

Chapter VI: Process Analysis and Modeling

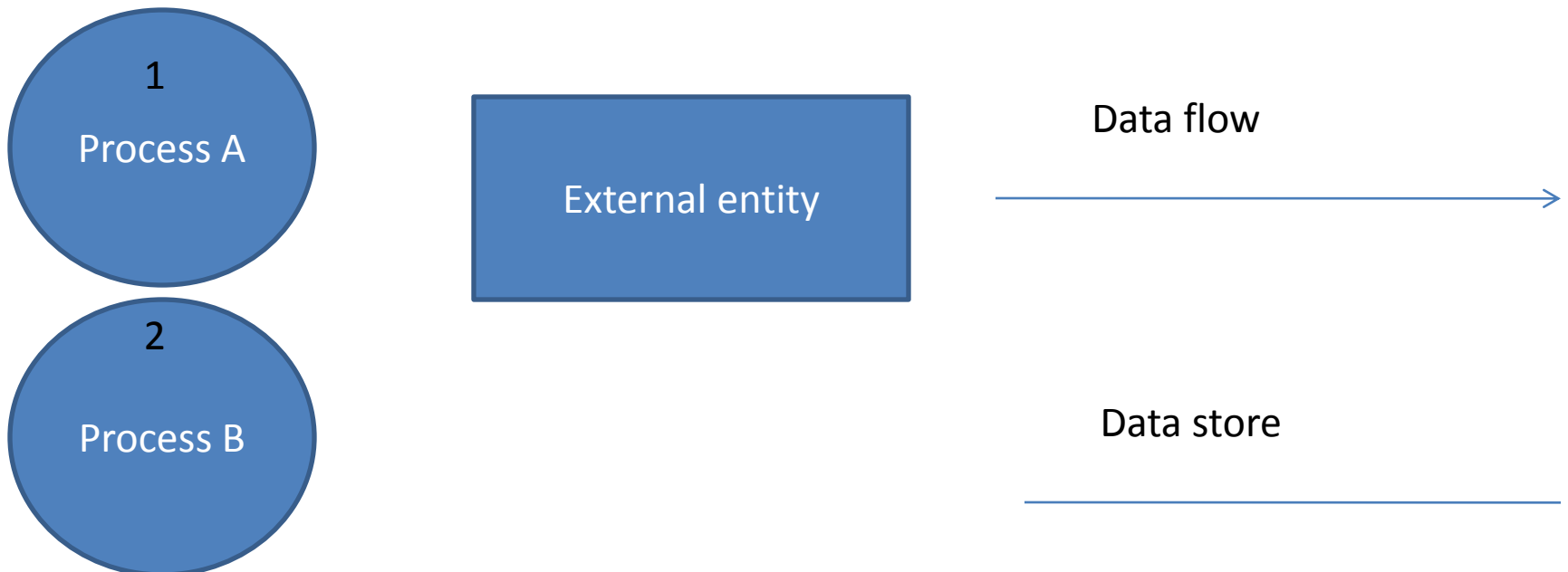
1. Introduction

In the structured analysis, the data is modeled by ERD diagram after requirements are collected. When the data feeds on the system, it is transformed to the output. Transforming an input to an output is a process. In the structured analysis, modeling processes of the system begins with Data Flow Diagrams (DFD).

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2. Data Flow Diagrams

DFDs, processes modeling tool, uses a number of symbols to present processes, data stores, data flows, and external entities in the system.



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2. Data Flow Diagrams

-**Processes** represent what the system does. Each process has one or more data input and produces one or more data output. In DFD, a process represented by a circle. All processes have different names, and identification numbers.



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2. Data Flow Diagrams

-**Data stores** are files to store the data. The data in the files can be read and written by the processes. Each data store is represented by a thin line. It has a unique name.

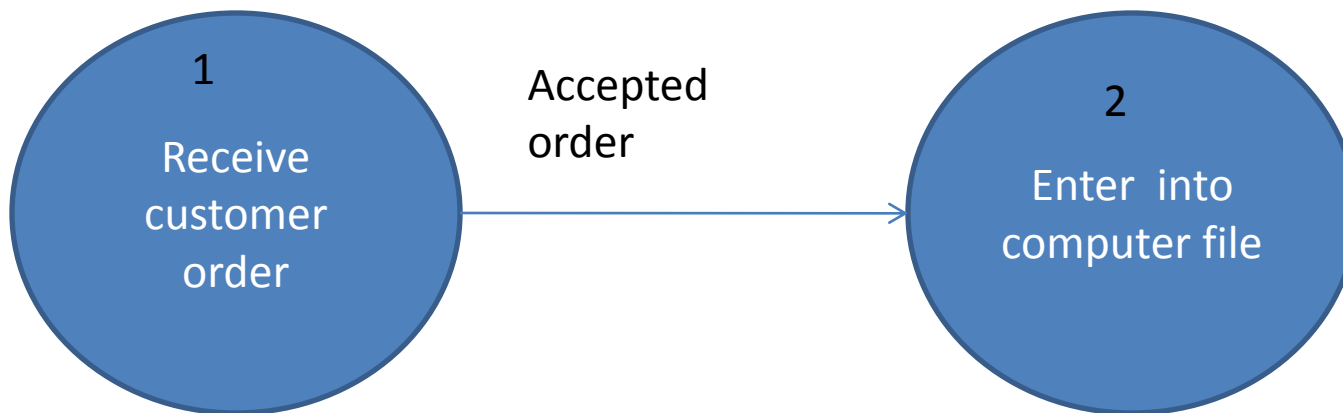
Orders



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2. Data Flow Diagrams

-**Data flows** show the flow of data in the system. It is represented by an arrow line that connects from one component to another component in the system. Data can flow between processes, external entities to processes, processes to processes, or processes to data stores and back.



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2. Data Flow Diagrams

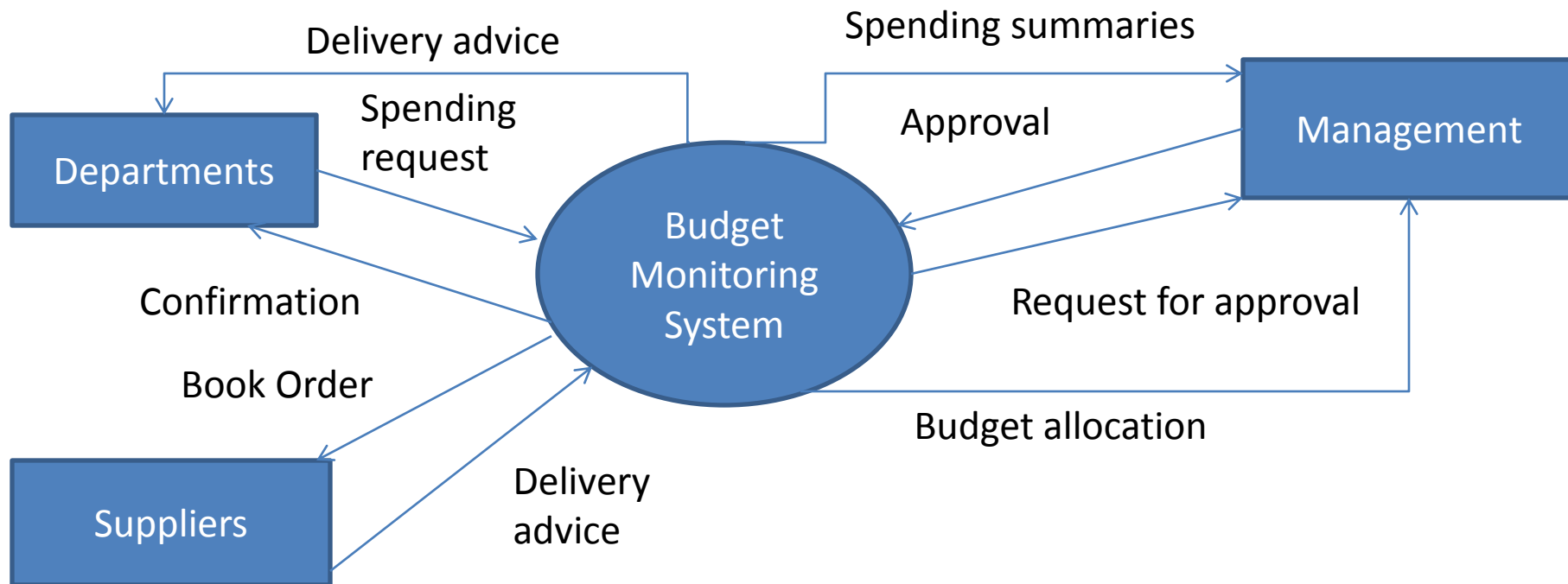
-**External entities** are represented by rectangles. An external entity shows what are outside the system, but interact with the system. They might be a person who input data in to system or a person who use the output of the system.



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3. Leveling DFD

-**Context diagram** describes the system in general sense. Context diagram models the system by a single process. It shows all the external entities that interact with the system, and data flow between the external entities.



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2. Data Flow Diagrams

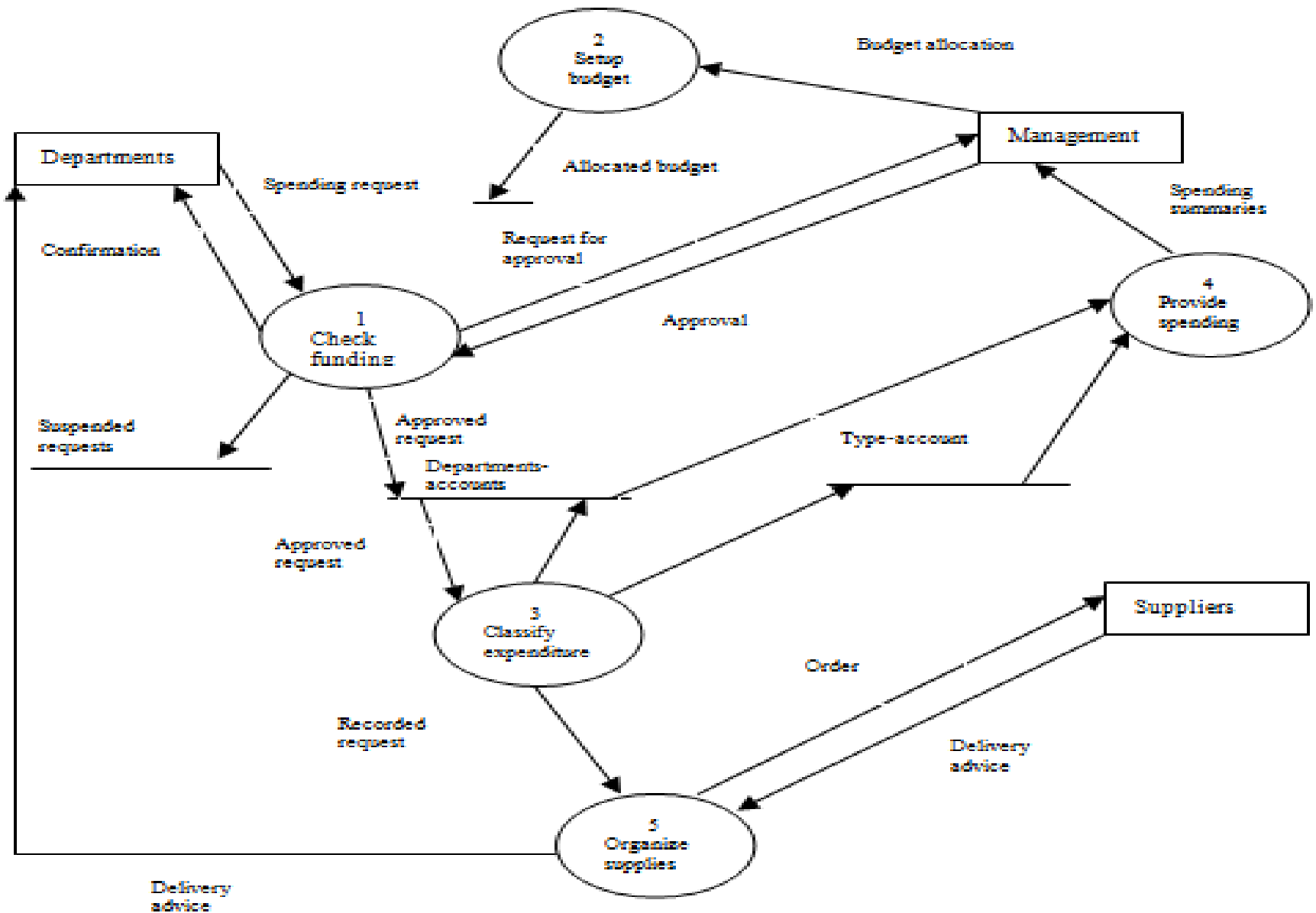
The content diagram above models the Budget monitoring system. This system interact with three external entities: Departments, Management, and Supplier. The data flow from Departments is “Spending request”. The Departments receives confirmation (acceptation or rejection). The Management receives spending summaries and request for approval. The Management sends approval and budget allocation the system. The Suppliers get order from the system and send delivery advice to the system.

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3. Leveling DFD

-**Top level diagram** shows more detail about the system. The major processes and data flows between them are described in Top level diagram.

Leveling DFD allows you to start with a top-level function and break it to more detailed components.

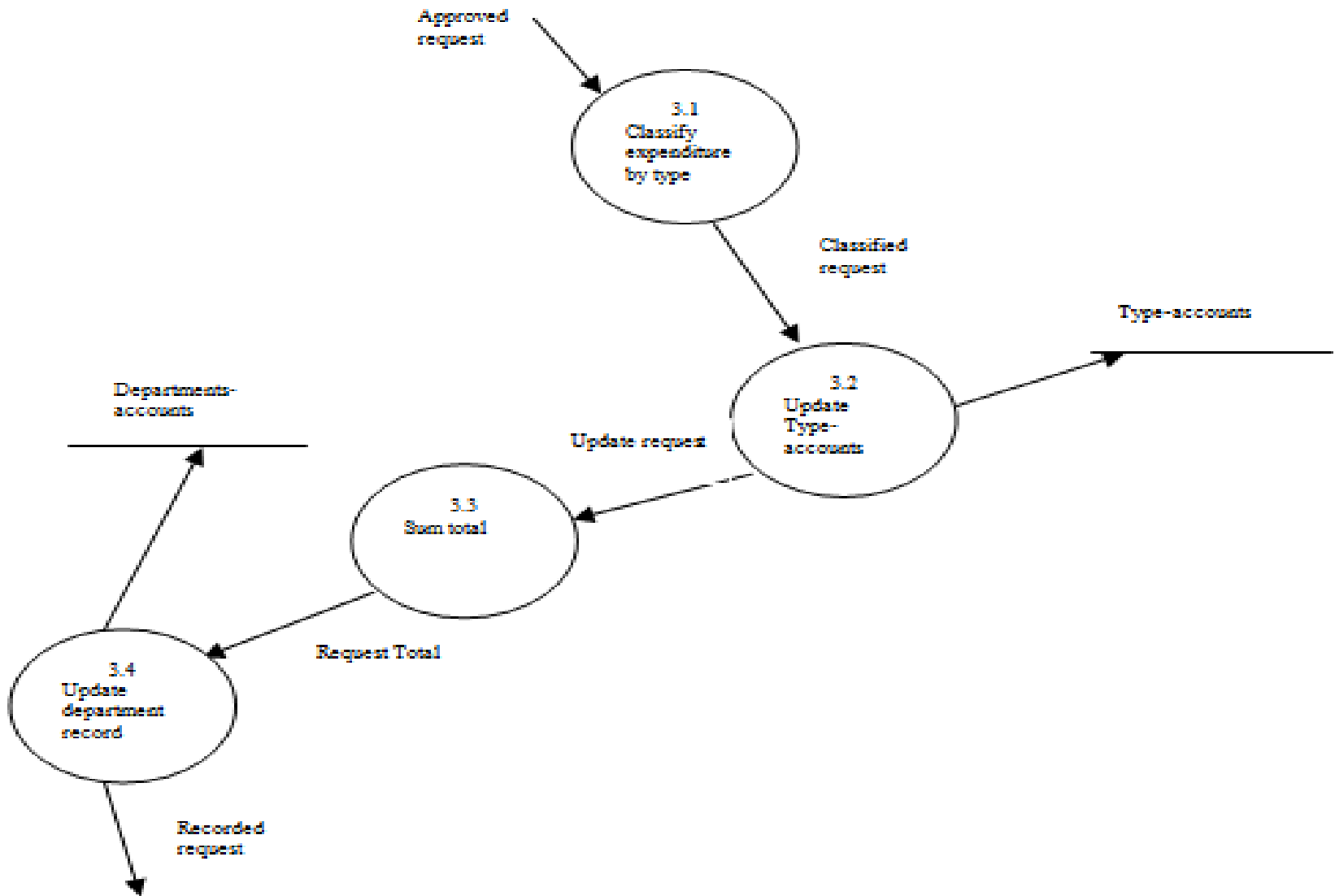


Top level DFD

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3. Leveling DFD

-**Lower level** diagram expands the major processes described in the Top level diagram to provide more detail. For example, the process 3 can be further expanded to more detail sub processes. Each sub process is labeled with 3 followed by a number to show the expansion from process 3.

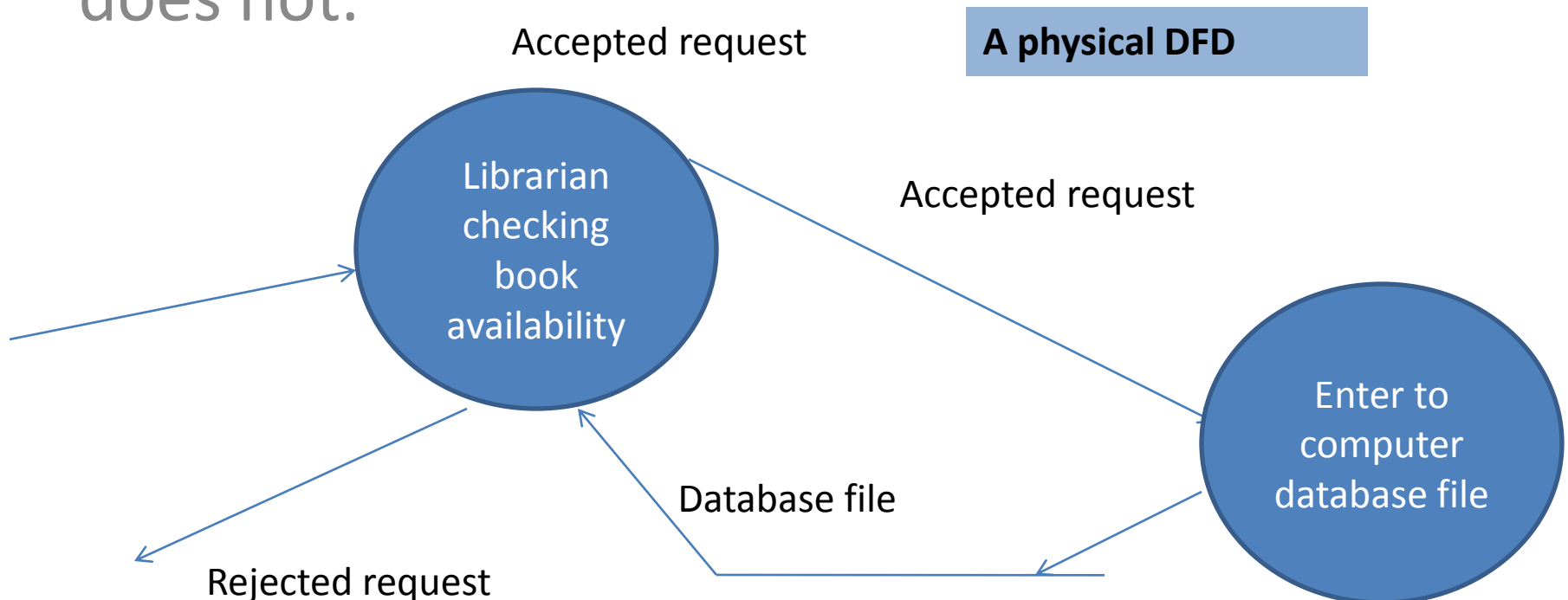


Lower level diagram

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4. Physical DFD Vs. Local DFD

Physical DFD shows you how and who (person or computer) does the processes while a Logical DFD does not.

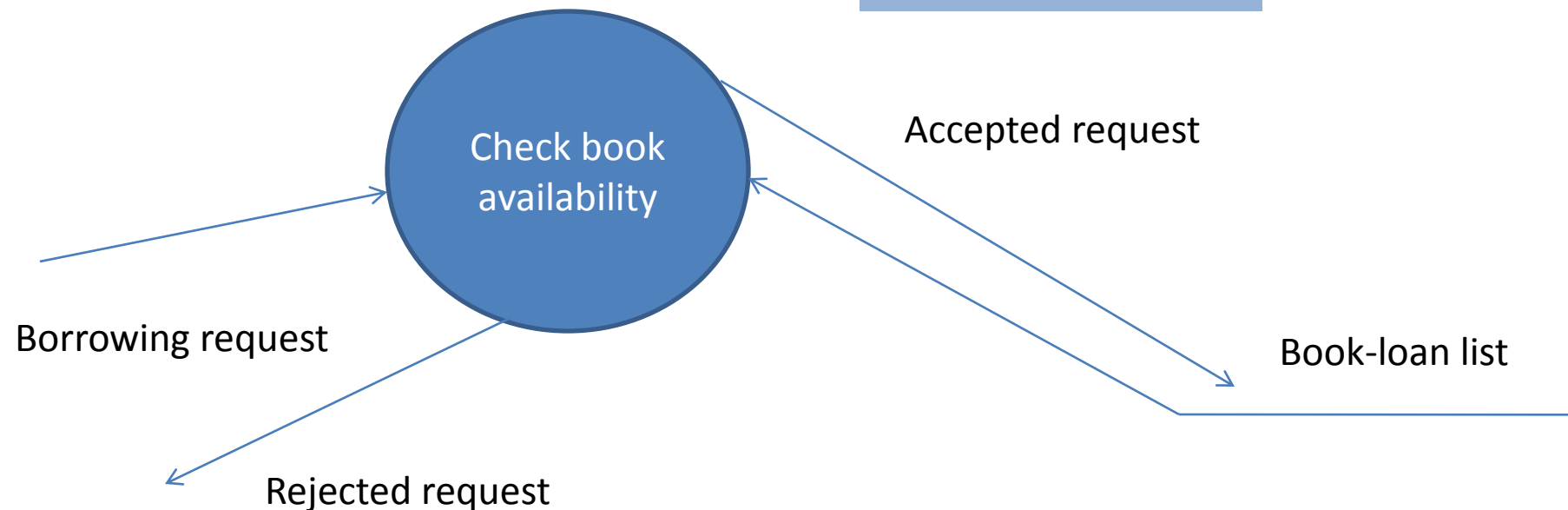


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4. Physical DFD Vs. Local DFD

Physical DFD shows you how and who (person or computer) does the processes while a Logical DFD does not.

A logical DFD



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5. Structure English

To specify each process in DFD precisely so that it is understandable to the user and can be directly implemented, Structure English is used to achieve this objective. Structure English is like a programming language. However, it does have restrict syntax rules.

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5. Structure English

To specify each process in DFD precisely so that it is understandable to the user and can be directly implemented, Structure English, Decision Table, or Decision Tree is used to achieve this objective.

5.1 Structure English

Structure English is like a programming language. However, it does have restrict syntax rules.

Operators that can be used in Structure English are:

- Arithmetic: +, -, *, /
- Comparison: >, <, >=, <=, =, !=
- Logical: and, or, not

Beside the operators, there are a number of keywords that can be used: *Begin, If, Then, Else, While, Do, Case, For, End, Until, Search, Read, Write, Repeat, Of.*

System Analysis & Design

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5. Structure English

Decision: in Structure English to make a decision you can use IF, Else, and End If keywords.

Example:

If register on 01/02/13

Then

 If take >1 subject

 Then

 Discount 10%

 Else

 If pay advance

 Then

 Discount 5%

 Else

 No discount

 End if

 End if

Else

 (register late) No discount

End if

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5. Structure English

Repetition: There are many ways to do repetition in Structure English:

- For...Do

- While...Do

- Repeat...Until

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5. Structure English

Example:

```
max=list[0]
```

```
For each next item in list Do
```

```
    If max<item
```

```
        Then
```

```
            max=item
```

```
Print max
```

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5. Structure English

Example:

x=0

While x!=10 Do

Print x

x=x+1

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5. Structure English

Example:

$i=0$

Repeat

 Copy list[i] to list1[i]

$i=i+1$

Until $i>10$

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5.2 Decision Table

The Decision Table is also used to define a process specification. The Decision Table is first divided in to two parts: conditions and actions. An action is taken depending the combination of the conditions.

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5.2 Decision Table

The Decision Table Example:

Register on 01/02/13	Y	Y	Y	Y	N	N	N	N
Take >1 subject	Y	N	N	Y	Y	N	Y	N
Pay advance	Y	Y	N	N	Y	Y	N	N
Discount 10%	X			X				
Discount 5%		X						
No discount			X		X	X	X	X

Y=Yes, N=No

X=do action

5.3 Decision Tree

Another tool to present the process specification is Decision Tree.

Decision Tree Example:

