



SE3030 – Software Architecture

Assignment 01 : Micro-kernel Architecture

Group Members Details:

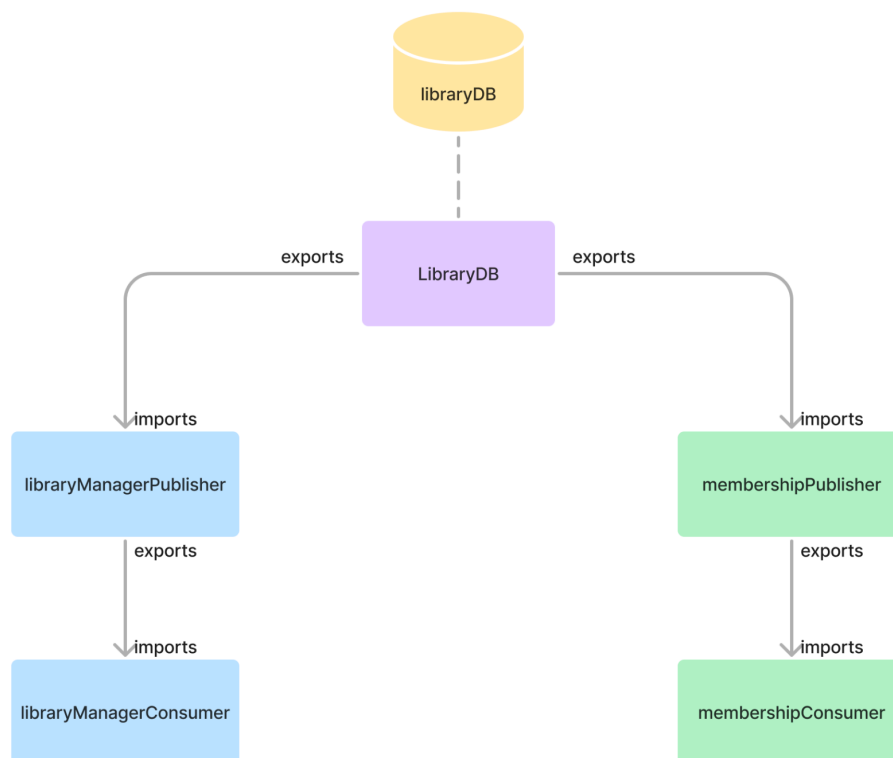
<i>Reg No</i>	<i>Name</i>
IT21171338	Tennakoon T. M. T. C.
IT21177996	Cooray N. T. L.

Source code:

GitHub RepoLink:

<https://github.com/Thareendra2000/sa-osgi-assignment-01.git>

Description:



The architecture consists of four bundles within an OSGi framework:

librarymanagerconsumer, ***librarymanagerpublisher***, ***membershipconsumer***, and ***membershippublisher***.

librarymanagerconsumer: This bundle represents the consumer side of the library management system. It interacts with the library manager through the **librarymanagerpublisher** bundle to perform actions like adding, listing, searching, and deleting books.

librarymanagerpublisher: This bundle publishes the services related to library management, such as adding, listing, searching, and deleting books. It exposes these services to be consumed by other bundles, like librarymanagerconsumer.

membershipconsumer: This bundle represents the consumer side of the membership management system. It interacts with the membership manager through the membershippublisher bundle to perform actions related to membership, such as adding new members and managing member details.

membershippublisher: This bundle publishes the services related to membership management, such as adding new members and managing member details. It exposes these services to be consumed by other bundles, like membershipconsumer.

librarydb: This bundle handles the database connection and operations related to library management, such as adding, listing, searching, and deleting books and memberships. It interacts with the MySQL database to perform these operations.

Manifest implementation (Exported services/ imported services)

libraryDB:

```
Activator.java Book.java LibraryDB x Activator.java libraryManag... LibraryManag... Lib
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: LibraryDB
4 Bundle-SymbolicName: LibraryDB
5 Bundle-Version: 1.0.0.qualifier
6 Export-Package: librarydb
7 Bundle-Activator: librarydb.Activator
8 Bundle-RequiredExecutionEnvironment: JavaSE-17
9 Automatic-Module-Name: LibraryDB
10 Import-Package: com.mysql.jdbc,
11   org.osgi.framework;version="1.3.0"
12 Bundle-ActivationPolicy: Lazy
13
```

libraryManagerConsumer:

```
Manifest-Version: 1.0
Bundle-ManifestVersion: 2
Bundle-Name: LibraryManagerConsumer
Bundle-SymbolicName: LibraryManagerConsumer
Bundle-Version: 1.0.0.qualifier
Bundle-Activator: librarymanagerconsumer.Activator
Bundle-RequiredExecutionEnvironment: JavaSE-17
Automatic-Module-Name: LibraryManagerConsumer
Import-Package: librarymanagerpublisher,
  org.osgi.framework;version="1.3.0"
Bundle-ActivationPolicy: lazy
```

libraryManagerPublisher:

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: LibraryManagerPublisher
4 Bundle-SymbolicName: libraryManagerPublisher
5 Bundle-Version: 1.0.0.qualifier
6 Export-Package: librarymanagerpublisher
7 Bundle-Activator: librarymanagerpublisher.Activator
8 Bundle-RequiredExecutionEnvironment: JavaSE-17
9 Automatic-Module-Name: LibraryManagerPublisher
10 Import-Package: librarydb,
11     org.osgi.framework;version="1.3.0"
12 Bundle-ActivationPolicy: lazy
13
```

membershipConsumer:

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: MembershipConsumer
4 Bundle-SymbolicName: membershipConsumer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: membershipconsumer.Activator
7 Bundle-RequiredExecutionEnvironment: JavaSE-17
8 Automatic-Module-Name: membershipConsumer
9 Import-Package: membershippublisher,
10     org.osgi.framework;version="1.3.0"
11 Bundle-ActivationPolicy: lazy
12
```

membershipPublisher:

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: MembershipPublisher
4 Bundle-SymbolicName: membershipPublisher
5 Bundle-Version: 1.0.0.qualifier
6 Export-Package: membershipPublisher
7 Bundle-Activator: membershipPublisher.Activator
8 Bundle-RequiredExecutionEnvironment: JavaSE-17
9 Automatic-Module-Name: membershipPublisher
10 Import-Package: librarydb,
11   org.osgi.framework;version="1.3.0"
12 Bundle-ActivationPolicy: lazy
13
```

Commands:

Ls / ss to get the list of active bundles then find the bundle id of the relevant bundle from the list.

Start a bundle: start <bundle_id>

Stop a bundle: stop <bundle_id>

Sample screenshots of its behavior & outputs

libraryManager:

Initiative:

```
at org.eclipse.osgi.internal.framework.EquinoxBundle$EquinoxModule.startWorker(EquinoxBundle.java:371)
at org.eclipse.osgi.container.Module.doStart(Module.java:605)
at org.eclipse.osgi.container.Module.start(Module.java:468)
at org.eclipse.osgi.container.ModuleContainer$ContainerStartLevel$2.run(ModuleContainer.java:1852)
at org.eclipse.osgi.internal.framework.EquinoxContainerAdaptor$1$1.execute(EquinoxContainerAdaptor.java:136)
at org.eclipse.osgi.container.ModuleContainer$ContainerStartLevel.incStartLevel(ModuleContainer.java:1845)
at org.eclipse.osgi.container.ModuleContainer$ContainerStartLevel.incStartLevel(ModuleContainer.java:1788)
at org.eclipse.osgi.container.ModuleContainer$ContainerStartLevel.doContainerStartLevel(ModuleContainer.java:1750)
at org.eclipse.osgi.container.ModuleContainer$ContainerStartLevel.dispatchEvent(ModuleContainer.java:1672)
at org.eclipse.osgi.container.ModuleContainer$ContainerStartLevel.dispatchEvent(ModuleContainer.java:1)
at org.eclipse.osgi.framework.eventmgr.EventManager.dispatchEvent(EventManager.java:234)
at org.eclipse.osgi.framework.eventmgr.EventManager$EventThread.run(EventManager.java:345)
DB Connection Successful]

----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option : 1
```

Add a book:

```
----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option : 1
Enter Book ISBN:
Java
Enter Book Title:
Java Baby
Enter Book Author:
Jonathan
Book added successfully...

----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option : 2
```

```

LibraryProject [OSGi Framework] C:\Users\LAKSHAN\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0
----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option : Java
Invalid input! Please enter a number.

----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option : 1
Enter Book ISBN:
SAMSUNG
Enter Book Title:
Krea
Enter Book Author:
-----
<

```

Book search:

```

Console X
LibraryProject [OSGi Framework] C:\Users\LAKSHAN\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32
----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option : 3
Enter Book ISBN to search:
3
Book not found!

----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option : SAMSUNG
Invalid input! Please enter a number.

```



```
Console x
LibraryProject [OSGi Framework] C:\Users\LAKSHAN\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_17.0.10.v20240120-1143\jre\bin\javaw.exe (Mar 12, 2024, 7:35:31 PM) [pid: 13520]
Book not found!

----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option : 3
Enter Book ISBN to search:
Java
Book found: Java Baby by Jonathan

----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option :
```

List all books:

```
LibraryMangentSystem [OSGi Framework] C:\Users\LAKSHAN\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_17.0.10.v20240120-1143\jre\bin\javaw.exe (Mar 13, 2024, 11:10:50 PM) [pid: 7952]

----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option : 2
List of Books:
ISBN: Java, Title: Java Baby, Author: Jonathan
ISBN: SAMSUNG, Title: Krea, Author: japan
ISBN: HarryPotter, Title: HarryPotter and the Sliit, Author: Saman
```

Delete a book:

```
----- Library Management System -----
1 - Add Book
2 - List All Books
3 - Search Book by ISBN
4 - Delete Book by ISBN
Select an option : 4
Enter Book ISBN to delete:
BBBBB
Book deleted successfully...
Book deleted successfully!
```

MembershipManager:

Initiative and add a member:

```
LibraryProject [OSGi Framework] C:\Users\LAKSHAN\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_17.0.10.v20240120-1143\jre\bin\javaw.exe (Mar 13, 2024, 10:25:29 PM)

----- Membership Management System -----
1 - Add Member
2 - List All Members
3 - Search Member by ID
4 - Delete Member by ID
Select an option : 1
Enter Member ID:
IT222222
Enter Member Name:
Nimal
Enter Member Address:
102/2/b sjdadkadjka kajasajdjakdjakja
Enter Member Telephone Number:
0737232782
Enter Number of Borrowed Books:
2
Member added successfully...
```

List all memberships:

```
LibraryProject [OSGi Framework] C:\Users\LAKSHAN\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_17.0.10.v20240120-1143\jre\bin\javaw.exe (Mar 13, 2024, 10:25:29 PM)

----- Membership Management System -----
1 - Add Member
2 - List All Members
3 - Search Member by ID
4 - Delete Member by ID
Select an option : 2
List of Members:
Member ID: IT222222, Name: Nimal, Address: 102/2/b sjdadkadjka kajasajdjakdjakja, Telephone Number: 0737232782, No. of Borrowed Books: 2
```

Search a member:

```
----- Membership Management System -----
1 - Add Member
2 - List All Members
3 - Search Member by ID
4 - Delete Member by ID
Select an option : 3
Enter Member ID to search:
IT222222
Member found: ID: IT222222, Name: Nimal, Address: 102/2/b sjdadkadjka kajasajdjakdjakja, Telephone Number: 0737232782, No. of Borrowed Books: 2
```

Delete a member:

```
LibraryProject [OSGi Framework] C:\Users\LAKSHAN\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_17.0.10.v20240120-1143\jre\bin\javaw.exe (Mar 13, 2024, 10:25:29 PM)

1 - Add Member
2 - List All Members
3 - Search Member by ID
4 - Delete Member by ID
Select an option : 4
Enter Member ID to delete:
IT222222
Member deleted successfully...
Member deleted successfully!
```