

ENG 1102 Renaissance Engineer 2: Engineering Design Principles

Winter Term (Jan – Apr, 2022)

Assignment #1 – Personas, Identifying User Needs, and Objective Tree

Due: January 28, 2022 at 11:59 p.m.

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This assignment is designed to give you practice with the skills you will be applying to your Project Phase I. Individually, choose one of the following two prompts:

Option A: Assessing Needs to Re-Design Pearson Airport

Pearson Airport is to undergo a major renovation to improve users' experience throughout the whole system, from check-in to take off. As a member of the engineering team hired to deliver this project, you have been tasked with developing three personas that represent different users to help with the design thinking process for this project. Note that users include both passengers and the people that work at the airport or run services to the airport. Read through and review the persona lecture slides and watch the videos from the slides to address the following points.

OR

Option B: Assessing Needs to Re-Design the York University Subway Station

The Toronto Transit Commission (TTC) York University subway station is located in the heart of the York University campus. The \$120-million facility is one of six new stops on the TTC's Toronto-York Spadina Subway Extension project and has been called "Toronto's most stunning subway station" by BlogTO. The station, which is 100 steps from Schulich's main entrance, connects the university to the core of Toronto's financial district. The York University subway station is to undergo a major renovation to improve the users' experience throughout the whole system, from buying of tickets to getting to different preferred destinations. As a member of the engineering team hired to deliver this project, you have been tasked with developing three personas that represent different users to help with the design thinking process for this project. Note that users include both passengers and the people that work at the station or run services to the station. Read through and review the persona lecture slides and watch the videos from the slides to address the following points.

Indicate Your Choice: Option 'A'

Q1. [13 marks] Identify **two** different personas that represent some of the diverse user base for the airport or the subway station. Use the **template provided at the end of this document**, in order to explain the key differences between the two personas.

Exceeds Expectations (13)	Meets Expectations (10)	Needs Improvement (6-9)	Unsatisfactory (0-5)
In addition to meeting expectations, there is creativity with the name description. (1 point) The described characteristics capture a unique persona that might be missed from general categorization of people. (1 point per persona)	Two personas properly named and pictures included with citation. (2 points per persona) Three characteristics identified for each persona. (1 point per characteristic, 3 points per persona)	Missing some of the details required to meet expectations.	One persona entirely missing, or the characteristics do not present any relevance to a real-life person.

Q2. [20 marks] Assume that the personas represent your users. Each of your users will have **specific needs** that your design should aim to meet, in the context of the airport or the subway station. You may wish to speak to someone who fits the persona, or look for news articles that share something about real people's experiences. Answer these questions for each user, using the **template provided at the end of this document**.

a.What purpose does the airport (or the subway station) serve for the user?

Example: Walter travels a lot. The airport provides access for Walter to get from city to city in a fast way.

b.While using or interacting with various aspects of the airport (or the subway station), what problems might each user encounter?

Example: There are delays at the gate, and some procedures create some hassle. Not enough time to grab food between connecting flights because the gate is too far from the food court.

c.In point-form, describe an ideal experience that the user should have, during his/her use or visit to the airport (or the subway station).

Example: Short distances between gates. Easier set of procedures. Moveable walkways. Enough time to grab food and get to the gate without a rush.

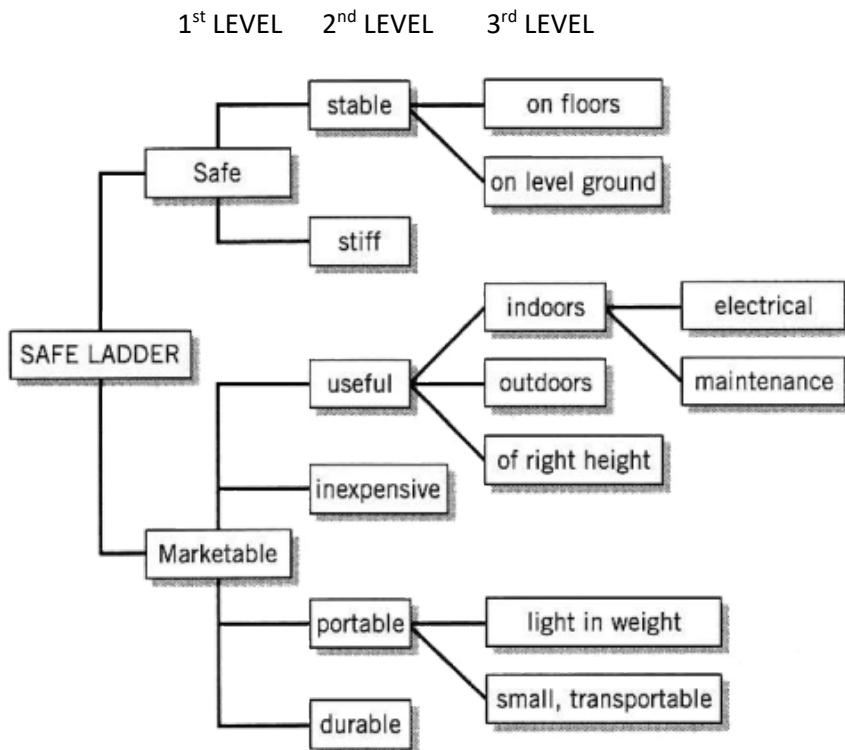
d.What aspects of the experience become a priority, to maximize the value of the airport (or the subway station) to the user?

Example: Walter values expediency and convenience. Carol values safety for children. Gareth values wellness and low-stress experience at the airport.

Exceeds expectations (20)	Meets expectations (18)	Needs improvement (8-17)	Unsatisfactory (0-8)
In addition to meeting expectations, the answers demonstrate an in-depth understanding of the user-specific experience. Insights are captured that would have been missed if not considering the selected personas/users.	Meaningful information specific to the persona/user are provided for each column (2 points per box). There is a good logical connection between the columns (2 points).	Information is provided for all the columns, but some information are either too generic or poorly connected to other columns for the same persona/user.	The responses do not reflect a good understanding of the specific characteristics of the personas/users, and how they bear on their experience in the airport/subway station.

Q3. [16 marks] Develop a list of objectives using the information collected for the personas, and organize them into an objective tree with three levels. [HINT: This should be done by brainstorming many attributes, classifying them, and then using an affinity diagram to develop an objective tree.]

**Example of an objective tree (this example can also be improved)



Exceeds expectations (16)	Meets expectations (14)	Needs improvement (6-12)	Unsatisfactory (0-6)
	[6] Three levels of objectives are included. At the 1 st -level, three or more objectives are included. Each 1 st -level objective is broken into two or more 2 nd -level objectives. At the 3 rd -level, nine or more objectives are included.	[4-6] Did not meet the minimum number of objectives expected.	[0-4] Missing an entire level of objectives.
[+2] In addition to meeting expectations, all nine 3 rd -level objectives provide clear, quantifiable, concrete features.	[3] There is a clear logical connection between levels of objectives. [5] At least 5 concrete features are identified by the 3 rd -level objectives.	[1-2] Some objectives have unclear logical connection, but overall there is some logical coherence. [1-4] Less than 5 concrete features are identified by the 3 rd -level.	[0-2] Not providing a logical connection nor concrete details moving from one level to the next.

Q4. [5 marks] From the objective tree, (a) identify at least two pairs of objectives that compete. Each pair of such objectives will require a decision of ‘trade-off’ (increase of x causes diminishing of y, therefore a balance has to be determined). This means each objective will have a limit/constraint because of its impact on another objective. (b) Describe the trade-off you would make for each pair of competing objectives, explaining why emphasizing one undermines the other.

Examples:

- For a ladder: Lightweight vs. Low cost of material
- “Light in weight” and “inexpensive” may be a trade-off if lighter materials (with equal strength) are more expensive in general. “Lightweight” may require a trade-off with “Durability” if material options being compared show increase in weight with increase in durability. Since an improvement in weight still has to be made, a slightly lighter (instead of the lightest) with reasonable cost increase (instead of a huge increase) should be selected.
- For the waiting area: Comfort (during waiting) provided by furniture vs. Evacuation speed for safety
- “Comfort in the waiting area” and “Evacuation speed” may be a trade-off if “comfort” refers to having furniture/facilities that take up space away from the hallways. Any increase in the size of each furniture and the number of furniture provided may be limited in order to secure hallway space. In another sense, this trade-off may change how ‘improving comfort’ is approached.

Exceeds expectations (5)	Meets expectations (4)	Needs improvement (2-3)	Unsatisfactory (0-1)
At least 2 trade-offs are clearly identified and reasonably explained. New ideas are included from analyzing the trade-off.	Two trade-offs are clearly and justifiably identified and explained.	Only one trade-off makes logical sense, or two reasonable trade-offs are partially explained.	One pair of competing objectives is identified but left unexplained; or no clear answer given.

Template for Question 1

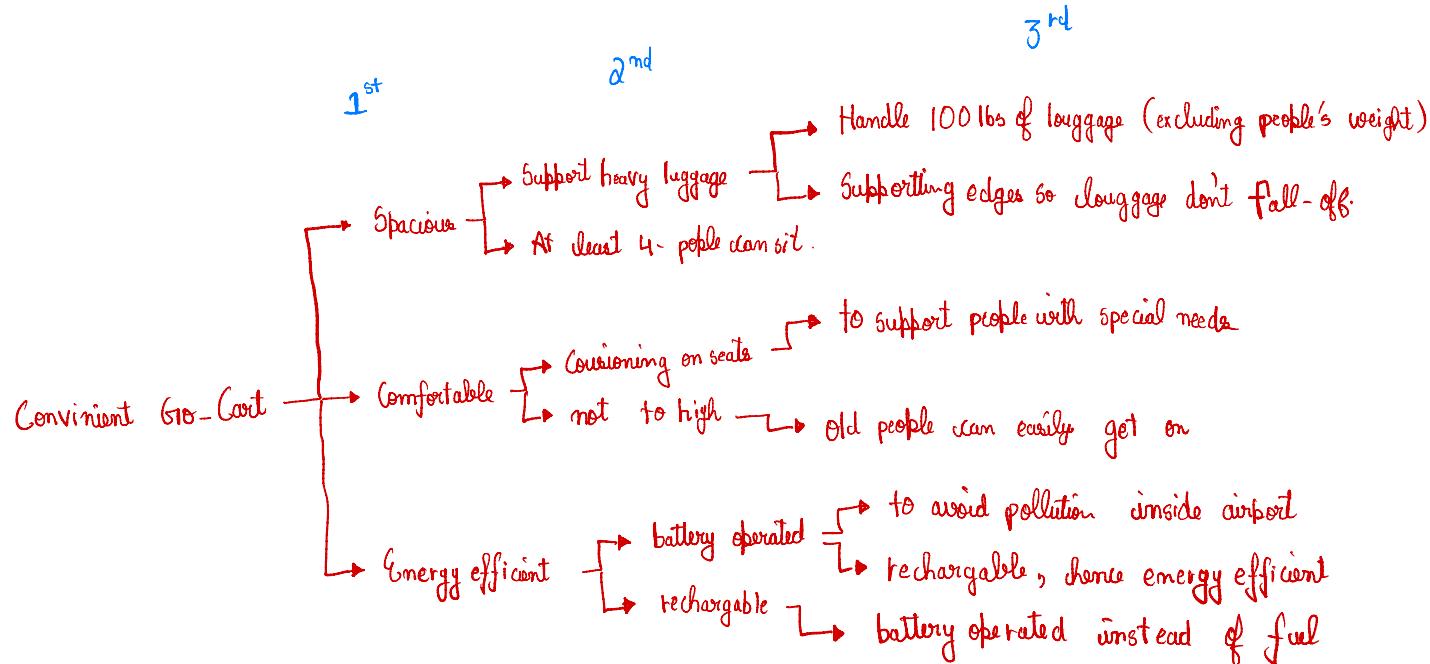
PICTURE	NAME (given to help refer to each persona)	CHARACTERISTIC DETAILS
#1 • Capture a representative picture, include proper citation (URL if downloaded from the internet) 	<ul style="list-style-type: none"> Give the persona a name. <i>You may add an interesting description to link the name with some characteristics (e.g., Dianne the Aerospace Engineer).</i> Choose a name and/or description that helps you develop sympathy for the persona. <p>Jeanine - The pregnant woman</p> <p style="text-align: center;">↙</p>	<ul style="list-style-type: none"> What are the persona's relevant characteristics and behaviours? Consider demographics such as age, income level, family role, or occupation. Also consider lifestyle, spare time activities, attitudes, and routine tasks that this persona might have. <p>Jeanine is a pregnant lady, in her mid 30's. She is a working mother, and her second baby is on its way in a few months. She has been working as a primary school art teacher and likes to go for yoga and shopping in her spare time.</p>
#2 • 	<ul style="list-style-type: none"> Bratt - The old grandpa <p style="text-align: center;">↙</p>	<p>Bratt is a lovely old grandpa who is travelling to meet his family. Ever since the loss of his wife he has been living in community old age home, and spends most of his time reading newspapers, and solving Sudokus at the back of the magazines. Besides his humpy back, he used to be a brave soldier in his days.</p>

Template for Question 2

Name Given to Persona	Purpose	Problems	Ideal Experience	Values
#1 • Jeanine	• In this case, Since Jeanine might need to travel to many different places due to nature of her husband's job and since, she cannot drive as she's pregnant and driving to certain cities might not be possible, Airways provide an easy and time efficient travel.	• Baggage Claiming, can take too long and there is generally no dock, or even seating, for people near the claiming area. Since Jeanine is a pregnant woman, lifting heavy luggage on her own might cause her discomfort, followed by prolonged waiting time.	• Baggage Claim for, special needs individuals and pregnant women done separately, with the help of airport staff. Adding proper seating in luggage claim areas.	• Jeanine Values <u>health security</u> and <u>convenience</u> . ✓
#2 • Bratt	• Bratt's son prefers to live alone with his wife and children. Ever since the loss of Bratt's wife, Bratt's son convinced him to stay at the community old age home, and moved to L.A. with his wife and children in a new house. Things have been a bit tight b/w Bratt and his son, since then, but now, Bratt was able to save some money through his pension, to visit his family.	• Bratt has some back problems, and a severe case of humpy back. It can difficult for him to reach at a certain Gate no. on time for connected flight and there might be delays that he had to experience too.	• Proper description of Gate numbers, and use of go carts to drop off people of need to certain gates at the airport, so they can catch their flight on time.	• Bratt Values a relaxing and low-hectic experience ✓

Space for Question 3

Show your affinity diagram and objective tree here. You can draw (words must be legible), insert a photo of a drawing, create a diagram using MS Word or MS PowerPoint, OR use another software and copy the image into this page.



Template for Question 4

Trade-Off (between which objectives)	Explanation (why changing one affects the other)
#1 Making Cart <u>battery operated.</u> 	<p>Since batteries efficiency depends on the R-C-L circuit {R}esistor, {C}apacitor, inductor (L) - circuit & making an energy efficient battery will require more space, because the size of these electric elements directly proportional to the size of the battery, which thereby, determines its efficiency and at the same time affect the size and space left in the cart. inversely.</p>
#2 Making enough space for baggage and people. 	<p>Using a structure that supports heavy weights with smallest surface area and feasible metal to build the cart, so as to make it spacious as well as resistant to weights may require large space in the rear end of the cart, which might make it less compact to smoothly run during a rush hour in the airport and hence we might need to compromise on the size of the battery.</p>