Tutorial 11

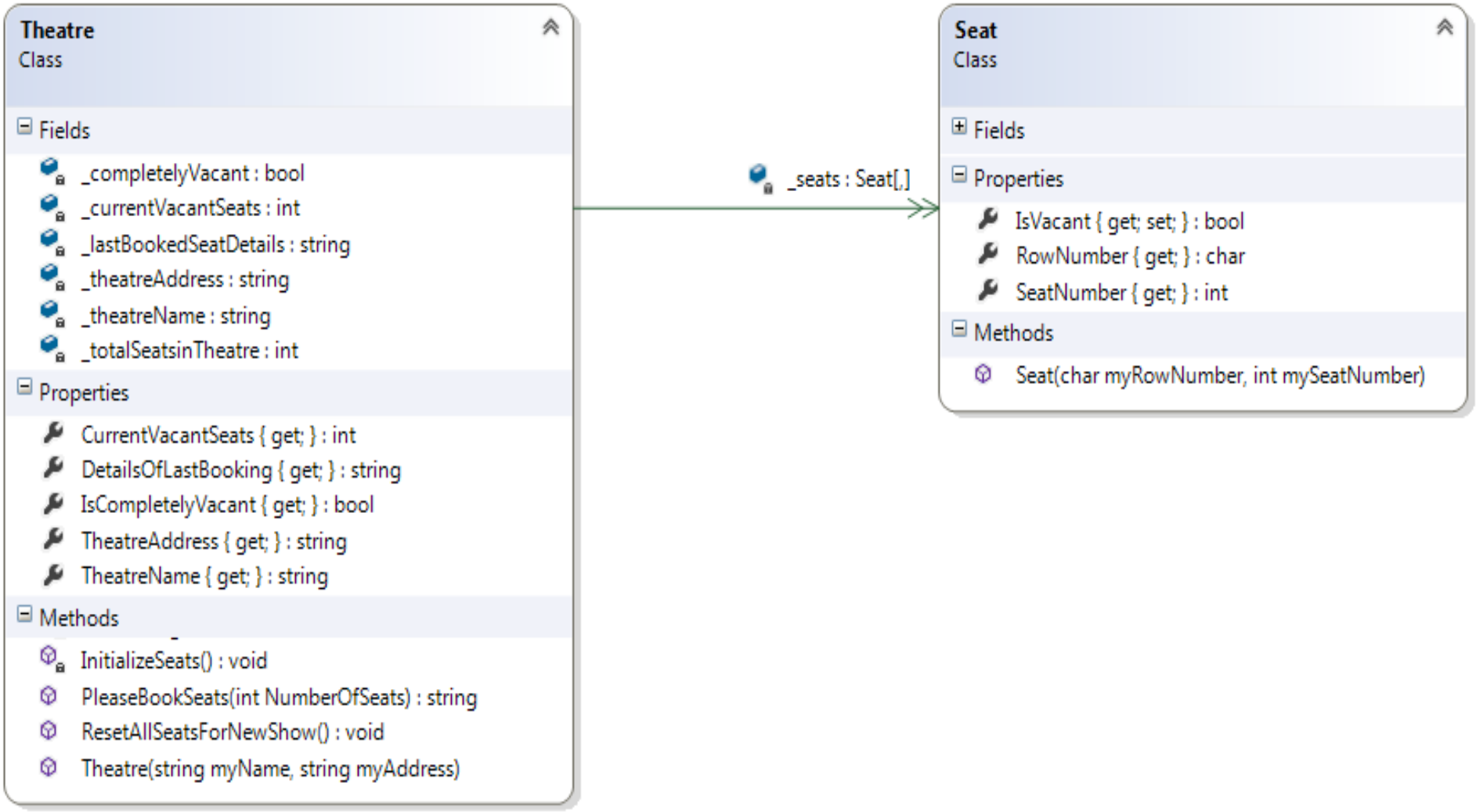
Apply Test Driven Development for the following scenario

A theatre comprises of 60 seats. Each seat has a row number (A,B, C.. F) and a seat number (1, 2, …10) as shown below

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10

You have to use a two dimensional array of Seat objects

1. All the seats are vacant at the start (CurrentVacantSeats = 60).
2. When CurrentVacantSeats = 60, then the property IsCompletelyVacant = true
3. Seats are booked sequentially as you iterate thru the array of 60 seats. That is, the booking order is
   A1, A2, … , A9, A10, B1, B2,…. and so on until F10.
4. We cannot book any seat if the method PleaseBookSeats asks for more seats than are currently vacant.
5. We cannot book more than 60 seats.
6. When seats are booked through the method PleaseBookSeats, the property CurrentVacantSeats will change accordingly, and also property IsCompletelyVacant = False
7. When seats are booked, the property DetailsOfLastSeatBooking will show all seats that have been booked
   I.e. if 3 seats have been booked, then message shows
   A1 Booked
   A2 Booked
   A3 Booked
8. We can reset the Theatre to make all seats vacant when the method ResetAllSeatsForNewShow is called. When the method ResetAllSeatsForNewShow is called, then the property IsCompletelyVacant = True


Theatre
Class
Fields
_completelyVacant : bool
_currentVacantSeats : int
_lastBookedSeatDetails : string
_theatreAddress : string
_theatreName : string
_totalSeatsinTheatre : int
Properties
CurrentVacantSeats { get; } : int
DetailsOfLastBooking { get; } : string
IsCompletelyVacant { get; } : bool
TheatreAddress { get; } : string
TheatreName { get; } : string
Methods
InitializeSeats() : void
PleaseBookSeats(int NumberOfSeats) : string
ResetAllSeatsForNewShow() : void
Theatre(string myName, string myAddress)
_seats : Seat[,]
Seat
Class
Fields
Properties
IsVacant { get; set; } : bool
RowNumber { get; } : char
SeatNumber { get; } : int
Methods
Seat(char myRowNumber, int mySeatNumber)

Use TDD to write the following tests to book seats from the Theatre Class

TestInitialEmptySeats()	Test will check if vacant seats = 60 at the start of the booking
TestResetAllSeatsForNewShow()	Test will reset theatre seat bookings for a new show (Vacant seats = 60)
TestBookingOfMoreThan60SeatsMessage()	Test the return message from PleaseBookSeats when we are trying to book more than the theatre capacity
TestCompletelyVacantIsTrueithIncorrectFirstBooking()	Test will check if show is completely vacant when the very first booking is incorrect (seats > 60)
TestBookingOf5Seats()	Test the currently vacant seats left after booking 5 seats
TestBookingDetailsOf3Seats()	Test the booking details (DetailsOfLastSeatBooking) after booking three seats
TestCompletelyVacantIsFalseWithCorrectFirstBooking()	Test will check if show is not completely vacant anymore when the very first booking is correctly done (seats requested < vacant seats)
TestBookingMoreSeatsAfterAllSeatsHaveBeenBookedMessage()	Test the return message from PleaseBookSeats after booking all 60 seats
TestBookingMoreSeatsWhenFewerSeatsAreRemainingMessage()	Test return message from PleaseBookSeats when we are trying to book more seats than are currently vacant
TestVacantSeatsAfterAllSeatsBooked()	Test currently vacant seats left after booking all 60 seats

IMPORTANT: After running all these tests, check using the code coverage tool if > 90% of the code has been tested.

Hints: Define a private method InitializeAll to set the initial values (total seats, vacant seats and an array of 60 Seats). Call this method from the constructor

Visual Basic

```
Sub New(myName As String, myAddress As String)
        _theatreName = myName
        _theatreAddress = myAddress
        InitializeAllSeats()
    End Sub



Private Sub InitializeAllSeats()
        _seats = New Seat(,) {
            {New Seat("A", 1), New Seat("A", 2), New Seat("A", 3), New Seat("A", 4), New Seat("A", 5), New Seat("A",
6), New Seat("A", 7), New Seat("A", 8), New Seat("A", 9), New Seat("A", 10)},
            {New Seat("B", 1), New Seat("B", 2), New Seat("B", 3), New Seat("B", 4), New Seat("B", 5), New Seat("B",
6), New Seat("B", 7), New Seat("B", 8), New Seat("B", 9), New Seat("B", 10)},
            {New Seat("C", 1), New Seat("C", 2), New Seat("C", 3), New Seat("C", 4), New Seat("C", 5), New Seat("C",
6), New Seat("C", 7), New Seat("C", 8), New Seat("C", 9), New Seat("C", 10)},
            {New Seat("D", 1), New Seat("D", 2), New Seat("D", 3), New Seat("D", 4), New Seat("D", 5), New Seat("D",
6), New Seat("D", 7), New Seat("D", 8), New Seat("D", 9), New Seat("D", 10)},
            {New Seat("E", 1), New Seat("E", 2), New Seat("E", 3), New Seat("E", 4), New Seat("E", 5), New Seat("E",
6), New Seat("E", 7), New Seat("E", 8), New Seat("E", 9), New Seat("E", 10)},
            {New Seat("F", 1), New Seat("F", 2), New Seat("F", 3), New Seat("F", 4), New Seat("F", 5), New Seat("F",
6), New Seat("F", 7), New Seat("F", 8), New Seat("F", 9), New Seat("F", 10)}
        }
        _currentVacantSeats = 60
        _totalSeatsinTheatre = 60
        _completelyVacant = True
    End Sub
```

C#

```
public Theatre(string myName, string myAddress)
        {
            _theatreName = myName;
            _theatreAddress = myAddress;
            InitializeSeats();
        }

private void InitializeSeats()
        {
            _seats = new Seat[,] {
            { new Seat('A', 1), new Seat('A', 2), new Seat('A', 3), new Seat('A', 4), new Seat('A', 5), new Seat('A',
6), new Seat('A', 7), new Seat('A', 8), new Seat('A', 9), new Seat('A', 10)},
            {new Seat('B', 1), new Seat('B', 2), new Seat('B', 3), new Seat('B', 4), new Seat('B', 5), new Seat('B',
6), new Seat('B', 7), new Seat('B', 8), new Seat('B', 9), new Seat('B', 10)},
            {new Seat('C', 1), new Seat('C', 2), new Seat('C', 3), new Seat('C', 4), new Seat('C', 5), new Seat('C',
6), new Seat('C', 7), new Seat('C', 8), new Seat('C', 9), new Seat('C', 10)},
            {new Seat('D', 1), new Seat('D', 2), new Seat('D', 3), new Seat('D', 4), new Seat('D', 5), new Seat('D',
6), new Seat('D', 7), new Seat('D', 8), new Seat('D', 9), new Seat('D', 10)},
            {new Seat('E', 1), new Seat('E', 2), new Seat('E', 3), new Seat('E', 4), new Seat('E', 5), new Seat('E',
6), new Seat('E', 7), new Seat('E', 8), new Seat('E', 9), new Seat('E', 10)},
            {new Seat('F', 1), new Seat('F', 2), new Seat('F', 3), new Seat('F', 4), new Seat('F', 5), new Seat('F',
6), new Seat('F', 7), new Seat('F', 8), new Seat('F', 9), new Seat('F', 10)}
            };
            _currentVacantSeats = 60;
            _totalSeatsinTheatre = 60;
            _completelyVacant = true;
        }
```