CS2003 Web2 - Directory Lister
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November 25, 2020

1. Overview

In this practical, we were asked to create a web application that allows users to browse files from a "logical root". The technologies used were - Node JS + os + path + express, Fetch API, JavaScript, HTML, and CSS.

2. Design

Brief - The server serves static files to the client. There exists a /api route which the client-side uses using the Fetch API to get information. The client-side code then updates the fields in the user interface i.e. the website.

Server Side -
The server side comprises the server and support/lib.js (from studres).
dir_list_server.js -
> The client side code has been declared static to serve the CSS and JS files. express.json has been used as middle ware to parse the JSON from the client. There are two "get" routes, "/" and "*". The first one serves the main HTML file and the second one catches every other route and serves an error 404 page.
>
> The most confusing thing was that for the server to work for multiple clients there should not be any variable variables in the server code. So how do we keep track of the directory we are currently in? I let the client send that to the server.
>
> I used the *lib.js* code (with some modification) to get the list of items (files and directories) in the current directory. This list is then added to the object that is sent when the client "posts" requesting information of the current directory to "/api". If the client's request asks for a search result, the searchResponse (returns "search response" object) method executes. This method uses searchHelper which recurses inside the given directory and gets all the items that match the search string.

Client Side -
The client side contains four files -
1. index.html
2. 404.html
3. style.css
4. script.js

index.html
This is the basic structure of the file completed by javascript's create element and append.

404.html
Shown when an invalid route is typed.

style.css
Styles both html pages. Used flexbox for the header. Implemented themes for the web page. I also wanted to style the bottom drawer of the website a little better but styling checkboxes is messy and would take time.

script.js
Starts by sending a post request to "/api" getting a listing for "/" or the logical root. Stores some variables at the client side to keep track. Listens for the user's keystrokes and executes move which moves the selected item. The vi keybindings i.e. h, j, k, l work here. More info on how to use it at the end.

The fetch function is used everytime the user enters something into the search field. This increases the user interactiveness but increases (not noticeable to the user) functions the stack has to execute. It is also used when the page is loaded, the user selects a directory. Every time the promise is resolved, the reset function is called. It resets the table and sets/resets variables.

The rows are sorted by the column when the user presses a column header. The theme (dark/light) is switched when the user presses the toggle theme button, the CSS variables are changed. The drawer can be opened/closed using the "v" button on the bottom of the page, switches display to "block" or "none". It also selects a row on mouse hover.

Website Design

Light Theme

Dark Theme

3. Testing

Cannot go "up" from logical root.

On mouse hover

On pressing J

Directory lister

Current directory: test1Dir/dirA
Server: klovia

Name	Type	Size	Atime	Mtime	Ctime	Birthtime
Parent Directory	directory					
A.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:35 PM	11/21/2020, 11:14:35 PM	1/1/1970, 1:00:00 AM
dirA1	directory	3	11/25/2020, 1:50:14 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM

Pressing enter or L when selected / on click

Directory lister

Current directory: Search
Server: klovia

Name	Type	Size	Atime	Mtime	Ctime	Birthtime	Location
A.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:35 PM	11/21/2020, 11:14:35 PM	1/1/1970, 1:00:00 AM	test1Dir/dirA
dirA1.txt	file	3	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM	test1Dir/dirA/dirA1
dirA1	directory	3	11/25/2020, 1:50:14 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM	test1Dir/dirA

Enter A in search while in test1Dir/dirA
Notice the Current Directory on top left and the new column location
Pressing x on the search field takes back to above screenshot

Directory lister

Current directory: test1Dir/dirA/dirA1
Server: klovia

Name	Type	Size	Atime	Mtime	Ctime	Birthtime
Parent Directory	directory					
dirA1.txt	file	3	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM

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Going to a directory from search results

Name	Type	Size	Atime	Mtime	Ctime	Birthtime
Parent Directory	directory					
.DS_Store	file	6148	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
._.DS_Store	file	4096	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
A.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
B.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
C.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
dirA	directory	4	11/25/2020, 1:50:13 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirB	directory	5	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirC	directory	6	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
img	directory	3	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM

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Toggle Theme

☑ Name   ☑ Type   ☑ Size   ☑ Atime   ☑ Mtime   ☑ Ctime   ☑ Birthtime

On pressing the "v" button

Parent Directory	directory					
.DS_Store	file	6148	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
._.DS_Store	file	4096	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
A.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
B.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
C.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
dirA	directory	4	11/25/2020, 1:50:13 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirB	directory	5	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirC	directory	6	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
img	directory	3	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM

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Toggle Theme

☑ Name   ☑ Type   ☑ Size   ☑ Atime   ☑ Mtime   ☑ Ctime   ☑ Birthtime

On pressing the "toggle theme" button

Parent Directory					
.DS_Store	6148	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
._.DS_Store	4096	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
A.txt	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
B.txt	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
C.txt	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
dirA	4	11/25/2020, 1:50:13 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirB	5	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirC	6	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
img	3	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM

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Toggle Theme

☑ Name   ☐ Type   ☑ Size   ☑ Atime   ☑ Mtime   ☑ Ctime   ☑ Birthtime

Unchecking "Type"

Directory lister

Current directory: test1Dir
Server: klovia

Search

Name	Size	Atime	Mtime	Ctime	Birthtime
Parent Directory					
.DS_Store	6148	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
._.DS_Store	4096	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
A.txt	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
B.txt	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
C.txt	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
dirA	4	11/25/2020, 1:50:13 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirB	5	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirC	6	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
img	3	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM

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No "Type" column

Directory lister

Current directory: test1Dir
Server: klovia

Search

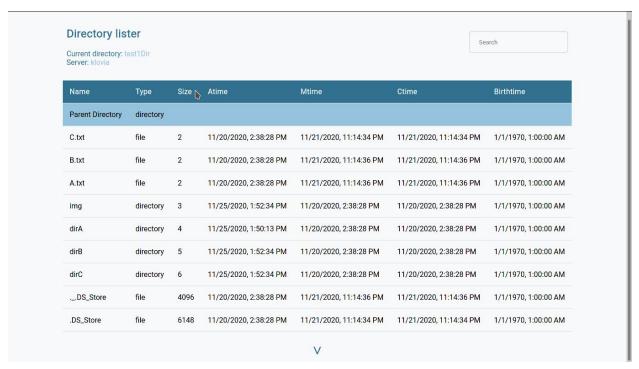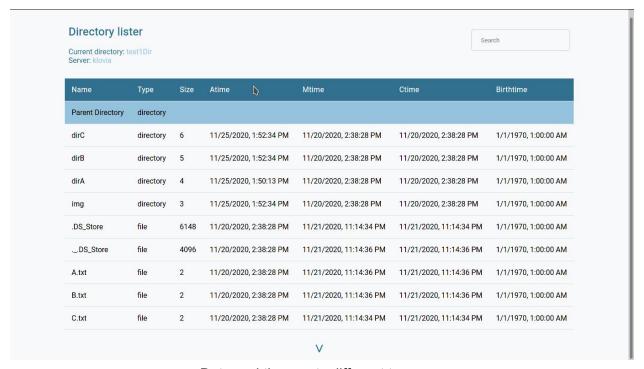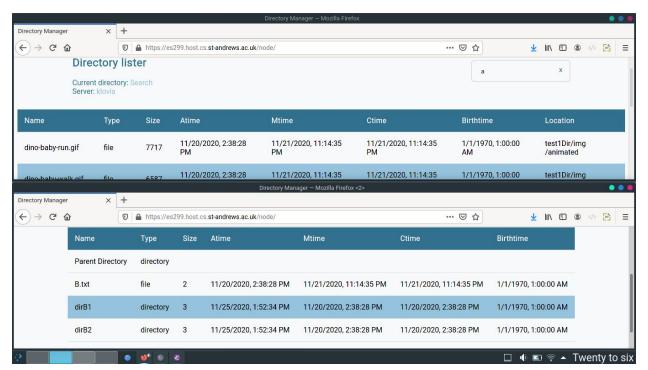| Name	Type	Size	Atime	Mtime	Ctime	Birthtime
Parent Directory	directory					
img	directory	3	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirC	directory	6	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirB	directory	5	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirA	directory	4	11/25/2020, 1:50:13 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
C.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
B.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
A.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
._.DS_Store	file	4096	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
.DS_Store	file	6148	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM

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Sorting by pressing "Name" (reverse sorting in this case)
Notice that Parent Directory column does not get sorted

Directory lister

Current directory: test1Dir
Server: klovia

Search

Name	Type	Size	Atime	Mtime	Ctime	Birthtime
Parent Directory	directory					
C.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
B.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
A.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
img	directory	3	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirA	directory	4	11/25/2020, 1:50:13 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirB	directory	5	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirC	directory	6	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
._.DS_Store	file	4096	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
.DS_Store	file	6148	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM

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Size sorts differently because its number

Directory lister

Current directory: test1Dir
Server: klovia

Search

Name	Type	Size	Atime	Mtime	Ctime	Birthtime
Parent Directory	directory					
dirC	directory	6	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirB	directory	5	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
dirA	directory	4	11/25/2020, 1:50:13 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
img	directory	3	11/25/2020, 1:52:34 PM	11/20/2020, 2:38:28 PM	11/20/2020, 2:38:28 PM	1/1/1970, 1:00:00 AM
.DS_Store	file	6148	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM
._.DS_Store	file	4096	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
A.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
B.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:36 PM	11/21/2020, 11:14:36 PM	1/1/1970, 1:00:00 AM
C.txt	file	2	11/20/2020, 2:38:28 PM	11/21/2020, 11:14:34 PM	11/21/2020, 11:14:34 PM	1/1/1970, 1:00:00 AM

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Date and time sorts different too

Multiple clients works

4. How to run the code

For school's network:
1. Follow https://systems.wiki.cs.st-andrews.ac.uk/index.php/Using_Node.js_on_the_host_servers#Running_Node.js to run.
2. Install express by "*npm install express*"
3. Run *node dir_list_server <dirname>*
4. Visit https://<username>.host.cs.st-andrews.ac.uk/node on your preferred browser.

Note: I used firefox for testing.

5. How to use the website

Features -

1. Dark / Light theme
   - Press the button in the bottom drawer
2. Keybindings
   - Up and down arrow keys select the item directly above or below in the table.
   - Right or enter go to the directory selected (if directory selected)
   - Left goes to the parent directory
   - Vi keybindings have been implemented
     - "h" = left arrow key
     - "j" = down arrow key
     - "k" = up arrow key
     - "l" = right arrow key

6. Conclusion

I completed all the parts of the practical successfully. This practical was quite helpful to get hands-on practice of using Fetch, Node JS and its modules. HTML and CSS (for me) were revised.

Given more time, I would have styled every component of the bottom drawer of the website. And although not in the specifications, I would have added buttons to rename items and create files / folders.