Reading: Basic JavaScript Concepts

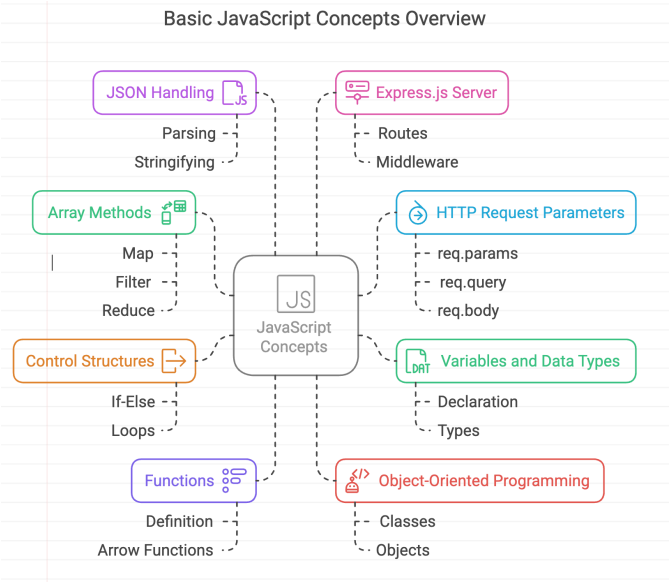
Estimated Time: 30 minutes

Learning objectives:

- Describe variable declaration and data types in JavaScript
- Apply control structures for logic flow
- Define and use functions, including arrow functions
- Explain the working of array methods (`map`, `filter`, `reduce`) for data transformation
- Implement basic object-oriented programming with classes
- Describe parse and stringify JSON data
- Demonstrate how to set up a simple Express.js server and define basic routes
- Explain how to use `req.params`, `req.query`, and `req.body` in Express

Prerequisite:

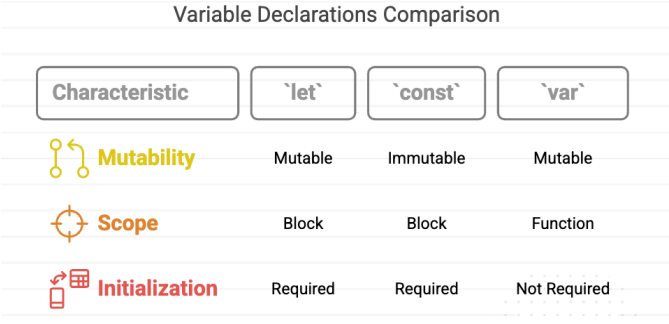
As highlighted in the Course Overview, basic knowledge of JavaScript is a prerequisite for this course. This reading includes additional JavaScript concepts to support and enhance your understanding.



Variables and data types

JavaScript uses `let`, `const`, and `var` to declare variables.

```
let name = "Book Review";  // string
const rating = 4.5;        // number (immutable binding)
var isPublished = true;    // boolean (function-scoped)
let book = { title: "JS Guide", author: "MDN" }; // object
let tags = ["JavaScript", "Express"];            // array
```



Control structures

Control structures control logic flow in programs.

```
// Conditional
if (rating > 4) {
  console.log("Highly rated!");  // executes if condition is true
```

```
} else {
  console.log("Needs improvement.");  // executes otherwise
}
// Loop
for (let tag of tags) {
  console.log(tag);  // prints each tag
}
```

Functions

Functions encapsulate code logic for reuse.

```
// Function Declaration
function greet(user) {
  return `Hello, ${user}`;  // returns a greeting
}
// Arrow Function
const add = (a, b) => a + b;  // concise syntax for function
console.log(greet("Dev")); // Hello, Dev
```

Array methods

Used to process data collections.

```
const books = [
  { title: "JS Basics", rating: 5 },
  { title: "Node Intro", rating: 3 }
];
// Filter: Get books with rating > 4
const topBooks = books.filter(book => book.rating > 4);
// Map: Get an array of book titles
const titles = books.map(book => book.title);
// Reduce: Calculate average rating
const averageRating = books.reduce((sum, book) => sum + book.rating, 0) / books.length;
console.log(topBooks);      // [{ title: "JS Basics", rating: 5 }]
console.log(titles);        // ["JS Basics", "Node Intro"]
console.log(averageRating); // 4
```

Object-oriented JavaScript

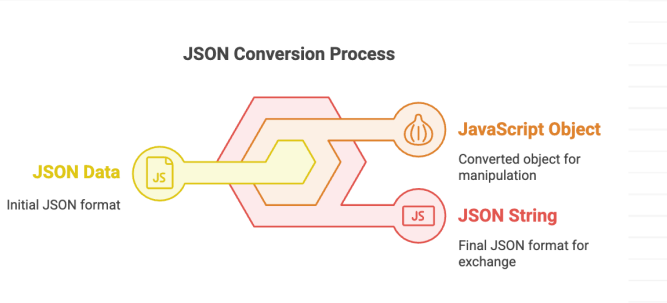
Organizes code using classes and objects.

```
class Book {
  constructor(title, rating) {
    this.title = title;
    this.rating = rating;
  }
  describe() {
    return `${this.title} has a rating of ${this.rating}`;
  }
}
const b1 = new Book("Node Basics", 4.2);
console.log(b1.describe());
```

Working with JSON

Essential for APIs—data is exchanged in JSON format.

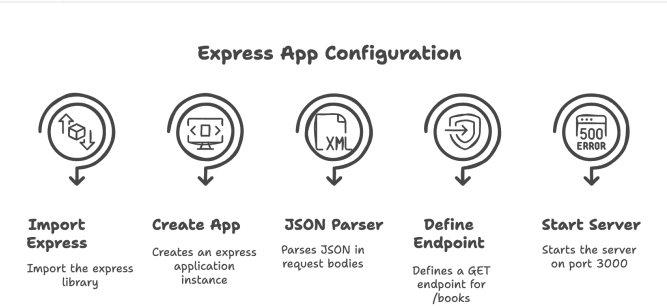
```
let jsonData = '{"title":"Express 101","rating":5}';
const bookObj = JSON.parse(jsonData);    // convert JSON to JS object
const newJson = JSON.stringify(bookObj); // convert JS object to JSON
```



Simple Node.js + Express Example

Create a minimal server that responds with JSON data.

```
// app.js
const express = require("express");
const app = express();
app.use(express.json());  // to parse JSON bodies
app.get("/books", (req, res) => {
  res.json([{ title: "Learn Node", rating: 4 }]);  // return JSON response
});
app.listen(3000, () => console.log("Server running on port 3000"));
```



HTTP methods overview (REST API)

Used for CRUD operations in web services.

Method	Purpose
GET	Read data
POST	Create data
PUT	Update data
DELETE	Remove data

Understanding `req.params`, `req.query`, and `req.body`

These are ways to access incoming request data in Express.

1. `req.params`

```
app.get('/users/:id', (req, res) => {
  const userId = req.params.id;  // extract dynamic part from URL
  res.send(`User ID is ${userId}`);
});
```

Visiting `/users/123` sets `req.params.id` to `"123"`

---

2. `req.query`

```
app.get('/books', (req, res) => {
  const author = req.query.author;  // extract ?author= value from query string
  res.send(`Filter by author: ${author}`);
});
```

Visiting `/books?author=JohnDoe` sets `req.query.author` to `"JohnDoe"`

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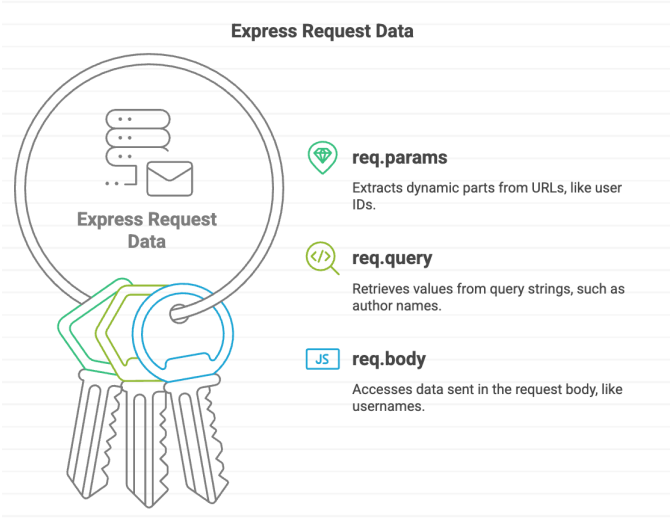
3. `req.body`

```
app.post('/register', (req, res) => {
  const username = req.body.username;  // get value from request body
  res.send(`Username received: ${username}`);
});
```

For JSON `{ "username": "aname", "password": "pwd123" }`, `req.body.username` returns `"aname"`



Summary

In this reading, you explored the core JavaScript concepts essential for server-side development with Node.js and Express. These included variables, functions, array methods, classes, and working with JSON. You also gained an understanding of how a basic Express server operates and how to handle incoming request data using req. params, req. query, and req.body.

Author(s)

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