



INSIGHT MATH MATHEMATICAL APP FOR VISUALLY IMPAIRED

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ABSTRACT

This presentation explores the development and implementation of mathematical applications designed specifically for visually impaired users. The focus is on enhancing accessibility to mathematical education and practice through innovative technologies that adapt to the unique needs of these learners. We will examine key features such as audio feedback, tactile interfaces, and integration with existing assistive technologies like screen readers. The applications discussed aim to provide an inclusive, intuitive learning environment that empowers visually impaired students to explore mathematical concepts independently. This session highlights the challenges, solutions, and impact of these specialized tools, underscoring the importance of accessible design in educational technology.

KNOW YOUR CLIENT

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Understanding Visual Impairment:

- Recognize types and degrees of visual impairment.
- Acknowledge challenges in accessing mathematical content.

Accessibility Needs:

- Identify specific requirements such as screen readers, and braille displays.
- Understand preferences for input methods.

User Goals and Objectives:

- Determine the purpose (e.g., educational, professional).
- Understand users' objectives in accessing mathematical content.

Challenges and Pain Points:

- Gather feedback on current obstacles in accessing mathematical content.
- Identify key pain points in existing solutions.

Feedback and Iteration:

- Establish channels for ongoing user feedback.
- Prioritize user input to improve app accessibility and usability.



UNDERSTAND BUSINESS FUNCTION

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Features:

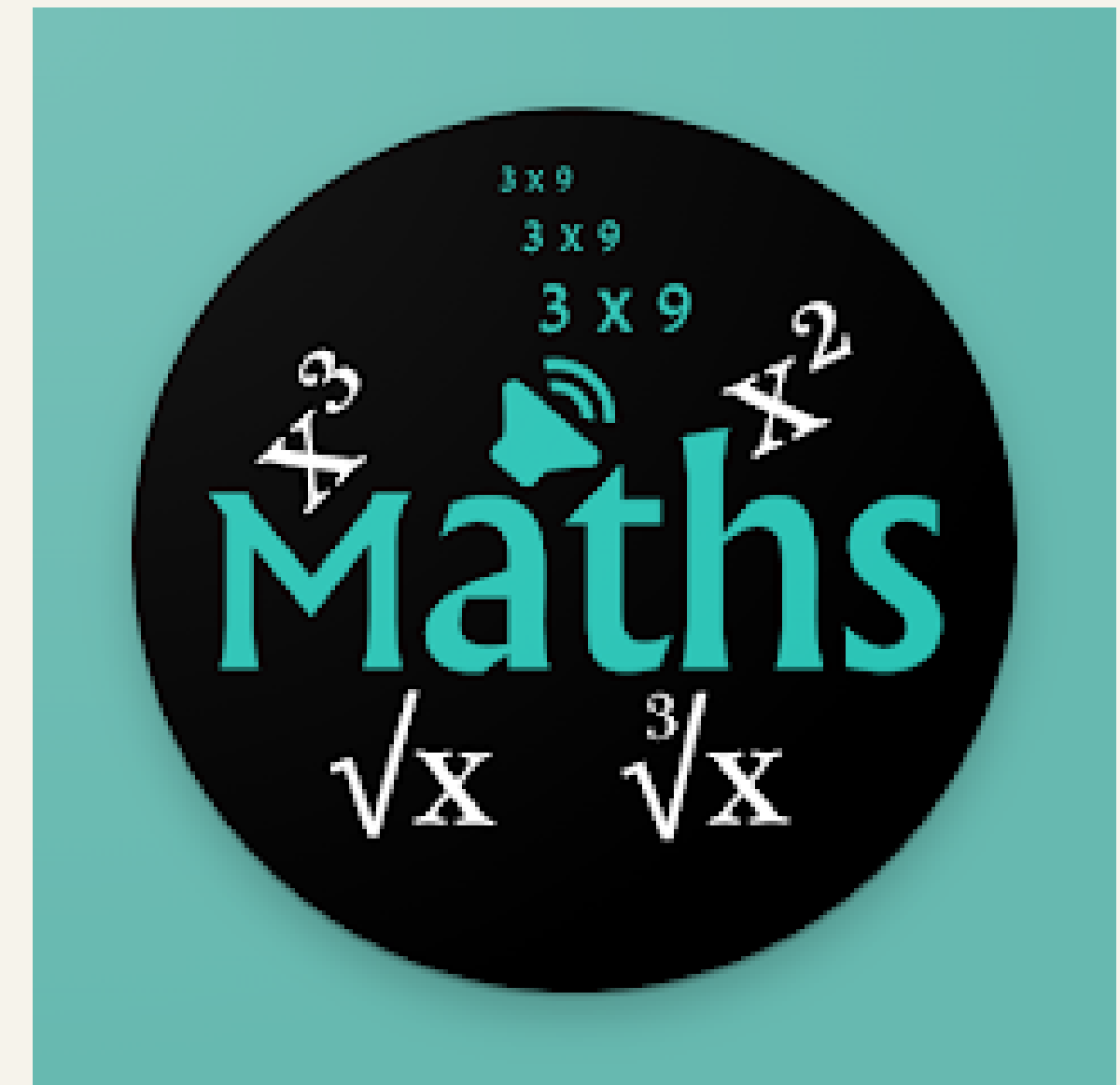
- Personalized learning experiences.
- Voice-controlled navigation.
- Braille display compatibility.
- High-contrast visuals for partial vision.
- Accessible mathematical expressions.

Impact:

- Enhances academic growth and inclusivity.
- Sets a standard for accessible educational technology.

Future Goals:

- Evolve through community feedback.
- Broaden subject coverage and educational tools.



UNDERSTAND PRINCIPLE OF GOOD SCREEN DESIGN

Clarity and Simplicity	Ensure interface elements are clear and easy to understand. Simplify complex information to enhance accessibility.
Consistency	Maintain consistency in design elements throughout the app. Use consistent layouts, colors, and navigation patterns.
Hierarchy and Organization	Establish clear visual hierarchy to prioritize important content. Organize information logically to facilitate easy navigation.
Accessibility Considerations	Design with accessibility in mind, ensuring compatibility with screen readers and assistive technologies. Use sufficient color contrast and provide alternative text for images.
Interactive Elements	Design interactive elements with clear affordances for users. Provide feedback for user actions to enhance usability.
Scalability	Design the interface to accommodate varying screen sizes and resolutions, ensuring a consistent user experience across devices.

SYSTEM MENU NAVIGATION

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Effortless Access to Learning

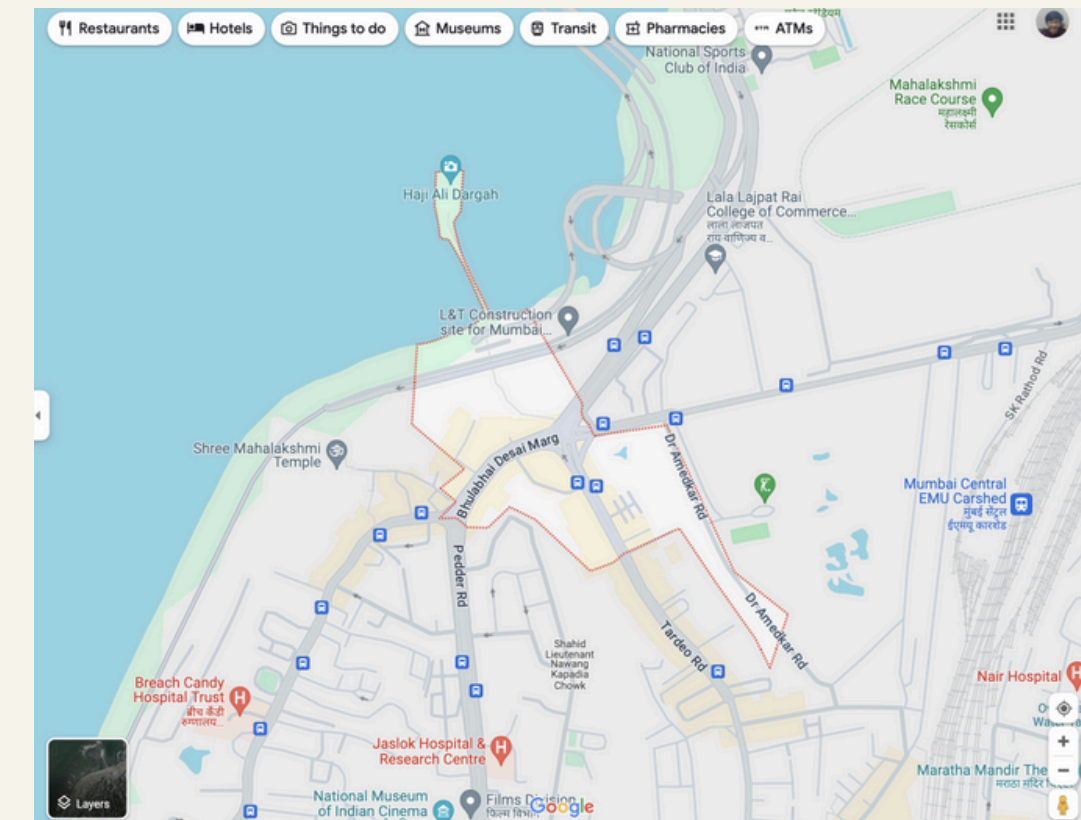
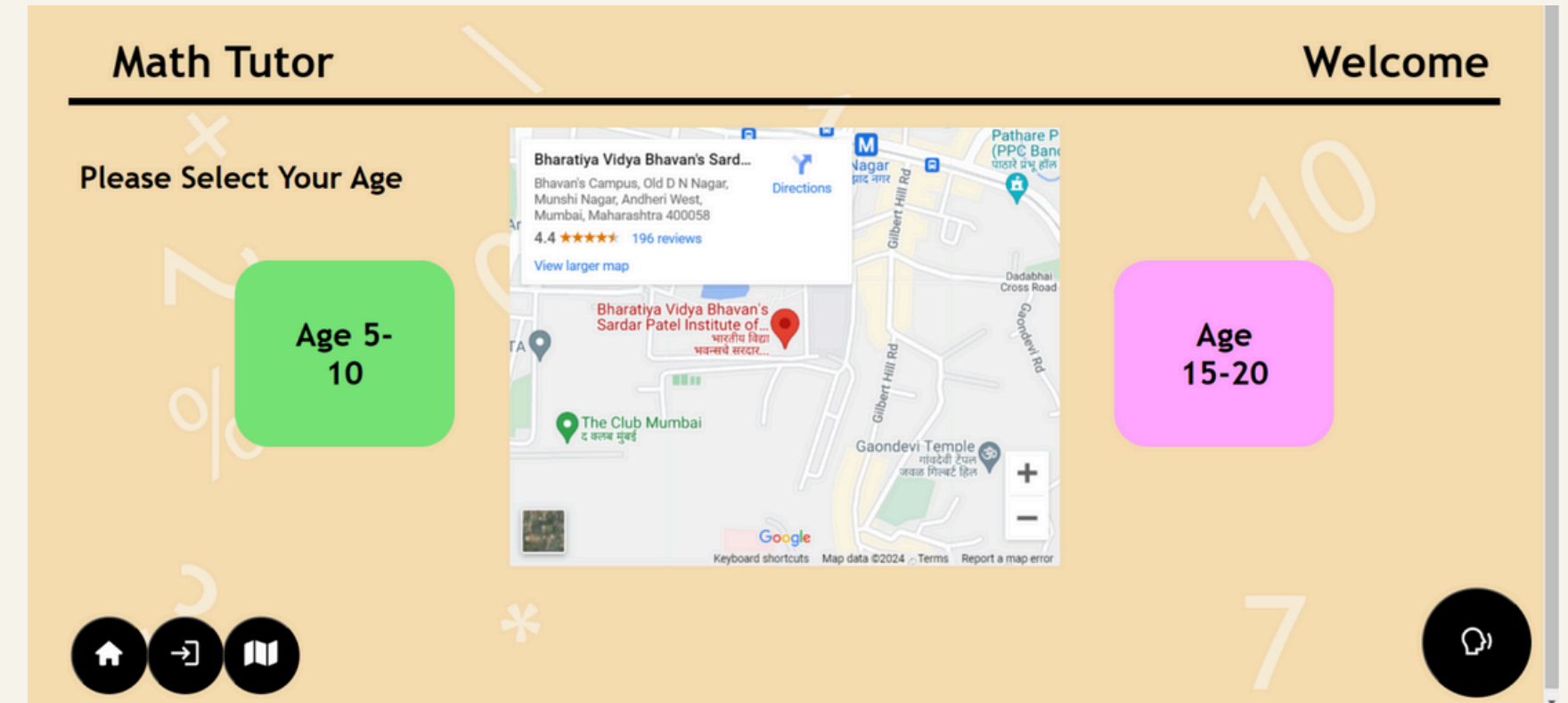
- Simplified Menu: Streamlined for ease of use.
- Voice-Guided Tours: Familiarize students with menu layout.
- Tactile Feedback: Confirm selections.
- Shortcut Keys: Quick access to functions.
- Consistent Layout: Uniform design across pages.

Navigation Aids

- Audio Cues: Different sounds for actions.
- Help Mode: On-demand assistance.

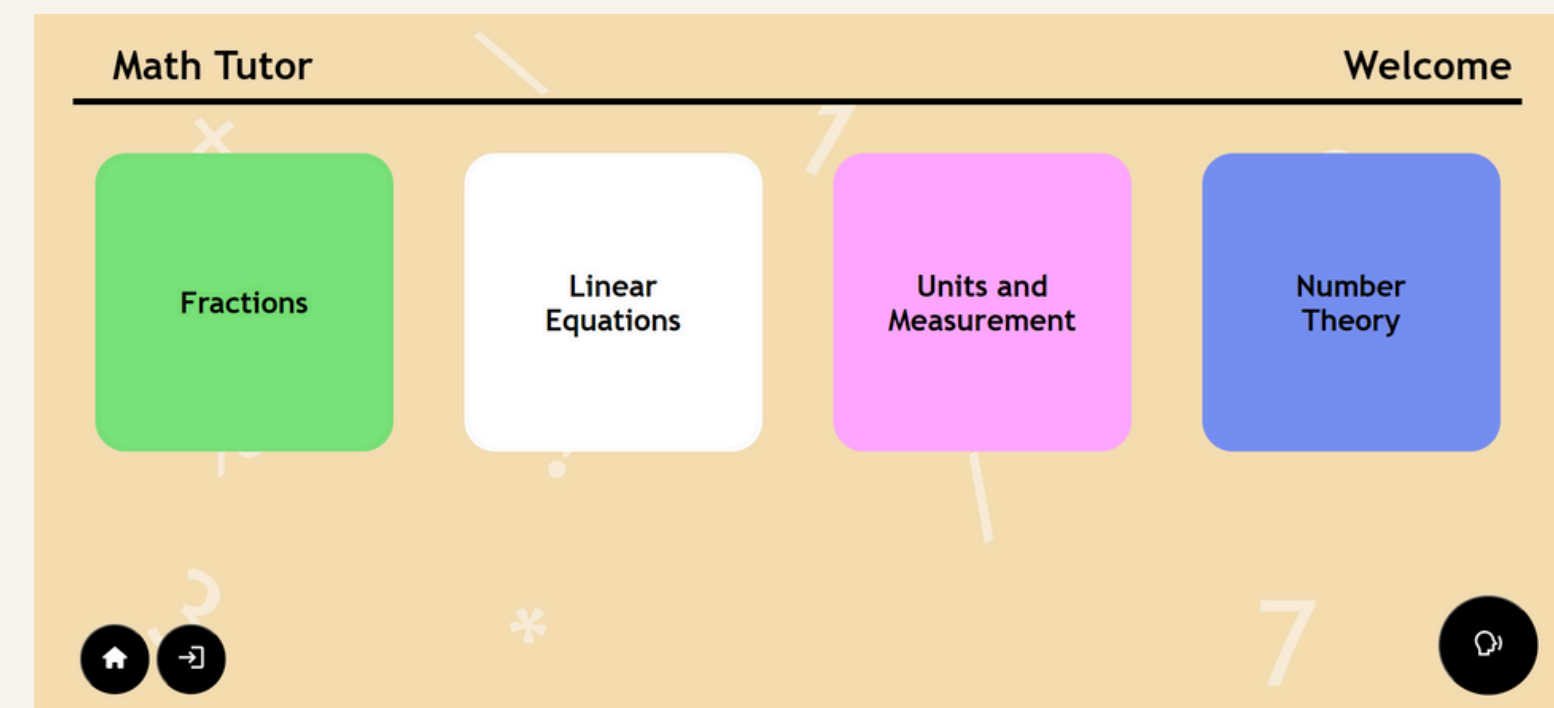
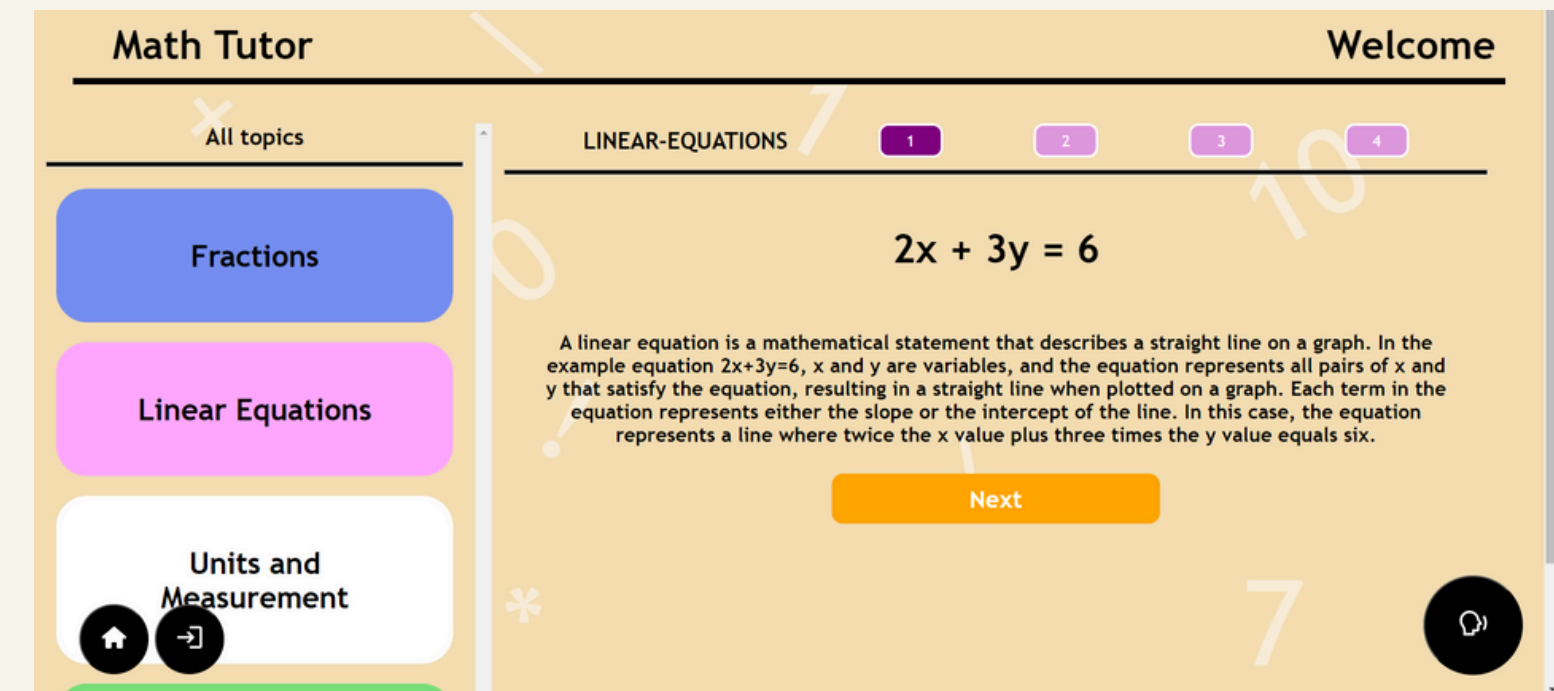
User-Centric Design

- Developed with input from visually impaired students.



WINDOWS

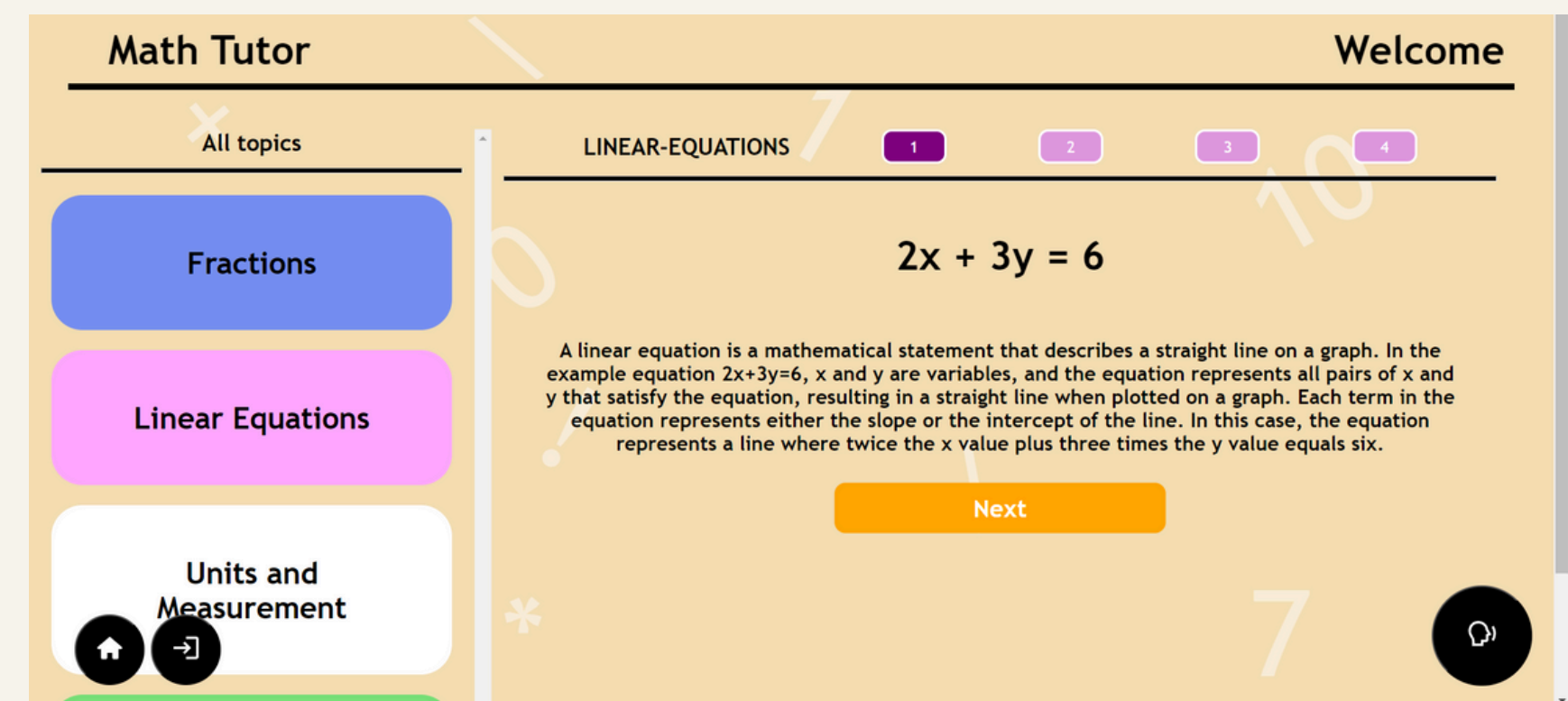
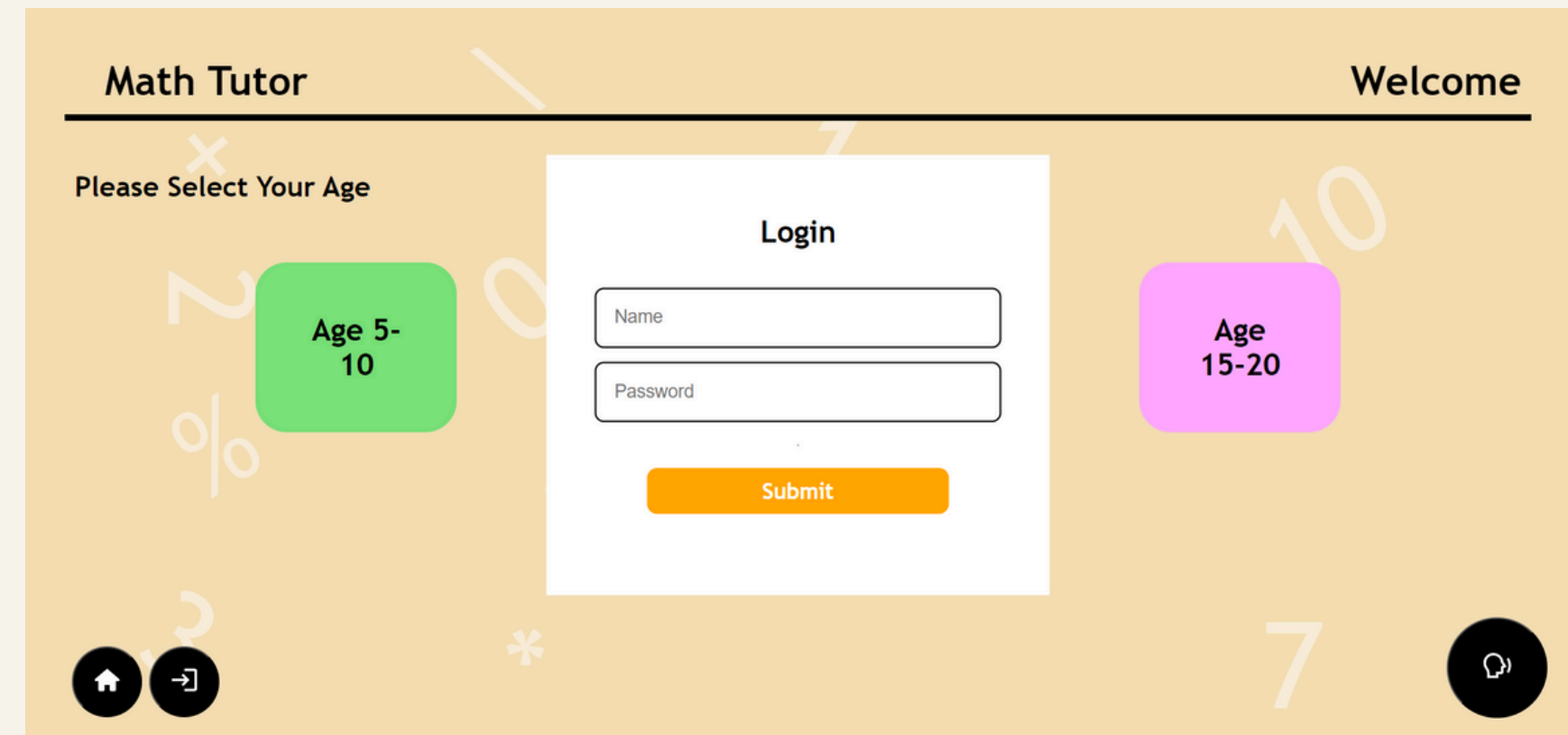
- **Characteristics:** Windows have properties like a name/title, dimensions (height and width), state (active, minimized, etc.), visibility (fully visible or partially hidden), management capabilities (resize, move, etc.), ability to highlight/select portions, and a specific function or application they are associated with.
- **Components:** Windows typically have a surrounding frame/border, a top title bar displaying the window's name and icons, buttons in the title bar to minimize, maximize, or close the window, and system menu icons.
- **Presentation Styles:** Windows can be displayed in different arrangements like tiled (side-by-side filling screen), overlapping (stacked allowing obstructed view), or cascading (overlapped in a staggered pattern).
- **Types:** There are primary windows that are the main application window with menus and toolbars. Secondary windows are supplemental pop-ups or dialogs dependent on the primary window. Website code can also create embedded frames or pop-up browser windows.



SCREEN CONTROLS

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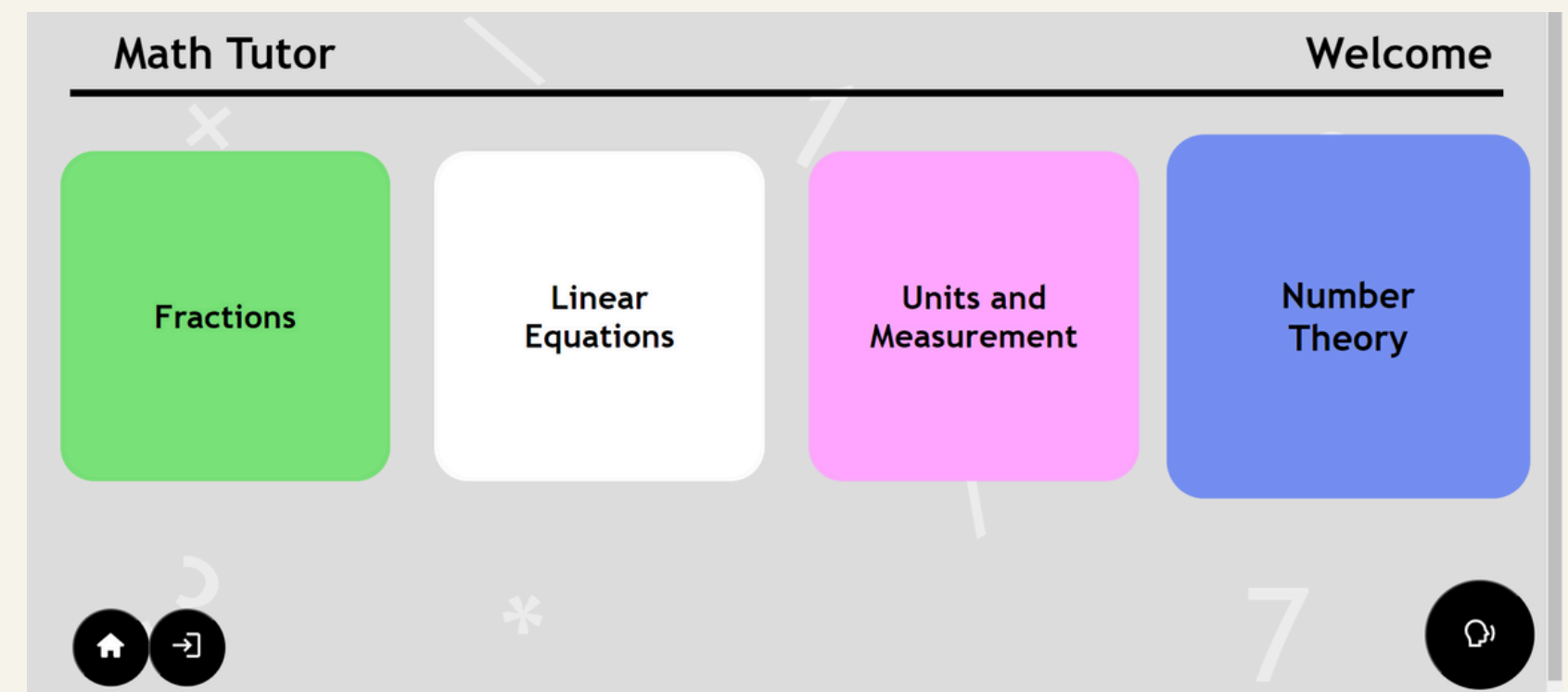
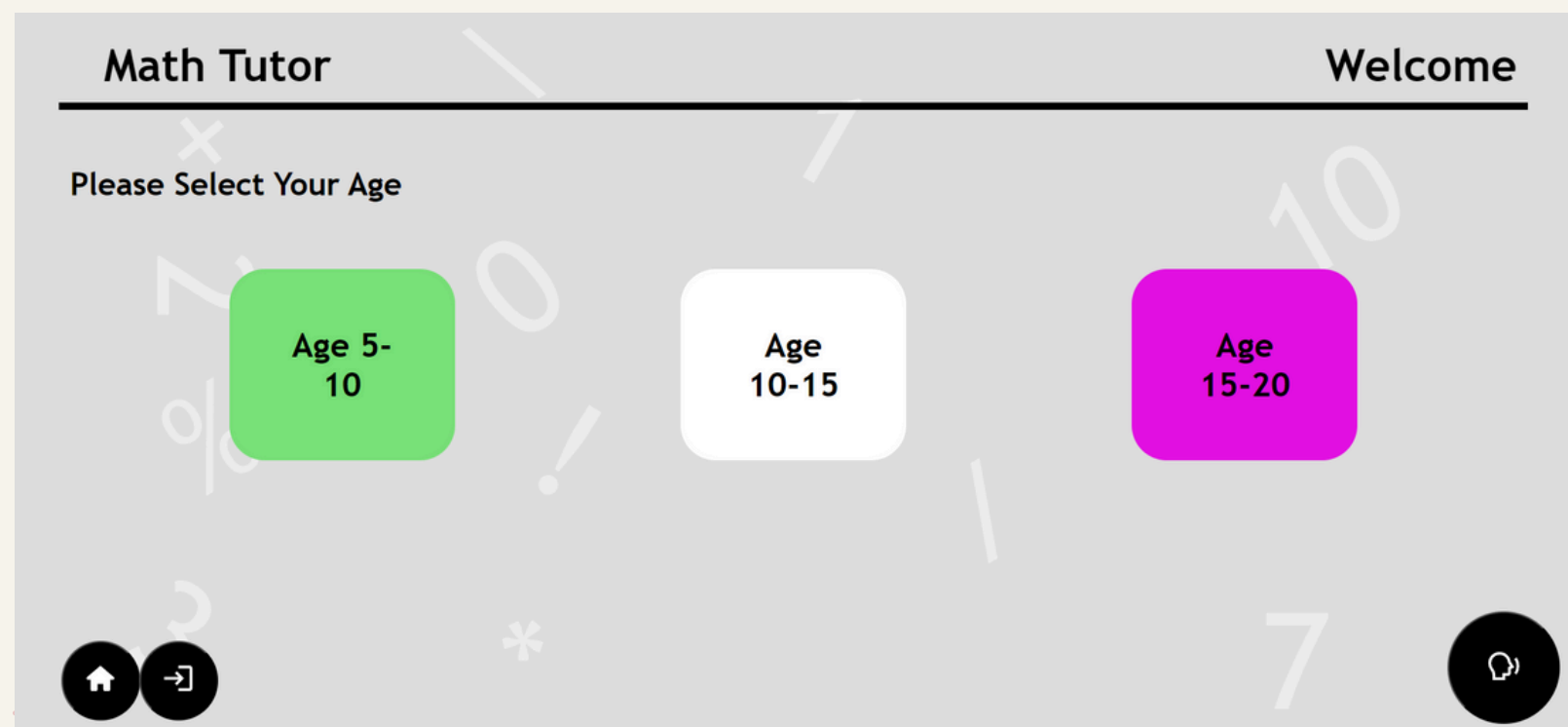
- **Operable Controls** enable user input and interaction like text boxes, buttons, checkboxes, drop-downs, and spin boxes to enter, edit, or trigger actions.
- **Presentation Controls** are informational, displaying data like static text labels, group boxes, column headers, tooltips showing control descriptions, and progress bars indicating processes.
- Other Controls include sliders to make value selections, tabs to switch between views, and to navigate through content.
- **Accessibility** is enhanced through keyboard navigation and shortcuts as an alternative to mouse/pointer, voice recognition for voice commands, and adjustable audio feedback like text-to-speech readout and audio cues to guide visually impaired users.



COLORS

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- **Balanced Contrasts:** High contrast, carefully balanced for clarity without strain.
- **Sectional Color Differentiation:** Each section has a distinct color palette for easy navigation.
- **Maximized Readability:** Optimal text contrast for readability, especially for impaired users.
- **Intuitive Navigation:** Familiar color associations aid easy navigation.
- **Subtle Emphasis:** Cool backgrounds subtly guide attention without overwhelming.
- **Vibrant Highlights:** Saturated colors draw attention to important sections.
- **Balanced Framing:** Limited contrasting elements for visual comfort.



EFFECTIVE FEEDBACK AND GUIDANCE

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Usability & Functionality

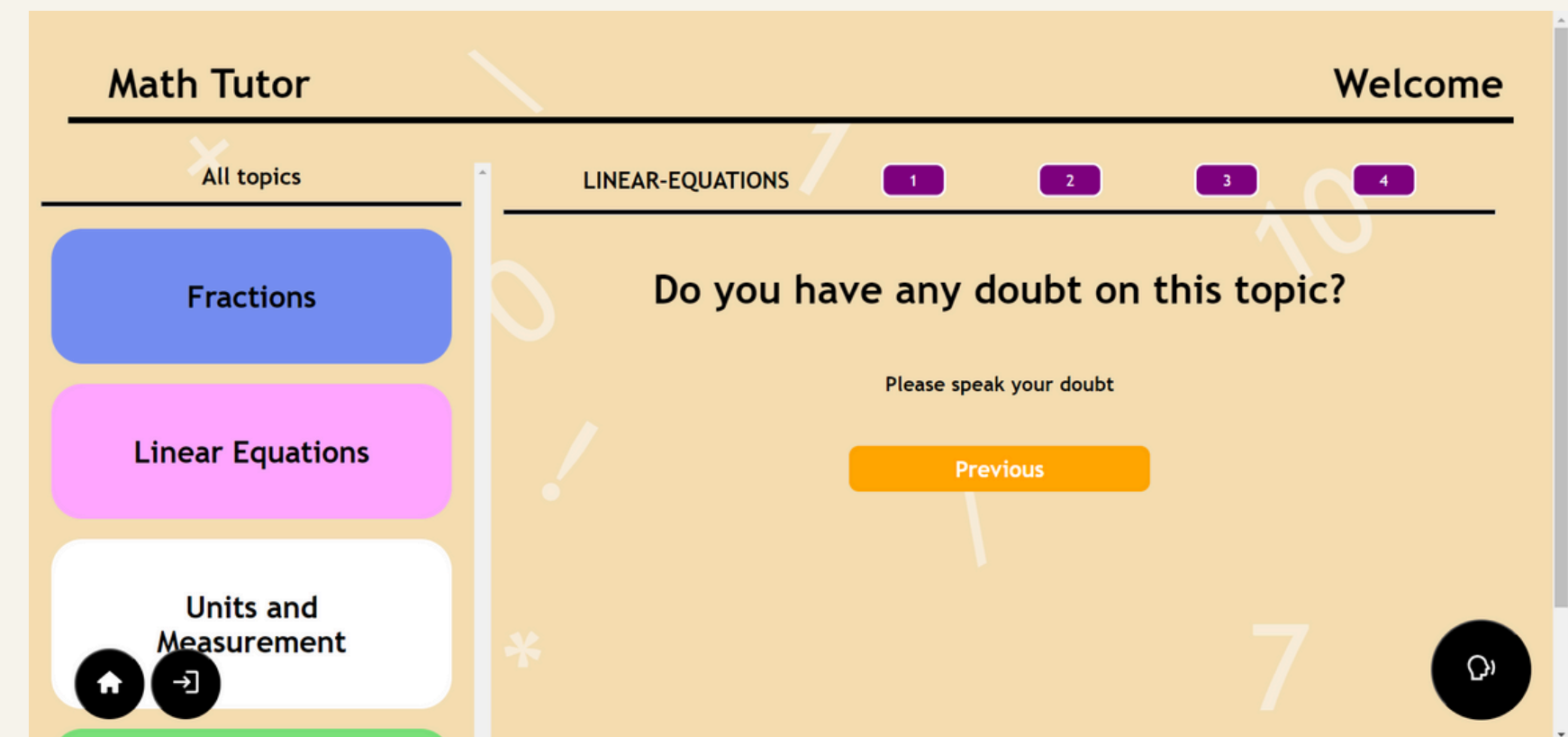
- Feedback: Icons should be efficient and match user expectations.
- Achievement: Designed icons to be familiar, direct, and efficient, considering task complexity.

Context & Integration

- Feedback: Icons should fit the website's context and voice input
- Achievement: Incorporated icons into a voice-guided navigation system tailored to math tutoring.

Consistency & Scalability

- Feedback: Maintain icon consistency and allow for scalability.
- Achievement: Established a standardized design approach and provided icons in standard sizes.



ICONS

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1. Design Principles

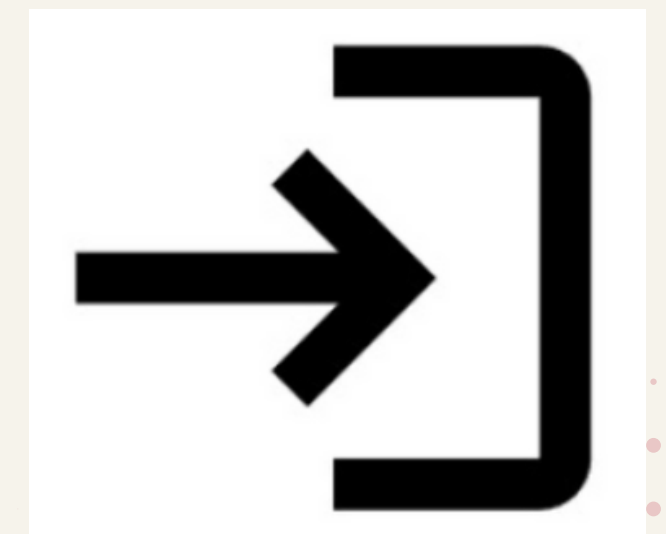
- Icons are familiar, clear, simple, consistent, direct, efficient
- Designed considering Context, user expectations, task complexity

2. Icon Utilization

- Icons visually represent actions and info
- Used for categorizing math topics and enhancing interaction

3. Conclusion

- Icon set tailored for the visually impaired.
- Enhances engagement and navigation using voice input.
- Facilitates easy interaction with math content



TEST & RETEST

1 User testing login functionality

3 Acceptance testing by user

2 Testing of accessibility and complexity of features

The screenshot displays the 'Math Tutor' application interface. At the top left, the text 'Math Tutor' is visible, and at the top right, 'Welcome' is displayed. Below the title bar, the prompt 'Please Select Your Age' is shown. There are two large, rounded rectangular buttons: a green one labeled 'Age 5-10' and a pink one labeled 'Age 15-20'. In the center, there is a white 'Login' form with two input fields: 'Name' and 'Password', followed by an orange 'Submit' button. The bottom left corner contains two circular icons: a home icon and a square icon with an arrow. The bottom right corner features a circular icon with a speech bubble. The background is a light orange color with faint mathematical symbols like 'x', '7', '10', '2', '%', and '*' scattered across it.

The background features three vertical stripes on the left: a wide pink stripe, a medium blue stripe, and a narrow beige stripe. The right side of the slide is a light beige color with two decorative dot patterns in the top right and bottom right corners. These patterns consist of a grid of dots that fade out towards the right edge.

THANK YOU

Presented By: Group 4