WebServiceServer.java

import java.io.IOException;

import java.io.OutputStream;

import java.net.InetSocketAddress;

import java.time.LocalTime;

import com.sun.net.httpserver.HttpExchange;

import com.sun.net.httpserver.HttpServer;

public class WebServiceServer {

    public static void main(String[] args) throws IOException {

        HttpServer server = HttpServer.create(new InetSocketAddress(8080), 0);

        server.createContext("/", exchange -> {

            String msg = htmlPage("Welcome to the Web Service!",

                "<ul>" +

                    "<li><a href='/time'> Get Current Time</a></li>" +

                    "<li><a href='/reverse?text=Distributed'> Reverse String</a></li>" +

                    "<li><a href='/calculate?op=add&x=10&y=20'> Calculate (10 + 20)</a></li>" +

                "</ul>");

            sendHTML(exchange, msg);

        });

        server.createContext("/time", exchange -> {

            String time = "Current Time: " + LocalTime.now();

            String msg = htmlPage(" Time Service", "<p>" + time + "</p>" + navBack());

            sendHTML(exchange, msg);

        });

        server.createContext("/reverse", exchange -> {

            String query = exchange.getRequestURI().getQuery();

            String text = "No input";

            if (query != null && query.startsWith("text=")) {

                text = query.substring(5);

            }

            String reversed = new StringBuilder(text).reverse().toString();

            String msg = htmlPage(" Reverse Service", "<p>Input: " + text + "<br>Reversed: " + reversed + "</p>" + navBack());

            sendHTML(exchange, msg);

        });

        server.createContext("/calculate", exchange -> {

            String query = exchange.getRequestURI().getQuery();

            String result;

            try {

                String[] params = query.split("&");

                String op = "", xStr = "", yStr = "";

                for (String param : params) {

                    if (param.startsWith("op=")) op = param.substring(3);

                    else if (param.startsWith("x=")) xStr = param.substring(2);

                    else if (param.startsWith("y=")) yStr = param.substring(2);

                }

                double x = Double.parseDouble(xStr);

                double y = Double.parseDouble(yStr);

                // Traditional switch statement for Java 8

                switch (op) {

                    case "add":

                        result = "Result of addition: " + (x + y);

                        break;

                    case "sub":

                        result = "Result of subtraction: " + (x - y);

                        break;

                    case "mul":

                        result = "Result of multiplication: " + (x \* y);

                        break;

                    case "div":

                        if (y != 0) {

                            result = "Result of division: " + (x / y);

                        } else {

                            result = " Error: Division by zero";

                        }

                        break;

                    default:

                        result = " Error: Invalid operation";

                        break;

                }

            } catch (Exception e) {

                result = " Error: " + e.getMessage();

            }

            String msg = htmlPage(" Calculation Service", "<p>" + result + "</p>" + navBack());

            sendHTML(exchange, msg);

        });

        server.setExecutor(null);

        System.out.println(" Server started on port 8080...");

        server.start();

    }

    // Sends HTML content with 200 status

    private static void sendHTML(HttpExchange exchange, String html) throws IOException {

        byte[] bytes = html.getBytes();

        exchange.getResponseHeaders().add("Content-Type", "text/html");

        exchange.sendResponseHeaders(200, bytes.length);

        OutputStream os = exchange.getResponseBody();

        os.write(bytes);

        os.close();

    }

    // Wrap content in HTML structure

    private static String htmlPage(String title, String body) {

        return "<html><head><title>" + title + "</title></head><body style='font-family:sans-serif;'>" +

                "<h2>" + title + "</h2>" + body + "</body></html>";

    }

    // Back button to go to homepage

    private static String navBack() {

        return "<p><a href='/' style='color:blue;'> Back to Home</a></p>";

    }

}

**Client.java**

import java.io.BufferedReader;

import java.io.InputStreamReader;

import java.net.HttpURLConnection;

import java.net.URL;

import java.util.Scanner;

public class WebServiceClient {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter first number: ");

        double x = scanner.nextDouble();

        System.out.print("Enter second number: ");

        double y = scanner.nextDouble();

        System.out.print("Enter operation (add/sub/mul/div): ");

        String op = scanner.next();

        try {

            // Send request to the /calculate endpoint

            String urlCalc = "http://localhost:8080/calculate?op=" + op + "&x=" + x + "&y=" + y;

            String calcResponse = sendGetRequest(urlCalc);

            System.out.println(" Calculation Service Response: " + calcResponse);

            // Get time from service

            URL timeURL = new URL("http://localhost:8080/time");

            String timeResponse = sendGetRequest(timeURL.toString());

            System.out.println(" Time Service Response: " + timeResponse);

            // Reverse string

            String text = "Distributed";

            URL reverseURL = new URL("http://localhost:8080/reverse?text=" + text);

            String reverseResponse = sendGetRequest(reverseURL.toString());

            System.out.println(" Reverse Service Response: " + reverseResponse);

        } catch (Exception e) {

            e.printStackTrace();

        }

    }

    // Helper method for sending GET requests

    public static String sendGetRequest(String url) throws Exception {

        URL obj = new URL(url);

        HttpURLConnection con = (HttpURLConnection) obj.openConnection();

        con.setRequestMethod("GET");

        BufferedReader in = new BufferedReader(new InputStreamReader(con.getInputStream()));

        String inputLine;

        StringBuilder response = new StringBuilder();

        while ((inputLine = in.readLine()) != null) {

            response.append(inputLine);

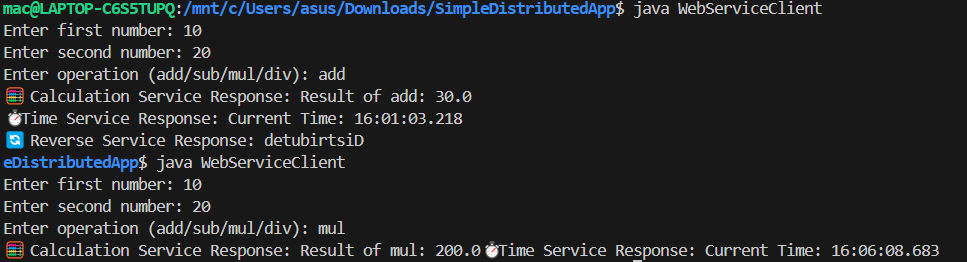
        }

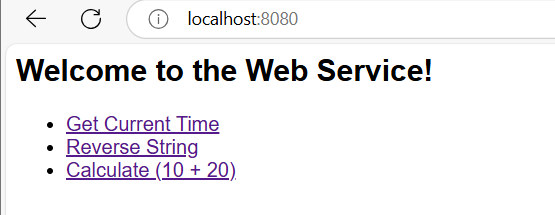
        in.close();

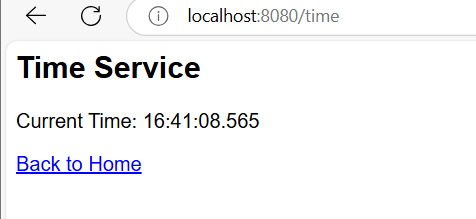
        return response.toString();

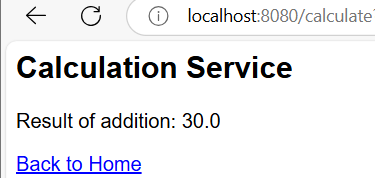
    }

}

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