**PROJECT DOCUMENTATION**

SUBJECT**:**  **Permeability Experiment Simulator Using JavaScript.**

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**1. INTRODUCTION**

The Permeability Experiment Simulator is the JavaScript version of the pre-existing simulator programmed in Java3D. The simulator runs on all the modern web-browsers like Chrome, Firefox, Edge etc., and does not need any requirement of any third party application to run, unlike the previous version.

**The following is the information related to the Tech-Stack used in the project:**

* Programming Language Used: **JavaScript**
* Markup Language Used: **HTML5**
* Style-Sheet Language Used: **CSS3**
* External Libraries/Frameworks Used: **SVG.js, jQuery and Bootstrap**

**FILES:**

1. Codes/index.html
2. Codes/style.css
3. Codes/script.js
4. Libraries/svg.js
5. Libraries/jquery.js

*Bootstrap is imported through a CDN link in the index.html file*

**2. OVERALL DESCRIPTION**

**2.1 BUTTONS:**

**2.1.1 START BUTTON:**

FUNCTIONALITY: Starts the animation of the simulation.

IMPLEMENTATION: The “START” button has been given ID “start” in the index.html file. A variable “startButton” has been declared in the script.js file to which this ID has been assigned by using DOM function document.getElementById(). Function toggleAnimation() executes on click of this button.

**2.1.2 RESET BUTTON:**

FUNCTIONALITY: Refreshes the webpage index.html

IMPLEMENTATION: The “RESET” button has been given ID “reset” in the index.html file. A variable “resetButton” has been declared in the script.js file to which this ID has been assigned by using DOM. location.reload() function executes on click of this button.

**2.2 THE SIMULATION**

*The simulation mainly SVG.js library to draw the outlines of the setup. Upward water and soil animations have been programmed using jQuery.*

**2.2.1 HTML STRUCTURE**

There are two .html files, one for variable head part and the other for constant head part. SVG animation is done in the <div> element with id “animation”. Some animations are also done by applying jQuery animate function to the concerned <div> element.

**2.2.2 OUTLINES OF THE EXPERIMENT (SVG.js)**

IMPLEMENTED BY: Function **experimentSetup()** in script.js file.

An SVG drawing variable “draw” has been declared at the top of script.js file as a global variable which creates an SVG area of size 1300x700 px.

If media of max-width 1100px matches then the code inside the “if” statement sends an alert to the user about the viewing of experiment. The functionality of the “START” button now has been changed, which sends an alert to make the browser window size full to view the experiement.

*experimentSetup():*

*Different components of the experiment setup are programmed using SVG.js functions and those variables have been named in such a way that a third person can understand it easily. experimentSetup() and toggleAnimation() of variable.js file is different from constant.js file.*

**2.2.3 ANIMATION**

IMPLEMENTED BY: Function **toggleAnimation()**. Function toggleAnimation() is called when the onclick event of “START” button occurs.

Animations of water drops are programmed by using animate() function of SVG.js

Unfilling animations are done using a white element moving towards the water, making it appear as if it is unfilling.

<div> elements responsible for the upward water animations. These <div> elements are as follows:

***Concept used:*** *These <div> elements have been styled in style.css file initially with some initial height. After respective waiting time for each element, height changes accordingly using animate() function of jQuery, in the toggleAnimation() function inside script.js*