

IN2013, Week 1 Use Case Realization (Sequence diagrams)

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Scenario

Consider the BAPERS case study and the specifications of the use cases given in Appendix 1 and the analysis class diagram provided in Appendix 2.

Question 1 (Sequence diagrams with combined fragments)

Using the analysis class diagram given in Appendix 2, draw a sequence diagram for the use case “PlaceOrder”. Concentrate on the main flow and ignore the alternative flows.

Question 2. Modular Sequence diagram (use of combined fragment ‘ref’)

You will notice that there are **two important flows** to address (handled by the extension use cases):

- i) when the CustomerID is known at the time of placing an order and
- ii) when the Customer is not known and a new CustomerAccount must be created before the job can be created.

The two flows differ only in the part of creating a CustomerAccount. Once the customer is established (either located if it exists or created as part of the use case in case of a new customer) the flow of creating a job is the same.

Redesign the sequence diagram to make use of the combined fragment **ref**, which allows one to capture the common interaction and show it concisely in the two branches of the sequence diagram.

Additional exercises:

1. The sequence diagram so far has provides a realization of the **main flow** only. Extend it to deal with the identified **alternative flows**.
2. Develop a use case specification for ‘MakePayment’ and develop a sequence diagram for it.
3. Draw the communication diagram for the above use cases.

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Appendix 1. Use case specifications

ID: TM02	Use case: PlaceOrder
Brief description: The Customer brings in photographic material to be processed in “The Lab”. A new Job sheet is made out with a unique ID, which lists the tasks to be performed, sets the completion time. The job is linked to a CustomerAccount. If necessary a new Customer Account is created.	
Primary actors: FrontStaff (Receptionist, Shift or Office Manager)	
Secondary actors: None	
Preconditions: 1. BAPERS is operational, the primary actor has logged in.	
Flow of events: 1. Actor activated the functionality for creating a new job Extension point: SearchCustomer Extension point: CreateCustomerAccount 2. Actor selects the chosen CustomerAccount. 3. The system assigns a unique ID to the Job and links the job to the chosen Customer account. 4. Until more tasks are to be added: 5.1. The actor selects a task from the list of available tasks and adds it to the job. 5. The actor selects the urgency of the job (either “urgent” or “normal”). 6. The system records the job completion time. 7. The system computes the price of the job. 8. The actor confirms that the job is completed. 9. The system prints a label (to be attached to the photographic material) which with the job ID and a collection note ¹ (with the job ID, the Customer name and the job completion time).	
Postconditions: 1. The system has recorded a new job with its ID, Customer who placed it, urgency, completion time, price and list of tasks to be completed. 2. The system printed a label and a collection note.	
Alternative flow: NoCustomerAccountProvided PrintingFailure	

¹ This note is handed over to the customer as a proof that the photographic material has been collected for processing.

Alternative flow: NoCustomerAccountProvided
ID: TM02.1
Brief description: No CustomerAccount is provided.
Primary actors: FrontStaff
Secondary actors: None
Preconditions: The session does not contain a valid CustomerAccount.
Alternative flow: <ul style="list-style-type: none"> 1. The system prompts the actor that no valid CustomerAccount has been chosen. 2. The actor acknowledges the notification 3. The system removes the session.
Postconditions: None.

Alternative flow: PrintingFailure
ID: TM02.2
Brief description: Printer fails to print the required document: either is out of paper or some other problem occurs.
Primary actors: FrontStaff
Secondary actors: None
Preconditions: <ul style="list-style-type: none"> 1. The printer is out of paper or a technical fault has accured.
Alternative flow: <ul style="list-style-type: none"> 4. The alternative flow starts after step 9 of the normal flow 5. BAPERS displays a message: "Printer fault". 6. If further details are known about the problem The system prints further details.
Postconditions: None

Use case ID: TM03	Use case: CreateCustomerAccount
Primary actors: FrontStaff	
Secondary actors: None	

Segment 1 Precondition (extension point: CreateCustomerAccount)

No customer account exists in BAPERS.

Segment 1 flow:

- 1) Actor activates the functionality for creating new customer account.
- 2) The system places an empty customer record in the session.
- 3) The system opens a form for entering the customer details such as Name, phone number and email address.
- 4) The actor types in the required details and confirms their validity.
- 5) The system creates a new customer record in BAPERS.
- 6) If the system succeeds
 it places the customer details in the session by adding a 'current customer' record in the session.
 Else
 Places an empty 'current customer' record in the session.

Postcondition:

1. CustomerAccount details are stored in the 'current customer' record in the session.

Use case ID: TM04**Use case:** SearchCustomer**Primary actors:**

FrontStaff

Secondary actors:

None

Segment 1 Precondition (extension point: SearchCustomer)

Customer chooses the CustomerAccount search functionality by activated it.

Segment 1 flow:

- 1) The system offers a search form for customer to specify the search criteria (e.g. name, email, phone number or any combination of these)
- 2) While no more than on record is found
 - a. The actor specifies the search criteria (any combination of the three listed above will be acceptable) and confirms the validity of the search criteria.
 - b. The system undertakes a search based on the search criteria.
- 3) If a single customer record is found
 it is placed in the 'current customer' record in the session.
 Else
 An empty record 'current customer' is placed in the session.

Postcondition:

CustomerAccount details are stored in the 'current customer' record in the session.

Appendix 2: BAPERS analysis class diagram

