



Sri Lanka Institute of Information Technology

## OSGI Assignment 1 Project Report

Software Architecture (SA)-SE3030

Submitted by:

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Submitted to:

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Name of the supervisor

19/04/2021

Date of submission

## **Individual contribution**

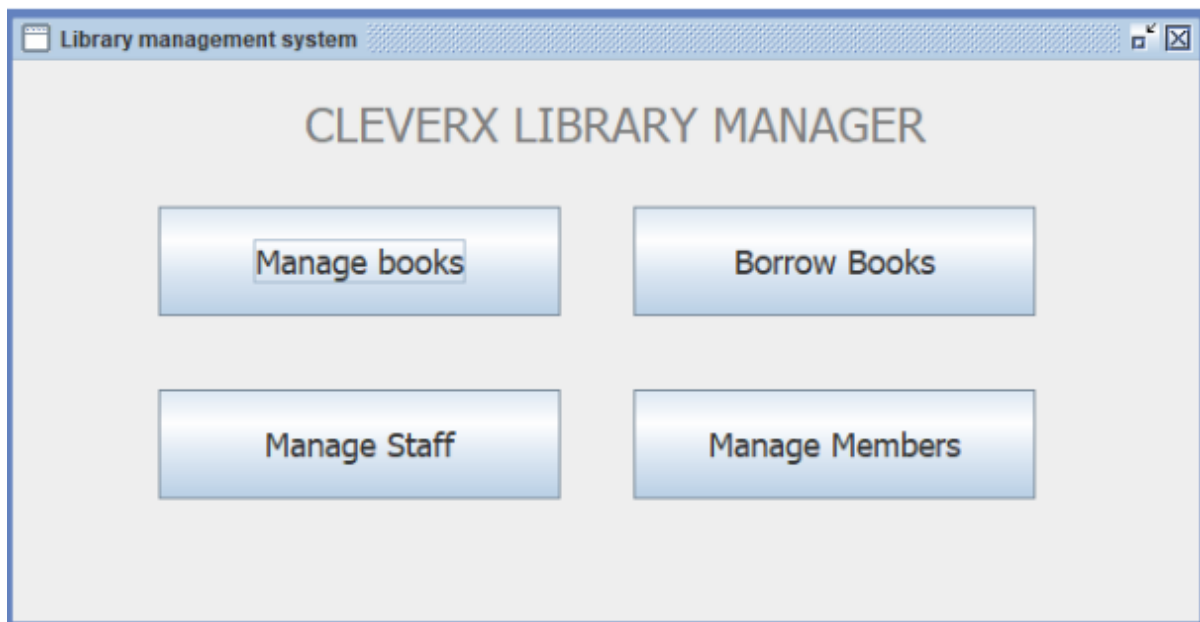
Student ID , NAME	Contributed Bundles / Plugins
IT19133850 - YASAS R.M	<ol style="list-style-type: none"><li>1. LibraryPublisher</li><li>2. LibraryConsumer</li><li>3. BooksPublisher</li><li>4. DBPublisher</li><li>5. Com.mysql.jdbc (jdbc connector)</li></ol>
IT19152288 - Bandara M.H.M.N.D.T.	<ol style="list-style-type: none"><li>1. IssueBooksPublisher</li></ol>
IT19215884 - Gunawardana K.H.R.	<ol style="list-style-type: none"><li>1. MembersPublisher</li></ol>
IT19056258 - Dhanasekara D.M.S.M	<ol style="list-style-type: none"><li>1. StaffPublisher</li></ol>

Project repository - [https://github.com/manuka99/osgi\\_library\\_mangement\\_system.git](https://github.com/manuka99/osgi_library_mangement_system.git)

**A) Explain the Scenario using a diagram.**

## Introduction

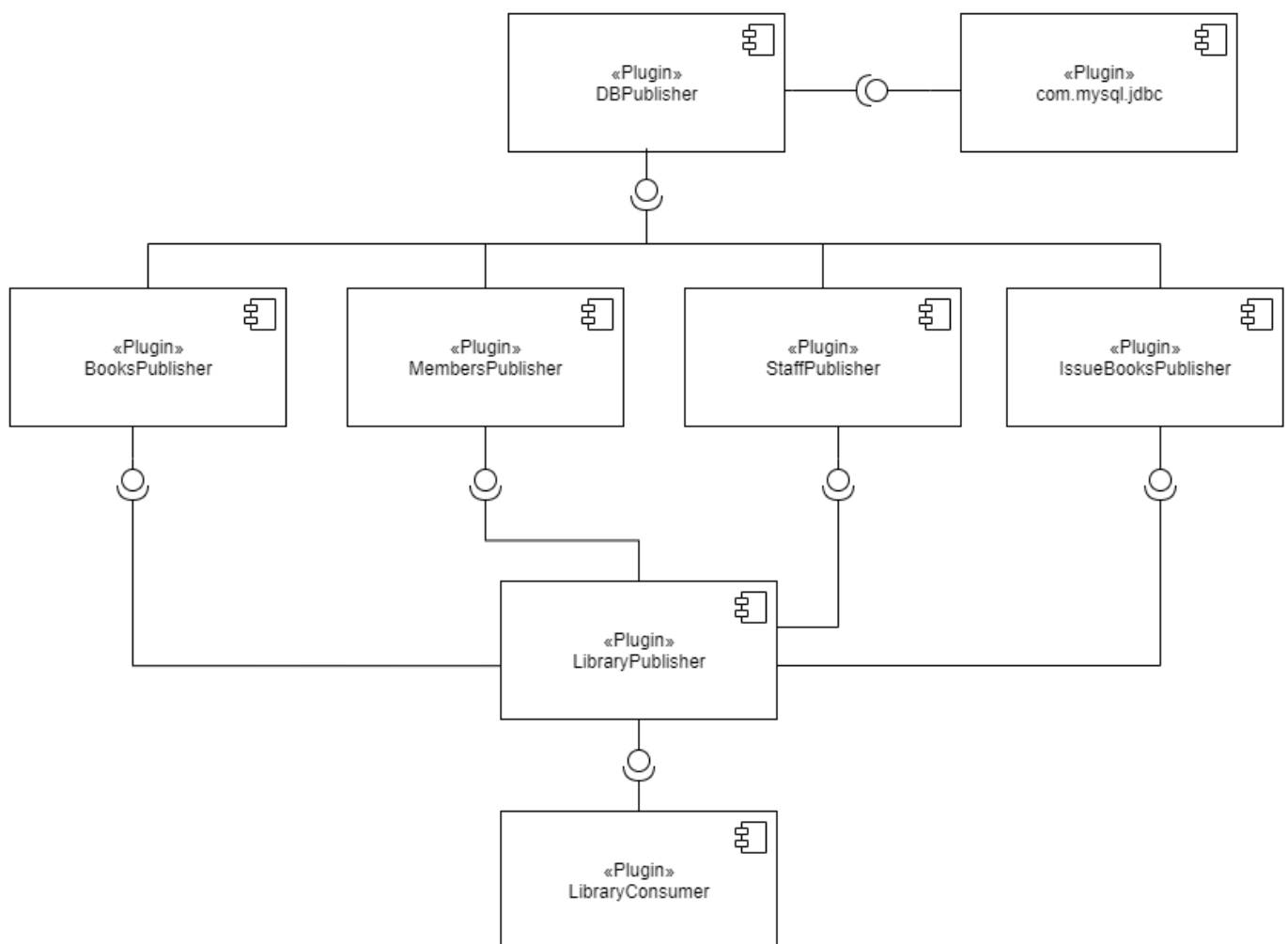
The CleverX Library Management System is a simple and a powerful software solution that provides a set of functionalities to manage all necessary tasks related to a library. Services such as registering staff as well as members, saving and updating books information, monitoring books issued, assisting staff members to track overdue books and much more made easy with CleverX Library Manager. The CleverX Library Manager was developed using Java Swing enhancing user interfaces and experience. All data and information are saved to a relational database(MYSQL) thereby data loss is completely prevented.



## Description

The software architecture of the CleverX Library Manager consist of eight components developed using OSGI Micro Kernel Architecture deployed using Eclipse Equinox. System consist of four publishers to manage Books, Members, Staff and Issue Books. The library publisher (Core system) will consume all the above four publishers and the Library consumer (Service consumer) will consume the library publisher. The relational database publisher (DBpublisher) will be used by all the four main service plugin modules and then the com.mysql.jdbc service will be consumed by the DBPublisher in order to connect to mysql-jdbc. Design patterns such as singleton and facades are used to perform complex functionalities which hides the chained implementation from the user. Four main service plugins were developed using interfaces, Abstraction, Inheritance, Polymorphism and other object oriented concepts in java. Separation of Data access logic (Crud operation) and Business logic in individual bundles. Java Swing were used to develop simple and powerful user interfaces to enhance the user experience.

Below is the component diagram of the CleverX Library Manager.



## 1. Library Publisher (Core system)

Library publisher was implemented in order to consume the main four plugins such as books publisher, issue books publisher, members publisher and staff publisher that performs the main functionalities of the library. When the user click on manage books it will check whether the service is open/running and prompt the user.

```
1 //      manage books
2      JButton btnBooks = new JButton("Manage books");
3      btnBooks.setBounds(80, 80, 220, 60);
4      btnBooks.setFocusable(true);
5      btnBooks.setFont(new Font("Tahoma", Font.PLAIN, 18));
6      contentPane.add(btnBooks);
7      btnBooks.addActionListener(new ActionListener() {
8          public void actionPerformed(ActionEvent e) {
9              BooksMenuClick = LibraryActivator.BooksTrackerChecker();
10             if (BooksMenuClick == true) {
11                 BooksMenuWindow obj = new BooksMenuWindow();
12                 obj.setVisible(true);
13                 frame.dispose();
14             } else {
15                 JOptionPane.showMessageDialog(null, "Please Start Library books Service",
16                     "Library books Service Not Found", JOptionPane.OK_OPTION);
17             }
18         }
19     });

public static boolean BooksTrackerChecker() {
    booksServiceTracker.open();
    booksService = (BooksService) booksServiceTracker.getService();
    if (booksService != null)
        return true;
    else
        return false;
}
```

## 2. Library Consumer (Service consumer)

Library consumer was implemented in order to consume the library publisher.

## 3. DB Publisher

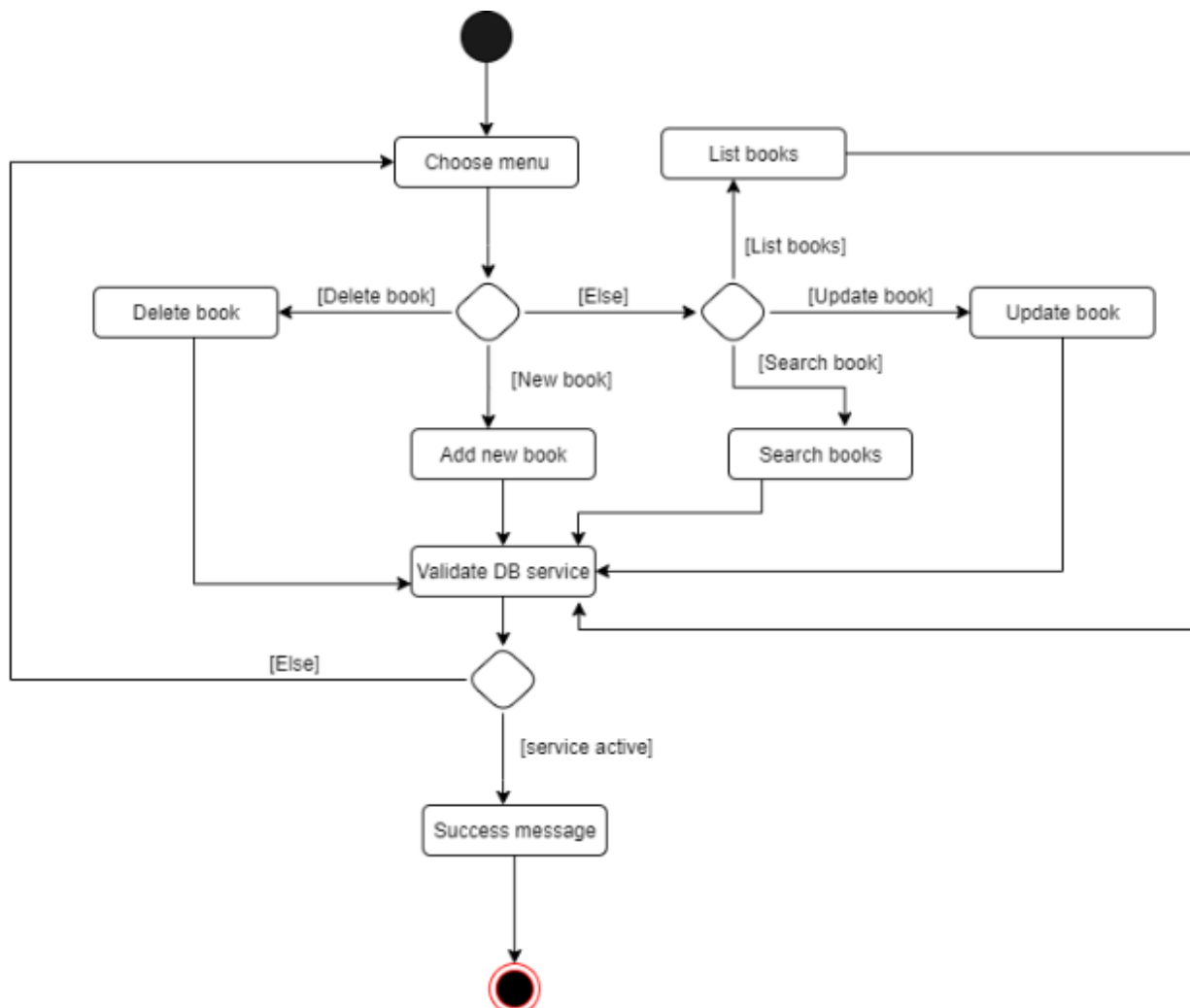
DB publisher was implemented in order to get an instance from the Mysql-JDBC using the singleton design pattern. This service will be consumed by the four main plugins to perform the data access logic.

#### 4. COM.MYSQL.JDBC

This was implemented to connect to the Mysql-JDBC. This service will be consumed by the DB publisher in order to get an instance.

#### 5. Books Publisher

Books publisher was implemented in order to manage books in the library. It is mainly responsible to store books, update books based on unique ID, delete and to list all books with filters. It is required to input a unique book ID, name, subject, book author and book published year. Once the data has been provided it will be saved to the database through the data access implementation by consuming the DBpublisher(get the connection to jdbc). Update, deletion and listing are also done in the same manner. All validations are made at necessary method implementations and displayed using Java Swing. Below is the activity diagram of the Books Publisher.



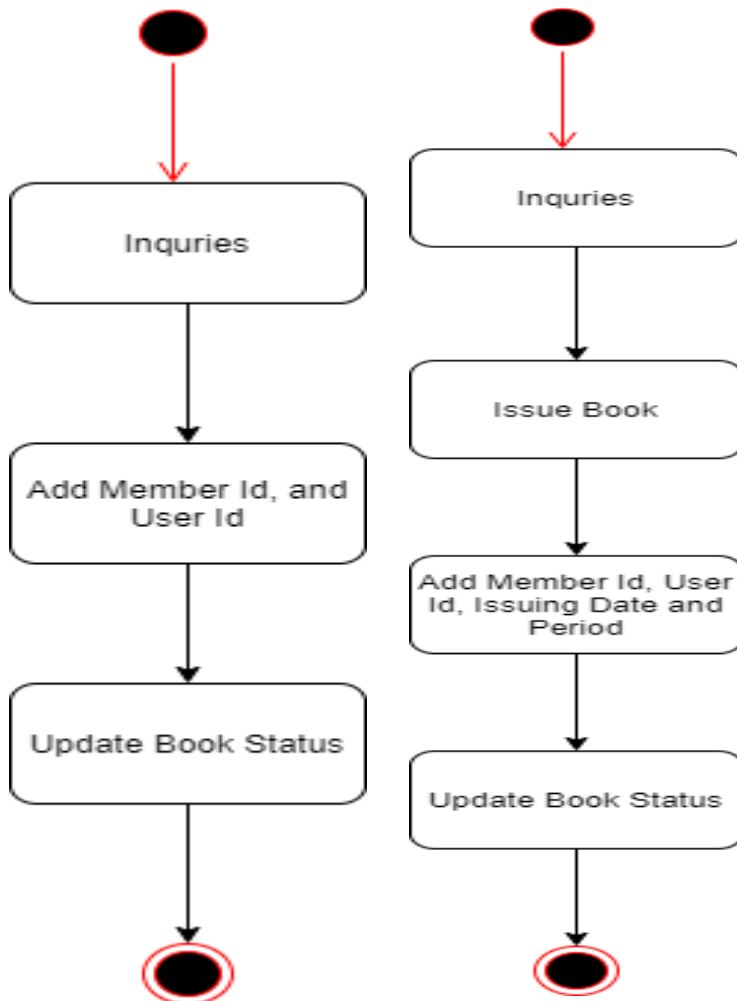
## 6. Issue Books Publisher

The library is the place where the huge collection of books. Maintenance of keeping the records of issuing and borrowing manually is a difficult task. A computer program makes it easy.

Issuing and Returning books part of this library management system is build using OSGi Framework with java swing and JDBC.

Features that are included in the library book issue and return system are as follows:

- Book id: This is a unique key to identified books.
- User id: This is a unique key to identify users.
- period: Time the book can keep within one user.
- Date of issuing: Issued date of the book
- Date of Return: The return date of the book

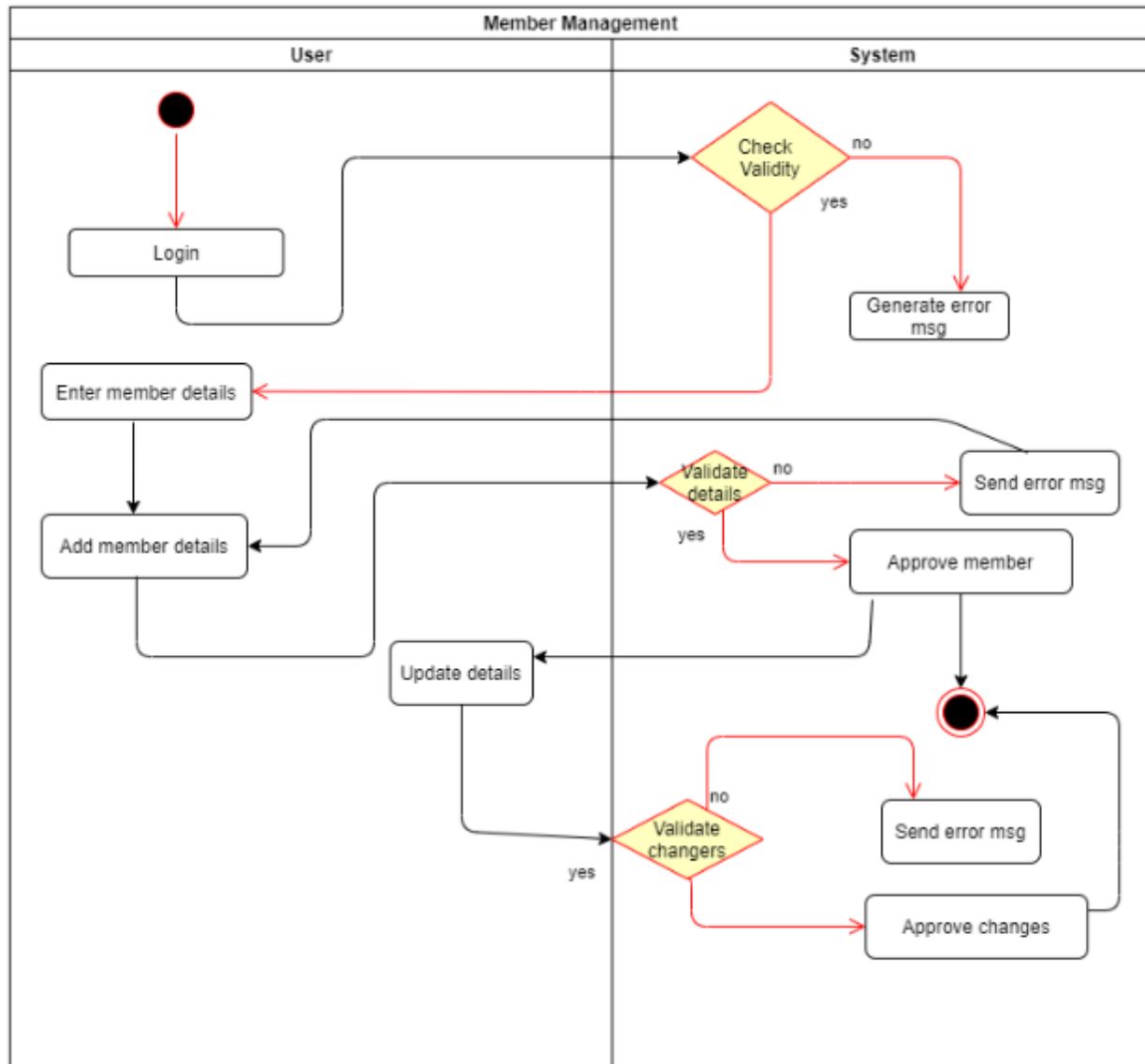


*Issuing Books*

*Return Books*

## 7. Members Publisher

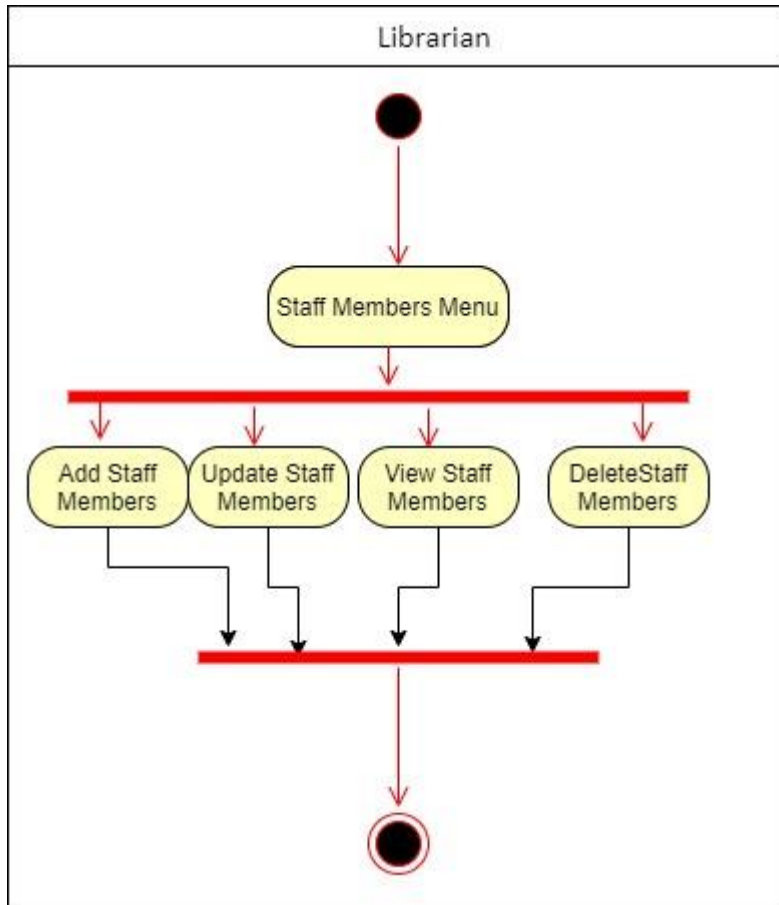
Library system users are facilitated to operate basic CRUD operations such as add member details, search for member details and fetch the details, Update the member details if needed and delete member details.





## 8. Staff Publisher

This function follows all the event which are related to the Staff member in Library System. It allows to add new staff member by providing Member Id, Name, Designation and the department. It has ability to change data which are stored in database by clicking update button. Librarian or other person can view all staff member details and they can delete the staff member details selecting by ID.



## B) Manifest implementation (Exported services/ imported services)

### 1. Library Publisher (Core system)

```
LibraryPublisher ✖
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: DisplayPublisher
4 Bundle-SymbolicName: LibraryPublisher
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: librarypublisher.LibraryActivator
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Automatic-Module-Name: DisplayPublisher
9 Import-Package: bookspublisher.service,
10 bookspublisher.ui,
11 org.osgi.framework;version="1.3.0",
12 org.osgi.util.tracker;version="1.5.2"
13 Bundle-ActivationPolicy: lazy
14 Export-Package: librarypublisher
15
```

### 2. Library Consumer (Service consumer)

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: LibraryConsumer
4 Bundle-SymbolicName: LibraryConsumer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: libraryconsumer.Activator
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Automatic-Module-Name: LibraryConsumer
9 Import-Package: librarypublisher,
10 org.osgi.framework;version="1.3.0"
11 Bundle-ActivationPolicy: lazy
12
```

### 3. DB Publisher

DBPublisher

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: DBPublisher
4 Bundle-SymbolicName: DBPublisher
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: dbpublisher.Activator
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Automatic-Module-Name: DBPublisher
9 Import-Package: org.osgi.framework;version="1.3.0", com.mysql.jdbc;version="5.1.35"
10 Bundle-ActivationPolicy: lazy
11 Export-Package: dbpublisher
```

### 4. COM.MYSQL.JDBC

com.mysql.jdbc

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: Jdbc
4 Bundle-SymbolicName: com.mysql.jdbc
5 Bundle-Version: 1.0.0
6 Automatic-Module-Name: com.mysql.jdbc
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Export-Package: com.mysql.jdbc;version="5.1.35";uses:="com.mysql.jdbc,
9 log, javax.naming, javax.net.ssl, javax.xml.transform, org.xml.sax", com.m
10 ysql.jdbc.jdbc2.optional;version="5.1.35";uses:="com.mysql.jdbc, com.m
11 ysql.jdbc.log, javax.naming, javax.sql, javax.transaction.xa", com.mysql.
12 jdbc.log;version="5.1.35", com.mysql.jdbc.profiler;version="5.1.35";us
13 es:="com.mysql.jdbc", com.mysql.jdbc.util;version="5.1.35";uses:="com.
14 mysql.jdbc.log", com.mysql.jdbc.exceptions;version="5.1.35", com.mysql.
15 jdbc.exceptions.jdbc4;version="5.1.35";uses:="com.mysql.jdbc", com.mys
16 ql.jdbc.interceptors;version="5.1.35";uses:="com.mysql.jdbc", com.mysq
17 l.jdbc.integration.c3p0;version="5.1.35", com.mysql.jdbc.integration.j
18 boss;version="5.1.35", com.mysql.jdbc.configs;version="5.1.35", org.gjt
19 .mm.mysql;version="5.1.35"
20 Import-Package: javax.net, javax.net.ssl;version="[1.0.1, 2.0.0)";resol
21 ution:=optional, javax.xml.parsers, javax.xml.stream, javax.xml.transfo
22 rm, javax.xml.transform.dom, javax.xml.transform.sax, javax.xml.transfor
23 m.stax, javax.xml.transform.stream, org.w3c.dom, org.xml.sax, org.xml.sax
24 .helpers;resolution:=optional, javax.naming, javax.naming.spi, javax.sql
25 , javax.transaction.xa;version="[1.0.1, 2.0.0)";resolution:=optional, c
26 om.mchange.v2.c3p0;version="[0.9.1.2, 1.0.0)";resolution:=optional, or
27 g.jboss.resource.adapter.jdbc;resolution:=optional, org.jboss.resource
28 .adapter.jdbc.vendor;resolution:=optional
```

## 5. Books Publisher

```
BooksPublisher ✕
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: BooksPublisher
4 Bundle-SymbolicName: BooksPublisher
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: bookspublisher.BooksActivator
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Automatic-Module-Name: BooksPublisher
9 Import-Package: dbpublisher,
10 org.osgi.framework;version="1.3.0",
11 org.osgi.util.tracker;version="1.5.2"
12 Bundle-ActivationPolicy: lazy
13 Export-Package: bookspublisher.service,
14 bookspublisher.ui
15
```

## 6. Issue Books Publisher

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: Library_Management_System_Issue_Books
4 Bundle-SymbolicName: Library_Management_System_Issue_Books
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: issue_books.IssueBookActivator
7 Bundle-RequiredExecutionEnvironment: JavaSE-13
8 Automatic-Module-Name: Library_Management_System_Issue_Books
9 Import-Package: dbpublisher,
10 org.osgi.framework;version="1.3.0",
11 org.osgi.util.tracker;version="1.5.2"
12 Bundle-ActivationPolicy: lazy
13
```

## 7. Members Publisher

MemberPublisher ✖

```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: MemberPublisher
4 Bundle-SymbolicName: MemberPublisher
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: memberpublisher.Activator
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Automatic-Module-Name: MemberPublisher
9 Import-Package: org.osgi.framework;version="1.3.0"
10 Bundle-ActivationPolicy: lazy
11 Require-Bundle: org.eclipse.osgi
12 Export-Package: memberpublisher.Service,
13 memberpublisher.ui
14
```

## 8. Staff Publisher

StaffMembersPublisher ✖

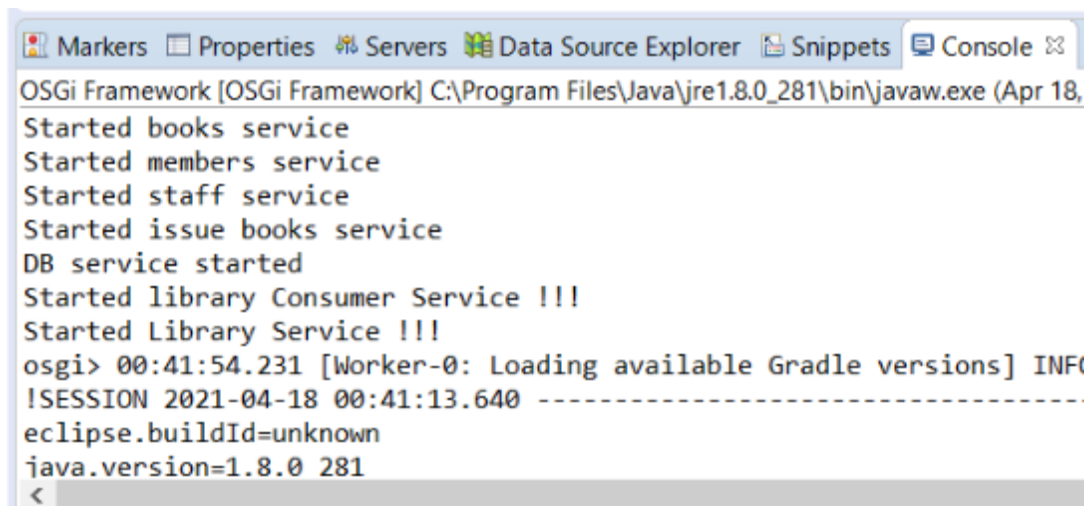
```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: StaffMembersPublisher
4 Bundle-SymbolicName: StaffMembersPublisher
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: staffmemberspublisher.StaffMemberActivator
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Automatic-Module-Name: StaffMembersPublisher
9 Import-Package: org.osgi.framework;version="1.3.0",
10 org.osgi.util.tracker;version="1.5.2"
11 Bundle-ActivationPolicy: lazy
12 Require-Bundle: org.eclipse.osgi
13 Export-Package: service,
14 ui
```

### C) All commands of bundle install and run in OSGi framework.

Create separate run configurations for each bundle by selecting Run As => Run Configurations.

Run the library consumer by right clicking the manifest file and selecting Run As => OSGi Framework

Then all the services will be started, to confirm type 'lb' in console and search for the bundle name.



```
OSGi Framework [OSGi Framework] C:\Program Files\Java\jre1.8.0_281\bin\javaw.exe (Apr 18, 2021 00:41:54.231)
Started books service
Started members service
Started staff service
Started issue books service
DB service started
Started library Consumer Service !!!
Started Library Service !!!
osgi> 00:41:54.231 [Worker-0: Loading available Gradle versions] INFO
!SESSION 2021-04-18 00:41:13.640 -----
eclipse.buildId=unknown
java.version=1.8.0 281
<
```

```
osgi> ss
"Framework is launched."

id      State      Bundle
0       ACTIVE    org.eclipse.osgi_3.15.100.v20191114-1701
        Fragments=698
1       ACTIVE    org.eclipse.equinox.simpleconfigurator_1.3.400.v2019101
2       ACTIVE    BooksPublisher_1.0.0.qualifier
3       ACTIVE    DBPublisher_1.0.0.qualifier
4       ACTIVE    LibraryConsumer_1.0.0.qualifier
7       ACTIVE    ch.qos.logback.classic_1.1.2.v20171220-1825
```



```

963    ACTIVE    org.uddi4j_2.0.0.v200803270300
964    ACTIVE    org.w3c.css.sac_1.3.1.v200903091627
965    ACTIVE    org.w3c.dom.events_3.0.0.draft20060413_v201105210656
966    ACTIVE    org.w3c.dom.smil_1.0.1.v200903091627
967    ACTIVE    org.w3c.dom.svg_1.1.0.v201011041433
968    ACTIVE    StaffMembersPublisher_1.0.0.qualifier
970    RESOLVED   MemberPublisher_1.0.0.qualifier
971    ACTIVE    LibraryPublisher_1.0.0.qualifier
osgi>
<

```

CLEVERX Library manager is deployed using Eclipse Equinox, therefore this implicitly handles the bundle management such as Install, Resolve, Start, Stop etc.

Since this is developed according to OSGI we can install and uninstall individual bundles without affecting the composite system. But this must be handled at the method in which opens the plugin window, else exceptions will occur.

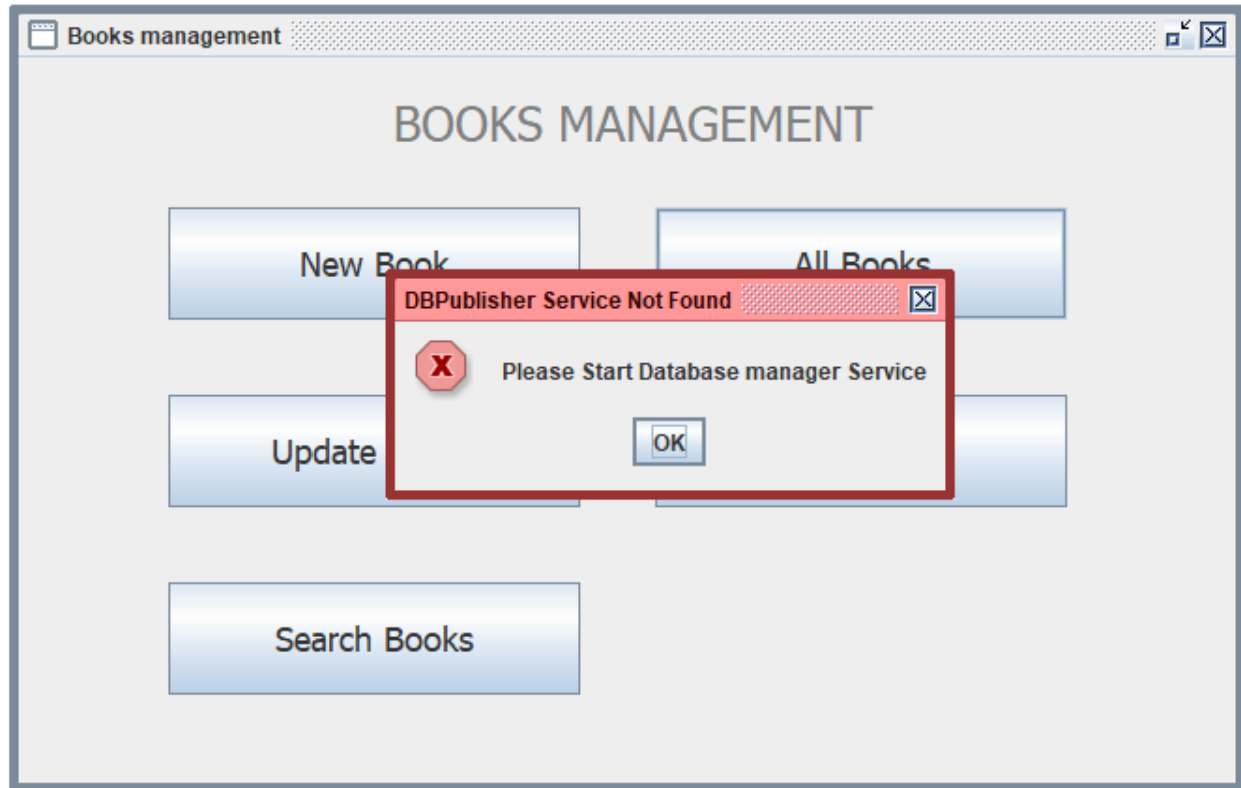
To install/uninstall a bundle search the bundle id from the list of bundles you get after the command 'lb' and then type 'start [bundle id]' to install a bundle and 'stop [bundle id]' to stop a service.

Ex: lets stop the DB publisher service and try to update a book.

```

968    ACTIVE    StaffMembersPublisher_1.0.0.qualifier
970    RESOLVED   MemberPublisher_1.0.0.qualifier
971    ACTIVE    LibraryPublisher_1.0.0.qualifier
osgi> stop 3
DB service stopped
osgi>
<

```



As you can see above, the system will throw an exception when the client trying to access a service which is decoupled from the core system.

Through this project implementation, services can be easily coupled or decoupled from the core system without the acknowledgement of the client.



## d) Sample screenshots of its behavior & outputs

### 1. Library Publisher (Core system)

```
2 /
3 public class LibraryActivator implements BundleActivator {
4
5     ServiceRegistration serviceRegistration;
6
7     // trackers
8     public static ServiceTracker booksServiceTracker;
9     public static ServiceTracker membersServiceTracker;
10
11     //Service
12     public static BooksService booksService;
13     public static MembersService membersService;
14
15     public void start(BundleContext bundleContext) throws Exception {
16         System.out.println("Started Library Service !!!");
17         LibraryService libraryService = new LibraryServiceImpl();
18         serviceRegistration = bundleContext.registerService(LibraryService.class.getName(), libraryService, null);
19
20         booksServiceTracker = new ServiceTracker(bundleContext, BooksService.class.getName(), null);
21         membersServiceTracker = new ServiceTracker(bundleContext, MembersService.class.getName(), null);
22     }
23
24     public void stop(BundleContext bundleContext) throws Exception {
25         System.out.println("Stopped Library Service !!!");
26         serviceRegistration.unregister();
27     }
28
29     public static boolean BooksTrackerChecker() {
30         booksServiceTracker.open();
31         booksService = (BooksService) booksServiceTracker.getService();
32         if (booksService != null)
33             return true;
34         else
35             return false;
36     }
37
38     public static boolean MembersTrackerChecker() {
39         membersServiceTracker.open();
40         membersService = (MembersService) membersServiceTracker.getService();
41         if (membersService != null)
42             return true;
43         else
44             return false;
45     }
46 }
```

```

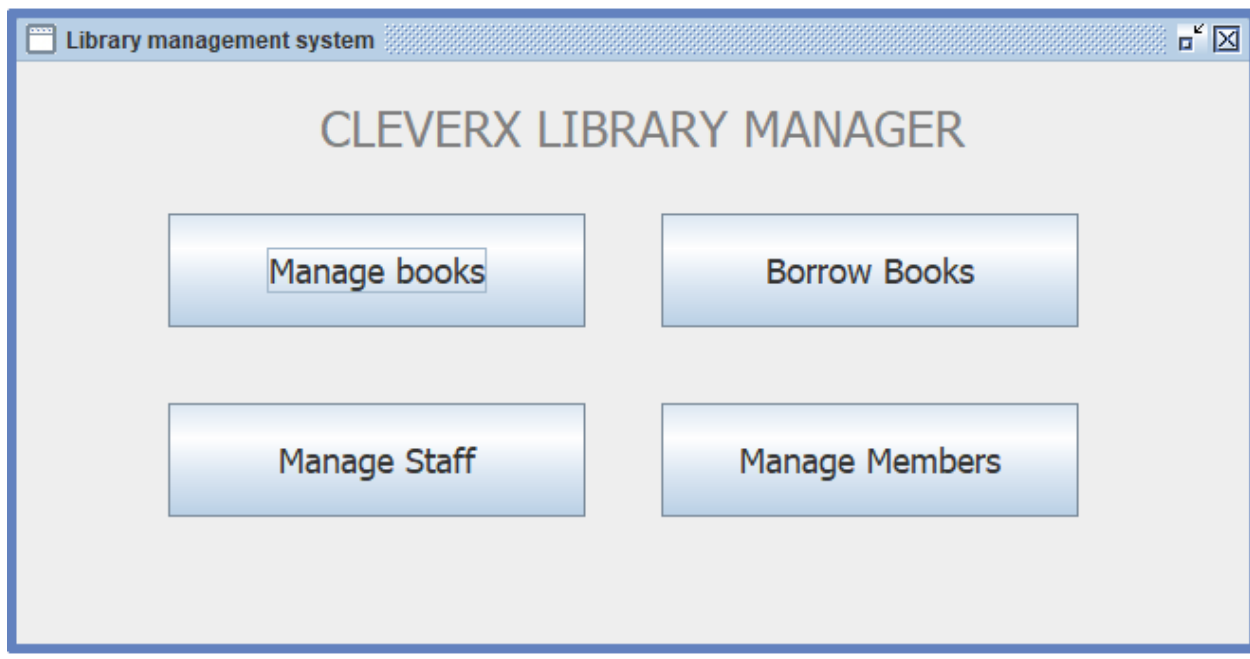
1 package librarypublisher;
2
3 import javax.swing.JDialog;
4 /**
5  * @author Manuka yasas
6  */
7 public class LibraryServiceImpl implements LibraryService {
8
9     LibraryMenuWindow menuWindow;
10
11     @Override
12     public void publishService() {
13         JFrame.setDefaultLookAndFeelDecorated(true);
14         JDialog.setDefaultLookAndFeelDecorated(true);
15         menuWindow = new LibraryMenuWindow();
16         menuWindow.setVisible(true);
17     }
18
19     @Override
20     public void disposeService() {
21         menuWindow.dispose();
22     }
23 }

```

```

1 package librarypublisher;
2 /**
3  * @author Manuka yasas
4  */
5
6 public interface LibraryService {
7     public void publishService();
8     public void disposeService();
9 }
10

```



## 2. Library Consumer

```
import librarypublisher.LibraryService;
/**
 * @author Manuka vasas
 */
public class Activator implements BundleActivator {
    ServiceReference serviceReference;
    LibraryService libraryService;

    public void start(BundleContext bundleContext) throws Exception {
        System.out.println("Started library Consumer Service !!!");
        serviceReference = bundleContext.getServiceReference(LibraryService.class.getName());
        libraryService = (LibraryService) bundleContext.getService(serviceReference);
        libraryService.publishService();
    }

    public void stop(BundleContext bundleContext) throws Exception {
        System.out.println("Stopped library Consumer Service !!!");
        bundleContext.ungetService(serviceReference);
        libraryService.disposeService();
    }
}
```

### 3. DB Publisher

```
*/
public class Activator implements BundleActivator {

    ServiceRegistration serviceRegistration;

    public void start(BundleContext bundleContext) throws Exception {
        System.out.println("DB service started");
        DBService driverService = new DBServiceImpl();
        serviceRegistration = bundleContext.registerService(DBService.class.getName(), driverService, null);
    }

    public void stop(BundleContext bundleContext) throws Exception {
        System.out.println("DB service stopped");
        serviceRegistration.unregister();
    }
}
```





























```
DBServiceImpl.java
1 package dbpublisher;
2
3 import java.sql.Connection;
4
5 /**
6  * @author Manuka yasas
7  */
8
9
10 public class DBServiceImpl implements DBService {
11
12     private static Connection connection;
13
14     // This works according to singleton pattern
15
16     public Connection getConnection() throws ClassNotFoundException {
17         /*
18          * This create new connection objects when connection
19          * null
20          */
21         if (connection == null || connection.isClosed()) {
22             Class.forName(Properties.DRIVER_NAME);
23             connection = DriverManager.getConnection(Properties.DRIVER_NAME, Properties.USERNAME, Properties.PASSWORD);
24         }
25         return connection;
26     }
27
28 }
29
```

```
Properties.java
1 package dbpublisher;
2 /**
3  * @author Manuka yasas
4  */
5
6 public class Properties {
7     public static String DRIVER_NAME = "com.mysql.jdbc.Driver";
8     public static String URL = "jdbc:mysql://localhost:3306/t";
9     public static String USERNAME = "root";
10    public static String PASSWORD = "";
11 }
12
```

```
DBService.java
1 package dbpublisher;
2
3 import java.sql.Connection;
4
5 /**
6  * @author Manuka yasas
7  */
8
9 public interface DBService {
10     public Connection getConnection() throws ClassNotFoundException;
11 }
12
```

## 4. Books Publisher

### Folder structure

- ▼  BooksPublisher [assignment 1 git master]
  - >  JRE System Library [JavaSE-1.8]
  - >  Plug-in Dependencies
  - ▼  src
    - ▼  bookspublisher
      - ▼  BooksActivator.java
        - >  BooksActivator
    - ▼  bookspublisher.dao
      - ▼  BooksDao.java
        - >  BooksDao
      - >  BooksDaoImpl.java
    - ▼  bookspublisher.model
      - ▼  Book.java
        - >  Book
    - ▼  bookspublisher.service
      - ▼  BooksService.java
        - >  BooksService
      - >  BooksServiceImpl.java
    - ▼  bookspublisher.ui
      - >  BooksForm.java
      - >  BooksMenuWindow.java
      - >  DeleteBook.java
      - >  ListBooks.java
      - >  SearchBooks.java
      - >  UpdateBook.java
  - ▼  META-INF
    -  MANIFEST.MF
  -  build.properties

```

4
3Ⓢ import org.osgi.framework.BundleActivator;
1
2Ⓢ /**
3  * @author Manuka yavas
4  *
5  */
6 public class BooksActivator implements BundleActivator {
7
8     ServiceRegistration serviceRegistration;
9     // ServiceReference dbServiceReference;
10    public static ServiceTracker dbServiceTracker;
11    public static DBService dbService;
12
13Ⓢ    public void start(BundleContext bundleContext) throws Exception {
14        System.out.println("Started books service");
15
16        // get the db service
17        // dbServiceReference = bundleContext.getServiceReference(DBService.class.getName());
18        // DBService dbService1 = (DBService) bundleContext.getService(dbServiceReference);
19
20        dbServiceTracker = new ServiceTracker(bundleContext, DBService.class.getName(), null);
21
22        BooksService booksService = new BooksServiceImpl();
23        serviceRegistration = bundleContext.registerService(BooksService.class.getName(), booksService, null);
24    }
25
26    public void stop(BundleContext bundleContext) throws Exception {
27        System.out.println("Stop book service");
28        serviceRegistration.unregister();
29    }
30
31Ⓢ    public static boolean dbServiceChecker() {
32        dbServiceTracker.open();
33
34        dbService = (DBService) dbServiceTracker.getService();
35
36        if (dbService != null)
37            return true;
38        else
39            return false;
40    }
41
42 }
43 }

```

```

1 package bookspublisher.dao;
2
3 import java.sql.Connection;
4
5
6 /**
7  * @author Manuka yasang
8  *
9  */
10
11 public class BooksDaoImpl implements BooksDao {
12
13     public Connection getConnectionFromDBService() {
14         Connection con = null;
15         if (BooksActivator.dbServiceChecker()) {
16             try {
17                 con = new DBServiceImpl().getConnection();
18             } catch (ClassNotFoundException | SQLException e) {
19                 // TODO Auto-generated catch block
20                 e.printStackTrace();
21             }
22         } else {
23             JOptionPane.showMessageDialog(null, "Please Start DBPublisher Service Not Found", JOptionPane.INFORMATION_MESSAGE);
24         }
25         return con;
26     }
27
28     public int save(Book book) {
29         int status = 0;
30         try {
31             Connection con = getConnectionFromDBService();
32             PreparedStatement ps = con.prepareStatement("insert into books(id, name, author, publishDate, subject) values(?, ?, ?, ?, ?)");
33             ps.setInt(1, book.getBookID());
34             ps.setString(2, book.getName());
35             ps.setString(3, book.getAuthor());
36             ps.setString(4, book.getPublishDate());
37             ps.setString(5, book.getSubject());
38             status = ps.executeUpdate();
39             con.close();
40         } catch (Exception e) {
41             e.printStackTrace();
42         }
43         return status;
44     }
45 }

```

```

1 package bookspublisher.dao;
2
3 import java.util.List;
4
5 /**
6  * @author Manuka yasang
7  *
8  */
9
10 public interface BooksDao {
11     public int save(Book book);
12
13     public int update(Book book);
14
15     public int delete(int id);
16
17     public List<Book> getAllBooks();
18
19     public Book getBookByID(int id);
20 }

```

```

1 package bookspublisher.service;
2
3 import java.sql.Connection;
4
5
6
7
8
9
10 /**
11  * @author Manuka yasar
12  */
13 public class BooksServiceImpl implements BooksService {
14
15     private BooksDao booksDao;
16
17
18     public BooksServiceImpl() {
19         booksDao = new BooksDaoImpl();
20     }
21
22     @Override
23     public int storeBook(Book book) {
24         return booksDao.save(book);
25     }
26
27     @Override
28     public int updateBook(Book book) {
29         return booksDao.update(book);
30     }
31
32     @Override
33     public int deleteBook(int id) {
34         return booksDao.delete(id);
35     }
36
37     @Override
38     public List<Book> listBooks() {
39         return booksDao.getAllBooks();
40     }
41
42     @Override
43     public Book getBook(int id) {
44         return booksDao.getBookByID(id);
45     }
46
47
48
49
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```

```

1 package bookspublisher.service;
2
3 import java.util.List;
4
5
6
7 /**
8  * @author Manuka yasar
9  */
10
11 public interface BooksService {
12     public int storeBook(Book book);
13
14     public int updateBook(Book book);
15
16     public int deleteBook(int id);
17
18     public List<Book> listBooks();
19
20     public Book getBook(int id);
21 }
22

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```
DeleteBook.java
1 package bookspublisher.ui;
2
3 import java.awt.Color;
4
5 /**
6  * @author Manuka yasar
7  */
8
9 public class DeleteBook extends JFrame {
10
11     private static DeleteBook frame;
12     private JPanel contentPane;
13     private BooksService booksService;
14
15     /**
16      * Launch the application.
17      */
18     public static void main(String[] args) {
19         EventQueue.invokeLater(new Runnable() {
20             public void run() {
21                 try {
22
23 ListBooks.java
1 package bookspublisher.ui;
2
3 import java.awt.BorderLayout;
4
5 /**
6  * @author Manuka yasar
7  */
8
9 public class ListBooks extends JFrame {
10
11     private static ListBooks frame;
12     private JPanel contentPane;
13     private JTable table;
14     private BooksService booksService;
15
16     public static void main(String[] args) {
17         EventQueue.invokeLater(new Runnable() {
18             public void run() {
19                 try {
20                     frame = new ListBooks();
21                     frame.setVisible(true);
22
BooksMenuWindow.java
1 package bookspublisher.ui;
2
3 import java.awt.Color;
4
5 /**
6  * @author Manuka yasar
7  */
8
9 public class BooksMenuWindow extends JFrame {
10
11     private static BooksMenuWindow frame;
12     private JPanel contentPane;
13
14     /**
15      * Launch the application.
16      */
17     public static void main(String[] args) {
18         EventQueue.invokeLater(new Runnable() {
19             public void run() {
20                 try {
21                     frame = new BooksMenuWindow();
22                     frame.setVisible(true);
23
BooksForm.java
1 package bookspublisher.ui;
2
3 import java.awt.EventQueue;
4
5 /**
6  * @author Manuka yasar
7  */
8
9 public class BooksForm extends JFrame {
10
11     private static BooksForm frame;
12     private BooksService booksService;
13     private JPanel contentPane;
14     private JTextField txtID;
15     private JTextField txtName;
16     private JTextField txtAuthor;
17     private JTextField txtDate;
18     private JTextField txtSubject;
19
20 /**
```

Delete Book

Delete Book

Book Id:1024

Delete book

Message

i

Unable to delete the given book

OK

Delete Book

Delete Book

Book Id:1124

Delete book

Message

i

Record deleted successfully!

OK

Search Books

Filter

Tita

BookID	Name	Author	Published Date	Subject
1123	Titanic Rose	S.D.F Gasdras	2002/05/25	Novel

Filter

Books management

BOOKS MANAGEMENT

New Book

All Books

Update Books

Delete Book

Search Books

Add New Book

## Add New Book

Book ID:

d

Name:

Author:

Published Date:

Book Subject

Add Book

Invalid BookID

X

Please enter a valid book ID

OK

Add New Book

Add New Book

Book ID:

Name:

Author:

S.D.F Gasdras

Published Date:

2002/05/25

Book Subject

Novel

Add Book

Message

i

Sorry, unable to save!

OK

Add New Book

Add New Book

Book ID:

1124

Name:

Titanic Rose

Author:

S.D.F Gasdras

Published Date:

2002/05/25

Book Subject

Novel

Add Book

Message

i

Book was saved successfully!

OK

List all Books

BookID	Name	Author	Published Date	Subject
3	23	323	2	3
4	2	3	dddd3	323233
5	rdfrfd	dfdf	fd	d
32	23	323	2	3
323	23	323	2	3
777	erer	rere	rere	rerer34343
1123	Titanic Rose	S.D.F Gasdras	2002/05/25	Novel
1124	Titanic Rose	S.D.F Gasdras	2002/05/25	Novel
3232	23	323	2	3
32323	23	323	2	3

## Get book details

Enter Book ID:

1124

Retrieve

## Update Book details #1124

Name:

Titanic Rose

Author:

S.D.F Gasdras

Published Date:

2002/05/25

Book Subject

Novel

Update

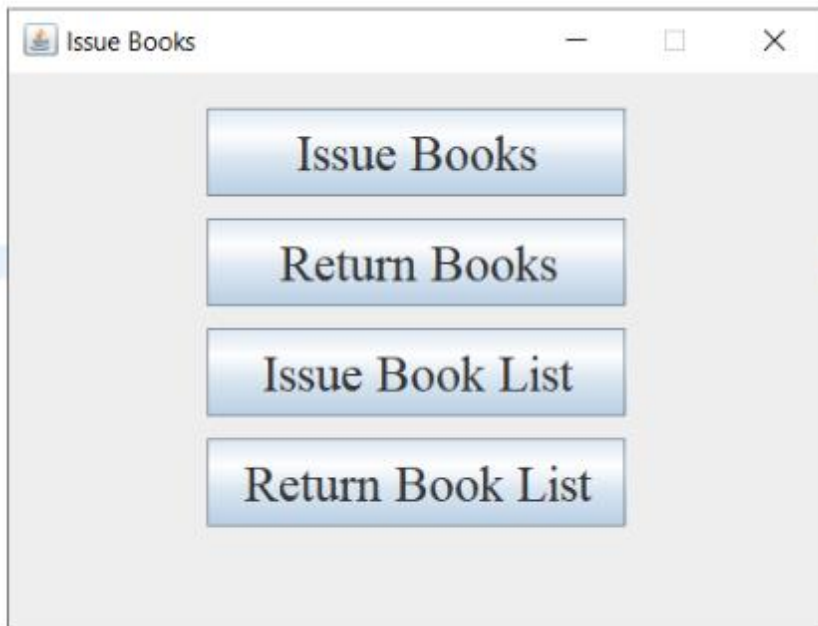
### Message



Book was updated successfully!

OK

## 5. Issue Books Publisher





Issue Book

User Id

Book Id

Period

Fill all the Feilds!

All the field Required!

OK

Issue

Return Book

User Id

Book Id

Return

Return Book

User Id

Book Id

Fill all the Feilds!

All the field Required!

OK

Return

## 6. Members Publisher

The image displays two screenshots of a software application. The top screenshot shows the 'Update Member' window, which has a title bar with a green icon and the text 'Update Member'. The window contains a section titled 'Get member details' with a label 'Enter Member ID:' and a text input field containing the number '1'. Below this is a blue button labeled 'Retrieve'. The second section is titled 'Update Member details 1' and contains four labels with corresponding text input fields: 'Name:' with 'John', 'Telephone:' with '0712234456', 'Registered Date:' with '01/04/2021', and 'City' with 'Colombo'. At the bottom of this section is a blue button labeled 'Update'. The bottom screenshot shows the 'Member management' window, which has a title bar with a green icon and the text 'Member management'. The window features a central title 'MEMBER MANAGEMENT' and five blue buttons arranged in a grid: 'New Member', 'All Members', 'Update Member', 'Delete Member', and 'Search Members'.

Update Member

Get member details

Enter Member ID: 1

Retrieve

Update Member details 1

Name: John

Telephone: 0712234456

Registered Date: 01/04/2021

City Colombo

Update

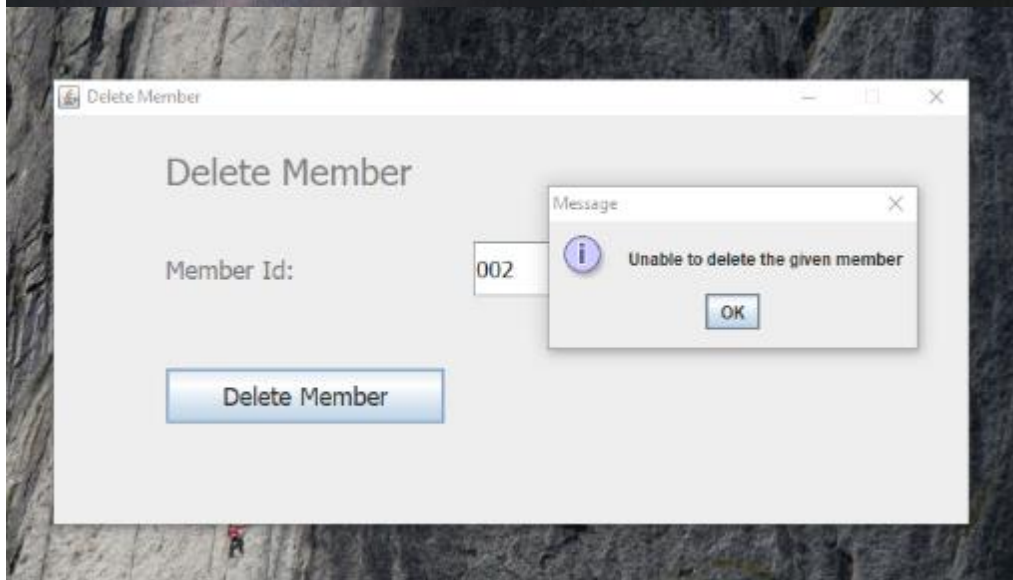
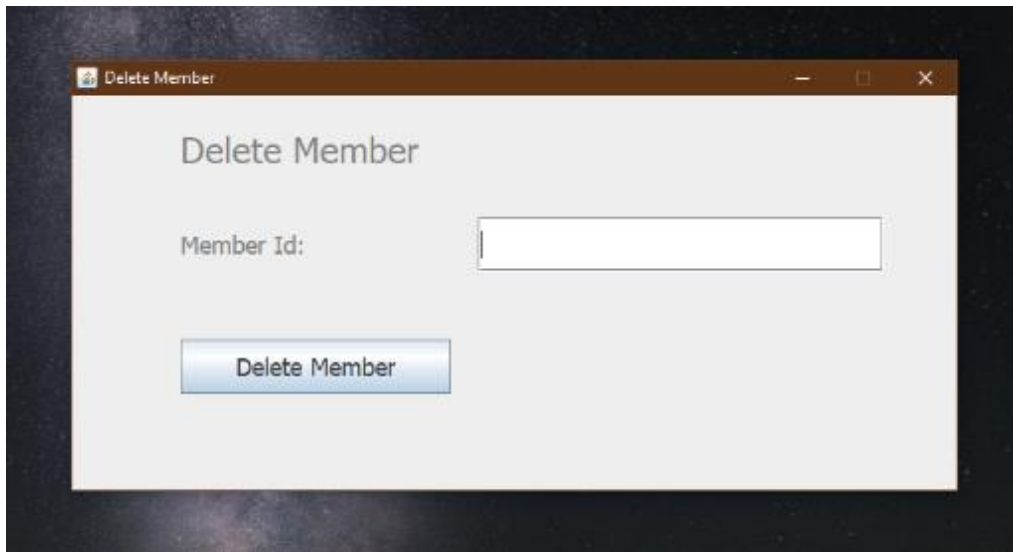
Member management

MEMBER MANAGEMENT

New Member All Members

Update Member Delete Member

Search Members



**Add New Member**

## Add Member

Member ID:

Name:

Telephone:

Registered Date:

City:

**Add Member**

**Search Members**

Filter:

MemID	Name	Telephone	Registered Date	City
Filter				

## 7. Staff Publisher

