

Decomposition

Types

- Algorithmic Decomposition
 - Structural, linear path
- Object Decomposition
 - Behavioural, interactivity is the focus here

Overview of Algorithmic Decomposition

- Linear path through the program
- Focus on data structures is secondary
- Overall module identification by route is key

Algorithmic decomposition continued

- Exhibits the process involved in achieving the end functionality
- Chronology is important here
- Constructed according to prescribed structures of a given language

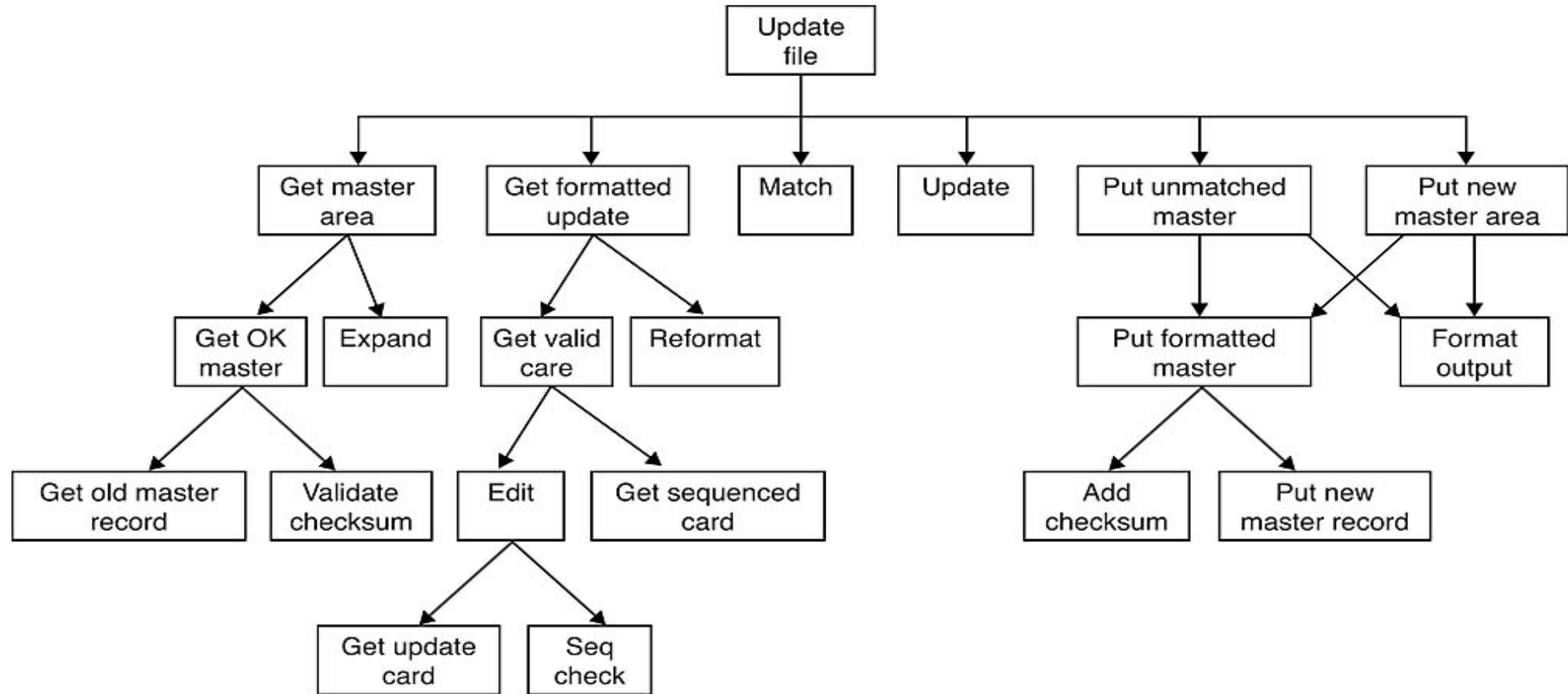
Advantages of Algorithmic Decomposition

- Improves the clarity of the pathways
- The majority of the structure for the software is conveyed
- The data structures for the containment of data is described

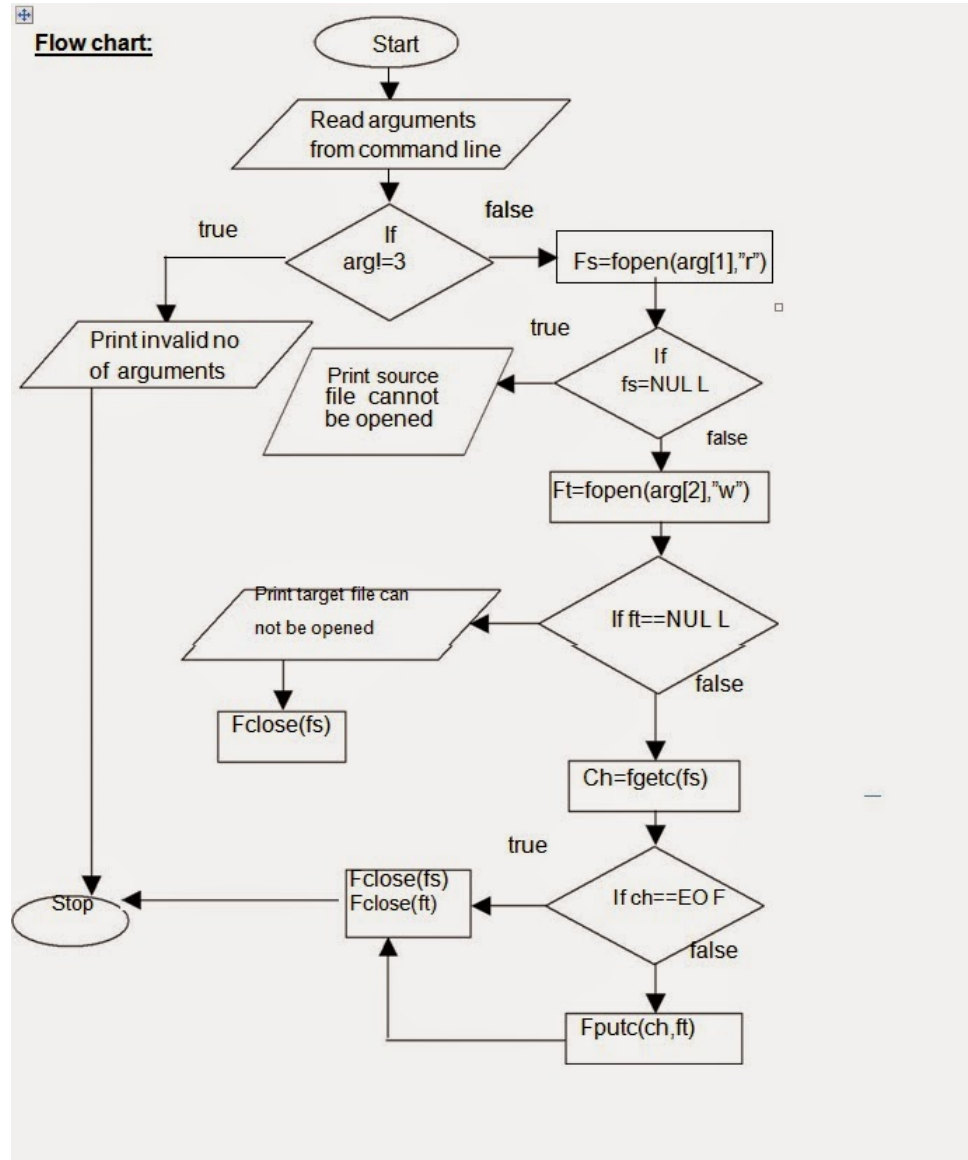
Disadvantages

- Focuses on prescriptive design and analysis
- Data structures are largely tied to the language that is intended
- Excessive documentation to describe every aspect of a system and how it is accessed
- Excessive time to undertake the process can pose challenges

Example of algorithmic/practical decomposition



Representation of this



Key thought processes in practical design

- Control flow blocks
- Consider the conditional statement in Java:

```
If(x<5)
{
    System.out.print("under 5");
}
Else
{
    System.out.print("over 5");
}
```

Usage

- Where would practical/algorithmic decomposition of a system prove to be useful ?
 - Safety critical systems
 - Real-time systems
 - Any system in which it is necessary to follow the path of something with certainty

Object Decomposition

- Compartmentalising the system into a series of blocks that represent physical entities
- Objects have interactivity
- Objects have behaviours
- Objects have properties

Object Decomposition Continued

- “Everything” is an object
- Objects are fundamental building blocks of the system
- Behaviour is modelled through the interactivity of the objects

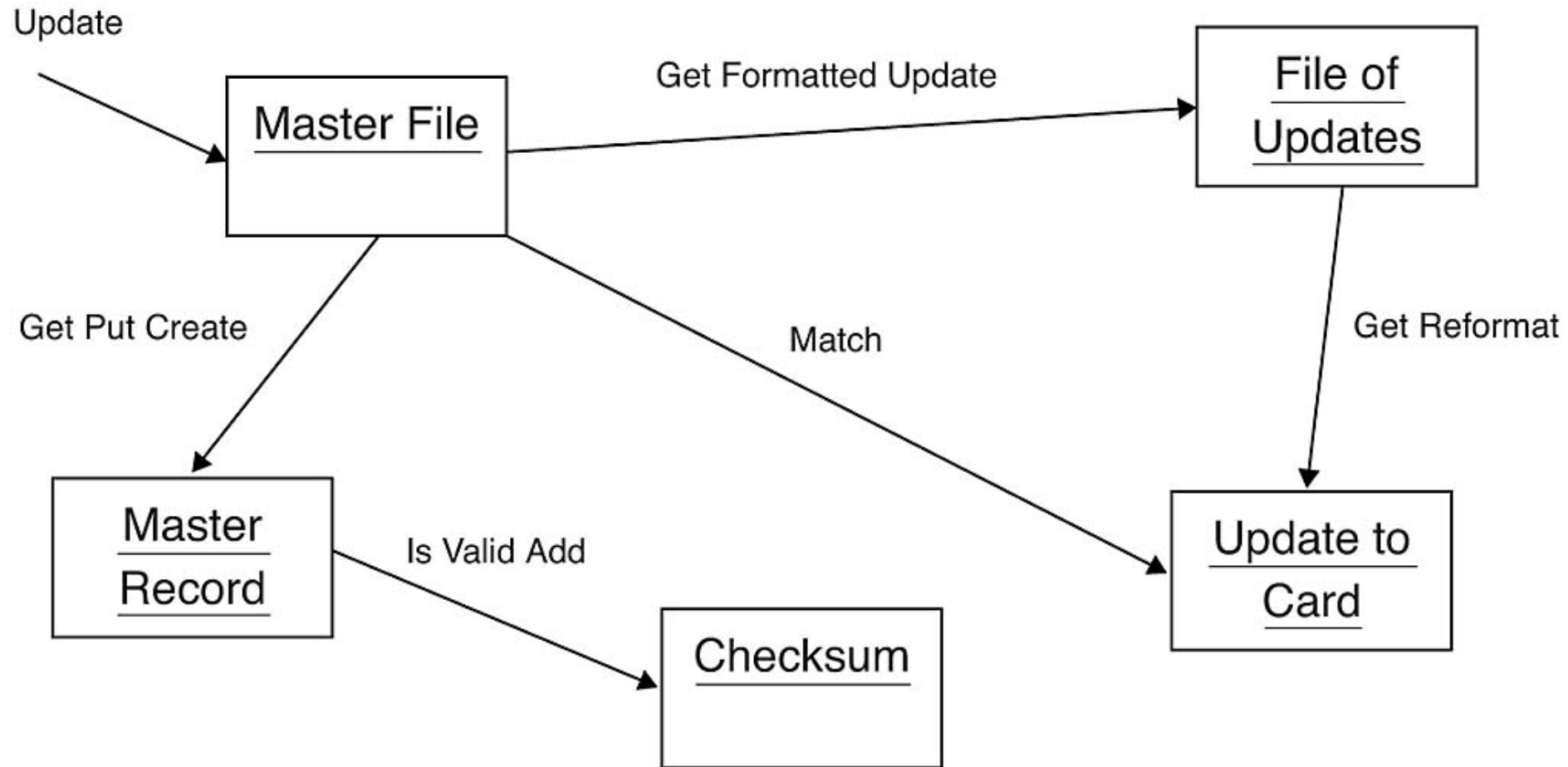
Advantages of Object Decomposition

- Takes less time to model a system
- Is easier to interpret how things talk to one another
- Easier to compartmentalise a system

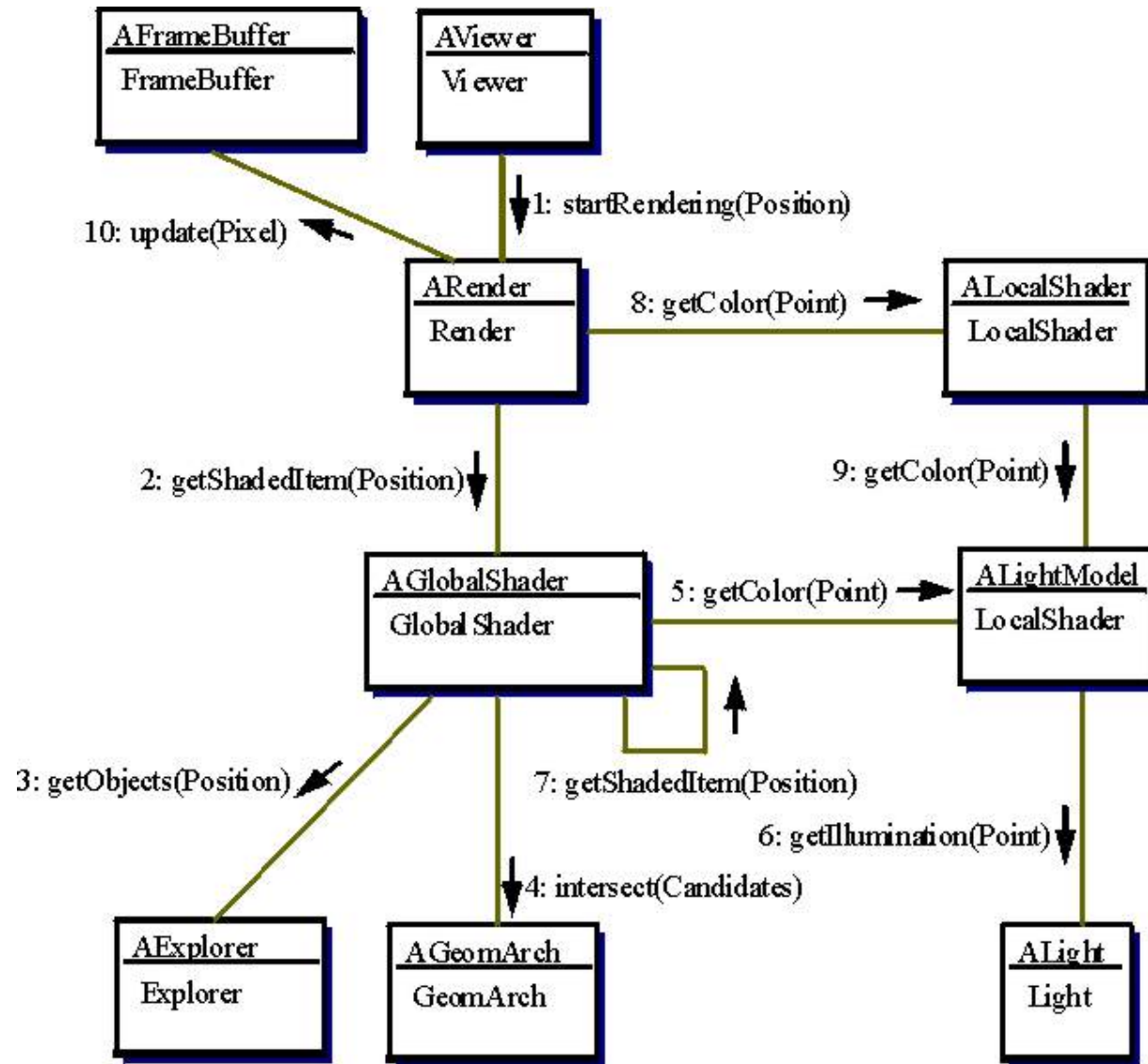
Disadvantages of Object Decomposition

- Does not provide a complete logical pathway through the software
- Does not necessarily provide chronology (at this stage)
- Data structures are defined but only in the abstract sense

Example



Example Two



Looks a little less like a flow chart now

