**Task-1**

**Aim:** custom Module

Create a Node.js module for basic arithmetic operations and demonstrate its utilization in a main script.

**Description:**

a custom module is a separate JavaScript file that encapsulates a set of related functionalities. The goal is to organize and modularize your code, making it easier to manage, maintain, and reuse.

Here are the key components and concepts related to custom modules in Node.js:

1) Module Definition 2)Module Export 3)Module import 4)Path to Modules 5)Encapsulation 6) Reusability

**Source Code:**

function fetchData() {

  return new Promise((resolve, reject) => {

    setTimeout(() => {

      const success = true;

      if (success) {

        resolve("Data successfully fetched");

      } else {

        reject("Error fetching data");

      }

    }, 2000);

  });

}

function handleData() {

  fetchData()

    .then((data) => {

      console.log("Resolved:", data);

    })

    .catch((error) => {

      console.error("Rejected:", error);

    });

}

 handleData();

**Output:**



**Task-2**

**Aim:** Chaining Promises

● Create three functions: fetchFirstData, fetchSecondData, and fetchThirdData, each

simulating fetching data with a 2-second delay.

● Use Promise chaining to fetch data sequentially: fetch the first data, then the second

data, and finally the third data.

● Log the combined result of all three data fetches.

**Description:**

A common need is to execute two or more asynchronous operations back-to-back, where each subsequent operation starts when the previous operation succeeds, with the result from the previous step.

**Source Code:**

let firstData;

let secondData;

function fetchFirstData() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("First Data");

    }, 2000);

  });

}

function fetchSecondData() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("Second Data");

    }, 2000);

  });

}

function fetchThirdData() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("Third Data");

    }, 2000);

  });

}

fetchFirstData()

  .then((data) => {

    firstData = data;

    return fetchSecondData();

  })

  .then((data) => {

    secondData=data

    return fetchThirdData()

})

  .then((thirdData) => {

    console.log("Combined Result:", firstData, secondData, thirdData);

  })

  .catch((error) => {

    console.error("Error:", error);

  });

**Output:**



**Task-3**

**Aim:** Promise.all

● Create three functions: fetchData1, fetchData2, and fetchData3, each simulating fetching

data with a 2-second delay.

● Use Promise.all to fetch all three sets of data concurrently.

● Log the combined result of all three data fetches.

**Description:**

The Promise.all() static method takes an iterable of promises as input and returns a single Promise. This returned promise fulfills when all of the input's promises fulfill (including when an empty iterable is passed), with an array of the fulfillment values. It rejects when any of the input's promises rejects, with this first rejection reason.

**Source Code:**

 function fetchData1() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("Data from FetchData1");

    }, 2000);

  });

}

function fetchData2() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("Data from FetchData2");

    }, 2000);

  });

}

function fetchData3() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("Data from FetchData3");

    }, 2000);

  });

}

Promise.all([fetchData1(), fetchData2(), fetchData3()])

  .then((results) => {

    console.log("Combined Result:", results);

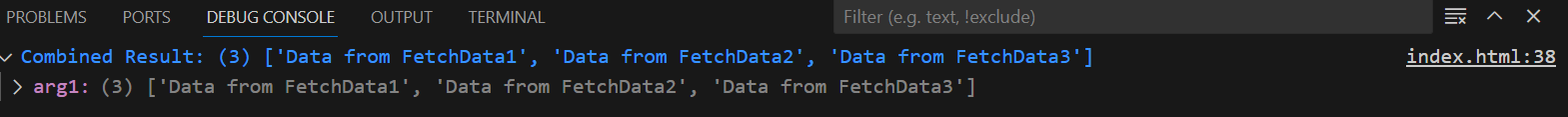
  })

  .catch((error) => {

    console.error("Error:", error);

  });

**Output:**



**Task-4**

**Aim:** Basic Async Function

● Create an asynchronous function fetchData that simulates fetching data from an API

using setTimeout with a delay of 2 seconds.

● Use async/await to handle the asynchronous operation.

● If the data is successfully fetched, return the data. If there is an error, throw an error with

an appropriate message.

● Implement a function handleData that calls fetchData and logs the data or error message

to the console.

**Description:**

The async function declaration creates a binding of a new async function to a given name. The await keyword is permitted within the function body, enabling asynchronous, promise-based behavior to be written in a cleaner style and avoiding the need to explicitly configure promise chains.

**Source Code:**

 async function fetchData() {

  return new Promise((resolve, reject) => {

    setTimeout(() => {

      const success = true;

      if (success) {

        resolve("Data successfully fetched");

      } else {

        reject("Error fetching data");

      }

    }, 2000);

  });

}

async function handleData() {

  try {

    const data = await fetchData();

    console.log("Resolved:", data);

  } catch (error) {

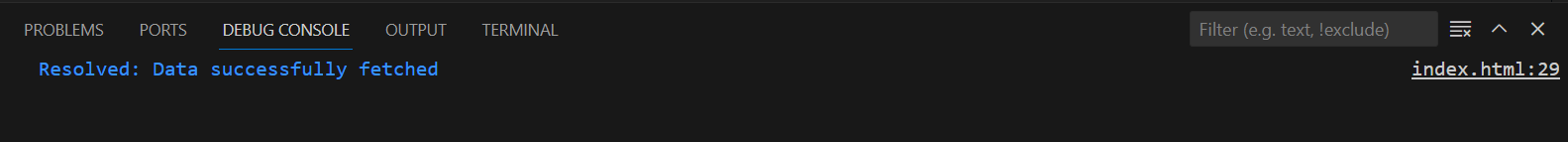
    console.error("Rejected:", error);

  }

}

handleData();

**Output:**

****

**Task-5**

**Aim:** Sequential Async Operations

● Create three asynchronous functions: fetchFirstData, fetchSecondData, and

fetchThirdData, each simulating fetching data with a 2-second delay.

● Use async/await to fetch data sequentially: fetch the first data, then the second data, and

Finally, the third data.

● Log the combined result of all three data fetches.

**Description:**

Sequential Async Operations refer to a scenario where asynchronous tasks are executed in a specific order, one after the other. In JavaScript, this often involves using the async/await syntax to handle promises in a more synchronous-looking manner.

**Source Code:**

async function fetchFirstData() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("First Data");

    }, 2000);

  });

}

async function fetchSecondData() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("Second Data");

    }, 2000);

  });

}

async function fetchThirdData() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("Third Data");

    }, 2000);

  });

}

async function sequentialAsyncOperations() {

  const firstData = await fetchFirstData();

  const secondData = await fetchSecondData();

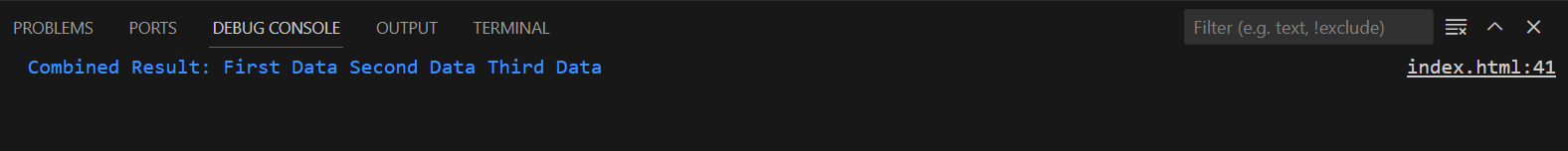
  const thirdData = await fetchThirdData();

  console.log("Combined Result:", firstData, secondData, thirdData);

}

 sequentialAsyncOperations();

**Output:**

****

**Task-6**

**Aim:** Parallel Async Operations

● Create three asynchronous functions: fetchData1, fetchData2, and fetchData3, each

simulating fetching data with a 2-second delay.

● Use Promise.all with async/await to fetch all three sets of data concurrently.

● Log the combined result of all three data fetches.

**Description:**

Parallel Async Operations refer to a scenario where multiple asynchronous tasks are executed concurrently or simultaneously, without waiting for the completion of one before starting the next. In JavaScript, this can be achieved using features such as Promise.all and asynchronous functions.

**Source Code:**

async function fetchData1() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("Data from FetchData1");

    }, 2000);

  });

}

async function fetchData2() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("Data from FetchData2");

    }, 2000);

  });

}

async function fetchData3() {

  return new Promise((resolve) => {

    setTimeout(() => {

      resolve("Data from FetchData3");

    }, 2000);

  });

}

async function parallelAsyncOperations() {

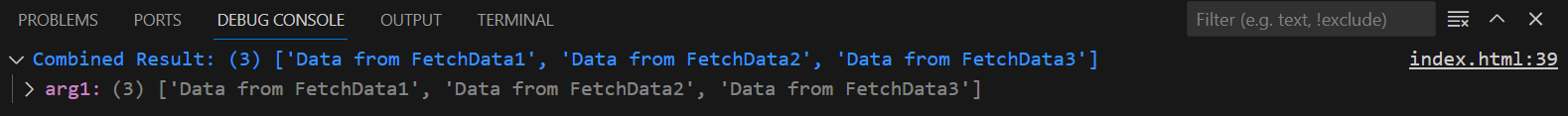
  const results = await Promise.all([fetchData1(), fetchData2(), fetchData3()]);

  console.log("Combined Result:", results);

}

 parallelAsyncOperations();

**Output:**

****

**Task-7**

**Aim:** Creating Modules

● Create a module mathOperations that exports functions for basic mathematical

operations (addition, subtraction, multiplication, division).

● Create another module stringOperations that exports functions for string manipulation

(concatenation, uppercase, lowercase).

● Import both modules in a main script and use functions from both modules to perform a

variety of operations.

**Description:**

Creating modules in JavaScript involves organizing code into separate files, each containing related functionality, variables, or classes. Modules help improve code maintainability, readability, and reusability. In JavaScript, there are different ways to create modules, and one common approach is using the ES6 module syntax.

**Source Code:**

//main.js

import \* as mathOps from "./mathOperations.js";

import \* as stringOps from "./stringOperations.js";

// Math Operations

const resultAdd = mathOps.add(5, 3);

const resultSubtract = mathOps.subtract(10, 4);

const resultMultiply = mathOps.multiply(2, 6);

const resultDivide = mathOps.divide(8, 2);

console.log("Math Operations:");

console.log("Addition:", resultAdd);

console.log("Subtraction:", resultSubtract);

console.log("Multiplication:", resultMultiply);

console.log("Division:", resultDivide);

// String Operations

const resultConcatenate = stringOps.concatenate("Hello", "World");

const resultUpperCase = stringOps.toUpperCase("hello");

const resultLowerCase = stringOps.toLowerCase("WORLD");

console.log("\nString Operations:");

console.log("Concatenation:", resultConcatenate);

console.log("Uppercase:", resultUpperCase);

console.log("Lowercase:", resultLowerCase);

//mathOperations.js

export function add(a, b) {

  return a + b;

}

export function subtract(a, b) {

  return a - b;

}

export function multiply(a, b) {

  return a \* b;

}

export function divide(a, b) {

  return a / b;

}

//stringOperations.js

export function concatenate(str1, str2) {

  return str1 + str2;

}

export function toUpperCase(str) {

  return str.toUpperCase();

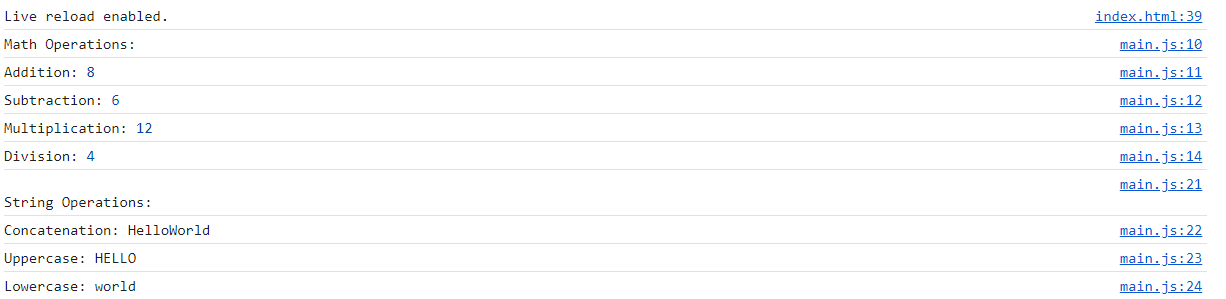
}

export function toLowerCase(str) {

  return str.toLowerCase();

}

**Output:**

****

**Task-8**

**Aim:** Asynchronous Module Loading

● Create a module asyncModule that exports an asynchronous function which simulates

fetching data with a 3-second delay.

● In the main script, use dynamic import to load the asyncModule asynchronously.

● Call the asynchronous function from the imported module and log the result.

**Description:**

Asynchronous Module Loading (AML) refers to the ability to load modules dynamically, on-demand, and asynchronously in a JavaScript application. This concept is closely related to the idea of lazy loading, where modules are only loaded when they are actually needed, rather than at the beginning when the application starts.

**Source Code:**

  //main.js

(async () => {

  const asyncModule = await import("./asyncModule.js");

  const result = await asyncModule.fetchDataAsync();

  console.log("Async Module Result:", result);

})();

//asyncModule.js

export async function fetchDataAsync() {

    return new Promise((resolve) => {

      setTimeout(() => {

        resolve("Data from Async Module");

      }, 3000);

    });

  }

**Output:**

****

**Task-9**

**Aim:** Default Export

● Create a module defaultExportModule that exports a default function to calculate the

square of a number.

● Import the module in a main script and use the default exported function to calculate the

square of a given number.

**Description:**

Default export in JavaScript allows a module to specify a single "default" export that can be imported without specifying a name. It provides a convenient way to export a primary entity or functionality from a module, and when importing, you can choose to give it any name you prefer.

**Source Code:**

//main.js

import square from "./defaultExportModule.js";

const numberToSquare = 5;

const result = square(numberToSquare);

console.log(`Square of ${numberToSquare} is:`, result);

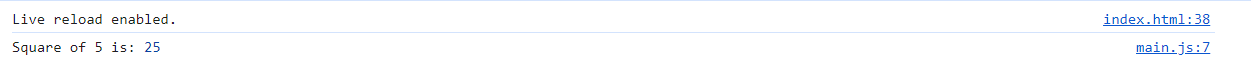
//defultExportModule.js

export default function square(number) {

    return number \* number;

  }

**Output:**

****

**Learning Outcome:**

Overall, the provided code examples cover various important aspects of web development, including HTML structure, Promises, Chaining Promises, Promise.all, Async Function, Sequential Async Operations, Parallel Async Operations, Creating Modules, Asynchronous Module Loading and Default Export JavaScript.