



SRI LANKA INSTITUTE OF INFORMATION TECHNOLOGY

SOFTWARE ARCHITECTURE

Assignment 1

Group Members

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Scenario Introduction

This Publisher - Subscriber Scenario is designed using the OSGI framework. In this scenario there are 2 publishers and 2 Subscribers. In order to achieve this, we created 4 bundles. They are,

Publisher Bundles:

1. Publisher_AutoVehicles
2. Publisher_ManualVehicles

Subscriber Bundles:

1. Normal_Subscriber
2. Permanent_Subscriber (rewarded customer)

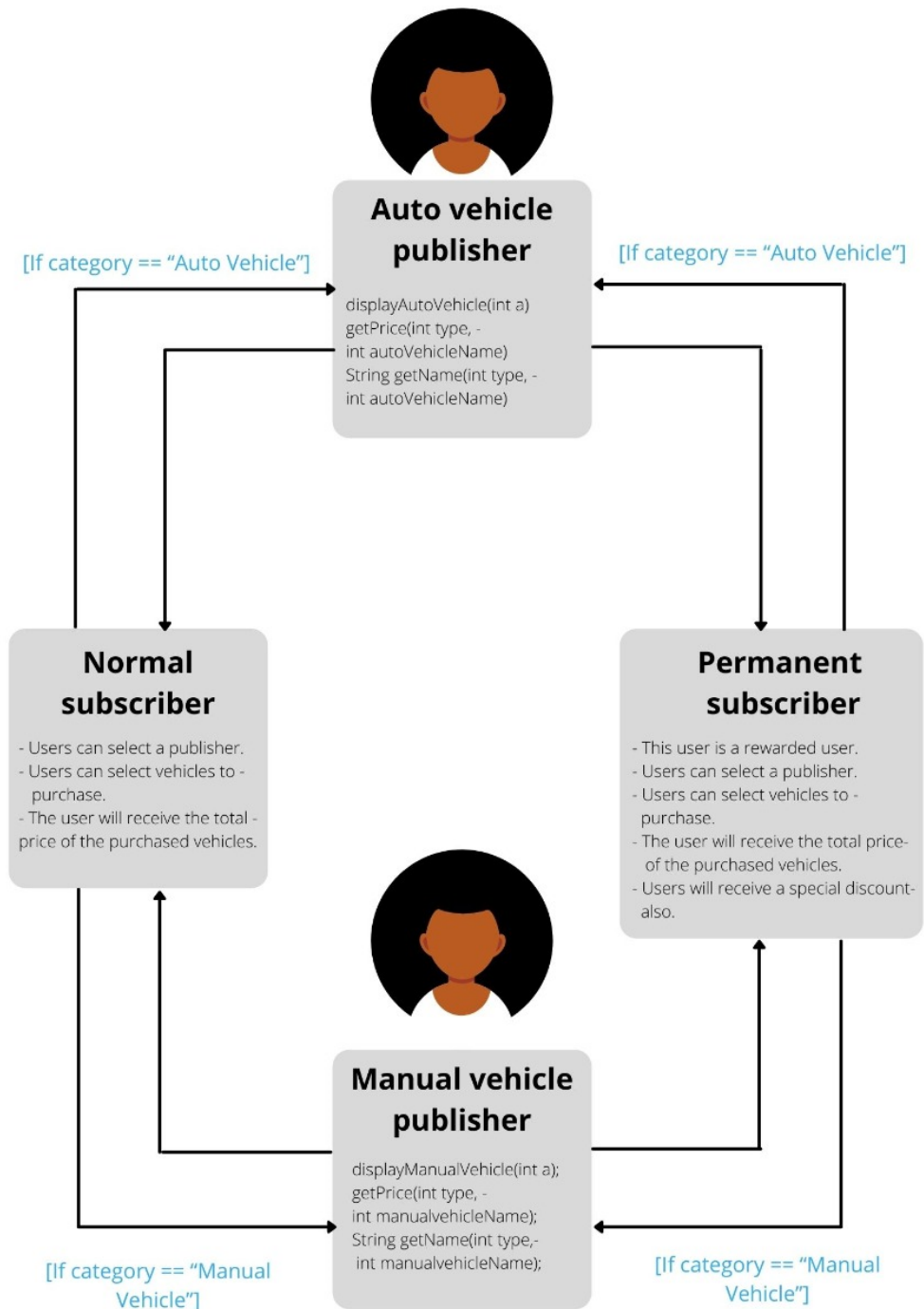
Publishers

Both publishers contain three classes. First one is the interface to define the services. Then there is the Impl class to implement the service methods. Service methods in Publisher_AutoVehicles are displayAutoVehicles: to display all the auto vehicles, getName: to return a auto vehicle name, getPrice: to return a auto vehicle price. In Publisher_ManualVehicle there are displayManualVehicles: this will display all the manual vehicles, getName: will return the name of a manual vehicle, getPrice: will return the price of a manual vehicle. And there is an Activator class to register the services.

Subscribers

Each subscriber bundle has an Activator class. With the use of service reference object, we can access the server Objects. After that subscribers can select auto or manual vehicles and get the total price of it. If the subscriber is a normal subscriber, they won't get a discount. Only the permanent subscribers will get a 10% discount from the total amount.

Scenario Using Diagrams



Publisher Bundle 1

Auto vehicle publisher Interface

- Void displayAutoVehicle(int a)
- Double getPrice(int type, int autoVehicleName)
- String getName(int type, int autoVehicleName)

Service Activator

Publisher Bundle 1

Service Activator

Publisher Bundle 2

Manual vehicle publisher Interface

- void displayManualVehicle(int a);
- Double getPrice(int type, int manualvehicleName);
- String getName(int type, int manualvehicleName);

Service Activator

Publisher Bundle 2

Service Activator

Manifest Implementation (Exported Services / Imported Services)

1. Publisher Manifest Files

- a) Publisher_AutoVehicle
 - Export Package – particular publisher package (publisher_autoVehicle)
 - Import Package – org.osgi.framework package

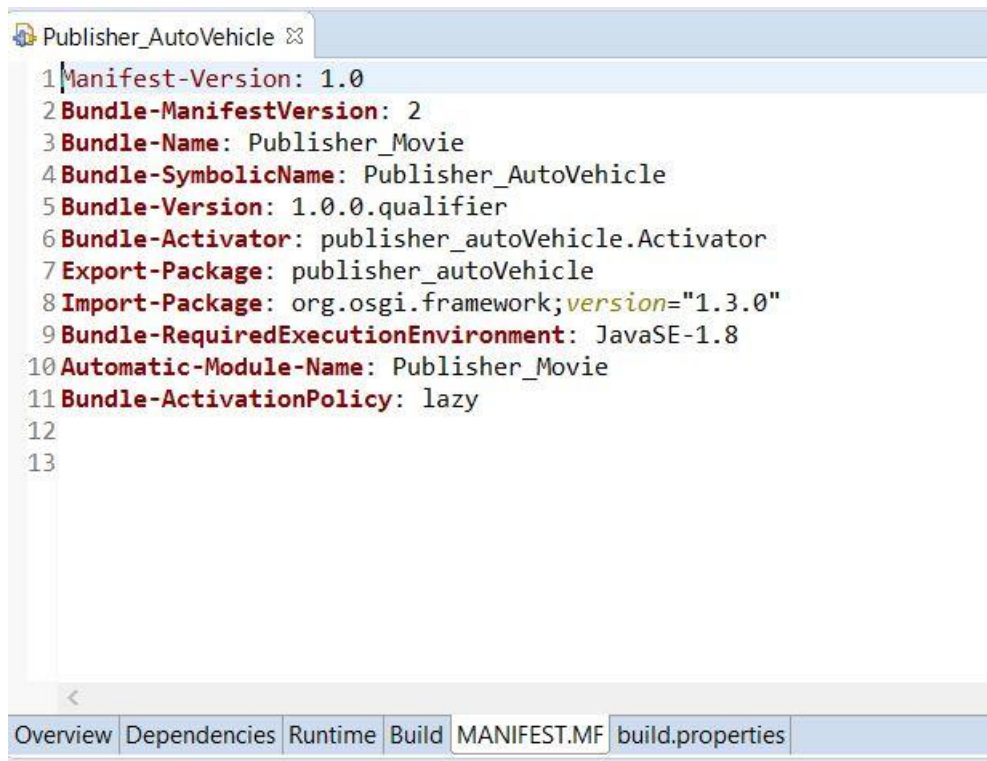
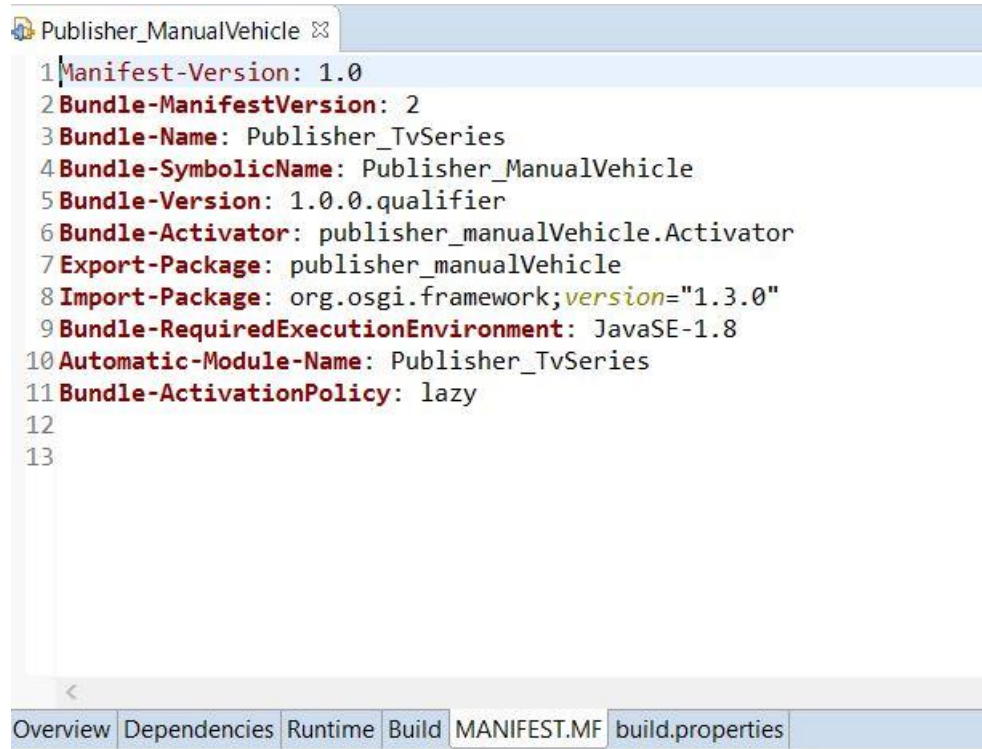


Figure 1: Manifest implementation of Auto Vehicle Publisher

b) Publisher_ManualVehicle

- Export Package – particular publisher package (publisher_manualVehicle)
- Import Package – org.osgi.framework package



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

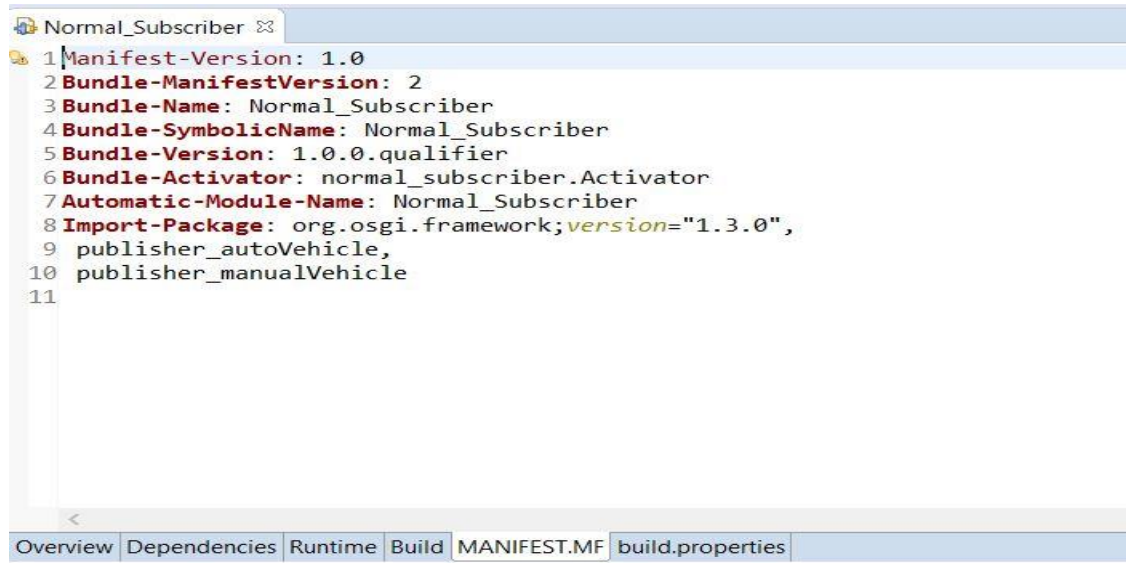
Overview Dependencies Runtime Build MANIFEST.MF build.properties

Figure 2: Manifest implementation of Manual Vehicle Publisher

2. Subscriber Manifest Files

a) Normal_Subscriber

- Export Package – No Export Packages
- Import Package –
 - org.osgi.framework
 - Publisher Packages
 - publisher_autoVehicle
 - publisher_manualVehicle



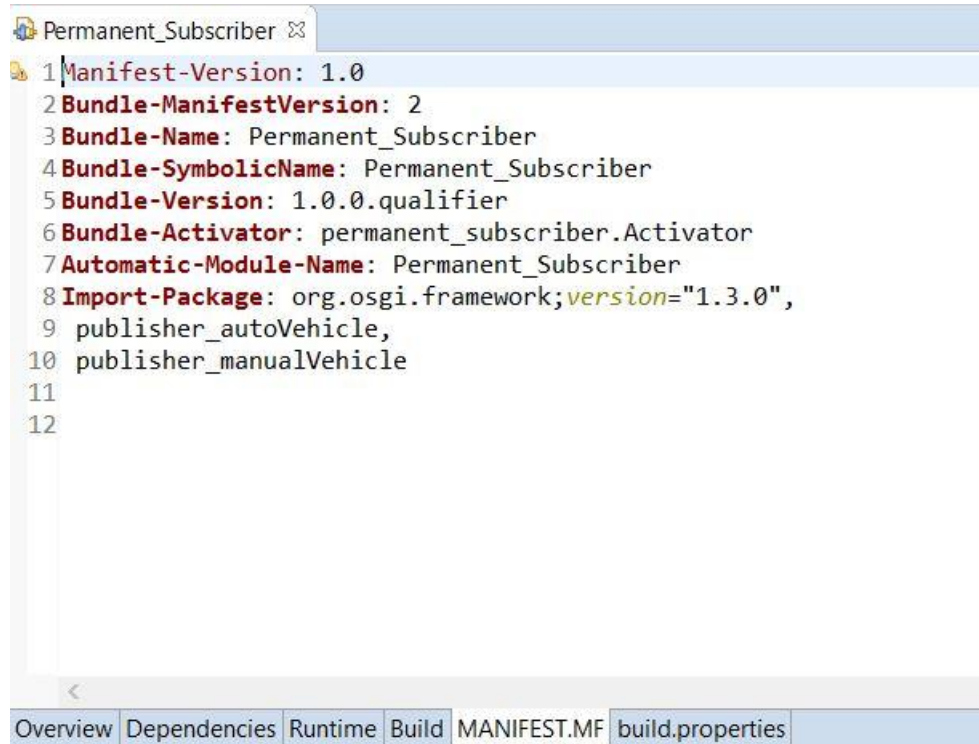
```
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: Normal_Subscriber
4 Bundle-SymbolicName: Normal_Subscriber
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: normal_subscriber.Activator
7 Automatic-Module-Name: Normal_Subscriber
8 Import-Package: org.osgi.framework;version="1.3.0",
9 publisher_autoVehicle,
10 publisher_manualVehicle
11
```

Overview Dependencies Runtime Build MANIFEST.MF build.properties

Figure 3: Manifest implementation of Normal Subscriber

b) Permanent_Subscriber

- Export Package – No Export Packages
- Import Package –
 - org.osgi.framework package
 - All the publisher packages
 - publisher_autoVehicle
 - publisher_manualVehicle



```
Permanent_Subscriber
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: Permanent_Subscriber
4 Bundle-SymbolicName: Permanent_Subscriber
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: permanent_subscriber.Activator
7 Automatic-Module-Name: Permanent_Subscriber
8 Import-Package: org.osgi.framework;version="1.3.0",
9 publisher_autoVehicle,
10 publisher_manualVehicle
11
12
```

Overview Dependencies Runtime Build MANIFEST.MF build.properties

Figure 4: Manifest implementation of Permanent Subscriber

Bundle install and run in OSGi framework

1. Publisher Installation

Run As → Run Configurations → Osgi Framework → New Configuration → Give a name → select workspace as Publisher Bundle name (export bundle name) → Run

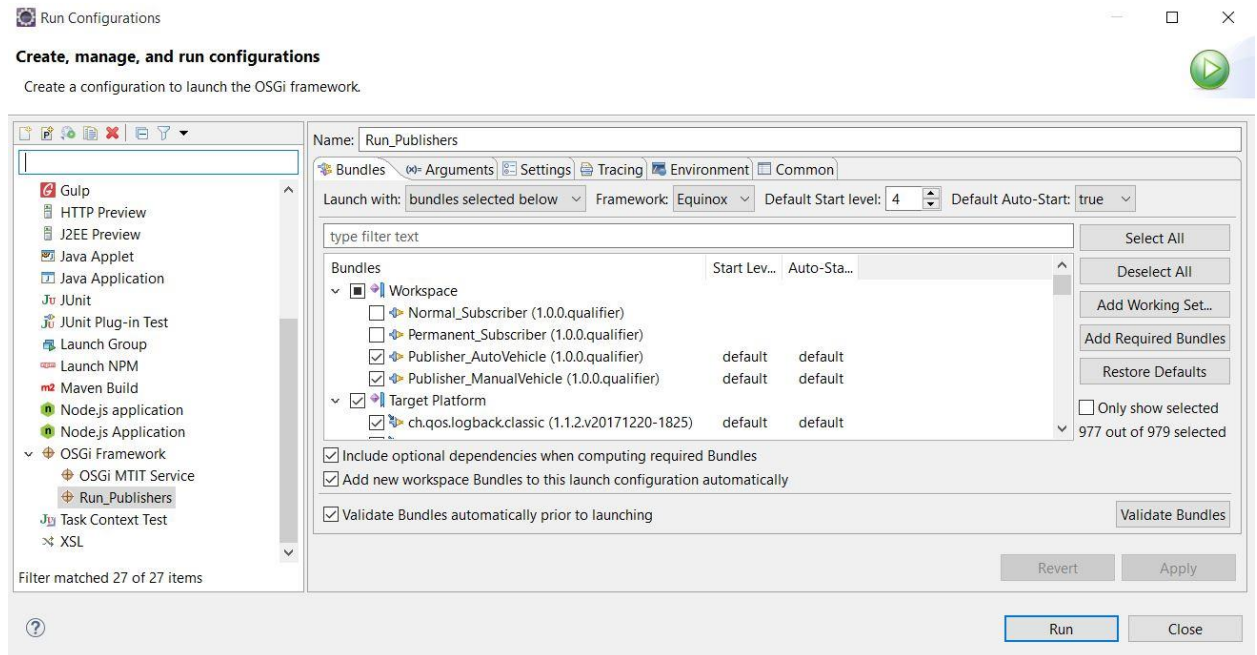


Figure 5: Publisher Installation

To clarify the installation of the bundles, Type SS in console. It will display the Active state on the installed bundles.

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

id      State      Bundle
0       ACTIVE      org.eclipse.osgi_3.15.200.v20200214-1600
                        Fragments=700
1       ACTIVE      org.eclipse.equinox.simpleconfigurator_1.3.500.v20200211-1505
2       ACTIVE      Publisher_AutoVehicle_1.0.0.qualifier
3       ACTIVE      Publisher_ManualVehicle_1.0.0.qualifier
4       ACTIVE      ch.qos.logback.classic_1.1.2.v20171220-1825
                        Fragments=591
```

Figure 6: Publisher Installation Active State

2. Subscriber Installation

Run As → Run Configurations → Osgi Framework → New Configuration → Give a name → select workspace as Publisher Bundles and Subscriber Bundle name → Run

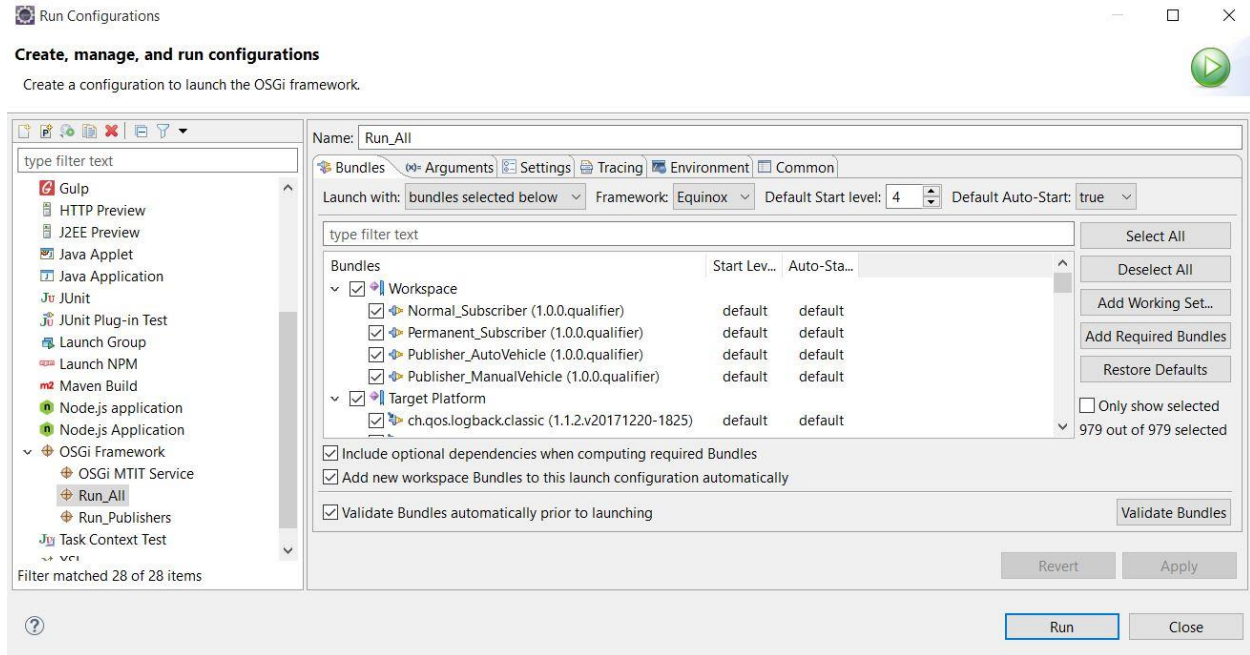


Figure 7: Subscriber Installation

To clarify the installation of the publisher and subscriber bundles, Type SS in console. It will display the Active state on the installed bundles.

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

id	State	Bundle
0	ACTIVE	org.eclipse.osgi_3.15.200.v20200214-1600 Fragments=702
1	ACTIVE	org.eclipse.equinox.simpleconfigurator_1.3.500.v20200211-1505
2	ACTIVE	Normal_Subscriber_1.0.0.qualifier
3	ACTIVE	Permanent_Subscriber_1.0.0.qualifier
4	ACTIVE	Publisher_AutoVehicle_1.0.0.qualifier
5	ACTIVE	Publisher_ManualVehicle_1.0.0.qualifier
6	ACTIVE	ch.qos.logback.classic_1.1.2.v20171220-1825 Fragments=593

Figure 8: Subscriber Installation Active State

Sample Screenshots of the Behavior & Outputs

```
osgi> stop 2
Normal Subscriber Has Stopped.

osgi> stop 3
Permanent Subscriber Has Stopped.

osgi> stop 4
Auto vehicle Publisher has Stopped

osgi> stop 5
Manual vehicle Publisher has Stopped
-----
```

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

id	State	Bundle
0	ACTIVE	org.eclipse.osgi_3.15.200.v20200214-1600 Fragments=702
1	ACTIVE	org.eclipse.equinox.simpleconfigurator_1.3.500.v20200211-1505
2	RESOLVED	Normal_Subscriber_1.0.0.qualifier
3	RESOLVED	Permanent_Subscriber_1.0.0.qualifier
4	RESOLVED	Publisher_AutoVehicle_1.0.0.qualifier
5	RESOLVED	Publisher_ManualVehicle_1.0.0.qualifier
6	ACTIVE	ch.qos.logback.classic_1.1.2.v20171220-1825 Fragments=593

Figure 9: Stop all bundles and checking the state of the bundles.

- **Normal Subscriber Behavior and Output**

```
osgi> start 2
Normal Subscriber has started.
Publishers:
1. Auto Vehicle
2. Manual Vehicle

Select a Category: 1

Type:
1. Auto SUV
2. Auto Sedan
3. Auto Hatchback

Press 0 to Exit

Select a Type: 2
1. Audi A4 :- $18.0
2. Toyota Yaris :- $28.0
3. Honda City :- $20.0
4. Hyundai Verna :- $22.0

Type -1 to exit from the Current Type.

Select Vehicle Name: 3
Select Vehicle Name: -1

Select a Type: 0
Purchased Items: [Toyota Yaris]
Total : $28.0
```

Figure 11: Normal Subscriber Behavior and Output. Purchased Items and Total price is displayed.

- **Permanent Subscriber Behavior and Output**

```
osgi> start 3
Permanent Subscriber has started.
Publishers:
1. Auto Vehicles
2. Manual Vehicles

Select a Category: 2
Type:
1. Manual SUV
2. Manual sedan
3. Manual Hatchback

Press 0 to Exit

Select a Type: 2
1. Nissan Sunny :- $18000.0
2. Mitsubishi Lancer :- $28000.0
3. 2016 Kia Forte :- $22000.0
4. Subaru WRX :- $31000.0

Type -1 to exit from the Current Type.

Select Manual Vehicle: 2
Select Manual Vehicle: -1

Select a Type: 0
Purchased Items: [Mitsubishi Lancer]
Discount Amount: $1400.0
Total : $26600.0
```

Figure 12: Permanent Subscriber Behavior and Output. Purchased Items, Total Price and the Discount amount is displayed according to the customers selected vehicles.

Individual Contributions

Student ID	Student Name	Individual Contributions
IT18121452	Kooragama K.G.C.M.	<ul style="list-style-type: none">• Permanent(rewarded) Subscriber Implementation with its manifest file.• Designing the high-level diagram• Contributions for the final report
IT18121902	Jayashanka L.R.W.D	<ul style="list-style-type: none">• Normal Subscriber Implementation with its manifest file.• Designing the high-level diagram• Contributions for the final report
IT18126884	Munasinghe J.A.	<ul style="list-style-type: none">• Auto vehicle Publisher Implementation with its manifest file.• Designing the high-level diagram• Contributions for the final report
IT18117738	Jayawardhana K.W.	<ul style="list-style-type: none">• Manual vehicle Publisher Implementation with its manifest file.• Designing the high-level diagram• Contributions for the final report