COM S/SE 319 : Software Construction and User Interfaces
Fall 2018

HW6: Extra Credit Assignment

SAMPLE SOLUTION

Task : SYSTEM MODELING AND UML DIAGRAMS

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 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. Customer himself has to take print out of the ticket. The amount of Tickets is deducted from customer's account.

For cancellation of 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 customer account. After booking ticket the customer has to checkout by paying the fare amount to clerk.

Task 1:

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

Task 2:

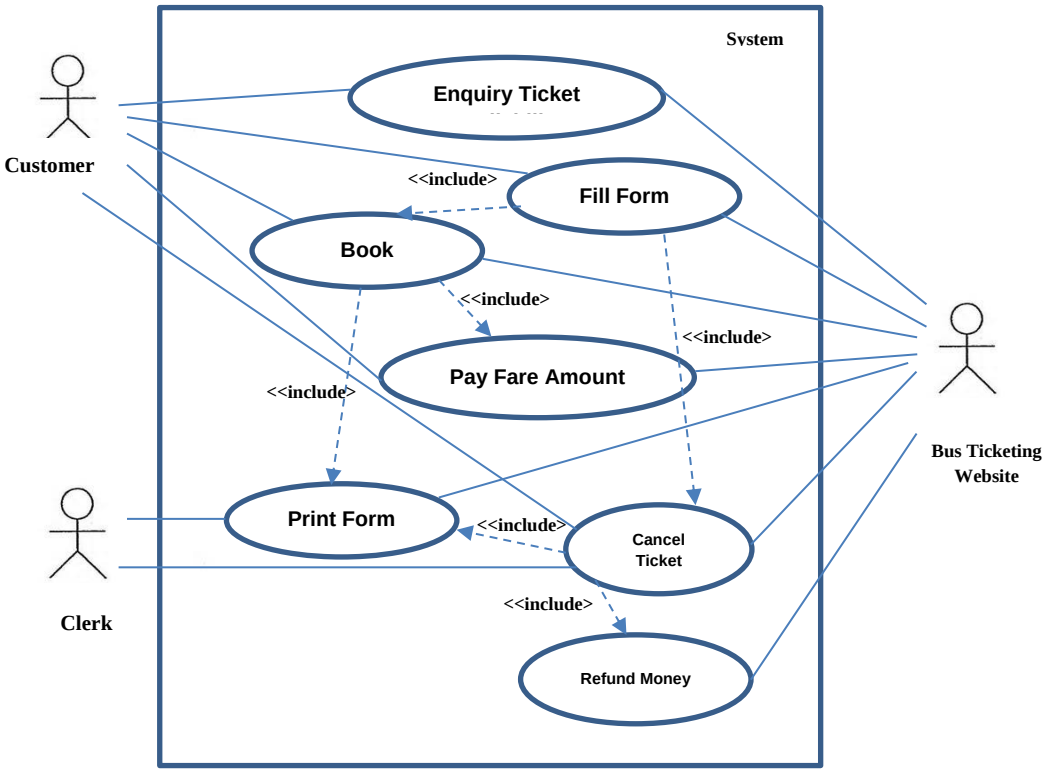
Draw the Sequence diagram with appropriate messages, attributes, activation bar (lifeline, objects are given) for Cancelling Ticket for above Bus Reservation System.

Task 3:

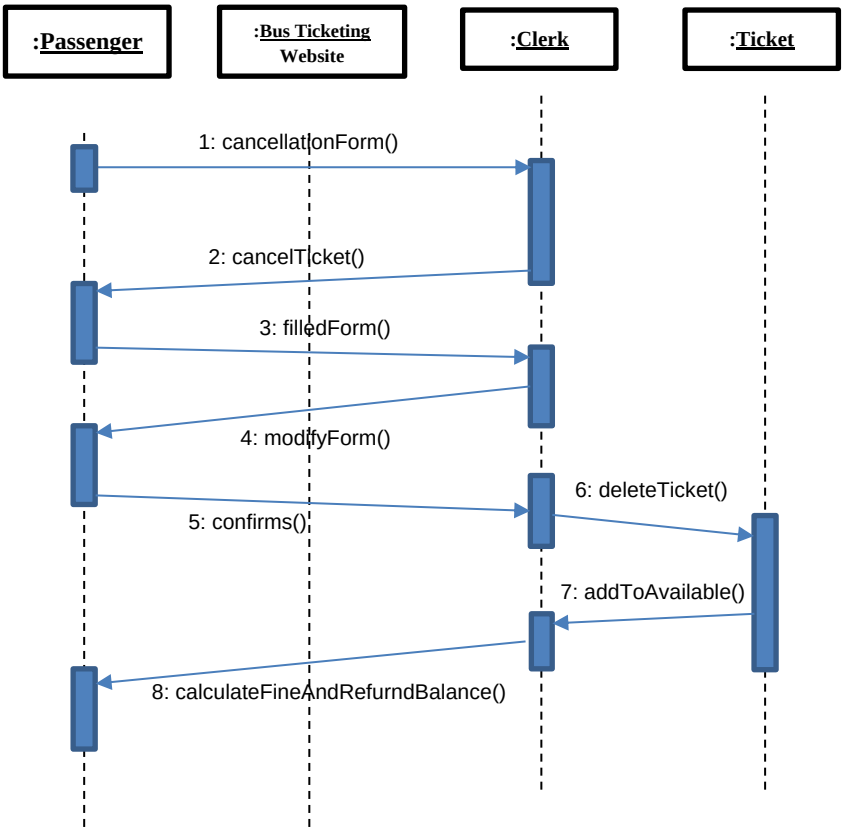
Draw the Class diagram with appropriate class, attributes, generalization, association, aggregation for for above Bus Reservation System.

The Below diagrams are just a sample solution, there can be other correct soultions.

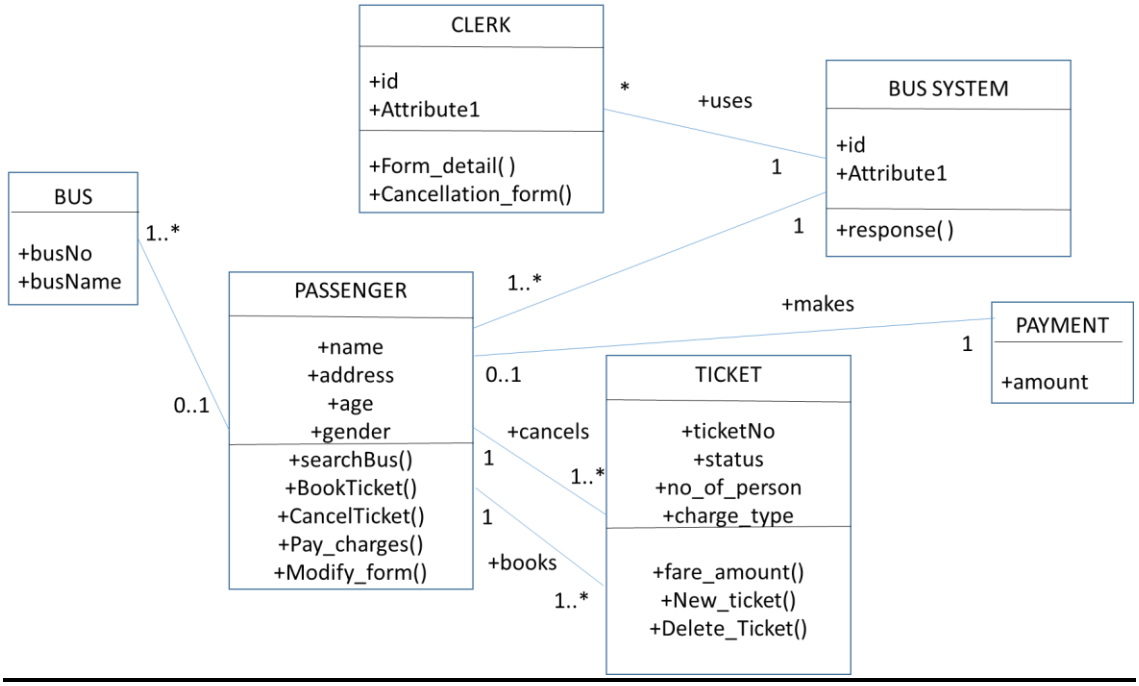
Ans: Task 1:



Task 2:



Task 3:



Task II: Testing (10 points)

Given the following method:

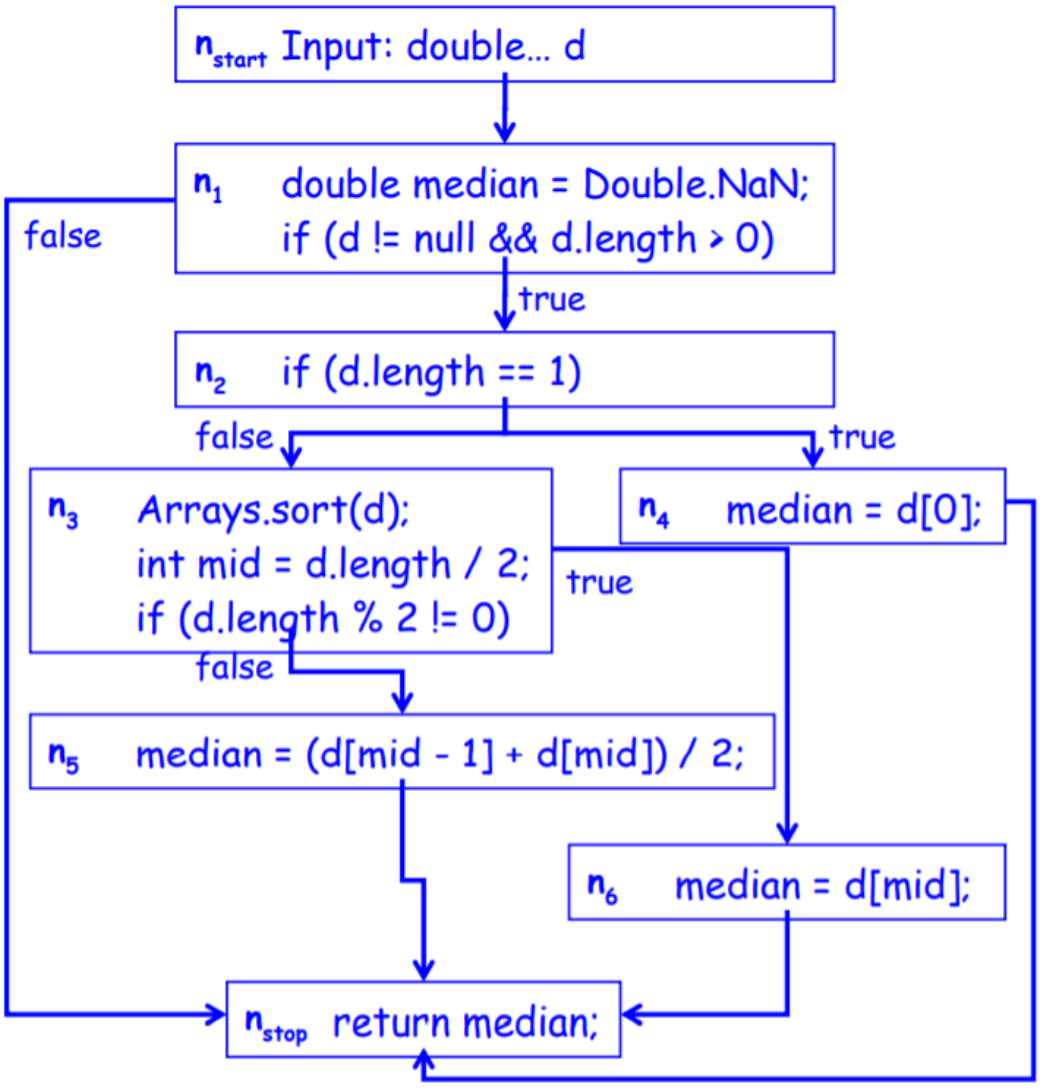
```
01 public static double median(double[] d) {
02   double median = Double.NaN;
03   if (d != null && d.length > 0)
04         if (d.length == 1) {
05          median = d[0];
06         } else {
07         Arrays.sort(d);     // sorted ascending
08         int mid = d.length / 2;
09         if (d.length % 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 "**&**"?
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.
c) Specify a test case (minimum input numbers) which satisfies the statement coverage for the method **median (...)**. Enter the paths that have been traversed.

a) Justify: What would be the effect if you replace **&&** in line 3 with a **&**?

No short evaluation ➔ If zero is input there would be a NullPointerExeption on d.length.

(b) On the following page, create the control flow graph of the method **`median(...)`**. Please write the source code in the boxes, references to the line numbers of the method are not sufficient.



(c) Specify a test case (minimum input numbers) which satisfies the statement coverage for the method **median (...)**. Enter the paths that have been traversed.

{1}	nstart, n1, n2, n4, nstop
{1, 2}	nstart, n1, n2, n3, n5, nstop
{1, 2, 3}	nstart, n1, n2, n3, n6, nstop
