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**DISTRIBUTED COMPUTING (DC)**  
**EXPERIMENT 05**

**AIM: To implement Load-Balancing using JAVA.**

**CODE:**

**LoadBalance.java**

```
import java.util.Scanner;

public class LoadBalance {

    // Method to print the load distribution across servers
    static void printLoad(int server, int processes) {
        int each = processes / server; // Processes per server
        int extra = processes % server; // Extra processes to be distributed

        // Distribute extra processes first
        for (int i = 0; i < extra; i++) {
            System.out.println("Server " + (i + 1) + " has " + (each + 1) + " processes");
        }

        // Distribute remaining processes
        for (int i = extra; i < server; i++) {
            System.out.println("Server " + (i + 1) + " has " + each + " processes");
        }
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        // Input number of servers and processes
        System.out.print("Enter the number of servers: ");
        int servers = sc.nextInt();
        System.out.print("Enter the number of processes: ");
        int processes = sc.nextInt();

        // Infinite loop for the load balancing options
        while (true) {
            // Display current load distribution
            printLoad(servers, processes);

            // Menu options for modifying servers and processes
            System.out.println("\n1. Add Servers");
            System.out.println("2. Remove Servers");
            System.out.println("3. Add Processes");
            System.out.println("4. Remove Processes");
            System.out.println("5. Exit");
            System.out.print("> ");
        }
    }
}
```

```

// Handle user input based on choice
switch (sc.nextInt()) {
    case 1:
        System.out.print("Enter the number of servers to add: ");
        servers += sc.nextInt();
        break;

    case 2:
        System.out.print("Enter the number of servers to remove: ");
        servers -= sc.nextInt();
        if (servers < 1) {
            servers = 1; // Ensure at least one server is present
            System.out.println("At least one server is required.");
        }
        break;

    case 3:
        System.out.print("Enter the number of processes to add: ");
        processes += sc.nextInt();
        break;

    case 4:
        System.out.print("Enter the number of processes to remove: ");
        processes -= sc.nextInt();
        if (processes < 0) {
            processes = 0; // Ensure non-negative process count
            System.out.println("Number of processes cannot be negative.");
        }
        break;

    case 5:
        System.out.println("Exiting...");
        sc.close();
        System.exit(0);

    default:
        System.out.println("Invalid choice. Please select a valid option.");
}
}
}
}

```

## OUTPUT:

- Compile LoadBalance.java

```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\savla\Documents\SEM 7 PRACS\DC> javac LoadBalance.java
PS C:\Users\savla\Documents\SEM 7 PRACS\DC> |
```

- Execute LoadBalance.java

```
Windows PowerShell
PS C:\Users\savla\Documents\SEM 7 PRACS\DC> javac LoadBalance.java
PS C:\Users\savla\Documents\SEM 7 PRACS\DC> java LoadBalance
Enter the number of servers:
4
Enter the number of processes:
17
Server 1 has 5 processes
Server 2 has 4 processes
Server 3 has 4 processes
Server 4 has 4 processes

1.Add Servers 2.Remove Servers 3.Add Processes 4.Remove Processes 5.Exit
> 3
Enter the number of processes to add:
3
Server 1 has 5 processes
Server 2 has 5 processes
Server 3 has 5 processes
Server 4 has 5 processes

1.Add Servers 2.Remove Servers 3.Add Processes 4.Remove Processes 5.Exit
> 4
Enter the number of processes to remove:
7
Server 1 has 4 processes
Server 2 has 3 processes
Server 3 has 3 processes
Server 4 has 3 processes

1.Add Servers 2.Remove Servers 3.Add Processes 4.Remove Processes 5.Exit
> 1
Enter the number of servers to add:
1
Server 1 has 3 processes
Server 2 has 3 processes
Server 3 has 3 processes
Server 4 has 2 processes
Server 5 has 2 processes

1.Add Servers 2.Remove Servers 3.Add Processes 4.Remove Processes 5.Exit
> 5
```