IF2261 Software Engineering

Architectural Design

Program Studi Teknik Informatika
STEI ITB

Structured Design

- objective: to derive a program architecture that is partitioned
- approach:
  - the DFD is mapped into a program architecture
  - the PSPEC and STD are used to indicate the content of each module
- notation: structure chart

Structured Design (2)

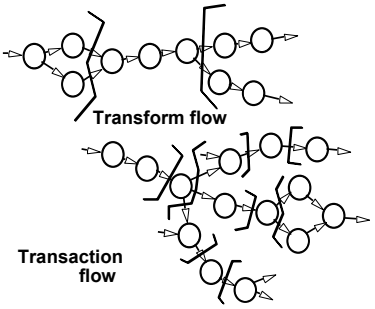
- Architectural design
- Interface design
- Data design
- Procedural design/component-level design

Architectural Design

Mapping Requirements to Software Architecture

- Establish type of information flow (transform flow - overall data flow is sequential and flows along a small number of straight line paths; transaction flow - a single data item triggers information flow along one of many paths)
- Flow boundaries indicated
- DFD is mapped into program structure
- Control hierarchy defined
- Resultant structure refined using design measures and heuristics
- Architectural description refined and elaborated

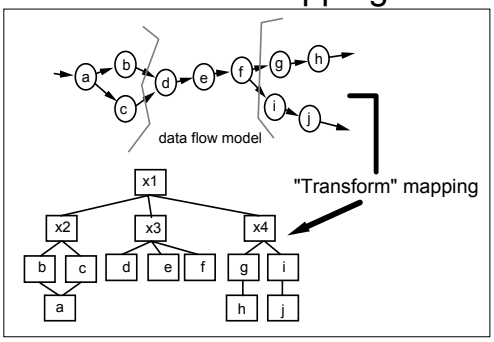
Flow Characteristics



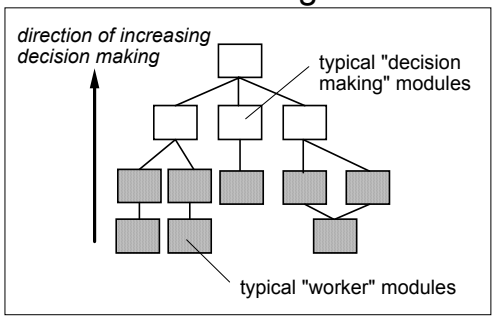
General Mapping Approach

- ❑ isolate incoming and outgoing flow boundaries; for transaction flows, isolate the transaction center
- ❑ working from the boundary outward, map DFD transforms into corresponding modules
- ❑ add control modules as required
- ❑ refine the resultant program structure using effective modularity concepts

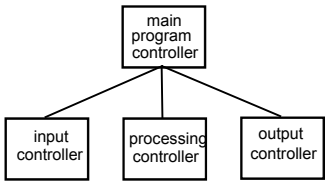
Transform Mapping



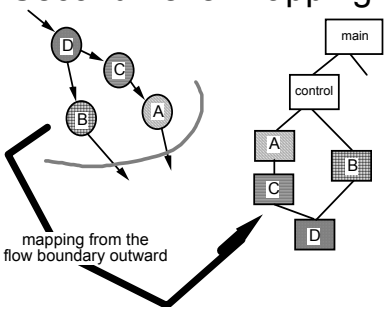
Factoring



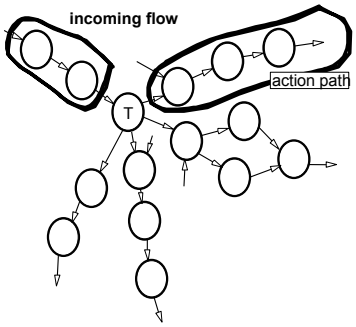
First Level Factoring



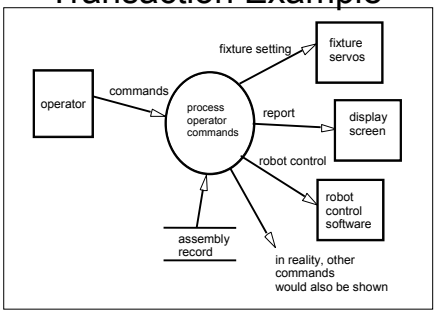
Second Level Mapping



Transaction Flow



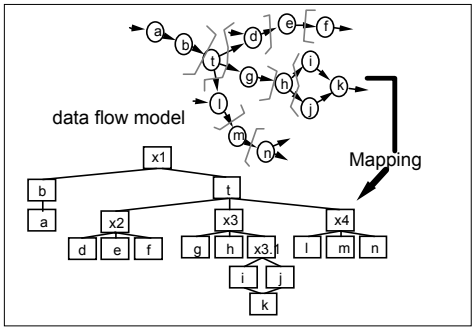
Transaction Example



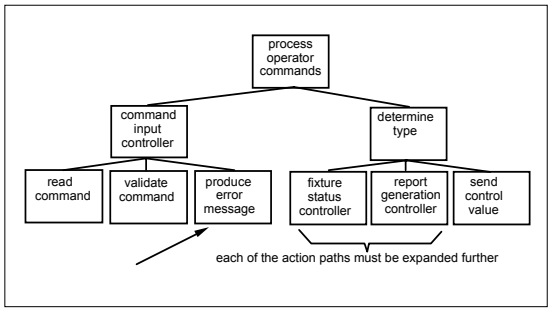
Transaction Mapping Principles

- isolate the incoming flow path
- define each of the action paths by looking for the "spokes of the wheel"
- assess the flow on each action path
- define the dispatch and control structure
- map each action path flow individually

Transaction Mapping



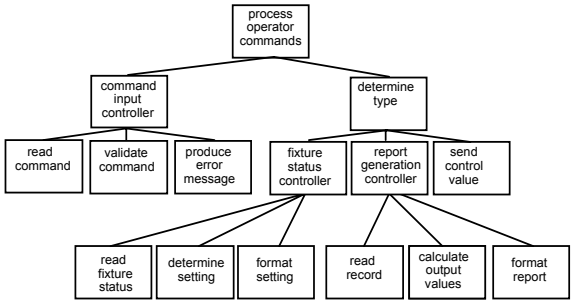
Map the Flow Model



Refining Architectural Design

- Processing narrative developed for each module
- Interface description provided for each module
- Local and global data structures are defined
- Design restrictions/limitations noted
- Design reviews conducted
- Refinement considered if required and justified

Refined Structure Chart



Architecture Design Assessment Questions

- How is control managed within the architecture?
- Does a distinct control hierarchy exist?
- How do components transfer control within the system?
- How is control shared among components?
- What is the control topology?
- Is control synchronized or asynchronous?
- How are data communicated between components?
- Is the flow of data continuous or sporadic?
- What is the mode of data transfer?
- Do data components exist? If so what is their role?
- How do functional components interact with data components?
- Are data components active or passive?
- How do data and control interact within the system?