Planning and Requirements Gathering:

Planning:

**Introduction and Project Overview:**

As a group we aim to create a Campus Map Website for campus where it shows the layout of campus and ways to navigate your way round the building, as there is only one for the main RHB (Richard Hoggart Building) building and not for the many other buildings around campus, because there aren't any maps for the other buildings, this creates challenges for students and visitors as there is not a way to guide them to the right room which can lead to inefficiencies in finding their way around campus, can waste their time and increase frustration when trying to look for the right room. Our goal is to address this issue by creating a Campus Map Website that not only provides a clear layout of all campus buildings but also offers additional information about facilities, services, and events. By doing so, we aim to enhance the overall campus experience and make navigation a breeze for everyone.

**Project Objectives**:

**Efficient Campus Navigation:** The Website will provide detailed building layouts, optimized routes to guide users to their destinations.

**Comprehensive Building Information:** Our website will strive to improve the campus experience by providing detailed building information, such as room locations, office hours, services offered, and other useful information.

**Event and Activity Integration:** integrating event and activity information into the Website (e.g., using an API to retrieve information from the goldsmith website about recent events and activities). This will help users to stay updated on the latest events going on around campus.

**User-Centered Design:**

A User-Centered Design will enhance the users experience andguarantee that the Website is accessible to everyone, regardless of their background or abilities.

**Scope and Boundaries**:

Scope:

* **Geographical Coverage**: The campus map Website will cover the entirety of our academic institution like the buildings, facilities, outdoor spaces, and paths. The goal is to provide comprehensive navigation and the ability to freely access information to our entire campus community.
* **Navigation**: The Website will offer interactive maps with zoom and search capabilities. It will enable users to find efficient routes between locations.
* **Building and Facility Information**: The Website will serve as a repository of detailed information about every building and facility on campus. Users will access information about classrooms, offices and services within each building.
* **Event Management**: The Website will incorporate a calendar and notification system for campus events, including lectures, workshops, performances, and more. Users will receive event alerts and have the option to explore event details within the Website.
* **Accessibility Features**: The Website will adhere to accessibility standards, including Web Content Accessibility Guidelines (WCAG), to ensure that all members of the campus community can use the Website easily.

Boundaries:

* **Off-Campus Locations**: The project's scope is confined to our academic institution and its immediate surroundings. Off-campus locations will not be included on the Website.
* **Third-Party Services**: While the Website will integrate with existing campus systems to provide real-time information like the RHB room finder, it will not cover third-party services or external data sources.
* **Additional Features**: While the Website's core features are extensive, certain features beyond the Website's scope, such as e-commerce functionalities for campus merchandise will not be included.
* **Customization for Individual Departments**: The Website will offer a standard, centralized experience. While it will cater to various user groups, it will not provide individual departments or organizations with customization options in this phase.
* **Language Support**: The Website will only support a single primary language which is English.

We hope to keep the project manageable and doable within the allocated period and budget by keeping the scope and boundaries clearly defined and focused on the essentials required to meet our user’s expectations. This Approach will lead to the successful delivery of the Minimum Viable Product (MVP) that aligns with our vision for a user-centric campus map Website.

**Stakeholders:**

* **Students**: Students are the primary users of the campus map website. They rely on it for daily navigation, finding classrooms, study spaces, and staying informed about campus events. Understanding their needs and preferences is crucial to creating a website that enriches their campus experience, helping them navigate efficiently and access relevant information.
* **Faculty**: Faculty members need the Website to locate department offices, classrooms, and other facilities. By understanding their needs, the Website can support a smooth teaching experience. Access to accurate information ensures they can effectively plan and execute their classes, meetings, and research activities.
* **Staff**: Staff members, including administrative staff and event coordinators, rely on the Website for planning and executing campus events, managing facilities, and responding to inquiries. Meeting their needs through the Website ensures the efficient execution of campus operations and event management.
* **Visitors**: Visitors, including prospective students and their families, often rely on the Website to explore the campus. An intuitive and informative Website enhances the visitor's experience and can positively influence their perception of the institution.
* **Information Technology (IT) Department**: The IT department will be a key stakeholder involved in the Website's development, integration with existing systems, and ongoing technical support. Their expertise will be vital in ensuring the Website's reliability, scalability, and security.

In conclusion, understanding the stakeholders' needs, preferences, and expectations will further help us in developing a campus map website that not only meets user requirements but also enhances the overall campus experience. It ensures that the Website's features and functionalities align with the goals and expectations of our users.

**User Personas**:

**User Persona 1: Sarah, the Student**

Background:

* Name: Sarah
* Age: 20
* Status: Undergraduate student
* Studying: Computer Science
* Campus: Familiar with the campus layout but still exploring

Characteristics:

* Tech-Savvy: Sarah is comfortable using smartphones and Websites for various purposes.
* Busy Schedule: She has a hectic academic schedule with multiple classes each day.
* Social: Active in student organizations and regularly attends campus events.

Needs and Goals:

* **Efficient Navigation**: Sarah needs a website to quickly find her way between classes, the library, and study spots. She wants a user-friendly map with clear directions and real-time tracking.
* **Event Information**: She looks for event details and schedules of club meetings, tech workshops, and campus social events.
* **Integration**: Sarah prefers that the Website integrates with her academic calendar and provides event reminders.

Disadvantages faced:

* Inefficient Navigation: Sarah sometimes gets lost on campus, especially in new buildings or during adverse weather conditions.
* Missed Events: She occasionally misses events and meetings due to not receiving timely event notification

**User Persona 2: John, the Prospective Visitor**

Background:

* Name: John
* Age: 45
* Status: Prospective student's parent
* Campus: First-time visitor, unfamiliar with the campus layout

Characteristics:

* Curious: John is keen to explore the campus facilities and academic environment.
* Limited Knowledge: He lacks prior knowledge of the campus layout and locations.
* Prioritizes Safety: John values safety and would like to know emergency exits and security information.

Needs and Goals:

* **Effortless Exploration**: John wants a website that provides a clear campus map with landmarks, visitor parking, and key buildings highlighted.
* **Tour Assistance**: He would Appreciate a virtual campus tour with descriptions of buildings and points of interest.
* **Safety Information**: John wants access to safety information, including emergency contact numbers and the locations of first-aid stations.

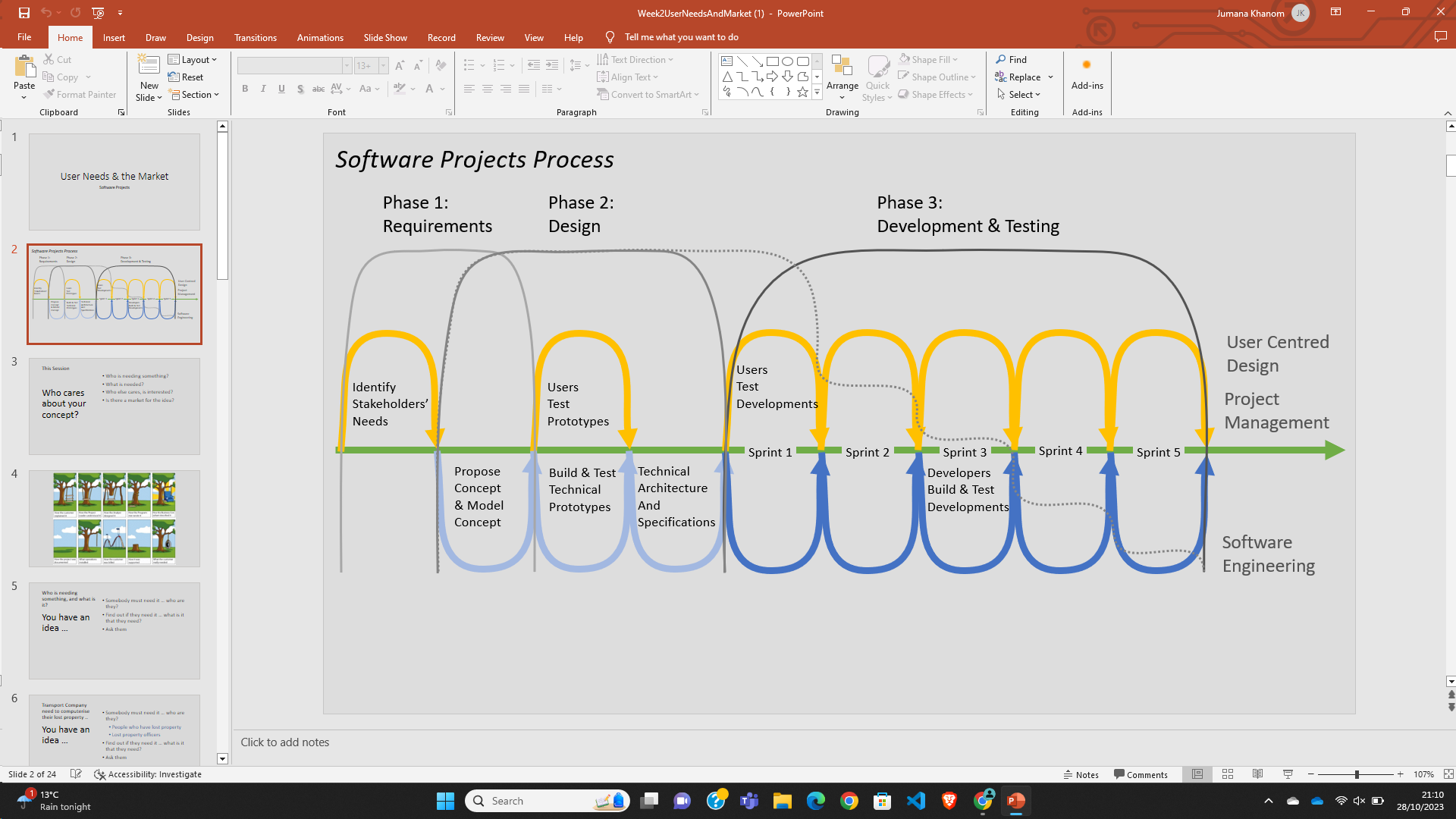
Disadvantages faced:

* Getting Lost: John is concerned about getting lost on a large and unfamiliar campus.
* Limited Information: He often finds it challenging to locate restrooms, visitor centers, and important landmarks.

**Methodology and Project Approach**:

The Methodology that we have chosen is the Agile Methodology as it is the most efficient as it will help us complete the task on time and within budget. Its iterative and flexible nature makes it particularly well-suited to a project with diverse stakeholder needs. Compared to other Methodologies such as the waterfall method or the Extreme Programming method, it’s the most viable one with the least amount of disruptive cons. While the Extreme Programming method might allow continuous integration and deployment and the waterfall method allows for easy reorganization of tasks as the project progresses, they both clearly have big disadvantages which could disrupt the planning and process of the project such as long delivery time and lack of resource management. Whereas the Agile method could resolve both those issues.

This will be the Process that we use:



**User-Centered Design Approach**:

* **User Research**: We will conduct comprehensive user research, including surveys, interviews, and usability testing, to understand the needs and preferences of students, faculty, staff, visitors, and other stakeholders.
* **User Personas**: User personas, such as those introduced in this proposal, will be referenced to keep the user at the center of the design process.
* **Iterative Design**: Design decisions will be informed by user feedback and refined iteratively. High-fidelity and Low-fidelity Wireframes and mockups will be created to visualize the user interface and user experience.
* **Accessibility**: Accessibility will be a core design consideration, ensuring that the Website is usable by individuals of all abilities.
* **Usability Testing**: We will regularly conduct usability testing to evaluate the Website's ease of use and make necessary adjustments.

**Project Approach Highlights**:

* **Continuous Communication**: Open and regular communication channels will be established among the project team members and stakeholders, fostering transparency and collaboration.
* **Resource Allocation**: Human and technical resources will be allocated strategically to ensure efficient development and timely delivery.
* **MVP Focus**: We will prioritize the development of a Minimum Viable Product (MVP) that encapsulates core features and functionalities, allowing for an early release to gather user feedback and refine the Website progressively.
* **Quality Assurance**: Rigorous quality assurance and testing will be integrated at all stages to ensure the Website's functionality and reliability.
* **Change Management**: We recognize that requirements may change throughout the project. A flexible change management process will be in place to address alterations in scope and priorities.

**Timeline and Milestones**:

**Project Timeline:**

* Start Date: Friday, 6 October 2023
* End Date: Friday, 22 March 2024

**Milestones:**

**Milestone 1: Project Definition (Duration: 2 weeks)**

* Define project objectives, scope, and requirements.
* Form a project team and assign roles and responsibilities.
* Set up project management tools and communication channels.

**Milestone 2: Requirement Gathering (Duration: 4 weeks)**

* Conduct user interviews, surveys, and workshops to gather detailed requirements.
* Analyze existing campus maps and data sources.
* Compile a comprehensive list of functional and non-functional requirements.

**Milestone 3: Design (Duration: 6 weeks)**

* Develop the database design.
* Design the user interface and map layout.
* Create wireframes and prototypes for user feedback.

**Milestone 4: Data Integration (Duration: 4 weeks)**

* Integrate data sources, including campus maps, university data and open data.
* Implement map APIs and third-party services for geographic information.
* Ensure data synchronization and accuracy.

**Milestone 5: Security and Privacy (Duration: 4 weeks)**

* Conduct security testing and vulnerability assessments.

**Milestone 6: Accessibility Implementation (Duration: 4 weeks)**

* Incorporate accessibility features to meet WCAG 2.1 AA standards.
* Conduct accessibility testing and user testing.
* Address any identified accessibility issues.

**Milestone 7: Frontend Development (Duration: 8 weeks)**

* Develop the frontend of the website, including map rendering, navigation, and search features.
* Ensure cross-browser and cross-device compatibility.
* Implement responsive design and user-friendly interactions.

**Milestone 8: Backend Development (Duration: 8 weeks)**

* Develop the backend systems for data storage, retrieval, and synchronization.
* Implement user authentication and authorization systems.
* Ensure data accuracy and real-time updates.

**Milestone 9: Quality Assurance and Testing (Duration: 6 weeks)**

* Conduct comprehensive testing, including functional, compatibility, performance, security, and accessibility testing.
* Address and resolve any identified issues, bugs, or inconsistencies.

**Milestone 10: User Acceptance Testing (Duration: 4 weeks)**

* Engage campus stakeholders, students, and staff in user acceptance testing.
* Gather feedback and validate that the website meets user needs and expectations.
* Make final adjustments based on user feedback.

**Resources and Team**:

**Human Resources:**

* **Development Team:** This team is responsible for coding, implementing features, and ensuring the functionality of the Website.
* **Design Team:** The UI/UX designers oversee creating a visually Appealing user interface. They will design the Website's layout, icons, and overall user experience.
* **Quality Assurance Team:** QA experts will rigorously test the Website to identify and rectify any bugs or issues. They play a critical role in ensuring a smooth and error-free user experience.
* **Project Managers:** Project managers oversee the planning, scheduling, and coordination of all project activities. They are responsible for keeping the project on track, managing resources, and ensuring timely delivery.

**Technical Resources:**

* **Development Tools:** Software development environments, integrated development platforms, and version control systems are necessary technical resources for the development team e.g., Visual Studio code.
* **Design Software:** Graphic design tools and user interface design software are required for the design team to create a visually appealing website.
* **Testing Tools:** Quality Assurance experts need access to testing tools and devices for a thorough evaluation of the Website's functionality and performance.

**Project Teams:**

* **Rhiannon Kennedy** (Project Manager): leads the project, oversees planning and resource allocation, and ensures the project stays on schedule.
* **Jumana khanom, Rhiannon Kennedy and Mohammed Mehera**j((Lead Developer): is responsible for the technical development of the Website, including coding and feature implementation.
* **Jumana khanom, Rhiannon Kennedy and Mohammed Meheraj(**(UI/UX Designer): designs the Website's user interface
* **Jumana khanom, Rhiannon Kennedy and Mohammed Mehera**j(Quality Assurance Lead): Oversees testing the Website for bugs and issues, ensuring a smooth user experience.

Since there are only three of us in the team, each of us is going to have to take on at least 3 roles e.g., one might have to be in the design, Development and Quality assurance team.

**Risks and Mitigation Strategies**:

**Potential Risks and Mitigating those Risks:**

* **Data Inaccuracy:** There is a risk that the geographical data used for mapping could be inaccurate, leading to navigational errors and user dissatisfaction.

**Mitigation Strategy:** Regularly verifying and updating the data sources. Implement a feedback system on the Website to allow users to report inaccuracies for swift correction.

* **Scope Creep:** There is a risk that the project's scope may expand beyond its original objectives, leading to delays and resource overruns.

**Mitigation Strategy:** Establishing a clear scope document and change control process. Any scope changes should be evaluated for their impact on the project timeline and budget.

**Managing Unexpected Challenges:**

* **Regular Monitoring and Reporting:** The project manager will maintain a continuous monitoring system to track progress and identify issues. Regular status reports will be shared with the team and stakeholders.
* **Change Management:** All changes to the project scope, timeline, or budget will go through a defined change control process. This will ensure that changes are assessed, approved, and communicated effectively.
* **Open Communication:** The team will maintain open communication with users, stakeholders, and team members. Any unexpected challenges will be promptly addressed and resolved with input from relevant parties.
* **Contingency Planning:** Contingency plans will be in place for identified risks, allowing the team to swiftly respond and mitigate potential disruptions.

Requirements Gathering:

This section explores the methods that we might employ to capture, assess, and document the essential requirements for the application, with a critical evaluation of each approach.

**1. Interviews:**

Method Description:

* Conducting one-on-one interviews with key stakeholders, including students, faculty, and administrative staff.
* Open-ended interviews with a predefined set of questions to elicit user preferences, navigation challenges, and feature expectations.

Evaluation:

**Advantages:**

* Personalized insights: Interviews allow for in-depth, personalized feedback, enabling a deeper understanding of user needs.
* Immediate clarification: The direct interaction provided the opportunity to seek clarification and probe for additional information.

**Limitations:**

* Resource-intensive: Interviews required significant time and effort.
* Possible bias: Responses may be influenced by interviewee expectations, potentially leading to biased information.

**2. Surveys:**

Method Description:

* Distributed online surveys to the campus community members.
* Surveys included a mix of closed-ended and open-ended questions to gather quantitative and qualitative data on preferences and challenges.

Evaluation:

**Advantages:**

* Scalability: Surveys reached a larger audience and collected diverse opinions efficiently.
* Anonymity: Participants may be more candid in their responses due to the anonymity of surveys.

**Limitations:**

* Limited depth: Surveys may not provide as detailed insights as interviews.
* Less control: Less opportunity for immediate follow-up questions, potentially leading to less context-rich data.

**3. User Testing:**

Method Description:

* Conducted user testing sessions with a prototype of the app, observing how users interacted with the interface and gathering feedback.

Evaluation:

**Advantages:**

* Actionable insights: User testing provided direct insights into usability issues and user preferences.
* Real-world simulation: Mimicked real-world app usage, uncovering potential roadblocks.

**Limitations:**

* Resource-intensive: User testing demands a functional prototype and considerable time investment.
* Limited sample size: Testing involved a small subset of potential users.

**4. Document Analysis:**

Method Description:

* Analyzing existing campus maps, floor plans, and other documents to extract spatial and geographical data.

Evaluation:

**Advantages:**

* Access to accurate spatial data: Document analysis provided a source of reliable, pre-existing information.
* Efficiency: Reduces the need for extensive on-site data collection.

**Limitations:**

* May lack user-centric insights: Document analysis primarily yielded spatial information and not user-specific requirements.

**User Requirements**:

These user requirements encompass the essential features and functions needed to make the Campus Map Website and we will explore this further later by using a thorough process involving surveys, interviews, and focus groups with students, faculty, staff, and campus visitors.

* **User-Friendly Interface:** The Website should have a user-friendly interface for ease of navigation. It should support touch gestures, pinch-to-zoom, and drag-to-scroll features for map exploration.
* **Comprehensive Campus Maps:** The Website should provide detailed maps of all campus buildings, including room locations and facility information.
* **Efficient Navigation:** The Website should offer optimized routes and directions to help users reach their desired destinations on campus. It should support real-time GPS location services to track the user's current position on the map.
* **Search and Location Services:** Users should be able to search for specific buildings, rooms, or campus services. The Website should provide an accurate and responsive search feature.
* **Event and Activity Information:** The Website should display information about campus events, lectures, workshops, and other activities. Users should be able to view event details, schedules, and locations.
* **Accessibility and Inclusivity:** The Website should be designed with accessibility in mind, ensuring it is usable by individuals with disabilities.
* It should offer customizable text sizes, color schemes, and voice-guided navigation.
* **Feedback and Reporting:** Users should have the ability to provide feedback and report inaccuracies in the maps or event information. There should be a user-friendly feedback mechanism within the Website so that we can continuously update it.
* **Offline Mode:** The Website should offer an offline mode for users to access maps and essential information even without an internet connection.

**Functional Requirements**:

* **Interactive Maps:** The Website must provide interactive campus maps with the ability to zoom in, zoom out, pan, and rotate for detailed exploration. Users should be able to switch between different map views, including satellite, terrain, and building layouts.
* **Search Functionality:** The Website must feature a robust search function that allows users to search for specific buildings, rooms, services, and events. Search results should be displayed clearly, with relevant suggestions and auto-corrections to improve the user experience.
* **Route Planning and Optimization:** Users should have the ability to input a destination and receive optimized turn-by-turn directions to reach that location. The Website should consider factors like shortest path (maybe use the shortest path algorithm), accessibility, and real-time traffic conditions.
* **Personalized Routes:** Users should be able to save frequently visited locations and create personalized routes, with the option to add multiple destinations. The Website should provide route alternatives and allow users to save and manage these routes.
* **Comprehensive Building Information:** For each building, the Website must display detailed information, including room locations, room numbers, floor plans, and building amenities. Users should be able to access photos or 360-degree views of buildings and landmarks.
* **Department Information Integration:** The Website should integrate with the university's departmental databases to help users locate specific offices, services, and resources within buildings. It should display each department's contact information and office hours.
* **Event Notifications and Schedules:** The Website must provide event notifications, allowing users to receive alerts and updates about campus events, lectures, workshops, and activities. Users should be able to customize event notifications based on personal interests.

**Technical Requirements**:

Choice of Platform:

* A web-based application will be created to provide access through standard web browsers on desktop computers.

Development Technology Stack:

* We will utilize web development technologies, including HTML, CSS, and JavaScript.
* The back end of the application will be built using a combination of Node.js and a relational database (e.g., SQL).

Specific Tools and Libraries:

* Mapping and geospatial data will be handled using established libraries and APIs, such as Map box or Google Maps API, for rendering interactive maps and navigation features.
* Accessibility features will be implemented using libraries that ensure compliance with web accessibility standards.

Overall, these technical choices are designed to help us create a Campus Map Website that not only aligns with the project's objectives but also offers a seamless and engaging experience for all users.

**Data Sources**:

* **University Databases:** The university's administrative databases will provide essential information, such as room numbers, building names, department locations, and office hours. Event schedules, including lectures, workshops, and extracurricular activities, will be sourced from the university's event management systems.
* **User-Generated Content:** Users of the website will contribute valuable data by reporting inaccuracies in maps, providing feedback, and adding information about temporary events or changes in building layouts.
* **Mapping APIs and Services:** We will leverage mapping APIs and services, such as Map box or Google Maps API, to enhance our mapping features and to provide real-time location tracking.
* **Photographic and Image Databases:** Photo and image databases will be used to provide users with visual aids, including building photographs, 360-degree views, and images of notable landmarks on campus.
* **Local and Regional Data Providers:** Local and regional data providers may be consulted for real-time traffic and transportation information, especially for those users who commute to the campus.
* **Open Data Sources:** Open data sources, such as public transportation information, local events, and points of interest, may be utilized to enrich the website's functionality and provide users with a more comprehensive experience.

By combining these data sources, we ensure that the Campus Map Website is a reliable, up-to-date, and valuable tool for campus navigation and information access.

**Integration Requirements**:

**Map API Integration:**

Requirement:

* The campus map website must integrate a reliable and widely used map API, such as Google Maps or Map box, for both indoor and outdoor mapping. The selected map API provides accurate geographic data, real-time updates, and advanced mapping features, enhancing the user experience.

**API Documentation:**

Requirement:

* Creating clear and comprehensive documentation for internal and external APIs to facilitate further development and third-party integrations. Well-documented APIs make it easier for developers to work with the app's functionalities and extend its capabilities.

**Data Synchronization:**

Requirement:

* The website must ensure continuous synchronization with data sources, such as campus maps and open data sources, to provide up-to-date information. Timely data updates are critical to maintaining accuracy and ensuring users have access to the latest information.

**Privacy and Security Requirements**:

Ensuring the security and privacy of user data is of paramount importance for the campus map app. This section outlines the specific security and privacy requirements that need to be addressed during the development and operation of the application.

**1. User Data Protection:**

Requirement:

* User data, including location information, should be stored and transmitted securely. Protecting user data is critical to maintaining privacy and security, especially in a location-based application.

**2. Authentication and Authorization:**

Requirement:

* Implement a robust user authentication and authorization system to control access to sensitive features and data. Authentication and authorization help prevent unauthorized access and misuse of the app.

**3. Data Encryption:**

Requirement:

* All data, both in transit and at rest, should be encrypted using strong encryption protocols. Encryption safeguards data against eavesdropping and unauthorized access.

**4. User Privacy Controls:**

Requirement:

* Users should have control over the sharing of their location and personal information. Respecting user privacy preferences is essential for trust and user satisfaction.

**Accessibility Requirements**:

Ensuring that the campus map website is accessible to all users, including those with disabilities, is a top priority. This section outlines the specific accessibility requirements that must be incorporated into the website's design and development.

**1. WCAG Compliance:**

Requirement:

* The campus map website must comply with the Web Content Accessibility Guidelines, ensuring accessibility for individuals with disabilities. WCAG compliance is an internationally recognized standard for web accessibility, providing guidelines for inclusive web design.

**2. Alternative Text for Images:**

Requirement:

* All images on the website, including maps, icons, and graphics, must include descriptive alternative text to convey their content and purpose. Alternative text is crucial for users with visual impairments who rely on screen readers to access web content.

**3. Keyboard Accessibility:**

Requirement:

* Ensure that all website features and functionalities are fully operable using only a keyboard, without relying on a mouse. Keyboard accessibility is essential for users with mobility impairments who may have difficulty using a mouse.

**4. Semantic Markup:**

Requirement:

* Maintain a consistent and semantic HTML structure that enhances the logical flow and structure of the website for screen reader users. Semantic markup improves the comprehension and navigation of content for users of assistive technologies.

**5. Color and Contrast:**

Requirement:

* Use color schemes and contrasts that meet accessibility standards to ensure readability for users with visual impairments. Proper color and contrast are crucial for users with various vision conditions.

**6. Focus and Highlighting:**

Requirement:

* Implement clear visual focus indicators to highlight interactive elements, ensuring that keyboard navigation is intuitive. Focus indicators help users understand which element they are interacting with, which is especially important for keyboard users.

**7. Captions and Transcripts:**

Requirement:

* For multimedia content (e.g., videos and audio), provide captions, transcripts, and audio descriptions to make the content accessible to users with hearing or visual impairments. Captions and transcripts ensure that all users can access multimedia content.

**8. Consistent Navigation:**

Requirement:

* Maintain a consistent and logical navigation structure that is easy to understand and follow for all users, including those using screen readers. This consistent navigation will aid users in locating and accessing content.

**9. Forms and Error Handling:**

Requirement:

* Ensure that forms are well-structured and provide clear and informative error messages for users with disabilities who may require assistance with form submissions. This Effective form handling is essential for users who rely on assistive technologies.

**Testing and Quality Assurance**:

**1. Functional Testing:**

Requirement:

* Comprehensive functional testing will be conducted to validate that all features and functionalities of the website work as expected by testing all the interactive elements, such as search, navigation, zoom, and filtering options. We will verify that users can access information on campus buildings, landmarks, and other relevant data and ensure that the interactive map functions correctly and responds to user inputs.

**2. Compatibility Testing:**

Requirement:

* Test the website on various browsers (e.g., Chrome, Firefox, Safari, Edge) to ensure it functions correctly across platforms.

Process:

* Evaluate the website's appearance and functionality on different browsers and devices.
* Verify that responsive design adapts effectively to various screen sizes.

**3. Accessibility Testing:**

Requirement:

* Conduct accessibility testing to verify that the website complies with WCAG standards, making it accessible to all users, including those with disabilities.

Process:

* Use automated tools and manual testing to ensure alt text, keyboard navigation, and other accessibility features meet WCAG standards.
* Engage users with disabilities in usability testing to identify potential accessibility issues and address them.

**4. Performance Testing:**

Requirement:

* Evaluate the website's performance to ensure it loads quickly, responds promptly to user interactions, and handles concurrent users efficiently.

Process:

* Test website loading times on various connections (e.g., 3G, 4G, broadband).
* Conduct stress testing to ensure the website can handle high volumes of traffic without performance degradation.

**5. Security Testing:**

Requirement:

* Perform security testing to identify vulnerabilities and protect user data from threats, including data breaches and malicious attacks.

Process:

* Conduct vulnerability assessments and penetration testing.
* Ensure secure transmission and storage of user data.

**6. Usability Testing:**

Requirement:

* User-centered testing will be conducted to assess the website's overall usability and user experience.

Process:

* Gather feedback from users, including students, faculty, and staff, to evaluate the website's ease of use and effectiveness in meeting their needs.
* Use this feedback to make improvements in terms of design, navigation, and feature usability.