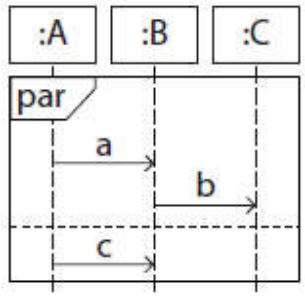
Métodos de Desenvolvimento de Software

2018/2019

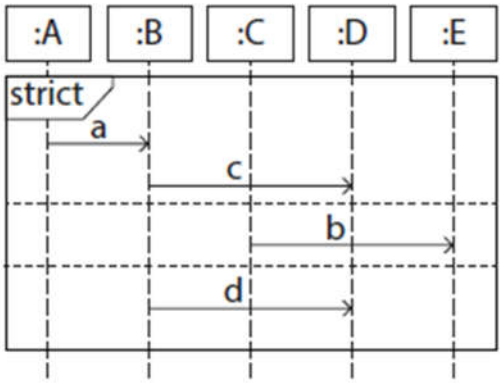
Lab 9 – Sequence Diagrams

1. You are given the following sequence diagram. Which of the following traces are possible?



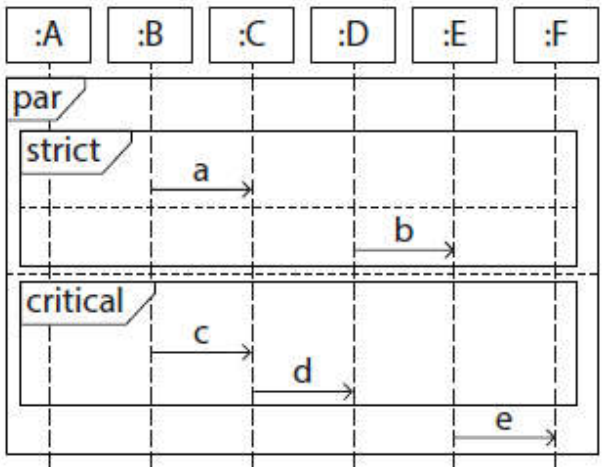
a) c → a → b
b) c → b → a
c) a → b → c
d) b → a → c
e) a → c → b
f) b → c → a

2. You are given the following sequence diagram. Which of the following traces are possible?



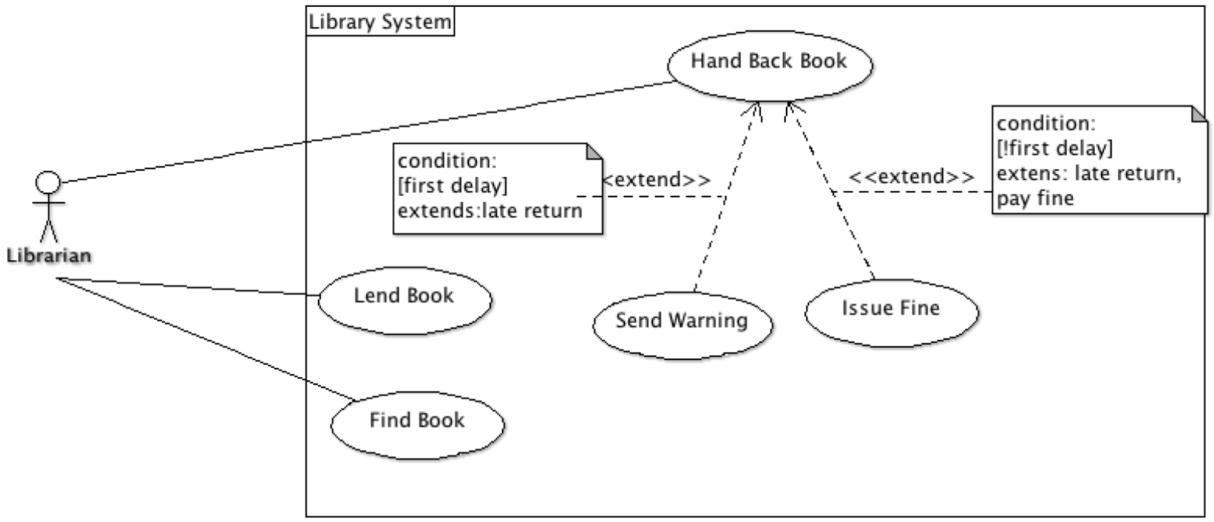
a. a → c → b → d
b. a → b → d → c
c. a → b → c → d
d. b → d → a → c

3. You are given the following sequence diagram. Which of the following traces are possible?



a) a → b → c → e → d
b) c → d → a → b → e
c) a → c → d → b → e
d) e → a → b → c → d
e) c → a → e → d → b
f) a → b → e → d → c

4. Consider the following Use Case Diagram of a Library system:



Consider the corresponding specification to the "Hand Back Book" Use Case:

Use Case: Hand Back Book
Description: the Librarian returns a lent book
Main Actor: Librarian
Secondary Actor: None
Pre-condition: The librarian is logged in the System
Main Flow: 1. The Use Case starts when the librarian selects an option to return book. 2. The Librarian introduces the Borrower's ID. 3. The System shows the Borrower's data details, including all the borrowed books. 4. For each book to be returned a) The Librarian finds the book to be returned in the borrowed books list. **Extension point: late return, pay fine** b) The Librarian tags the book as returned. 5. The Use Case Ends.
Post-condition: The book was returned.
Alternative Flow: Borrower's Id does not match the Library user's list The book is not in the list.

Consider the corresponding specification to the “Hand Back Book” Use Case:

Use Case: Hand Back Book: Borrower’s ID does not match the Library user’s list
Description: the User with the Borrower’s ID does not match in the system’s list of
Library users
Main Actor: Librarian
Secondary Actor: None
Pre-condition: The entered Borrower’s ID is invalid
Main Flow: 1. The alternative Flow starts before step 3. 2. The System shows message saying that the borrower’s ID is invalid. 3. Return to step 2 of the main Scenario.
Post-condition: none

Use Case: Hand Back Book: The book is not in the list.
Description: the User has a book that is not in his list of borrowed books.
Main Actor: Librarian
Secondary Actor: None
Pre-condition: The book is not in the list of borrowed books
Main Flow: 1. The alternative Flow starts before step 4- b). 2. The System shows message saying that the book is not in the system. 3. Return to step 4 of the main Scenario.
Post-condition: none

Use Case: Issue Fine
Description:
Segment 1: the Librarian registers and issues the fine
Segment 2: the Librarian accepts the payment of the fine
Main Actor: Librarian
Secondary Actor: None
Pre-condition of Segment 1: late return
Main Flow in Segment 1:
1. The Librarian introduces the details regarding the fine (Borrower's ID and amount due). 2. The System prints the fine. 3. The Use Case Ends.
Post-condition of Segment 1: The fine is registered in the System and the system issued the fine.
Pre-condition of Segment 2: There is a fine to be paid
Main Flow in Segment 2: 1. In parallel: 1.1. The Librarian accepts the payment. 1.2. The Librarian introduces the data about the fine to be paid (borrower's ID and amount to be paid). 2. The System prints the receipt for the paid amount.
Post-condition of Segment 2: 1. The fine was registered in the System as being paid. 2. The System has printed the receipt for the corresponding fine.

Use Case: Send Warning
Description:
Segment 1: the Librarian sends a warning
Main Actor: Librarian
Secondary Actor: None
Pre-condition of Segment 1 : It is a late book return
Main Flow: 1. The Librarian sends a warning to the user. 2. The system increments the warning count. 3. The use case ends. **Post-condition:** The book was returned.
Alternative Flow: None

Represent the corresponding Sequence Diagrams to the Use Cases detailed before. Do this in a stepwise manner.

5. Consider the following class diagram fragment (i.e., only some of the operations and attributes are presented explicitly – for example, the Log class entity is not detailed here). Build a package diagram and then a component diagram for it. Hint: aim for implementing your system as a layered architecture. In this case, we are more insterested in maximizing the flexibility of the design. If you find it necessary, please add interfaces where adequate.