





Programming Analogies

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Description of Users and Environment

- Environment
 - System that will clarify computer science topics through meaningful, real-world analogies
- Primary Users
 - Professors/High School teachers/Teacher Assistants
 - Translate knowledge to analogies to explain principles
 - Provide clarity and engagement with students
 - Administrators
 - Manage the application
- Secondary Users
 - Students who need clarification regarding a topic (view only, no creating analogies)
 - Ranging from high school to third & fourth-year university students
 - Scientist (Dr. Briana Bettin)



Use Scenario 1: Creating an Analogy

Use Scenario Personas

Persona 1: Dr. Douglas Brockmeier (Instructor)

38 years old, Ph.D. in Computer Science

Dr. Brockmeier is a favorite professor of first and second-year computer science students, and he is the only instructor at his university that teaches Introduction to Programming I, which teaches students C++. His Introduction to Programming course is always over 200 students and he's noticed that there are some concepts that a majority of students struggle with. He is looking for a way to communicate these concepts more effectively to students, but he doesn't have a lot of time to spend trying to come up with new ideas on his own.



Persona 2: Stewie (Student)



17 years old, First-year computer engineering student

Stewie is an avid reader and really enjoys blogging. He writes articles about technology and its applications and frequently tweets about the same. Stewie has some experience with programming since he likes mathematics and hopes to learn more about the underlying concepts and enhance his programming skills.



Use Scenario Description



- Dr. Brockmeier receives feedback from Stewie about their understanding of a topic
 - Misconceptions = Create an analogy
- Login to their account, and be redirected to the home page.
- Dr. Brockmeier chooses to create a new analogy by clicking button
 - Prompted to enter this information:
 - Misconception
 - Desired knowledge,
 - Source Domain and Target Domain
 - Domain, Precondition, Required action, Postcondition, Constraints
- Able to click the submit button if all fields are filled
- Help information popup to provide assistance with entering specific fields
- The analogy can now be given to Stewie to help their understanding



Use Scenario 2: Searching for Analogies

Use Scenario Description

- Stewie enters his query into the search bar
 - Query is specific to the concept needing clarification
- System will reference database based on query
- System returns “matches” to query based on similarities in database
- The return will be formatted to show highly visited and highly rated analogies
 - Stewie is now able to view analogies based on his results



Use Scenario 3: Deleting Analogies

Administrator description



Persona 3: Dr. Brian Bettib (Admin)

Ph.D. in Computer Science

Dr. Bettib is an admin for the application. She's technologically savvy and literate in database management. She ensures that authorized users and appropriate analogies are present on the application.

Use Scenario Description

- Dr. Bettib finds a poorly-organized analogy/inappropriate analogy
- Dr. Bettib selects the analogy by clicking on it
 - Elevated privileges will display a delete button at the bottom of the screen
- Upon clicking the delete button, system will prompt for a confirmation
 - User clicks confirmation button and system will delete the analogy.
- System will delete the analogy from the database
 - Success/Error will be displayed when system responds



Use Scenario 4 & 5: Errors creating an Analogy

Use Scenario Description

Use Scenario 4: Creating analogy with missing fields

- Instructor/TA enters information about their new analogy
 - Form is not 100% complete, but they still click the submit button
- Before inserting into database, form validation will occur.
 - System will recognize which fields are missing, and will inform the user which fields they still need to fill out
- Once the form is valid, system will insert into database, and inform the user the success/error response.

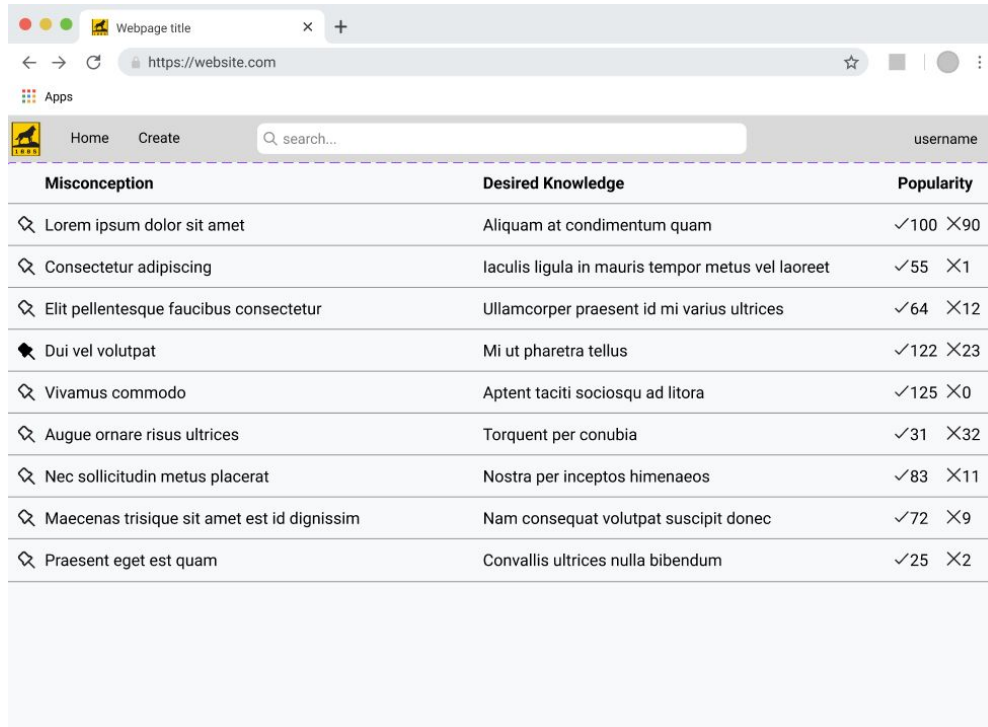
Use Scenario 5: Creating analogy without account

- A student or non-logged in user accesses create page.
 - User is not authorized unless they have a registered instructor account
- System will prompt user to login/create an account.
 - Once this is done, user will be able to access the create page.



Paper Prototypes

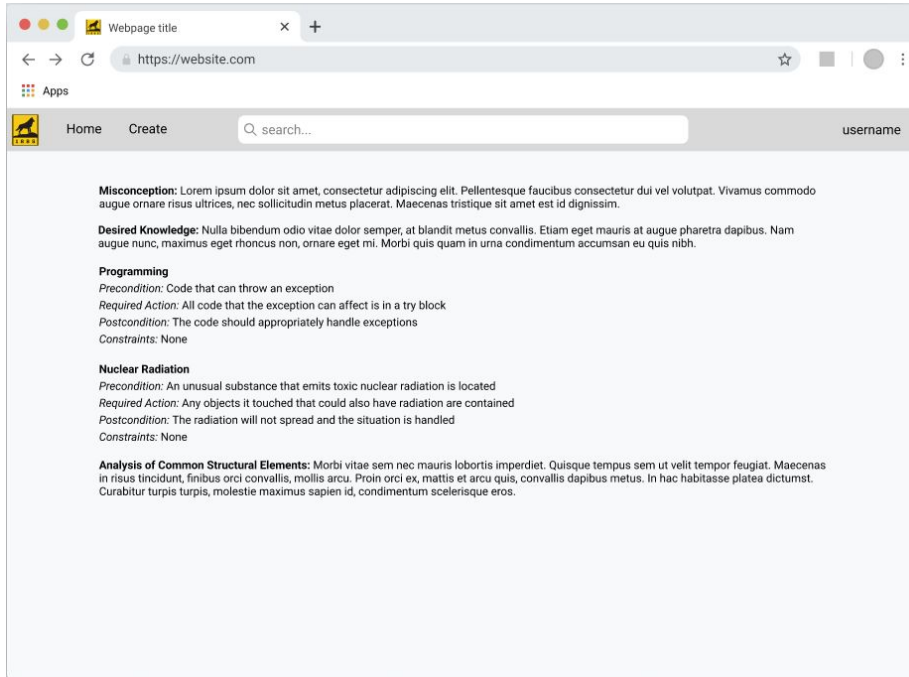
Browsing Page



The image shows a web browser window with a table of data. The browser's address bar displays 'https://website.com'. The page header includes a logo, 'Home', 'Create', a search bar, and a 'username' field. The table below contains 10 rows of data, each with a 'Misconception', 'Desired Knowledge', and 'Popularity' column. The 'Popularity' column shows a checkmark and a cross icon followed by a number.

Misconception	Desired Knowledge	Popularity
🔍 Lorem ipsum dolor sit amet	Aliquam at condimentum quam	✓100 ✕90
🔍 Consectetur adipiscing	Iaculis ligula in mauris tempor metus vel laoreet	✓55 ✕1
🔍 Elit pellentesque faucibus consectetur	Ullamcorper praesent id mi varius ultrices	✓64 ✕12
🔍 Dui vel volutpat	Mi ut pharetra tellus	✓122 ✕23
🔍 Vivamus commodo	Aptent taciti sociosqu ad litora	✓125 ✕0
🔍 Augue ornare risus ultrices	Torquent per conubia	✓31 ✕32
🔍 Nec sollicitudin metus placerat	Nostra per inceptos himenaeos	✓83 ✕11
🔍 Maecenas tristique sit amet est id dignissim	Nam consequat volutpat suscipit donec	✓72 ✕9
🔍 Praesent eget est quam	Convallis ultrices nulla bibendum	✓25 ✕2

Analogy Page



The screenshot shows a web browser window with the address bar containing "https://website.com". The page title is "Webpage title". The browser interface includes navigation buttons (back, forward, refresh), a search bar, and a user profile labeled "username". The main content area of the page is titled "Analogy Page" and contains several sections of text:

Misconception: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Pellentesque faucibus consectetur dui vel volutpat. Vivamus commodo augue ornare risus ultrices, nec sollicitudin metus placerat. Maecenas tristique sit amet est id dignissim.

Desired Knowledge: Nulla bibendum odio vitae dolor semper, at blandit metus convallis. Etiam eget mauris at augue pharetra dapibus. Nam augue nunc, maximus eget rhoncus non, ornare eget mi. Morbi quis quam in urna condimentum accumsan eu quis nibh.

Programming
Precondition: Code that can throw an exception
Required Action: All code that the exception can affect is in a try block
Postcondition: The code should appropriately handle exceptions
Constraints: None

Nuclear Radiation
Precondition: An unusual substance that emits toxic nuclear radiation is located
Required Action: Any objects it touched that could also have radiation are contained
Postcondition: The radiation will not spread and the situation is handled
Constraints: None

Analysis of Common Structural Elements: Morbi vitae sem nec mauris lobortis imperdiet. Quisque tempus sem ut velit tempor feugiat. Maecenas in risus tincidunt, finibus orci convallis, mollis arcu. Proin orci ex, mattis et arcu quis, convallis dapibus metus. In hac habitasse platea dictumst. Curabitur turpis turpis, molestie maximus sapien id, condimentum scelerisque eros.

Analogy Comparison Page

Webpage title × +
← → ↻ https://website.com ☆ ■ | ● ⋮
Apps
LEEDS Home Create 🔍 search... username

Misconception: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Pellentesque faucibus consectetur dui vel volutpat. Vivamus commodo augue ornare risus ultrices, nec sollicitudin metus placerat. Maecenas tristique sit amet est id dignissim.

Desired Knowledge: Nulla bibendum odio vitae dolor semper, at blandit metus convallis. Etiam eget mauris at augue pharetra dapibus. Nam augue nunc, maximus eget rhoncus non, ornare eget mi. Morbi quis quam in urna condimentum accumsan eu quis nibh.

Programming
Precondition: Code that can throw an exception
Required Action: All code that the exception can affect is in a try block
Postcondition: The code should appropriately handle exceptions
Constraints: None

Fire	Nuclear Radiation
<i>Precondition:</i> An object that is on fire	A substance that emits toxic nuclear radiation is located
<i>Required Action:</i> Anything flammable that is touching the fire is removed	Anything it touched that could also have radiation are contained
<i>Postcondition:</i> The fire will not spread and the situation is handled	The radiation will not spread and the situation is handled
<i>Constraints:</i> None	None

Analysis of Common Structural Elements: Morbi vitae sem nec mauris lobortis imperdiet. Quisque tempus sem ut velit tempor feugiat. Maecenas in risus tincidunt, finibus orci convallis, mollis arcu. Proin orci ex, mattis et arcu quis, convallis dapibus metus. In hac habitasse platea dictumst. Curabitur turpis turpis, molestie maximus sapien id, condimentum scelerisque eros.

Create Analogy Page

Webpage title x +
https://website.com ☆ □ ● ⋮

Apps

Home search... username

Analogy Context Target Domain Source Domain Common Elements

Misconception

Desired Knowledge

Create Analogy

Webpage title x +
https://website.com ☆ □ ● ⋮

Apps

Home search... username

Analogy Context Target Domain Source Domain Common Elements

Exploration of Target Domain (Programming) Procedure

Precondition

Required Action

Postcondition

Constraints

Create Analogy

Create Analogy Page pt 2

The screenshot shows a web browser window with the URL `https://website.com`. The browser's address bar and navigation buttons are visible. Below the browser, there is a header with a logo, the text "Home", a search bar, and the text "username". The main content area has four tabs: "Analogy Context", "Target Domain", "Source Domain", and "Common Elements". The "Source Domain" tab is selected, and the form titled "Exploration of Source Domain Procedure" is displayed. This form contains five input fields labeled "Domain", "Precondition", "Required Action", "Postcondition", and "Constraints". A dark blue button labeled "Create Analogy" is positioned at the bottom center of the form.

The screenshot shows a web browser window with the URL `https://website.com`. The browser's address bar and navigation buttons are visible. Below the browser, there is a header with a logo, the text "Home", a search bar, and the text "username". The main content area has four tabs: "Analogy Context", "Target Domain", "Source Domain", and "Common Elements". The "Common Elements" tab is selected, and the form titled "Analysis of Common Structural Elements" is displayed. This form contains five input fields labeled "Precondition", "Required Action", "Postcondition", and "Constraints". A dark blue button labeled "Create Analogy" is positioned at the bottom center of the form.

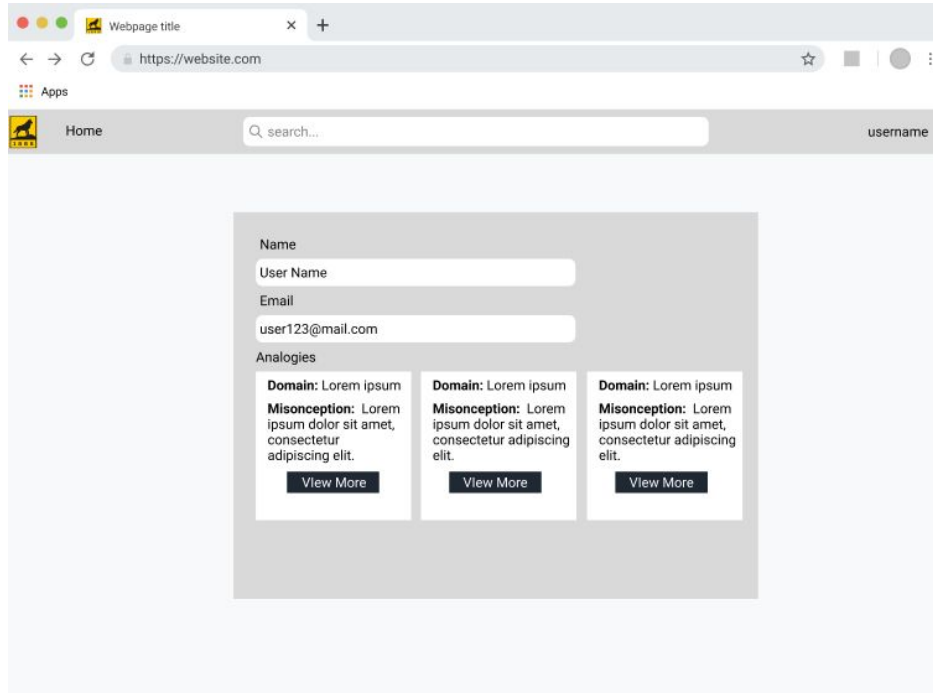
Signup and Login Page

The image displays two browser screenshots side-by-side, illustrating a login and a signup page. Both pages are viewed in a browser window with the address bar showing 'https://website.com' and a search bar containing 'search...'. The browser's address bar also shows 'Webpage title' and a plus sign for additional tabs. The browser's app drawer is visible, showing 'Home' and 'username'.

Left Screenshot (Login Page): The login form is centered on the page. It contains two input fields: 'Username' with the text 'UserName' entered, and 'Password' with six dots representing masked characters. Below the input fields are two buttons: a dark blue 'Login' button and a dark blue 'Create an Account' button.

Right Screenshot (Signup Page): The signup form is centered on the page. It contains five input fields: 'First Name' and 'Last Name' (two separate fields), 'Email', 'Username', and 'Password'. Below these fields is a 'Re-type Password' field. At the bottom of the form is a dark blue 'Create Account' button.

User Info Page



Usability Goals and Concerns

Goals

- Make analogies accessible
- Explain computer science concepts with real-world examples
- Make comparisons to computer concepts to further understanding
- Allow professors & assistants to rate the analogies
- Compare analogies of similar topics in a side-by-side format

Concerns

- Comparing analogies in a comprehensible way
- Bugs/Error handling
-



Thanks For Watching!
Any Questions?

