**Assistive Technologies Overview**

**Assistive technologies (AT)** are specialized hardware and software tools that help individuals with disabilities interact with digital content. These tools are crucial in bridging the gap between users’ abilities and the digital environment. When websites are built with accessibility in mind, assistive technologies can interpret and present content in formats that are usable by people with diverse needs.

**13.1 Screen Readers**

**Screen readers** are software applications that convert digital text into synthesized speech or Braille. They are primarily used by individuals who are blind or have severe visual impairments.

**Examples**:

* **JAWS (Job Access With Speech)** – Widely used on Windows platforms.
* **NVDA (Non-Visual Desktop Access)** – A free, open-source screen reader for Windows.
* **VoiceOver** – Built-in screen reader on Apple macOS and iOS devices.
* **TalkBack** – Android’s built-in screen reading feature.

**Key Features**:

* Reads text content, including links, headings, and image alt text.
* Allows navigation by elements like headings, landmarks, and form controls.
* Announces form field labels and input statuses (e.g., errors or checked boxes).

**13.2 Screen Magnifiers**

Screen magnifiers enlarge the content displayed on a screen, helping users with low vision.

**Examples**:

* **ZoomText**
* **Windows Magnifier**
* **Apple Zoom** (iOS/macOS feature)

**Key Features**:

* Magnifies portions of the screen while maintaining clarity.
* Often includes enhancements like contrast adjustment, color filtering, and cursor customization.

**13.3 Keyboard Navigation and Alternative Input Devices**

Many users cannot operate a mouse due to motor impairments. They rely on keyboard navigation or other input devices.

**Key Features of Keyboard Navigation**:

* Use of **Tab**, **Shift+Tab**, **Enter**, **Spacebar**, and **Arrow keys** to navigate menus, buttons, and forms.
* Websites must provide logical tab order and visible focus indicators for accessibility.

**Alternative Input Devices**:

* **Switch Access** – Users activate controls using single or multiple switches.
* **Eye Tracking Systems** – Control the cursor using eye movements.
* **Voice Recognition Software** – Tools like **Dragon NaturallySpeaking** allow users to control the computer using voice commands.

**13.4 Braille Displays**

Braille displays are hardware devices that convert screen content into Braille characters via a refreshable display. These are used by individuals who are both blind and literate in Braille.

**How they work**:

* Connected to screen reader software, they display one line of Braille at a time.
* Allow silent reading of digital content and precise navigation.

**13.5 Speech Recognition Software**

These tools enable users to interact with computers through voice commands and dictation, beneficial for users with mobility or dexterity impairments.

**Examples**:

* **Dragon NaturallySpeaking**
* **Windows Speech Recognition**
* **Apple Siri (for dictation)**

**Uses**:

* Navigating the interface.
* Typing via voice dictation.
* Opening applications or web pages.

**13.6 On-Screen Keyboards and Touch Accessibility**

For users who cannot use physical keyboards:

* **On-screen keyboards** allow mouse or touch-based text entry.
* **Touch accessibility settings**, like AssistiveTouch on iOS, simplify complex gestures.

**13.7 Captions and Subtitles**

Used by individuals who are deaf or hard of hearing:

* **Closed Captions**: Display spoken dialogue and audio cues.
* **Live Captioning Tools**: Automatically transcribe speech in real time (e.g., Google Live Caption, Zoom transcription).

**14. Summary**

Assistive technologies empower users with disabilities to navigate, understand, and interact with digital content. However, their effectiveness relies heavily on whether the website or application follows accessibility standards like WCAG. When developers create accessible content, they ensure that assistive technologies can accurately interpret and present the information, resulting in a truly inclusive digital experience.