# Assignment 1
# ITEC 3230 B

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## 2.1.1 Method: make observations

**(i)**     **Problems students, family members experience as University students (using probes, contextual inquiry, and brainstorming):**

- **Commuting:**
  - Trouble getting to school for students who depend on public transit (travel distances, congested transportation, unforeseen delays).
  - Commute time resulting in little time for meal preparation.

- **Health and Safety**:
  - Issues with mental health awareness and assistance.
  - Safety concerns include reduced campus security measures, and non-functional emergency response systems.

- **Wellness**:
  - Stress and mental health concerns.
  - Insufficient quiet areas to relax and unwind in.
  - Socializing on campus is not easy – feeling of isolation.

- **Time Management**:
  - Time management issues with studies and part/full time jobs.
  - Balancing academic and social life is a challenge.

- **Food and diet:**
  - Not familiar with restaurants in the area.
  - On-campus dining options are very expensive.

- **Other opportunities and problems:**
  - High cost of living, especially around the campus.
  - High tuition fees.
  - Finding jobs while studying (schedule and availability issues).
  - Limited financial support from family/parents.

**(ii)**     **Report the documentation:** University students deal with a variety of issues, including money, time management, mental health and safety, transportation, and food and diet concerns. To complete the reporting, we took session notes and created a list with headers that were bulleted. Furthermore, we employed the brainstorming technique to pinpoint other problems that university-level students confront and that require attention.

**(iii)   Commonalities/Documentation of findings:**

- **Opportunities for design:**
  - Consider the possibility of a student carpooling platform.
  - Develop an app for mental health that links students to counselling services, offers resources, and advice.
  - Offer recommendations for improving campus security and emergency response procedures.
  - Provide a social media platform or arrange events to let students connect more easily.
  - Develop a time-management app just for students that integrates part-time job responsibilities with study schedules.
  - Create a centralized job platform that accommodates students' schedules and aids their search for flexible work.

- **Needs to be fixed and enhanced:**
  - **Carpooling Platform**: Make sure the platform is easy to use and handles any related safety issues with carpooling. Incorporate a rating and feedback mechanism to increase user confidence. Consider rewards for consistent users to promote participation and engagement.
  - **Mental Health App**: Including functions like personalized coping mechanisms and mood tracking.
  - **Social Media Platforms**: To foster relationships among students, ensure a safe and abuse-free online environment free from cyberbullying.
  - **Time-Management Application**: Include AI functions to provide individualized timetable recommendations.
  - **Job Assistance**: Provide a framework of assistance for internships and jobs for University students.

- **Needs that cannot be addressed using the current interactive systems:**
  - Issues like bad weather that effect commuting times and food prep periods cannot be directly handled by interactive systems.
  - In-person assistance from friends, family, or mental health professionals cannot be substituted by apps or other online resources. For some people, receiving effective assistance may require face-to-face interaction.
  - Social media sites can help students connect, but they are unable to ensure students' physical safety when they attend events or meet in-person.

## 2.1.2 User profiles, Personas, Scenarios

**User Profile 1:** *https://www.figma.com/file/VGwO6ja7UNSBGG58N3atfj/User-Profile-1?type=whiteboard&node-id=0-1*

Jordan, a 21-year-old university student, hails from a vibrant city where she has a good circle of friends and exciting places to explore. Her enthusiasm for social interactions is further fueled by her love for the great outdoors. However, her recent move from London, Ontario to Toronto to pursue a BCOM degree coincided with the onset of the COVID pandemic, forcing her into remote learning. As a result, she finds herself grappling with feelings of isolation and homesickness. Given her extroverted nature, she eagerly anticipates the return to in-person classes as an opportunity to forge new connections and make fresh friends.

Managing her finances has become a challenge, as the cost of university tuition is steep, and the pandemic has led to increased daily expenses. To cope with this financial strain, she's actively seeking a part-time on-campus job. Unfortunately, she's encountered difficulties in accessing support services and navigating the unfamiliar campus environment, as she's a newcomer. In addition to these adjustments, she is keen to connect with peers pursuing the same course and is eager to explore any available extracurricular activities on campus. Jordan also harbors a desire to discover the local area and nearby restaurants, further enriching her university experience.

**User Profile 2:** *https://www.figma.com/file/f9jsD0TlNy0GjJRTBCuV8s/User-Profile-2?type=whiteboard&node-id=0-1*

## More about Lisa

### Interests

Listening to music(R & B, jazz)

Reading (as long as it's a book)

Cooking

### Goals

Secure a full-time job in their desired career within six months of graduation

Save at least $15,000 and begin paying off student loans within the next two years.

Join a professional networking group related to their field to expand their industry connections.

### Needs and expectations

Tutors for various courses

Clear and easy to use map for the campus

Opportunities for internships and practical experience in chosen field.

Financial assistance for tuition and living expenses

### Pain points and frustrations

Struggling to keep up with peers and fulfill academic requirements

Limited networking opportunities and lack of mentorship

Financial instability and pressure to support family
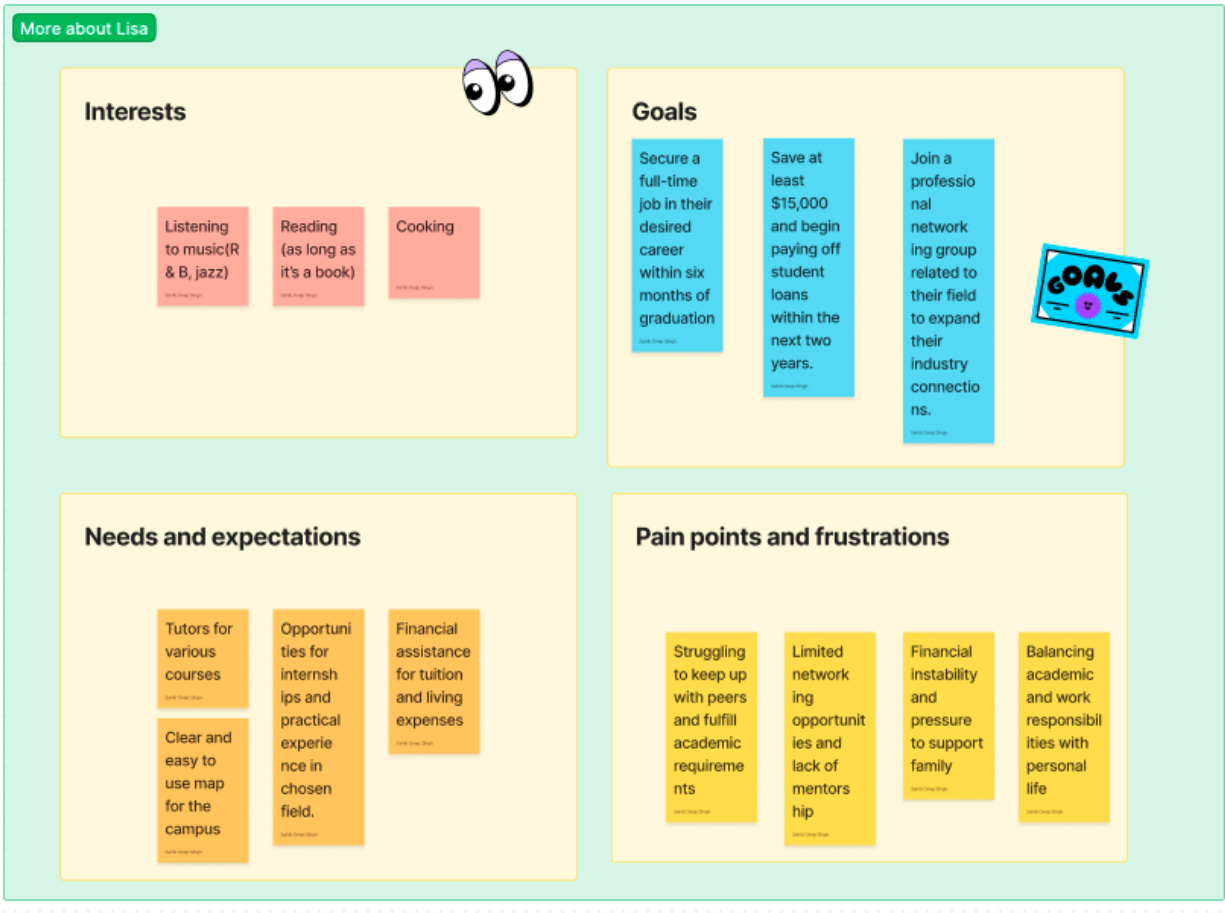
Balancing academic and work responsibilities with personal life

Lisa, a 24-year-old First Nation student, is currently in her second year of university, diligently working towards a degree in Human Resources. Her ambition is to secure a full-time position in her chosen field within half a year of graduation. Lisa's life is a juggling act as she strives to harmonize her academic pursuits and employment commitments with her personal life. Adding to the complexity, she grapples with financial instability and the weight of providing for her family, which poses a considerable challenge to her academic concentration.

On an average day, Lisa wakes up early to attend her morning classes. However, since in-person lectures have only recently resumed, she encounters difficulty locating her lecture room and often arrives late. Following her classes, she dedicates her time to working at a local coffee shop, where she is employed part-time to sustain herself. During her breaks, she uses every available moment to study for her courses and complete her assignments. Post work, Lisa proceeds to her evening classes and tries to engage in extracurricular activities and professional networking groups whenever possible. Upon returning to her university dorm, she spends time with her hostel friends and continues her studies into the late hours of the night. Yet, even with her diligent efforts, she remains challenged in keeping pace with her peers and fulfilling her academic obligations.

## 2.1.3 Establishing Requirements

The Volere Requirements Specifications Template is intended to systematically collect requirements for software development projects. To make sure that all requirements are recorded, the template has distinct sections for functional and non-functional requirements. Each part is then divided into more detailed subsections.

**FUNCTIONAL REQUIREMENTS:** For a product to satisfy its stakeholders' or consumers' needs, it must meet certain functional requirements. These requirements serve as the foundation for the product and are critical to its success. A need's distinct identity, need description, demand justification, necessary input and expected output data, and any limitations or dependencies that must be considered make up each requirement. Compiling and recording all the product's functional requirements is crucial.



Common attributes of a functional requirement in the template:

1. Requirement #: A primary key/unique identifier for each requirement.
2. Requirement Type: Categorization of a requirement based on its nature.
3. Event/BUC/PUC #: A event or business use case or product use case number used to refer the requirement.
4. Description: Short summary of the requirement.
5. Rationale: Explanation of the requirement.

6. Originator: The person or group of people/team who requested that specific requirement.
7. Fit Criterion: A quantifiable benchmark that is used to evaluate whether a product satisfies the predetermined standards.
8. Customer Satisfaction: Details to determine when the client will be happy.
9. Customer Dissatisfaction: Information to check when the client will not be satisfied.
10. Priority: The weight of a requirement in relation to other requirements.
11. Dependencies: Any limitations or dependencies that have an impact on this requirement.
12. Conflicts: Any inconsistencies or possible inconsistencies between this req and other prerequisites.
13. Supporting Materials: Any other supporting documents or sources for this requirement.
14. History: Document revisions, updates, and modifications tracked over time.

The system must:
- Encourage networking and interaction between companies and students.
- Allow users to apply for jobs, internships, and other opportunities through the system, giving them priority.
- Provide details about affordable local eateries that suit a range of priorities and tastes (vegan, vegetarian, halal, quick, healthful, cheap, etc.).
- Help with getting to and about the campus, including carpooling, and providing directions with map view.
- Guarantee live agents are available via phone and chat around-the-clock for academic and financial support.
- Offer online tools for mental health and the opportunity to make therapy appointments.
- Include text-to-speech functionality and resources specifically designed to serve kids with special needs in your accessibility features.
- Offer resources to make it simple for students to apply for government assistance, bursaries, and scholarships.

**NON-FUNCTIONAL REQUIREMENTS:** This is the section where you document your system's features. These attributes describe how well the system performs in terms of reliability, usability, security, and effectiveness.

A more detailed analysis of the non-functional requirements that the system must meet is provided by the sub-divisions. They ensure that all relevant non-functional requirements are thoroughly documented, and they set up a framework for evaluating different possible designs to ensure that they comply with the requirements. It is anticipated that the Non-Functional Requirements section will include sub-subsections for the following:

1. **Look and Feel Requirements**
   (i)  **<u>Appearance Requirements:</u>**
        **Content:** This section outlines the requirements for the product's visual component. It includes the demands made by the customer, including corporate logo, and chosen colors, among other things. It is best to determine the criteria for the visual aspect before starting the product design.

        **Motivation:** To ensure that the product meets the standards of the company and appeals to its intended audience, its appearance is essential.

        **Examples:**
        1. The product needs to follow corporate branding specifications.
        2. The product needs to have a modern, clean appearance.

        **Fit Criterion:** A sample of prospective buyers who are representative of the market should agree that the product fulfills their visual requirements. The client's branding department must approve the design.

        **Considerations:** Prototypes shouldn't be used in place of the specifications for visual appeal. The prototype's only purpose is to help gather requirements.

   (ii) **<u>Style Requirements:</u>**
        **Content:** This section describes what the product must have in terms of atmosphere, style, or feeling. It considers the goals of the stakeholders on how much involvement users are supposed to have with the product. If manufacturing is involved, it also specifies how the package should be presented.

        **Motivation:** The success of a product is mostly dependent on its style.

        **Examples:**
        1. The final product should have a polished, authoritative appearance.
        2. The product should also have a bright and witty style.

        **Fit Criterion:** A significant portion of prospective buyers must agree that the product's style complements its intended purpose. The marketing department of the customer must approve the design.

        **Considerations:** The requirements may seem vague at first, but the fit criteria will put a number on them and provide the designer clear guidelines on what needs to be accomplished.

2.  **Usability and Humanity Requirements**
    (i)      <u>**Ease of Use Requirements:**</u>
    **Content:** This section outlines the requirements related to the product's usability for the intended users.

    **Motivation:** A product's ability to satisfy, adopt, and increase productivity from users is largely dependent on its user-friendliness. Therefore, it is imperative to accurately specify the requirements for user-friendliness to guarantee that the product satisfies the demands and expectations of its target audience.

    **Examples:**
    1.  The product should be user-friendly, requiring little training for new users to become proficient.
    2.  The product must deliver clear error messages to help consumers troubleshoot.
    3.  The user interface of the product needs to be unified and consistent across all modules and features.
    4.  It should be possible for users to quickly adjust settings and preferences to meet their unique needs.
    5.  The product ought to provide clear, basic instructions for routine operations.

    **Fit Criterion:** Every user-friendliness requirement needs to have a fit criterion that explains the validation process. For example: The product should be easy to use and require little training for new users to become proficient.
    1.  After 15 minutes of instruction, 90% of new users should be able to finish simple tasks. To help consumers solve issues, the product must provide clear and concise error messages.
    2.  To ensure comprehension, error messages should be written at an eighth grade reading level and tested on a subset of users.

    **Considerations:** When creating requirements for user-friendliness, consider the attributes of the intended users, their degree of experience and familiarity, and the duties that are expected of them in relation to the product. Furthermore, consider any linguistic or cultural barriers that could affect how user-friendly the product is.

    (ii)      <u>**Personalization and Internationalization Requirements:**</u>
    **Content:** This section outlines the requirements for internationalizing and customizing the product to accommodate a range of languages, cultures, and user preferences.

**Motivation:** To provide customization choices based on user preferences and ensure that the product is usable by a wide user base with a range of cultural backgrounds and linguistic inclinations.

**Examples:**
1. Multiple languages, such as but not limited to English, Spanish, and French, should be supported by the product.
2. The user interface should allow users to select their favorite language.
3. Dates and hours must be displayed in the product in line with the user's national customs.
4. The product should be able to switch between imperial and metric measurements with ease, based on user preferences.
5. The product needs to make it easier to use characters that aren't Latin, like Arabic or Chinese.

**Fit Criteria:** List the following requirements for each area of personalization and internationalization:
1. The specific languages and cultures in need of assistance.
2. The specific user preferences that require modification.
3. The elements of the UI that are configurable.
4. The data elements—dates, timings, and measures, among others—that need to be internationalized.
5. The precise guidelines and procedures that must be adhered to enable internationalization.

**Examples:**
1. The customer's preferences should be considered in the product.
2. The product must allow the user to select their preferred language.

**Consideration:** Consider the country and culture of the people who might buy your product. International users will appreciate being able to switch to their own language and expressions.

**(iii)** <u>**Learning Requirements:**</u>
**Content:** This section describes the training and education requirements that must be met for the product to be considered user-friendly.

**Motivation:** This part helps identify what is needed for consumers to gain the knowledge and expertise required to use the product in an efficient manner.

**Examples:**
1. The product must provide a tutorial video that walks new users through the process.
2. A feature that allows users to obtain online support from any screen should be included in the product.
3. It is mandatory for the product to provide a quick start guide that includes detailed instructions for basic functionalities.

**Fit Criterion:**
1. The instructional film should cover the most important aspects of the product in no more than five minutes.
2. The online assistance component needs to have a search tool and be offered in a minimum of two languages.
3. The fast start guide should be available in print and digital versions, with no more than two pages.

**Considerations:**
1. Acknowledge the target market and the extent to which they are already aware with related products.
2. Assess the product's complexity and the amount of time needed for users to become proficient with it.
3. Determine which instructional strategies—such as films, tutorials, or interactive training modules—will work best for the intended audience.

**(iv)** <u>**Understandability and Politeness Requirements:**</u>
**UNDERSTANDABILITY REQUIREMENTS:**
**Content:** This section outlines the requirements that must be met for the product to be simply understood and utilized by its intended users.

**Motivation:** To ensure that the product is easy to use and learn, reduce the possibility of user error, and increase user happiness.

**Examples:**
1. The language used in the product should be clear and concise.
2. It is necessary for the product to provide precise and easy-to-follow usage instructions.
3. The product should make use of standard icons and symbols.
4. There must be no technical jargon in the product.

**Considerations:**
1. The intended viewership: What is the users' degree of education and technical proficiency? How well-versed are they in similar goods or services?
2. The usage context: What are the scenarios in which the product will be utilized? Exist any user groups with requirements or limitations.

**POLITENESS REQUIREMENTS**

**Content:** This section describes the requirements that must be met for the product to engage with users in a courteous and respectful manner.

**Motivation:** To guarantee that users see the product as friendly and helpful, improving user satisfaction and reducing the possibility of user annoyance or dissatisfaction.

**Examples:**
1. The language used in the product should be kind.
2. There must be no overuse of all caps or exclamation points throughout the product.
3. It is required of the product to provide polite and unambiguous error messages.
4. Users should not be interrupted by the product when they are working on important tasks.

**Considerations:**
1. The intended viewership: What expectations do the users have regarding civility and respect? What is their cultural background? Are there particular user groups (older people, kids, etc.) that require special attention?
2. The usage context: What are the scenarios in which the product will be utilized? Exist any user groups with unique requirements or constraints (such as impairments or language barriers)?

3. **Performance Requirements**
   (i) **Speed and Latency Requirements:**
   **Content:** This section describes the product's speed and latency performance requirements. It includes the expected timings for system operations and user activities to respond.

   **Motivation:** To ensure that the product meets performance expectations and provides a positive user experience.

**Examples:**

1. Transactions must be completed by the system in less than two seconds.
2. It is required that the product display search results 500 milliseconds after the user submits the query.
3. The system should be able to handle at least 1000 users at once without experiencing a response time increase of more than 10%.

**Fit Standard:** It is necessary to specify the response times and latency requirements in quantifiable quantities, such as seconds or milliseconds. To confirm that the system complies with the requirements, load testing must be done.

**Considerations:** The size of the database, the number of users, and the complexity of the system processes can all affect how fast a system needs to operate. Considering the resources and technological capabilities at hand, the needs should be reasonable and doable. Relevant industry guidelines or standards should also be considered.

(ii)   <u>**Safety-Critical Requirements:**</u>
**Content:** This section describes the performance standards related to the product's safety-critical features.

**Motivation:** To ensure that the product meets the necessary safety-critical standards and performs dependably in every situation.

**Examples:**

1. To ensure safe functioning, the product should be set up to operate within the specified temperature range.
2. The product, even in case of a malfunction, must not create dangerous conditions.
3. The product must be designed in accordance with all applicable safety standards, such as ISO 26262 for the safety of automobiles.
4. Fail-safe features are required in the product to prevent or lessen the effects of any possible failures.
5. Testing and validation are necessary to ensure that safety-critical requirements are met by the product.

**Fit Criterion:**

1. Outlining the relevant safety requirements and criteria that need to be met.
2. A description of the product's acceptable degree of risk.

3. Specification of the performance level needed in a range of operating scenarios.
4. A description of the testing and validation processes to guarantee compliance with regulations that are vital to safety.

**Considerations:**
1. To ensure compliance with safety-critical criteria, the product might need extensive testing and validation.
2. It is essential to carefully evaluate and control the degree of risk connected to the product.
3. To prevent or lessen the effects of potential failures, the product must incorporate fail-safe features.
4. To ensure safe functioning, the product must be designed to function within the specified environmental parameters.

**(iii)** <u>**Precision or Accuracy Requirements:**</u>
**Content:** This section describes the product's requirements for accuracy or precision.

**Motivation:** Some items require computations or measurements that are exact or accurate. The necessary degree of accuracy or precision for the product is stated in this section.

**Example:** The product's temperature readings must be precise to within one degree Celsius.

**Fit Criterion:** Indicate the required degree of exactness or precision for every quantifiable or computed feature of the product. Determine the acceptable level of departure from the required accuracy or precision.

**Considerations:**
1. Examine how changes in accuracy or precision affect the product's usability and safety.
2. Analyze how environmental elements (such as humidity and temperature) affect the product's accuracy or precision.
3. Work together with subject matter experts to determine what degree of accuracy or precision is suitable for the product.

**(iv)** <u>**Reliability and Availability Requirements**</u>:
**Content:** This section outlines the specifications for the system's availability and dependability. It describes the desired performance level in terms of system uptime and its capacity to bounce back from errors.

**Motivation:** The system's capacity to work as planned and meet user needs depends critically on its availability and reliability. The necessary degree of availability and dependability must be specified to ensure that the system is suitable for the intended use.

**Examples:**
1. The system ought to have a minimum 10,000-hour mean time between failures (MTBF).
2. During business hours, the system must be reachable 99.99% of the time.
3. In five minutes or less, the system should be able to recover on its own from failures.

**Fit Criteria:**
1. Establish acceptable thresholds for system uptime and downtime in the fit criteria.
2. Indicate how long the system needs to recover from a failure.
3. Establish what percentage of data loss is acceptable in the case of a system failure.
4. Establish what constitutes acceptable performance deterioration during repairs or upgrades.

**Considerations:**
1. Evaluate how important company operations or safety-critical systems would be affected by system failures.
2. To guarantee system availability, assess the costs and viability of putting redundancy and failover solutions in place.
3. Think about how updates and maintenance affect the dependability and availability of the system.

**(v)** <u>**Robustness or Fault-Tolerance Requirements**</u>:
**Content:** This section describes the specifications for the product's ability to handle malfunctions, errors, and unanticipated events.

**Motivation:** To ensure that the product is robust and able to withstand unforeseen circumstances, malfunctions, and errors without sacrificing its functionality.

**Examples:**
1. In five seconds, the product should be able to recover from hardware or software issues without losing any data.
2. A built-in system for detecting and correcting inaccuracies in data obtained from external sources must be included in the product.
3. The product ought to have a fault-tolerant architecture that keeps the system from failing due to a single point of failure.

**Fit Criterion:**
1. The longest period the product may be unavailable in the case of a malfunction or defect.
2. The system's minimally necessary degree of fault tolerance.
3. The level of resilience required to deal with unforeseen circumstances.

**Considerations:**
1. The system's criticality and the possible consequences of a mistake or defect.
2. The price of putting in place a strong or fault-tolerant design.

**(vi)  <u>Capacity Requirements:</u>**
**Content:** The requirements for the system's capacity are outlined in this part. These requirements cover the greatest amount of data or transactions that the system is capable of handling, as well as any constraints or limitations on its capacity.

**Motivation:** To guarantee that the system can handle the expected load and prevent possible problems like performance degradation or system failures, capacity requirements are essential.

**Examples:**
1. At least 1,000 concurrent users must be supported by the system without any performance issues.
2. The system has a maximum data storage capacity of 10 terabytes.
3. During peak hours, the system should be able to perform at least 10,000 transactions per second.

**Fit Criterion:**
1. Find the highest number of concurrent users that the system can support without seeing a drop in performance.
2. Decide on the maximum amount of storage for data.

3. Indicate the bare minimum of transactions per second that the system needs to handle at its busiest.
4. Determine any limits or restrictions on the system's capability.

**Considerations:**
1. When defining capacity requirements, it is critical to take the system's prospective growth and scalability into account.
2. To achieve the capacity needs, the system can require more infrastructure or hardware.

**(vii)** **Scalability or Extensibility Requirements:**
**Content:** This section describes the needs for the product's scalability and functionality enhancement in response to changing market conditions and technological advancements.

**Motivation:** Requirements for scalability and extensibility are important for goods that need to be flexible enough to adjust to changing business needs or handle an increasing workload. Identifying these needs early on allows for future modifications to be made to the design without requiring a complete redesign.

**Examples:**
1. A 50% increase in traffic should not cause the product's performance to suffer.
2. Modularity in the product architecture is necessary to make it easier to add new features.
3. New data sources must be supported by the product without requiring changes to the main system.
4. The product ought to be able to support at least 1000 users at once.

**Fit Criterion:** List the following in relation to each scalability or extensibility requirement:
1. The expected rise in demand or modification in features.
2. The level of performance or capacity that needs to be maintained throughout the transition.
3. The amount of work needed to put the change into action.

**Considerations:**
Capacity requirements are closely related to scalability and extensibility requirements. Products with expandable features or scalability should also be able to handle growing workloads or volumes of data. These specifications may also influence the testing plan, development procedure, and product architecture.

**(viii)  Longevity Requirements:**
**Content:** This part describes the specifications for the product's durability, including its capacity to continue being useful and effective for a long time.

**Motivation:** It's critical to establish any needs pertaining to the product's durability and to make sure it can continue to be useful and effective for a long time.

**Examples:**
1. The product must be designed to allow for updates and modifications in the future to ensure its longevity.
2. It must be functional and supported for a minimum of 5 years after the initial release.
3. It must be resistant to software and hardware obsolescence for a minimum of 10 years.

**Fit Criterion:** Indicate how the requirements for lifespan will be evaluated or confirmed, for example, via routine upkeep and upgrades.

**Considerations**:
1. Consider the product's anticipated lifetime, the possibility of technical breakthroughs, and any other elements that might affect its longevity.
2. Consider the resources and assistance required to guarantee the product's continued efficacy and utility.

## 4.  Operational and Environmental Requirements
**(i)  Expected Physical Environment:**
**Content:** This section outlines the conditions and physical environment in which the product is expected to be used.

**Motivation:** To identify any unique circumstances that may require specific product requirements, preparation, or training to ensure the product is suitable for use in its intended environment.

**Examples:**
1. The product must be operable by a construction worker standing outside in cold and rainy.
2. weather.
3. The product must be able to function in a noisy and dusty environment.
4. The product must be portable and fit in a pocket or purse.

5. The product must be usable in low light conditions.
6. The product must not generate noise levels higher than the existing environment.

**Considerations:** Are there any unusual work environments where the product will be used that require special requirements?

**(ii)    Requirements for Interfacing with Adjacent Systems:**
**Content:** This section describes the conditions for integrating with other programs and/or devices that are necessary for the proper functioning of the product. It also outlines the needs for interacting with nearby systems.

**Motivation:** This section aims to prevent the need for significant rework by proactively defining the needs for interfaces with other programs. By doing so, the chance of finding requirements during the implementation process is reduced.

**Examples:** The prerequisites for integrating with other programs include making certain the product runs on widely used web browsers or gaining access to information from earlier spreadsheet iterations. Making sure the product can communicate with programs running on distant weather stations is another example.

**Fit Criterion:** Every inter-application interface definition includes information about data content, physical content, interface medium, frequency, volume, trigger, and relevant standards and protocols.

**(iii)   Productization Requirements:**
**Content:** This section includes everything that is needed to make the product marketable or distributable, including the procedures that must be followed for the installation to be effective.

**Motivation:** The goal is to make sure that every job required to get the product ready for distribution is regarded as essential to meeting the requirements. It also aims to measure what the customer and users anticipate would be required in terms of time, money, and resources to install the product.

**Examples:**
1. The finished work should be distributed as a ZIP file.
2. An inexperienced user must be able to install the product without the need for further instructions.

**Considerations:** Certain products can require special requirements for them to be able to be distributed or used. Protecting the product to make sure that only customers who have paid for it may access it might be essential. Any implicit presumptions regarding the designated setting and customers' expectations regarding installation time and cost can be revealed through interactions with the marketing department. Commercial products typically include requirements in this domain.

**(iv)**   **Release Requirements:**
**Content:** This section describes the product's format and planned release schedule.

**Motivation:** Ensuring that all stakeholders are aware of how frequently new product releases will occur is the main goal.

**Examples:**
1. Every year, end users will receive maintenance releases.
2. Every release needs to keep the features that came before it functional.

**Fit Criterion:** This section should specify the kind of maintenance that is needed and the resources that will be used for it.

**Considerations:** Does the release of the new product have any bearing on any ongoing maintenance agreements or contractual obligations?

**(v)**   **Backwards Compatibility Requirements:**
**Content:** This section outlines the requirements concerning the product's capacity to interface with preceding versions or legacy systems.

**Motivation:** To ascertain that the new product harmonizes with existing systems and mitigates the expense of transitioning to the new product.

**Examples:**
1. The product must possess the capability to import data from the previous version.
2. The product must have the capability to export data in a format compatible with the previous version.
3. The product must be compatible with the current version of the database system.

**Fit Criterion:** The product should undergo testing to verify its ability to import and export data to and from the previous version.

**Considerations:** Compatibility with existing systems significantly influences the success of a new product. Identifying any compatibility issues early in the development process is crucial to evade costly rework later. Additionally, considering contractual or legal obligations related to backward compatibility is imperative.

5. **Maintainability and Support Requirements**
   (i) **Requirements for Maintenance:**
      **Content:** This segment specifies the timeframe required for implementing specific changes to the product.

      **Motivation:** The aim is to ensure that all stakeholders are informed about the maintenance demands of the product.

      **Examples:**
      1. The system must facilitate the incorporation of a new weather station overnight.
      2. New Management Information System (MIS) reports must be accessible within one week after finalizing the requirements.

      **Considerations:** Special considerations may be essential for maintainability, such as the capacity for end-users or non-original developers to uphold the product. These requirements can impact the product development process. Additionally, there might be stipulations for documentation or training. Including testing requirements in this section may also be contemplated.

   (ii) **Supportability Requirements:**
      **Content:** This section describes the degree of support that the product requires, which is often provided by a help desk. Any requirements for the product's support, if it is a service given by persons, should be clearly mentioned here. Furthermore, this section should specify those criteria if the assistance is embedded within the product itself.

      **Motivation:** This part aims to ensure that the support component inside the product is well defined.

**Considerations:** It is important to think about the kind and expected quantity of assistance that will be needed. For instance, the product could have to be self-sufficient, or there can be limitations on the availability of printed manuals.

**(iii)**     <u>**Adaptability Requirements:**</u>
**Content:** This section outlines the contexts or platforms to which the product needs to be adjusted or flexible.

**Motivation**: The goal is to communicate the client's and users' expectations about the platforms that the product will function on.

**Examples:**
1. The product should work with multiple OS platforms, including Windows 7.
2. The gadget was first intended for use in offices, but a version specifically for restaurant kitchens is also being investigated.

**Fit Criterion:** The system software that the product must run on, as well as any future environments that are envisaged, should be described in this section. It should also include a schedule for the changeover.

**Considerations**: It is imperative that you ask the marketing division about any unspoken presumptions about the product's mobility.

6. **Security Requirements**
Security requirements include several subcategories, such as access requirements, authentication requirements, privacy requirements, audit requirements, and security requirements.

**(i)**     <u>**Access Requirements:**</u>
**Content:** The system needs to specify who can access the product's features and information. It should outline the terms and conditions for access as well as the sections of the product that are available for use.
**Motivation**: This is necessary to guard against unwanted access and preserve system confidentiality.

**Examples**:
1. Only direct supervisors should be able to view personnel records through the system.
2. It is only appropriate for those who possess a valid security clearance to enter the building.

**Fit Standard:**
1. Identification of data or system functions.
2. The designations or roles of permitted users for data.
3. The names or roles of users with the authority to add, edit, or remove data.

**Considerations:**
1. Does management wish to safeguard any sensitive information?
2. Are there any areas of the system that should not be accessible by low-level users?
3. Are there any people whose access to the system is supposed to be restricted?

**(ii)** <u>**Integrity Requirements:**</u>
**Content:** Databases, files, and the product itself should all have their required integrity standards specified by the system.

**Motivation:** Preventing data corruption and ensuring data integrity are important objectives.

**Examples of what the system should do are:**
1. Prevent the introduction of inaccurate data.
2. Provide protection against deliberate misuse.

**Considerations:** Integrity requirements are intended to prevent data loss and corruption in a time where enterprises rely largely on their stored data.

**(iii)** <u>**Privacy Requirements:**</u>
**Content:** The system should include instructions on how to protect the privacy of those whose data is kept. It should guarantee adherence to privacy regulations as well.

**Motivation:** It's critical to follow the law and protect client privacy.

**Examples:**
1. Prior to data collection, users need to be made aware of the system's data gathering procedures.
2. When the system's data usage policy changes, users should be notified.

**Considerations:** Customers should have the right to consent to the acquisition and storage of their private data, and privacy issues may have legal repercussions.

**(iv)    Audit Requirements:**
Content: To enable required audit checks, the system should specify the steps that must be taken, most often record retention.

Motivation: It's critical to design a system that complies with audit regulations.

Considerations: There might be legal ramifications for this section. To make sure that consumers are unable to subsequently deny using the product or taking part in transactions, the system should keep track of user activities.

**(v)     Immunity Requirements:**
Content: The system should outline the steps it must take to protect itself from unwanted or unauthorized software, including worms, viruses, malware, spyware, and other harmful interference.

Motivation: To develop a highly secure product that is impervious to outside intervention is the goal.

Considerations: Customers anticipate that the system will defend itself against outside dangers, such as malicious malware. It ought to be able to defend against different types of unwanted intervention.

## 7. Cultural and Political Requirements
Content: Requirements pertaining to social aspects that may influence the product's acceptability and degree of success are covered in this part. These specifications become even more crucial when developing a product for global markets.

Reason: The inclusion of cultural needs serves the purpose of bringing to light features that may not be immediately apparent, primarily because they are beyond the development team's cultural experiences.

Examples: of cultural needs include, but are not limited to, making sure the product doesn't offend any religion or ethnic group, respecting public holidays in different regions, and systems specific to distinct cultures.

## 8. Legal Requirements
When organizing Non-Functional Requirements (NFRs) for a system, such as Legal Compliance Requirements and Standard Compliance Requirements, the Volere

Requirements Specification Template is a useful tool. Here's an illustration of how to record these requirements using this template:

**(i)** <u>**Legal Requirements:**</u>

**Content:** To avoid any future legal problems, litigation, or penalties, you should clearly state in this section what legal requirements the system must meet. For example, it's crucial to make sure that personal data handling complies with the Data Protection Act.

**Motivation:** Adhering to the law is essential for the system to function properly and to protect against legal ramifications.

**Examples:** The system needs to comply with laws including the Health Insurance Portability and Accountability Act (HIPAA), the Sarbanes-Oxley (SOX) Act, and the Gramm-Leach-Bliley Act.

**Fit Criterion:** Legal opinions attesting to the product's non-violation of laws are required to validate legal compliance.

**Considerations:** To find out the precise legal requirements, it is highly recommended that you consult legal counsel. In addition, elements that could affect the system's evolution, such as copyrights, intellectual property, impending legislation, criminal law, tax laws, and labor regulations, should be considered.

**(ii)** <u>**Compliance Requirements:**</u>

**Content:** This section should describe the system's responsibilities to adhere to rules and industry standards. Following ISO 27001:2013, for instance, is crucial when it comes to information security management.

**Motivation:** To guarantee that the system functions properly and is regarded as reliable, compliance with pertinent standards and laws is essential.
Examples: HIPAA regulations must be followed by the system when managing patient data. It should also follow the insurance industry's guidelines.

**Fit Criterion:** It is necessary to have certification from the relevant regulatory agency attesting to the system's compliance with the necessary standards.

**Considerations:** It is important to consult industry experts for help on identifying suitable standards. It's also critical to consider any watchdogs, ombudsmen, industry bodies, or codes of practice that may impose requirements. Additionally,
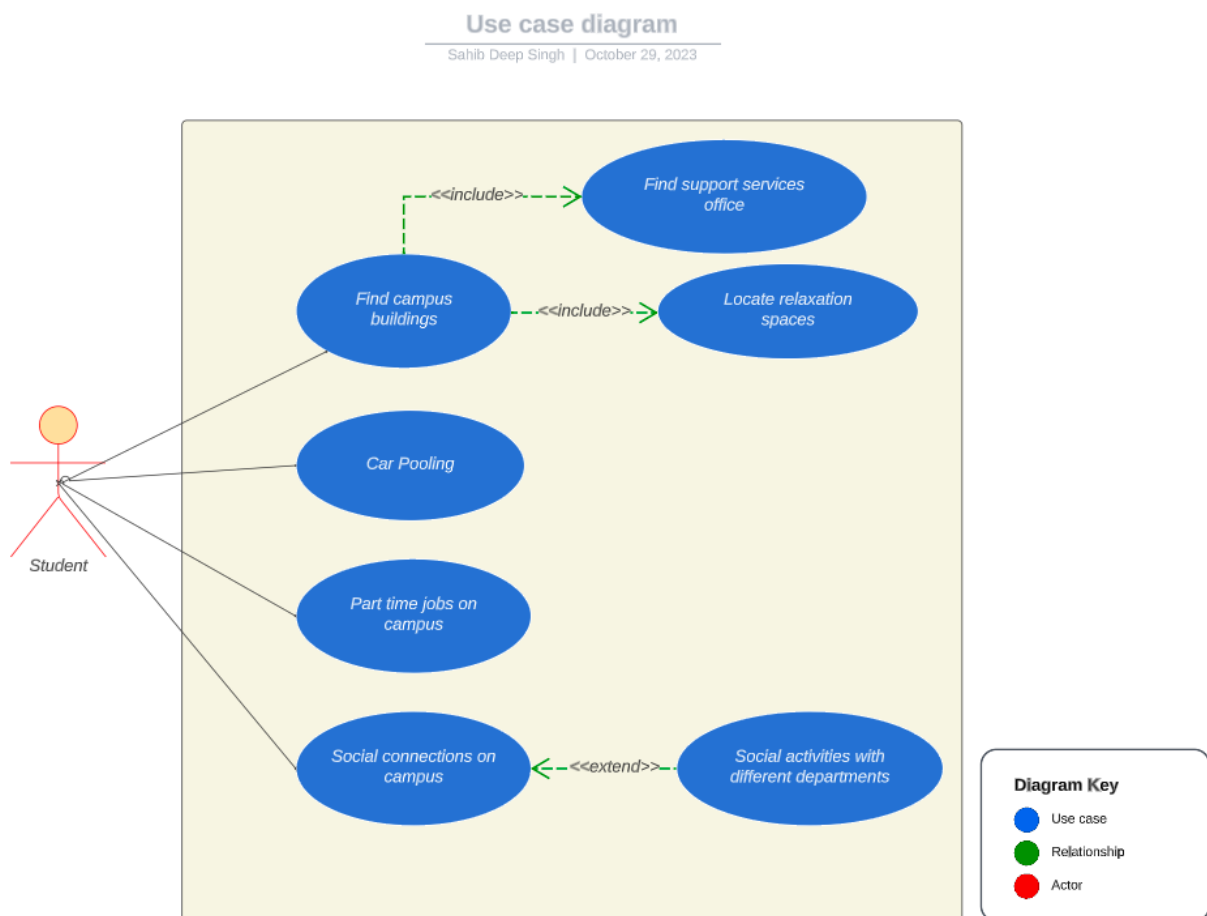
when building this kind of product, extra development procedures should be considered, if needed.

**(iii)** <u>**Standards Requirements:**</u>
The term "standards requirements" refers to the standards that a system or product must follow that are set by the business or industry. Respecting these guidelines is essential to preventing further delays. These guidelines could be insurance sector guidelines or MilSpec guidelines.

As a suitable criterion, certification from the appropriate standard-keeping body is crucial. It is imperative for companies to investigate whether industry groups, codes of practice, watchdogs, ombudsmen, and other development procedures apply to the sort of product being developed, as it may not always be immediately clear that appropriate standards exist.

## 2.1.4 Use cases



Link: *https://lucid.app/lucidchart/3fb14fa5-b6a9-45bb-95df-05e56f2e3f28/view?page=.Q4MUjXso07N#*