**CODE: (HTML, CSS, JAVASCRIPT)**

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Factorial Calculator</title>

<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css" rel="stylesheet">

<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.4.0/css/all.min.css">

<link href="https://fonts.googleapis.com/css2?family=Poppins:wght@400;600;700&display=swap" rel="stylesheet">

<style>

:root {

--purple: #8A2BE2;

--pink: #FF69B4;

--teal: #20B2AA;

--orange: #FFA500;

--blue: #1E90FF;

--dark: #2F4F4F;

--light: #F5F5F5;

}

body {

font-family: 'Poppins', sans-serif;

background: linear-gradient(135deg, var(--purple), var(--teal));

color: white;

min-height: 100vh;

padding: 2rem;

}

.calculator-container {

max-width: 600px;

margin: 0 auto;

background: rgba(255, 255, 255, 0.15);

backdrop-filter: blur(10px);

border-radius: 20px;

padding: 2rem;

box-shadow: 0 10px 30px rgba(0, 0, 0, 0.2);

border: 1px solid rgba(255, 255, 255, 0.2);

}

h1 {

text-align: center;

margin-bottom: 2rem;

background: linear-gradient(to right, var(--pink), var(--orange));

-webkit-background-clip: text;

background-clip: text;

color: transparent;

font-weight: 700;

}

.input-group {

margin-bottom: 1.5rem;

}

.input-group-text {

background: linear-gradient(to right, var(--blue), var(--teal));

color: white;

border: none;

}

.form-control {

background: rgba(255, 255, 255, 0.1);

border: none;

color: white;

height: 50px;

}

.form-control:focus {

background: rgba(255, 255, 255, 0.2);

color: white;

box-shadow: 0 0 0 0.25rem rgba(138, 43, 226, 0.25);

}

.btn-calculate {

background: linear-gradient(45deg, var(--pink), var(--orange));

border: none;

font-weight: 600;

width: 100%;

padding: 12px;

margin-top: 1rem;

transition: all 0.3s;

}

.btn-calculate:hover {

transform: translateY(-3px);

box-shadow: 0 5px 15px rgba(255, 105, 180, 0.4);

}

.method-selector {

background: rgba(0, 0, 0, 0.1);

padding: 1rem;

border-radius: 10px;

margin-bottom: 1rem;

}

.form-check-input:checked {

background-color: var(--pink);

border-color: var(--pink);

}

.form-check-label {

margin-left: 0.5rem;

}

.result-container {

background: rgba(32, 178, 170, 0.2);

border-radius: 15px;

padding: 1.5rem;

margin-top: 1.5rem;

display: none;

border: 1px solid rgba(32, 178, 170, 0.3);

}

.result-item {

display: flex;

justify-content: space-between;

margin-bottom: 1rem;

padding-bottom: 1rem;

border-bottom: 1px dashed rgba(255, 255, 255, 0.2);

}

.result-item:last-child {

border-bottom: none;

}

.result-label {

font-weight: 600;

color: var(--orange);

}

.result-value {

font-weight: 700;

}

.info-section {

background: rgba(30, 144, 255, 0.15);

border-radius: 15px;

padding: 1.5rem;

margin-top: 2rem;

border: 1px solid rgba(30, 144, 255, 0.2);

}

.info-section h2 {

color: var(--pink);

font-size: 1.5rem;

margin-bottom: 1rem;

}

.formula-box {

background: rgba(0, 0, 0, 0.1);

border-left: 3px solid var(--orange);

padding: 1rem;

margin: 1rem 0;

border-radius: 0 5px 5px 0;

}

.invalid-feedback {

color: #FF6B6B;

font-weight: 600;

}

@media (max-width: 576px) {

body {

padding: 1rem;

}

.calculator-container {

padding: 1.5rem;

}

}

</style>

</head>

<body>

<div class="calculator-container">

<h1><i class="fas fa-calculator"></i> Factorial Calculator</h1>

<form id="factorialForm">

<div class="input-group">

<span class="input-group-text"><i class="fas fa-hashtag"></i></span>

<input type="number" class="form-control" id="numberInput" min="0" placeholder="Enter a positive integer" required>

</div>

<div id="inputError" class="invalid-feedback"></div>

<div class="method-selector">

<div class="form-check">

<input class="form-check-input" type="radio" name="method" id="iterativeMethod" value="iterative" checked>

<label class="form-check-label" for="iterativeMethod">

<i class="fas fa-redo-alt"></i> Iterative Method

</label>

</div>

<div class="form-check">

<input class="form-check-input" type="radio" name="method" id="recursiveMethod" value="recursive">

<label class="form-check-label" for="recursiveMethod">

<i class="fas fa-infinity"></i> Recursive Method

</label>

</div>

</div>

<button type="submit" class="btn btn-calculate">

<i class="fas fa-bolt"></i> Calculate Factorial

</button>

</form>

<div id="resultContainer" class="result-container">

<div class="result-item">

<span class="result-label">Input Number:</span>

<span id="inputNumber" class="result-value"></span>

</div>

<div class="result-item">

<span class="result-label">Factorial Result:</span>

<span id="resultValue" class="result-value"></span>

</div>

<div class="result-item">

<span class="result-label">Calculation Method:</span>

<span id="calculationMethod" class="result-value"></span>

</div>

<div class="result-item">

<span class="result-label">Time Taken:</span>

<span id="timeTaken" class="result-value"></span>

</div>

</div>

<div class="info-section">

<h2><i class="fas fa-info-circle"></i> About Factorials</h2>

<p>The factorial of a non-negative integer n is the product of all positive integers less than or equal to n.</p>

<div class="formula-box">

n! = n × (n-1) × (n-2) × ... × 2 × 1

</div>

<p><strong>Example:</strong> 5! = 5 × 4 × 3 × 2 × 1 = 120</p>

</div>

</div>

<script>

document.addEventListener('DOMContentLoaded', function() {

const form = document.getElementById('factorialForm');

const numberInput = document.getElementById('numberInput');

const inputError = document.getElementById('inputError');

const resultContainer = document.getElementById('resultContainer');

form.addEventListener('submit', function(e) {

e.preventDefault();

// Reset validation

numberInput.classList.remove('is-invalid');

inputError.textContent = '';

resultContainer.style.display = 'none';

// Get input value

const inputValue = parseInt(numberInput.value);

// Validate input

if (isNaN(inputValue)) {

showError('Please enter a valid number');

return;

}

if (inputValue < 0) {

showError('Factorial is not defined for negative numbers');

return;

}

if (inputValue > 170) {

showError('Please enter a number ≤ 170 (JavaScript number limit)');

return;

}

// Get calculation method

const method = document.querySelector('input[name="method"]:checked').value;

// Calculate factorial

let result, startTime, endTime;

startTime = performance.now();

if (method === 'iterative') {

result = iterativeFactorial(inputValue);

} else {

result = recursiveFactorial(inputValue);

}

endTime = performance.now();

// Display results

document.getElementById('inputNumber').textContent = inputValue;

document.getElementById('resultValue').textContent = result.toLocaleString();

document.getElementById('calculationMethod').textContent = method === 'iterative' ? 'Iterative' : 'Recursive';

document.getElementById('timeTaken').textContent = (endTime - startTime).toFixed(4) + ' ms';

resultContainer.style.display = 'block';

});

function showError(message) {

numberInput.classList.add('is-invalid');

inputError.textContent = message;

}

// Iterative factorial function

function iterativeFactorial(n) {

if (n === 0 || n === 1) return 1;

let result = 1;

for (let i = 2; i <= n; i++) {

result \*= i;

}

return result;

}

// Recursive factorial function

function recursiveFactorial(n) {

if (n === 0 || n === 1) return 1;

return n \* recursiveFactorial(n - 1);

}

// Clear result when input changes

numberInput.addEventListener('input', function() {

resultContainer.style.display = 'none';

});

});

</script>

</body>

</html>

**PROJECT URL:**

https://6818825733087025a4c4e5d8--clinquant-cucurucho-eef87d.netlify.app/