

# Air University Islamabad Department of Computer Science



## LAB-4

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**Web Technologies Lab - Sir. Mohabbat Ali**

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### Lab Overview

This lab manual is designed to introduce students to JavaScript for creating dynamic and interactive web pages. It focuses on core JavaScript concepts with hands-on practice through 2 solved activities and 4 practice tasks.

### Lab Objectives

After completing this lab, students will be able to: - Understand JavaScript syntax and basic programming concepts - Use variables, operators, and functions - Handle user events using JavaScript - Manipulate HTML elements using the DOM

### Software / Tools Required

- Any modern web browser (Chrome, Firefox, Edge)
- Text editor (VS Code, Notepad++, or Notepad)

## LAB ACTIVITY

### Activity 1: Basic JavaScript Interaction

#### Objective

Use JavaScript to display output and handle a button click.

#### Problem Statement

Create a webpage with a button that displays a message when clicked.

#### CODE:

```
<!DOCTYPE html>
<html>
<head>
<title>JavaScript Basics</title>
</head>
<body>
<h2>JavaScript Lab</h2>
<button onclick="showMessage()">Click Me</button>
<script>
function showMessage() {

    alert("Welcome to JavaScript Lab!");
}
</script>
</body>
</html>
```

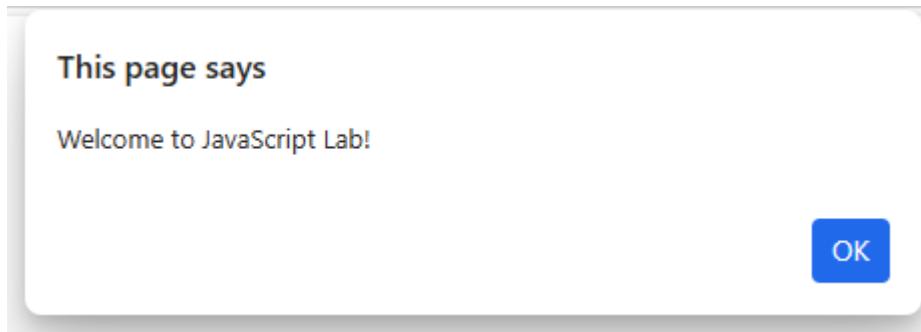
#### Output

##### Before Click

**JavaScript Lab**

**Click Me**

## After Click



## Explanation

- function defines reusable code
- onclick handles button click event
- alert() displays a message box

## Activity 1: Add numbers

### CODE:

```
<!DOCTYPE html>
<html>
<head>
<title>Activity 2 - Add Two Numbers</title>
</head>
<body>

<h2>Activity 2: Add Two Numbers</h2>

<label>Enter First Number:</label>
<input type="number" id="num1"><br><br>

<label>Enter Second Number:</label>
<input type="number" id="num2"><br><br>

<button onclick="addNumbers()">Add</button>

<h3 id="result"></h3>

<script>
function addNumbers(){
let n1 = Number(document.getElementById("num1").value);
let n2 = Number(document.getElementById("num2").value);

let sum = n1 + n2;

document.getElementById('result').innerHTML = "Sum = " + sum;
}
```

```
}
```

```
</script>
```

```
</body>
```

```
</html>
```

## OUTPUT

### Add Two Numbers

Enter First Number:

Enter Second Number:

**Sum = 4**

# LAB TASK

## TASK 1

Write a JavaScript program that: -

- Takes two numbers from the user –
- Displays their product using an alert box

### CODE:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Product of Two Numbers</title>
</head>
<body>

    <h2>Product of Two Numbers</h2>
    <p>Click the button below to enter two numbers and see their product.</p>

    <button onclick="calculateProduct()">Click Here</button>

    <script>
        function calculateProduct() {
            let num1 = parseFloat(prompt("Enter the first number:"));
            let num2 = parseFloat(prompt("Enter the second number:"));

            if (isNaN(num1) || isNaN(num2)) {
                alert("Please enter valid numbers!");
            } else {
                let product = num1 * num2;
                alert("The product of " + num1 + " and " + num2 + " is: " +
product);
            }
        }
    </script>

</body>
</html>
```

## OUTPUT

### Menu Of PRODUCT

#### Product of Two Numbers

Click the button below to enter two numbers and see their product.

[Click Here](#)

#### Enter First Number

This page says

Enter the first number:

10

OK

Cancel

#### Enter Second Number

This page says

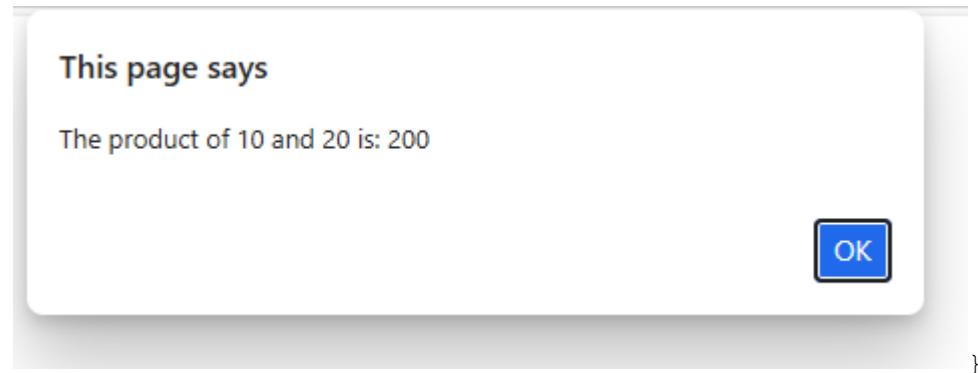
Enter the second number:

20

OK

Cancel

## Result of First and Second Number



### How it works:

1. `prompt()` takes input from the user as a string — `parseFloat()` converts it to a decimal number.
2. A simple validation check ensures both inputs are actually numbers.
3. The two numbers are multiplied and stored in `product`.
4. `alert()` displays the result in a pop-up dialog box.

### Example run:

- User enters 6 → User enters 7 → Alert shows: "*The product of 10 and 20 is: 42*"

## TASK 2

### ATM System with Balance Update

1. Add input field for withdrawal amount.
2. Deduct amount from balance.
3. Prevent withdrawal if:
  - Amount > Balance.
4. Display updated balance after transaction.

### CODE:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>ATM System</title>
    <style>
        body {
            font-family: Arial, sans-serif;
            background-color: #1a1a2e;
            display: flex;
            justify-content: center;
            align-items: center;
            height: 100vh;
            margin: 0;
        }

        .atm-card {
            background-color: #16213e;
            border-radius: 20px;
            padding: 40px;
            width: 350px;
            box-shadow: 0 0 30px rgba(0, 200, 255, 0.3);
            color: white;
            text-align: center;
        }

        h2 {
            color: #00c8ff;
            margin-bottom: 5px;
            font-size: 26px;
        }

        p.subtitle {
            color: #aaa;
            font-size: 13px;
            margin-bottom: 25px;
        }
    </style>
</head>
<body>
    <div class="atm-card">
        <h2>Welcome to ATM System</h2>
        <p>Please enter your withdrawal amount:</p>
        <input type="text" id="withdrawal">
        <p><span id="balance">Your current balance is $1000</span></p>
        <button>Withdraw</button>
        <script>
            document.querySelector('button').addEventListener('click', function() {
                const withdrawalAmount = document.getElementById('withdrawal').value;
                const balanceElement = document.getElementById('balance');
                const balanceText = balanceElement.textContent;
                const currentBalance = parseFloat(balanceText);
                const newBalance = currentBalance - parseFloat(withdrawalAmount);

                if (newBalance < 0) {
                    alert('Insufficient funds');
                } else {
                    balanceElement.textContent = `Your new balance is $${newBalance}`;
                }
            });
        </script>
    </div>
</body>
</html>
```

```
}

.balance-box {
    background-color: #0f3460;
    border-radius: 12px;
    padding: 20px;
    margin-bottom: 25px;
}

.balance-box p {
    margin: 0;
    font-size: 14px;
    color: #aaa;
}

.balance-box h3 {
    margin: 8px 0 0;
    font-size: 32px;
    color: #00e676;
}

input[type="number"] {
    width: 100%;
    padding: 12px;
    border-radius: 8px;
    border: 2px solid #00c8ff;
    background-color: #1a1a2e;
    color: white;
    font-size: 16px;
    margin-bottom: 15px;
    box-sizing: border-box;
    outline: none;
}

input[type="number"]::placeholder {
    color: #888;
}

button {
    width: 100%;
    padding: 13px;
    border: none;
    border-radius: 8px;
    font-size: 16px;
    cursor: pointer;
    margin-bottom: 10px;
    font-weight: bold;
    transition: opacity 0.2s;
```

```
}

button:hover {
    opacity: 0.85;
}

.btn-withdraw {
    background-color: #00c8ff;
    color: #000;
}

.btn-deposit {
    background-color: #00e676;
    color: #000;
}

.btn-reset {
    background-color: #ff5252;
    color: #fff;
}

.message {
    margin-top: 15px;
    padding: 12px;
    border-radius: 8px;
    font-size: 14px;
    display: none;
}

.message.success {
    background-color: #1b5e20;
    color: #00e676;
}

.message.error {
    background-color: #4e1010;
    color: #ff5252;
}

.transaction-history {
    margin-top: 20px;
    text-align: left;
}

.transaction-history h4 {
    color: #00c8ff;
    margin-bottom: 8px;
    font-size: 14px;
```

```
}

.history-list {
    list-style: none;
    padding: 0;
    margin: 0;
    max-height: 100px;
    overflow-y: auto;
}

.history-list li {
    font-size: 12px;
    padding: 5px 0;
    border-bottom: 1px solid #0f3460;
    color: #ccc;
}

.history-list li span.credit {
    color: #00e676;
    font-weight: bold;
}

.history-list li span.debit {
    color: #ff5252;
    font-weight: bold;
}
</style>
</head>
<body>

<div class="atm-card">
    <h2>ATM ATM System</h2>
    <p class="subtitle">Secure Banking at Your Fingertips</p>

    <!-- Balance Display -->
    <div class="balance-box">
        <p>Available Balance</p>
        <h3 id="balanceDisplay">Rs. 10,000</h3>
    </div>

    <!-- Input Field -->
    <input type="number" id="amountInput" placeholder="Enter amount (Rs.)"
min="1" />

    <!-- Buttons -->
    <button class="btn-withdraw" onclick="withdraw()">Withdraw</button>
    <button class="btn-deposit" onclick="deposit()">Deposit</button>
```

```
<button class="btn-reset" onclick="resetAccount()">↺ Reset Account</button>

<!-- Message Box -->
<div class="message" id="messageBox"></div>

<!-- Transaction History -->
<div class="transaction-history">
    <h4>📋 Transaction History</h4>
    <ul class="history-list" id="historyList">
        <li>No transactions yet.</li>
    </ul>
</div>
</div>

<script>
    let balance = 10000;
    let transactions = [];

    function updateBalanceDisplay() {
        document.getElementById("balanceDisplay").textContent = "Rs. " +
balance.toLocaleString();
    }

    function showMessage(text, type) {
        const msgBox = document.getElementById("messageBox");
        msgBox.textContent = text;
        msgBox.className = "message " + type;
        msgBox.style.display = "block";

        setTimeout(() => {
            msgBox.style.display = "none";
        }, 3000);
    }

    function addHistory(entry, type) {
        const list = document.getElementById("historyList");

        // Remove default text
        if (transactions.length === 0) {
            list.innerHTML = "";
        }

        transactions.push(entry);

        const li = document.createElement("li");
        li.innerHTML = entry + " → Balance: <span class='" + type + "'>Rs. " +
balance.toLocaleString() + "</span>";
    }
</script>
```

```
        list.prepend(li);
    }

function withdraw() {
    const input = document.getElementById("amountInput");
    const amount = parseFloat(input.value);

    if (!amount || amount <= 0) {
        showMessage("✖ Please enter a valid amount!", "error");
        return;
    }

    if (amount > balance) {
        showMessage("✖ Insufficient balance! You cannot withdraw Rs. " +
amount.toLocaleString(), "error");
        return;
    }

    balance -= amount;
    updateBalanceDisplay();
    addHistory("Withdrawn: Rs. " + amount.toLocaleString(), "debit");
    showMessage("✓ Successfully withdrawn Rs. " +
amount.toLocaleString(), "success");
    input.value = "";
}

function deposit() {
    const input = document.getElementById("amountInput");
    const amount = parseFloat(input.value);

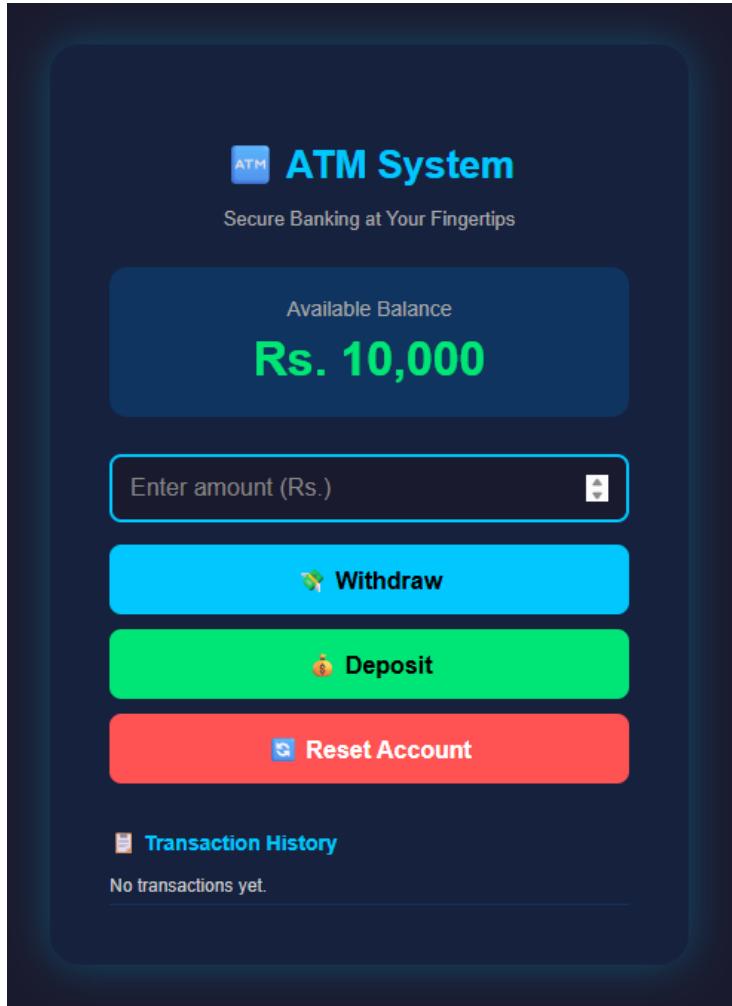
    if (!amount || amount <= 0) {
        showMessage("✖ Please enter a valid amount!", "error");
        return;
    }

    balance += amount;
    updateBalanceDisplay();
    addHistory("Deposited: Rs. " + amount.toLocaleString(), "credit");
    showMessage("✓ Successfully deposited Rs. " +
amount.toLocaleString(), "success");
    input.value = "";
}

function resetAccount() {
    balance = 10000;
    transactions = [];
    updateBalanceDisplay();
```

```
document.getElementById("historyList").innerHTML = "<li>No  
transactions yet.</li>";  
document.getElementById("amountInput").value = "";  
showMessage("✉ Account has been reset to Rs. 10,000", "success");  
}  
</script>  
  
</body>  
</html>
```

## OUTPUT



## TASK 3

### Loop Customization

1. Print numbers from 1–20.
2. Print only even numbers.
3. Print numbers in reverse order (10–1).

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Loop Customization</title>
    <style>
        body {
            font-family: Arial, sans-serif;
            background-color: #1a1a2e;
            color: white;
            text-align: center;
            padding: 30px;
        }

        h1 {
            color: #00c8ff;
        }

        button {
            padding: 12px 25px;
            margin: 10px;
            border: none;
            border-radius: 8px;
            font-size: 15px;
            font-weight: bold;
            cursor: pointer;
        }

        .btn1 { background-color: #00c8ff; color: #000; }
        .btn2 { background-color: #00e676; color: #000; }
        .btn3 { background-color: #ff5252; color: #fff; }
        .btn4 { background-color: #888; color: #fff; }

        .output-box {
            background-color: #16213e;
            border-radius: 12px;
            padding: 20px;
            margin: 20px auto;
            width: 400px;
            min-height: 80px;
            font-size: 16px;
        }
    </style>
</head>
<body>
    <h1>Loop Customization</h1>
    <button>Print</button>
    <div class="output-box" id="output"></div>
</body>
</html>
```

```
        line-height: 2;
        color: #ffd700;
    }

    .label {
        color: #aaa;
        font-size: 13px;
        margin-top: 10px;
    }

```

</style>

</head>

<body>

<h1>▣ Loop Customization</h1>

<button class="btn1" onclick="printOneToTwenty()">▣ Print 1 to 20</button>
 <button class="btn2" onclick="printEven()">▣ Print Even Numbers</button>
 <button class="btn3" onclick="printReverse()">▣ Print Reverse (10-
1)</button>
 <button class="btn4" onclick="clearOutput()">☒ Clear</button>

<p class="label" id="outputLabel"></p>
 <div class="output-box" id="output">Click a button to see output...</div>

<script>

```
// Task 1 - Print 1 to 20
function printOneToTwenty() {
    let result = "";
    for (let i = 1; i <= 20; i++) {
        result += i + " ";
    }
    document.getElementById("output").textContent = result;
    document.getElementById("outputLabel").textContent = "☑ Numbers from
1 to 20:";
}

// Task 2 - Print Even Numbers
function printEven() {
    let result = "";
    for (let i = 1; i <= 20; i++) {
        if (i % 2 === 0) {
            result += i + " ";
        }
    }
    document.getElementById("output").textContent = result;
    document.getElementById("outputLabel").textContent = "☑ Even Numbers
from 1 to 20:";
```

```
}

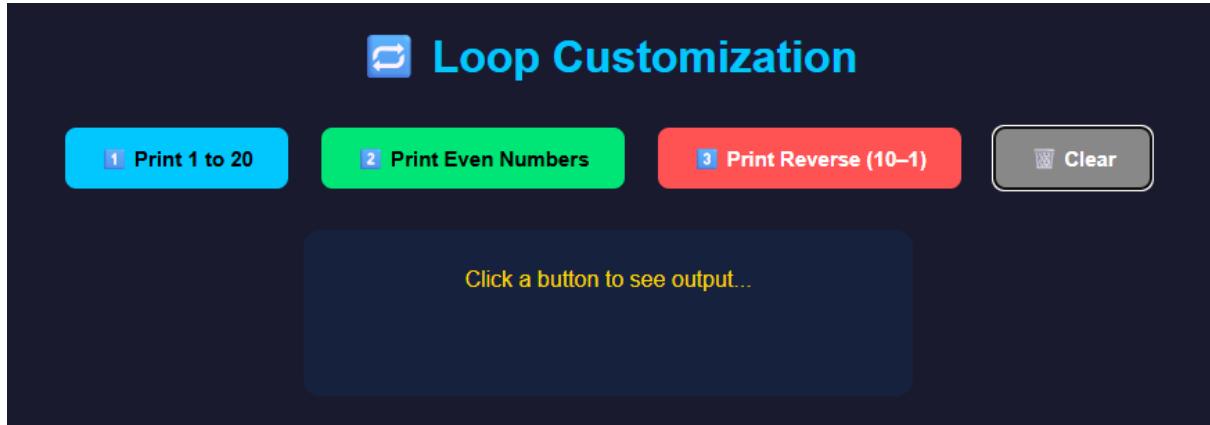
// Task 3 - Print Reverse 10 to 1
function printReverse() {
    let result = "";
    for (let i = 10; i >= 1; i--) {
        result += i + " ";
    }
    document.getElementById("output").textContent = result;
    document.getElementById("outputLabel").textContent = "☑ Reverse
Numbers from 10 to 1:";
}

// Clear Output
function clearOutput() {
    document.getElementById("output").textContent = "Click a button to see
output...";
    document.getElementById("outputLabel").textContent = "";
}

</script>

</body>
</html>
```

## OUTPUT



## TASK 4

Create a Student Result Calculator using JavaScript: -

- Take marks of 3 subjects.
- Calculate total and percentage.
- Display grade based on percentage.

## OUTPUT

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Student Result Calculator</title>
    <style>
        body {
            font-family: Arial, sans-serif;
            background-color: #1a1a2e;
            display: flex;
            justify-content: center;
            align-items: center;
            min-height: 100vh;
            margin: 0;
        }

        .card {
            background-color: #16213e;
            border-radius: 20px;
            padding: 40px;
            width: 400px;
            box-shadow: 0 0 30px rgba(0, 200, 255, 0.3);
            color: white;
            text-align: center;
        }

        h2 {
            color: #00c8ff;
            margin-bottom: 5px;
        }

        p.subtitle {
            color: #aaa;
            font-size: 13px;
        }
    </style>
</head>
<body>
    <div class="card">
        <h2>Student Result Calculator</h2>
        <p>Enter marks of three subjects:</p>
        <form>
            <label>Subject 1:</label>
            <input type="text" id="subject1">
            <label>Subject 2:</label>
            <input type="text" id="subject2">
            <label>Subject 3:</label>
            <input type="text" id="subject3">
            <br>
            <button type="button" onclick="calculateResult()>Calculate</button>
            <div id="result"></div>
        </form>
    </div>
</body>
</html>
```

```
        margin-bottom: 25px;
    }

label {
    display: block;
    text-align: left;
    margin-bottom: 5px;
    color: #aaa;
    font-size: 14px;
}

input[type="number"] {
    width: 100%;
    padding: 12px;
    border-radius: 8px;
    border: 2px solid #00c8ff;
    background-color: #1a1a2e;
    color: white;
    font-size: 15px;
    margin-bottom: 15px;
    box-sizing: border-box;
    outline: none;
}

input[type="number"]::placeholder {
    color: #555;
}

button {
    width: 100%;
    padding: 13px;
    border: none;
    border-radius: 8px;
    font-size: 16px;
    font-weight: bold;
    cursor: pointer;
    margin-bottom: 10px;
    transition: opacity 0.2s;
}

button:hover { opacity: 0.85; }

.btn-calculate { background-color: #00c8ff; color: #000; }
.btn-clear     { background-color: #ff5252; color: #fff; }

.result-box {
    background-color: #0f3460;
    border-radius: 12px;
```

```
        padding: 20px;
        margin-top: 20px;
        display: none;
        text-align: left;
    }

.result-box h3 {
    color: #00c8ff;
    text-align: center;
    margin-bottom: 15px;
}

.result-row {
    display: flex;
    justify-content: space-between;
    padding: 8px 0;
    border-bottom: 1px solid #1a1a2e;
    font-size: 15px;
}

.result-row:last-child {
    border-bottom: none;
}

.result-row span:last-child {
    font-weight: bold;
    color: #ffd700;
}

.grade-box {
    text-align: center;
    margin-top: 15px;
    padding: 15px;
    border-radius: 10px;
    font-size: 22px;
    font-weight: bold;
}

.grade-A { background-color: #1b5e20; color: #00e676; }
.grade-B { background-color: #1a3a5c; color: #00c8ff; }
.grade-C { background-color: #4a3800; color: #ffd700; }
.grade-D { background-color: #4e1010; color: #ff5252; }
.grade-F { background-color: #3a0000; color: #ff1744; }

</style>
</head>
<body>

<div class="card">
```

```
<h2>🎓 Student Result Calculator</h2>
<p class="subtitle">Enter marks out of 100 for each subject</p>

<label>📝 Subject 1 - Math</label>
<input type="number" id="sub1" placeholder="Enter marks (0-100)" min="0" max="100" />

<label>📝 Subject 2 - English</label>
<input type="number" id="sub2" placeholder="Enter marks (0-100)" min="0" max="100" />

<label>📝 Subject 3 - Science</label>
<input type="number" id="sub3" placeholder="Enter marks (0-100)" min="0" max="100" />

<button class="btn-calculate" onclick="calculateResult()">📊 Calculate Result</button>
<button class="btn-clear" onclick="clearResult()">⟲ Clear</button>

<!-- Result Box -->
<div class="result-box" id="resultSet">
    <h3>📋 Result Card</h3>

    <div class="result-row">
        <span>Math Marks</span>
        <span id="r1"></span>
    </div>
    <div class="result-row">
        <span>English Marks</span>
        <span id="r2"></span>
    </div>
    <div class="result-row">
        <span>Science Marks</span>
        <span id="r3"></span>
    </div>
    <div class="result-row">
        <span>Total Marks</span>
        <span id="rTotal"></span>
    </div>
    <div class="result-row">
        <span>Percentage</span>
        <span id="rPercent"></span>
    </div>

    <div class="grade-box" id="gradeBox"></div>
</div>
</div>
```

```
<script>

function calculateResult() {

    // Get values
    let s1 = parseFloat(document.getElementById("sub1").value);
    let s2 = parseFloat(document.getElementById("sub2").value);
    let s3 = parseFloat(document.getElementById("sub3").value);

    // Validation
    if (isNaN(s1) || isNaN(s2) || isNaN(s3)) {
        alert("✖ Please enter marks for all 3 subjects!");
        return;
    }

    if (s1 < 0 || s1 > 100 || s2 < 0 || s2 > 100 || s3 < 0 || s3 > 100) {
        alert("✖ Marks must be between 0 and 100!");
        return;
    }

    // Calculate Total and Percentage
    let total      = s1 + s2 + s3;
    let percentage = (total / 300) * 100;

    // Calculate Grade
    let grade = "";
    let gradeClass = "";

    if (percentage >= 90) {
        grade = "⭐ Grade A – Excellent!";
        gradeClass = "grade-A";
    } else if (percentage >= 70) {
        grade = "⭐ Grade B – Good!";
        gradeClass = "grade-B";
    } else if (percentage >= 50) {
        grade = "⭐ Grade C – Average";
        gradeClass = "grade-C";
    } else if (percentage >= 40) {
        grade = "⚠ Grade D – Poor";
        gradeClass = "grade-D";
    } else {
        grade = "✖ Grade F – Fail";
        gradeClass = "grade-F";
    }

    // Display Results
    document.getElementById("r1").textContent      = s1 + " / 100";
    document.getElementById("r2").textContent      = s2 + " / 100";
}
```

```

document.getElementById("r3").textContent      = s3 + " / 100";
document.getElementById("rTotal").textContent   = total + " / 300";
document.getElementById("rPercent").textContent =
percentage.toFixed(2) + "%";

let gradeBox = document.getElementById("gradeBox");
gradeBox.textContent = grade;
gradeBox.className = "grade-box " + gradeClass;

document.getElementById("resultBox").style.display = "block";
}

function clearResult() {
    document.getElementById("sub1").value = "";
    document.getElementById("sub2").value = "";
    document.getElementById("sub3").value = "";
    document.getElementById("resultBox").style.display = "none";
}

</script>

</body>
</html>

```

## OUTPUT

**Student Result Calculator**

Enter marks out of 100 for each subject

■ Subject 1 - Math  
Enter marks (0-100)

■ Subject 2 - English  
Enter marks (0-100)

■ Subject 3 - Science  
Enter marks (0-100)

**Calculate Result**

**Clear**