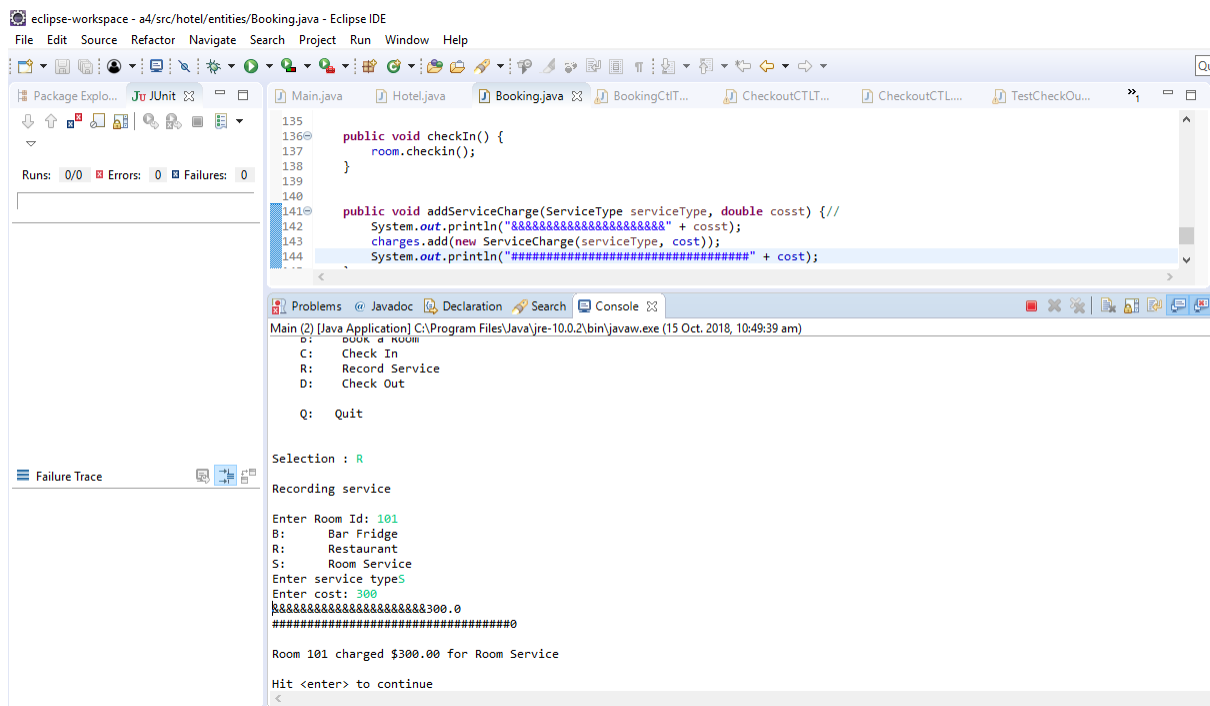


Tracing:

The origin of bugs is being traced for BUG 1 (All Service charges are reported as 0.00 when checking out)



As we can see that, there is a human error. In line number 142 the second parameter is mistakenly written **double cosst**, whereas it should be **double cost**. This is the reason for charging services as 0.00 when checking out.

The origin of the bug is being traced for BUG 2 (It is possible to charge a room for service after the guest has checked out)

The screenshot shows the Eclipse IDE with the file `Hotel.java` open. The `checkout` method is visible, which checks for a booking and prints the room ID. The console output shows the program running, with the user entering room number 101. The program prints charges for room 101, booking 102019101, arrival date 01-01-2019, staylength 1, and guest Charles. The charges are \$0.00. The user accepts the charges and enters credit card details (Visa, MasterCard, number 1, CCV 12). The program prints "this is TD101".

```
121
122 public void checkout(int roomId) {
123     Booking booking = activeBookingsByRoomId.get(roomId);
124     System.out.println("this is ID" + roomId);
125     if (booking == null) {
126         String msg = String.format("Hotel: checkout: no booking present for room id : %d", roomId);
127         throw new RuntimeException(msg);
128     }
129     System.out.println("checking this is ID" + roomId);
130     booking.checkOut();
131     System.out.println("again double check this is ID" + roomId);
132 }
```

Console Output:

```
Main (2) [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (15 Oct. 2018, 12:04:17 pm)
Selection : D
Checking out
Enter room number: 101
Charges for room: 101, booking: 102019101
Arrival date: 01-01-2019, Staylength: 1
Guest: Charles, Address: Melbourne, Phone: 7890431
Charges:
    Restaurant :    $0.00
Total: $0.00
Accept charges(Y/N) : Y
Charges accepted
Enter credit card details
V: Visa
M: MasterCard
Enter credit card type selection: V
Enter credit card number: 1
Enter CCV: 12
this is TD101
```

The screenshot shows the Eclipse IDE with the file `Hotel.java` open. The `checkout` method is visible, which checks for a booking and prints the room ID. The console output shows the program running, with the user entering room number 101. The program prints charges for room 101, booking 102019101, arrival date 01-01-2019, staylength 1, and guest Charles. The charges are \$0.00. The user accepts the charges and enters credit card details (Visa, MasterCard, number 1, CCV 12). The program prints "this is TD101".

```
121
122 public void checkout(int roomId) {
123     Booking booking = activeBookingsByRoomId.get(roomId);
124     System.out.println("this is ID" + roomId);
125     if (booking == null) {
126         String msg = String.format("Hotel: checkout: no booking present for room id : %d", roomId);
127         throw new RuntimeException(msg);
128     }
129     System.out.println("checking this is ID" + roomId);
130     booking.checkOut();
131     System.out.println("again double check this is ID" + roomId);
132 }
```

Console Output:

```
Main (2) [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (15 Oct. 2018, 12:04:17 pm)
Visa credit card number 1 was debited $0.00
Hit <enter> to continue
Checking out completed
Hotel Management System
Please select:
B: Book a Room
C: Check In
R: Record Service
D: Check Out
Q: Quit
Selection : R
Recording service
Enter Room Id: 101
B: Bar Fridge
```

As we can see that the origin of the bug is in method name public void checkout(int roomId) of Hotel class. The active booking list was not removed after check out.