CAMPINAS STATE UNIVERSITY
COMPUTER AND ELECTRICAL ENGINEERING SCHOOL

Development of the system WebAnywhere: A screen reader for the visually impaired specific for web

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Agenda

- Goal
- Assistive Technology: Screen readers
- DOM API
- WebAnywhere system
- Methodologies
- Download and print file
- Conclusion

Goal

- This work will be concerned with the study of a screen reader specific for web
- And an analysis of the functioning of the DOM API to ensure accessibility

Assistive Technology: Screen readers

Assistive technologies are important instruments of support.

Screen readers are primary assistive tools.

However these software are hard to use because it must have the ability to read complex content.

Operation of a screen reader for web

- With the advent of internet, the web use was innovated
- The most common screen reader through the GUI, off-screen technology
- Arises the need for screen readers to work with the DOM (Document Object Model).

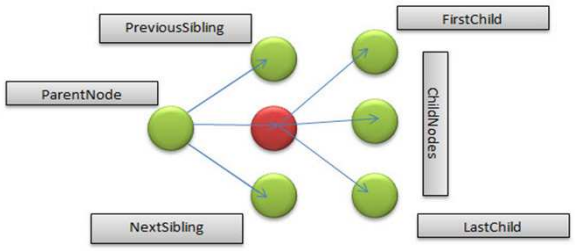
Document Object Model

- DOM is a standard W3C (World Wide Web Consortium). It defines a standard for the access of document elements such as HTML and XML
- The mechanism of Document Object Model (DOM) and the tool that allows total integration between JavaScript and HTML document in which it is integrated. Dynamic Web sites = Web Applications

DOM Tree

- The DOM represents your indexed HTML tags
- It references its markings as it was referencing elements of a family tree
- It describes the relationships between family members, and it uses conventional definitions such as father, son, brother

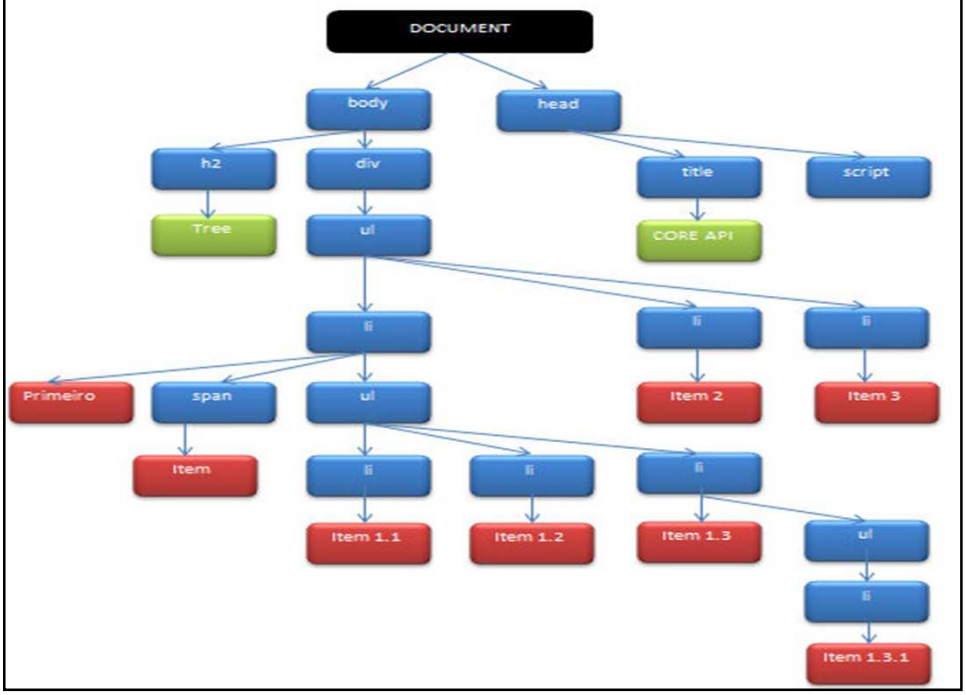
DOM Tree



In a node tree, the top node is called the root
Each node except the root, has only one parent node
A node may have any amount of children
A leaf is a node without children
Siblings are nodes with the same parent

Browsing the DOM tree

- CORE DOM API is literally the core of the DOM
- You can query the contents of a document at the same time you update it.
- Interactive Access to nodes



Browsing the DOM tree

1.3.1 Accessing last item from the first div of the following document.

```
window.onload = function(){
var div =document.getElementsByTagName("div").item(0);
var ul = div.childNodes.item(0);
var li = ul.firstChild.lastChild.childNodes[1];
alert(div.firstChild.firstChild.lastChild.lastChild.lastChild.firstChild.f
irstChild.nodeValue); //acessando item 1.3.1
}
```

WebAnywhere System

- WebAnywhere is a screen reader specific for internet, created for the visually impaired.
- It was developed by the phD student Jeffrey Bigham from Washington University in 2008
- The application runs on any operating system

WebAnywhere System

- The requirements for its use is that the computer or device are connected to the internet and have audio out
- Charging time data for 100 Kb in less than 5 seconds.

WebAnywhere System

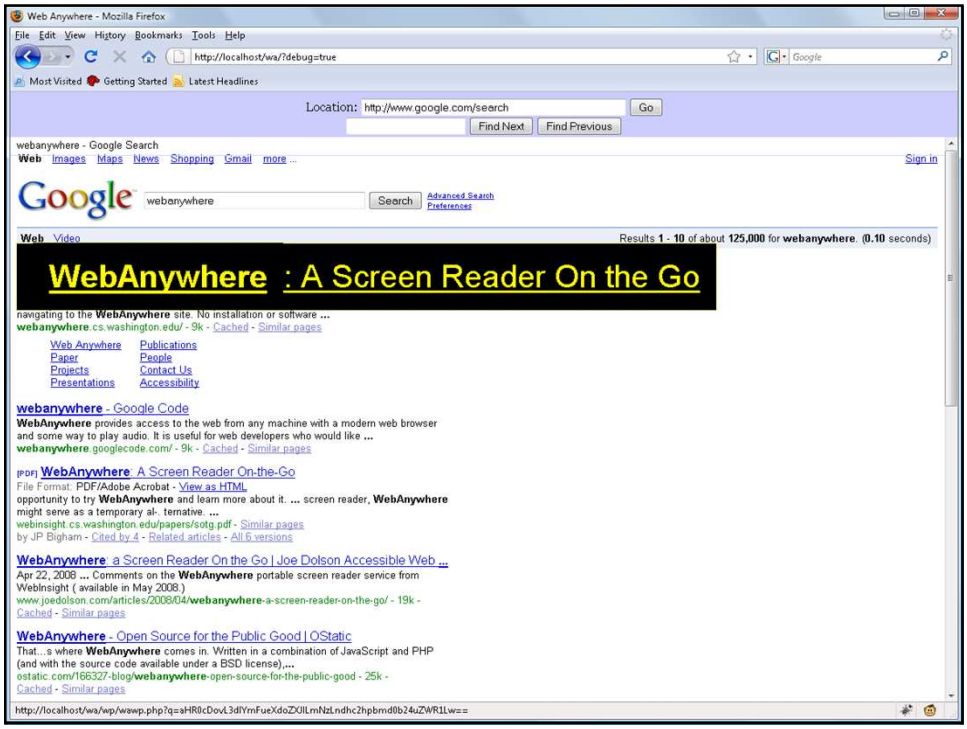
WebAnywhere Browser Frame

Possui uma interface para a leitura do conteúdo *web* e de outras funções do browser.

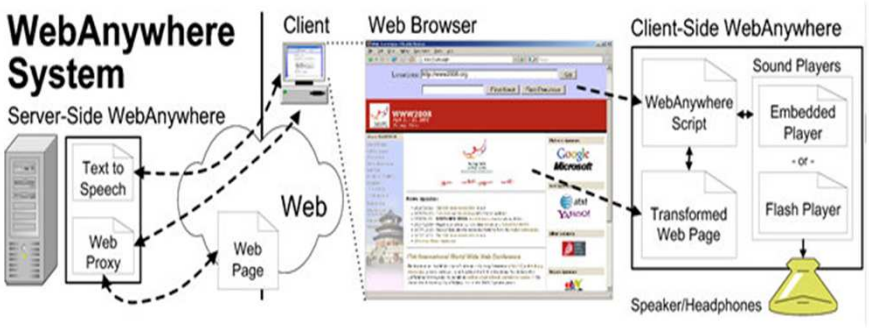
WebAnywhere Browser Frame

Carrega o conteúdo da *web* pelo servidor *proxy*.

Standalone web browser that runs inside a regular web browser



Basic operation of the WebAnywhere



The system consists of components next to the browser

WebAnywhere System

- The development was done in the JavaScript language, interacting directly with the DOM and capturing all key events,
- The control of the browser's window pages are loaded with a version of PHP Proxy.

WebAnywhere System is Open Source

webanywhere.googlecode.com

Methodologies

- List of requirements
- Literature review to analyze related work
- Develop new features
- Run a test to verify usability

Download and print file

- This section proposes the implementation of new features, such as images and pages from the reader WebAnywhere
- The study of various functions of the JavaScript language and DOM API.
- Allowing to update the content, structure, and style of the document search engines and filtering.

Download and print file

- A dialog box to save an image or page that appears when the user interacts with the web content
- We use the execCommand method of the document object

```
window.onload = function(){
var img= document.getElementsByTagName ("img")[0];
if (img = img.src){
window.win = open(img);
setTimeout('win.document.execCommand("SaveAs")',
500);
}
}
```

Download and print file

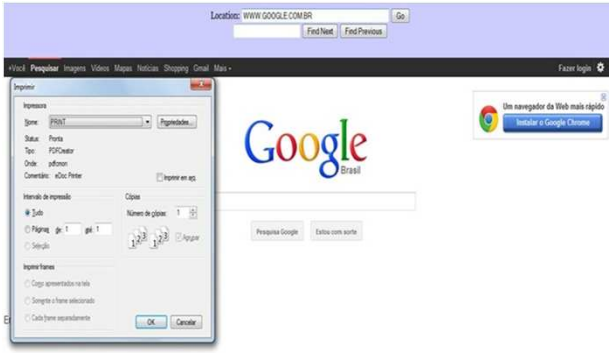
Mapped image being activated by the "CTRL - C" on the keyboard opening the dialog box.

Download and print file

- self.print() function allows the user to be able to print a web page

```
<html><head><title></title></head><body>
   <p>
   Pressione o botão para imprimir esta página.
   </p>
<form action="javascript:;">
     <input onclick="window.print()" type="button"
value="Imprimir esta página"/>
   </form>
</body></html>
```

Download and print file



Printer being activated by "alt-p" keyboard.

Conclusion

- Through these studies we have developed the new commands
- Blind users can download and print files as pages and images
- This research demonstrates how important it is to provide the visually impaired with the same capabilities to interact with the web as well as those who have no such limitations.

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Thank You

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