

## Practice 1 - Backend

**Title:** Middleware Implementation for Logging and Bearer Token Authentication

**Objective:**

To learn how to build and integrate middleware functions in an Express.js application that:

1. Logs every incoming request (method, URL, timestamp).
2. Secures certain routes using a Bearer token.

**Concept Overview:**

Middleware are functions that execute between the request and response in Express.js. Global middleware (like a logger) applies to all routes. Authentication middleware checks headers and decides if the request should continue.

### Steps / Procedure:

**Step 1: Initialize a Node.js project**

```
mkdir middleware-demo
cd middleware-demo
npm init -y
npm install express
```

**Step 2: Create server.js**

```
const express = require('express');
const app = express();
const PORT = 3000;

// Logging Middleware
app.use((req, res, next) => {
  const timestamp = new Date().toISOString();
  console.log(`[${timestamp}] ${req.method} ${req.url}`);
  next();
});

// Authentication Middleware
const authenticateToken = (req, res, next) => {
  const authHeader = req.headers['authorization'];
  if (!authHeader) {
    return res.status(401).json({ message: 'Authorization header missing or incorrect' });
  }

  const token = authHeader.split(' ')[1];
  if (token !== 'mysecrettoken') {
    return res.status(401).json({ message: 'Invalid token' });
  }

  next();
};

// Public Route
app.get('/public', (req, res) => {
  res.send('This is a public route. No authentication required.');
```

// Protected Route

```
app.get('/protected', authenticateToken, (req, res) => {
  res.send('You have accessed a protected route with a valid Bearer token!');
});

app.listen(PORT, () => {
  console.log(`Server running on http://localhost:${PORT}`);
});
```

### Step 3: Run the Server

```
node server.js
```

### Step 4: Test the Routes

#### ■ Public Route

```
curl http://localhost:3000/public
```

#### ■ Protected Route (without token)

```
curl http://localhost:3000/protected
```

#### ■ Protected Route (with correct token)

```
curl -H "Authorization: Bearer mysecrettoken" http://localhost:3000/protected
```

**Expected Console Output:** [2025-10-23T12:34:56.789Z] GET /public  
[2025-10-23T12:35:02.123Z] GET /protected [2025-10-23T12:35:10.456Z] GET /protected

### Result:

- Logging middleware logs all incoming requests.
- Protected route is only accessible when the correct Bearer token is provided.
- The system correctly returns HTTP 200 or 401 as expected.