

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;
```

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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();

```

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    }

    // 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();
}
}

```

```
mac@LAPTOP-C6S5TUPQ: /mnt/c/Users/asus/Downloads/SimpleDistributedApp$ java WebServiceClient
Enter first number: 10
Enter second number: 20
Enter operation (add/sub/mul/div): add
📊 Calculation Service Response: Result of add: 30.0
🕒 Time Service Response: Current Time: 16:01:03.218
🔄 Reverse Service Response: detubirtsid
eDistributedApp$ java WebServiceClient
Enter first number: 10
Enter second number: 20
Enter operation (add/sub/mul/div): mul
📊 Calculation Service Response: Result of mul: 200.0 🕒 Time Service Response: Current Time: 16:06:08.683
```

