

1. KitchenSync: A Pantry and Recipe Companion
2. Team Members
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3. Advisor - Fitzroy Nembhard
4. Client - Fitzroy Nembhard
5. Meeting(s) with the Client for developing this Plan: TBD
6. Goal and motivation: Discuss the overall goal (help make the intended users "happier") and motivation (why are the intended users not too "happy"? limitations/pains of current systems)
 - Making the process for home chefs to track and use what they have in their kitchen from the freezer and fridge to the cabinet and pantry. Current systems only have some of the features we have planned but not all of them which allows our users to be able to do it all in one place instead of several. Such as tracking the ingredients a user might have on hand and then see what recipes the user can make with what they have. Our application will also allow a user to see the cost of a recipe based on what they have and where they can purchase the remaining ingredients.
7. Approach (key features of the system):
 - The user can track their inventory
 - The inventory of a kitchen is managed and organized by where the items are stored such as a pantry, freezer, fridge, or cabinet. However, if this level of organization is not for you that's fine too as products will be sorted by default into one of three locations based on where they are often found: Freezer, Fridge, and Pantry.
 - From here you can tag items that you want a minimum to keep on hand. Other items that might be perishable or best if used by can also be tagged and tracked like fruit or cheese. Of course, sometimes things might go bad before the date printed on a product so you should use your best judgment before consuming.
 - Push notifications can be enabled to let you know when something is low, expired, or needs to be used up soon.
 - When shopping you can simply scan a barcode on a product and have it uploaded into your kitchen's inventory. For larger hauls and to save time you can simply scan your receipt. First-time users will need to scan the barcodes on items they have on hand or manually enter them such as with produce.

- The user can manage and share recipes
 - Keeping track of and organizing your recipes can be hard so storing them in one place that you can access from anywhere is important.
 - Users can upload recipes they find, make, or scan into their recipe book. Each recipe will have its own recipe card which includes: Time to prepare and cook, Complexity to make, Equipment needed (with substitutions if possible), ingredients, directions, and of course pictures.
 - Every user can also post their recipes to share with others and get feedback and reviews.
 - Cooking is often more than just following a recipe so that is why recipe cards will also have recommendations such as pairings or even ingredients to spice things up.
 - Nutritional information on recipes will appear to make choosing recipes easier.
 - Tags can be used to filter recipes such as vegan, high protein, keto, paleo, gluten-free. To further help users find just what they want and things that they might want to try, recipes can be sorted by Time, Cost, and Complexity to make.

- The admin can remove invalid recipes, reviews, and seed recipes
 - Admins will be able to take recipes from different sources and provide them to the database of recipes that all users can access in order to seed it.
 - As users submit their own recipes then certain filters can be applied in order to remove invalid recipes that include bad ingredients like inedible items, bad names, or making illegal substances.
 - Reviews from users will also be able to be removed based on keywords.
 - Users themselves can also have their usernames removed or changed to an appropriate one by an admin.

- The user can plan their meals
 - Recipe cards have prep and cook stages and can be organized in the meal planner to know when to pull meat to thaw or make dough to proof.
 - Plan for up to two weeks in advance to keep track of when to prep meals and when you need to go shopping. Ingredients and their amounts needed for recipes will then be deducted from the kitchen's inventory when the meal is prepared.
 - The meal plan made for the week can also be shared with family members to let everyone know what is on the menu.

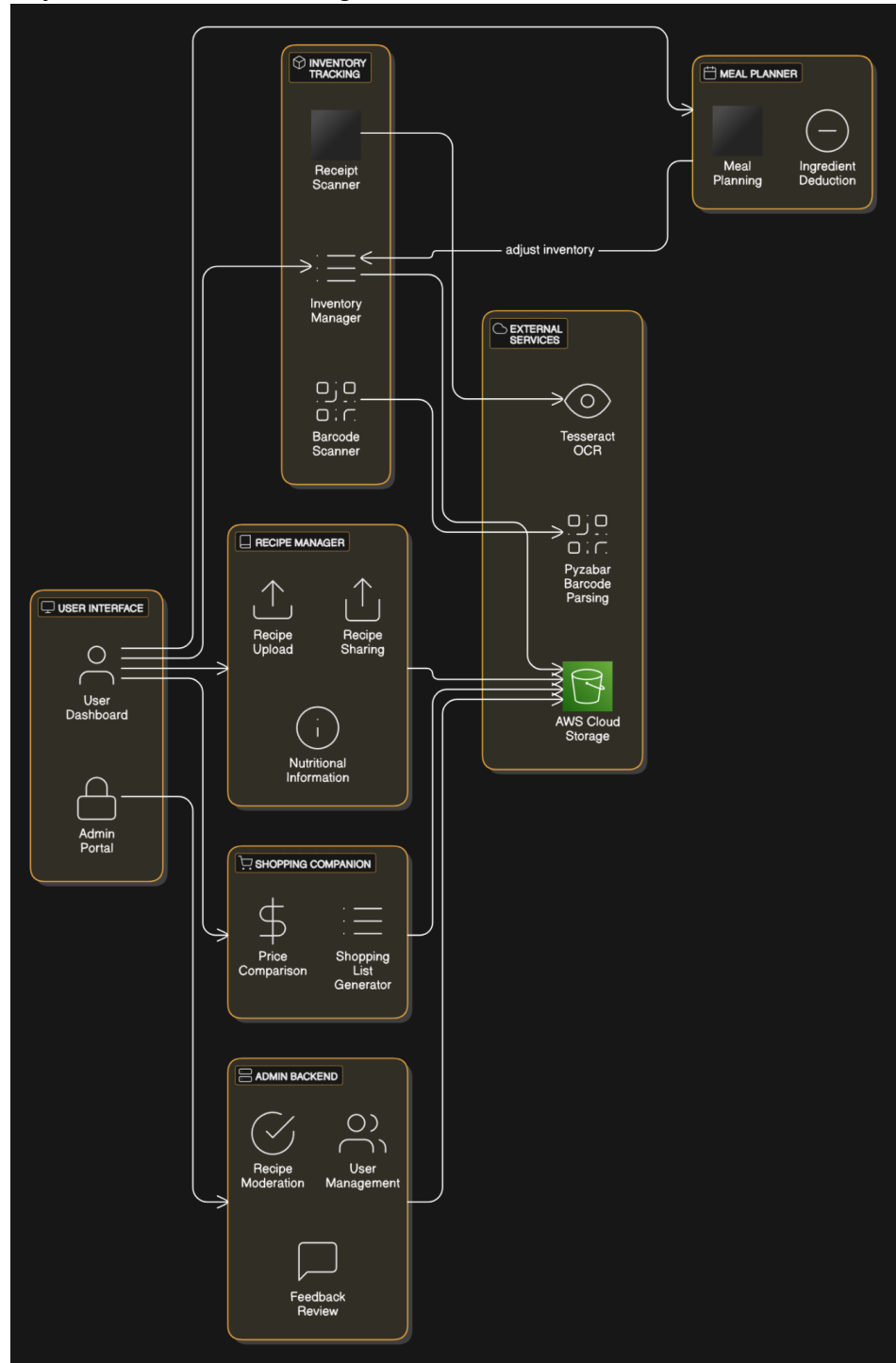
- The user can get better deals in shopping
 - You can create lists of items you need based on recipes or from the store you will be going to shop at. When a list is made for what a user needs the prices of items will be pulled from local stores and compared to find the cheapest price. For bulk and club stores, users will be able to sign in and gain access to the price comparison at these stores as well.
 - From here a user can exclude places they don't want to shop at or if the store is too far out of their way. Certain ingredients can also be tagged for store preferences such as produce from store a rather than anywhere else. This will then be made into convenient lists to help you know what you need to pick up from which store.
 - Lists can also be shared with family members. The price per serving will be provided based on the stores that you have access to and your preferences. When you scan a receipt and the prices are different then the price per serving shown then the serving cost will be adjusted.
- 8. Algorithms and tools (libraries/api/frameworks/languages) for the key features:
Discuss how and which algorithms and tools are used to achieve the features
 - [Tesseract](#) for OCR of the images of the receipts
 - JavaFX for Frontend
 - AWS for our Cloud Storage
 - Pyzabar for barcode parsing
- 9. Novel features: Discuss which features/functionalities are novel and why.
 - Recipe suggestions based on what the user has on hand noted by "Ready to Make". Recipes that are partly complete would be marked "Partly Ready". Then there are other recipe types that can be added such as those that the user would need to prep or have ingredients like protein to thaw before use.
 - Ingredient substitutions and add-ons based on a "flavor matrix". Just like there is a color wheel with contrasting colors and hues, there is also a flavor matrix like salty often pairs well with sweet, or crunchy and creamy. Recipes can show addons to a recipe such as adding nuts to add texture and a salty component or a drizzle of oil to add depth of flavor. Perhaps a user wants to make a recipe that calls for milk but they are lactose intolerant or do not have the type indicated, if the recipe allows for a different type of milk or plant-based milk, then the substitution would be shown. A recipe will also show if a substitution like this is not possible for a science reason such as with making cheese where you have to have a very specific type of milk.
 - Shopping companion allows users to take their list of needed ingredients and then generate one or more lists of ingredients they need based on their meal plan they made. These lists will be generated based on a set of preferences the user can modify such

as distance from the user, store preferences, item preferences, or membership requirements, number of items per store.

10. Technical Challenges: Discuss three main technical challenges for this semester (for example, "we plan to find the shortest path from A to B, but don't know which algorithm to use.")

- We plan on having a way to let users share things with nonusers and users such as a recipe, list, or other notifications via their phone but not sure how to get this done.
- Expanding the accepted list of receipts from stores such as Public, Aldis, Fresh Market and so on. Currently our receipt parser only works on receipts with the item upc code on the receipt.
- Getting the prices from stores like Costco and other bulk/clubs that require a sign-in
- Getting product information from the UPC
 - Kinda have a solution just not fully tested/researched - plug the UPC into the store website as it can search their internal db this way but could become slow if large amounts of items are to be searched

11. Design: system architecture diagram



- interfacing with different types of users (if any) - Admins and Users
- interfacing with different hardware devices (if any) - N/A

12. Evaluation: how to measure success? Some ideas:

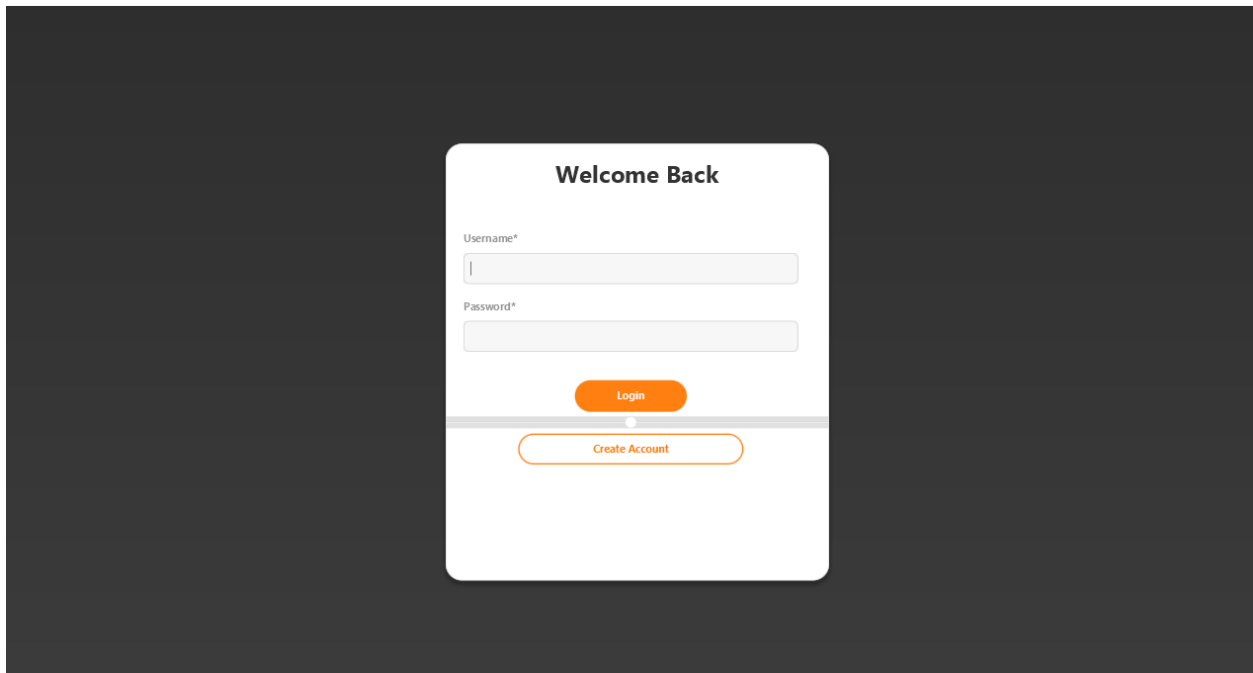
- Speed: Average System response time, not including image parsing, shall be around 5 secs
- Accuracy: Out of the UPCs parsed on a receipt no more than 1-3 items are to not be able to be read
- reliability 4 in 5 successful image parses
- user survey rating of 1-5 on each of the different features and then a questionnaire about the features
- Recipe Screening should take no more than five minutes
- Inventory updates should take no more than 2-3 seconds
- Recipes should be displayed within 5 secs of a user searching the database
- Modifying meals or recipes should take no more than 5 seconds
- Admin should be able perform moderation onto recipes, feedback, and users and have it applied within 2 seconds
- Bulk recipe adding should take no more then 10 mins for up to 1000 recipes
- Scanned data from barcodes should be processed within 2 seconds
- Receipts be scanned should have their data extracted and processed within 5 seconds
- The System should support up to 100 concurrent users without degradation in recipe browsing
- UI/UX should load and respond on all pages within 5 seconds of clicking/tapping on a button
- Price preserving estimates should be 90% accurate when compared with the final price a user scans in from the receipt.
- The receipt scanning should have a 90% accuracy rate

13. Progress Summary:

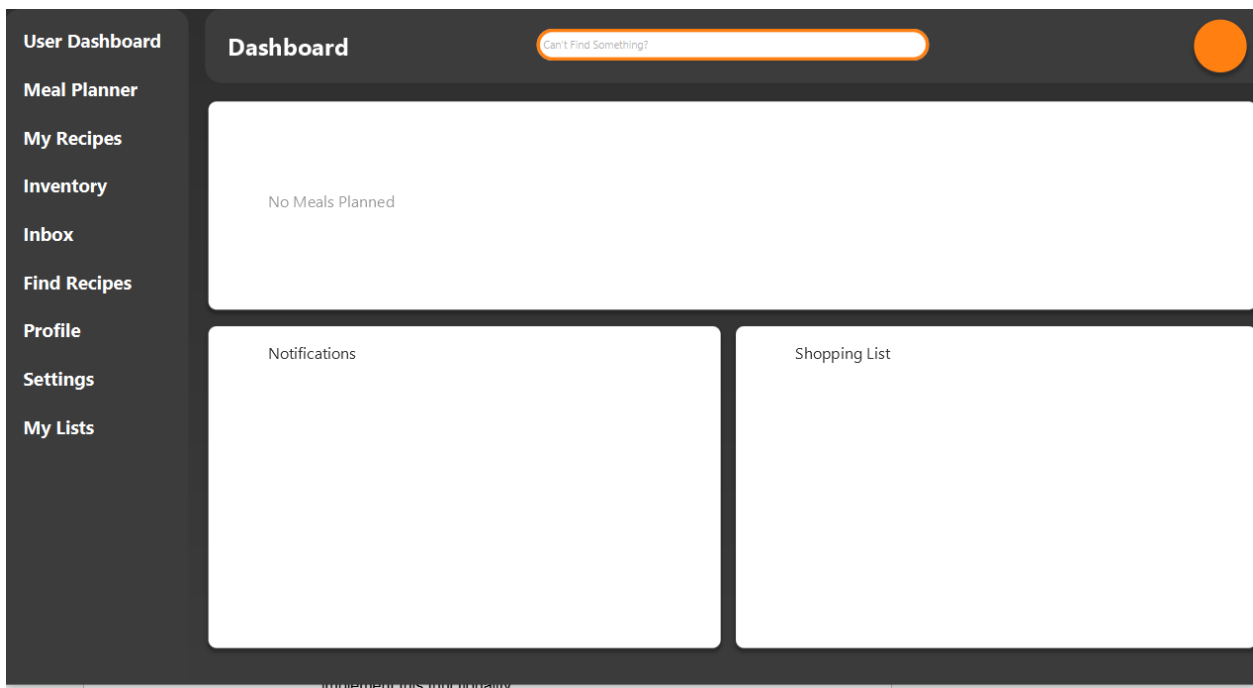
Module/feature	Completion %	To do
GUI	70%	User Profile, User Settings, User Notifications, Shopping Lists, Shopping Preferences, Community Reviews/feedback, Community Dashboard, Community Add Recipe, Search Bar, Connect Modules to User Dashboard, Filter popups, Random UI/UX components

Inventory Tracking	80%	Auto Tracking, Item sorting, Item Filters, Item Images
Recipe Manager	80%	Recipe Card Images, Recipe Filters, Recipe Searching, Recipe Notes, Nutrition Calculator, Recipe Cooking Images
Community Recipes	10%	Recipe Reviews/Feedback, Populate the Starting Recipe DB, Populate the UI with Recipe Cards, Allow user to Post Recipes, Allow Users to Save Recipes, Allow Users to Remove their Recipes, Allow Users to edit/update their Recipes
Meal Planner	70%	Recipe Sharing to Other users/non-users, Recipe Ingredients added to needed ingredient list, Recipe ingredients removed from list if updated, Recipe ingredients removed from inventory if made, Nutrition Calculator, Daily Meal Summary
Shopping Companion	20%	List Sharing, Item pricing, Price data from retailers, Price data from club stores, Price per unit comparison, Meal cost Estimate
Admin Backend	10%	User and Admin accounts, Admin Portal, Admin lists of current users, names, feedback, recipes. Admin filters, Admin sorting, Admin ticketing system, Admin controls, Activity Logs, Reporting System

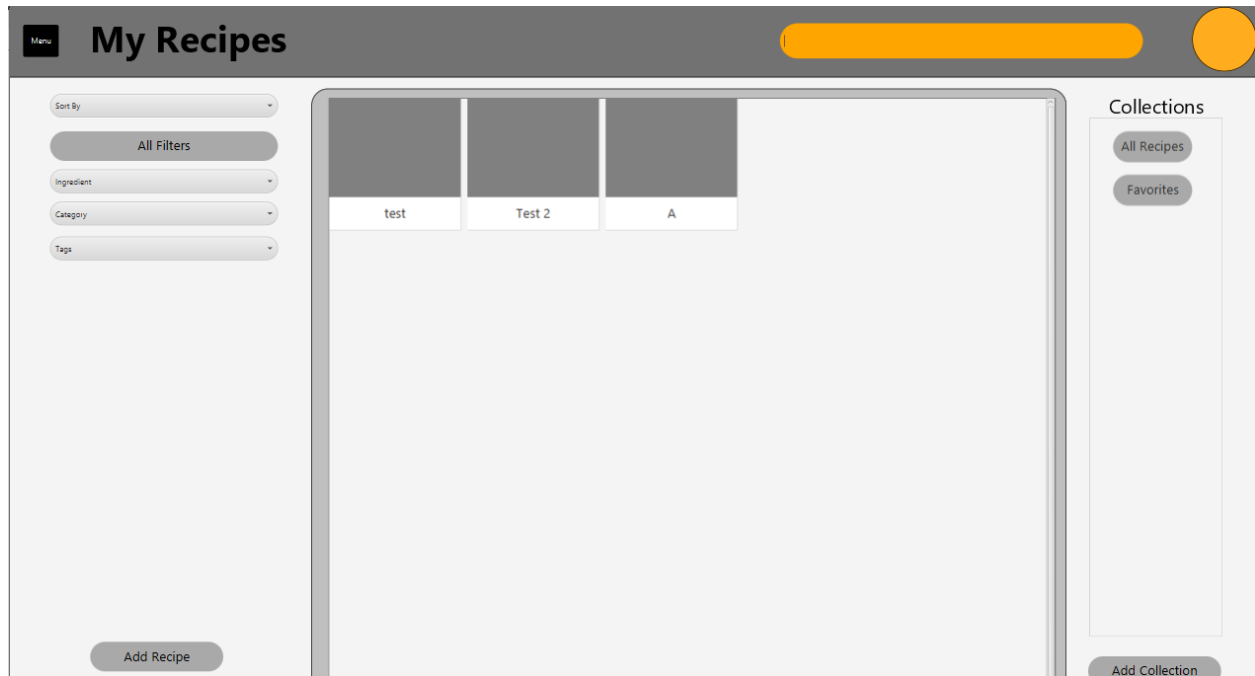
UI Screenshots



Login Screen



User Dashboard



My Recipes (New Theme Not Yet Applied)

14. Milestone 4 (Feb 24): itemized tasks:

- Finish implementing all GUI elements needed
 - User Profile
 - User Settings
 - User Inbox
 - Community Review/feedback popup
 - Shopping List Preference Screen
- Complete the Inventory Module
- Complete the Recipe Module
- Set up User Accounts
- Explore ways to expand acceptable receipts, and possibly work to implement this functionality
- Start on the Shopping Companion
- Implement Community Recipe Page
- Implement Reviews/Feedback onto recipes in the community module

15. Milestone 5 (Mar 26): itemized tasks:

- Implement Recipe ingredient suggestions and substitutions
- Implement Nutritional Information Module
- Implement and Complete Admin Portal
- Implement and Complete Admin Backend as a whole
- Complete Shopping Companion
- Implement New User Guide // Tutorial onboarding process

- Conduct evaluation and analyze results
 - Create poster for Senior Design Showcase
16. Milestone 6 (Apr 21): itemized tasks:
- Test/demo of the entire system
 - Conduct evaluation and analyze results
 - Create user/developer manual
 - Create demo video

17. Task matrix for Milestone 4 (teams with more than one person)

Task	Tyler Son	David Tran	Chris Nederhoed
User Accounts		Create user account creation process, and link user accounts to AWS DB	
User Sub Components (Inbox, Settings, Profiles)	Allows users to customize their settings such as "light mode" vs "dark mode" and users to include profile pictures.		
Frontend Facelift			Polish front-end UI/UX making things look more professional while adhering to good principles. Implement window scaling.
Accepted Receipt Expansion			Use machine learning to parse

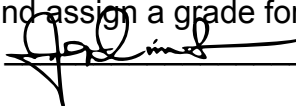
			hard-to-read user images and get the information from them
Shopping Companion	Create a list creation algorithm based on a user shopping list and preferences.	Get item prices from websites and/or api's.	
Feedback/Review System	Create attributes that store user feedback for recipes.		

18. Description (at least a few sentences) of each planned task for Milestone 4:
- User accounts will be handled through AWS so that way they can access the cloud DB. We also will be able to track users this way and manage their content once we are ready to allow user uploads to the cloud. The overall plan is to gather minimal data from users such as just their name and email address. If we find we need more data like a phone number then we can add this as a field we need and then will have to add a security plan to manage this data.
 - User Subcomponents include all the views and ways a user can further interact with the application in ways that are user-specific. These are things such as an inbox for notifications, settings like light or dark mode, and then profiles to provide any stats a user might want to see or change. We will add more settings to let the user customize their experience as we think of them/provide support for them.
 - First semester left us with a fairly stable front end but it leaves a lot to be desired from it. Our goal this time around is to create a style sheet to make extending functions and adding new functionality have some standard to adhere to but also make the application more professional. We also want to improve the UI/UX of the

application so that there are little quality of life features that help make the application better.

- Shopping companion is going to gather information from websites that provide us with the cost for an ingredient and then allow a user to create a shopping list and see where they need to get them. We have two core parts to this: 1) get the prices, 2) create lists based on a users shopping list and their preferences. This will let users be able to take into account the user's store preferences and distance to the store making the lists more reasonable.
- The feedback and review system is part of the community recipes page where users can give feedback and/or review a recipe another user has posted or that admins have posted. This is so that other users can see if the recipe is good as is or needs changes such as shorter cook time or less salt. This will be another table we store in AWS and link the recipes table using the recipe ID to reference the two table together through this foreign key.

19. Approval from Faculty Advisor

- "I have discussed with the team and approve this project plan. I will evaluate the progress and assign a grade for each of the three milestones."
- Signature:  _____ Date: 1/27/2025