

Software Requirements Specification (SRS)

Project Blackboard Bookmarking Bar

Team: 2

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1 Introduction

This document will cover the following topics about a new Bookmarking System for UMass Lowell's Blackboard learning management system called the "Blackboard Bookmarking Bar":

- (Section 1) Introduction
 - Describes the purpose of BBB, general scope of the project, commonly used terms/acronyms, and what the rest of the document will go over.
- ((Section 2) Overall Description
 - Depicts how the BBB system should work, assumptions about users, and features that will be implemented in the future.
- (Section 3) Specific Requirements
 - List drafted requirements for the BBB system.
- (Section 4) Modeling Requirements
 - Shows a use case diagram, class diagram, sequence diagrams, and state diagram.
- (Section 5) Prototypes
 - Goes over how to run our prototype and shows an example scenario.
- (Section 6) References
 - Gives a link to our website and cites used images and resources used.
- (Section 7) Point of Contact

1.1 Purpose

The SRS document organizes ideas and details a Bookmarking System for UMass Lowell's desktop version of Blackboard. The system is meant to make navigating the current Blackboard system easier. We intend on making it available for anyone who already has access to Blackboard so it will be for students and professors at UMass Lowell. The document shows our clients how we plan on implementing our Bookmarking System.

1.2 Scope

The scope of the "Blackboard Bookmarking Bar" is to make traversing through Blackboard simpler and faster. Rather than going through several layers of links to reach a specific destination, the user can go there with just one click. The objective of this system is to improve upon the current "Quick Links" feature in Blackboard and to reduce users' navigation time. The "Quick Links" system is not known to many users and serves no real purpose as it does not change the current page the user is on. Our system will allow students to personalize what parts of Blackboard they get quick access to by placing those parts onto a fixed Bookmark Bar. It will allow users to make folders and put direct links to Blackboard Resources. Users will also be allowed to add, remove, or rename those folders or Bookmarks for Blackboard Resources using an edit box feature. Dragging and dropping Blackboard Resources onto the bar or into folders will be outside the scope of this project. Some other functionality left out includes having a bookmark file directory available in the edit box and Bookmark Folders cannot contain other Bookmark Folders. There is also a

limit on the number of Bookmarks that can be on the bar, it will not shrink the width of Bookmarks on the bar or create a dropdown to hold the ones that cannot fit. This project is hosted on GitHub pages and does not include any data from the current UMass Lowell Blackboard.

1.3 Definitions, acronyms, and abbreviations

BBB – Blackboard Bookmark Bar

UMassL – The University of Massachusetts Lowell

Instructor – A professor or teaching assistant who teaches a course at UMassL

Class page – A folder on Blackboard that holds all the courses materials such as assignment descriptions, submission pages, class notes, class recordings, etc.

Folder – can hold one or more resources.

Blackboard Folder– A type of folder that an instructor creates for their class page that holds Blackboard Resources.

Resource - Assignments, Blackboard Folders, Class Recordings, PDFs, and other things that an instructor puts inside their class page.

Blackboard Resource – A resource that the instructor creates for their class page.

Bookmark Folder – A type of folder that the student creates for their BBB that holds Bookmark Resources.

Bookmark Resource – Resource that holds the link of a Blackboard Resource in the BBB.

LMS – Learning Management System

Learning Management System – a software system where instructors can upload class materials and students can access those materials while being able to submit assignments and do tests or quizzes.

Blackboard – The desktop version of the LMS at UMassL that is being improved upon

Edit box – A functionality in the BBB system which allows users to create/remove Bookmark Folders and remove/rename Bookmarks and Bookmark Folders.

Bookmark Item – An item that resides on the BBB, this item is either a Bookmark Folder or Bookmark Resource

1.4 Organization

The remaining sections of the document will go over a general description of the assignment, along with the development process of the software, which includes their requirements, the models of those requirements to make it work, and how to run the prototype, along with examples. Section 2 is the general description of the software. Section 3 is the project requirements sorted in importance and subgoals per requirements.

Section 4 is all the model requirements, along with descriptions of each model. Finally, section 5 details how to use the prototype with a sample scenario.

2 Overall Description

This section will go over our BBB system. It will go over the product that was made, along with its current functions and characteristics. It will also cover current issues with the product, and other constraints that were placed on the system. It will also examine the requirements set by the client, which may be implemented in the future, but are not in the current model, or any assumptions made about the product.

2.1 Product Perspective

Students in college are given access to a learning management system in order to organize their work and grades. It also helps the professors submit notes and homework for the students to adhere to. Many students have at least four classes per semester and there are a lot of notes, homework, and resources to keep track of. In Blackboard, students do not have ease of access in order to switch between certain Blackboard Resources quickly, the only work around would be to have several tabs or go navigate through Blackboard. This project creates a bookmark system called the BBB, to help with student and instructor navigation through the system.

The BBB is inserted as part of Blackboard itself. The interface is inserted directly below the header on the original site. It follows the user to every page they navigate to. The following figure gives a pictorial representation of the BBB. “My Class” and “Bookmarked Assignment” are Bookmarks in the Bookmark Bar

Figure 2.1 Screenshot of the Bookmark Bar



The BBB is a functional bookmark system that creates easier navigation among students and instructors. In order to express the usage of the BBB the developers needed to recreate Blackboard from scratch.

Where the user interface is concerned, some constraints can cause some user difficulty. The developers chose to imitate the original Blackboard. This will limit the exploration of the functionality of the BBB.

There are no hardware limitations for this project since there has been no attempt to improve any hardware. This project only looks to improve on the existing software.

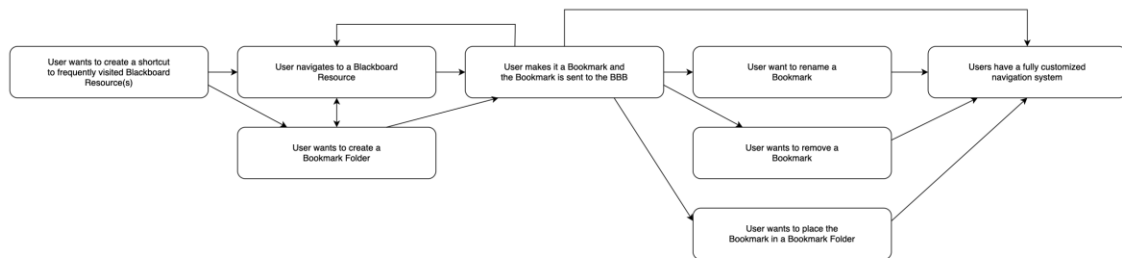
Since the developers have created their own version of Blackboard, there could be some software limitations. Normal Blackboard software allows the user to look at their grades for each of their classes. The developers limited the functional aspects of the homebrew Blackboard to how it would apply to the BBB.

2.2 Product Functions

The BBB is a website that allows users to create bookmarks for Blackboard Resources. They have the choice to pick which Blackboard Resources they can turn into bookmarks.

If a user no longer needs a bookmark, they may remove it. Bookmark folders can be made to hold bookmarks that a user wants to arrange and put into a subsection. Renaming can of both bookmarks and folder may be done too.

Figure 2.2 High-level Goal Diagram



This high-level goal shows the process of how a user wants to create a customized BBB.

2.3 User Characteristics

We expect the users of our product will be students and or teachers that are already familiar with other LMS (Learning Management Systems). We expect a baseline knowledge and literacy with web browsers and web browsing. Users of Google Chrome and Chrome adjacent products will be familiar with the bookmark feature that they offer, and we seek to do something similar.

2.4 Constraints

For the BBB, there are multiple constraints, some from the environment the project is hosted in and some where it is based off ones, we set for ourselves. The environment constraints come from the environment of web development since the BBB is a part of a hosted website. Which means the user should have an updated browser and internet connection. Since we host the code on GitHub Pages the website code must be static, which means we must use an external database to store information or browser's local storage. We also put the constraint on our project that it must be related to the current Blackboard site where our project might be implemented easily on the current site. So, you will see that our site looks very similar to the Blackboard site which currently exists. We also have set the constraint to ourselves that we shouldn't take up too much of the screen for the UI that is added so it does not interfere with the existing components of Blackboard such as Course pages, Blackboard Resources, messages, announcements, organizations, tech support, etc.

2.5 Assumptions and Dependencies

For users of our product, the hardware requirements should be a system that can handle running Chrome or a similar browser. JavaScript should be enabled and working on the system. A mouse and keyboard should be present and working on the system as well so that the user can interact with the page and bookmarks. No cookies are required for the website to work now, but they should be enabled anyways in case of future updates.

2.6 Apportioning of Requirements

There are several functionalities that are not implemented in the current version of BBB. These include the ability to drag and drop items, create a dropdown for Bookmarks that don't fit onto the BBB, show a file directory in the Edit box, and the ability to nest Blackboard Folders.

The ability to drag and drop items would allow users to directly drag Blackboard Resources onto the BBB and Bookmark Folders or out of them. We decided not to do implement this due to time constraints and its added complexity. This feature also is not fully needed because users already can add/remove Blackboard Resources onto the BBB or Bookmark Folders. This may be implemented in the future.

Creating a dropdown when the BBB fills up would be a highly important implementation because it allows users to have many Bookmarks, the current version of BBB only allows the user to place Bookmarks until the BBB is fully filled horizontally. This will be a part of a future update as we weren't able to do it due to time constraints.

Showing a file directory was scrapped due to it not being needed and would take up unnecessary space in the Edit box. This may be implemented in the future.

The last part of BBB left off the current prototype is the ability to nest Bookmark Folders. This would allow users to place Bookmark Folders in Bookmark Folders. We decided to leave this out due to the added layers and complexity. It could be implemented in future updates.

3 Specific Requirements

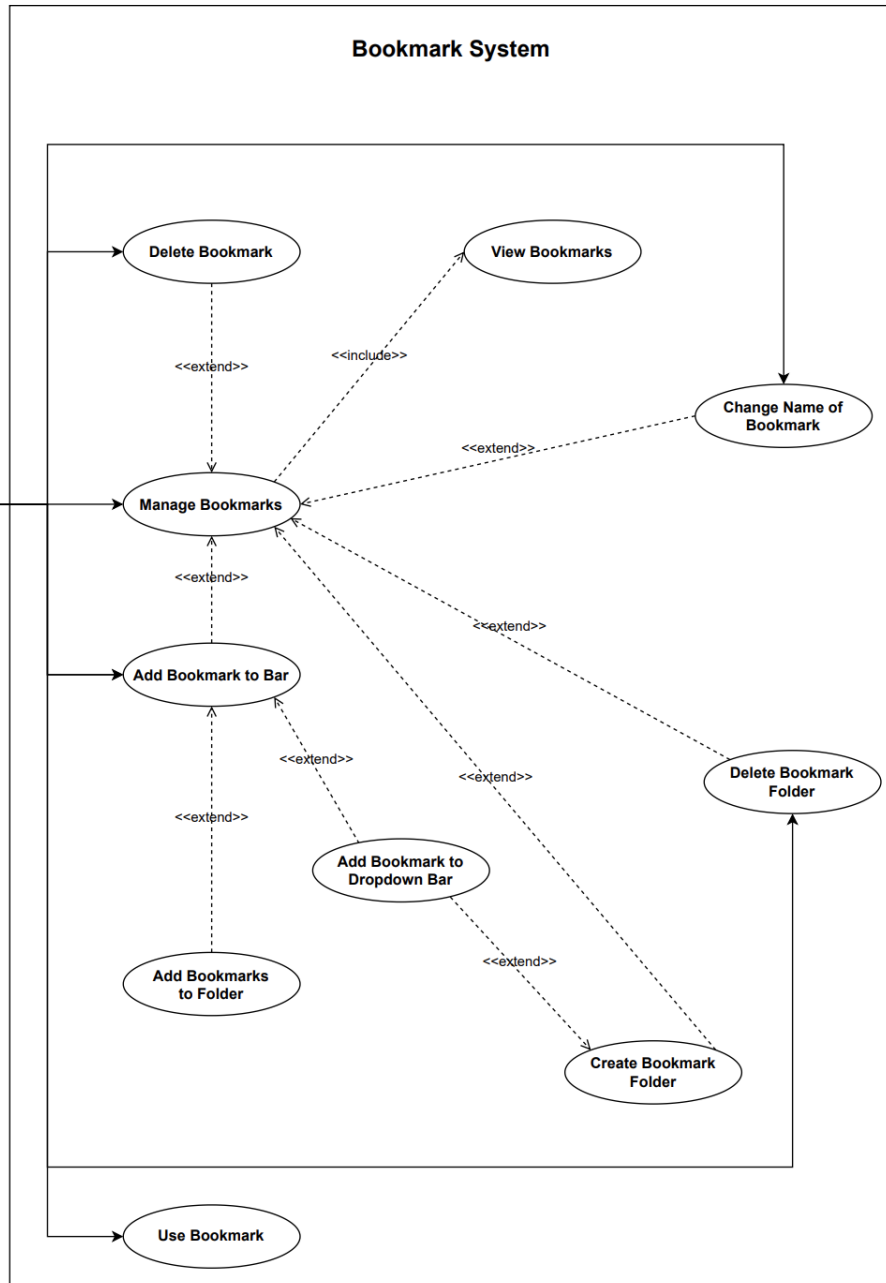
1. Each Blackboard resource is assigned an icon.
 - 1.1. The resources can be Assignments, Blackboard Folders, Class Recordings, PDF's, etc.
 - 1.2. When interacting with an icon, a non-bookmarked Blackboard Resource becomes bookmarked, and vice versa.
 - 1.2.1. Bookmarking a Blackboard Resource will create a Bookmark that links the Blackboard Resource to a bookmark bar.
 - 1.2.1.1. The bookmark bar is visible on every page on Blackboard.
 - 1.2.1.2. The bookmark bar holds bookmarked items by users.
 - 1.2.1.3. When the bar becomes filled, additional bookmarks get sent to a dropdown menu
 - 1.2.1.4. Interacting with the bookmarks on the bar or dropdown menu leads to either opening an Edit Box or sending the user to the location of the bookmarked item.
 - 1.2.2. Unbookmarking a Blackboard Resource will remove the Bookmark that is linked to the Blackboard Resource from the fixed bookmark bar.
2. An Edit box will appear when interacting with bookmarks and Blackboard resources icons.
 - 2.1. Allows the user to create an empty Blackboard Folder.
 - 2.1.1. Blackboard Folder used to hold Bookmark Resources.
 - 2.1.2. Cannot add a Bookmark Folder inside a Bookmark Folder.
 - 2.1.3. Located inside the bookmark bar.
 - 2.2. Allows users to add bookmarked items to the folder.
 - 2.3. Allows users to add/remove bookmarks and bookmark folders from the bar.
 - 2.4. Allows users to rename bookmarks.

4 Modeling Requirements

The UML Use Case Diagram describes the behavior of the software system. It focuses on the changing aspects of the system and how it works for each case of use.

Refer to the diagram below to understand the notation described here. The diagram consists of actors important to how the system will work. In this case, there is only one actor, the user. The system boundary holds all the use cases designed for the system. The name of the system is at the top of the boundary. The actor will have arrows pointing to each case that it will be interacting with. Within the system boundary, multiple use cases are held in ovals. Every use case defines something that the user can change and do. Between certain use cases, there are multiple arrows that can be used as well. A line defined as “includes” means that the case being pointed to is a sub-goal that needs to be done. There are also “extends” arrows that can modify the original use case.

Figure 4.1 Use Case Diagram



The use case diagram shows that our users interact with almost all the functionality directly. They are responsible for using the bookmark like clicking the link that it has and adding bookmarks that they need. They also are responsible for managing the bookmarks, which includes deleting them and changing the names of them. They also manage the organization of the bookmarks with folders. They can delete and add folders as they need.

Use Case Name:	Manage Bookmarks
Actors:	User

Description:	The user can choose to add/delete/rename bookmarks and add/delete bookmark folders.
Type:	Primary
Includes:	View Bookmarks
Extends:	Add Bookmarks to Bar, Delete Bookmark, View Bookmark, Delete Bookmark Folder, Create Bookmark Folder
Cross-refs:	Requirements 1.2, 1.2.1, 1.2.2, 2.1, and 2.3
Uses cases:	Used whenever the user feels like adding customization to their bookmark bar as they're allowed to remove, add, and rename bookmarks while also being able to make and delete folders.

Use Case Name:	Add Bookmark to Bar
Actors:	User
Description:	The user navigates to a Blackboard Resource they want quicker access to and clicks on the Ribbon icon for it. This adds a Bookmark to the BBB. During the adding process the user may also choose the name of the bookmark.
Type:	Primary
Includes:	N/A
Extends:	Add Bookmarks to Folder and Add Bookmark to Dropdown Bar
Cross-refs:	Requirements 1.2, 1.2.1, and 1.
Uses cases:	Used when the BBB is not filled up and a user wants to bookmark a specific Blackboard Resource, they want faster access to.

Use Case Name:	Delete Bookmark
Actors:	User
Description:	The user navigates to the location of the Blackboard Resource they want to remove as bookmark and click on the ribbon icon to take it off the BBB. Another method a user can delete the bookmark is by going to the bookmark bar and right clicking the Bookmark they want to remove. Doing this opens an Edit Box where they will then need to press the "Remove" button to take the Bookmark off the BBB.
Type:	Primary
Includes:	N/A
Extends:	N/A
Cross-refs:	Requirements 1.2.2 and 2.3

Uses cases:	Used when a user wants to remove a bookmark due to not needing the linked Blackboard Resource, make space for other bookmarks, etc.
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Use Case Name:	Add Bookmark to Folder
Actors:	User
Description:	The user needs to first navigate to the Bookmark that they want to add to a Bookmark Folder. From there right clicking the Bookmark will open the Edit Box and there will be a dropdown menu that allows you to select the Bookmark Bar or created Bookmark Folders as the place the Bookmark will be placed. After selecting the chosen Bookmark Folder, the user presses done, and the Bookmark will be moved to a folder.
Type:	Secondary
Includes:	N/A
Extends:	N/A
Cross-refs:	Requirement 2.2
Uses cases:	Used when a user wants to organize a Bookmark and put it in a folder.

Use Case Name:	Use Bookmark
Actors:	User
Description:	The user navigates to the BBB and left clicks on a bookmark whose Blackboard Resource they want to go to. Left clicking on the Bookmark sends the user to the page of the Blackboard Resource.
Type:	Primary
Includes:	N/A
Extends:	N/A
Cross-refs:	Requirement 1.2.1.4
Uses cases:	Used when a user wants to go a Blackboard Resource they've bookmarked.

Use Case Name:	View Bookmarks
Actors:	User
Description:	The user is able to view their Bookmarks on the BBB for every page and if they want to view bookmarks in Folders or the dropdown menu they can click on a folder or open the dropdown on the BBB.

Type:	Secondary
Includes:	N/A
Extends:	N/A
Cross-refs:	Requirement 1.2.1.1
Uses cases:	Used when a user wants to see their Bookmarks.

Use Case Name:	Add Bookmark to Dropdown Bar
Actors:	User
Description:	The user does not need to do anything in order for a Bookmark to go to the Dropdown menu/bar. This happens automatically if a new Bookmark or Bookmark Folder can't be fitted onto the BBB.
Type:	Secondary
Includes:	N/A
Extends:	N/A
Cross-refs:	Requirement 1.2.1.3
Uses cases:	Used by the system whenever a user tries to add something to the BBB if it's filled.

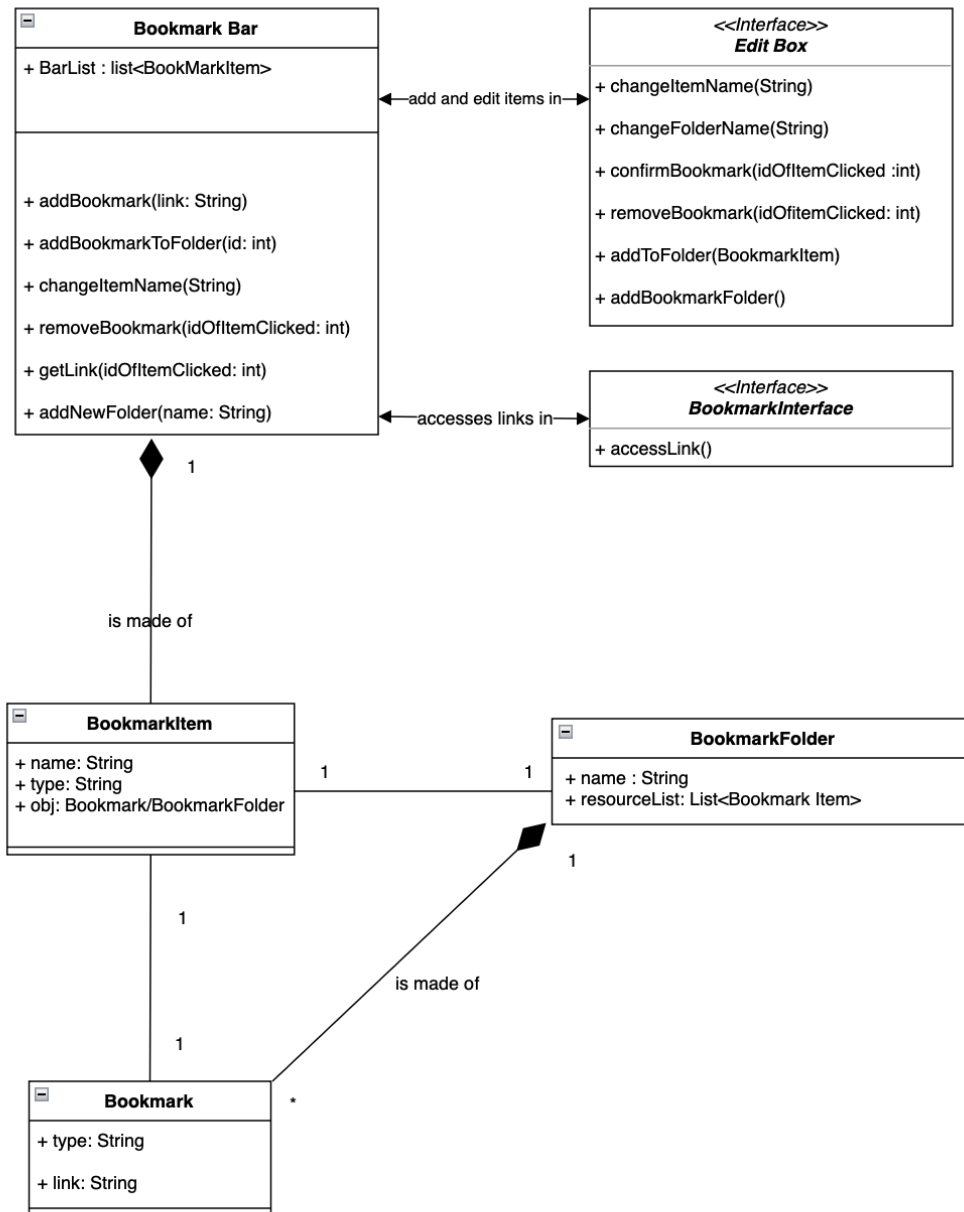
Use Case Name:	Change Name of Bookmark
Actors:	User
Description:	The user navigates to the Bookmark and opens up the Edit Box for it and renames the Bookmark by typing the new name of the Bookmark in the text field and then selecting done.
Type:	Primary
Includes:	N/A
Extends:	N/A
Cross-refs:	Requirement 2.4
Uses cases:	Used when a user wants to rename a Bookmark.

Use Case Name:	Delete Bookmark Folder
Actors:	User
Description:	The user navigates the Bookmark Folder they want to delete and by opening the Edit Box for it, using the "Remove" button deletes the Folder and clicking the "Done" button confirms the deletion.
Type:	Primary

Includes:	N/A
Extends:	N/A
Cross-refs:	Requirement 2.3
Uses cases:	Used when a user no longer wants a Bookmark Folder and want to delete it.

Use Case Name:	Create Bookmark Folder
Actors:	User
Description:	The user first opens an Edit box by either bookmarking a new Blackboard Resource or left clicking a Bookmark. From there the Edit Box gives an option to create a new folder and it asks the user for the name of it.
Type:	Primary
Includes:	N/A
Extends:	Add Bookmark to Dropdown Bar
Cross-refs:	Requirement 2.1 and 2.3
Uses cases:	Used when the user wants to create a new folder if they want to be more organized and arrange certain bookmarks together, or some other reason.

Figure 4.2 Class Diagram



The Class diagram revolves around the Bookmark Bar object and how it interacts with the UI. It holds all the methods for modifying the data on the backend for the UI to update using it. The Bookmark Bar object holds a list of Bookmark Items which is an abstracted data type that can hold either a Folder or a Bookmark. The Bookmark just holds the name given by the user as well as the link that was on the resource. The BookmarkFolder holds the name of the folder as well as a list of BookmarkItems. This does allow a nested folder in the back end, but the current UI does not support nested folders currently.

Class: Bookmark Bar	
Class Element	Description
+ BarList: list<BookmarkItem>	A variable that holds a list of all the Bookmark Items that will be placed on the BBB.
+ addBookmark(link: String)	A method that adds a Bookmark to the bar by taking in a link which refers to a Blackboard Resource.
+ addBookmarkToFolder(id: int)	A method that takes a unique id of Bookmark so that the Bookmark can be added to a folder.
+ changeItemName(String)	A method that takes a new String so that a Bookmark Item's name can be changed.
+ removeBookmark(idOfItemClicked: int)	A method that removes a Bookmark off the BBB using the id of a Bookmark.
+ getLink(idOfItemClicked: int)	A method that retrieves the link of a Blackboard Resource by using the id of a Bookmark.
+ addNewFolder(name: String)	A method that adds a new folder which takes in a string that holds the name of the folder.
<p>Class Description: This class is used for the fixed bar shown on every screen of Blackboard. It holds BookmarkItems which are Bookmarks and Bookmark Folders.</p>	

Class: Edit Box	
Class Element	Description
+ changeItemName(String)	A method that can change the name of an item on the BBB or inside a Bookmark Folder.
+ changeFolderName(String)	A method that can change the name of a Bookmark Folder.
+ confirmBookmark(idOfItemClicked :int)	A method that confirms changes made by the Edit Box to a certain Bookmark Item.
+ removeBookmark(idOfitemClicked: int)	A method that removes a Bookmark Item.

+ addToFolder(Bookmark)	A method that adds a Bookmark to a Bookmark Folder.
+ addBookmarkFolder()	A method that creates a new blank Bookmark Folder.
<p>Class Description:</p> <p>The Edit Box class allows renaming, addition, and removing of Bookmark Folders and Bookmark Items.</p>	

Class: BookmarkInterface	
Class Element	Description
+ accessLink()	A method that sends the user onto the page of the bookmarked Blackboard Resource.
<p>Class Description:</p> <p>The BookmarkInterface represents the user interface version of the bookmarked items on the BBB. These are in boxes on the BBB and clicking them sends them to the link of the Blackboard Resource.</p>	

Class: BookmarkItem	
Class Element	Description
+ name: String	A variable that holds the name of the Bookmark Item.
+ id: int	A variable that holds a unique id for the Bookmark Item.
+ obj: Bookmark/BookmarkFolder	A variable which holds the object type of Bookmark Item so, it'll either be a Bookmark or Bookmark Folder.
<p>Class Description:</p> <p>The main purpose of this class is to combine both Bookmarks and Bookmark Folders into one class so that it makes putting both onto the BBB easier.</p>	

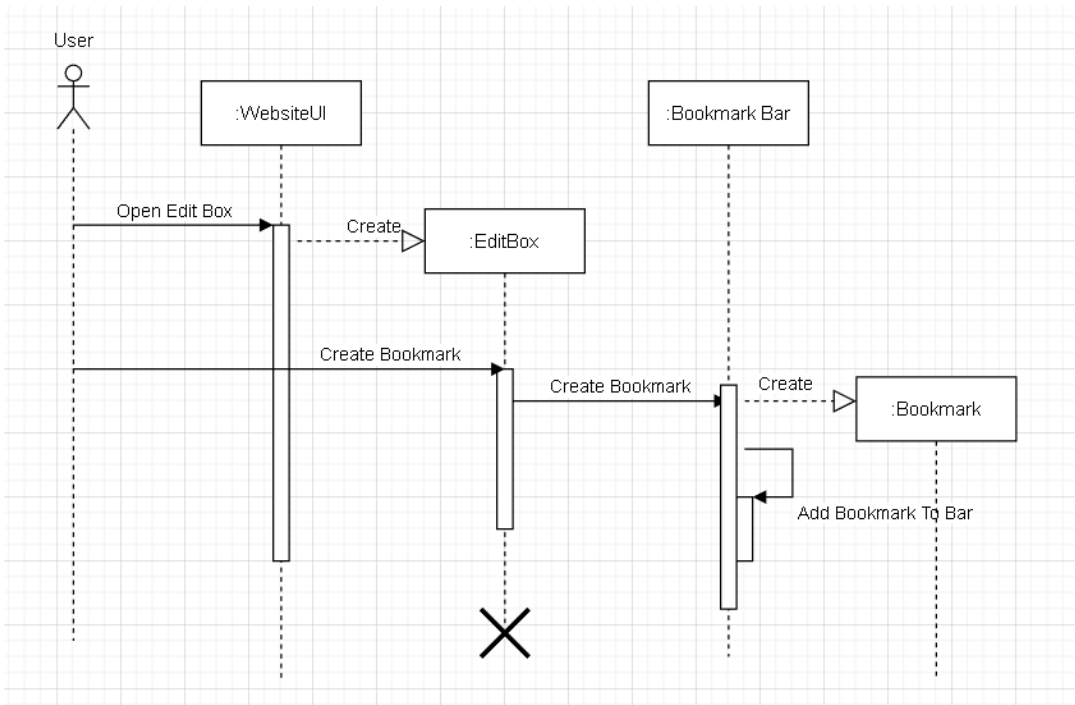
Class: BookmarkFolder	
Class Element	Description

+ name: String	A variable that holds the name of the folder.
+ resourceList: list<Bookmark item>	A variable that holds all the Bookmark items that are in the folder. It's a list of all the different Bookmarks.
Class Description: This class is for the Bookmark Folder, these are made up of Bookmarks and allow access to all the different Bookmarks inside it. This class is also counted as a BookmarkItem because it will be placed on the BBB.	

Class: Bookmark	
Class Element	Description
+ type: String	A variable that holds the type of resource the Blackboard Resource is such being a folder, pdf, document, etc.
+ link: String	A variable that holds the link to a Blackboard Resource.
Class Description: This class is for Bookmark whose main purpose is to store a link to a Blackboard Resource. Bookmarks also count as a BookmarkItem. Another thing to note is that 0+ Bookmarks make up Bookmark Folders.	

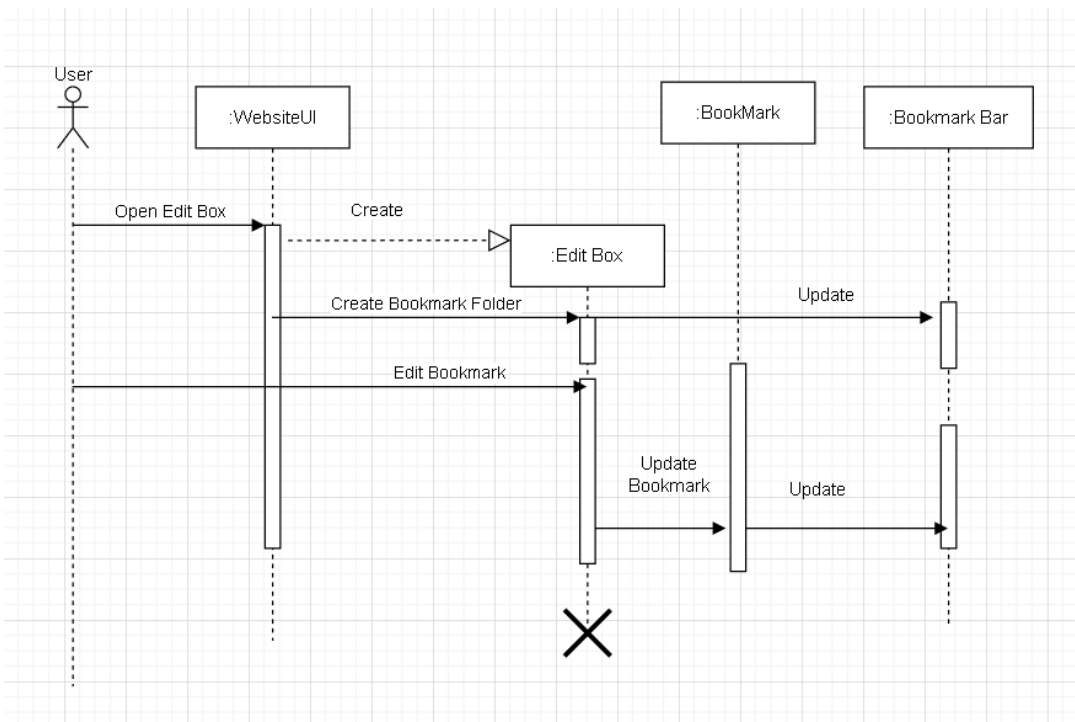
Sequence Diagrams describe the interactions between the different objects in the system with each of the diagrams below describing a different use case. Each box represents an object or role, with the vertical line downwards representing the lifeline or the instance where the object exists. You can see as objects get created, they are put at lower levels which means they have been “alive” a shorter amount of time. Objects can also get destroyed which are represented by the ‘x’ at the bottom of a lifeline. The solid arrowed lines are function calls to different objects where the actions are performed. Each sequence starts with the User interacting with UI components, that then make and open objects to complete the following tasks.

Figure 4.3 Sequence Diagram I (Create Bookmark)



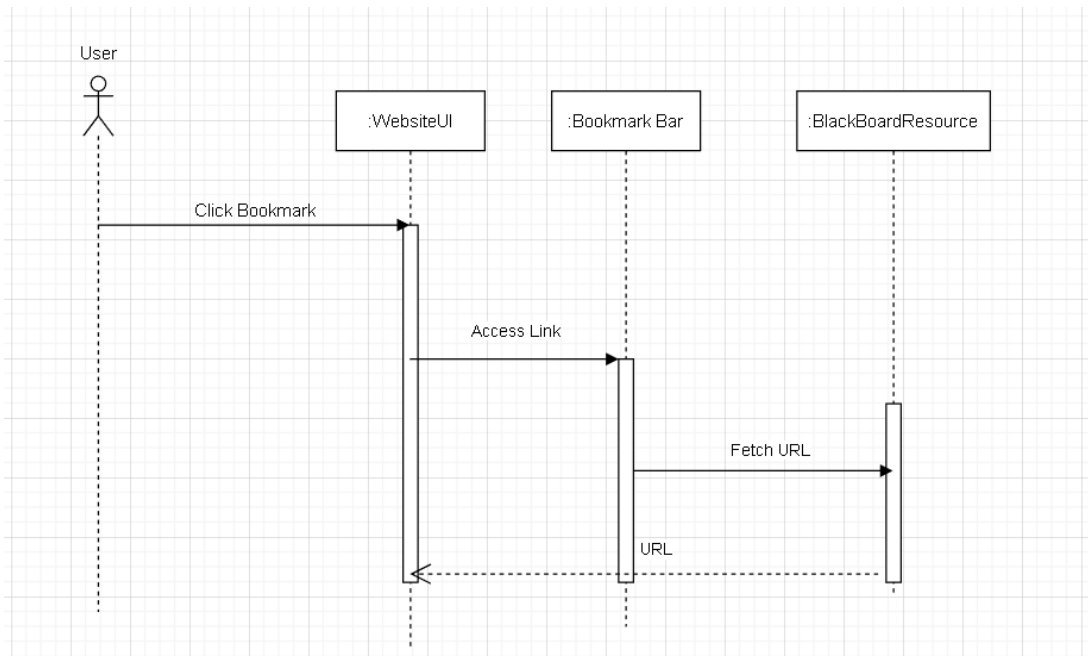
The user can open the Edit Box and create a Bookmark that will be added to the Bookmark Bar.

Figure 4.4 Sequence Diagram II (Creating a Bookmark Folder)



A user can open an edit box, which can create a Bookmark Folder, which will update in the Bookmark Bar. The user can also edit the Bookmark's info, which will update the selected Bookmark and update the Bookmark Bar with those changes.

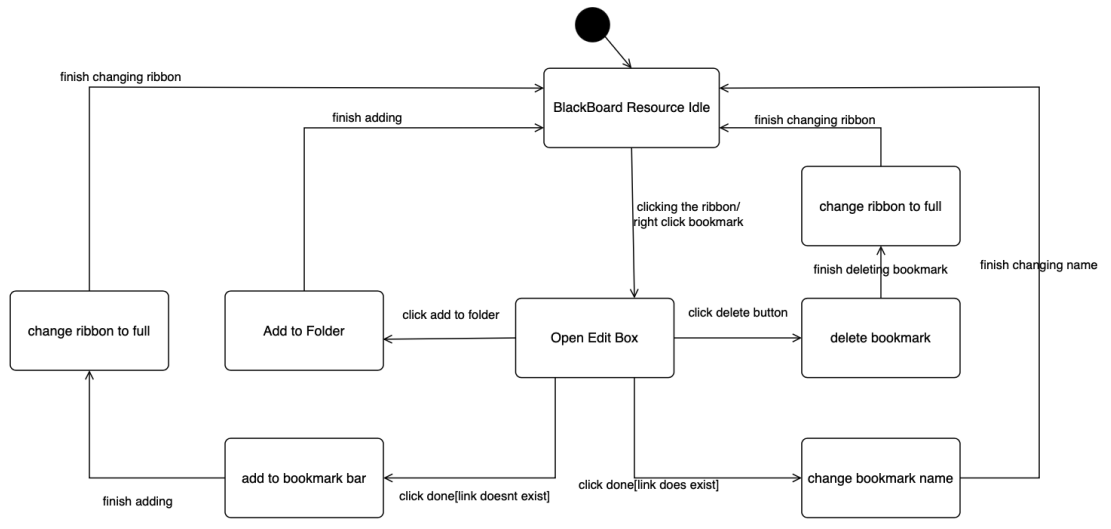
Figure 4.5 Sequence Diagram III (Accessing a Bookmarked Link)



The user can click on a Bookmark in the Bookmark bar, which will redirect the user's page to the link of the Blackboard Resource.

The UML State Diagram is a variation on finite automata. It represents the current state of the system when certain events occur. States have three actions that can occur. Entry occurs when transitioning into the state. Do is performed continuously while in the state. Exit occurs when transitioning out of the state.

Figure 4.6 State Diagram



5 Prototype

The prototype for the BBB will show the defined area for the location of the bar in terms of the actual Blackboard website. The prototype is set up exactly like the normal site in terms of functionality with our added feature of the BBB.

5.1 How to Run Prototype

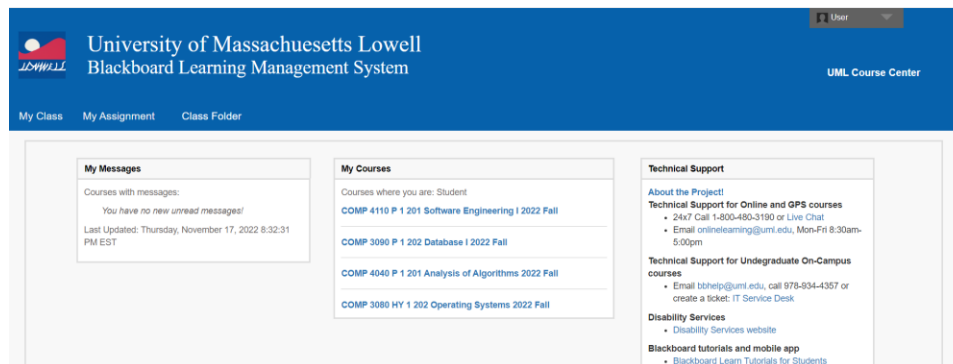
The prototype runs better on the computer and looks better on full screen. The type of browser does not matter, and there are no plugins needed to run it. The constraint I can think of is that it takes GitHub a while to update the website to the newer version, and as such the version would sometimes be on an older version. The URL link to the website is here:

<https://ansoncheang50.github.io/BlackboardBookmarkingBar-B-Cubed-Bar-website%20skeleton/HTML/homepage.html>

5.2 Sample Scenarios

A student named Billy taking college courses wants to get to his Software Engineering I course page because there is an assignment he wants to submit. There are two ways he can access this assignment; first Billy clicks the Software Engineering I link to access its' course page.

Figure 5.1 Project Website Homepage



Then Billy clicks on assignment link to access the assignment page, however, there is a faster way to get to the assignment page.

Figure 5.2 Project Website Example Course Page

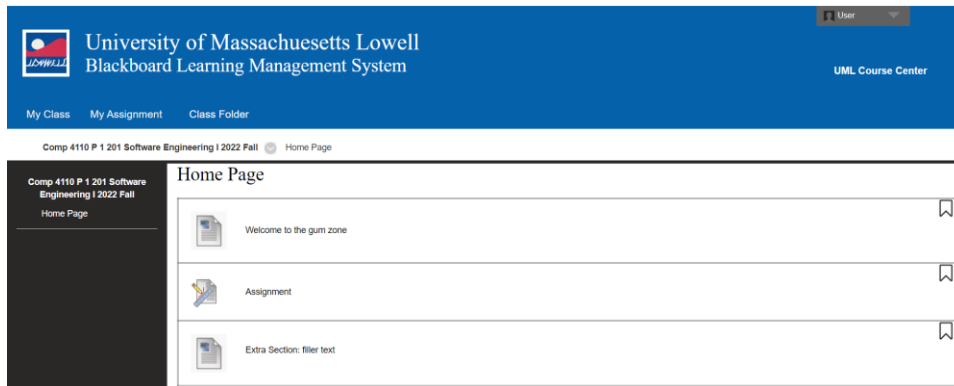
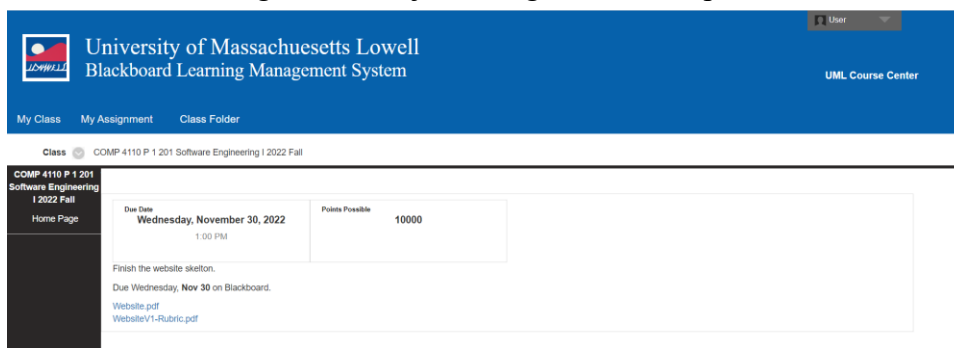
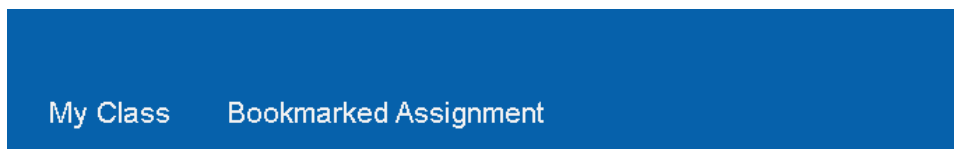


Figure 5.3 Project Assignment Example



Billy can bookmark the assignment which will put the link to the assignment in the Blackboard Bookmark Bar.

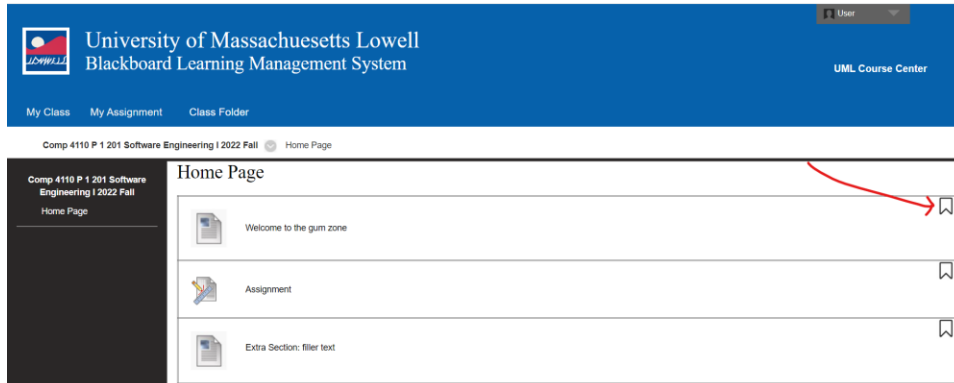
Figure 5.3 Bookmark Bar



Clicking this bookmark will redirect the page to the assignment page, no matter where you are on Blackboard.

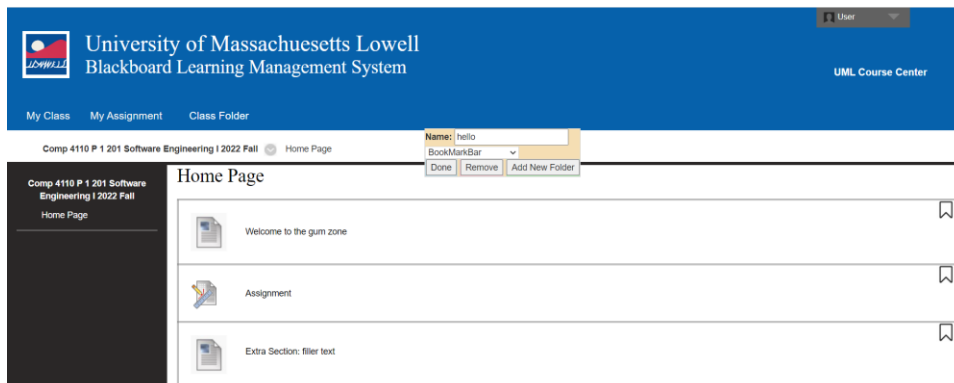
To add to the bookmark bar, there should be a ribbon to the right side of each system.

Figure 5.4 essentially pointing to the ribbon



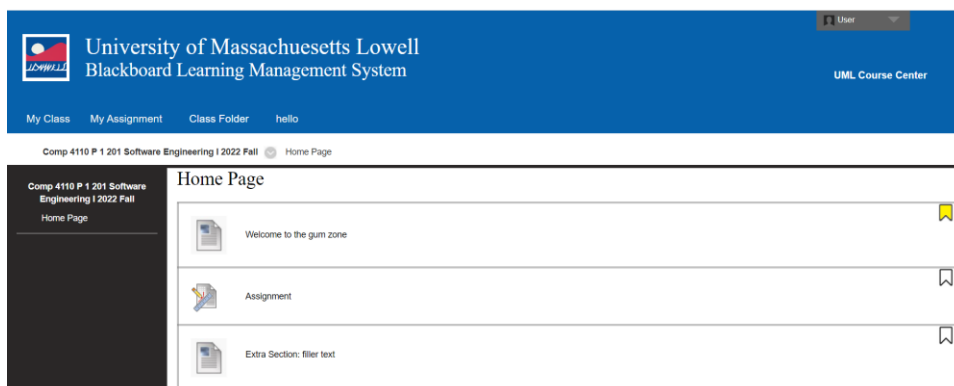
This will pull up the edit box

Figure 5.5 showing the edit box



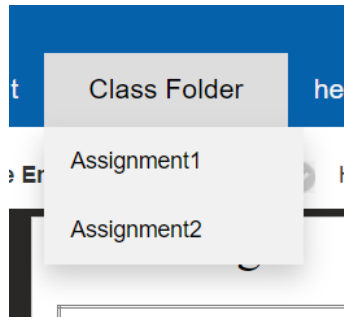
After typing a name for the bookmark, it will be added to the bookmark bar, by clicking the done button, also by clicking the ribbon again and clicking delete you can remove the bookmark.

Figure 5.6 Showing the effect of the edit box



Of course, that will fill up the bar quickly so there is a folder.

Figure 5.7 Showing the folder



And by right clicking the bookmark bar we can either change the name of the bookmark, or even delete and add in a new folder.

Figure 5.8 Renaming Assignment to yooo

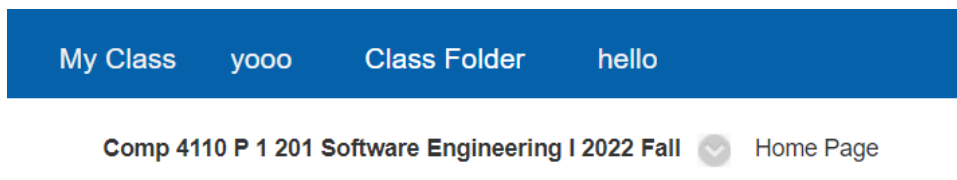
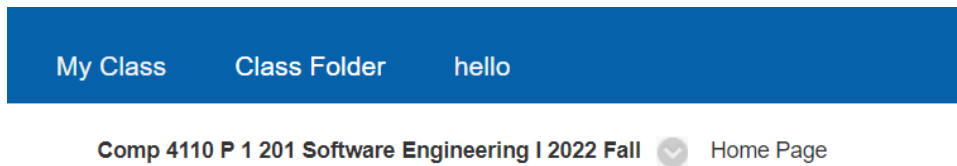


Figure 5.9 Deleting the assignment link



6 References

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Note about images:

Images used were either from the Blackboard website or made by Arthur.

Project Website Link:

<https://ansoncheang50.github.io/BlackBoardBookmarkingBar-B-Cubed-Bar-/website%20skeleton/HTML/homepage.html>

7 Point of Contact

For further information regarding this document and project, please contact **Prof. Daly** at the University of Massachusetts Lowell (james_daly@uml.edu). All materials in this document have been sanitized for proprietary data. The students and the instructor gratefully acknowledge the participation of our industrial collaborators.