CS-571 Building User Interfaces, Spring 2022, Professor Yuhang Zhao

React β (7 Points)

Reimagining Layout & Navigation, Improving Usability Using Heuristic Evaluation

In this assignment, you will explore the concepts we learned in the lecture, titled "*Interaction Design: Structure, Layout, & Navigation*". Using the principles and components covered in class, you will redesign your implementation of React α. Then, you will put the ten usability heuristics we learned in class into practice toward improving the usability of your redesign. Use this opportunity to make concrete design decisions about your project, to improve your design using usability heuristics, and to build a keen eye for identifying usability issues as a UX developer.

Part 1—Redesign: (2.5 Points) In this part, you will analyze your current solution for the *React* α Assignment in terms of its layout and navigational elements. Then, you will use the principles and components covered in class to redesign your solution and describe your design choices.

Part 2—Implementation: (2.5 Points) In this part, you will implement your new design by extending your implementation for the *React* α Assignment using additional React and/or Bootstrap components.

Step 3—Heuristic Evaluation. (2.0 Points) Review your implementation from Part 2 with a critical eye to identify 2-3 "components" that you think are most consequential for user experience. Focusing on your components, inspect your design, considering each usability heuristic, for any violations of the heuristics.

Submission Details

GitHub Classroom Starter Code

React β can be built on your implementation of React α. If you choose to do so, remove everything in the starter code and copy the files from your React α project to the React β repository above. When you commit and push, ensure that you are committing and pushing to the *react-beta-s22* repository, not *react-alpha-s22*.

To complete the assignment, you will need to submit the following on Canvas:

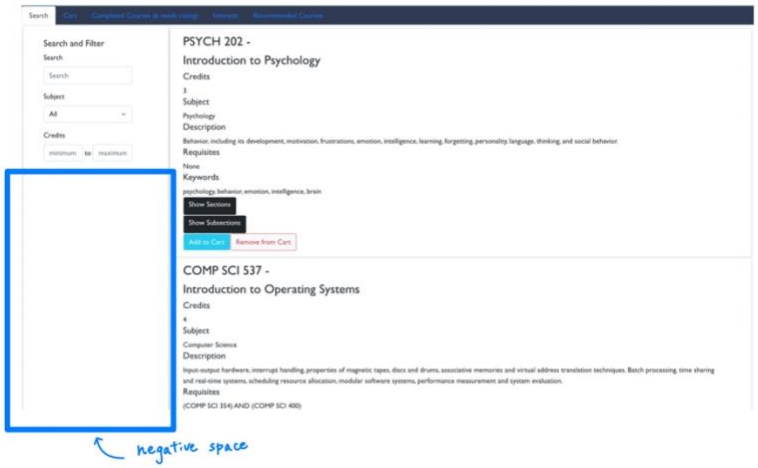
1. A completed version of this document as PDF as an attachment.
2. Your repository name and latest commit hash from GitHub Classroom, e.g., `react-beta-s22-osori, 7a0bc38`, as a comment.

Part 1: Redesign (2.5 Points)

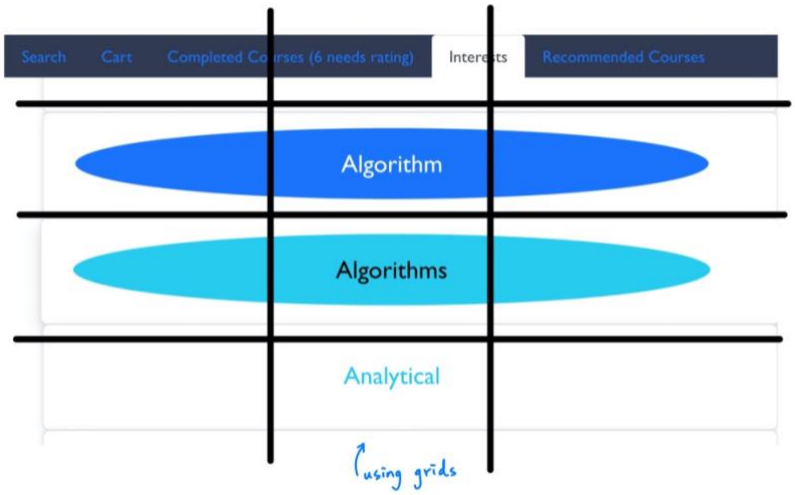
(0.2 Points) **Step 1. Analyze Layout.** Describe the current layout of your *React* α implementation, identifying at least *two* elements of layout design (e.g., golden proportion, visual hierarchy, visual scan patterns) it currently follows. Take a screenshot of your implementation and annotate the principles you identify, briefly (2-3 sentences) briefly justifying why parts or all of your implementation follow these principles.

In my current course guide, it can be found that many layout principles are utilized.

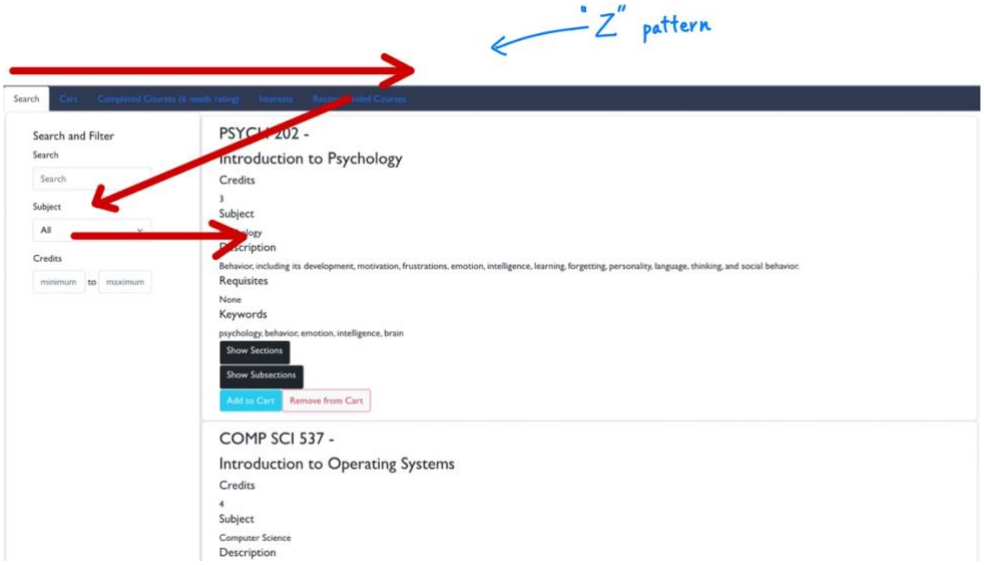
- Using negative space
    - Some space is intentionally left white and created an emphasis on the main idea to user. For example, under the “Search and Filter” area. The negative space is provided to become a relaxing purpose area for user, so that user will only fill-in information without too much distraction and overwhelming designs.



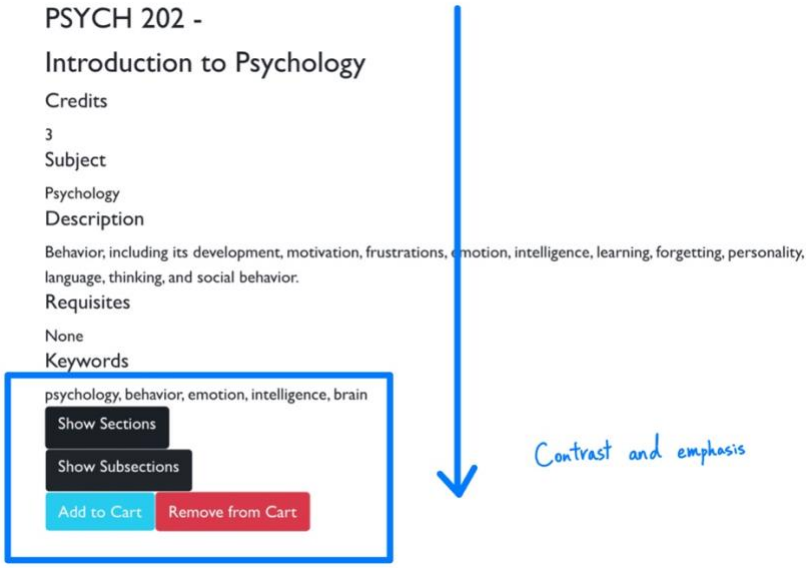
- Effectively using grids
    - For each of the like tag item, it was divided and wrapped into one center area. This organization gives visual guide to user and show information with the first glance. Whenever user is searching recommendations from likes, they clearly see the border lines surrounded by the invisible grids, which always hints the user to press those like tag buttons.



- Exploiting visual scan patterns
    - User first decides the searching tab and goes to the “Search and Filter”. After typing query information from user, user switches his/her focus to the right side and start scanning the intended courses.
    - Whenever user added the course, user will consider going to the “Cart” tab. Once the user completed the courses, s/he scan through to the bottom part and start the star rating. By following the transition of user’s eye track, the “Z” pattern scanning can be observed.



- Creating contrast and emphasis
    - From top to bottom, it can be observed the plain area of texts is shown, and when it goes to bottom part of each course, color contrast is utilized. “Sections and subsections” are highlighted contrast buttons. In addition, the “add and remove” is also used in color contrast element in the layout.



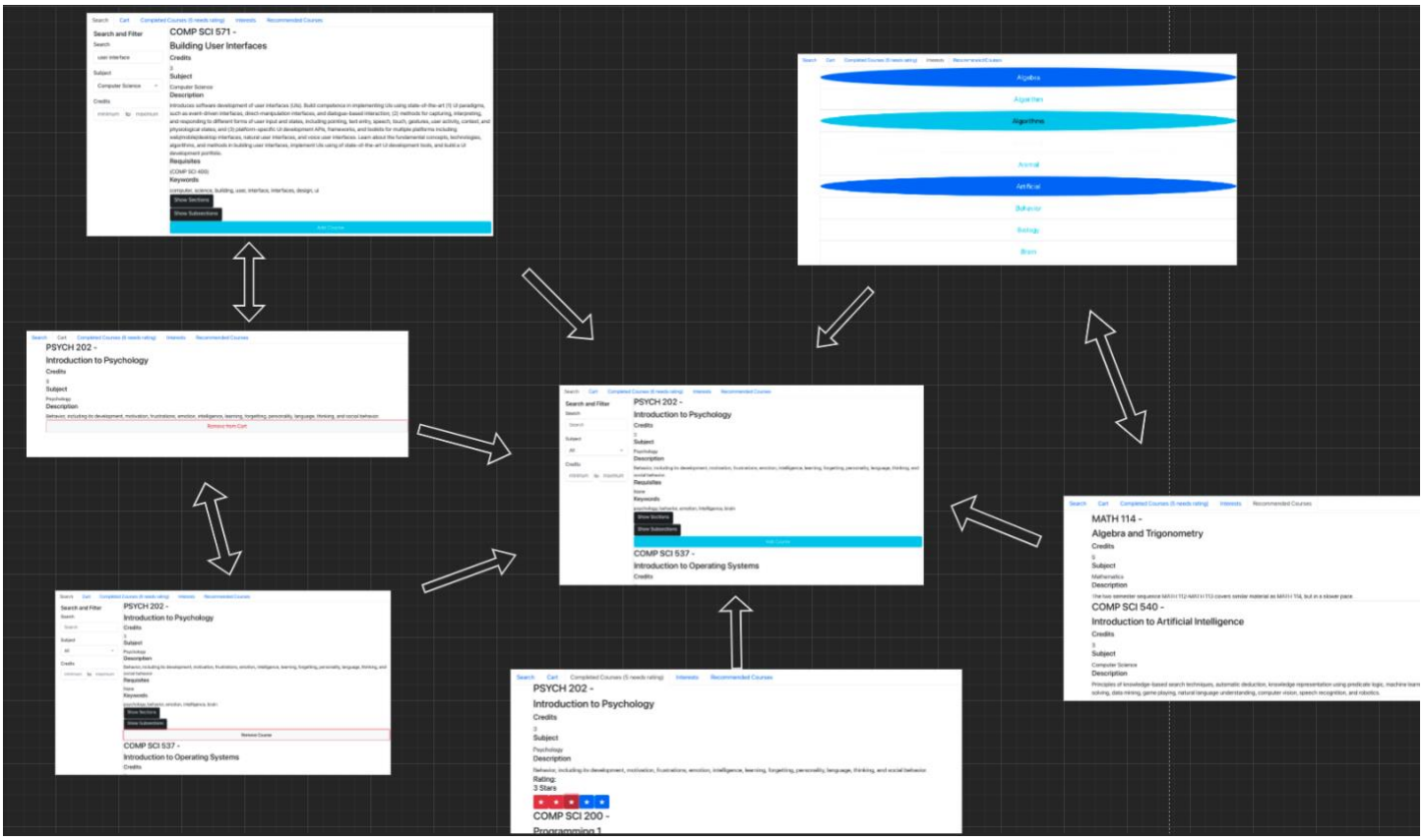
(0.2 Points) **Step 2. Analyze Navigation.** Consider your *React α* implementation, what navigation model(s) does it use? Below, draw the navigation model that your implementation follows the same way navigation models were described in class.

- hub-and-spoke model
    - Definition: Involves a central hub, e.g., a home screen, that provides transitions to and from several specialized components.
- In my implementation, I defined there is a main student account that will connect all these tabs and functionalities. In each of the tab, it will send data to main account and update the information. For example, whenever the user adds a course by clicking adding button, it will update data to the centralized server, and vice versa in removal; whenever users click the interests-like tags from them, they update

the data to centralized server in upward direction. After all, the recommended courses in the tabs will be updated downward simultaneously.

- Fully connected
    - Definition: A central component/page is connected to all other components that are also linked to each other.
- Some parts of the pairing tabs are fully connected. For instance, the Search tab can add/remove courses to the cart, and on the other hand, whenever the courses in the cart are removed, it will update the intended updated course button in the search, reversing to be shown in being able to add. Moreover, the Interests tab and the Recommended Course tab relate to each other. When users are filtering their likes, the Recommended Courses will update the recommended course based on the like tags.

I define this course guide pattern is closer to Fully Connected model than Hun-and-Spoke model, however, it comes with features of both.



(0.6 Points) **Step 3. Conceptual Redesign.** In this step, you will reimagine your *React α* implementation, such that it uses a different set of navigation models, and/or principles of layout design. Your goal should not be to change your implementation for the sake of changing it but consider ways in which the structures and layout and navigation principles might improve your implementation. Your conceptual redesign should involve the use of at least one layout principle, make at least one change in the navigation model, and introduce at least one element/aid to improve navigation. Provide a hand-drawn or digitally created (e.g., in Adobe XD) mock-up of your design below. Annotate your design to describe your design choices, highlighting the specific principles you employed.

Layout principle

- Creating visual hierarchy

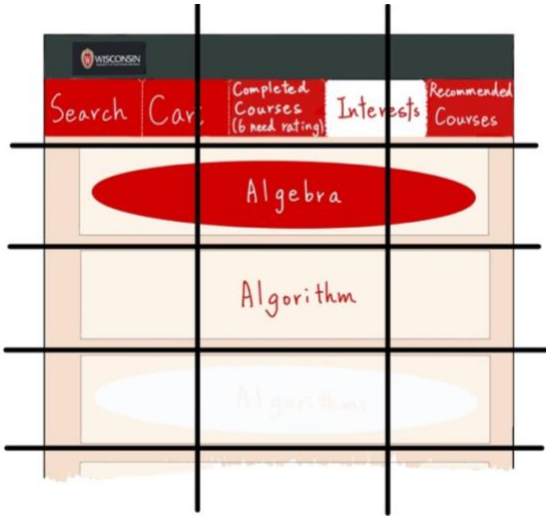
- In the design of course content with sections and subsections, I decided to visualize the course content hierarchy by adjusting the size and bold of the text to show the relative positions, which emphases relatively more important information to user. Some important information will be read first, and some less important information will be read later.

- Integrating type

- The tab options are highlighted. When the user is actively using the intended tab, it guides the user and deliver the information of current usage. To follow the headlines of text, users are notified and informed by the block of texts.

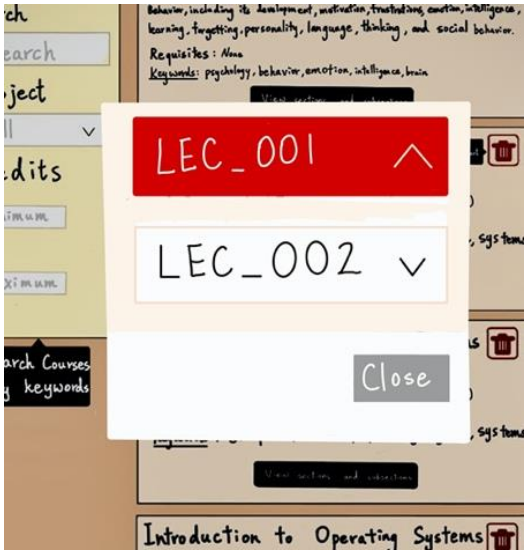
- Using the rule of thirds

- The canvas is divided into 3x3, and in addition, the line intersection points are boundary that wrap up the important information, I leave the like tags texts in between of the intersection points.



Navigation model

- Modal panel

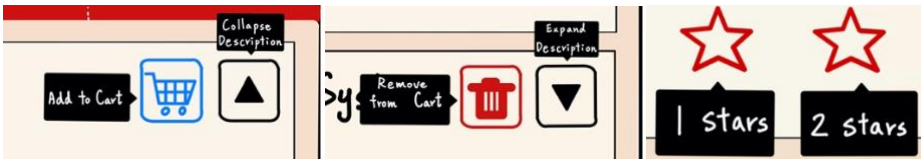


- hub-and-spoke model
    - add school icon to link to student account

- I inserted the school icon to navigate the user that the center point can be accessed by clicking the icon. When the users click the icon, s/he is able to back to the student user account.

Navigation Aids

- Button annotation – Tool tip



- I annotate the button's action to user. When user hover the cursor on the buttons, it will pop-up the action information. This utility navigation aids the user to know exactly each action button does.
- Card hover effect
- When user hovers the cursor on each course or like tag, the hovered zoom-in effect will be aiding user. The intended course or tag will be emphasized and give a concise overview of the content.

(1.5 Points) **Step 4. Detailed Redesign.** In this step, you will build on your mock-up to create a detailed design, determining image, color (for background and elements), type, size, icons, and so on (as we also did, to some extent, in the JavaScript β Assignment). Provide a digitally created mock-up (e.g., in Adobe XD) that shows your design choices. Annotate your mock-up to describe your design choices.

- Space
  - I decided to put some negative space under the search filter layout. I avoid squeezing in too many items in the searching page, especially, this area is for inputting user's queries. I leave the searching clean and understandable, so that user can keep focusing on their course orders.

- Line
  - The lines between course cards are to divide user's views. Besides, the lines between cards and intentionally set the black buttons long with different background color. This design further distinguishes the boarders between courses.

- Shape
  - In my design, I keep things in rectangle shapes to express the sequential courses listed. When the user clicks in to the "View sections and subsections", the modal is also rectangle, and it informs user that each subsection's detail can be clicked-in as well.

- Size
  - The size is set to be 2 major objects in a page. One third of left is for searching filter and the rest two third is to list the courses. The adjustment is to let the user comparing the searching result as comfortable as possible.

- Pattern
  - I made a combination in cardinal red and black to show all similar symbols on top of the navigation bar. It is effective that users will click the school icon on the left top to go back to centralized student account. The cardinal red is to attract user's attention and also match the theme of UW-Madison.

- Texture
  - Cardinal red looks energetic. They can motivate students be thoughtful to consider the courses they want to add to cart. The texture with tan color is soft and smooth to have deep think on each decision for students.

- Value
  - The hover tip tools are helpful to guide the user that meaning of each button action. When user hover on the buttons with symbols, they buttons are not only reverse their color but also pop-up the meaning with tips. This combination of buttons and aid tool create clean and understandable canvs to users.

- Colors

Color - RGB 206, 18,18

Color - RGB 25, 255, 255

Color – RGB 0, 0, 0

Color - RGB 238, 235, 221

  - I chose the white, black, tan, and cardinal red colors to be my theme colors. I was inspired by University of Wisconsin-Madison's home page. As a student in university, s/he will need more energy when selecting courses with clear minds. Students may need to contemplate their career path that relevant to course selection. Cardinal red is a common color in our nature, especially this color can be found in birds' feather, seeds in spring. This red draw people's attention and motivates people to the clarity, pursuing higher purpose.

❑ Font

  - I chose Segoe UI to become my font for the Course Guide website. I considered it because this is a course purchasing page. The Segoe UI is used for printed marketing materials, logos for several products in big tech companies. The font is Microsoft's default operating system font and commonly used in marketing to be shown in public. In addition, Students get used to using this theme from the UW-Madison colors, and this will apply the sense to navigating the Course Guide webpage with comfortable feeling.


WISCONSIN
Search
Cart
Completed Courses (6 need rating)
Interests
Recommended Courses
Search and Filter
Search
Search
Subject
All
Credits
minimum
maximum
Search Courses by keywords
Introduction to Psychology
College Description
Add to Cart
PSYCH 202 · 3 credits
Behavior, including its development, motivation, frustrations, emotion, intelligence, learning, forgetting, personality, language, thinking, and social behavior.
Requisites : None
Keywords: psychology, behavior, emotion, intelligence, brain
View sections and subsections
Introduction to Operating Sy
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Expand Description
COMP SCI 537 · 4 credits
Requisites : (COMP SCI 354) AND (COMP SCI 400)
Keywords : computer, science, operating, system, systems
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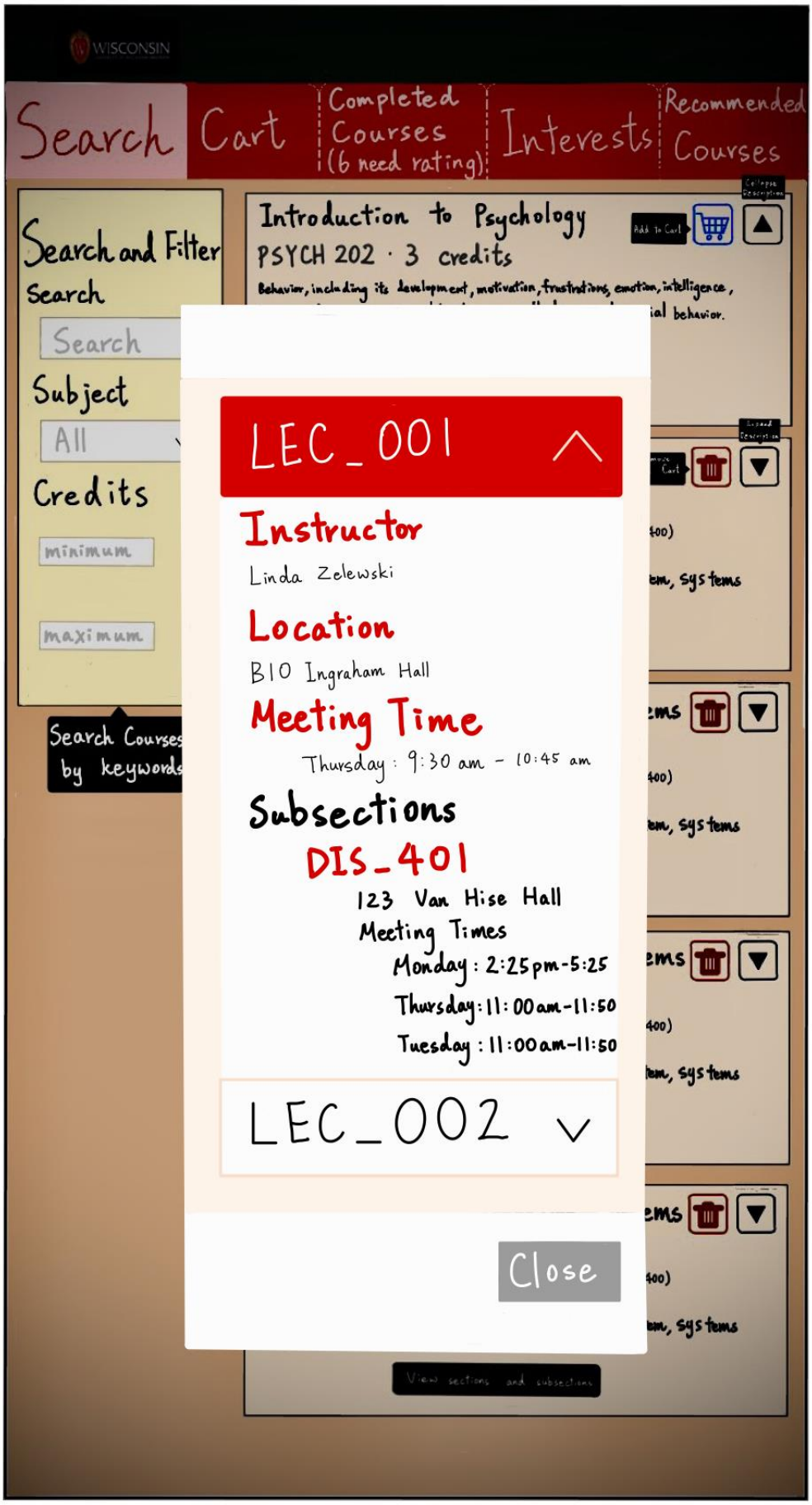
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Introduction to Psychology
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Behavior, including its development, motivation, frustrations, emotion, intelligence,
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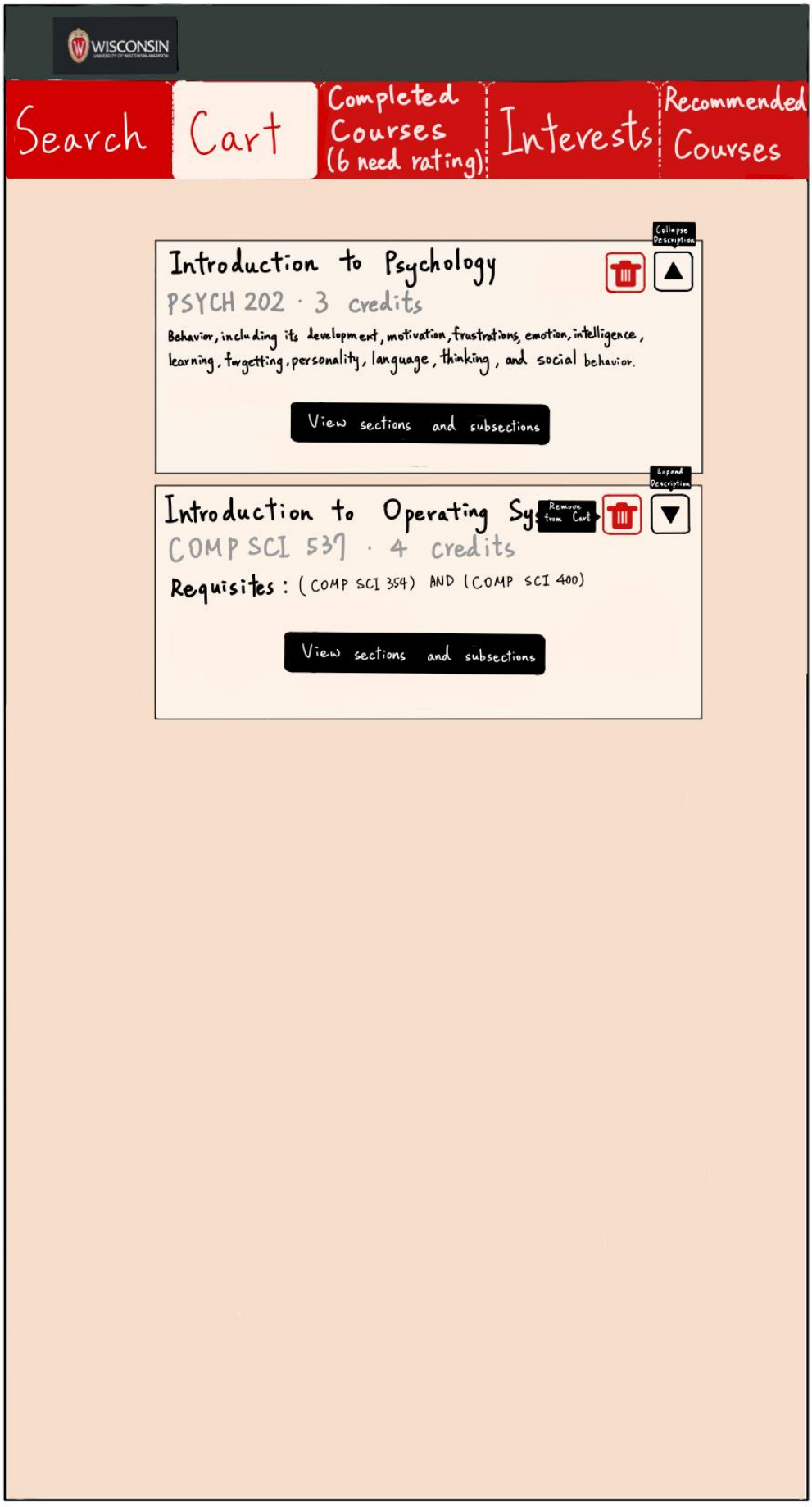
LEC_001
Instructor
Linda Zelewski
Location
B10 Ingraham Hall
Meeting Time
Thursday : 9:30 am - 10:45 am
Subsections
DIS_401
123 Van Hise Hall
Meeting Times
Monday : 2:25pm-5:25
Thursday: 11:00am-11:50
Tuesday : 11:00am-11:50
LEC_002
Close
View sections and subsections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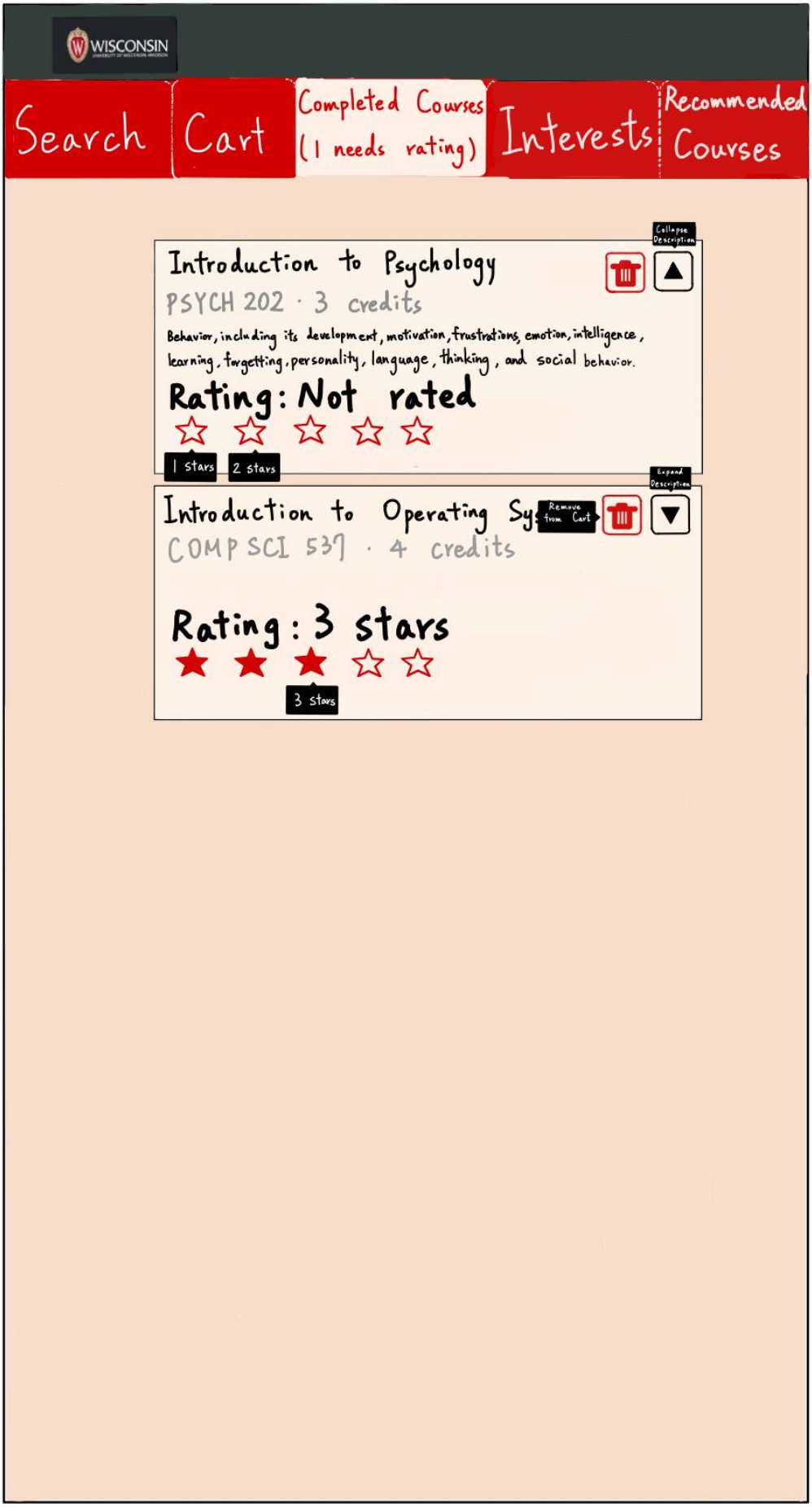
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Algebra
Algorithm
Algorithms
Analytical
Animal
Artificial
Behavior

WISCONSIN

Search | Cart | Completed Courses (6 need rating) | Interests | Recommended Courses

Introduction to Psychology

PSYCH 202 · 3 credits

Behavior, including its development, motivation, frustrations, emotion, intelligence, learning, forgetting, personality, language, thinking, and social behavior.

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Part 2: Implementation (2.5 Points)

(0.5 Points) **Step 1. Inspect Library Elements.** In this step, you will inspect the standard React component library, the react-bootstrap component library, and/or an alternative that you are comfortable working with to see how you can realize the detailed design you created in the previous part using these components. You are not expected to change the library components to exactly match your design choices, but to identify which component elements might best meet your design goals. Below, copy the design and the choices you generated in Part 1 and annotate them to describe which components from the library you will use to accomplish your design goals.

Default colors –

In bootstrap library, it includes default 9 colors in default, Primary, Secondary, Success, Info, Warning, Danger, Light, Dark, White. However, I overwrite some custom colors myself. For example, the cardinal red color and tan color to become my customized theme.

Button –

The button component is a key that will guide user into actions, for example, add/remove course in cart, like or dislike tag to change recommended courses. The buttons have utilized a lot of hovering and get usage instructions.

Nav Bar –

In Bootstrap's default navigation bar, it can adjust the position of each object on it. I use the navbar to let user identify the home school page such that user can go back to user account. I inserted UW-Madison's school icon on left top to show above the tabs.

Tabs –

Tabs are main part of this course guide web design. Each tab section directs the user to different functions. When user decides to add/remove course in cart, the search tab can be set to active and change the tab color to white and provide list of courses to function. When user decides to remove course in cart, it can select the cart tab to remove the intended course in cart. When user decides to get recommended courses, user can click the intended tag in Interest tab, and after all get the results in Recommended Courses tab.

Cards –

Card component is the most important part of my canvas, in every tab's page structure, I input the Card component to wrap up each course. I furtherly set the hover zoom-in effect with styles, such that it will keep user's focus when user is hovering a certain course card.

Modals/ Accordion –

I use Modal component to show all detailed course section and subsections data from requested server. When user click-in to each lecture, the Accordions components are utilized to expand/collapse the subsections.

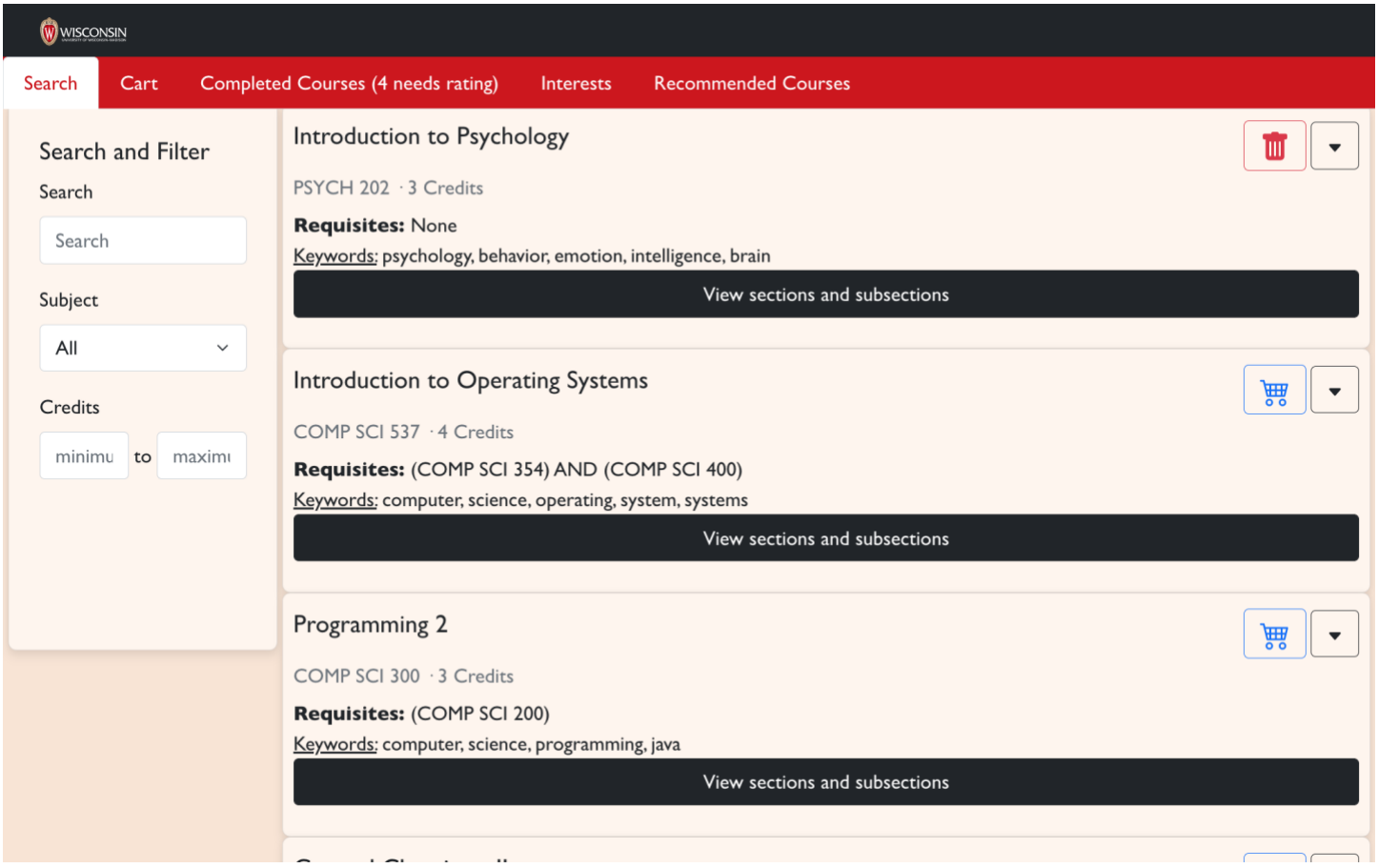
SVG Icons –

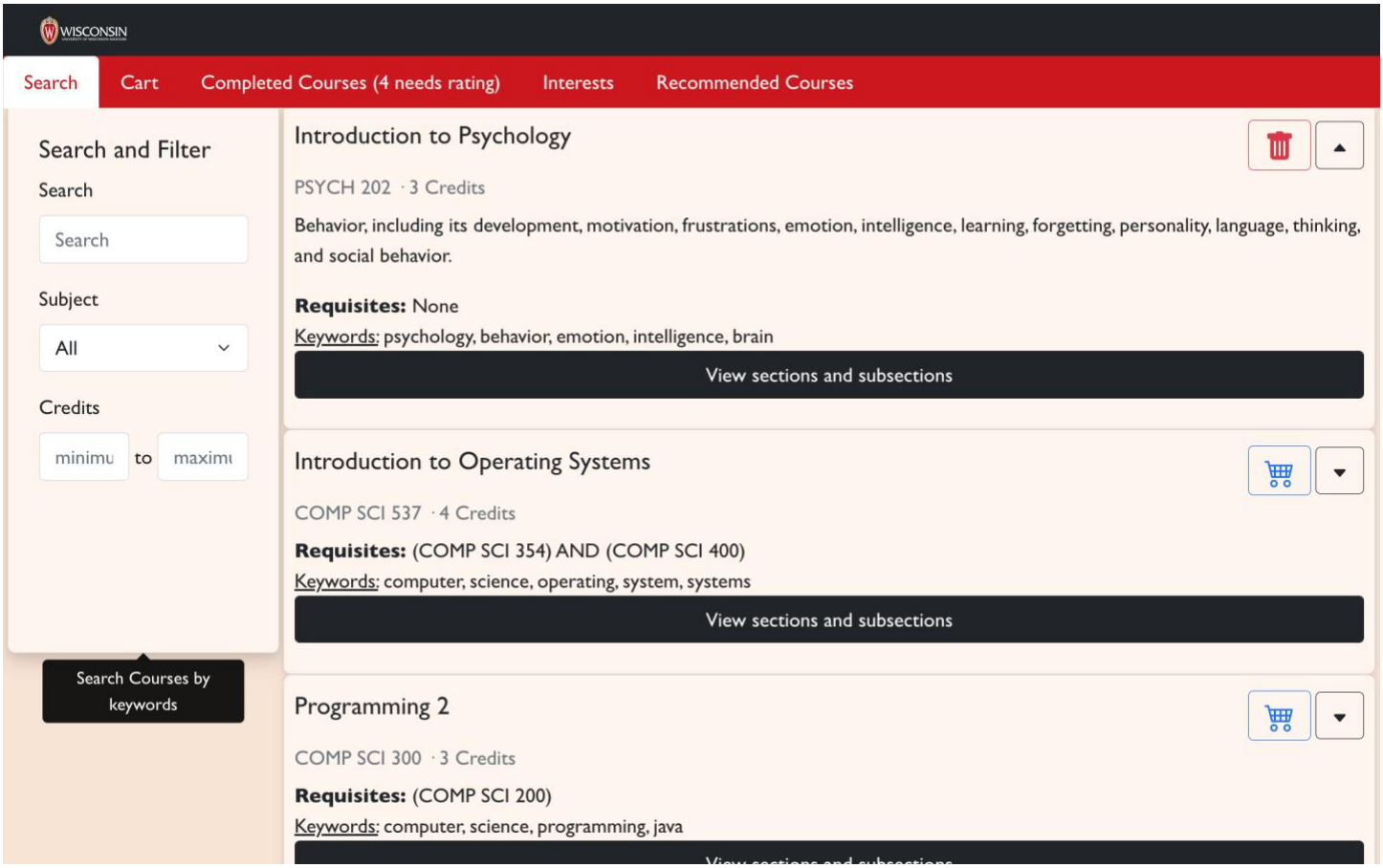
I use SVG Icons to symbolize the adding to cart, removing from cart, expanding information, and collapsing information. I attach the icon to every function button without using real text.

Tooltip / Overlay Trigger –

I design the aid navigation by using Overlay Trigger with Tool tip in bootstrap library. Specifically, when user hover the cursor on the filter query, the aid element pops up and show the text “Search Courses by Keywords”. When user hover the cursor on the buttons of add/remove or triangle symbol buttons, the aid elements will pop-up and show text “add/remove” in cart and “expand/collapse” with course descriptions.

(2.0 Points) **Step 2. Implement Redesign.** The last step of this part will involve implementing the design improvements you described in Part 1, using the layout and components you described in the previous step. You can use standard React components, Bootstrap components, and/or an alternative library in your implementation. You do not have to implement new *functionality*; focus on implementing your *design*.

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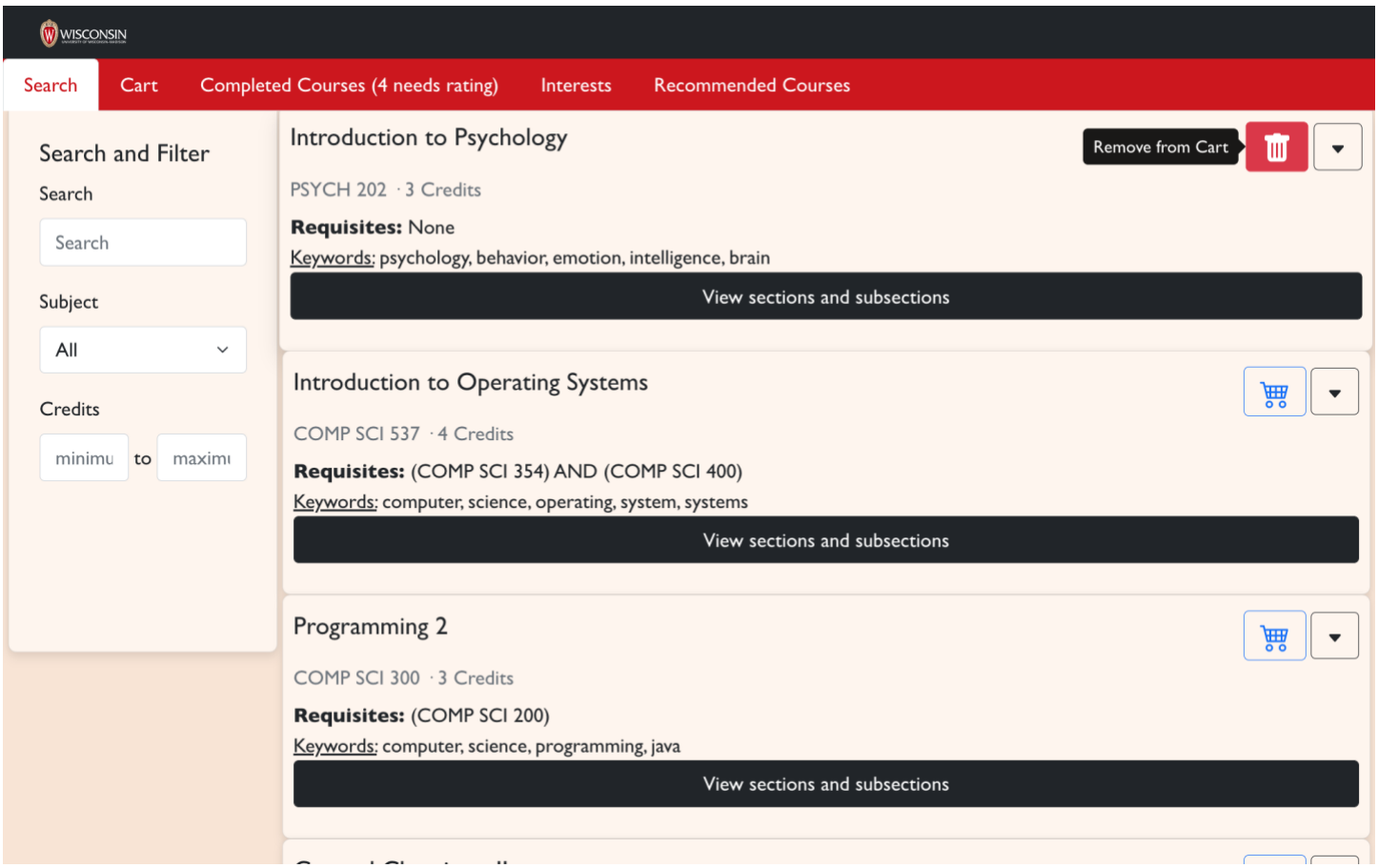
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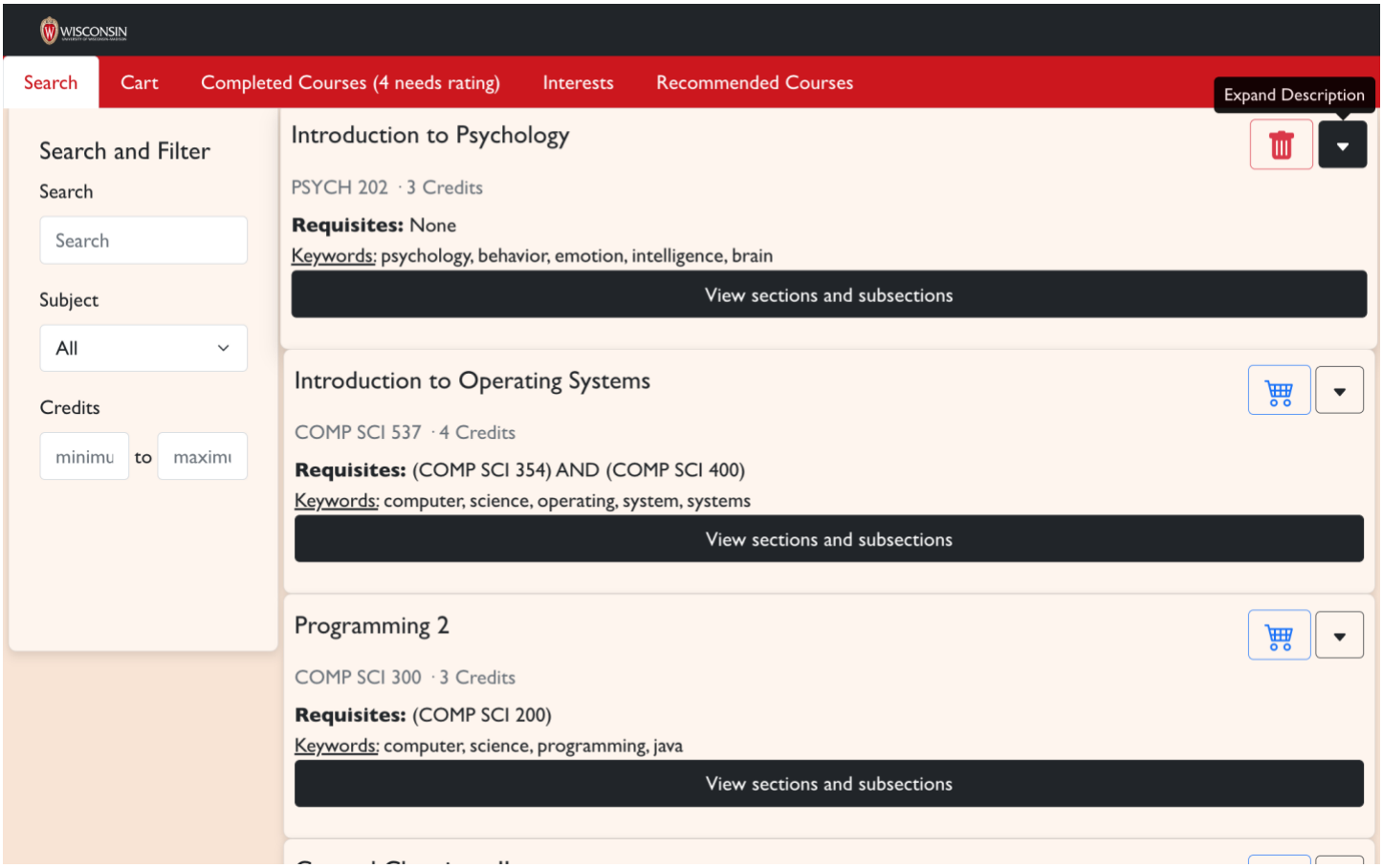
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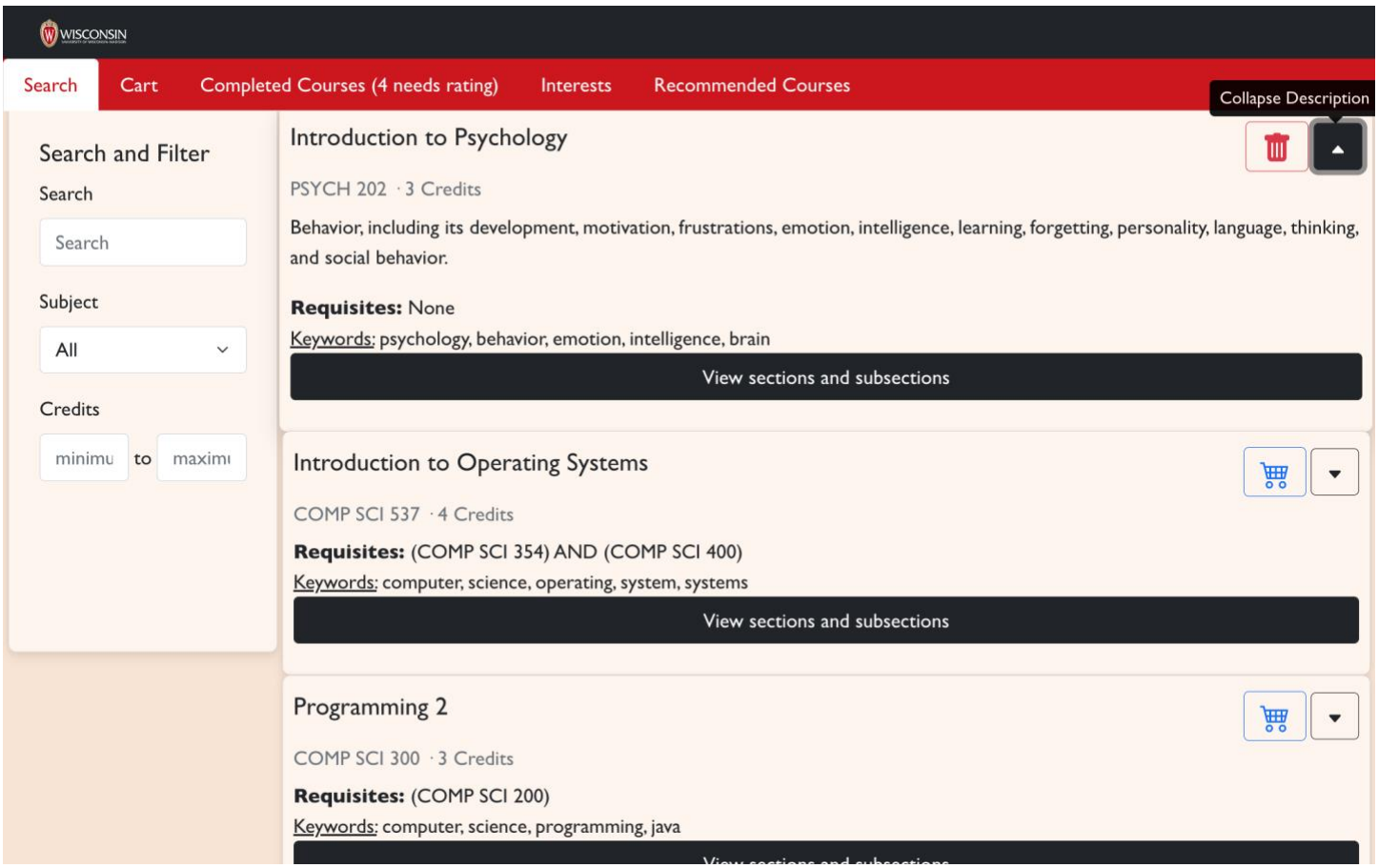
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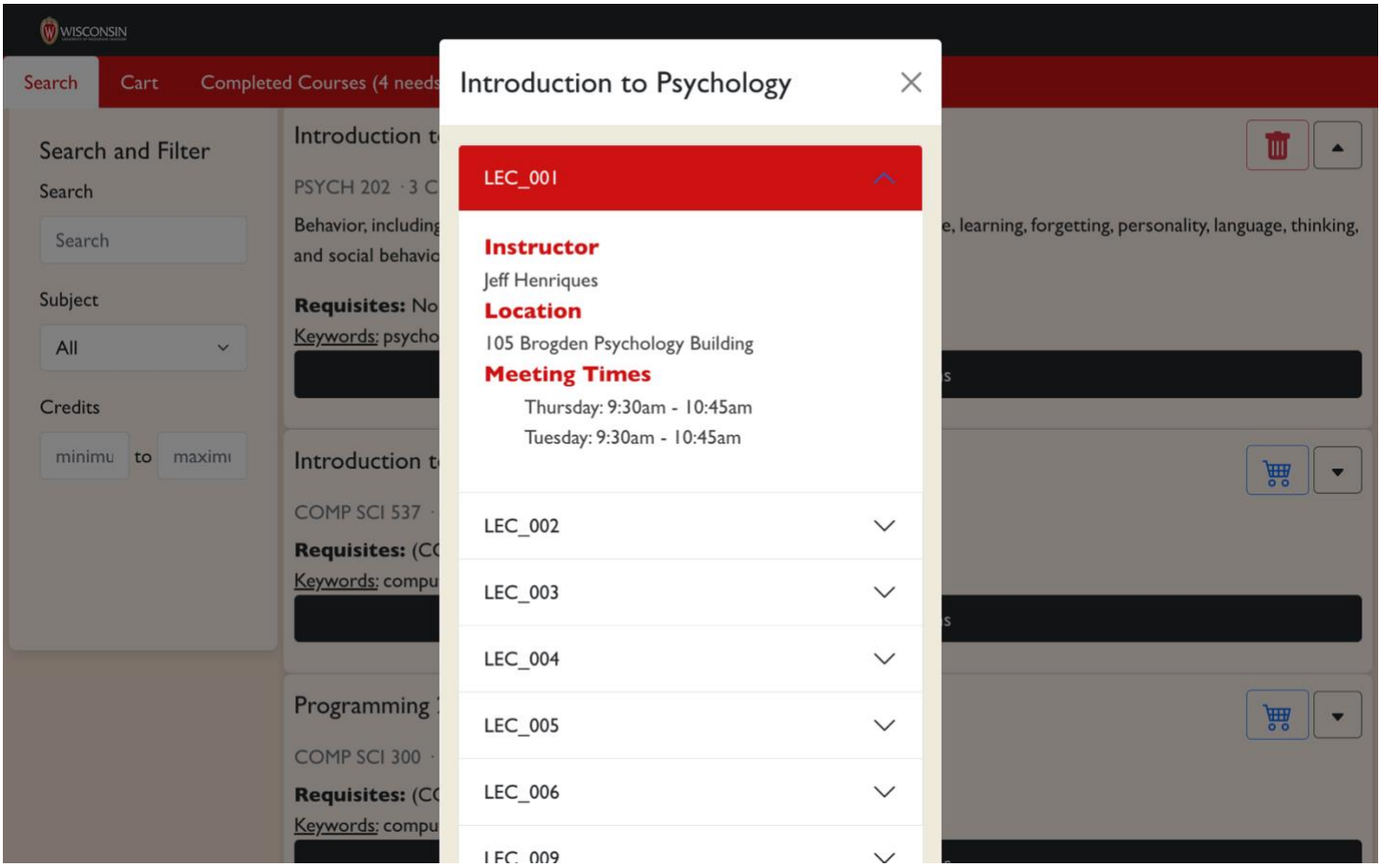
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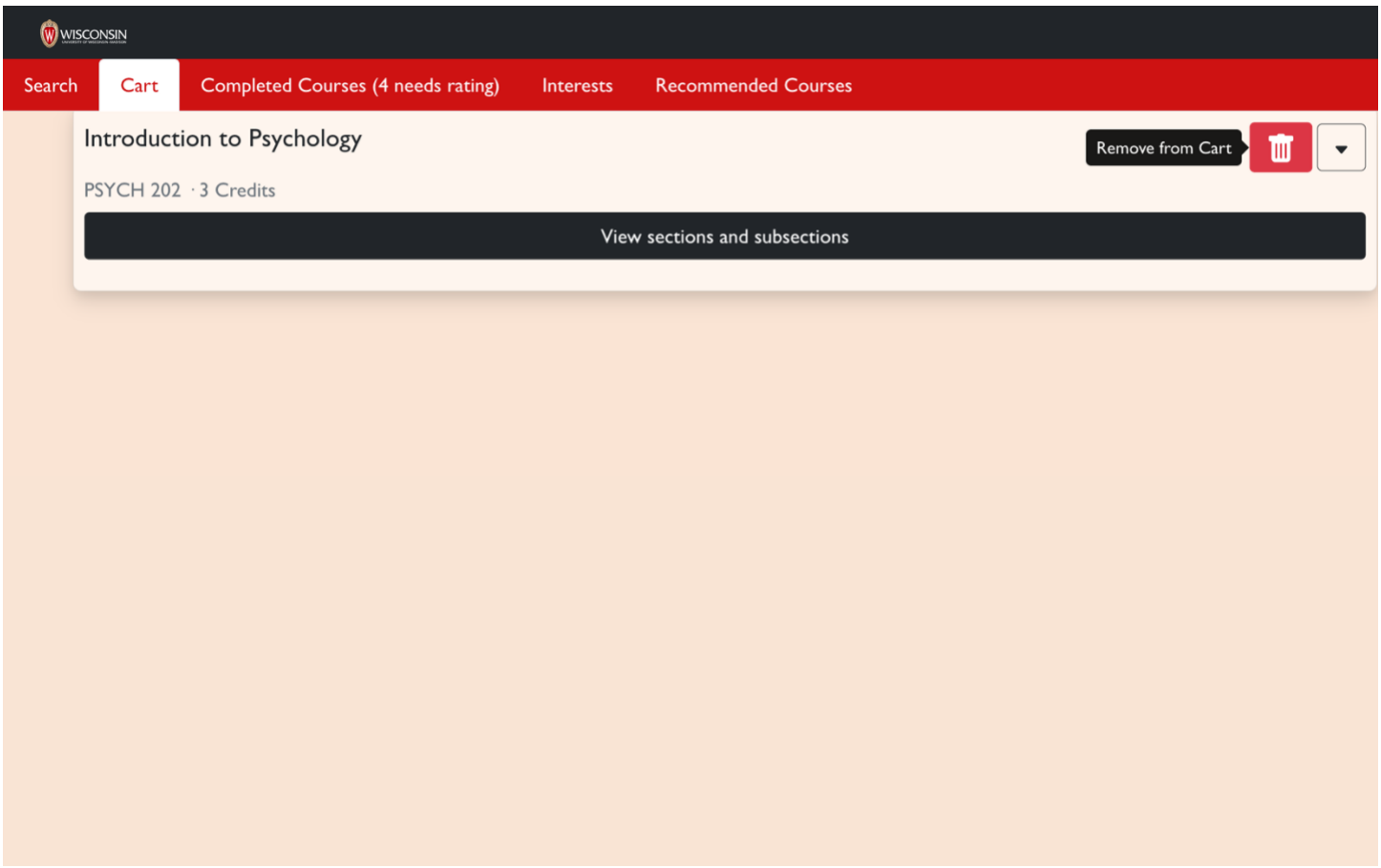
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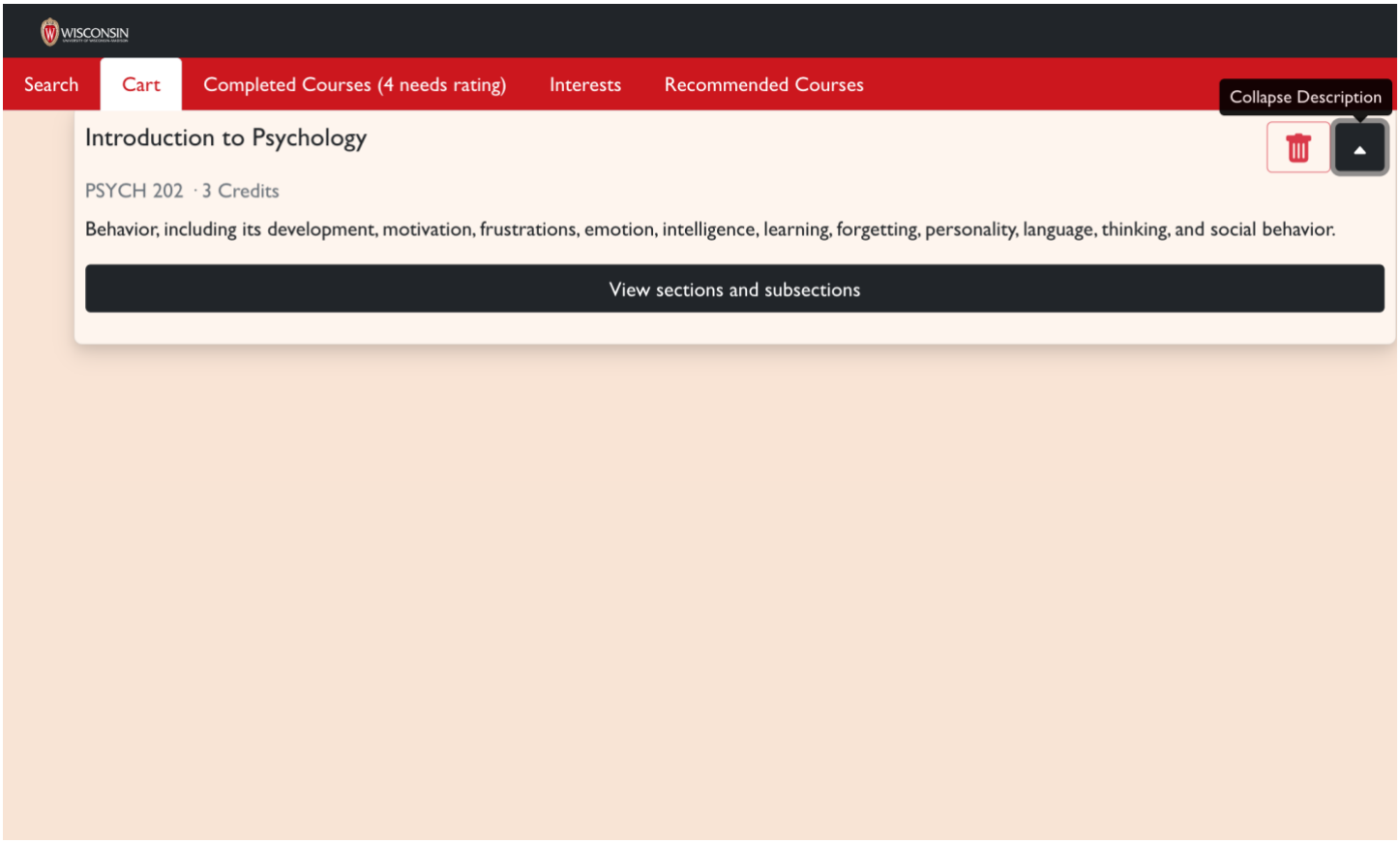
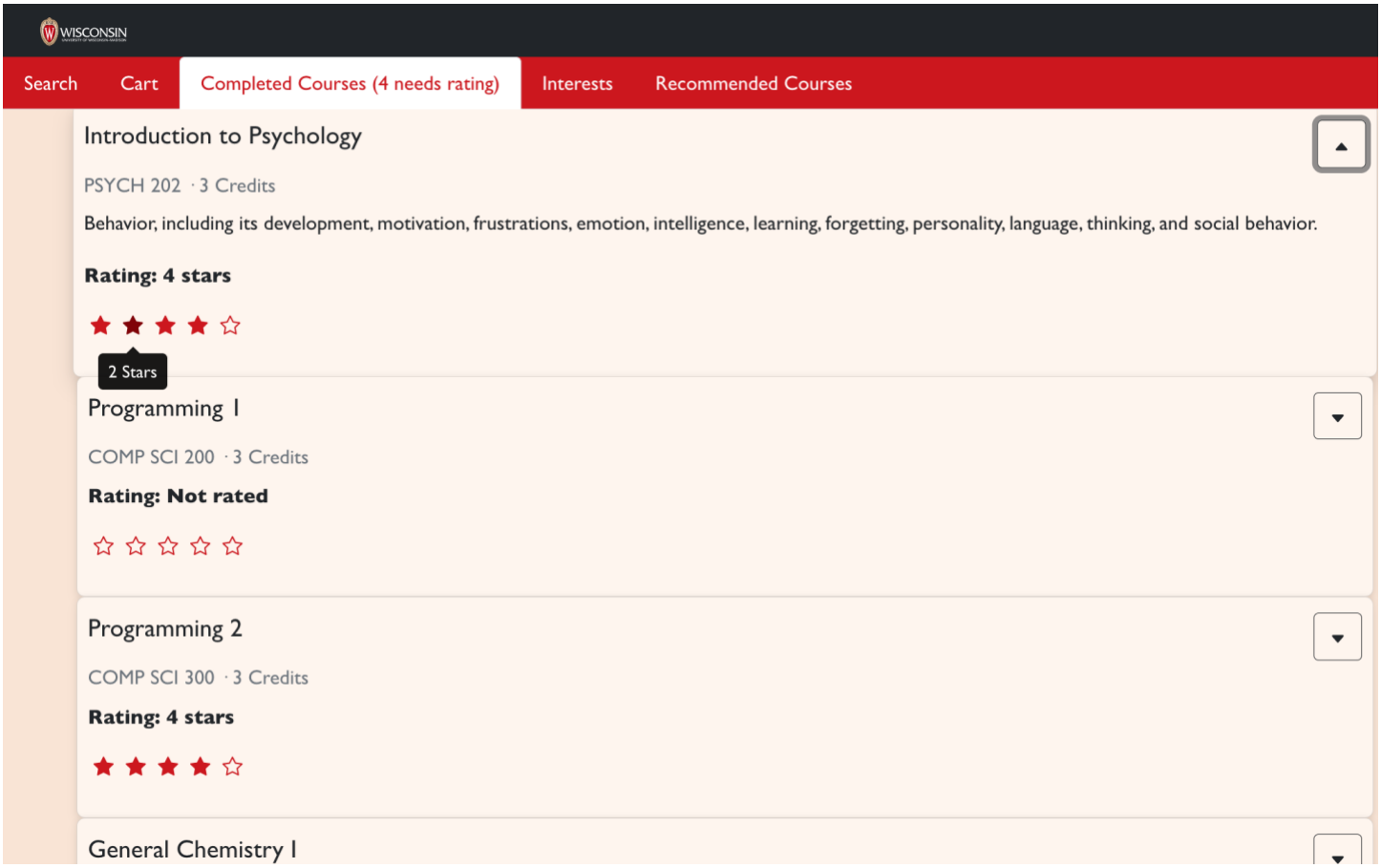
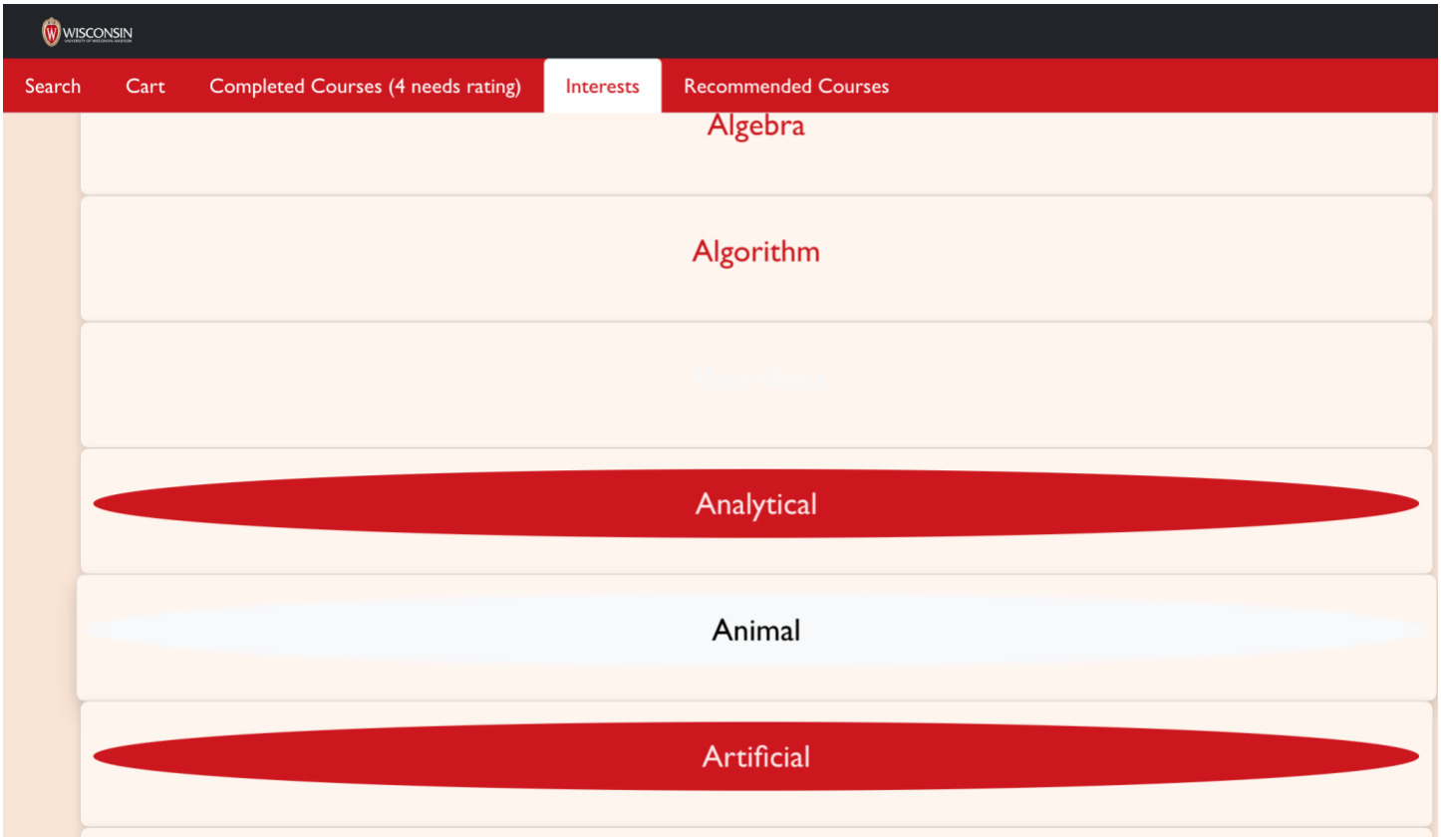
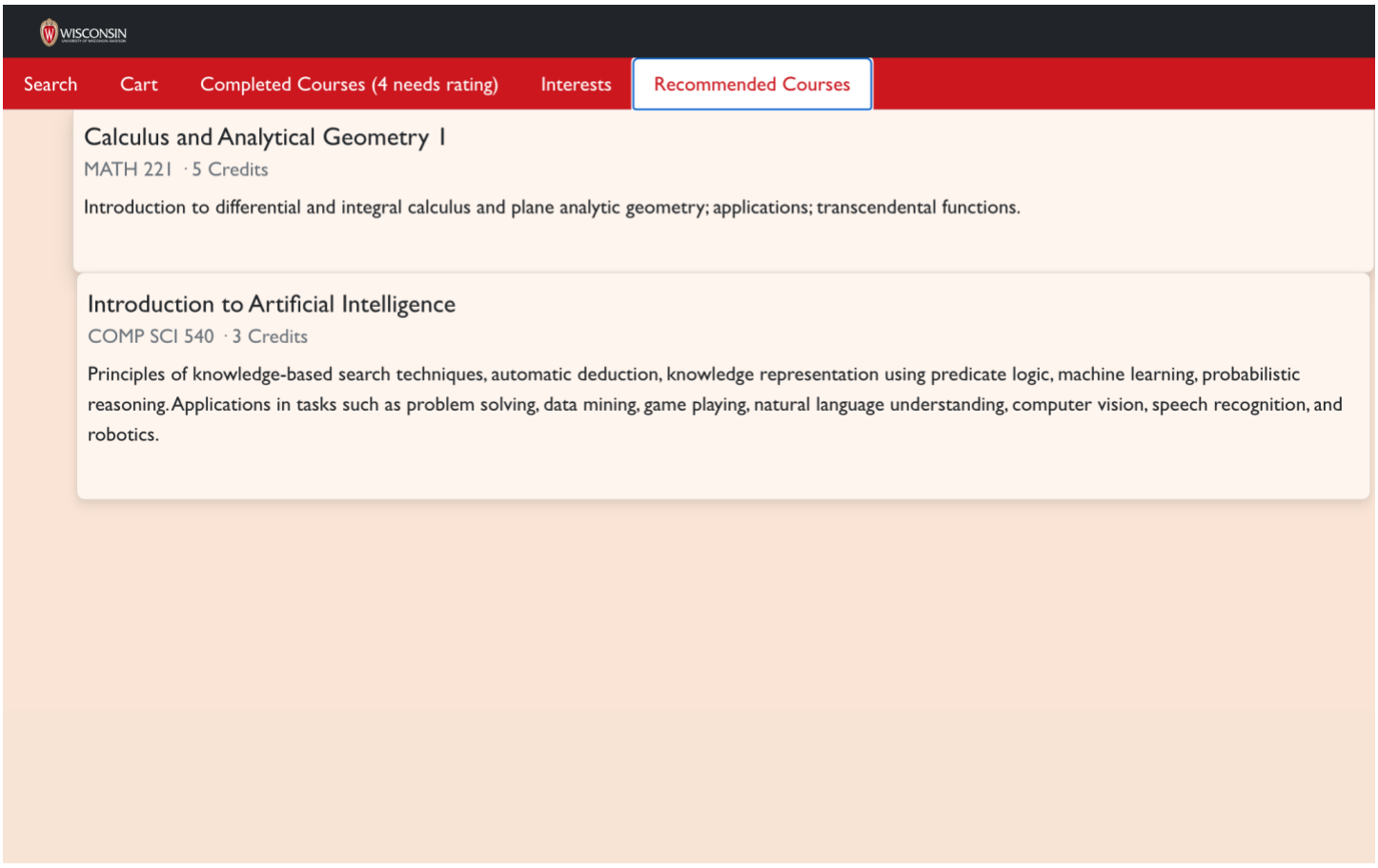
Remove from Cart
PSYCH 202 · 3 Credits
View sections and subsections


WISCONSIN
Search
Cart
Completed Courses (4 needs rating)
Interests
Recommended Courses
Collapse Description
Introduction to Psychology
PSYCH 202 · 3 Credits
Behavior, including its development, motivation, frustrations, emotion, intelligence, learning, forgetting, personality, language, thinking, and social behavior.
View sections and subsections


WISCONSIN
Search
Cart
Completed Courses (4 needs rating)
Interests
Recommended Courses
Introduction to Psychology
PSYCH 202 · 3 Credits
Behavior, including its development, motivation, frustrations, emotion, intelligence, learning, forgetting, personality, language, thinking, and social behavior.
Rating: 4 stars
2 Stars
Programming 1
COMP SCI 200 · 3 Credits
Rating: Not rated
Programming 2
COMP SCI 300 · 3 Credits
Rating: 4 stars
General Chemistry 1


WISCONSIN
Search
Cart
Completed Courses (4 needs rating)
Interests
Recommended Courses
Algebra
Algorithm
Algorithms
Analytical
Animal
Artificial

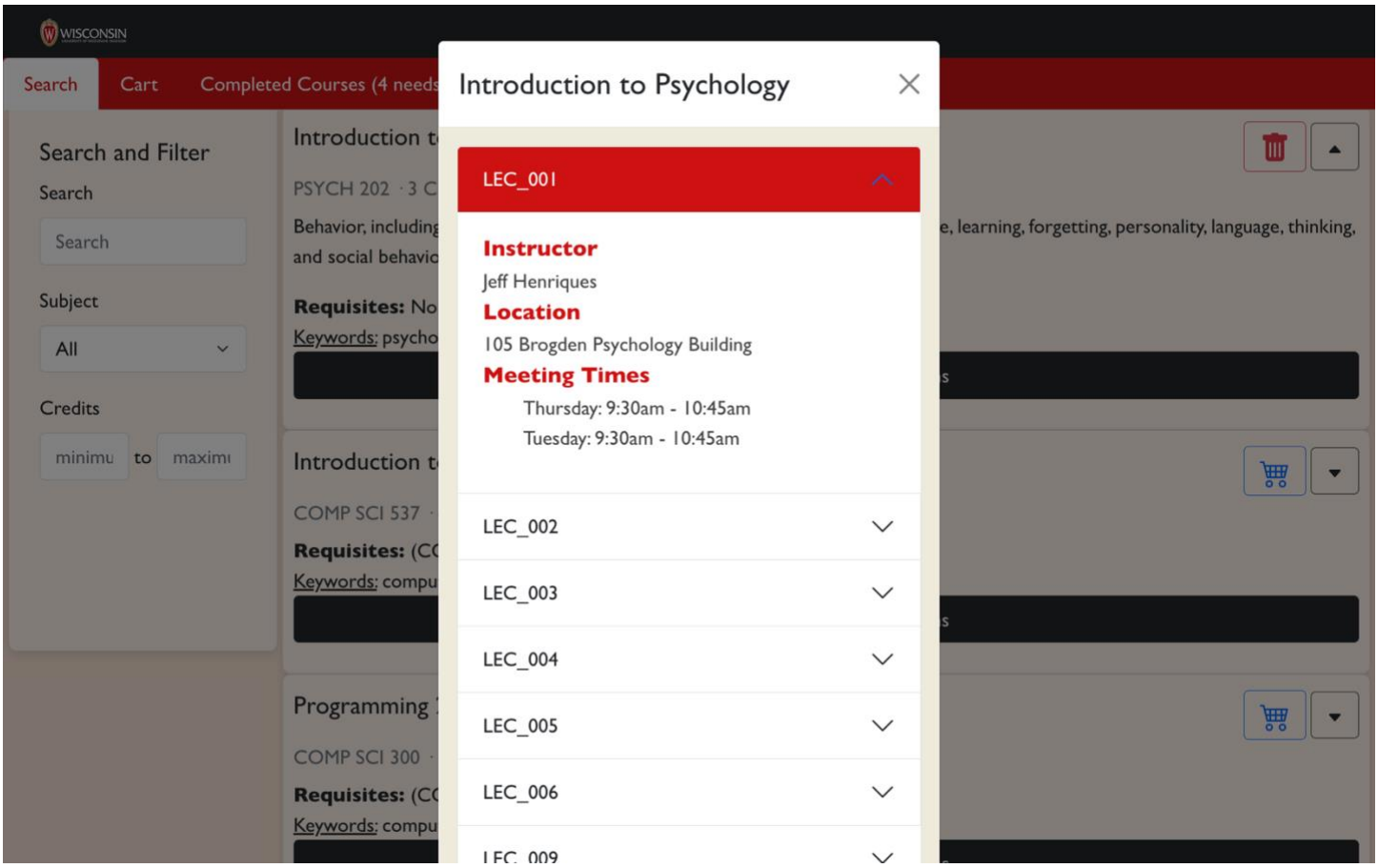

WISCONSIN
Search
Cart
Completed Courses (4 needs rating)
Interests
Recommended Courses
Calculus and Analytical Geometry I
MATH 221 · 5 Credits
Introduction to differential and integral calculus and plane analytic geometry; applications; transcendental functions.
Introduction to Artificial Intelligence
COMP SCI 540 · 3 Credits
Principles of knowledge-based search techniques, automatic deduction, knowledge representation using predicate logic, machine learning, probabilistic reasoning. Applications in tasks such as problem solving, data mining, game playing, natural language understanding, computer vision, speech recognition, and robotics.

Part 3. Heuristic Evaluation (2.0 Points)

(0.2 Points) **Step 1. Identify a Focus.** In this step, you will review the implementation of your redesign from Part 2 with a critical eye to identify 2-3 "components" that you think are most consequential for user experience and that you will put under the microscope of heuristic evaluation in the next step. In real life, your application might have hundreds of components, screens, or pages, and you will have to focus your efforts on a limited set that will make the most difference in terms of effectiveness and user experience. Similarly, you will review your design and identify 2-3 components to focus on. Here, a "component" can be the entire page/view (e.g., completed courses) or a reusable component (e.g., the course component, the rating component), but not something as small as a button or label. Provide screenshots of each component below and provide a brief justification (1–2 sentences) of why you think each one is a critical component.

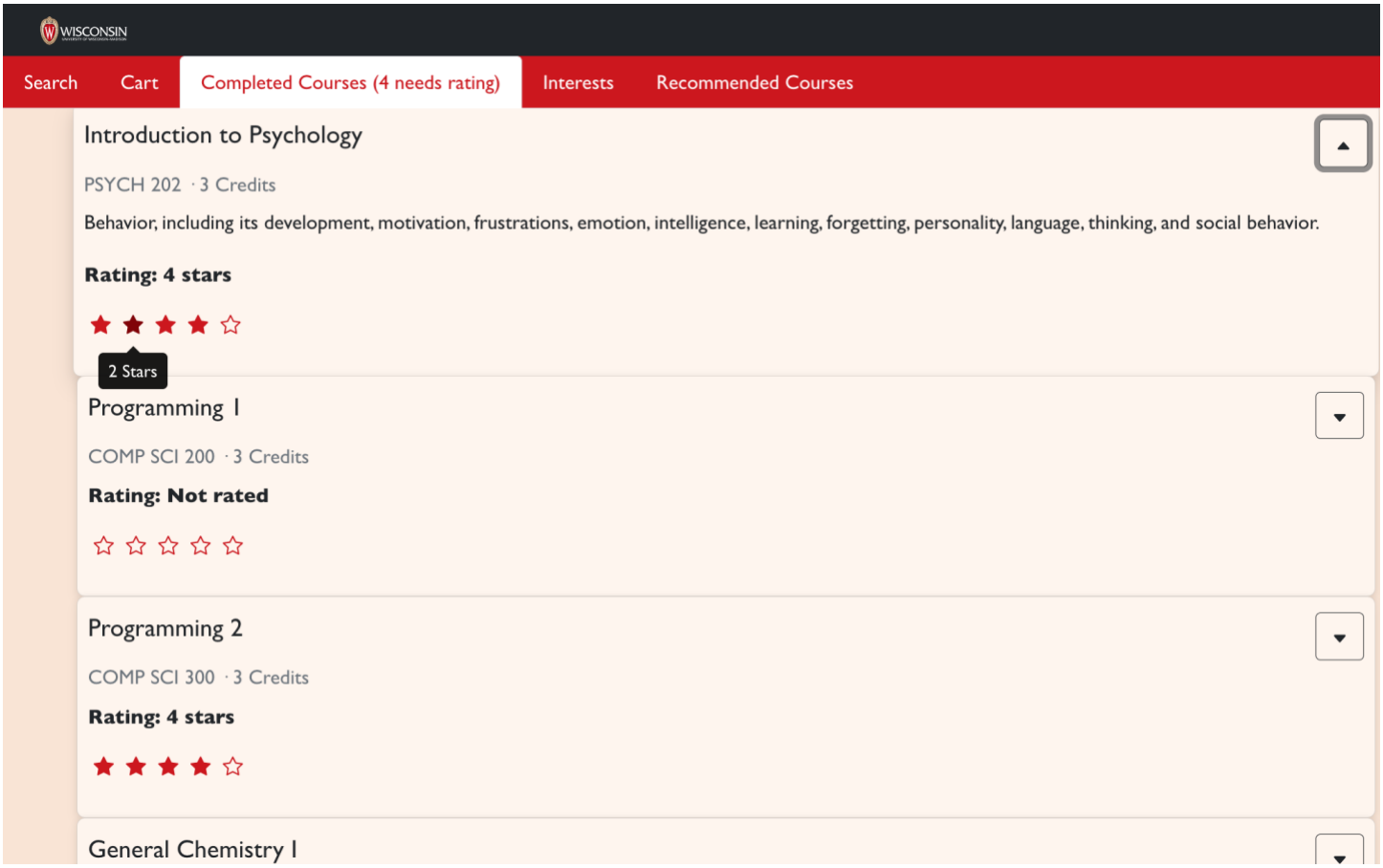
Search Modal

- Some may criticize that the information of each section or subsection is long, and user may need to scroll the page in an unorganized situation. It may need other options to decide the improvements.



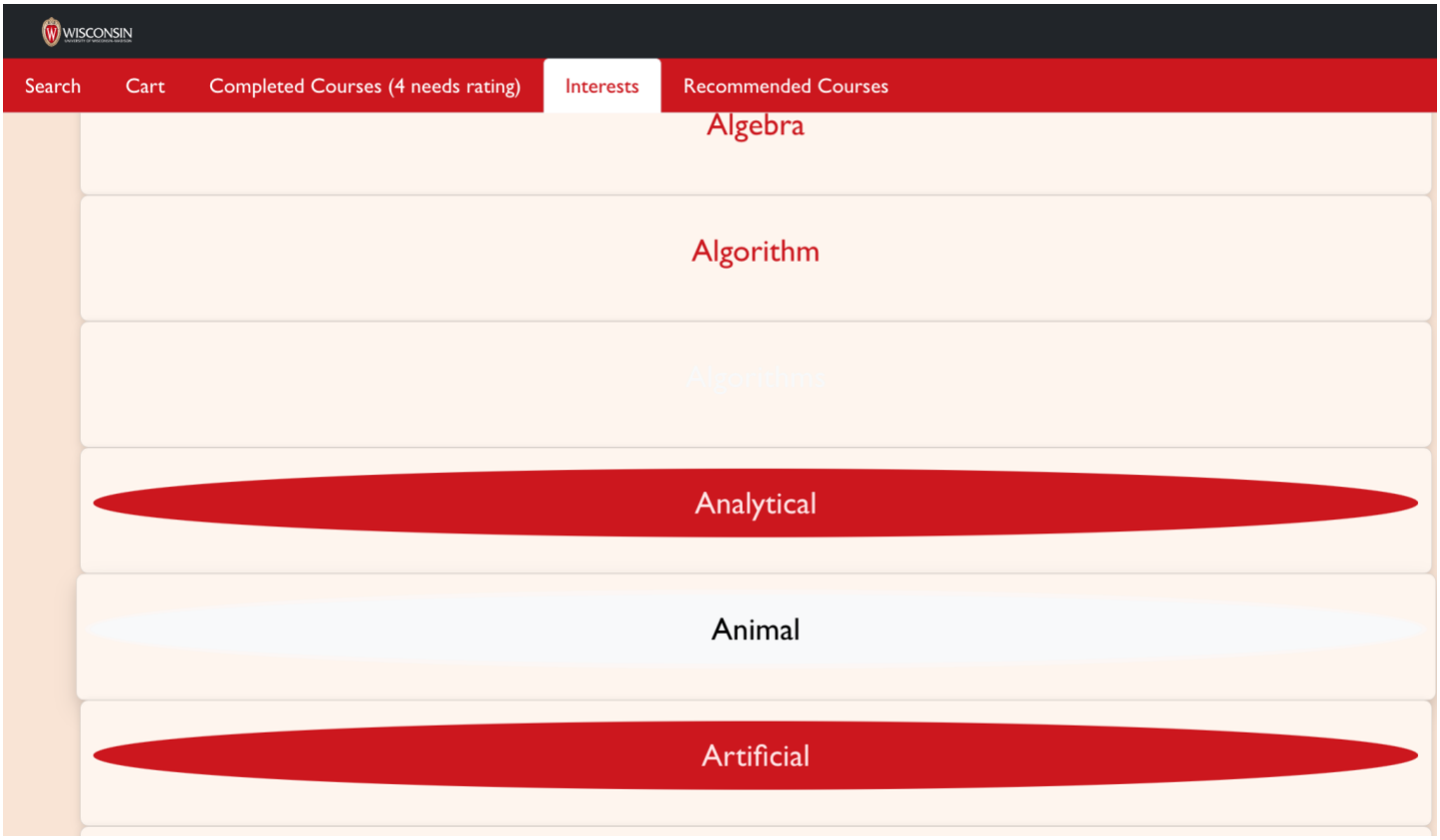
Rating System

- Rating system's pop-up star aid elements may seem redundant to users whenever user hover on each star. The stars for some people may seem obvious but from some may do not understand. In addition, the layout has a balance view of left. Some may think not smooth enough in a point of bigger picture.



Interests Tags

- In this Interests page, user needs to click each like tag to generate the recommended courses, but at first, user may not know the meaning of one-click, double-clicks, and hover actions on each tag button.



Step 2. Review the Heuristics. Carefully review the ten usability heuristics we discussed in class from the slides, what principle each heuristic represents, and examples of the designs that violate and support the heuristics. Below is a cheat sheet for Nielsen's ten heuristics that you can use in the next step. (This step does not have any deliverables.)

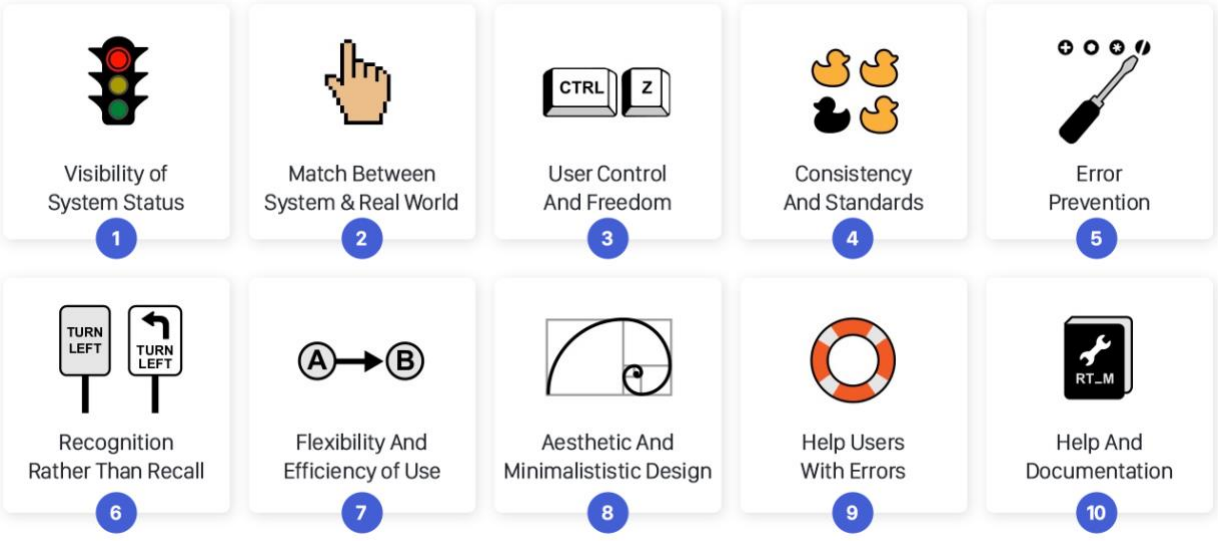


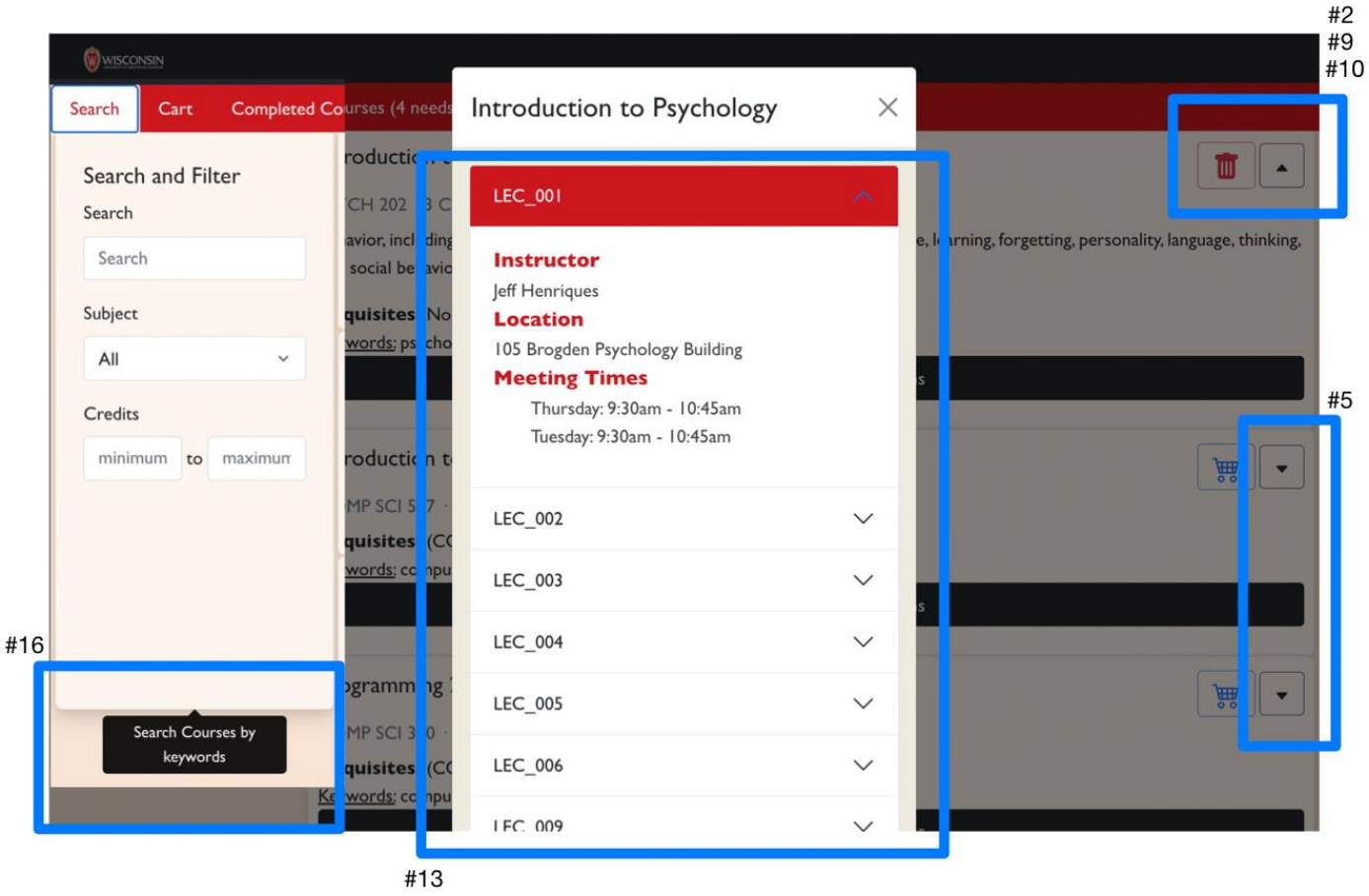
Image source: UX Collective

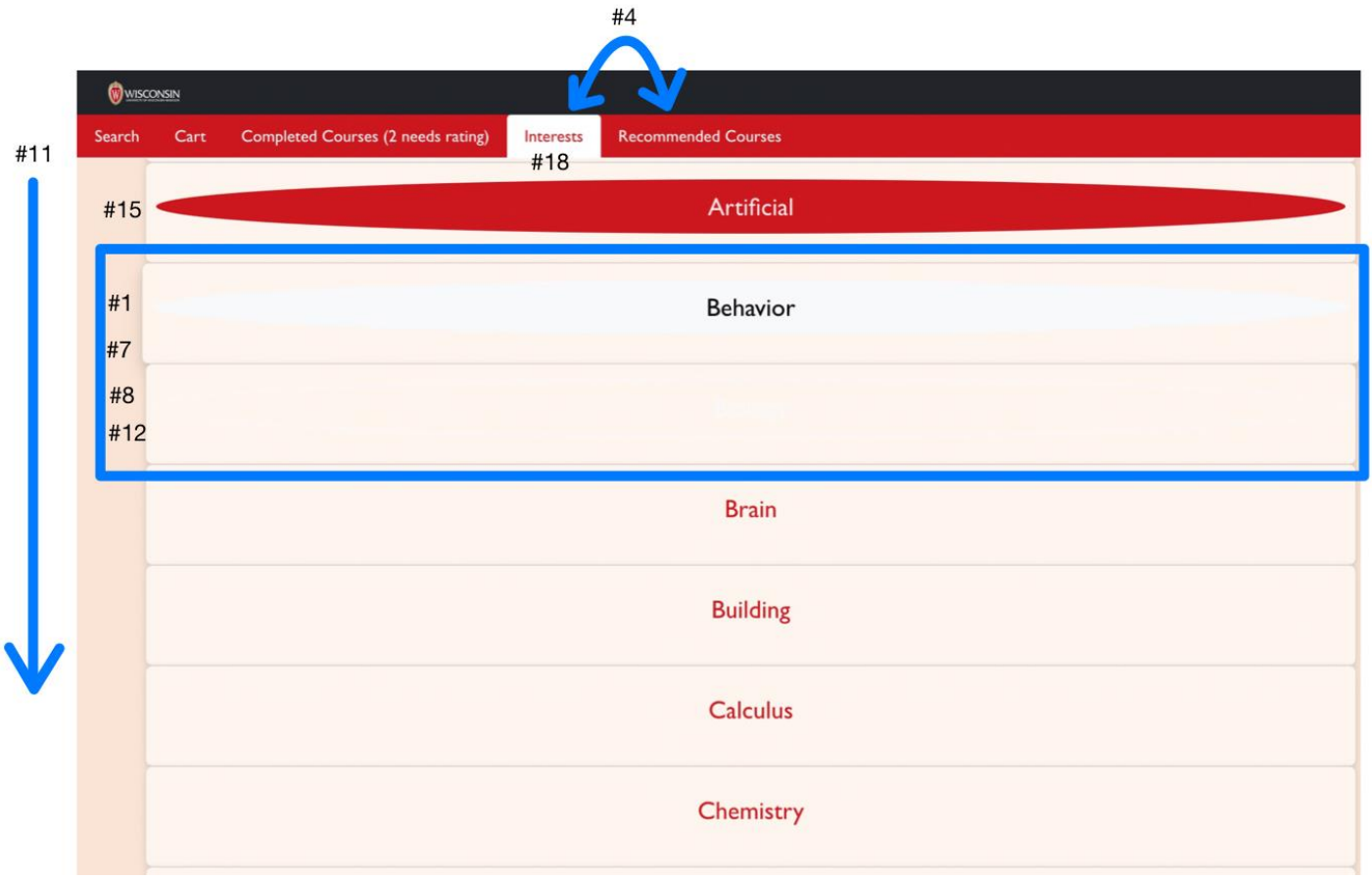
(1.8 Points) **Step 3. Identify Potential Violations.**

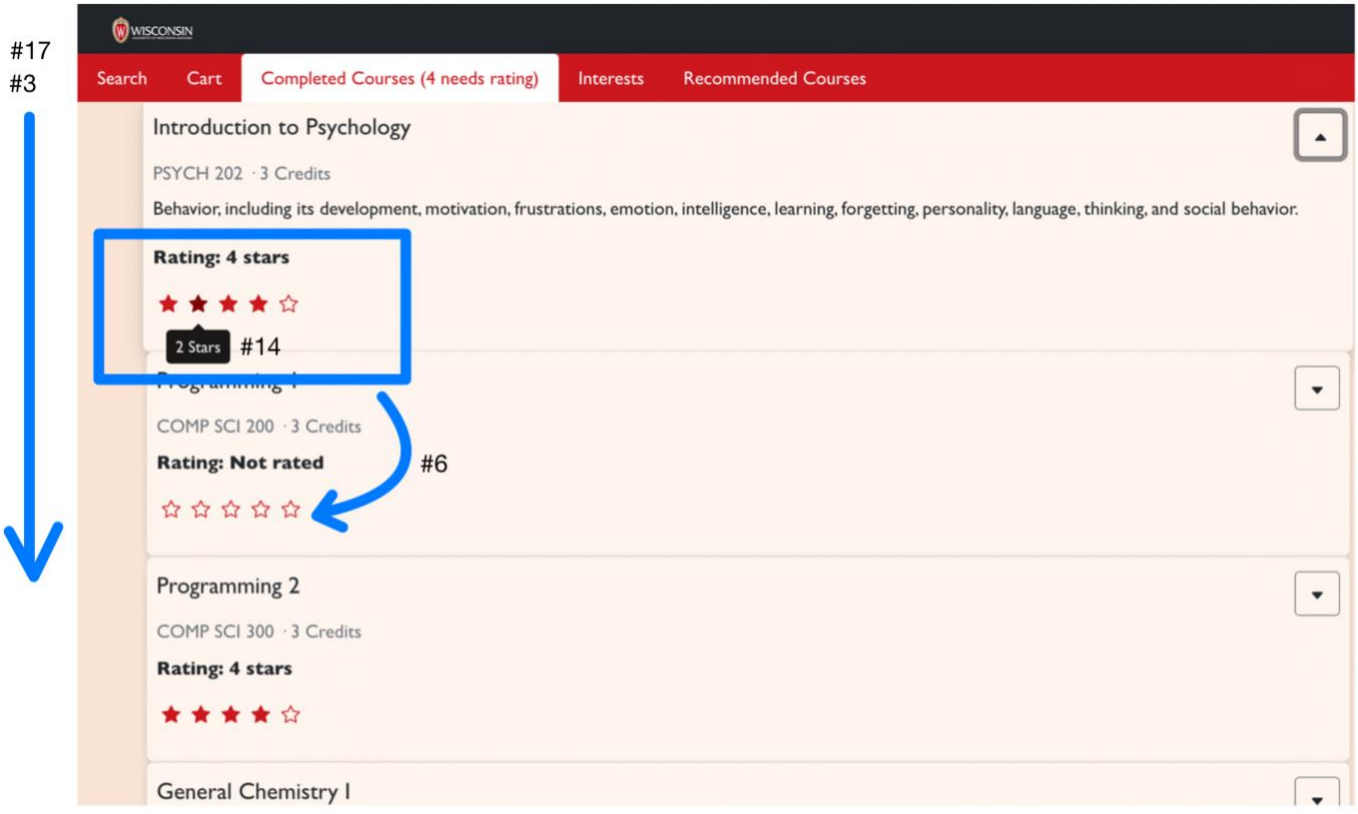
Focusing on your components, inspect your design, considering each usability heuristic, for any violations of the heuristics. For each violation, use the following table to describe the violation and give it a unique number (specified in the # column). Make copies of your screenshots from Step 1, focusing on the design elements you are considering in this step, and mark them with unique numbers so that the reader of your report can find the location of the violation in the screenshots and read your description in the table below. In addition, color-code the violations for severity, highlighting with red, orange, yellow, green, and gray for the severity-rating scale we covered in class (with red being most severe to gray being a non-issue). For each component, you will likely note violations of some of the heuristics but not others. Only highlight violations in the table below and in the screenshots, and heuristics that are not violated can be left blank.

Heuristic	#	Component 1 Search Modal	#	Component 2 Rating system	#	Component 3 Interests tag
Visibility of system status					1	The white dislike opacity may seem unrecognizable to users to know the meaning
Match between real world & system	2	Number of enrolled students may affect the user to add course cart	3	User may want to know more about the rating to affect the course outcome in the future	4	User may be confused that how the interest tags are relating to the recommended courses
User control & freedom	5	If user want to expand all descriptions of all courses, it needs to click all expands	6	The rating stars options do not allow the user to change back to not deciding how many stars	7	The clicking options do not allow the user to change back to undecided tag
Consistency & standards					8	The like options may seem having different meaning to users in red, white, and disappearing
Error prevention	9	When user does not complete requisite courses, it may need to pop-up warning				
Recognition rather than recall	10	Some already added courses in cart may need more obvious notifications to user			11	User may need to memorize how many like tags are clicked to ensure the recommended courses are meaningful
Flexibility & efficiency of use					12	At the first time, user may do not realize the tags can be press multiple times to change states
Aesthetic & minimalist design	13	The sections and subsections may seem overwhelming to user if user is not going to find details of lectures	14	The hover rating pop-ups may be to many when user hover each star	15	The circle button may seem irritating and overwhelming

Help users with errors						
Help & documentation	16	The hover pop-up help in the filter area may not helpful enough	17	User may want to know the rating system's usage	18	May need more documentation or pop-up information to know how the like tags work




#4
WISCONSIN
Search
Cart
Completed Courses (2 needs rating)
Interests
Recommended Courses
#18
#11
#15
Artificial
#1
Behavior
#7
#8
#12
Brain
Building
Calculus
Chemistry


#17
#3
WISCONSIN
Search
Cart
Completed Courses (4 needs rating)
Interests
Recommended Courses
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PSYCH 202 · 3 Credits
Behavior, including its development, motivation, frustrations, emotion, intelligence, learning, forgetting, personality, language, thinking, and social behavior.
Rating: 4 stars
2 Stars
#14
COMP SCI 200 · 3 Credits
Rating: Not rated
#6
Programming 2
COMP SCI 300 · 3 Credits
Rating: 4 stars
General Chemistry I

Your deliverable will be a completed version of this document, attached to the canvas assignment as a PDF, and the GitHub Classroom repository name and latest commit hash.