on which the application will be installed, to scan and validate the electronic tickets.With the official iGo app you can manage your card anytime, anywhere.Loading your iGo card has never been easier.You can:

- load funds and transit passes (instant load available on Android devices with NFC)

- receive low balance/pass expiry reminders and email receipts for fare purchases.

- pay with Apple Pay and saved payment method

- set up and manage Autoload and Autorenew

- manage multiple iGo cards

- check your iGo card balances

- view your transaction history

- buy a iGo card and create a iGo account

You can download the iGo App now from the Google Play Store or the Apple App Store.The current month's passes are available up to the 8th day of the month. Next month's passes are available as early as 12 days before the end of the month.

You can purchase an iGo Monthly Pass: 1)through the iGo app ,2)at one of our Fare Vending Machines or Self-Serve Reload Machines, located at all iGO metro stations iGO fares

| |
|---|
| $3.10 (Adult) |
| $2.15 (Senior, age 65+ / Youth, ages 13-19) |
| Save up to $1.60 per trip when you transfer between Transits. |
| Monthly pass (Adult - $151.15; Senior/Youth - $122.45) |
| 12 Month Pass (Adult - $138.55; Senior/Youth $112.25) |
| Post-Secondary Monthly Pass ($122.45) |
| iGo Tickets (One-ride - $3.25; Two-ride - $6.50; Day pass - $13.00) |

The Software system must have a Very High Performance, Low-Latency, High Traffic management, Highly Available, Secure, and Accurate.

The payment for the Ticket Purchase is out of scope for this project and will not described in the specifications. However, a Payment option is added which can be extended for realization. Some additional functionalities of the Software include support for multiple Languages.

0.2 PROBLEM 2:

CONTEXT OF USE for Ticket Vending Machine

The context for the ticket vending machine is specific for the public transportation. The application would be designed for the mobile, is customized accordingly. The context of use model has been described in the below diagram where the centralized concept is the iGO TVM which is deployed in on the mobiles. The users are using it for generating the tickets for public transportation like busses and trains etc. The software development team on the other hand would be responsible to implement the design and produce the software for the people to use on day to day basis
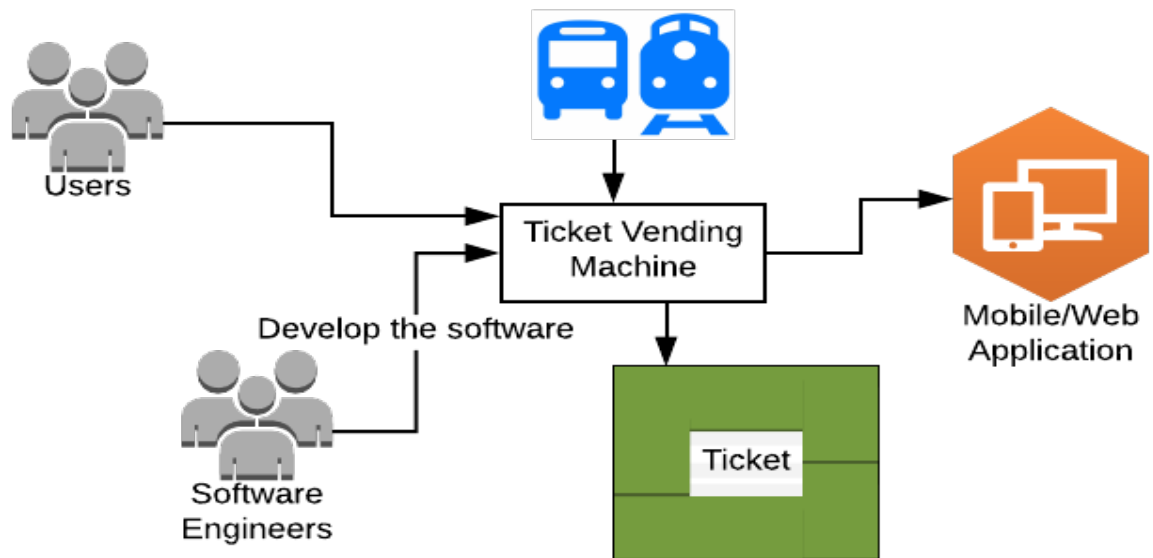
We use the user-centric context of use framework [1: Kamthan] to identify and classify factors that influence the utility and usability of iGo.

Framework of Context of use Model:[CUIGO]

TYPE OF FACTORS	ATTRIBUTE	DETAILS
User	Age	>6
	Skill	Able to interact and read instruction set
	Education	Basic Details
	Training	Self training needed to operate the vending machine
	Experience	Previous experience counts with the similar type of TVM
	Mental /Physical Attribute	Mentally presence and physically activeness is needed. TVM should be accessible if the users are blind or physically challenge
	Attention	Full attention needed

User Task	Task specific goals	A complete and successful transaction from user side .for example -1.printing ticke 2. printing receipt
	Criticality of task	Priority high due to the reason that user might be in rush to reach his/her destination.
	Frequency of use	No restriction for user in multiple purchase of ticket ir a single day
	Dependency on use	Database connection and power breakage is inacceptable.
	Duration of use	3 minutes of idle state will bring the user back to its home page.
	Risk from error	If at any time user makes a mistake they can always go back or cancel current transactio

User Role	Admin	1.Network Administrator 2.Security Engineer 3.Software Engineer
	Registered	Users with a valid iGO card.
	New user non-registered	Users or non frequent travellers with no iGO card and are interested in buying tickets according to their needs.

User Goal	Criticality	Highly Critical
	Overall Goal	A complete and successful transaction from user side.
User Activity	Sitting	Physically challenged user with for example a wheelchair person should be able to use TVM.
	Standing	User should be able to use TVM in standing position.
	Others	Children >6 or blind user should have proper access to TVM
Location and Time	Location	Available near to every metro station even on the streets
	Time	Ticket will be purchased according to local time zone
Natural Environment	Light	Proper lighting needed even in the brightest day to see the display for all users
	Temperature	TVM will be on the street .So Temperature will play a major role here.
	Sound	Specially for physically challenged users the sound from the system should be in perfect pitch.

Technical Environment	Hardware		
	Screen		Interface with proper button options to select any options
	Keyboard		Keyboard should be made keeping in mind all kind of users and OK,CANCEL and CLEAR button will be there in GREEN,RED and YELLOW colour.
	Software		
	Server		Server will be running 24/7. It will accept payment gateways as well. Every transaction will be recorded in the IGO database.
	Operating System		IGO will be using any preferable OS on market.
	Network		
	Connectivity		It will be running 24/7.
	Stability		It should be stable enough to run

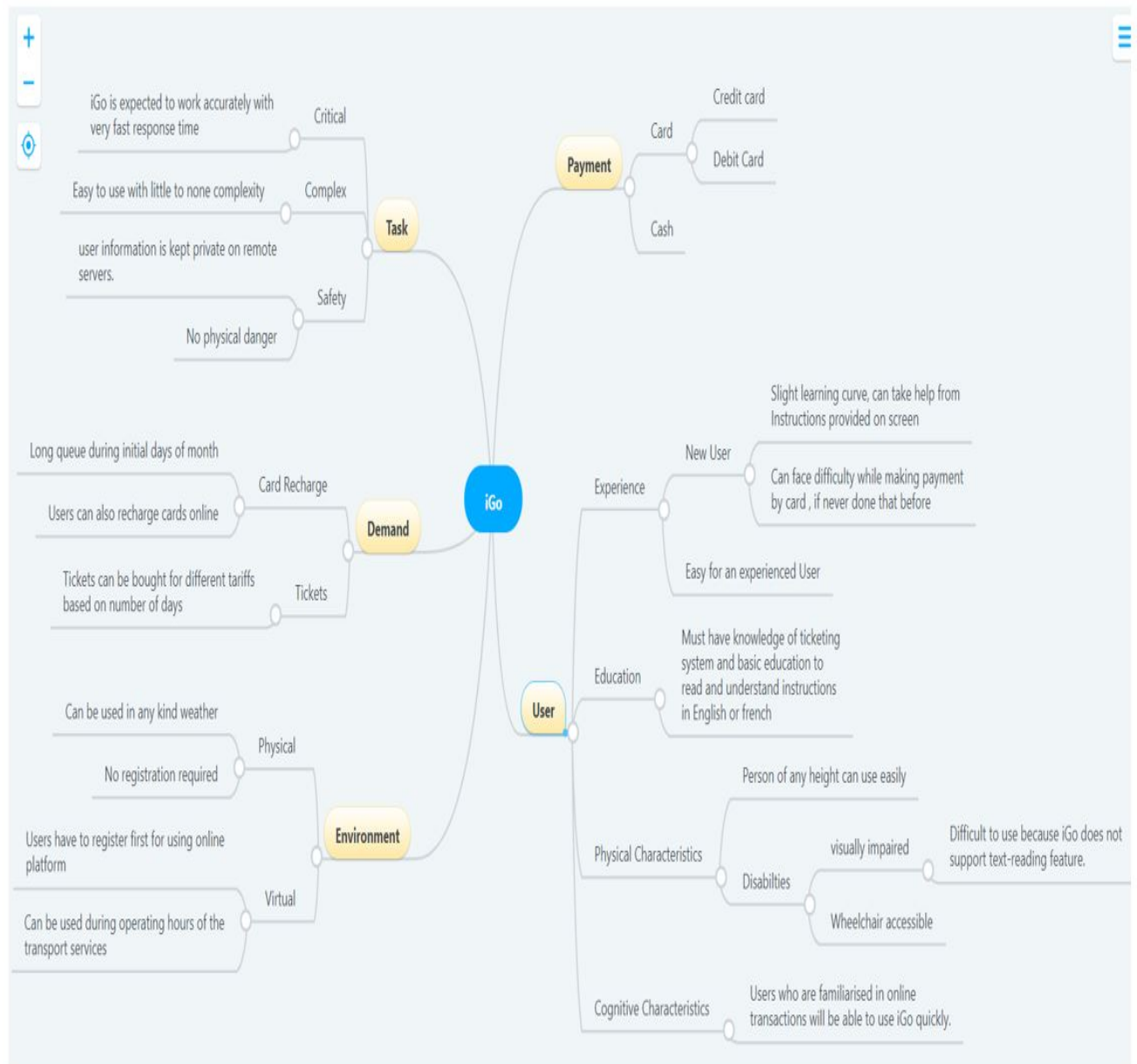|		in a real world with real users.
Social Environment	*Ethical Standard*	It should follow standard Canadian ethics.
	Legal Constraints	It should follow all the legal rules made by Transport Canada

Mind Map for Context of use

Figure 2. Mind Map - Context of use for Ticket Vending Machine

0.3 PROBLEM 3

A stakeholder is defined as anyone with an interest in the project, irrespective of whether that interest is positive or negative. They may be individuals or organizations that are actively involved in the project, or whose interests may be affected by the execution or completion of the project.
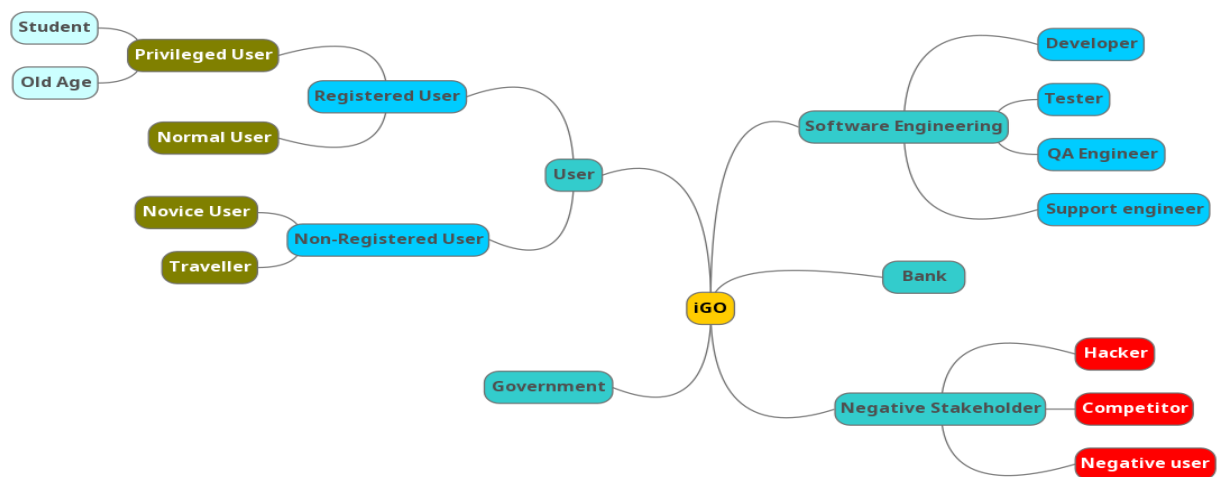
Vocabulary and key concepts of the problem domain.

- **Transport Authority**
  Governing and managing authority for iGo TVMs. There is only ONE transport authority for all the TVMs.

- **iGo**
  It is the central concept of domain model and has the responsibility to provide service of buying tickets or recharging metro cards to end users.

Class derived from this concept will have attributes such as:
Location: geographical location of the physical iGo TVM kiosk.

As shown in the domain model diagram iGo has following relationships among other concepts in the domain.

- One Transport Authority manages more than one iGos

- More than one users can use One-to-many iGos.

- Any of the iGo can be used to recharge cards or buy tickets and can be used to generate receipt after that.

- One TVM has only one Payment Gateway.

- **Payment Gateway**

  Every iGo has a dedicated payment gateway to process daily payments by users. users can either insert coins or cash or can also use their Debit or credit card for their transactions.

  Relationships

  - One to one relationship between iGo and payment gateway.
  - Every gateway is connected to all major national banks to process transactions.

- **Bank**

  Bank depicts a governing authority related to banking domain, which authenticates and verify payments.

  Relationships

  - One to one relationships between bank and payment, as one payment can not be authenticated by multiple banks.
  - Every payment gateway can be connected to more than one banks.

  User

  The end user of the iGo.

  Description of relationships:

  - Every TVM iGo can be used by one to many users.
  - Every user has one to many relationships with payment. Because every user can make more than one payment.

- Not every user has Metro card hence many to zero relationships between user and metro card.

- Not every user will buy a ticket if they have metro card, hence many to zero between user and metro ticket.

- **MetroCard**

  A RFID based card provided by transport authority to each registered user. Users can recharge their cards at any of the iGo TVM

  Description of relationships:

  - One User can own minimum zero and maximum one card.

  - Any number of cards can be recharged at any of the iGo TVM.

- **Ticket**

  Paper based tickets can be bought from any of the iGO TVM. These tickets validity can differ based on the option selected.

  Description of relationships

  - Users can buy more than one ticket from any of the TVMs.

  - iGo TVM can dispense more than one tickets in a day of its during its life time.

- **Payment** Information about transaction is shared with Bank in the form of payment. User can do payment by either Cash or Card (Debit/Credit).

  Description of relationships:

  - Each payment will have one receipt (paper receipt or email receipt).

  - One payment will be verified by one bank during a single session created through payment gateway.

- **Receipt** Either paper or email receipt or both are provided to customer in return for their payment. Which acts at the proof for that particular payment.

  Description of relationships:

  - One receipt has only information about single payment.

  - One to many receipts can be generated by a one to many TVMs.

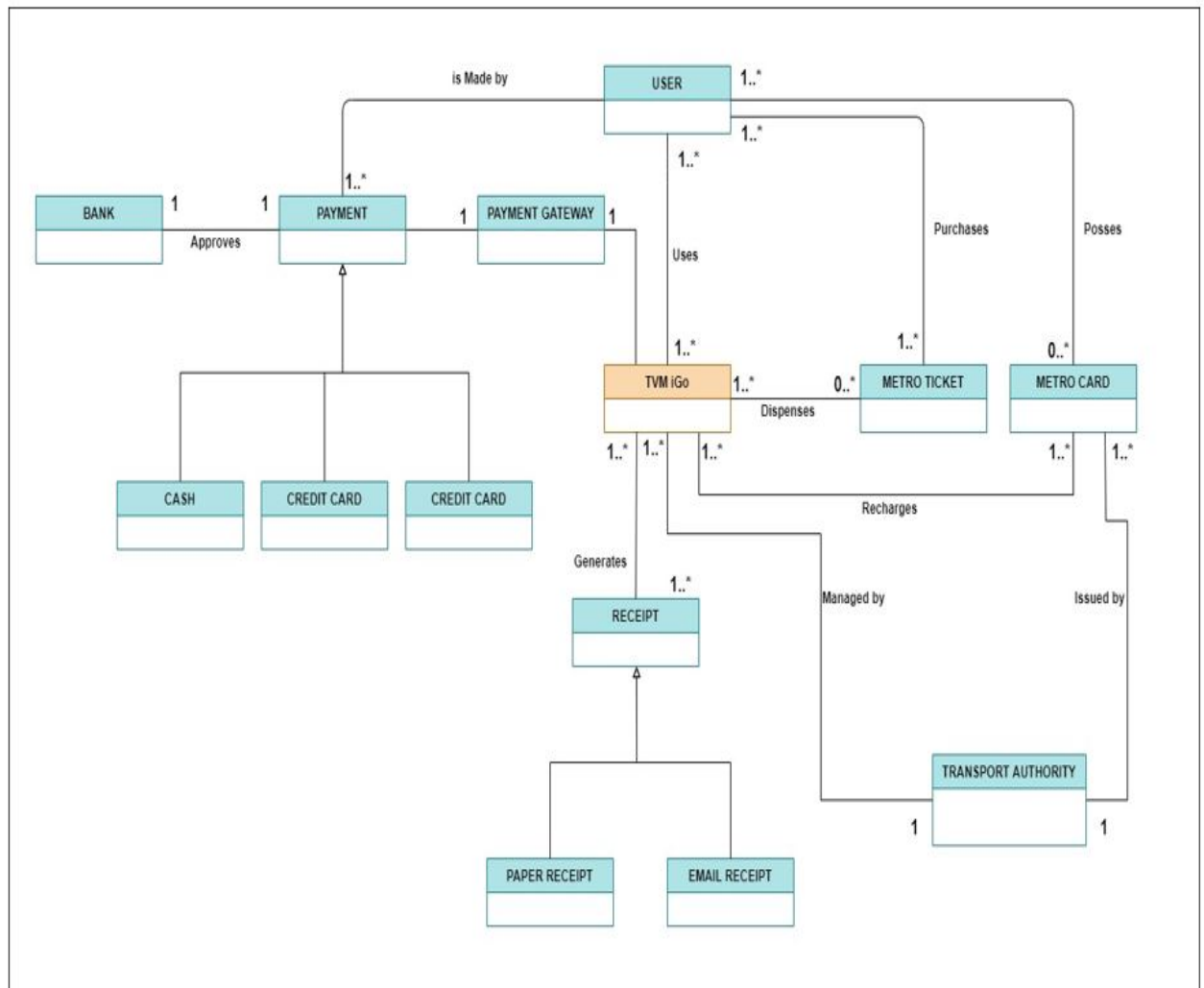**Relationships among all of the entities within the scope of the domain**

Figure 4. Domain Model : iGO

0.4 Problem 4

Insert information explaining the results from your physical circuits as it relates to the function and logic gates. Insert well titled and organized truth tables from the lab manual with the data you collected while conducting the experiment. Insert every truth table the lab calls for. Insert Logic Diagrams made in Multisim relating to the functions used in the experiment.

0.5 Truth Tables, Expressions* and K-Maps*

Add Tables here

0.6 Multisim

Not used

0.7 IC Diagrams

0.8 Conclusion

References