

COM S/SE 319 : Software Construction and User Interfaces

Spring 2019

HW5

[Total Points: 50]

Assignment Due: Friday, April 26, 2019, 11:59 PM

[N.B.: No Late penalty for this Individual HW up to a maximum of 2 days after April 26, 2019]

Task I: SYSTEM MODELING AND UML DIAGRAMS (30 Points)

Please find below the scenario for the construction of UML diagrams and answer the questions after that.

Bus Reservation System is a system used for booking tickets over the internet. Any Customer Can book tickets for different buses. Customer can book a ticket only if the tickets are available. Customer searches for the availability of tickets then if the tickets are available he books the tickets by initially filling details in a form. The customer himself has to take a print out of the ticket. The amount of Tickets is deducted from the customer's account.

For cancellation of the ticket, the customer has to go at reservation office then fill out the cancellation form and ask the clerk to cancel the ticket then the refund is transferred to the customer account. After booking the ticket the customer has to checkout by paying the fare amount to the clerk.

Task 1:

Draw the Use Case diagram mentioning the actors, lines associated with each actor, appropriate use cases and relationship (<<include>>) between appropriate use cases for the above Bus Reservation System. (10 points)

Task 2:

Draw the Sequence diagram with appropriate messages, attributes, activation bar (lifeline, objects are given) for Cancelling Ticket for above Bus Reservation System. (10 points)

Task 3:

Draw the Class diagram with appropriate class, attributes, generalization, association, aggregation for above Bus Reservation System. (10 points)

Task II: Testing (20 points)

Given the following method:

```
01 public static double median(double[] d) {
02     double median = Double.NaN;
03     if (d != null && d.length > 0){
04         if (d.length == 1) {
05             median = d[0];
06         } else {
07             Arrays.sort(d);    // sorted ascending
08             int mid = d.length / 2;
09             if (d.length % 2 != 0) {
10                 median = d[mid];
11             } else {
12                 median = (d[mid - 1] + d[mid]) / 2;
13             }
14         }
15     }
16     return median;
17 }
```

- a) Justify: What would be the effect if you replace “&&” in line 3 with a “&”? (5 Points)
- b) Create the control flow graph of the method **median(...)**. Please write the source code, references to the line numbers of the method are not sufficient. (10 Points)
- c) Specify a test case (minimum input numbers) which satisfies the statement coverage for the method **median (...)**. Enter the paths that have been traversed. (5 Points)

What to Submit:

Submit via Canvas a **pdf** file containing the answers of all the four tasks. Please Make sure diagrams are drawn legibly using UML diagram/ drawing tool.
