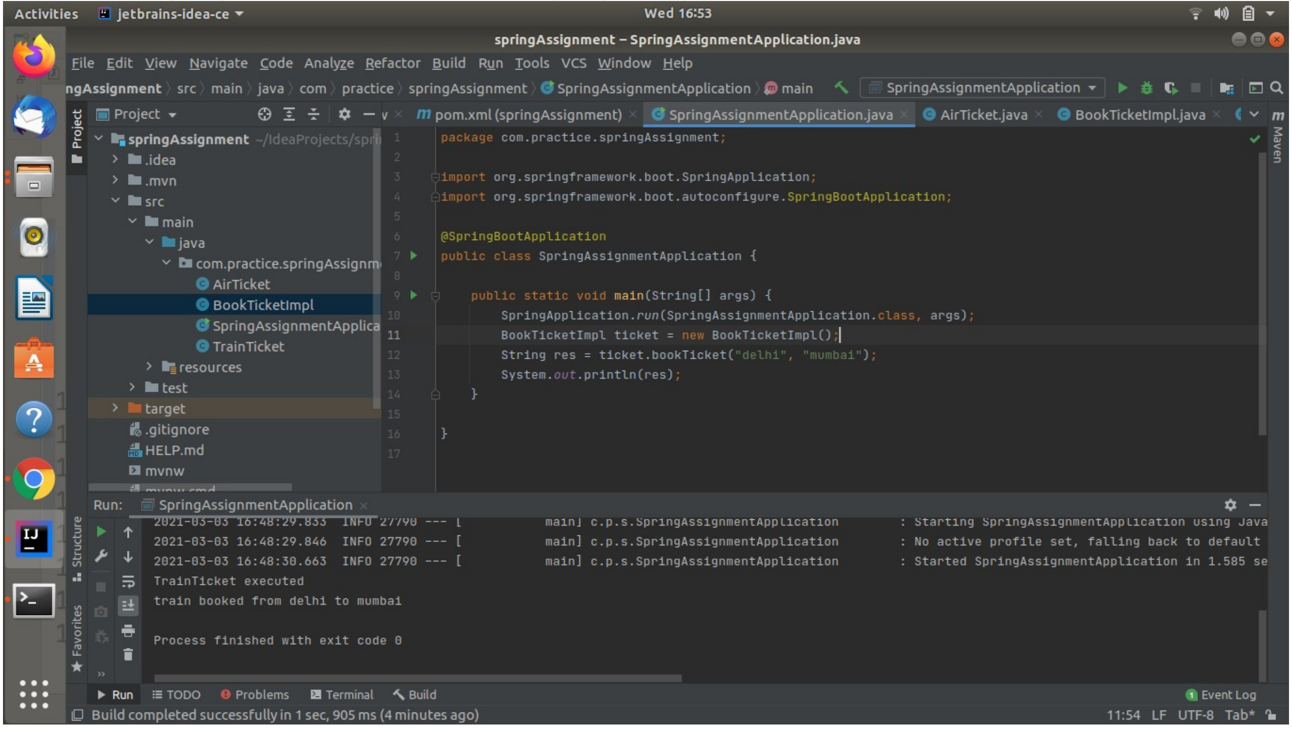
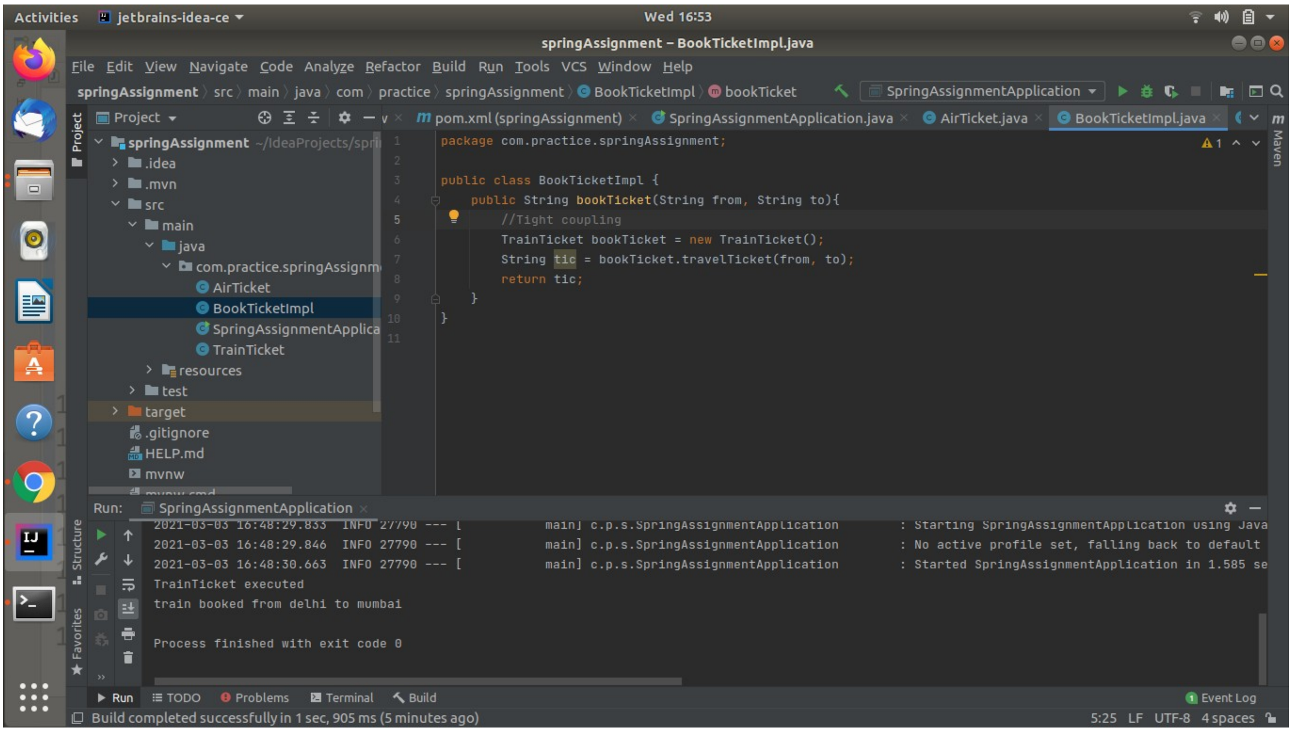
Q1: Write a program to demonstrate Tightly Coupled code.


springAssignment – SpringAssignmentApplication.java
pom.xml (springAssignment)
SpringAssignmentApplication.java
AirTicket.java
BookTicketImpl.java
Run: SpringAssignmentApplication
Build completed successfully in 1 sec, 905 ms (4 minutes ago)

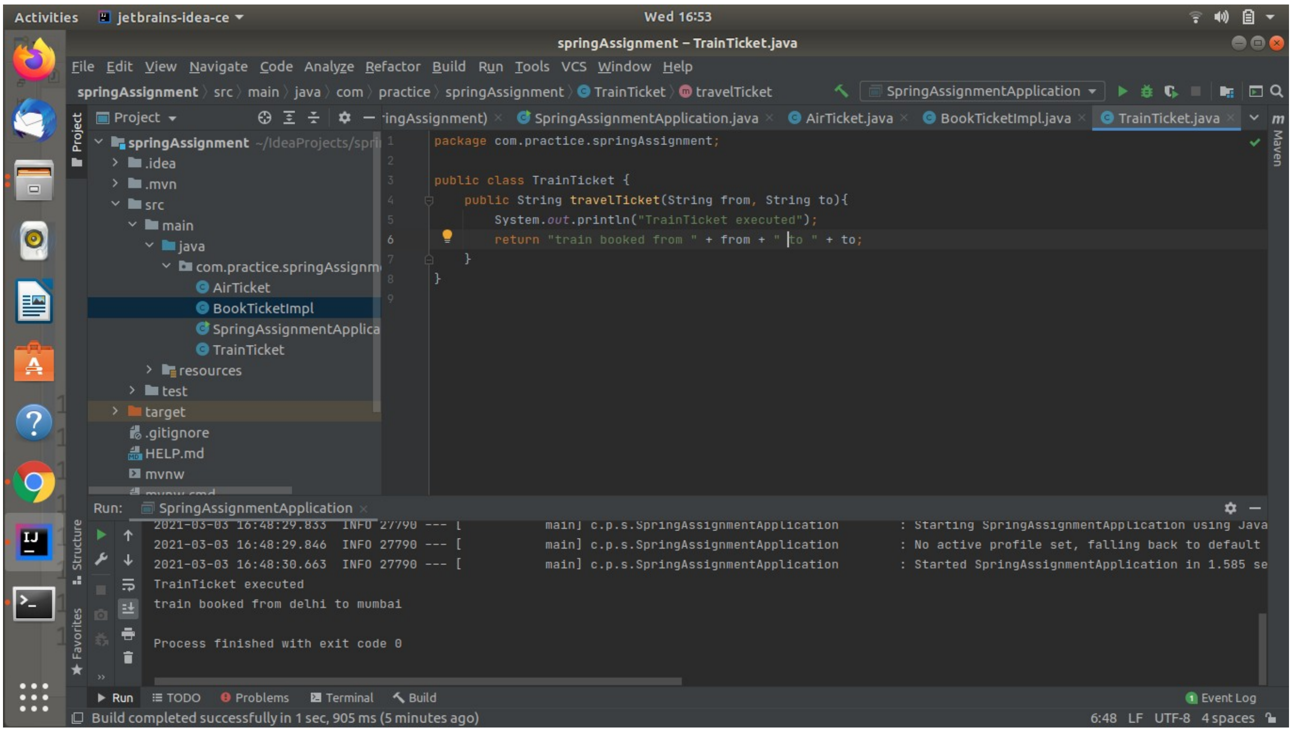
```java
package com.practice.springAssignment;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class SpringAssignmentApplication {

    public static void main(String[] args) {
        SpringApplication.run(SpringAssignmentApplication.class, args);
        BookTicketImpl ticket = new BookTicketImpl();
        String res = ticket.bookTicket("delhi", "mumbai");
        System.out.println(res);
    }

}
```

```
2021-03-03 16:48:29.833  INFO 27790 --- [           main] c.p.s.SpringAssignmentApplication        : Starting SpringAssignmentApplication using Java
2021-03-03 16:48:29.846  INFO 27790 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 16:48:30.663  INFO 27790 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 1.585 se
TrainTicket executed
train booked from delhi to mumbai

Process finished with exit code 0
```


springAssignment – BookTicketImpl.java
pom.xml (springAssignment)
SpringAssignmentApplication.java
AirTicket.java
BookTicketImpl.java
Run: SpringAssignmentApplication
Build completed successfully in 1 sec, 905 ms (5 minutes ago)

```java
package com.practice.springAssignment;

public class BookTicketImpl {
    public String bookTicket(String from, String to){
        //Tight coupling
        TrainTicket bookTicket = new TrainTicket();
        String tic = bookTicket.travelTicket(from, to);
        return tic;
    }
}
```

```
2021-03-03 16:48:29.833  INFO 27790 --- [           main] c.p.s.SpringAssignmentApplication        : Starting SpringAssignmentApplication using Java
2021-03-03 16:48:29.846  INFO 27790 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 16:48:30.663  INFO 27790 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 1.585 se
TrainTicket executed
train booked from delhi to mumbai

Process finished with exit code 0
```


Activities
jetbrains-idea-ce
Wed 16:53
springAssignment – TrainTicket.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
springAssignment 〉 src 〉 main 〉 java 〉 com 〉 practice 〉 springAssignment 〉 TrainTicket 〉 travelTicket
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com.practice.springAssignm
AirTicket
BookTicketImpl
SpringAssignmentApplica
TrainTicket
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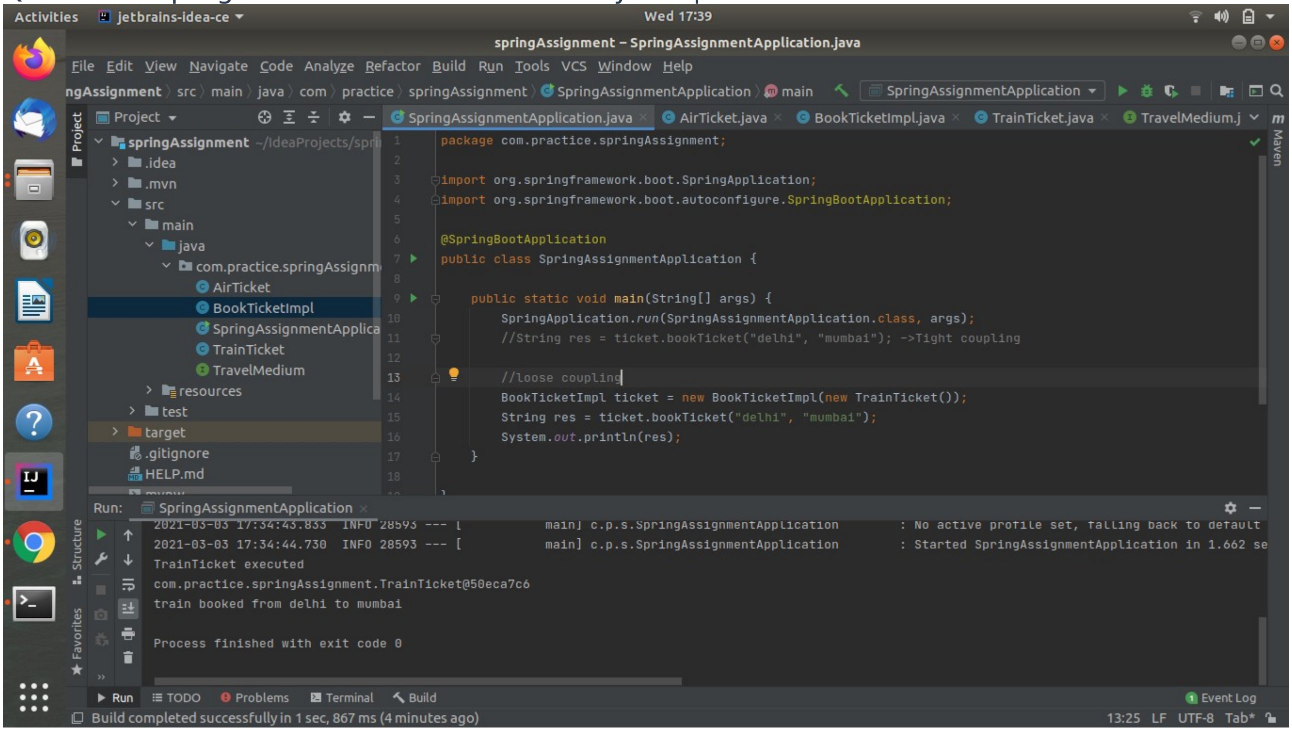
.gitignore
HELP.md
mvnw
Structure
Favorites
Maven
Run: SpringAssignmentApplication
Run TODO Problems Terminal Build
Event Log
6:48 LF UTF-8 4 spaces

```java
package com.practice.springAssignment;

public class TrainTicket {
    public String travelTicket(String from, String to){
        System.out.println("TrainTicket executed");
        return "train booked from " + from + " to " + to;
    }
}
```

```
2021-03-03 16:48:29.833  INFO 27790 --- [           main] c.p.s.SpringAssignmentApplication        : Starting SpringAssignmentApplication using Java
2021-03-03 16:48:29.846  INFO 27790 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 16:48:30.663  INFO 27790 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 1.585 se
TrainTicket executed
train booked from delhi to mumbai

Process finished with exit code 0
```

Build completed successfully in 1 sec, 905 ms (5 minutes ago)

Q2: Write a program to demonstrate Loosely Coupled code.



springAssignment – SpringAssignmentApplication.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
SpringAssignmentApplication.java
AirTicket.java
BookTicketImpl.java
TrainTicket.java
TravelMedium.j
springAssignment ~/IdeaProjects/spri
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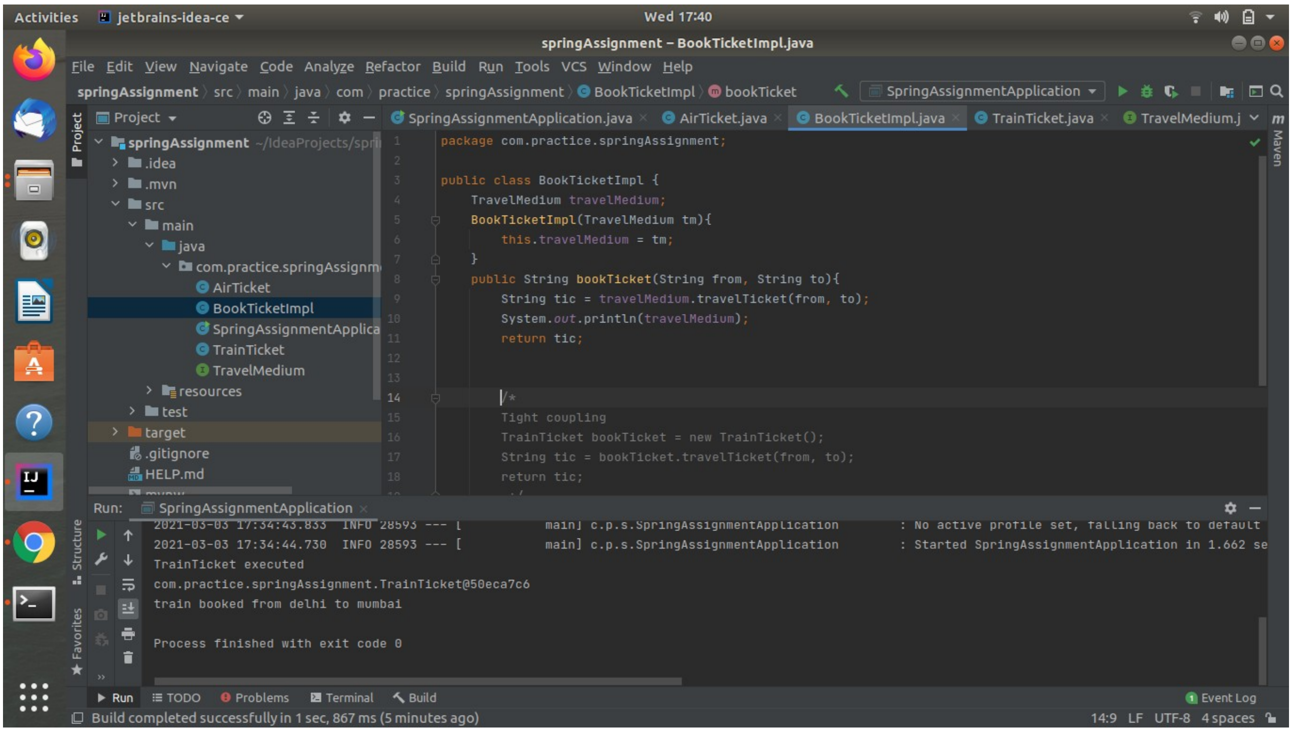
com.practice.springAssignm
AirTicket
BookTicketImpl
SpringAssignmentApplica
TrainTicket
TravelMedium
resources
test
target
.gitignore
HELP.md
Run: SpringAssignmentApplication

```java
package com.practice.springAssignment;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class SpringAssignmentApplication {

    public static void main(String[] args) {
        SpringApplication.run(SpringAssignmentApplication.class, args);
        //String res = ticket.bookTicket("delhi", "mumbai"); ->Tight coupling

        //loose coupling
        BookTicketImpl ticket = new BookTicketImpl(new TrainTicket());
        String res = ticket.bookTicket("delhi", "mumbai");
        System.out.println(res);
    }

}
```

```
2021-03-03 17:34:43.833  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 17:34:44.730  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 1.662 se
TrainTicket executed
com.practice.springAssignment.TrainTicket@50eca7c6
train booked from delhi to mumbai

Process finished with exit code 0
```

Build completed successfully in 1 sec, 867 ms (4 minutes ago)

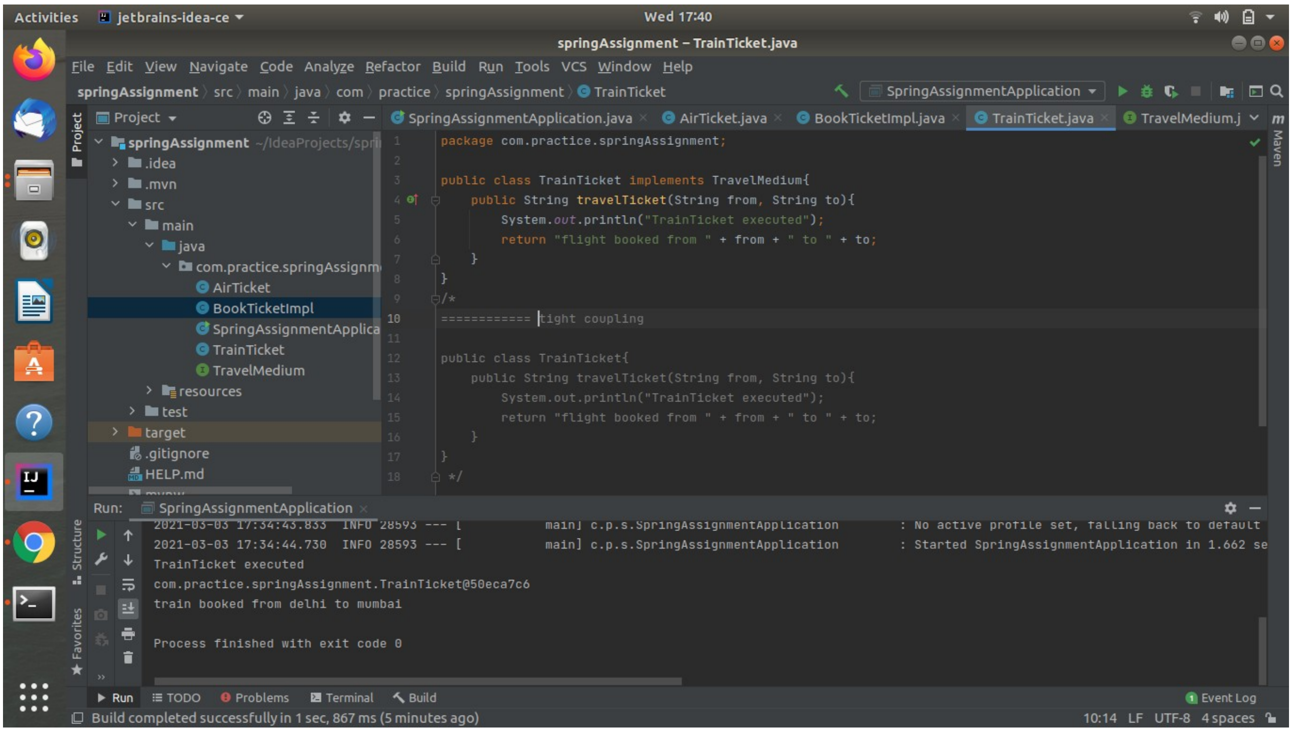


springAssignment – BookTicketImpl.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
SpringAssignmentApplication.java
AirTicket.java
BookTicketImpl.java
TrainTicket.java
TravelMedium.j
Run: SpringAssignmentApplication

```java
package com.practice.springAssignment;

public class BookTicketImpl {
    TravelMedium travelMedium;
    BookTicketImpl(TravelMedium tm){
        this.travelMedium = tm;
    }
    public String bookTicket(String from, String to){
        String tic = travelMedium.travelTicket(from, to);
        System.out.println(travelMedium);
        return tic;


        /*
        Tight coupling
        TrainTicket bookTicket = new TrainTicket();
        String tic = bookTicket.travelTicket(from, to);
        return tic;
```

```
2021-03-03 17:34:43.833  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 17:34:44.730  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 1.662 se
TrainTicket executed
com.practice.springAssignment.TrainTicket@50eca7c6
train booked from delhi to mumbai

Process finished with exit code 0
```

Build completed successfully in 1 sec, 867 ms (5 minutes ago)


Activities
jetbrains-idea-ce
Wed 17:40
springAssignment – TrainTicket.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
springAssignment src main java com practice springAssignment TrainTicket
SpringAssignmentApplication
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BookTicketImpl
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TrainTicket
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.gitignore
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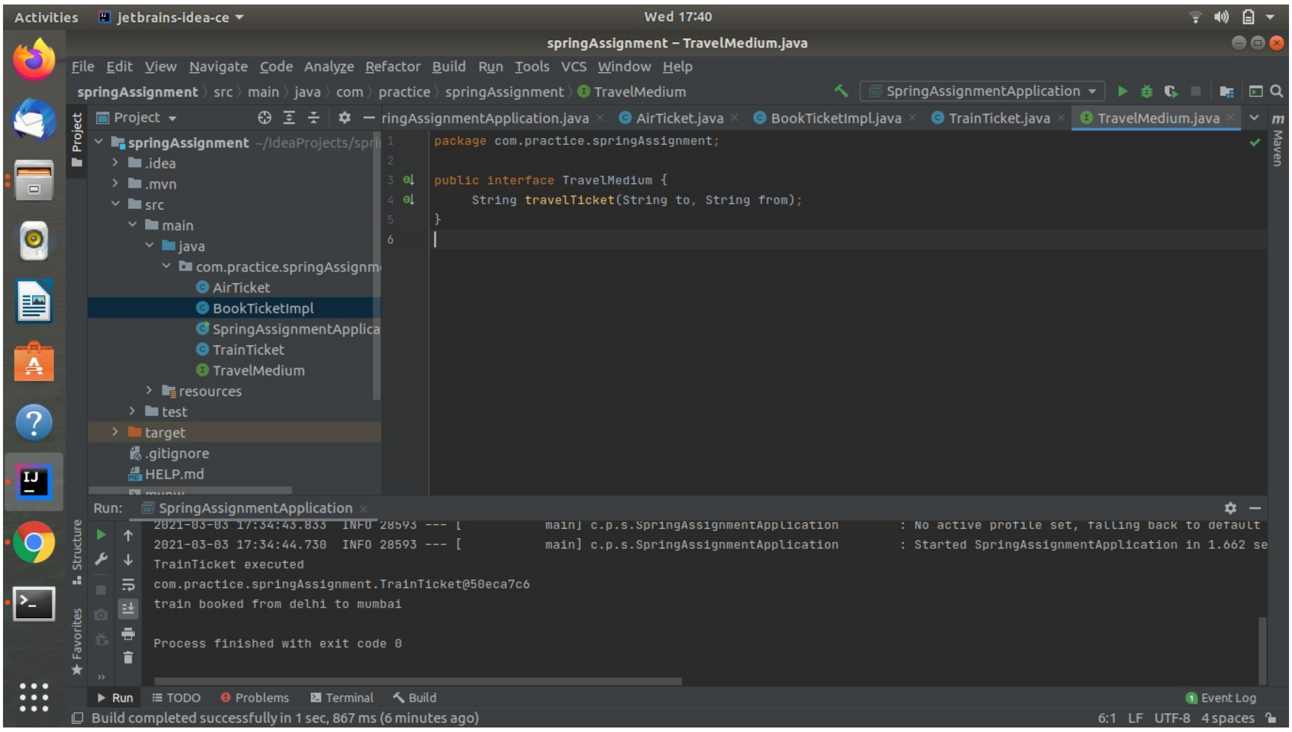
SpringAssignmentApplication.java
AirTicket.java
BookTicketImpl.java
TrainTicket.java
TravelMedium.j
Maven
Run:
SpringAssignmentApplication
Structure
Favorites
Run
TODO
Problems
Terminal
Build
Event Log
10:14 LF UTF-8 4 spaces

```
package com.practice.springAssignment;

public class TrainTicket implements TravelMedium{
    public String travelTicket(String from, String to){
        System.out.println("TrainTicket executed");
        return "flight booked from " + from + " to " + to;
    }
}
/*
============ tight coupling

public class TrainTicket{
    public String travelTicket(String from, String to){
        System.out.println("TrainTicket executed");
        return "flight booked from " + from + " to " + to;
    }
}
 */
```

```
2021-03-03 17:34:43.833  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 17:34:44.730  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 1.662 se
TrainTicket executed
com.practice.springAssignment.TrainTicket@50eca7c6
train booked from delhi to mumbai

Process finished with exit code 0
```

Build completed successfully in 1 sec, 867 ms (5 minutes ago)


Activities
jetbrains-idea-ce
Wed 17:40
springAssignment – TravelMedium.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
springAssignment src main java com practice springAssignment TravelMedium
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BookTicketImpl.java
TrainTicket.java
TravelMedium.java
Maven
Run:
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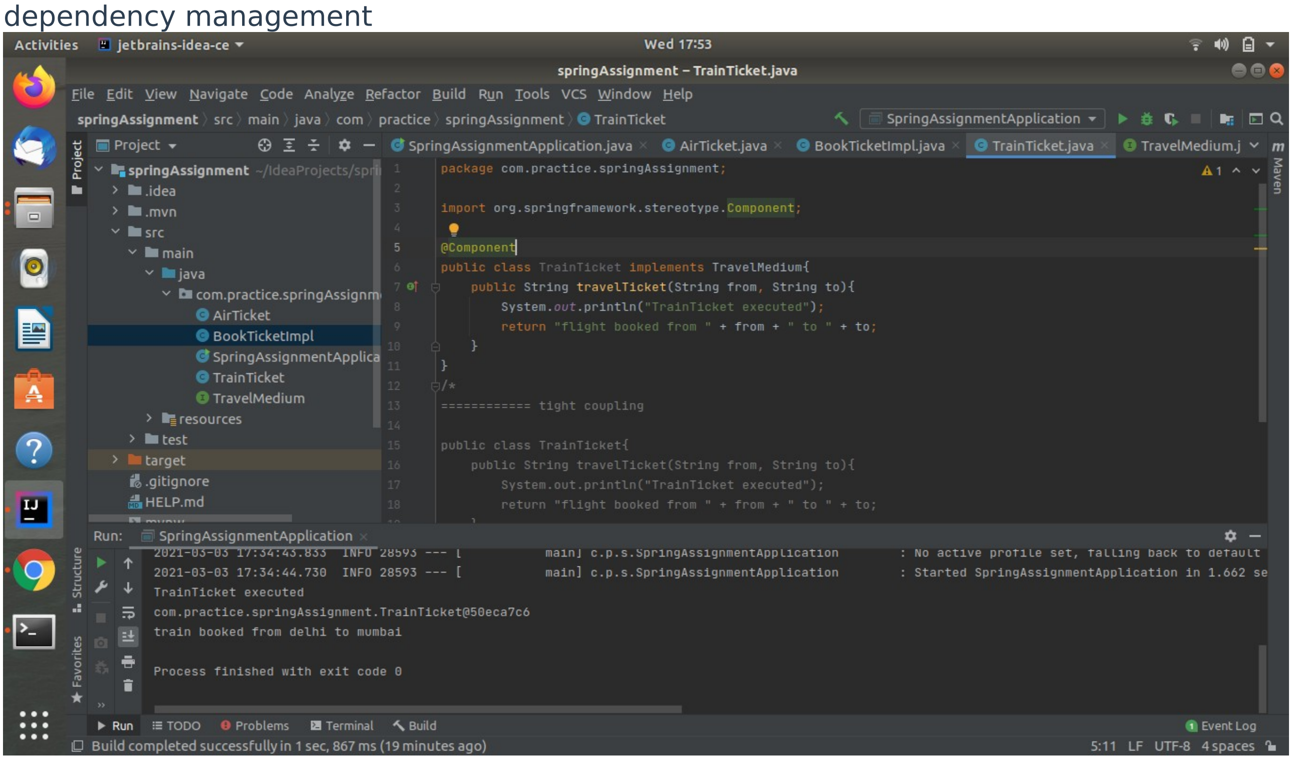
Favorites
Run
TODO
Problems
Terminal
Build
Event Log
6:1 LF UTF-8 4 spaces

```
package com.practice.springAssignment;

public interface TravelMedium {
     String travelTicket(String to, String from);
}

```

```
2021-03-03 17:34:43.833  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 17:34:44.730  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 1.662 se
TrainTicket executed
com.practice.springAssignment.TrainTicket@50eca7c6
train booked from delhi to mumbai

Process finished with exit code 0
```

Build completed successfully in 1 sec, 867 ms (6 minutes ago)

Q3: Use @Compenent and @Autowired annotations to in Loosely Coupled code for dependency management



Activities
jetbrains-idea-ce
Wed 17:53
springAssignment – TrainTicket.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
springAssignment 〉 src 〉 main 〉 java 〉 com 〉 practice 〉 springAssignment 〉 TrainTicket
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SpringAssignmentApplication.java
AirTicket.java
BookTicketImpl.java
TrainTicket.java
TravelMedium.j
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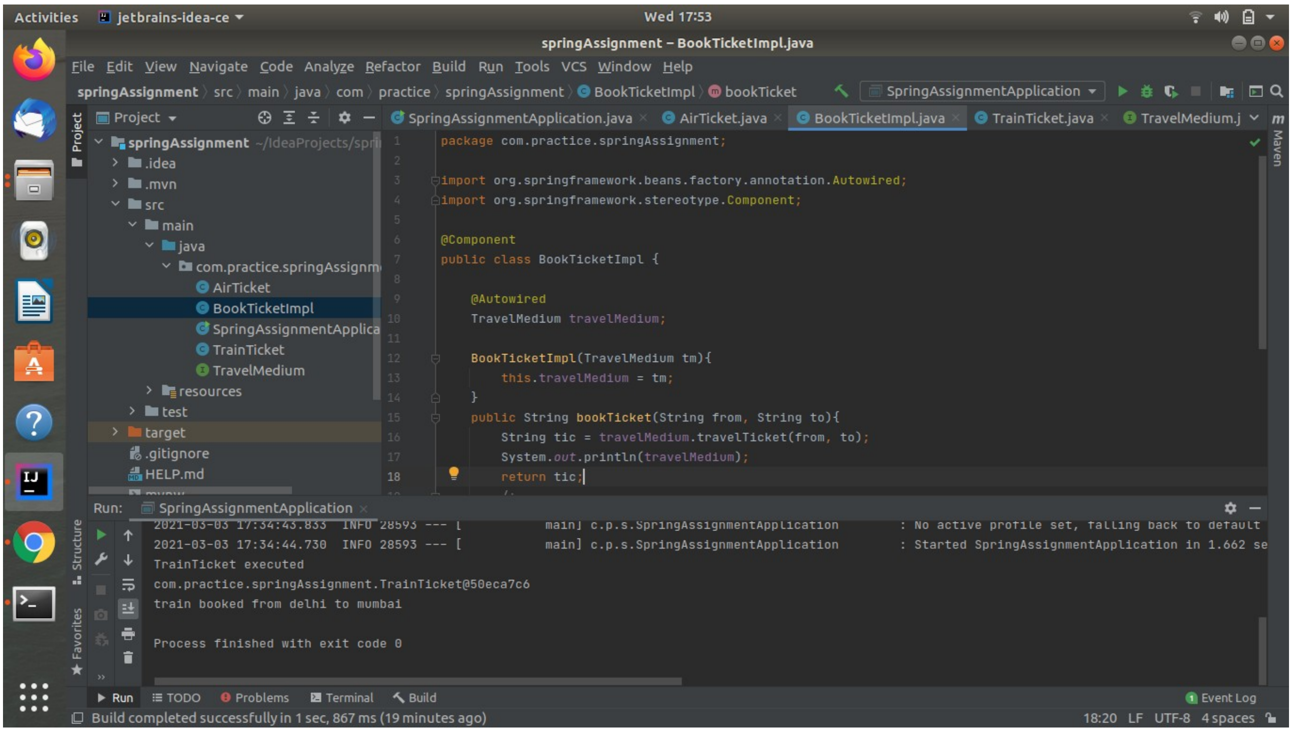
com.practice.springAssignm
AirTicket
BookTicketImpl
SpringAssignmentApplica
TrainTicket
TravelMedium
resources
test
target
.gitignore
HELP.md
Run: SpringAssignmentApplication
Run
TODO
Problems
Terminal
Build
Event Log
Build completed successfully in 1 sec, 867 ms (19 minutes ago)
5:11 LF UTF-8 4 spaces

```
package com.practice.springAssignment;

import org.springframework.stereotype.Component;

@Component
public class TrainTicket implements TravelMedium{
    public String travelTicket(String from, String to){
        System.out.println("TrainTicket executed");
        return "flight booked from " + from + " to " + to;
    }
}
/*
============ tight coupling

public class TrainTicket{
    public String travelTicket(String from, String to){
        System.out.println("TrainTicket executed");
        return "flight booked from " + from + " to " + to;
```

```
2021-03-03 17:34:43.833  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 17:34:44.730  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 1.662 se
TrainTicket executed
com.practice.springAssignment.TrainTicket@50eca7c6
train booked from delhi to mumbai

Process finished with exit code 0
```



Activities
jetbrains-idea-ce
Wed 17:53
springAssignment – BookTicketImpl.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
springAssignment 〉 src 〉 main 〉 java 〉 com 〉 practice 〉 springAssignment 〉 BookTicketImpl 〉 bookTicket
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SpringAssignmentApplication.java
AirTicket.java
BookTicketImpl.java
TrainTicket.java
TravelMedium.j
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BookTicketImpl
SpringAssignmentApplica
TrainTicket
TravelMedium
resources
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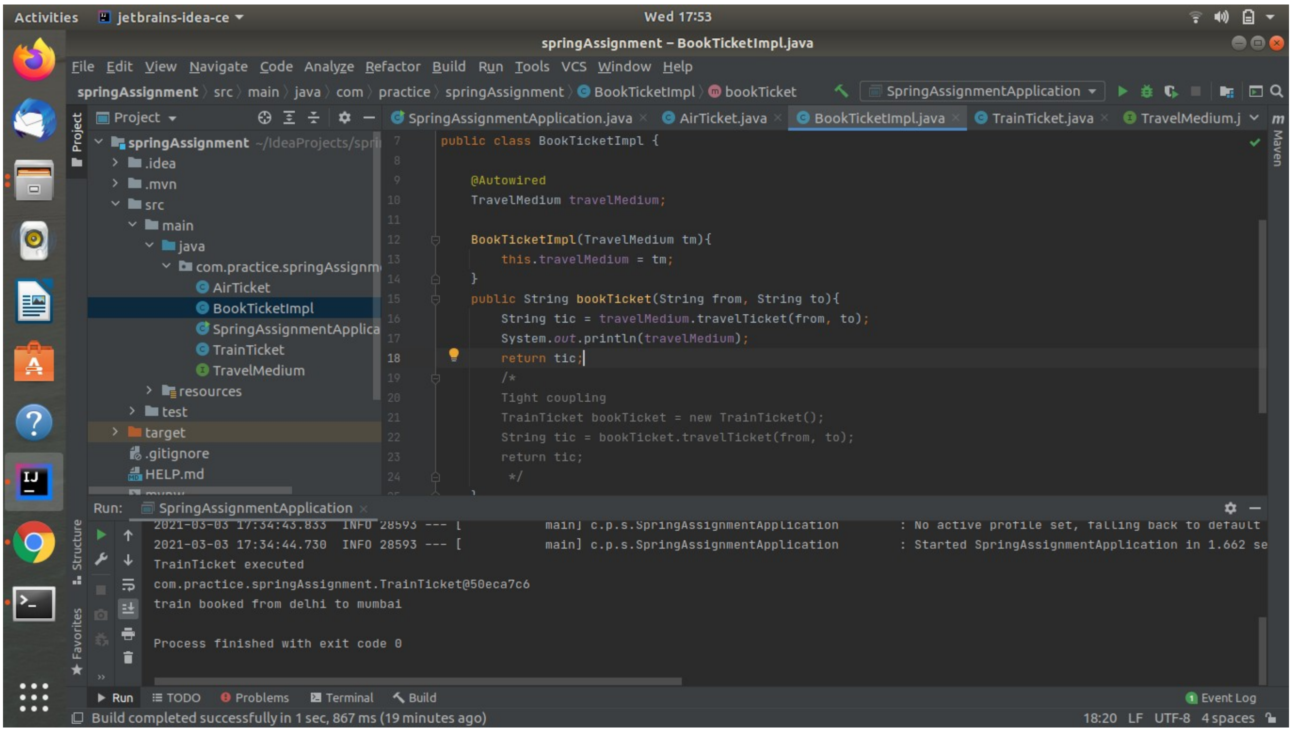
HELP.md
Run: SpringAssignmentApplication
Run
TODO
Problems
Terminal
Build
Event Log
Build completed successfully in 1 sec, 867 ms (19 minutes ago)
18:20 LF UTF-8 4 spaces

```
package com.practice.springAssignment;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Component;

@Component
public class BookTicketImpl {

    @Autowired
    TravelMedium travelMedium;

    BookTicketImpl(TravelMedium tm){
        this.travelMedium = tm;
    }
    public String bookTicket(String from, String to){
        String tic = travelMedium.travelTicket(from, to);
        System.out.println(travelMedium);
        return tic;
```

```
2021-03-03 17:34:43.833  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 17:34:44.730  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 1.662 se
TrainTicket executed
com.practice.springAssignment.TrainTicket@50eca7c6
train booked from delhi to mumbai

Process finished with exit code 0
```



Activities
jetbrains-idea-ce
Wed 17:53
springAssignment – BookTicketImpl.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
springAssignment 〉 src 〉 main 〉 java 〉 com 〉 practice 〉 springAssignment 〉 BookTicketImpl 〉 bookTicket
SpringAssignmentApplication
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SpringAssignmentApplication.java
AirTicket.java
BookTicketImpl.java
TrainTicket.java
TravelMedium.j
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TrainTicket
TravelMedium
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Run:
SpringAssignmentApplication
Run
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Terminal
Build
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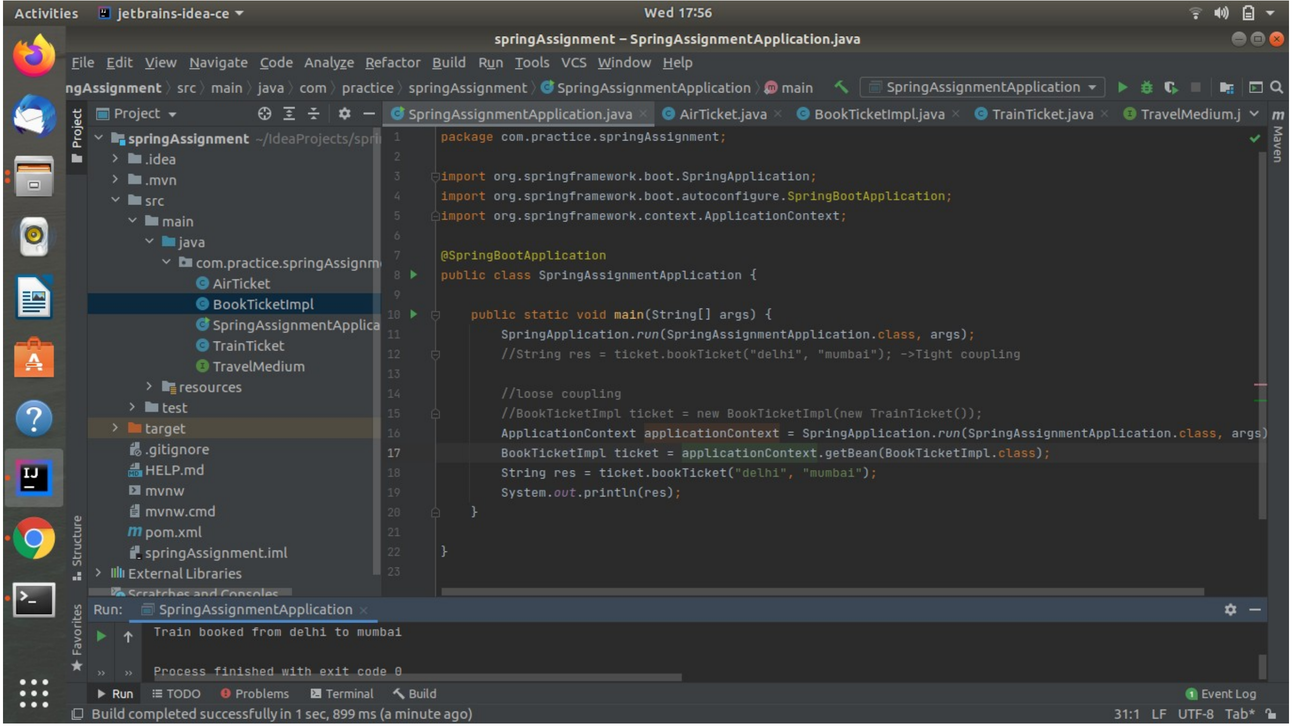
18:20 LF UTF-8 4 spaces

```java
public class BookTicketImpl {

    @Autowired
    TravelMedium travelMedium;

    BookTicketImpl(TravelMedium tm){
        this.travelMedium = tm;
    }
    public String bookTicket(String from, String to){
        String tic = travelMedium.travelTicket(from, to);
        System.out.println(travelMedium);
        return tic;
        /*
        Tight coupling
        TrainTicket bookTicket = new TrainTicket();
        String tic = bookTicket.travelTicket(from, to);
        return tic;
         */
```

```
2021-03-03 17:34:43.833  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 17:34:44.730  INFO 28593 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 1.662 se
TrainTicket executed
com.practice.springAssignment.TrainTicket@50eca7c6
train booked from delhi to mumbai

Process finished with exit code 0
```

Build completed successfully in 1 sec, 867 ms (19 minutes ago)

Q4: Get a Spring Bean from application context and display its properties.

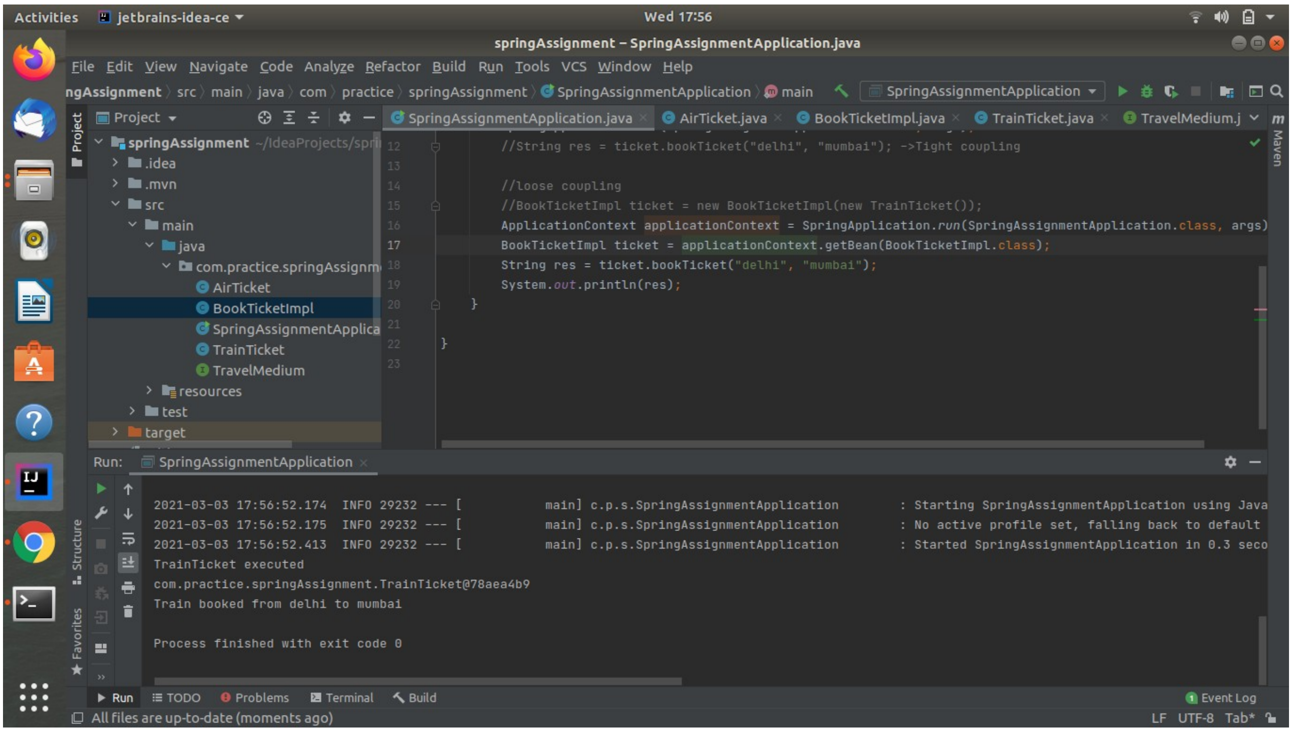


springAssignment – SpringAssignmentApplication.java

```java
package com.practice.springAssignment;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.context.ApplicationContext;

@SpringBootApplication
public class SpringAssignmentApplication {

    public static void main(String[] args) {
        SpringApplication.run(SpringAssignmentApplication.class, args);
        //String res = ticket.bookTicket("delhi", "mumbai"); ->Tight coupling

        //loose coupling
        //BookTicketImpl ticket = new BookTicketImpl(new TrainTicket());
        ApplicationContext applicationContext = SpringApplication.run(SpringAssignmentApplication.class, args)
        BookTicketImpl ticket = applicationContext.getBean(BookTicketImpl.class);
        String res = ticket.bookTicket("delhi", "mumbai");
        System.out.println(res);
    }

}
```

```
Train booked from delhi to mumbai

Process finished with exit code 0
```

Build completed successfully in 1 sec, 899 ms (a minute ago)

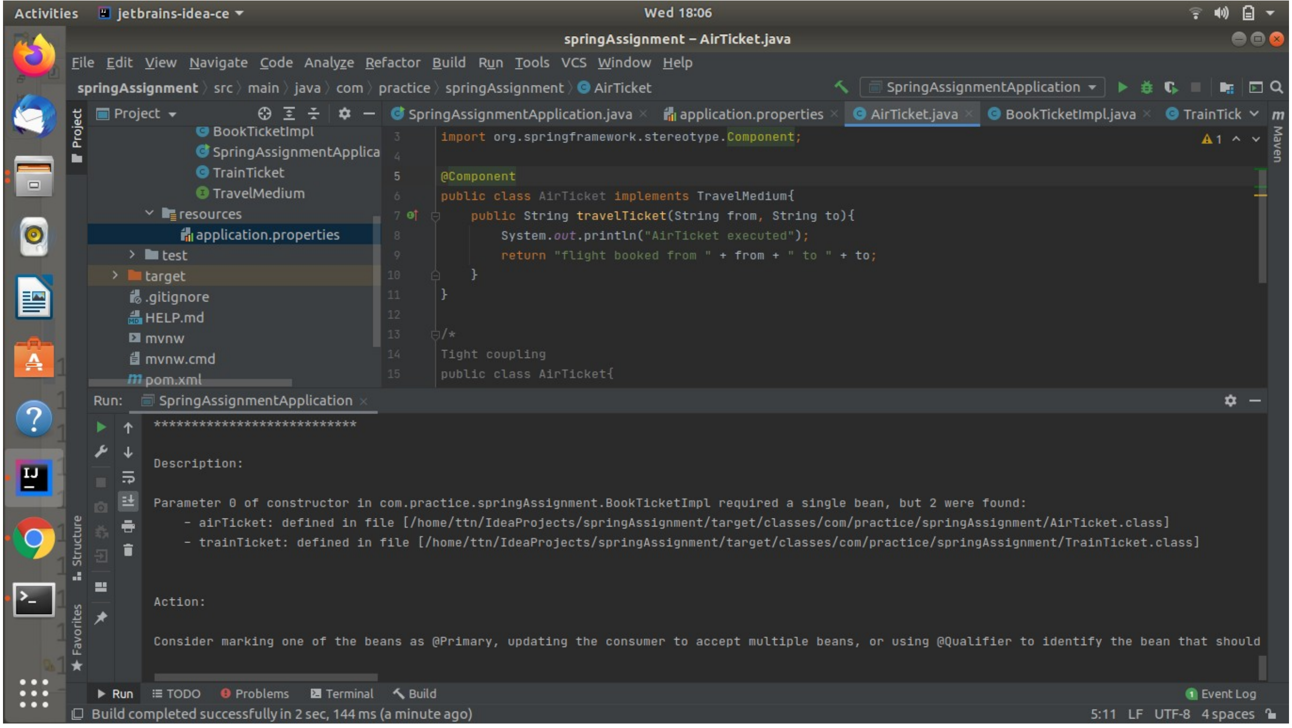


```java
        //String res = ticket.bookTicket("delhi", "mumbai"); ->Tight coupling

        //loose coupling
        //BookTicketImpl ticket = new BookTicketImpl(new TrainTicket());
        ApplicationContext applicationContext = SpringApplication.run(SpringAssignmentApplication.class, args)
        BookTicketImpl ticket = applicationContext.getBean(BookTicketImpl.class);
        String res = ticket.bookTicket("delhi", "mumbai");
        System.out.println(res);
    }

}
```

```
2021-03-03 17:56:52.174  INFO 29232 --- [           main] c.p.s.SpringAssignmentApplication        : Starting SpringAssignmentApplication using Java
2021-03-03 17:56:52.175  INFO 29232 --- [           main] c.p.s.SpringAssignmentApplication        : No active profile set, falling back to default
2021-03-03 17:56:52.413  INFO 29232 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 0.3 seco
TrainTicket executed
com.practice.springAssignment.TrainTicket@78aea4b9
Train booked from delhi to mumbai

Process finished with exit code 0
```

All files are up-to-date (moments ago)

Q5:Demonstrate how you will resolve ambiguity while autowiring bean (Hint : @Primary)


Activities
jetbrains-idea-ce
Wed 18:06
springAssignment – AirTicket.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
springAssignment src main java com practice springAssignment AirTicket
SpringAssignmentApplication
Project
BookTicketImpl
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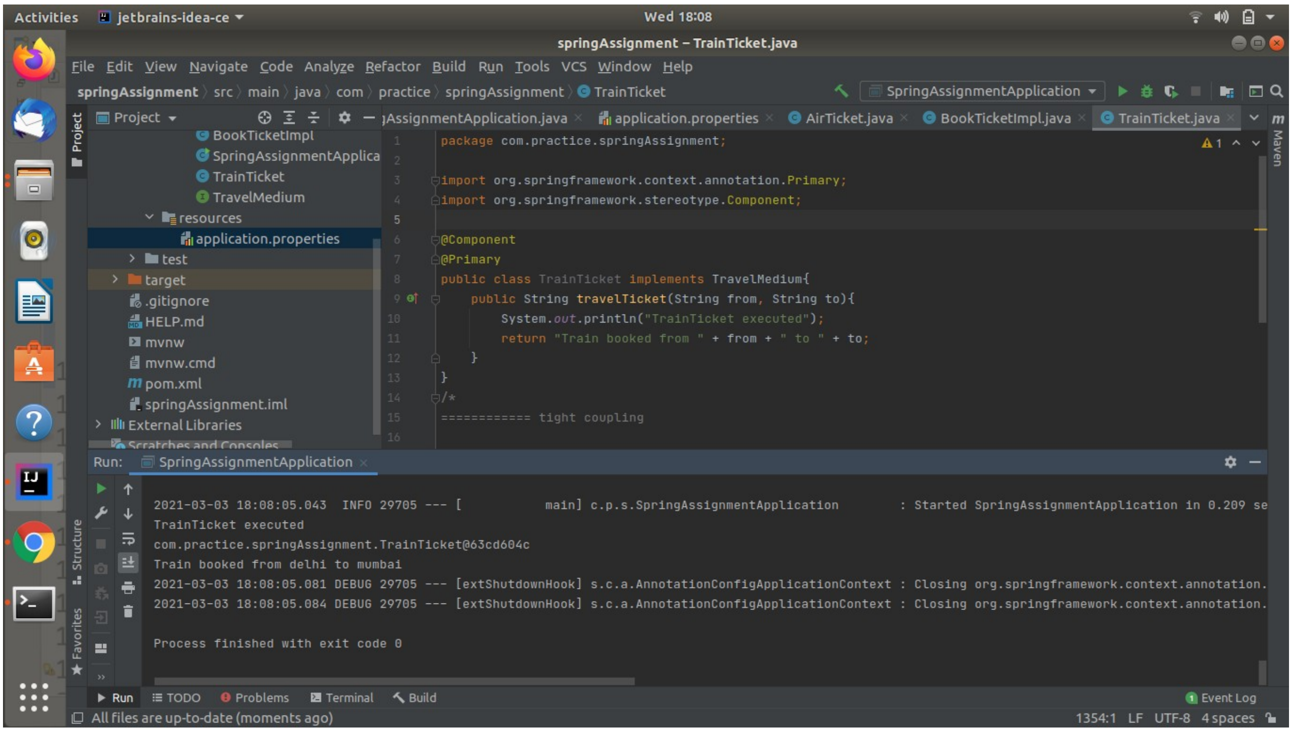
TrainTicket
TravelMedium
resources
application.properties
test
target
.gitignore
HELP.md
mvnw
mvnw.cmd
pom.xml
SpringAssignmentApplication.java
application.properties
AirTicket.java
BookTicketImpl.java
TrainTick
Run: SpringAssignmentApplication
Run TODO Problems Terminal Build
Event Log
Build completed successfully in 2 sec, 144 ms (a minute ago)
5:11 LF UTF-8 4 spaces

```java
import org.springframework.stereotype.Component;

@Component
public class AirTicket implements TravelMedium{
    public String travelTicket(String from, String to){
        System.out.println("AirTicket executed");
        return "flight booked from " + from + " to " + to;
    }
}

/*
Tight coupling
public class AirTicket{
```

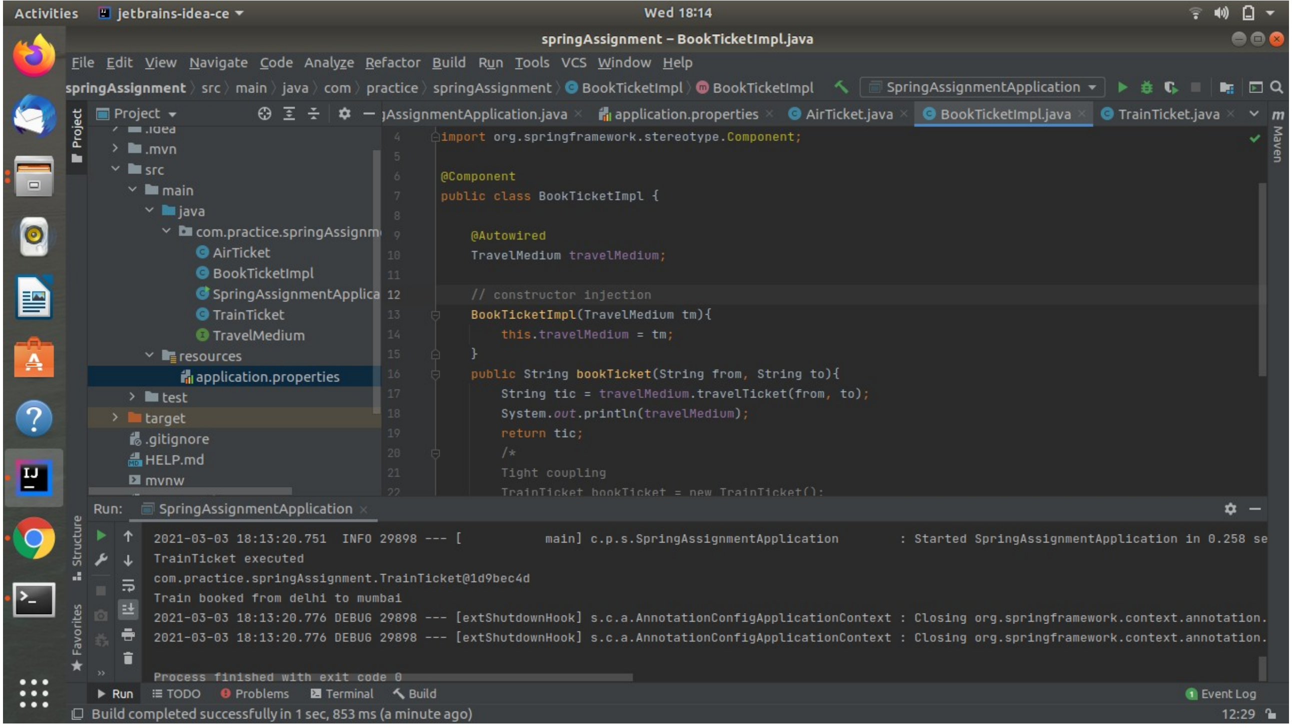
```
***************************

Description:

Parameter 0 of constructor in com.practice.springAssignment.BookTicketImpl required a single bean, but 2 were found:
    - airTicket: defined in file [/home/ttn/IdeaProjects/springAssignment/target/classes/com/practice/springAssignment/AirTicket.class]
    - trainTicket: defined in file [/home/ttn/IdeaProjects/springAssignment/target/classes/com/practice/springAssignment/TrainTicket.class]


Action:

Consider marking one of the beans as @Primary, updating the consumer to accept multiple beans, or using @Qualifier to identify the bean that should
```



```java
package com.practice.springAssignment;

import org.springframework.context.annotation.Primary;
import org.springframework.stereotype.Component;

@Component
@Primary
public class TrainTicket implements TravelMedium{
    public String travelTicket(String from, String to){
        System.out.println("TrainTicket executed");
        return "Train booked from " + from + " to " + to;
    }
}
/*
============ tight coupling

```

```
2021-03-03 18:08:05.043  INFO 29705 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 0.209 se
TrainTicket executed
com.practice.springAssignment.TrainTicket@63cd604c
Train booked from delhi to mumbai
2021-03-03 18:08:05.081 DEBUG 29705 --- [extShutdownHook] s.c.a.AnnotationConfigApplicationContext : Closing org.springframework.context.annotation.
2021-03-03 18:08:05.084 DEBUG 29705 --- [extShutdownHook] s.c.a.AnnotationConfigApplicationContext : Closing org.springframework.context.annotation.

Process finished with exit code 0
```

Q6: Perform Constructor Injection in a Spring Bean



```java
import org.springframework.stereotype.Component;

@Component
public class BookTicketImpl {

    @Autowired
    TravelMedium travelMedium;

    // constructor injection
    BookTicketImpl(TravelMedium tm){
        this.travelMedium = tm;
    }
    public String bookTicket(String from, String to){
        String tic = travelMedium.travelTicket(from, to);
        System.out.println(travelMedium);
        return tic;
        /*
        Tight coupling
        TrainTicket bookTicket = new TrainTicket();
```

```
2021-03-03 18:13:20.751  INFO 29898 --- [           main] c.p.s.SpringAssignmentApplication        : Started SpringAssignmentApplication in 0.258 se
TrainTicket executed
com.practice.springAssignment.TrainTicket@1d9bec4d
Train booked from delhi to mumbai
2021-03-03 18:13:20.776 DEBUG 29898 --- [extShutdownHook] s.c.a.AnnotationConfigApplicationContext : Closing org.springframework.context.annotation.
2021-03-03 18:13:20.776 DEBUG 29898 --- [extShutdownHook] s.c.a.AnnotationConfigApplicationContext : Closing org.springframework.context.annotation.

Process finished with exit code 0
```

Build completed successfully in 1 sec, 853 ms (a minute ago)