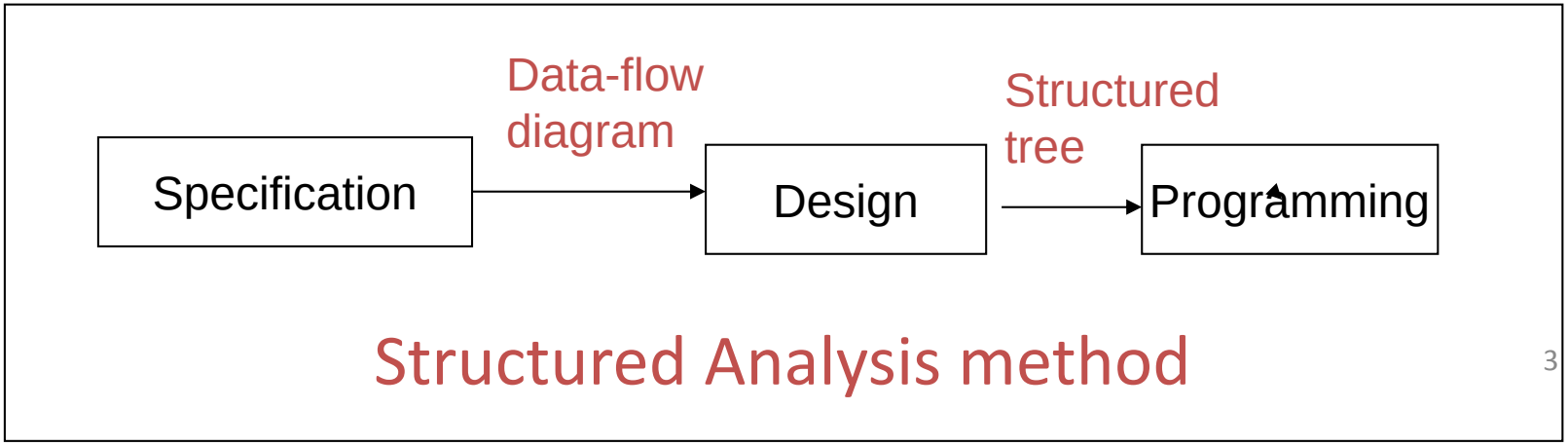
Structured Design
– Architecture Design and Detailed Design

Xin Feng

Summary

- Architecture design and detailed design in structured analysis method
- Steps in structured design

Structured Analysis

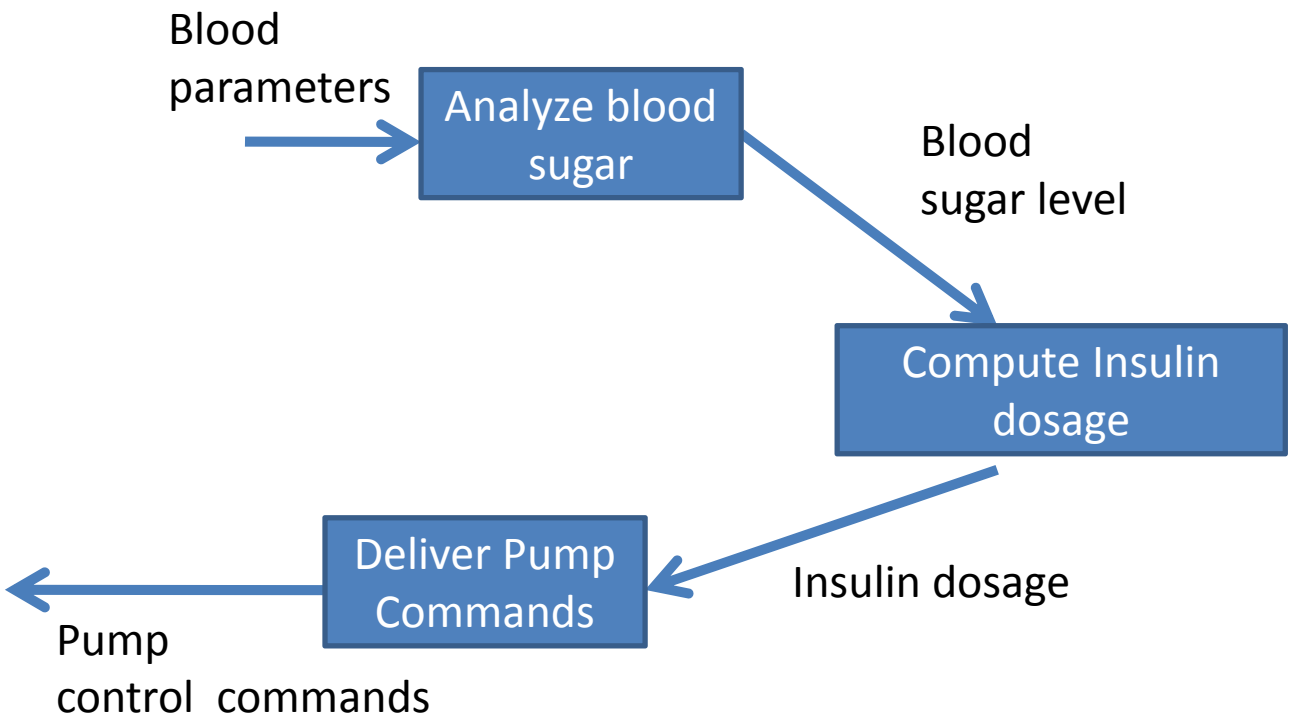


This is NOT an OO-Method!!!

Design

- Architecture design
  - Create a structured call tree
- Detailed design
  - Re-structure the structured tree

Data-Flow Model

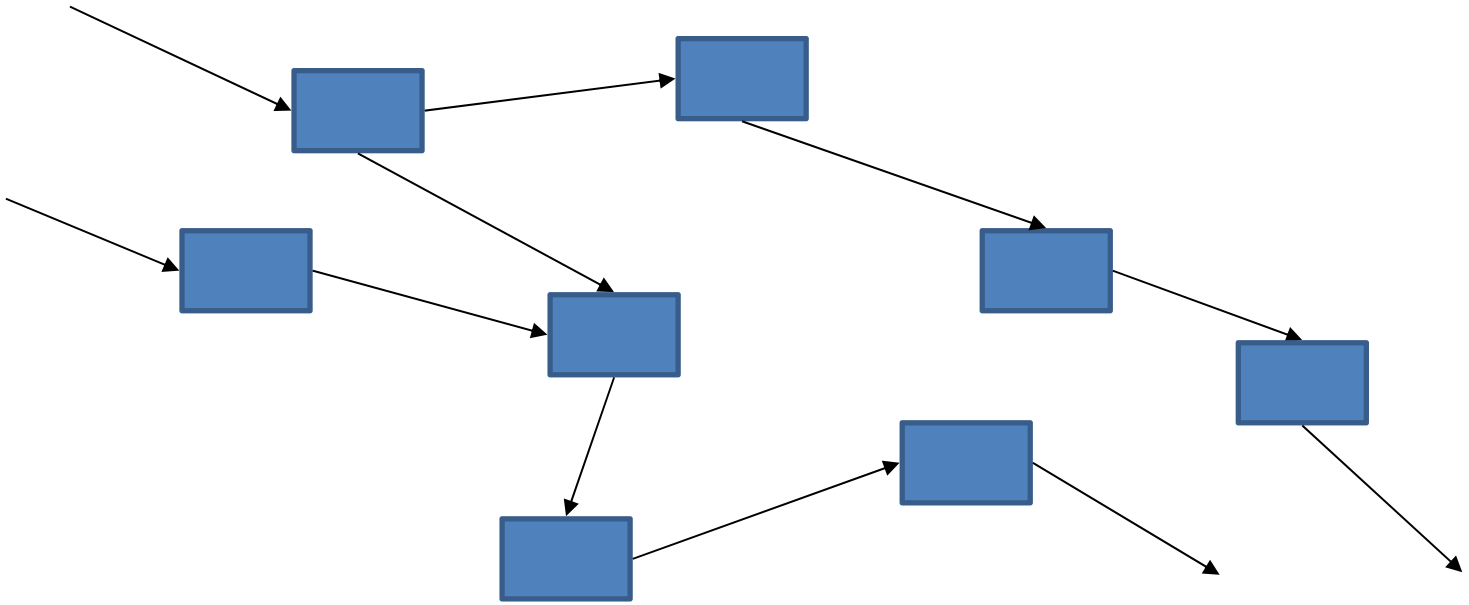


An insulin pump control system

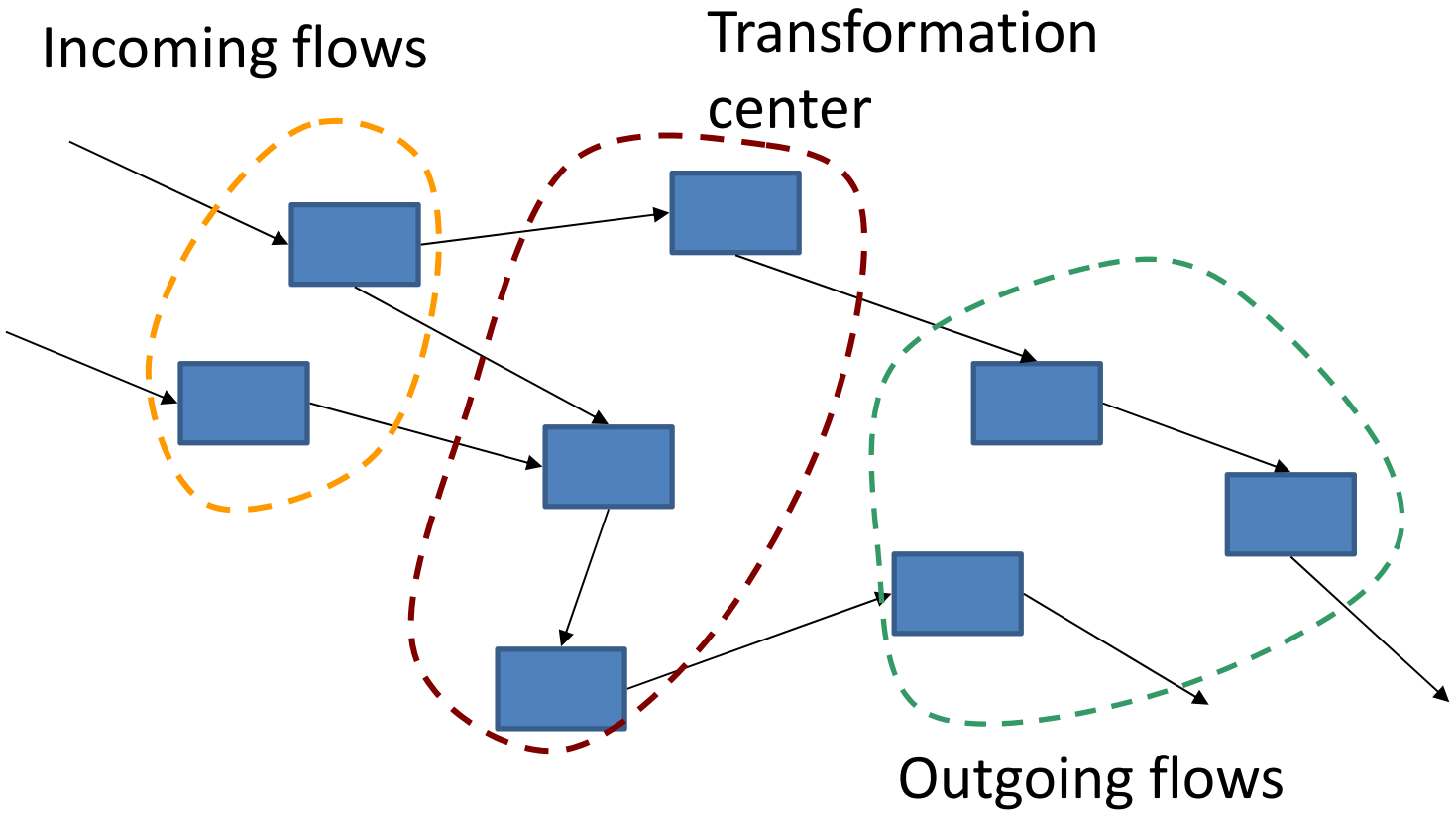
Architecture Design

- Steps
  1. Review （再检查）and refine data flow diagrams
  2. Isolate (分离) the transform （转换）center by specifying incoming and outgoing flow boundaries （边界）
     - Incoming flow is a path that converts （转换）information from external to internal form
     - Outgoing flow is a path that converts information from internal form to external form
  3. Perform the first-level factoring （分解）
  4. Perform the second level factoring

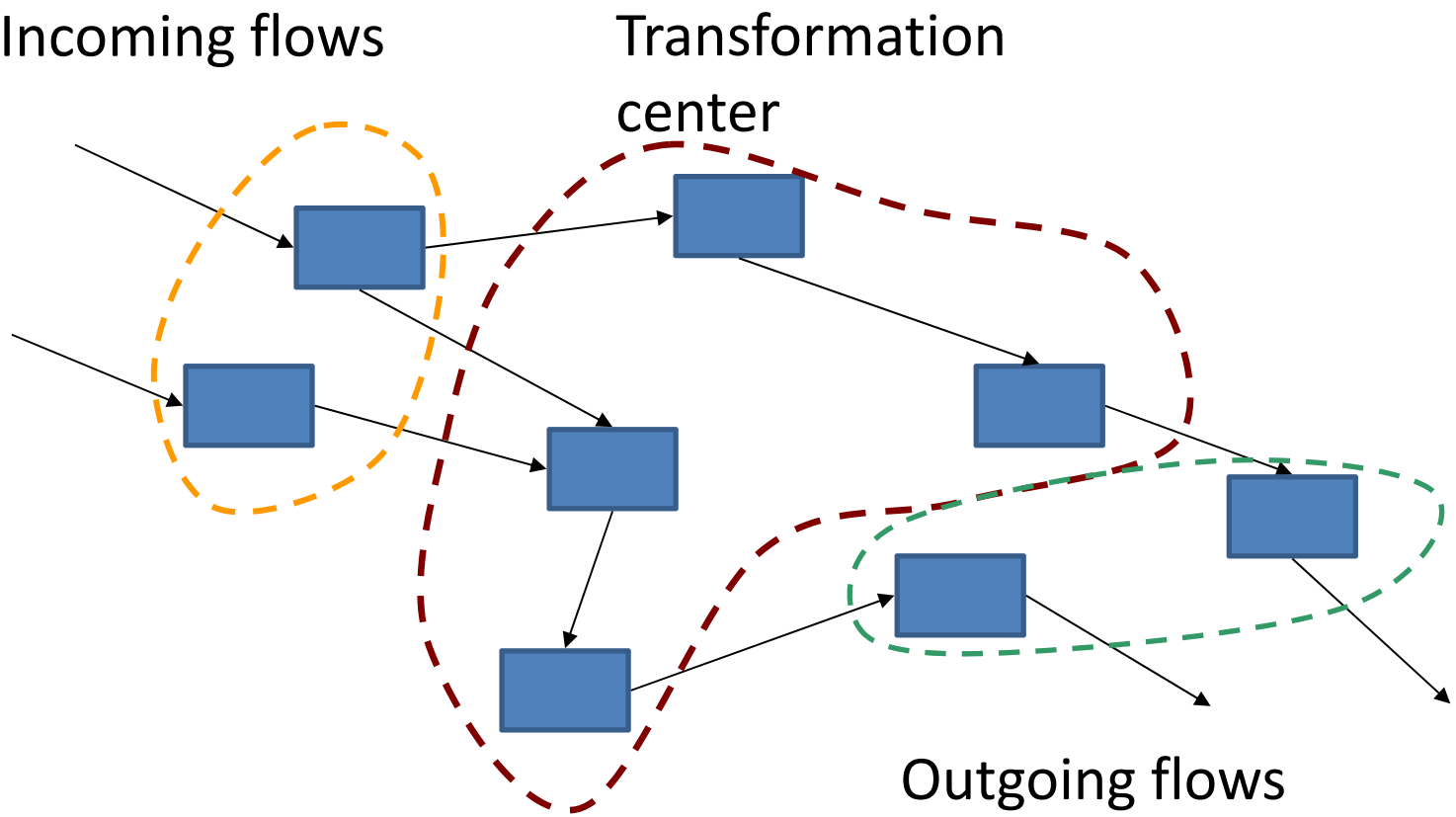
Isolating Transform Center



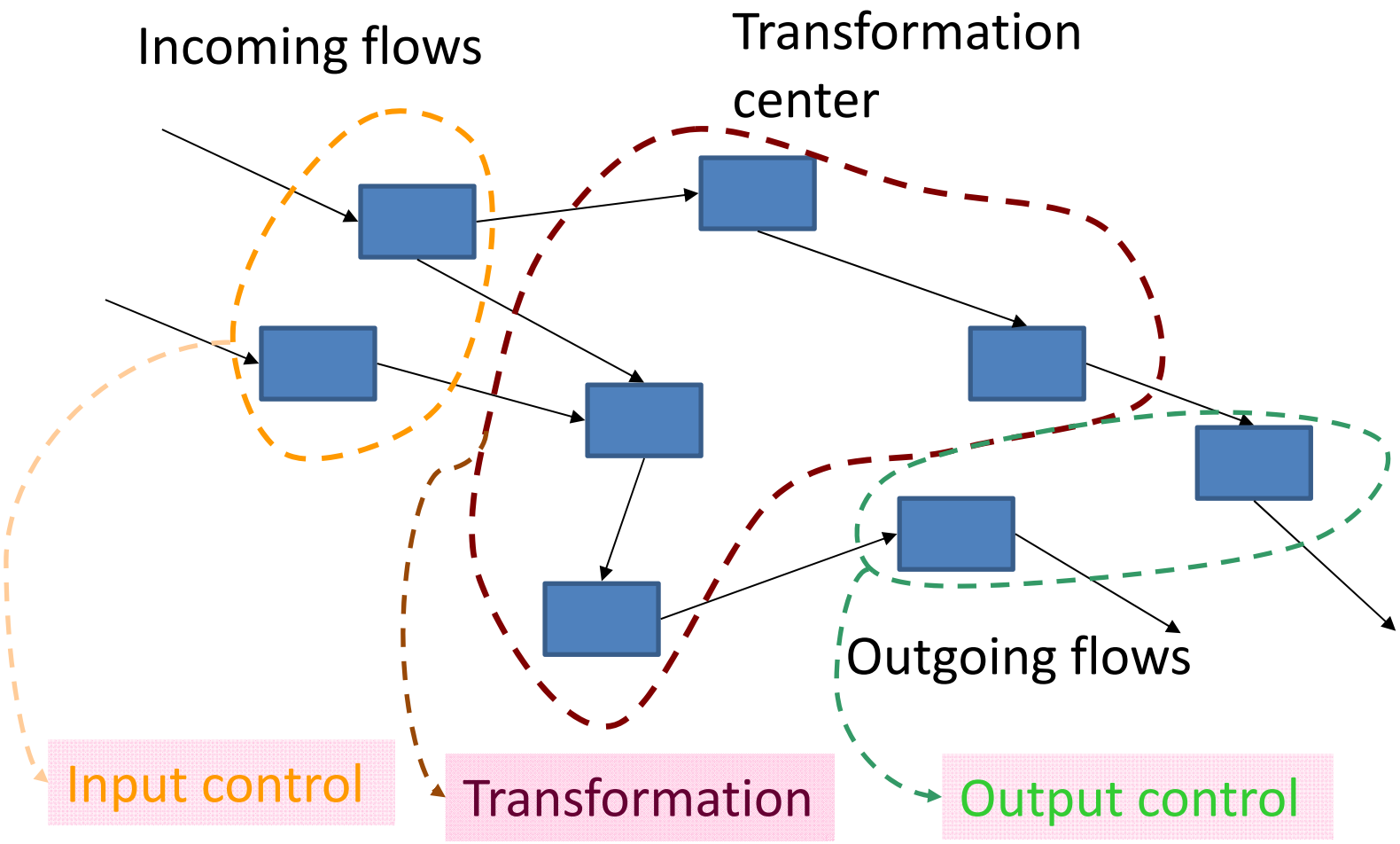
Isolating Transform Center



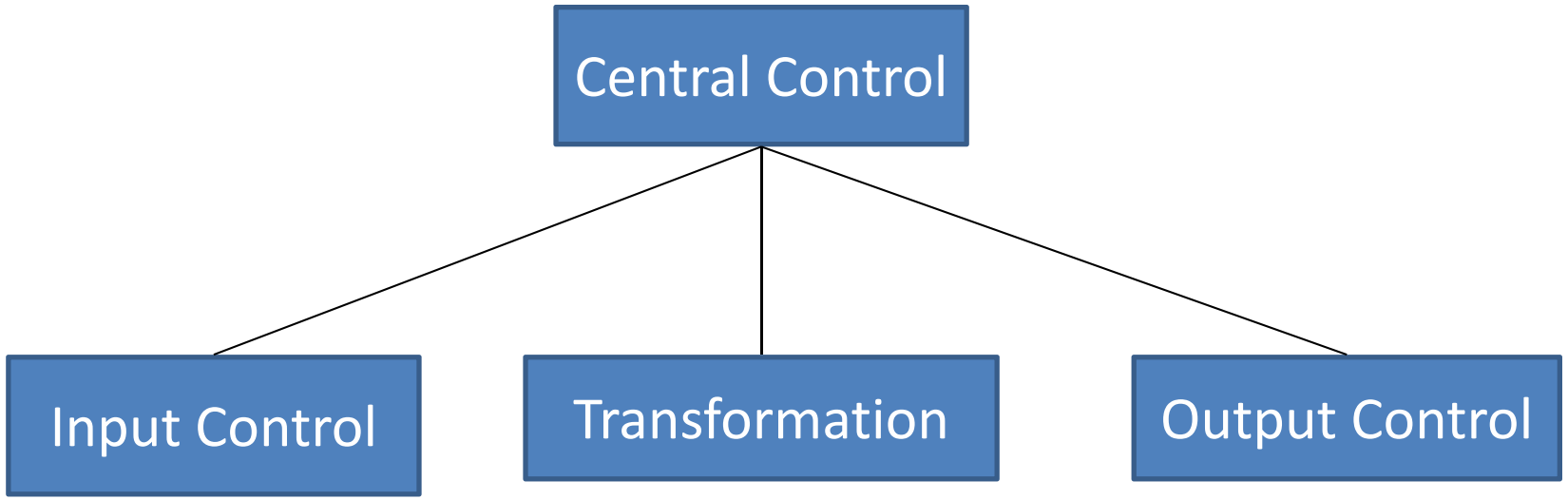
Isolating Transform Center



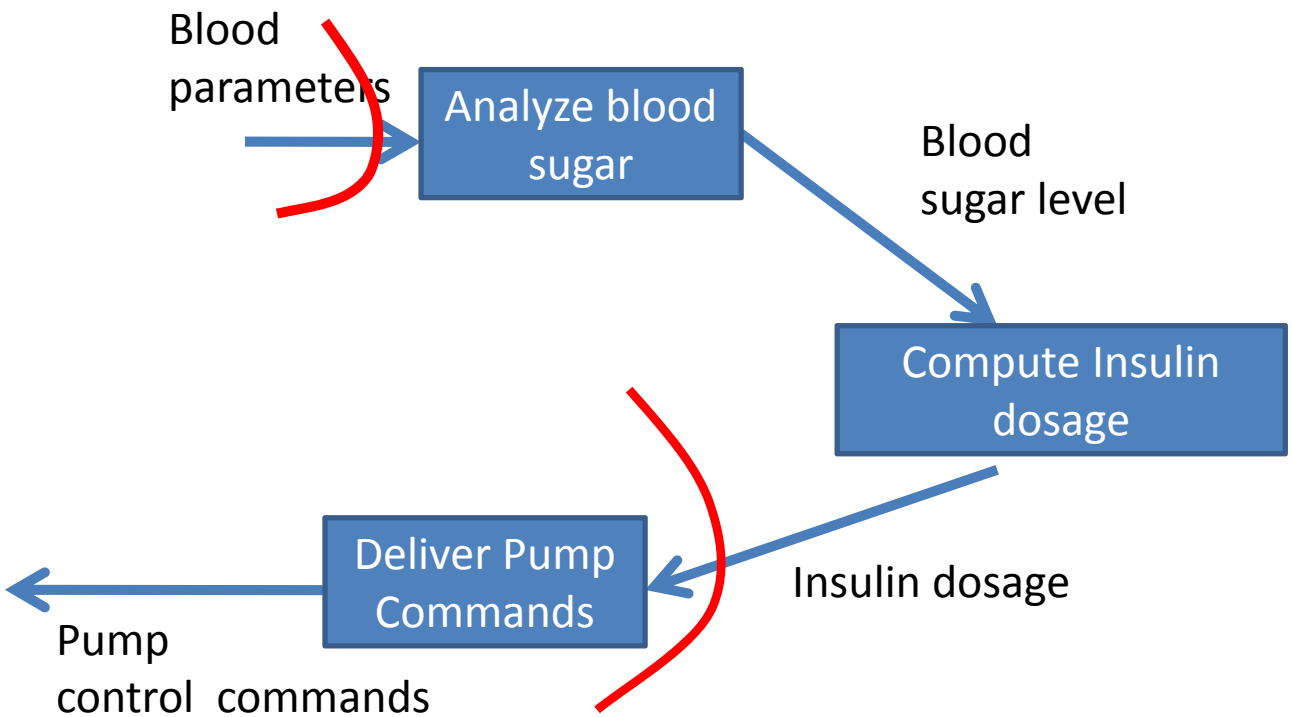
Isolating Transform Center



First Level Factoring

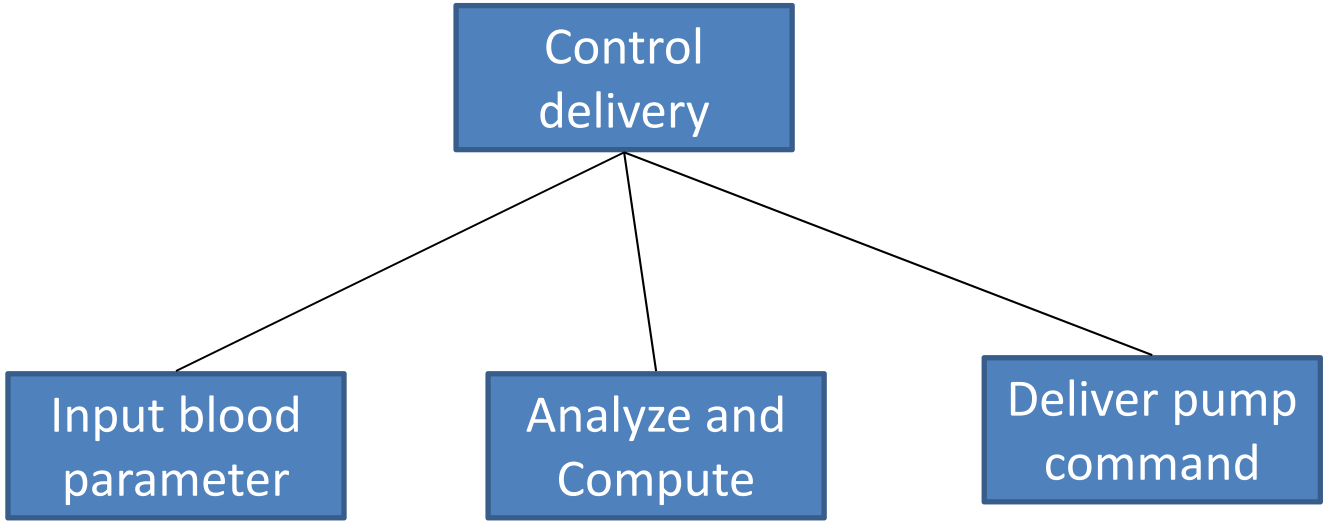


Isolating Transform Center - Example 1

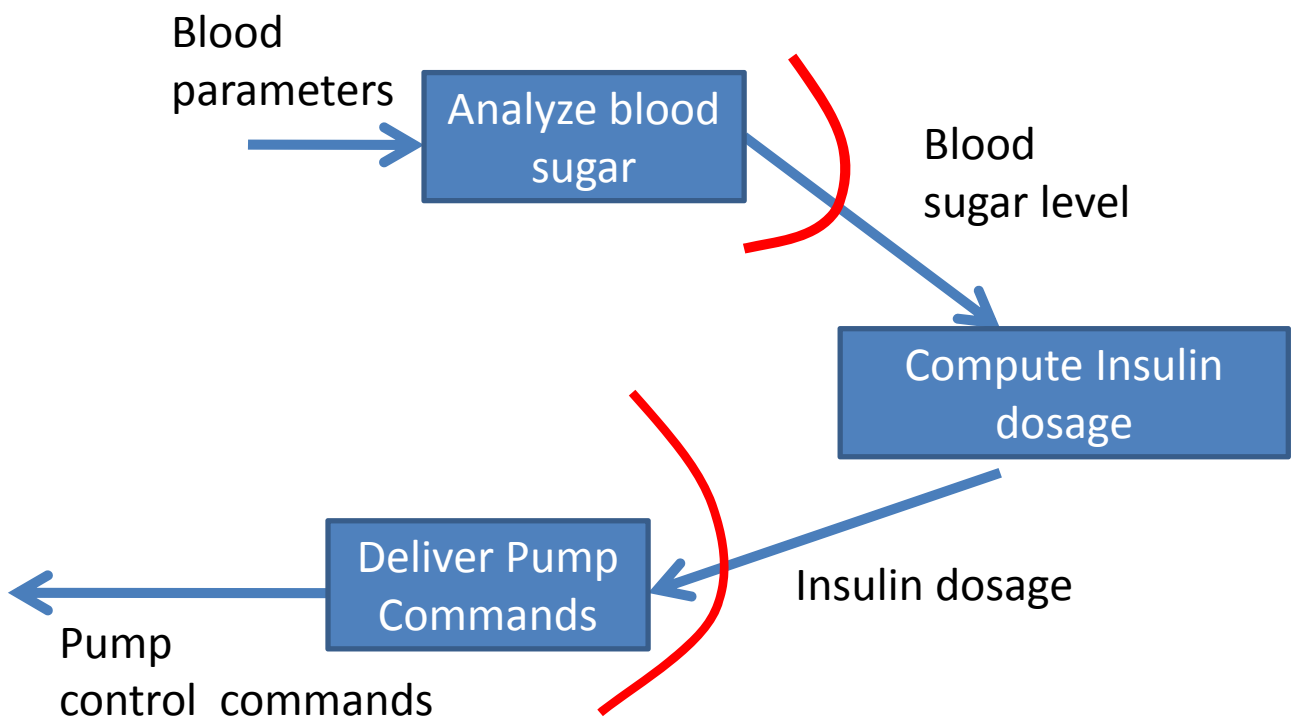


An insulin pump control system

First Level Factoring – Example 1

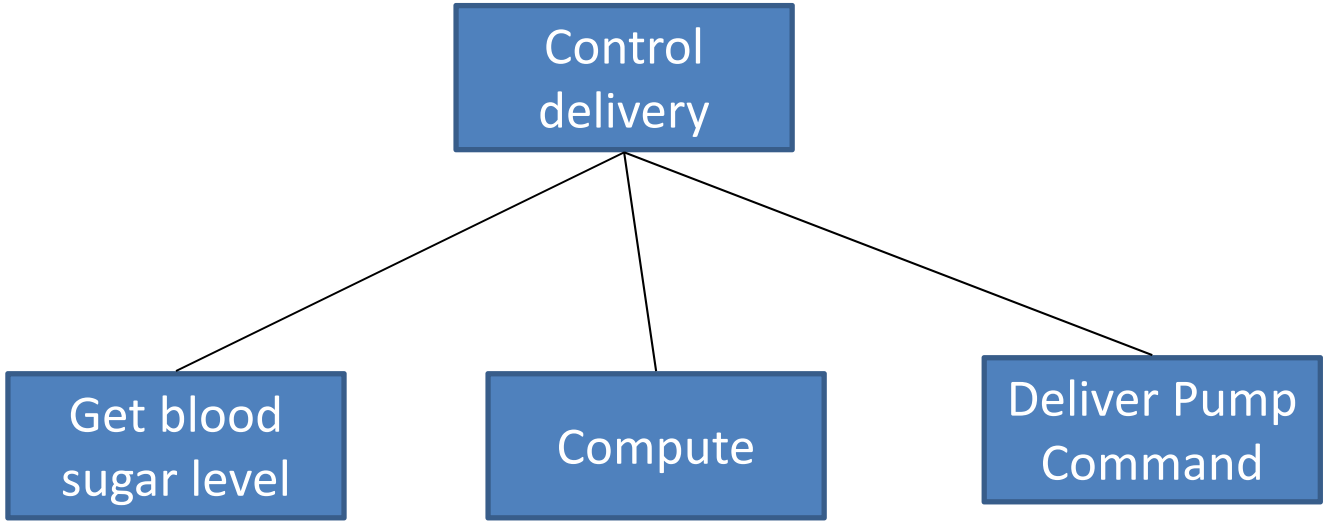


Isolating Transform Center - Example 2

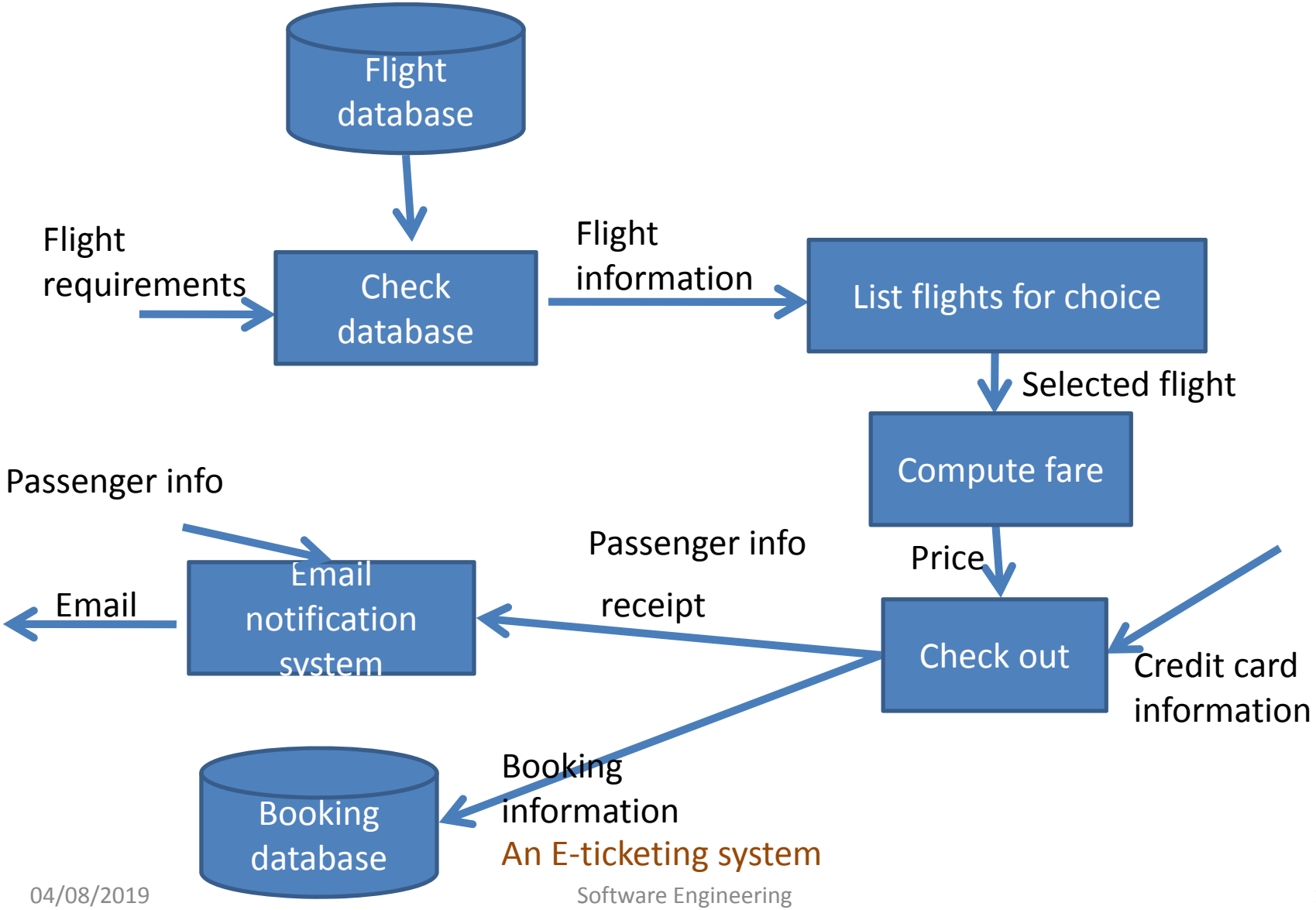


An insulin pump control system

First Level Factoring – Example 2

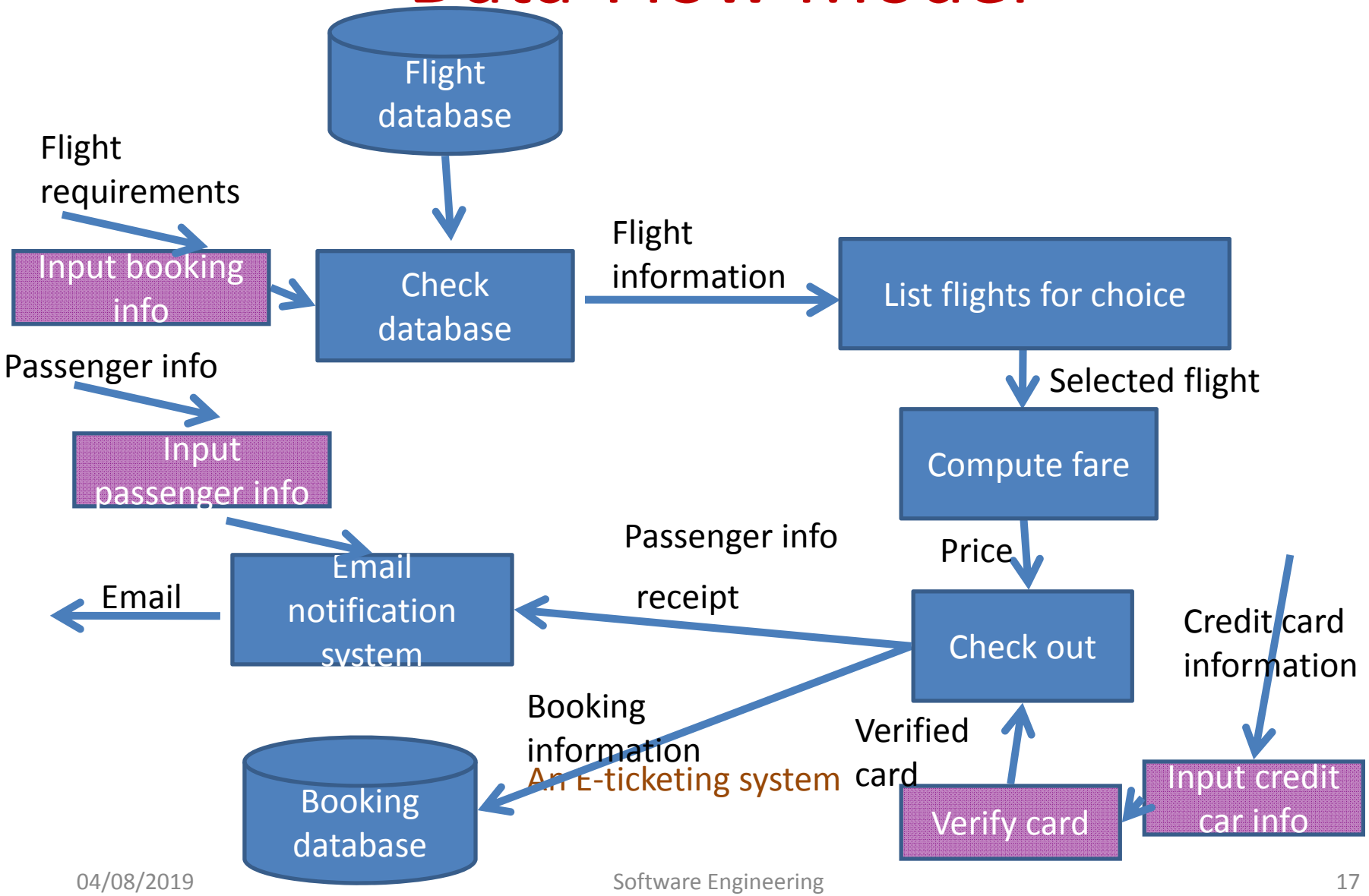


Data-Flow Model

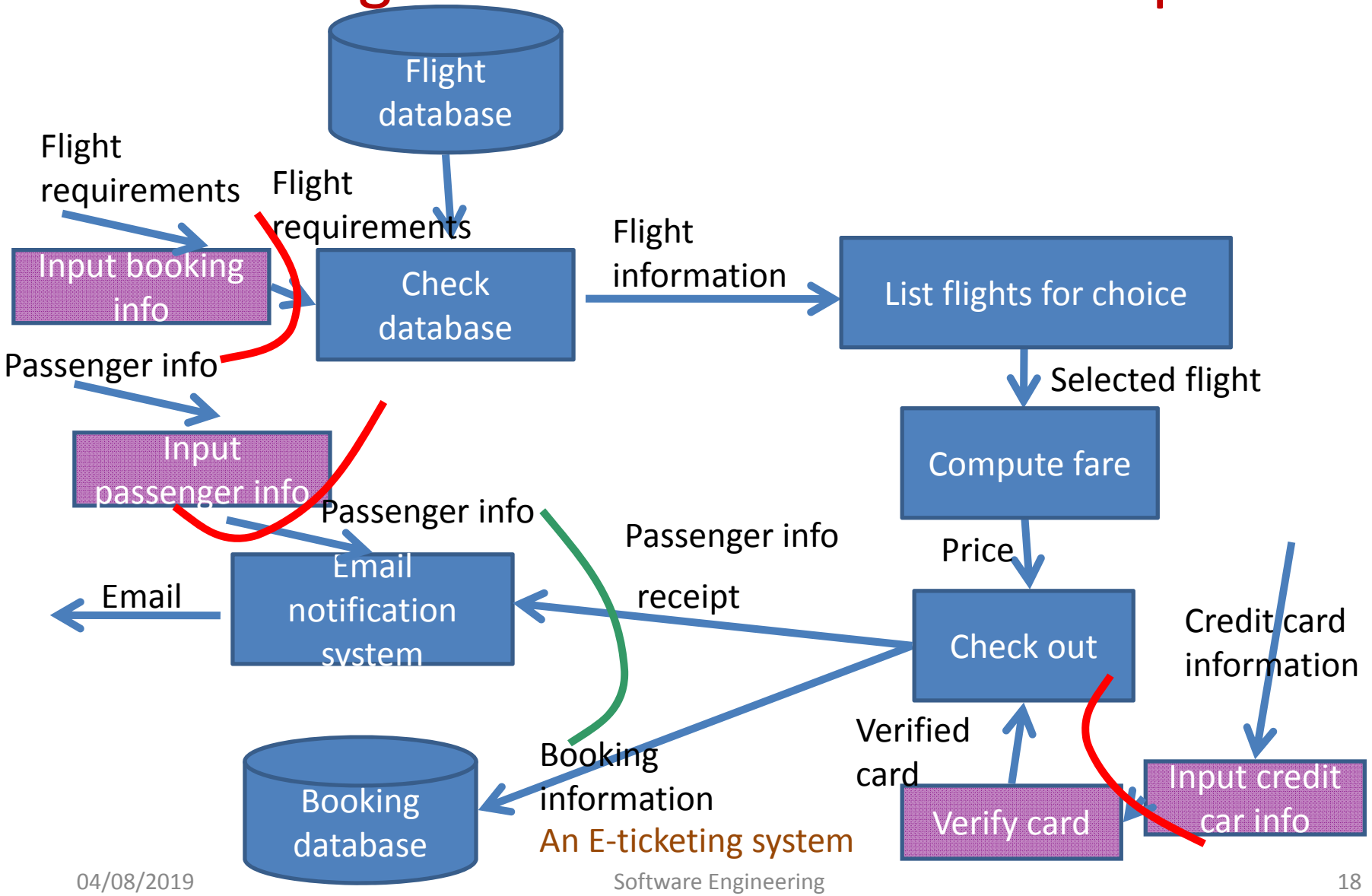


An E-ticketing system

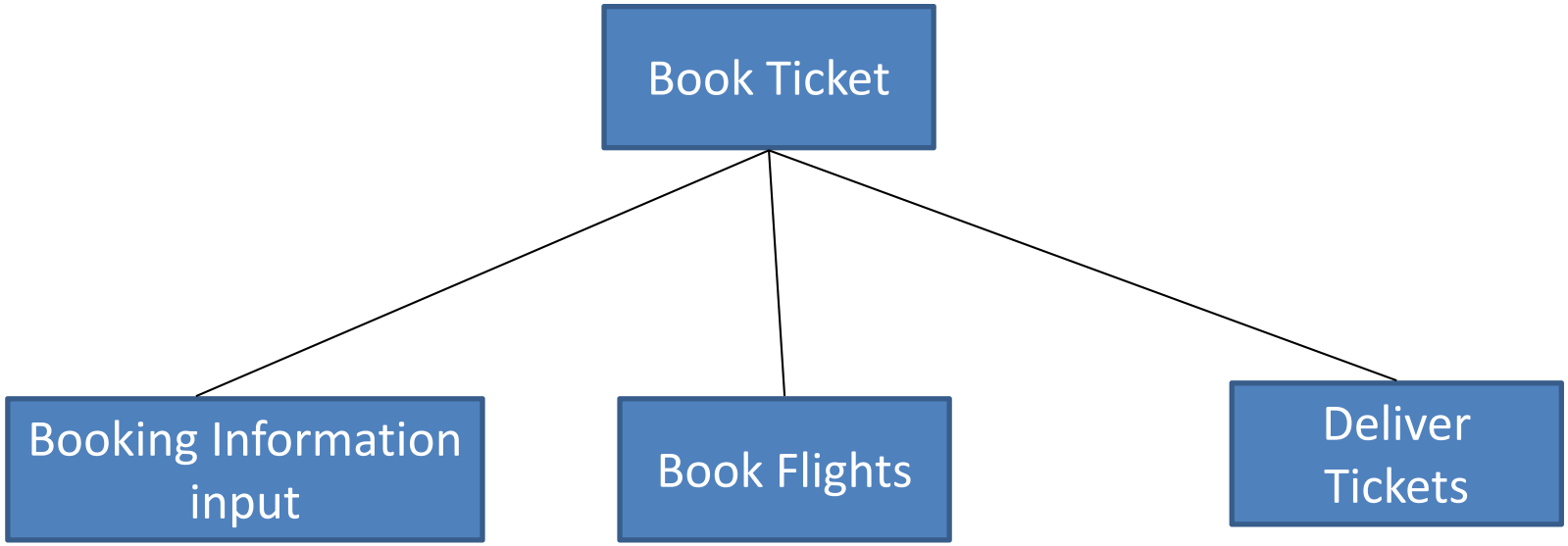
Data-Flow Model



Isolating Transform Center – Example 3



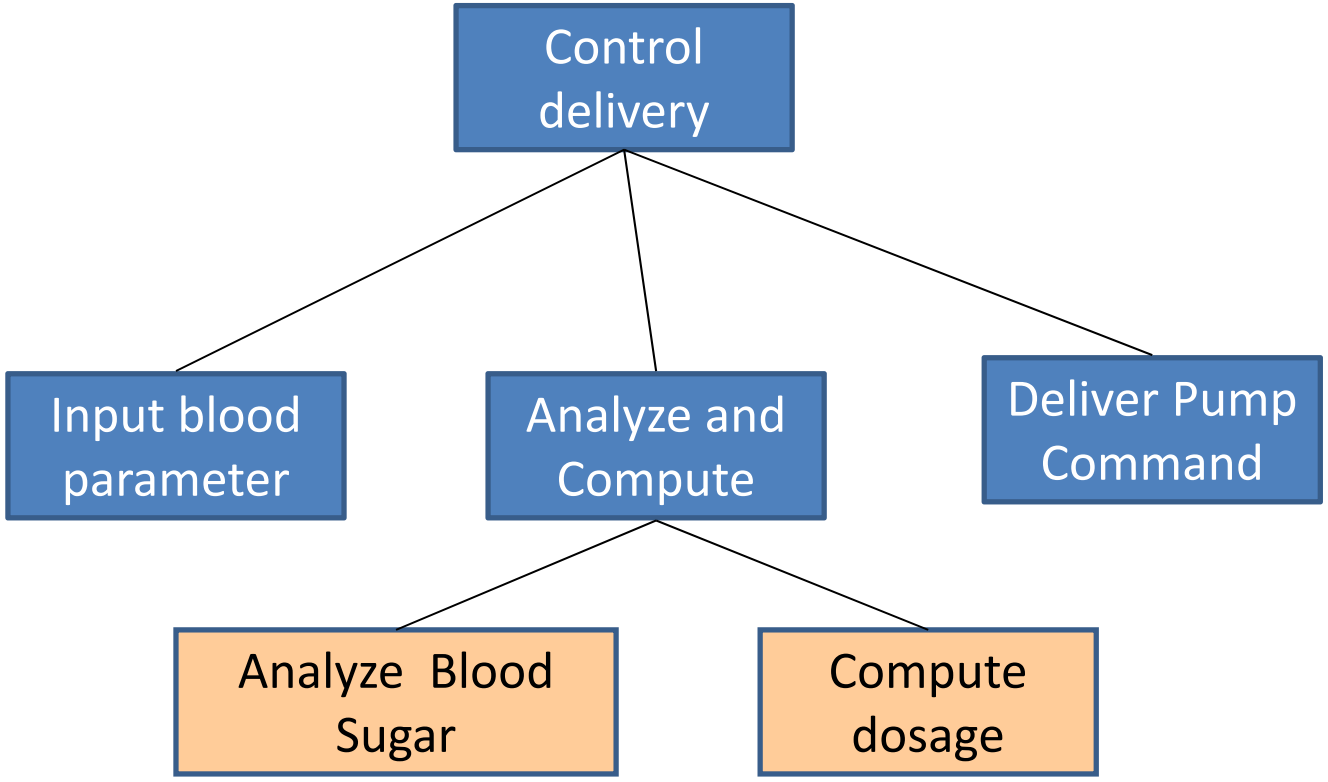
First Level factoring – Example 3



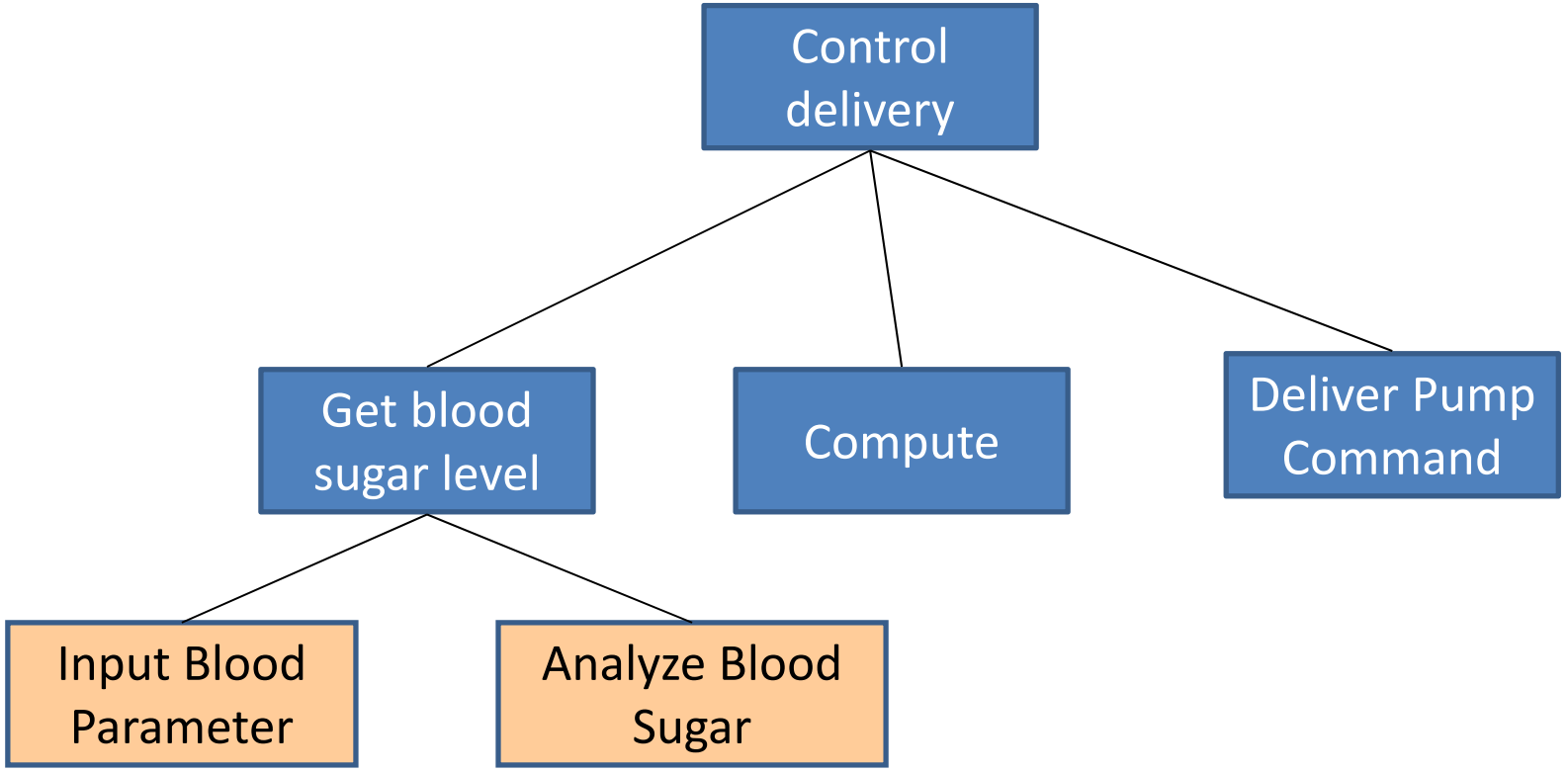
Second Level factoring

- Map individual （单个）transforms of a data flow diagram into appropriate （合适的） modules within the architecture
  - Several transactions （事务）can be merged to one transaction
  - One transaction can be further expanded (扩展) to several transactions
  - The structure can be changed

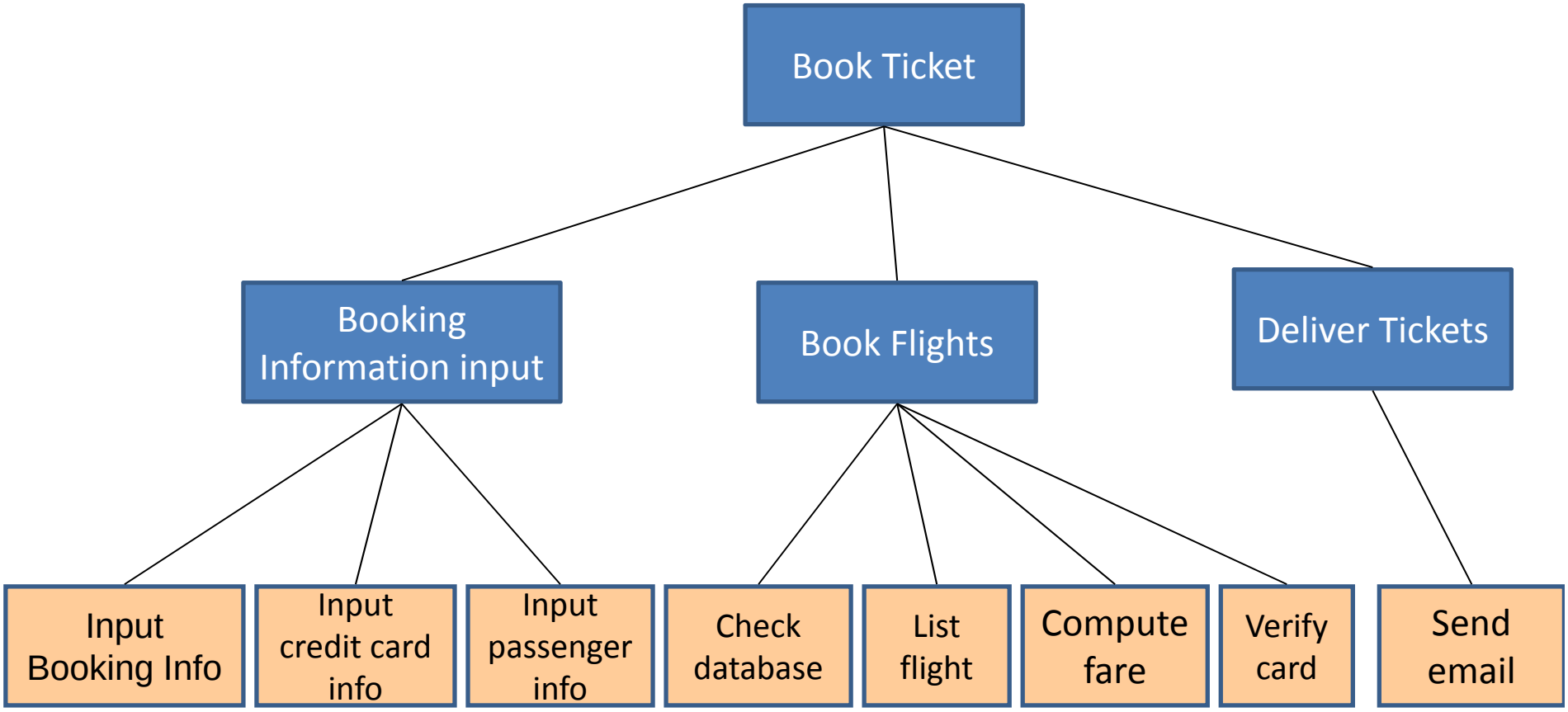
Second Level Factoring – Example 1



Second Level Factoring – Example 2

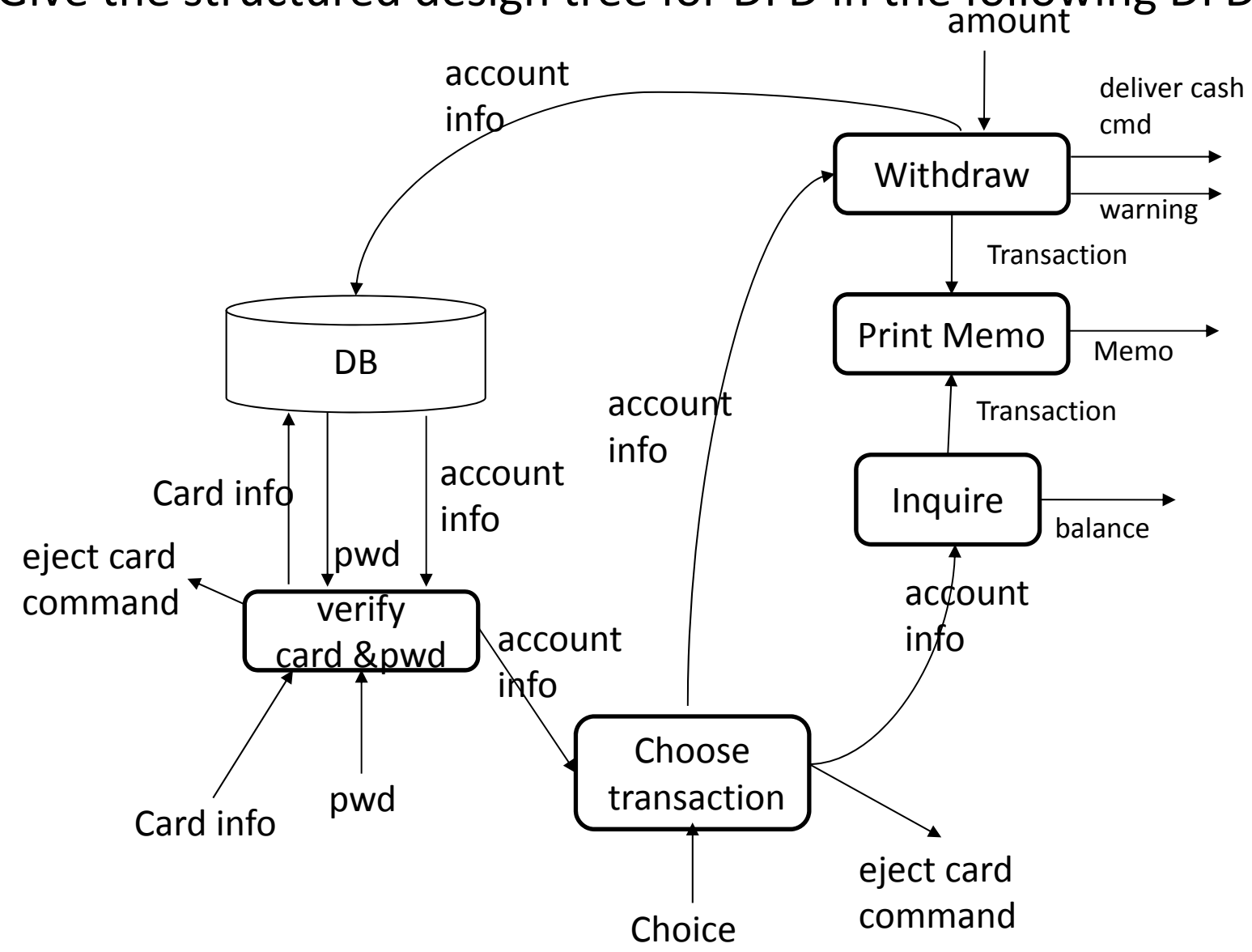


Second Level Factoring – Example 3



Class Exercise

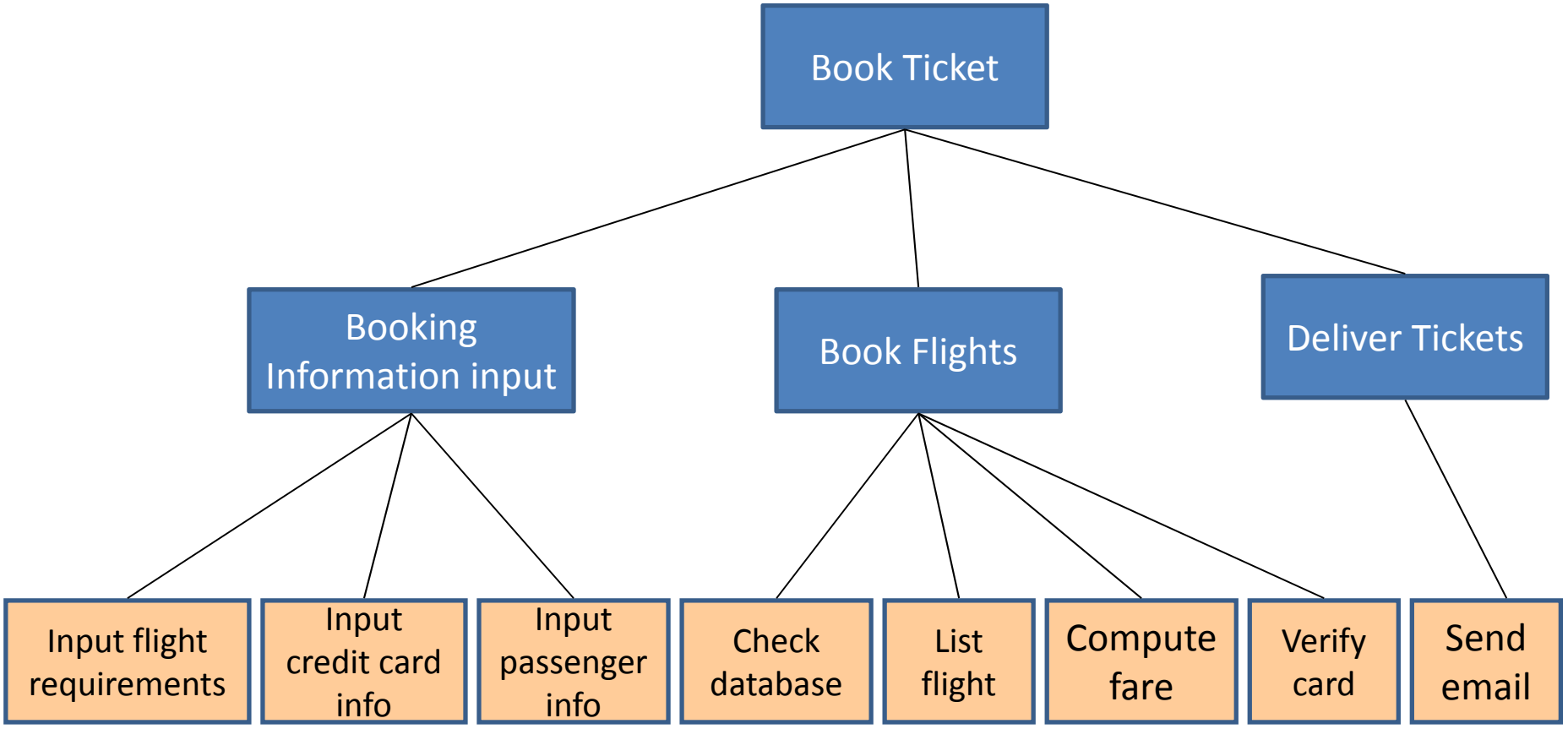
- Give the structured design tree for DFD in the following DFD



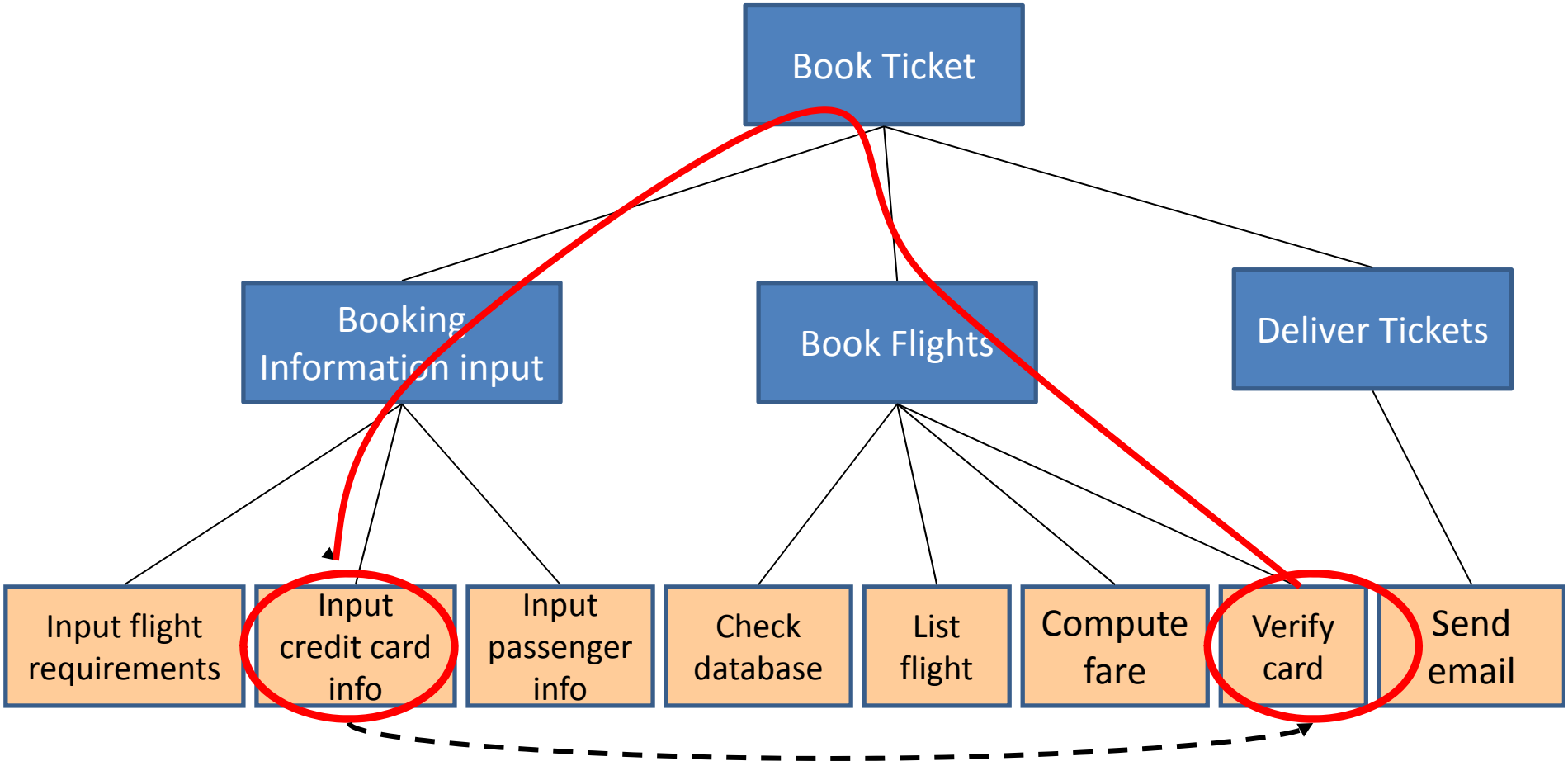
Detailed Design

- Software specification is modeled in DFD.
- Architecture design is modeled in a call-tree.
- The considerations in the restructuring of the structure
  - Coupling
  - Cohesion
  - Database process

Data-Flow Model – System Structure

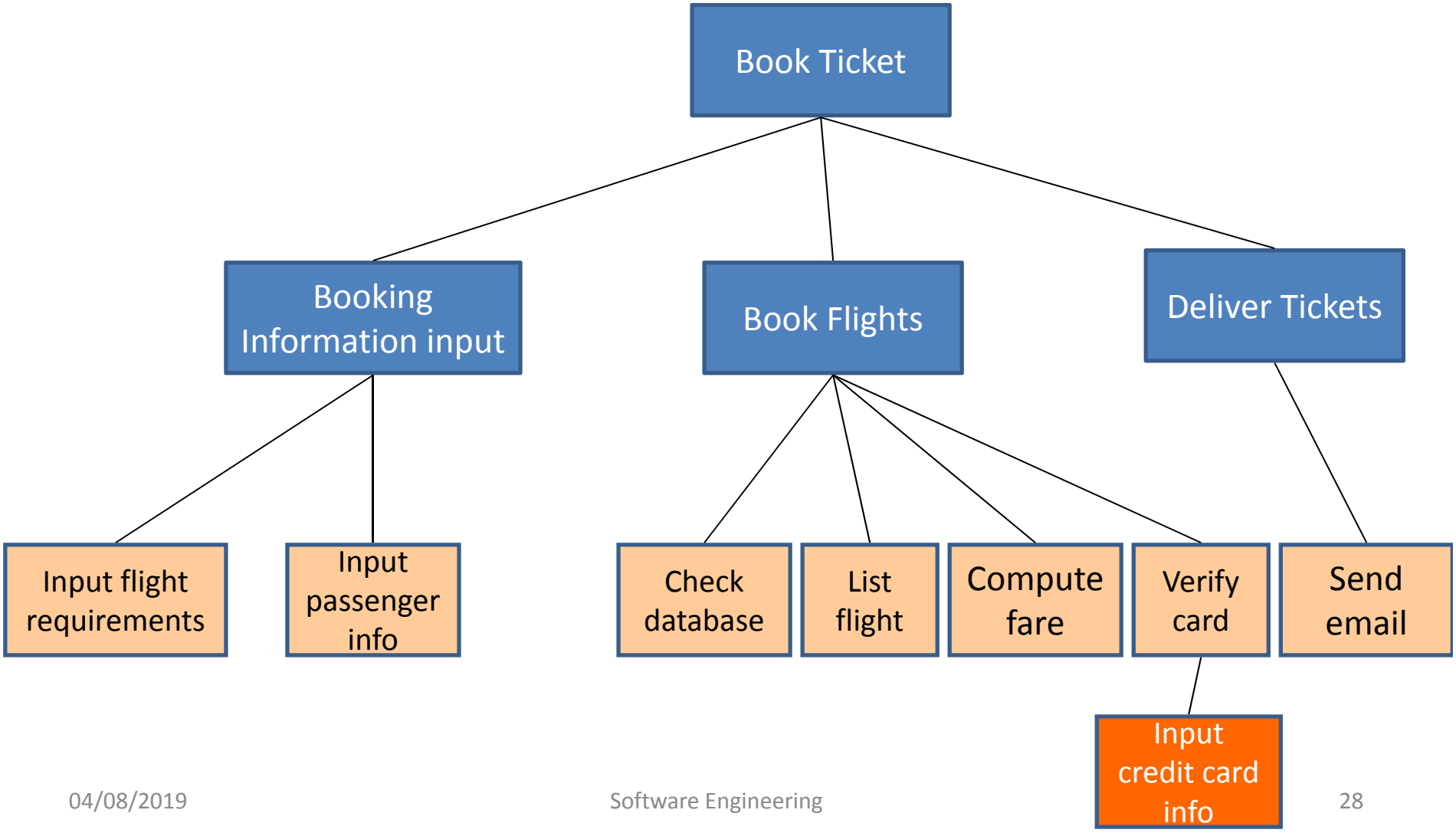


Data-Flow Model – System Architecture

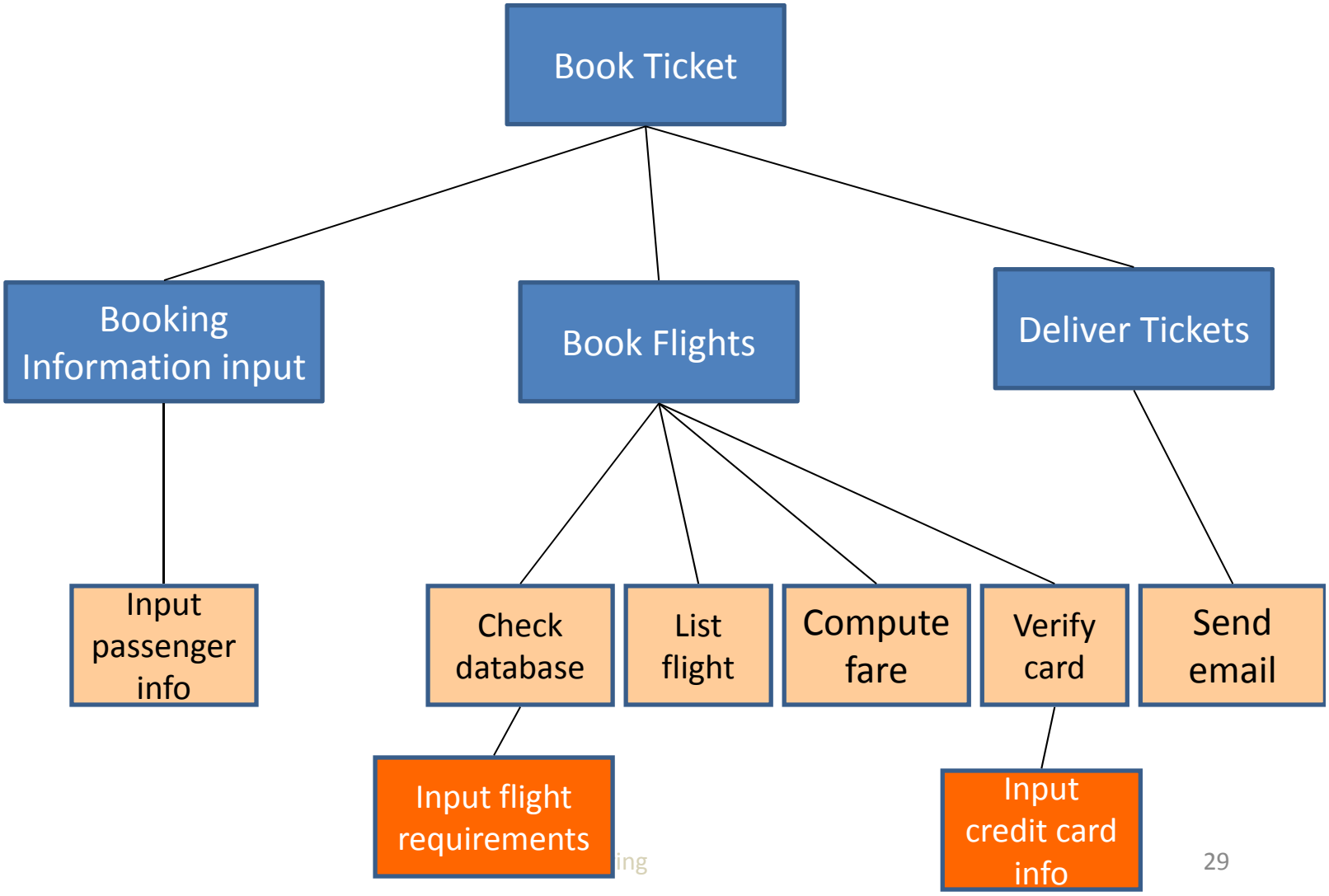


How can the credit card info get to "Verify card" to verify? Coupling?

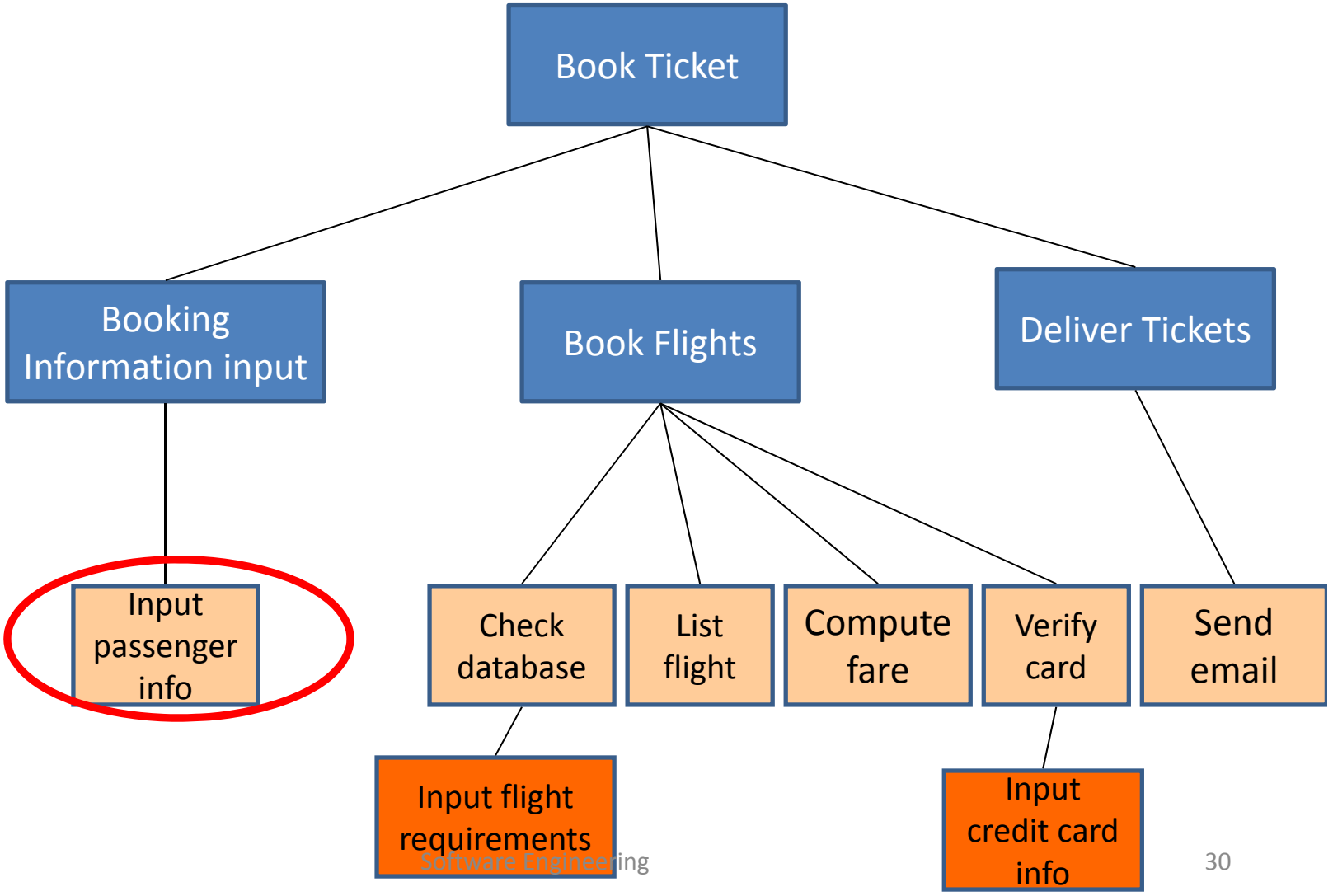
Data-Flow Model – System Structure



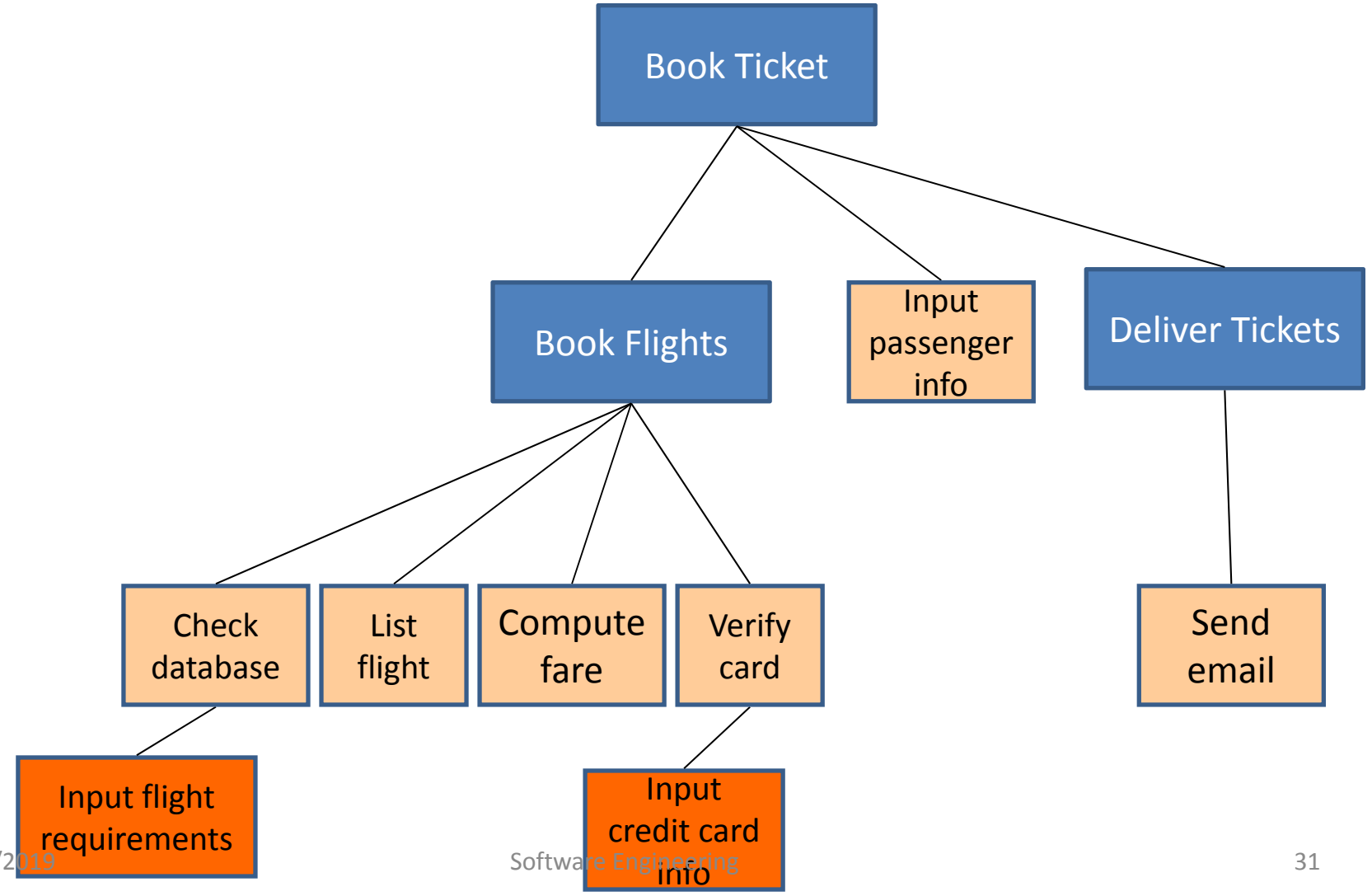
Data-Flow Model – System Structure



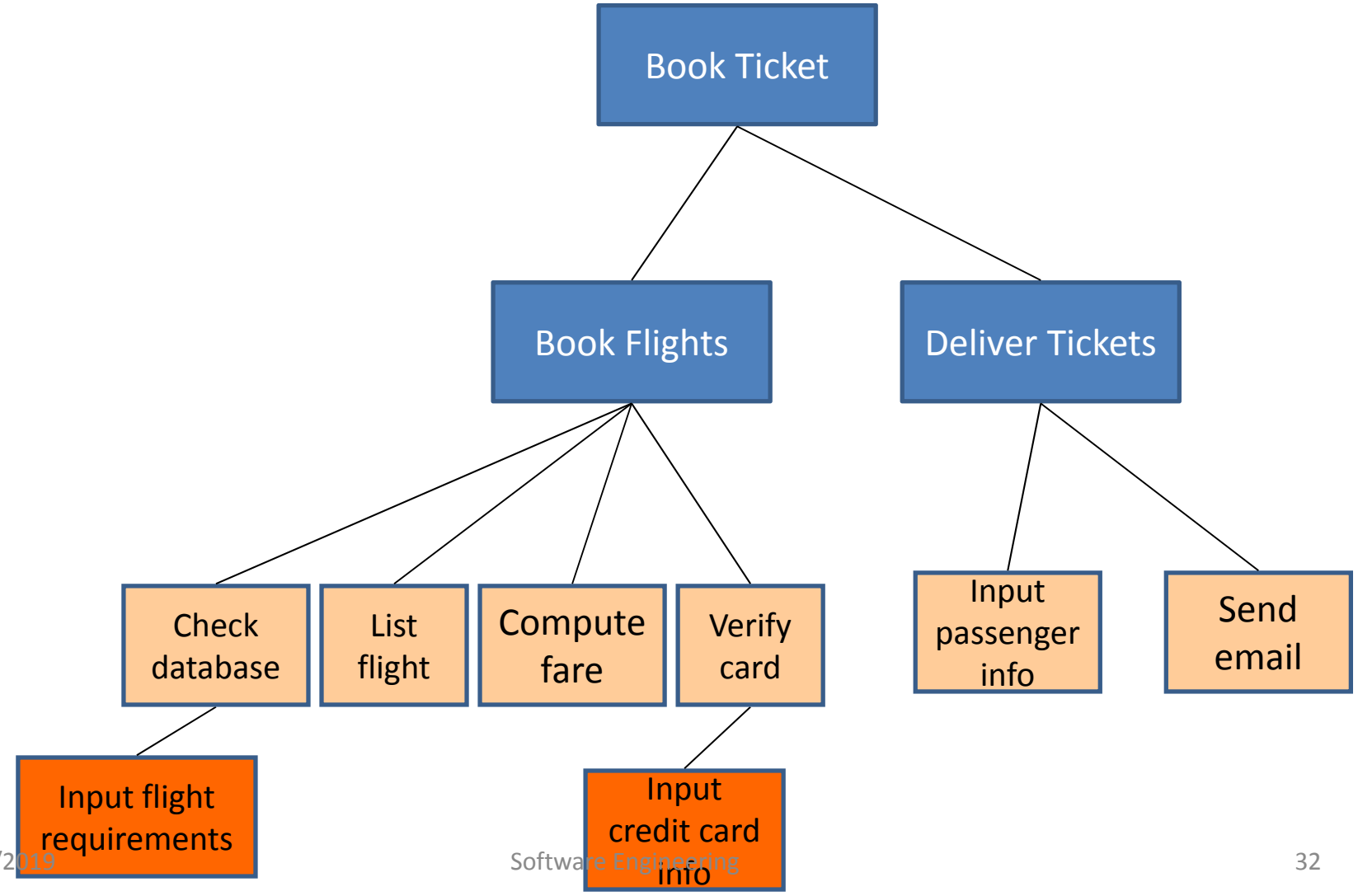
Data-Flow Model – System Structure



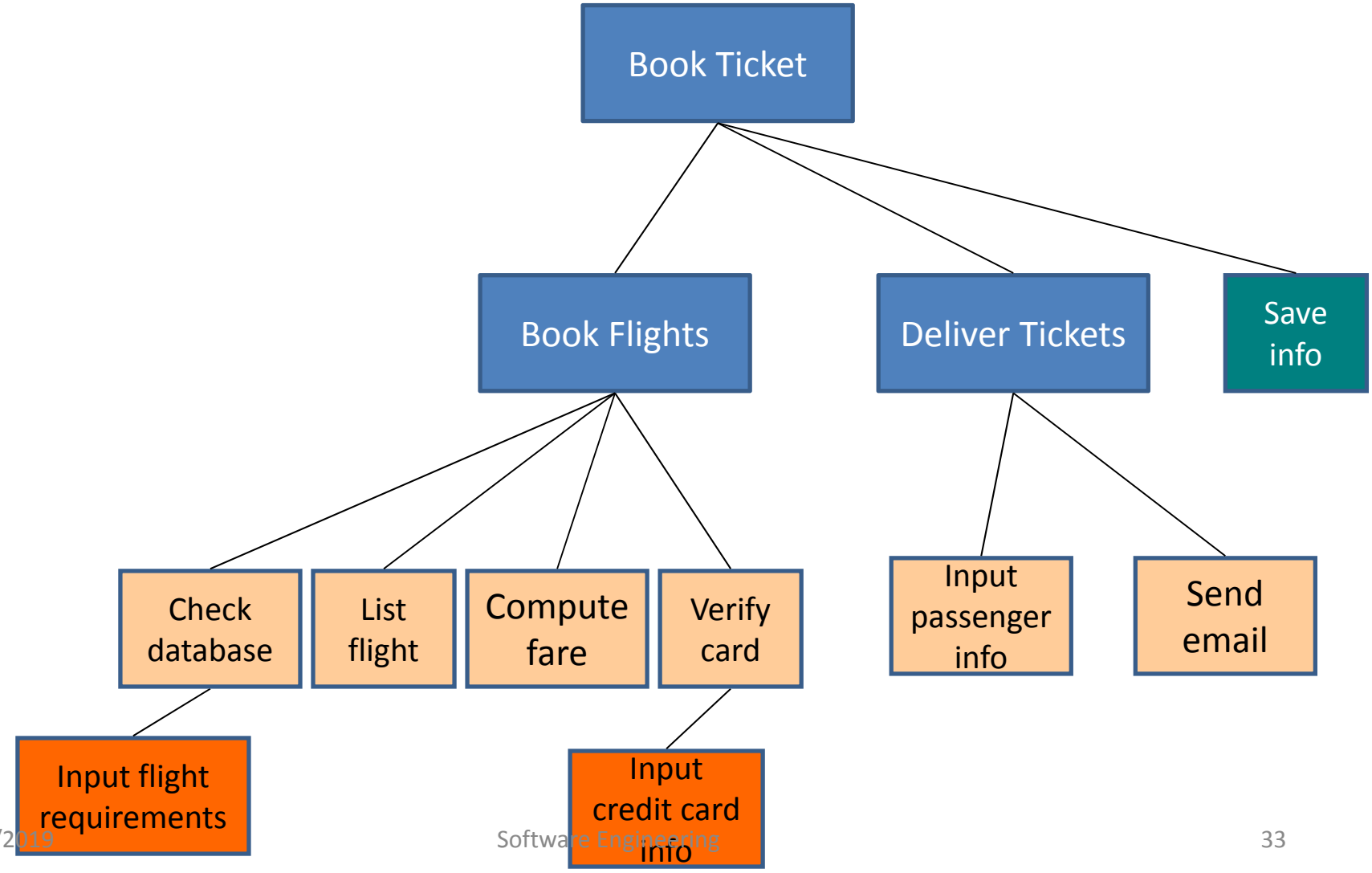
Data-Flow Model – System Structure



Data-Flow Model – System Structure



Data-Flow Model – System Structure



Class Exercise

- Re-structure the tree for the ATM example

Summary

- Steps can be followed to create architecture based on the DFD diagram
- The architecture design depends on the isolation of transformations
- The structured design is a step in the structured analysis method