CS335 PROJECT REPORT

Project completed by David and Sebastian.

Introduction to SafeScan:

SafeScan is safety software for construction workers on construction sites, before workers are allowed into the building site the workers must complete a safety checklist to ensure they're wearing all the right gear, and only then will they be able to scan a code to unlock the door and get in. The construction company can produce safety equipment with barcodes that can be scanned into the app to ensure the builder has the item/items every day before they head onto the building site. That way the construction company can get cheaper rates on insurance and better safety inspection scores because they can guarantee the builders inside the construction site are wearing the correct safety equipment. In doing this process it will reduce serious injury being caused, due to negligence of safety equipment which is surprisingly prevalent in the industry.

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Part 1, User Stories: (Contributed to by David and Sebastian)

As a site worker, I want to be sure that I have all the required safety equipment before I start work, so that I can feel safe and secure on the job site.

As a project manager, I want to ensure that all my construction workers are wearing the appropriate safety equipment, so that we can comply with safety regulations and avoid costly accidents.

As an owner of a construction company, I want to reduce the risk of accidents on my job sites, so that I can keep my insurance rates low and protect my workers.

As a safety inspector, I want to be able to easily verify that all workers have the required safety equipment, so that I can ensure that everyone is working safely and within the guidelines.

As a safety officer, I want to have a clear and concise safety checklist that covers all the necessary safety gear, so that I can easily ensure that all workers have what they need to work safely.

As a safety officer, I want to be able to view a list of workers and allocate them to teams based on their role, so that they have the correct checklist to mark their items off.

As a construction site supervisor, I want to have a quick and easy way to confirm that all workers are wearing the right safety gear before they enter the job site, so that I can quickly identify and address any safety issues.

As a safety manager, I want to track the safety equipment used by each worker, so that I can monitor compliance with safety regulations and ensure that everyone is working safely.

As a contractor, I want to provide a safe working environment for my workers, so that they can focus on their jobs and avoid the stress of worrying about safety.

As a safety trainer, I want to provide workers with the knowledge and resources they need to work safely, so that they can perform their job duties with confidence and minimize the risk of accidents.

As an IT Admin, I want to be able to manage the system and its users in an efficient and intuitive way, so that I may administrate the system, assist any other worker with their needs, and ensure that the software reinforces a safe working site.

Part 2, formal descriptions/models

SYSTEM REQUIREMENTS(contributed to by David and Sebastian)

Centralized Server Storage

1. The system shall run on a centralized server. This server can be remote and run by the provider, or hosted locally by the client, with configuration provided by the providing company.

a. The construction site will be able to access their worksite's information remotely from devices on the site.

Equipment Model Class

1. The system shall store entries for safety equipment/gear used on the construction site.

a. The system shall accept manual form input from its users to create these entries.

i. Necessary information includes Model Name, Producer, Model ID, Purpose of the item (e.g., is it a hardhat, safety vest, etc)

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ii. The system will also keep track of a hidden ID for each model (as a primary key) and who last edited the model's information.

b. The system shall also have a folder of pages for user access that can be filtered and/or sorted based on name, producer, hidden ID, and item purpose.

i. Users can interact with this system to find, edit, and delete entries.

Worker Class

1. The system shall maintain a record of all workers on the site.

a. A worker's name, ID, and the team they work on will be recorded.

Construction Team Class

1. The system shall organize workers based on the team they work in.

a. Users can allocate a worker to a specific team.

Checklist Class

1. Users can create checklists for items.

2. Checklists can be attached to a specific team.

Onsite Devices

1. Items may be scanned by scanners which can connect to the centralized server.

a. The centralized server must have a service that can receive requests from external sources.

FUNCTIONAL REQUIREMENTS:

SITE WORKER:

1. The site worker shall be able to view their own checklist, which is generated based on the team they are in.

a. A checklist is generated by other users (specified below) and includes several models/types of safety equipment necessary on the work site. Each checklist is attached to a team. Each site worker's checklist will be a personal copy of the checklist attached to the team they are in.

b. The checklist will be a list of these models, showing the model’s name, type (e.g. hard hat, belt, etc), producer, and whether it is required or optional to be worn on the site.

2. The site worker shall be able to view entries for specific models of tools on their checklist.

a. Each item on the checklist is clickable and will open a page showcasing more details of the item, such as an image or any other details added by the user.

i. This page will also have a button to notify a safety inspector to get more of the current item in case there are none on the site.

3. The site worker shall be able to scan their gear to check all required items off the list and gain access to the site.

a. Each construction site will have their own instance of the software running on a central server.

b. Construction sites will have scanners for the workers to scan their gear. Scanning gear sends a request to the central server which will mark the item scanned as checked off on the worker's checklist.

c.. A worker's checklist will have a large notification stating whether they are allowed to work onsite.

i. If the worker has unchecked required items on their list, the notification will state they cannot enter the worksite. Workers will be warned they may be liable for injuries sustained as a result of entering the worksite when not allowed to.

ii. If all the required items on the list are checked off, the notification will indicate they can enter the worksite.

d. The worker will also scan their gear at the end of their worktime to indicate that the gear has been returned and there is inventory available.

PROJECT MANAGER:

1. The project manager shall have all the same abilities as a Site Worker.

2. The project manager can view their team members' checklists:

a. When the PM opens their own checklist, they will have an additional button that says, "View as".

i. When clicked, this button will extend a menu listing all members on their team.

ii. If a member is clicked, the checklist will display that person's checklist as the team member would see it, including scanned equipment.

SITE SUPERVISOR:

1. The site supervisor shall have all the same abilities as a Project Manager.

2. The site supervisor shall be able to view the checklist of any worker, no matter their team membership.

a. On the main page of the application, the supervisor will have a clickable menu listing all teams on the site.

i. When selecting a team, the interface will appear as if it were the Project Manager's team.

ii. Like the PM, the supervisor can use this interface to view all team members' checklists.

b. Another button will also lead to a page listing all checklists.

i. This page will list all checklists by name, assigned team(s), and creation date, each which can be used to sort and/or filter the list.

SAFETY INSPECTOR

1. The safety inspector shall have all the same abilities as a Site Supervisor.

2. The safety inspector shall be able to view the checklist of any worker and/or team.

SAFETY OFFICER:

1. The safety officer shall have all the same abilities as a Safety Inspector.

2. The safety officer shall be able to form checklists of safety equipment by choosing models from <A>:

a. On the page listing all checklists, the safety officer will have an additional button which will allow for the creation of a new checklist.

i. This button will open a new page prompting for information to be put into a form.

ii. This form will ask for information such as checklist name (required), team(s) it is assigned to (optional), and equipment to add to the checklist (optional).

iii. Equipment additions will be blocked out by type e.g. There will be one input asking to add a specific helmet(s), another asking for another type of gear, etc.

iv. Equipment additions will be done via search. Users can search by equipment type, model name, or manufacturer, and will be given a dynamic list of items fitting that search. This way only equipment with existing entries in the system will be available for selection.

3. The safety officer shall be able to assign these checklists to a team of workers for their use.

a. When a safety officer opens a team's page, they will have the option to edit the checklist(s) assigned to that team.

i. Edit will be done through a form input to validate the checklist and ensure the safety officer can only select from existing checklists.

b. When a safety officer opens any checklist, they can edit the team(s) it is assigned to.

i. Edit will be done through a form input to validate that the team's entered exist.

4. The safety officer may also edit existing checklists.

a. When the safety officer opens a checklist page, there will be a button allowing them to open it in an editing mode.

i. This edit page will be identical to the checklist creation page, except with the form values prefilled with the current checklist data.

SAFETY MANAGER

1. The safety manager shall have all the same abilities as a Safety Officer.

2. The safety manager shall be able to create entries for specific models of tools in <A>.

a. The main UI page will have a button leading to a page listing all equipment entries, visible to all users.

i. This page will display equipment name, manufacturer, type, and the number of checklists it is used in, and can be sorted and filtered by these metrics.

b. A button labelled "Create Entry" will be visible only to those with the permissions of the safety manager on this model list page.

i. When clicked, it will lead to an empty form prompting for the equipment info, similar to the checklist creation page.

3. The safety manager shall be able to edit and remove entries for specific models of tools in <A>.

a. The page for a specific model will have an additional button to edit the equipment.

i. When clicked, a page to edit the model to open.

ii. This edit page will be identical to the equipment creation page, except with the form values prefilled with the current equipment data.

b. The page for a specific model will have an additional button to delete the equipment.

i. When clicked, the model will be validated:

1. The model must not be in any checklist to be deleted. The user will be notified of any checklists that have the item.

2. A confirmation message will prompt the user that this page will be deleted.

c. The equipment list page will also have a delete button for each equipment.

OWNER

1. The owner of the construction company should be a superuser and have the ability to view reports detailing statistics relating to compliance with the software at any given site where the software is active.

a. This feature will help ensure that the software is being used effectively across the up taken sites and that all workers are following safety rules.

i. The system will have a button in the admin options that the owner can press to display a list of the companies sites where the software is active. Upon clicking into a specific site location they will be able to view the analytics on the uptake of the software at the chosen site.

2. The owner shall be able to view the latest safety inspector site safety rating:

a. This feature will help ensure that the owner knows how a site is doing from a safety perspective in terms of safety inspector visits.

i. The system will have a button in the admin options that the owner can press to display a list of the companies sites where the software is active. Upon clicking into a specific site location, the site safety rating that the inspector left for the site will be visible as well as a confirmation signature from the head inspector.

SAFETY TRAINER

1. The safety trainer shall be able to upload site safety training videos.

a. The system will have a safety training page accessible from the main UI.

i. The safety trainer will have an additional button to upload videos.

1. These videos can be submitted via a link or upload from the user's device. Submission will also require a video title, and a list of tags to identify the video's topic(s).

2. This task will be done through a form page prompting for all these submissions.

ii. The videos can be filtered and searched by the tags provided by the uploader.

iii. Each video will have a settings slot allowing viewers to do actions such as save and like the video.

1. The safety trainer will have an additional option to edit or delete the video.

2. The video title and tags may be edited, but not the video. Editing will be done on a page similar to the upload page, just with the form values prefilled with the existing data.

3. Deleting a video will prompt the user to confirm their action before deleting it.

b. The main UI page will have a section dedicated to safety training, and a link to a dedicated safety page.

IT ADMINISTRATOR

1. The IT Admin shall be a superuser i.e. have the permissions of all other roles in the system.

2. The IT Admin shall add workers to the system.

a. The IT Admin shall have an administrative interface that can add users to the system via a form.

i. A user's name, worksite identification, other identification documents, email, and role(s) and team(s) will be recorded.

3. The IT Admin shall allocate workers to other roles.

a. The administrative interface will also keep a log of all workers in the system, which are modifiable.

b. The IT Admin can allocate workers to roles (e.g. project manager) through this interface.

CONTRACTOR

1. The contractor shall have the same abilities as the Safety Manager.

2. The contractor shall have the ability to allocate workers to other roles.

a. The administrative interface will also keep a log of all workers in the system, which are modifiable.

b. The contractor can allocate workers to roles (e.g. project manager) through this interface.

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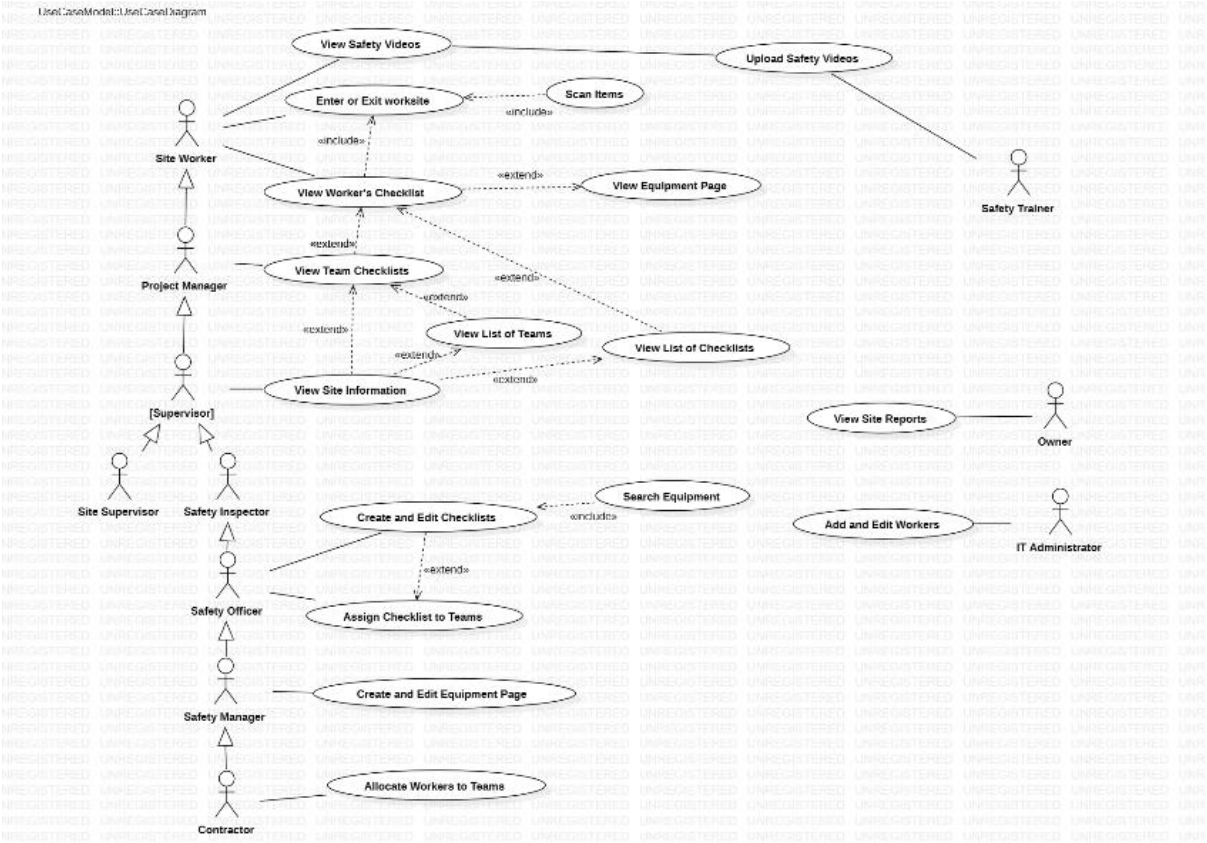
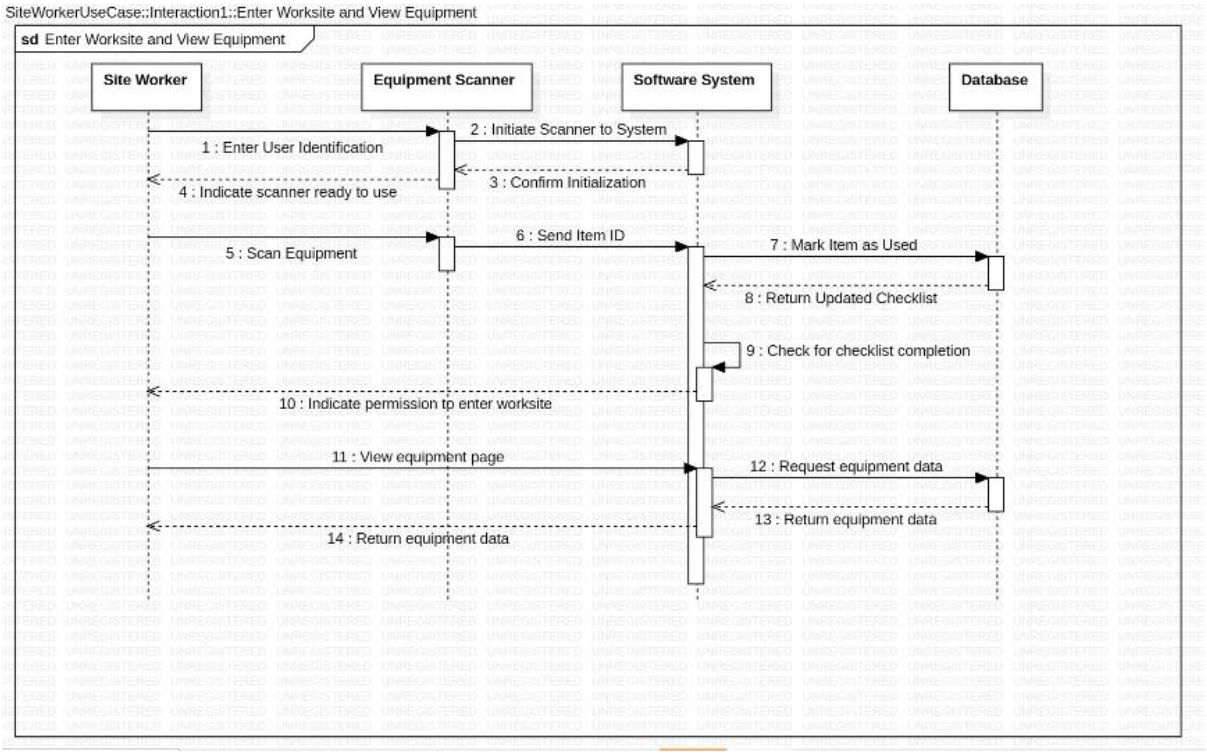
(Part 2 diagrams)(contributed to by Sebastian)





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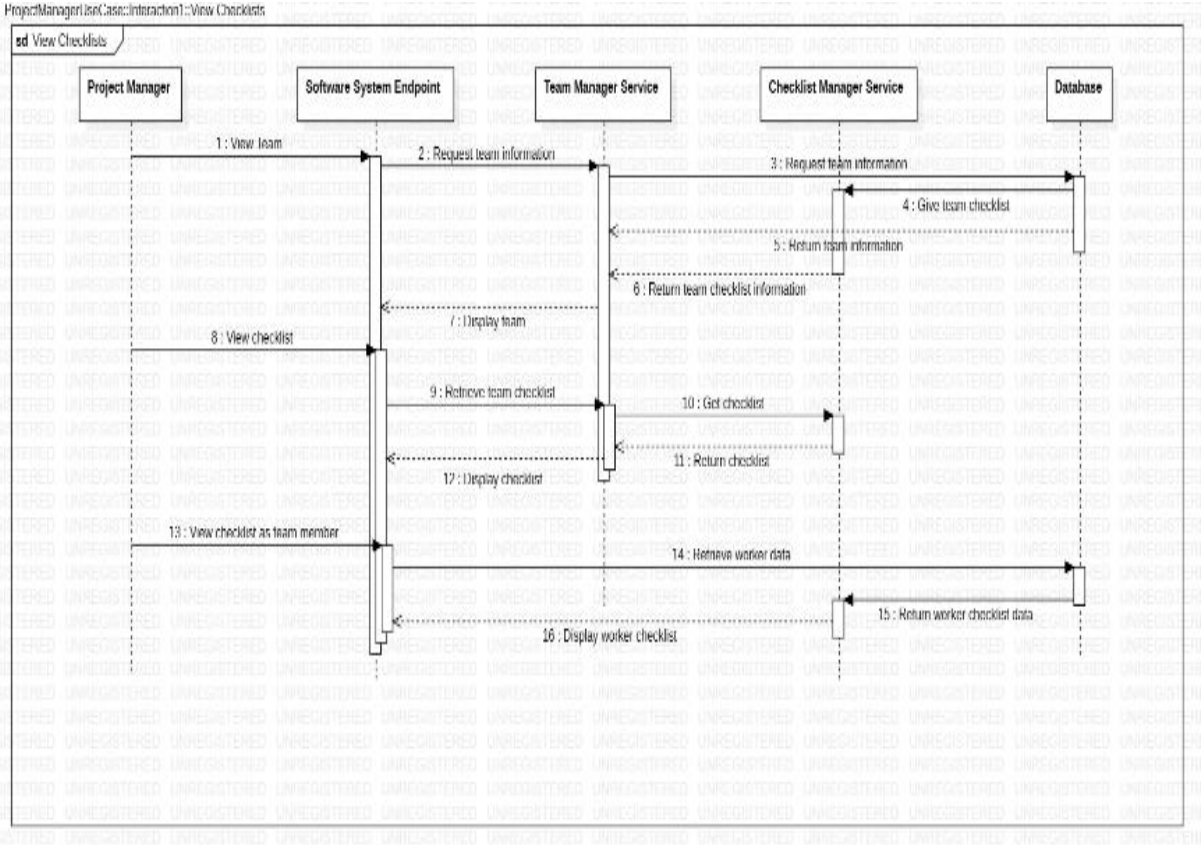

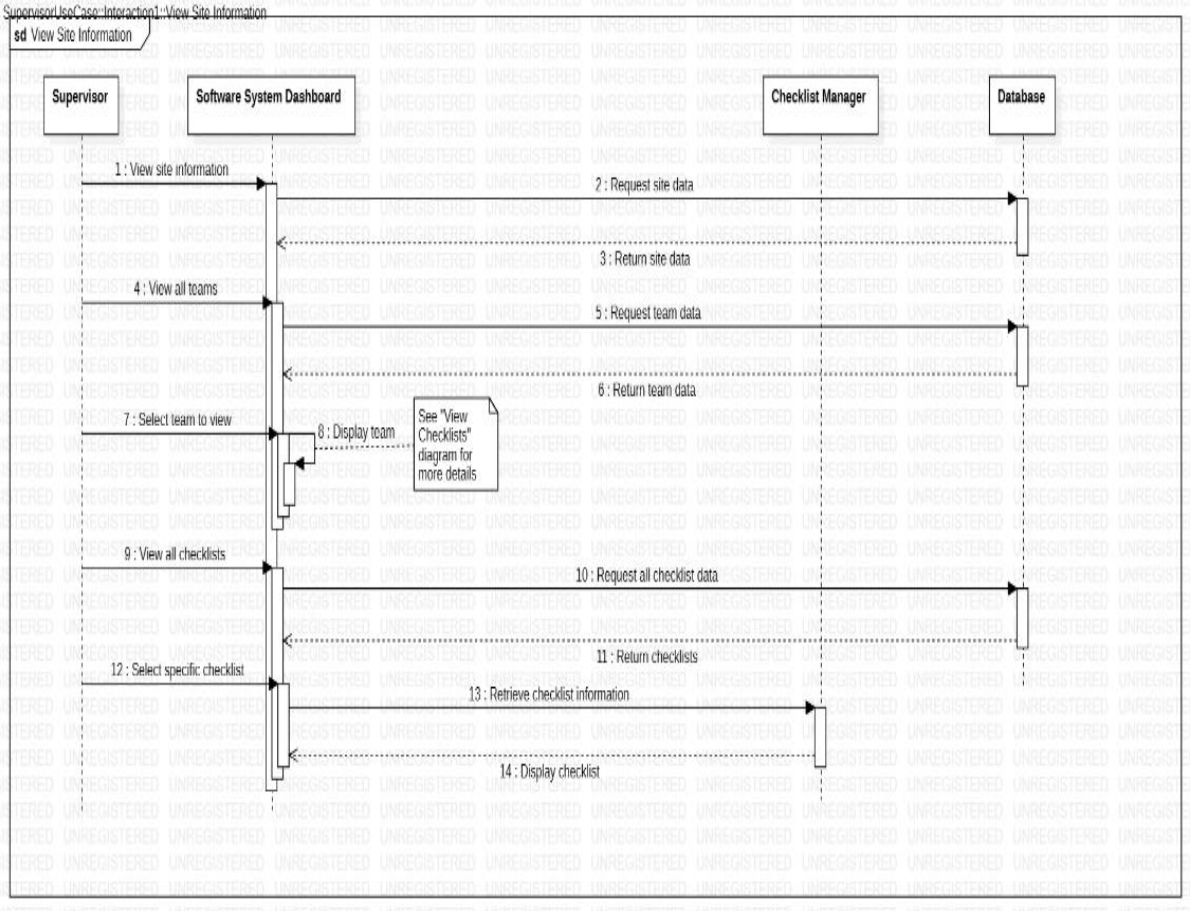

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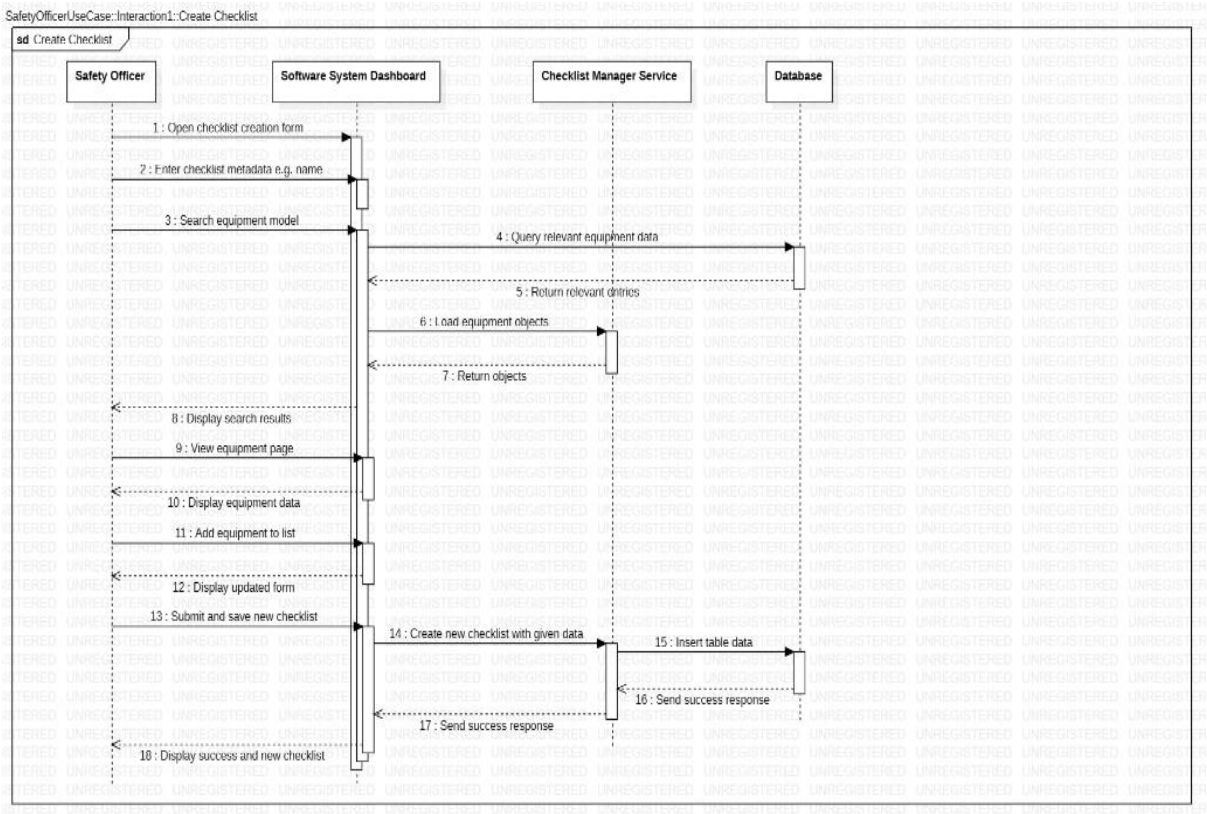

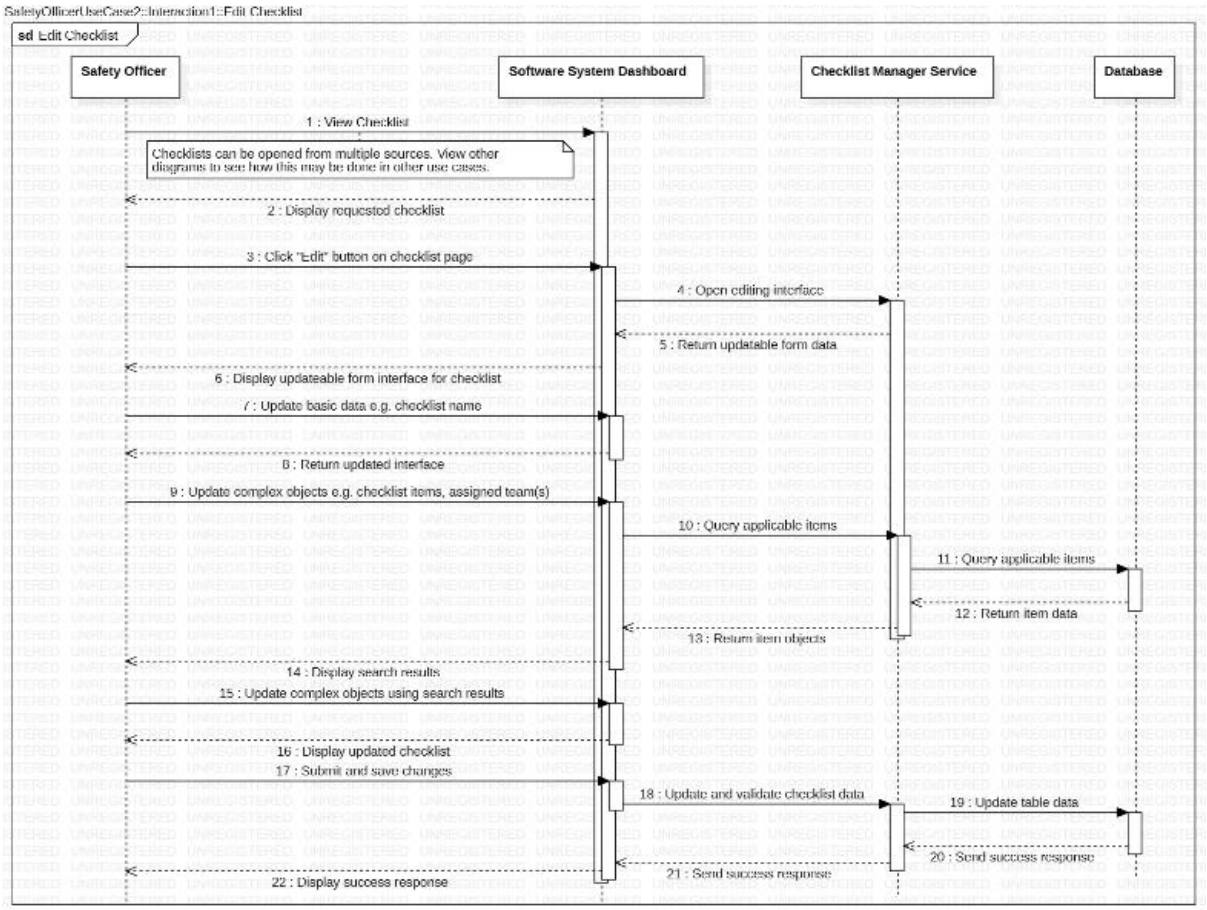

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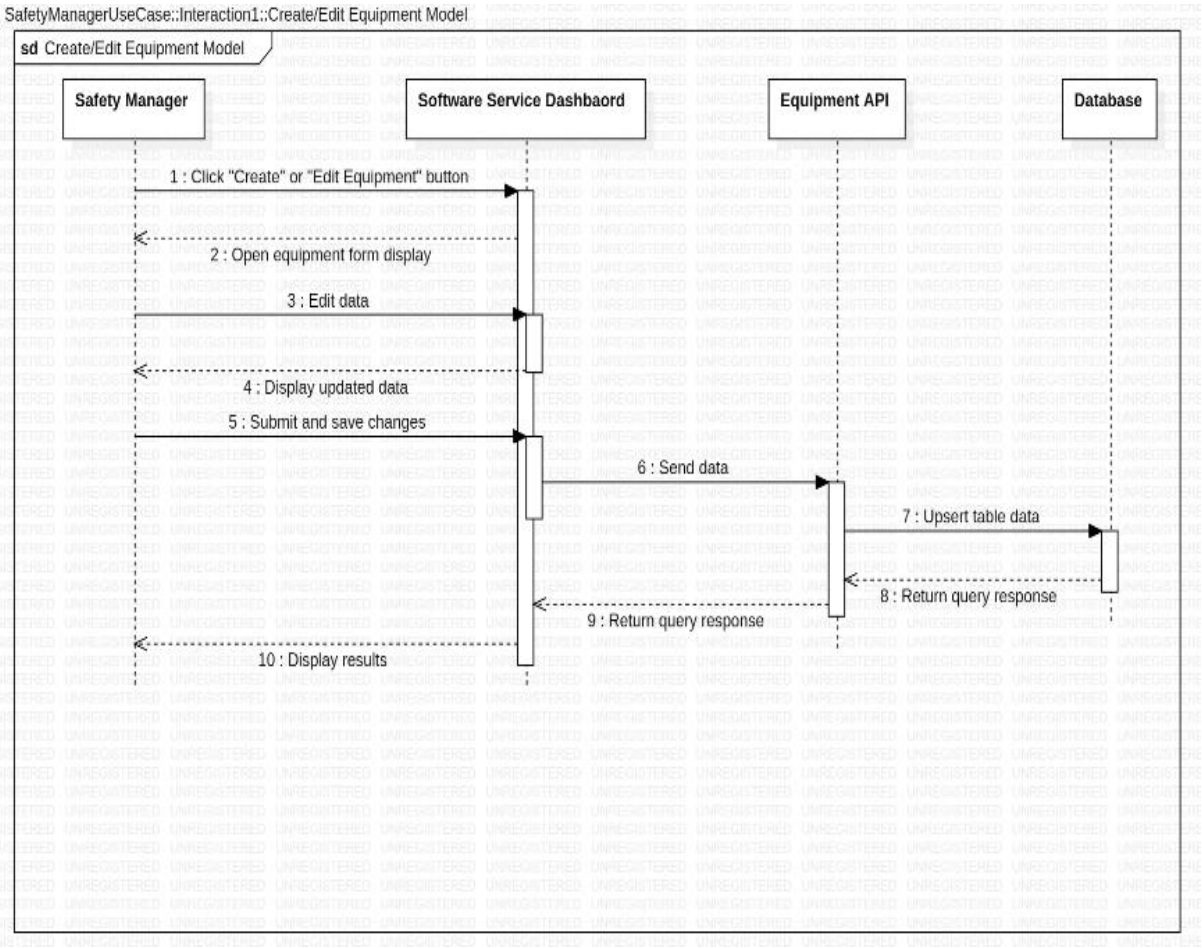

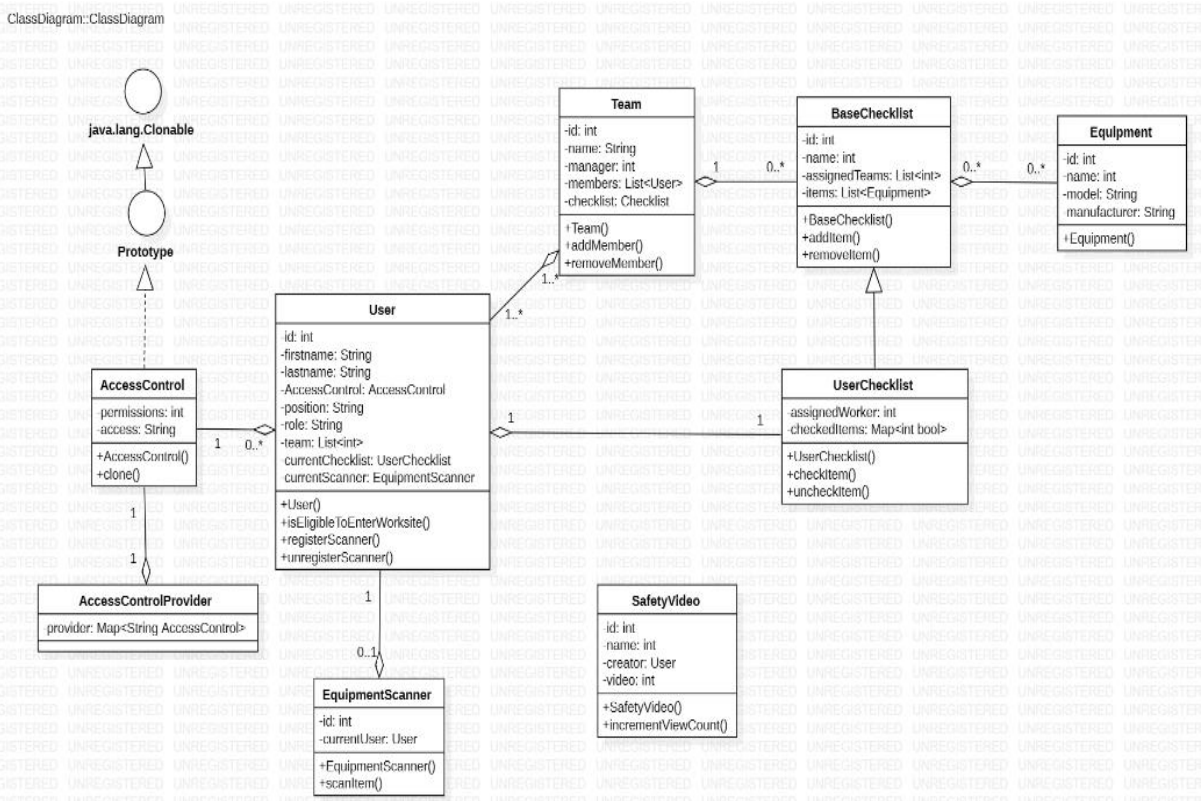

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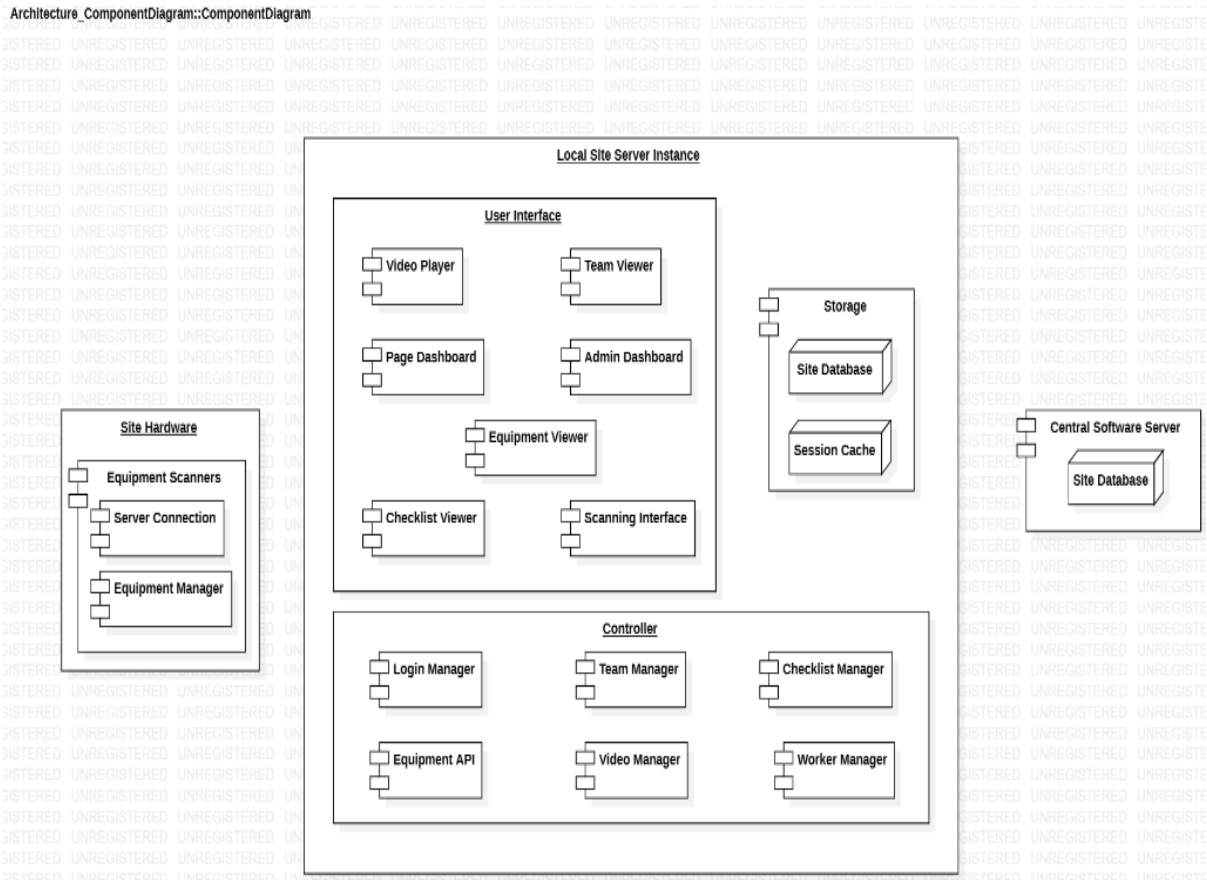

(part 3).(contributed to by David)

Click on this object to view the Fully clickable SafeScan UI mock-up.

28 pages worth, so made into an object for neatness sake.

CS335 UI mockup.pdf

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Part 4, System tests that can be used to validate the User requirements.(contributed to by David and Sebastian)

Site Workers

Test that the site worker can view their own checklist.

Test that the checklist is given based on the team they are in.

Test that the checklist shows the model's name, type and producer.

Test that each item on the checklist is clickable.

Test that clicking on an item opens a page showing more details of the item such as an image or other details added by the user.

Test that the site worker can scan their gear to check all required items off the list and gain access to the site.

Test that scanning gear sends a request to the central server which will mark the item scanned as checked off on the worker's checklist.

Test that if the worker has unchecked required items on their list a notification will state they cannot enter the worksite.

Test that if all the required items on the list are checked off the notification will indicate they can enter the worksite.

Test that the worker can scan their gear at the end of their worktime to indicate that the gear has been returned and there is inventory available.

Project Manager

Test that the project manager has all the same abilities as a site worker.

Test that the project manager can view their team members checklists.

Test that when clicked it will extend a menu listing all members on their team.

Test that if a member is clucked the checklist will display that person's checklist as the team member would see it.

Site Supervisor

Test that the site supervisor has all the same abilities as a Project Manager.

Test that the site supervisor can view the checklist of any worker.

Test that on the main page of the application, the supervisor will have a clickable menu showing all teams on the site.

Test that like the PM, the supervisor can use this interface to view all team members checklists.

Test that another button will also lead to a page listing all checklists.

Safety Inspector

Test that the safety inspector has all the same abilities as a Site Supervisor.

Test that the safety inspector can view the checklist of any worker and/or team.

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Safety Officer

Test that the safety officer has all the same abilities as a Safety Inspector.

Test that the safety officer can create a new checklist.

Test that the new checklist page prompts for information to be put into a form, including checklist name , team it is assigned to, and equipment to add to the checklist.

Test that equipment additions are blocked out by type.

Test that equipment additions can be done via search.

Test that only equipment with existing entries in the system is available for selection.

Test that the safety officer can assign checklists to a team of workers for their use.

Test that the safety officer can edit the checklists assigned to a team.

Test that the edit is done through a form input to validate the checklist and ensure the safety officer can only select from existing checklists.

Test that the safety officer can edit the team a checklist is assigned to.

Test that the edit is done through a form input to validate that the team's entered exist.

Test that the safety officer can edit existing checklists.

Test that the safety officer can open a checklist page.

Test that there is a button allowing the safety officer to open the checklist in edit mode.

Test that the edit page is identical to the checklist creation page, except with the form values prefilled with the current checklist data.

Safety Manager

Test that the safety manager has all the same abilities as a Safety Officer.

Test that the safety manager can create entries for specific models of tools.

Test that the main UI page has a button leading to a page listing all equipment entries.

Test that the page displays equipment name, manufacturer, type, and the number of checklists it is used in.

Test that the page can be sorted and filtered by these metrics.

Test that the safety manager can create an empty form prompting for the equipment info, similar to the checklist creation page.

Test that the safety manager can edit and remove entries for specific models of tools.

Test that the page for a specific model has an additional button to edit the equipment.

Test that when clicked, a page to edit the model opens.

Test that the edit page is identical to the equipment creation page, except with the form values prefilled with the current equipment data.

Test that the page for a specific model has an additional button to delete the equipment.

Test that when clicked the model is validated and the user is notified of any checklists that have the item.

Test that a confirmation message prompts the user that the page will be deleted.

Test that the equipment list page also has a delete button for each equipment.

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Owner

Verify that the owner has superuser permissions and can view reports of compliance statistics at active sites.

Test the functionality of the button in the admin options to display a list of active sites.

Test the ability to view analytics for a specific site.

Verify that the owner can view the latest safety inspector site safety rating.

Test the functionality of the button in the admin options to display a list of active sites.

Test the ability to view the site safety rating and the confirmation signature from the head inspector for a specific site.

Safety Trainer

Verify that the safety trainer can upload site safety training videos.

Test the functionality of the safety training page accessible from the main UI.

Test the ability to upload videos through the form page including video title and tags.

Test the ability to filter and search videos by tags.

Test the ability to edit or delete videos.

Verify that the safety training section is accessible from the main UI.

IT Administrator

Test the functionality of the admin interface to add users to the system via a form, including name, worksite id, other id documents, email, role, and team.

Test the allocation of workers to roles.

Test the ability to modify the log of all workers in the system.

Test the ability to allocate workers to roles through the interface.

Contractor

Verify that the contractor can create entries for specific models of tools and add them to the wanted section.

Test the ability to create entries for specific models of tools.

Test that the contractor can form checklists of safety equipment.

Test the ability to select models from the designated section.

Test the ability to form checklists of safety equipment.

Test that the contractor can allocate workers to teams.

Test the ability to assign workers to construction teams.