

## National University of Computer and Emerging Sciences, Lahore Campus



<b>Course:</b>	<b>Object-oriented Analysis &amp; Design</b>	<b>Course Code:</b>	<b>CS-309</b>
<b>Program:</b>	<b>BS (Computer Science)</b>	<b>Semester:</b>	<b>Fall 2018</b>
<b>Duration:</b>	<b>60 Minutes</b>	<b>Total Marks:</b>	<b>25</b>
<b>Paper Date:</b>	<b>16-Nov-18</b>	<b>Weight</b>	<b>15 %</b>
<b>Section:</b>	<b>All</b>	<b>Page(s):</b>	<b>6</b>
<b>Exam:</b>	<b>Midterm-II</b>	<b>Reg. No.</b>	

**Instruction/Notes:** Solve the exam on this paper. Do not submit answer sheets. You may use rough sheets but those shouldn't be attached.

### Question 1

**10 points**

Consider a use case for a complaint / issue management system being used by an organization to ensure better customer support. In case of any problems, customers can register their complaints that can be tracked by the customers as well as the organization for efficient redressal.

**UC:** Register complaint

**Purpose:** To register complaint against a pending issue. Issues may be categorized depending upon their nature. For instance, a malfunctioning projector relates to support category while a slow internet connection relates to IT category. An issue may be simultaneously assigned multiple categories.

**Actor:** Customer

**Main Flow:**

1. Customer enters her identification details including mobile number and an optional email
2. Customer enters the issue detail as text
3. Customer selects appropriate categories from the available category list to mark the issue
4. Customer submits the form
5. System generates and shows a CAPTCHA code and ask the customer to enter the code, in order to prevent spurious complaints
6. Customer enters the code and submits the form
7. System registers the customer (if not already recorded in the system) and the complaint. A tracking number, timestamp, and status of the complaint along with given details and expected resolution time is shown.
8. System sends an email to the customer with the complaint details.
9. System routes the complaint to the concerned departments (based upon the category). A department may be responsible for multiple categories
10. Use case ends

**Alternative Flow:**

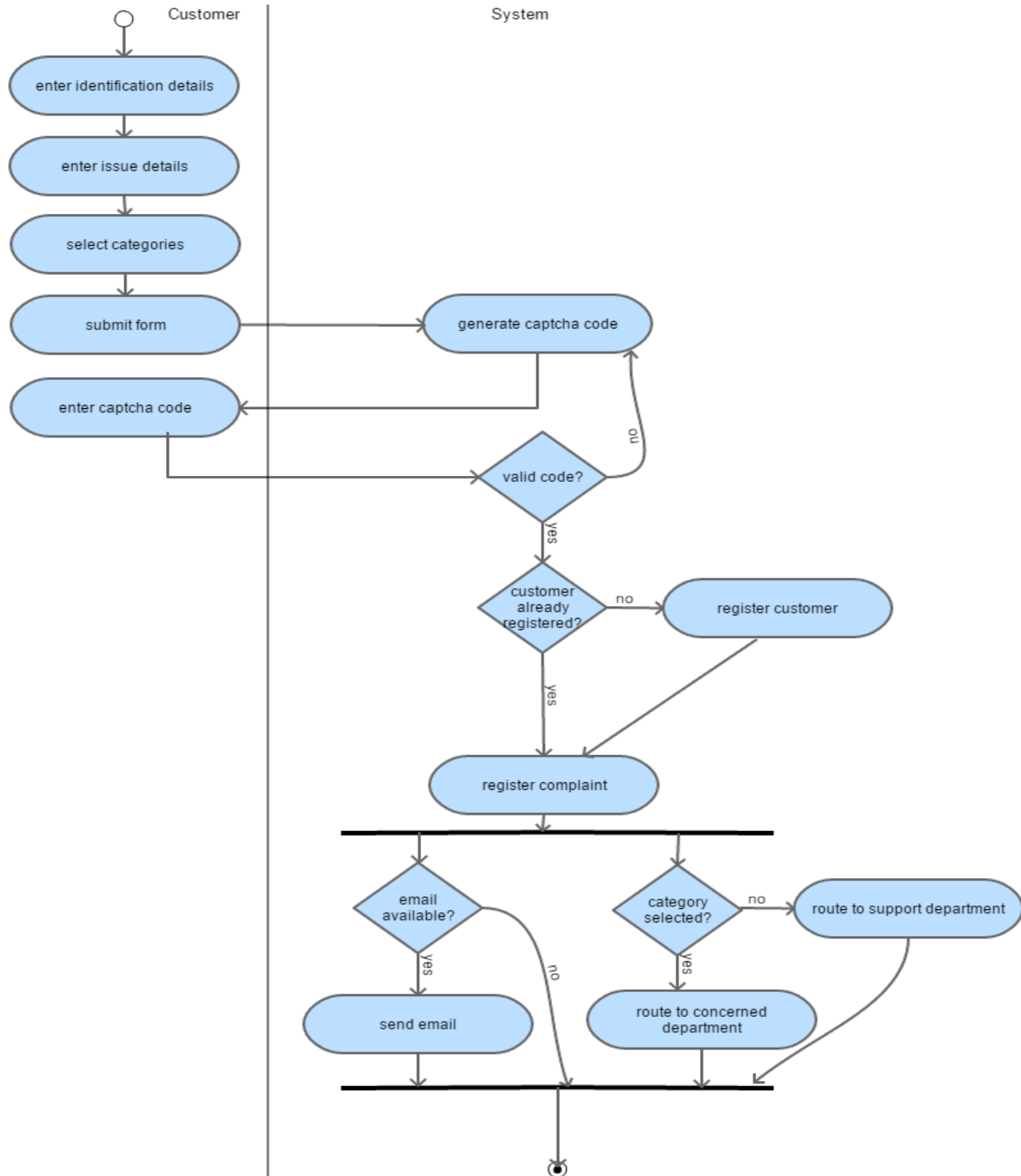
- 6A Customer may regenerate CAPTCHA code
- 7A If the CAPTCHA code is invalid, system regenerates the code, jumping to step-5 of main flow
- 8A If the customer didn't provide email address, system skips sending the email
- 9A If no category is assigned to the issue, system routes it to Support department by default.

Draw an activity diagram for the use case, illustrating possible concurrent activities

# National University of Computer and Emerging Sciences, Lahore Campus



Course:	Object-oriented Analysis & Design	Course Code:	CS-309
Program:	BS (Computer Science)	Semester:	Fall 2018
Duration:	60 Minutes	Total Marks:	25
Paper Date:	16-Nov-18	Weight	15 %
Section:	All	Page(s):	6
Exam:	Midterm-II	Reg. No.	



## National University of Computer and Emerging Sciences, Lahore Campus



<b>Course:</b>	<b>Object-oriented Analysis &amp; Design</b>	<b>Course Code:</b>	<b>CS-309</b>
<b>Program:</b>	<b>BS (Computer Science)</b>	<b>Semester:</b>	<b>Fall 2018</b>
<b>Duration:</b>	<b>60 Minutes</b>	<b>Total Marks:</b>	<b>25</b>
<b>Paper Date:</b>	<b>16-Nov-18</b>	<b>Weight</b>	<b>15 %</b>
<b>Section:</b>	<b>All</b>	<b>Page(s):</b>	<b>6</b>
<b>Exam:</b>	<b>Midterm-II</b>	<b>Reg. No.</b>	

### Question 2

5 points

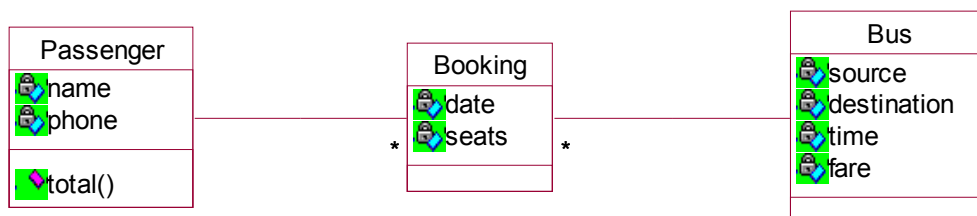
Match each entry in the first column with a single entry in the second column. Try to give the best answer.

a) Suitable for concurrent tasks	1) Class diagram
b) Depicts the required object interactions	2) Sequence diagram
c) Useful for gathering requirements	3) Activity diagram
d) Shows static structure of the system	4) Use case diagram
e) Shows dynamic behavior of the objects	

### Question 3

10 points

Consider the following class diagram:



Here the attribute "fare" holds the ticket-price, while the attribute "seats" denotes the number of seats reserved.

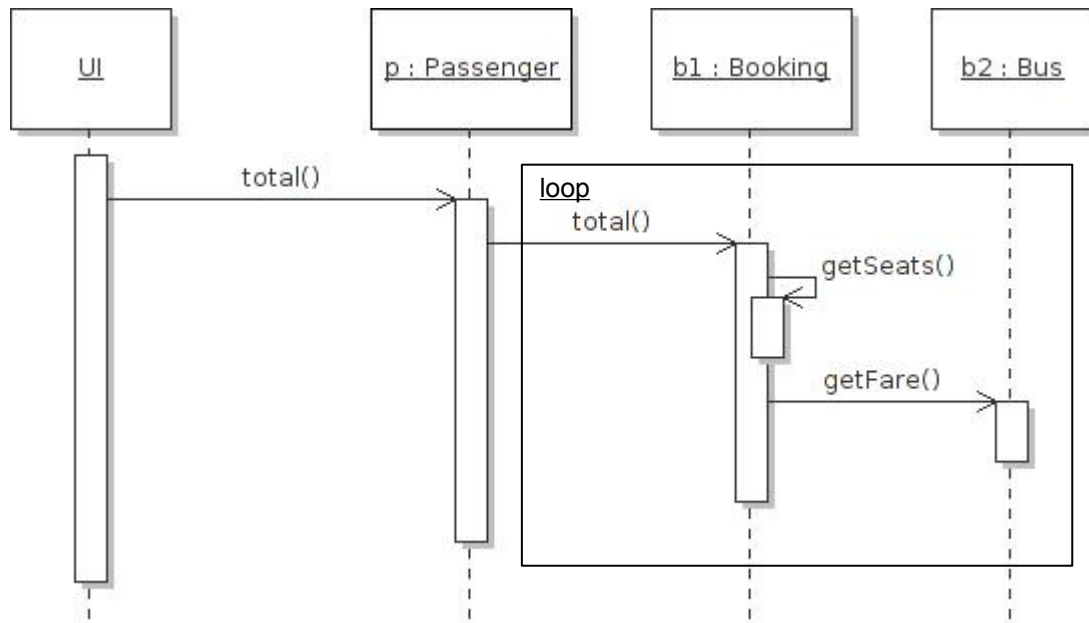
Now give a sequence diagram to compute the total payable amount for a passenger. The sequence diagram must include objects of above classes and message/function names with parameters and return value. You may add any auxiliary (helper) functions, such as getFare(). Give one-line description for each added function separately.

# National University of Computer and Emerging Sciences, Lahore Campus



Course:	Object-oriented Analysis & Design	Course Code:	CS-309
Program:	BS (Computer Science)	Semester:	Fall 2018
Duration:	60 Minutes	Total Marks:	25
Paper Date:	16-Nov-18	Weight	15 %
Section:	All	Page(s):	6
Exam:	Midterm-II	Reg. No.	

// sequence diagram



// one line description of functions

Bus::getFare: returns fare of bus

Booking::getSeats: returns number of seats reserved

Booking::total(): computes total for a single booking as product of seats and fare

Passenger::total(): computes total for the passenger, iterating over all bookings