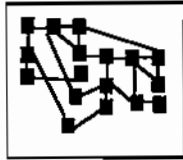


Chapter 4

Navigating Structured Hypertrails



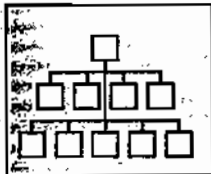
**Geographic
Hypertrails**



**Prerequisite
Hypertrails**



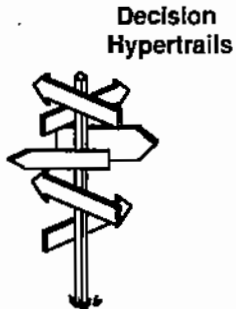
**Structural
Hypertrails**



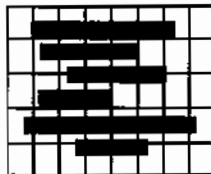
**Classification
Hypertrails**

**In this Chapter
...we ask:
"What are some
kinds of generally
useful
linkage structures
in hypertext?"**

**Definition
Hypertrails** (_) is a
 (_) with a
 (_)

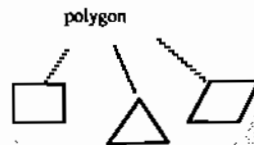


**Decision
Hypertrails**



**Project
Hypertrails**

**Example
Hypertrails**



Overview of This Chapter

Definition: Hypertrails

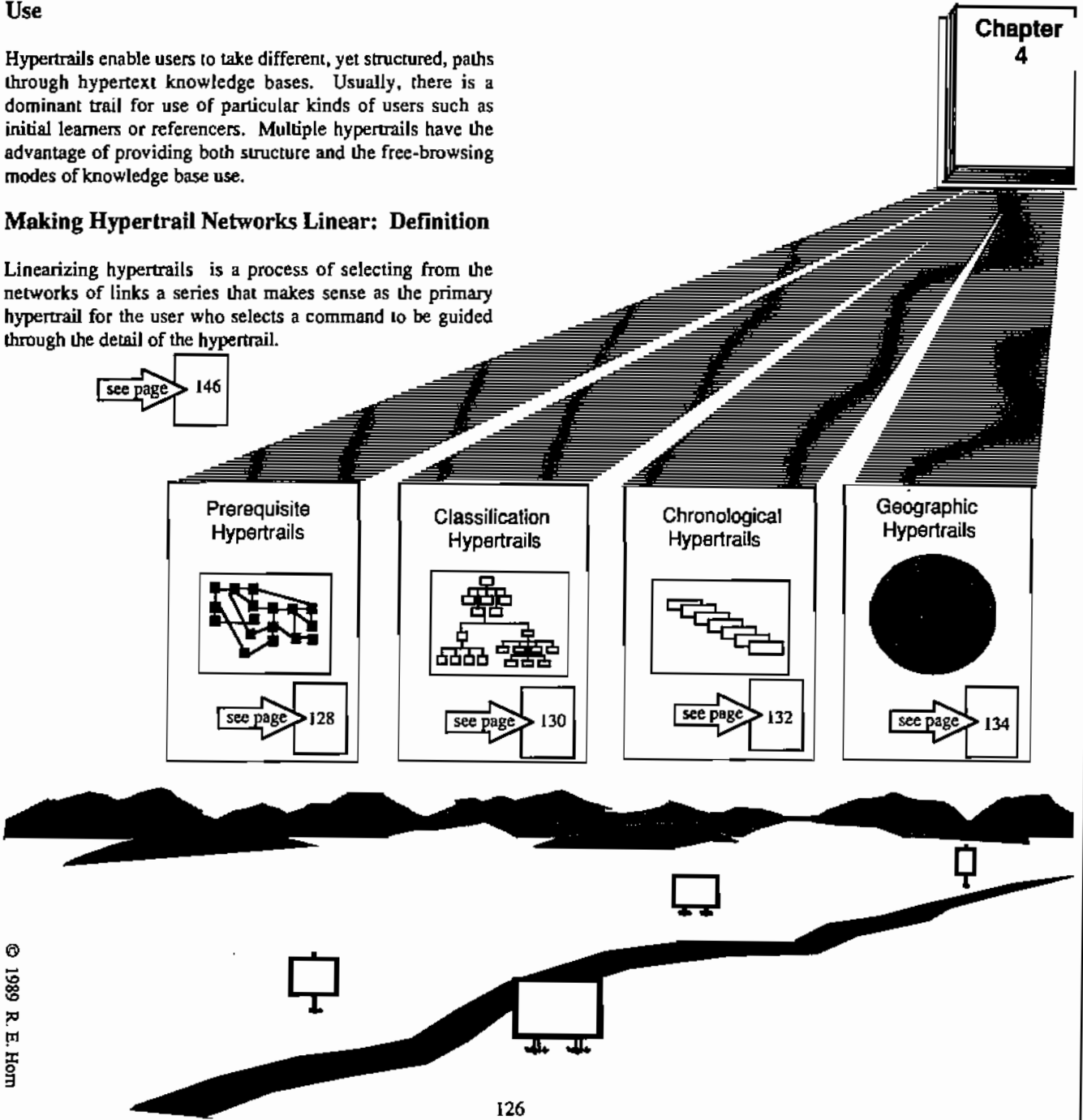
A **hypertrail** is a set of links between chunks of information, such as units, chapters, articles, books, or courses (and in the context of Information Mapping's method, blocks and maps), that organize and sequence information about a particular function or characteristic of subject matters.

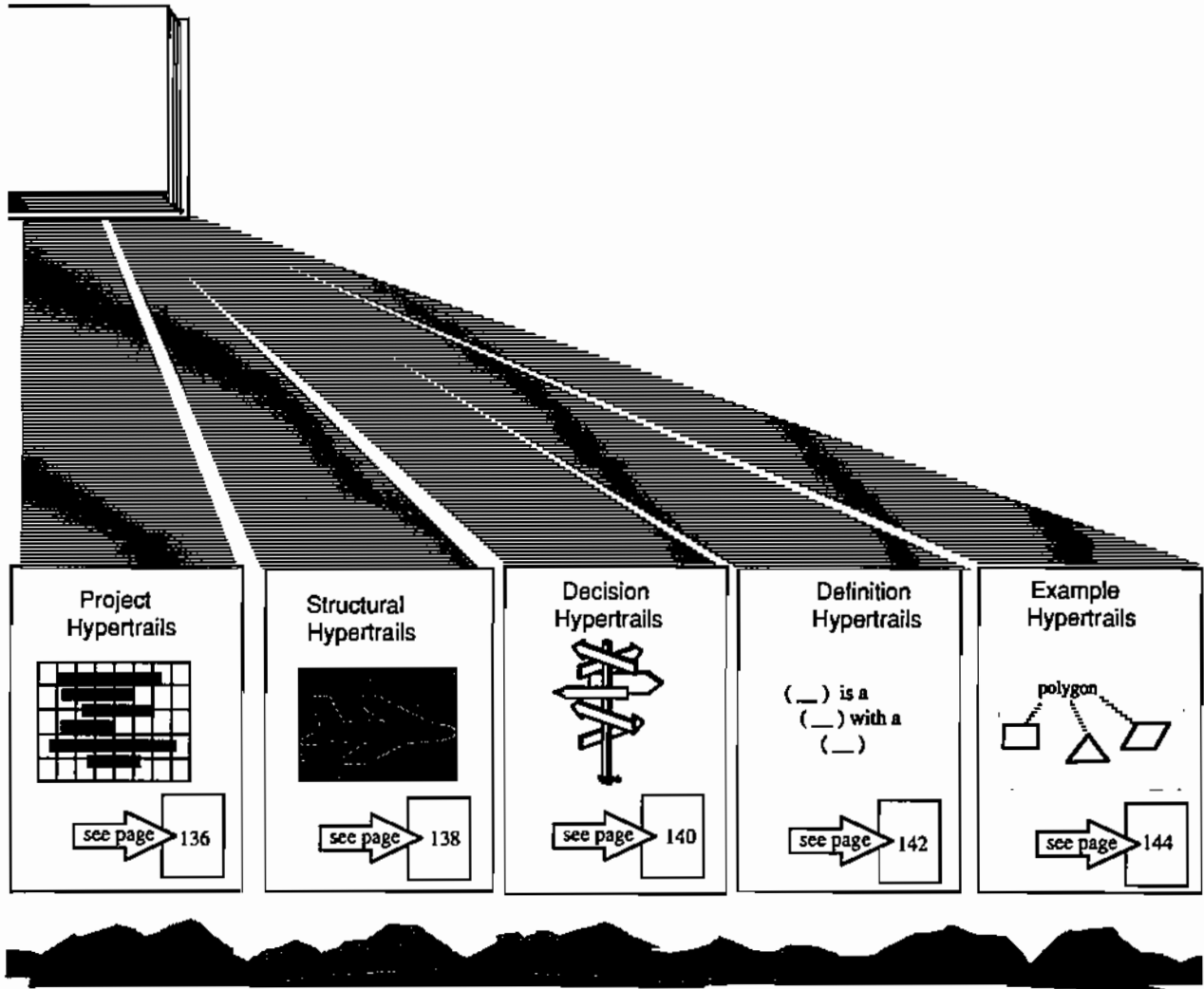
Use

Hypertrails enable users to take different, yet structured, paths through hypertext knowledge bases. Usually, there is a dominant trail for use of particular kinds of users such as initial learners or referencers. Multiple hypertrails have the advantage of providing both structure and the free-browsing modes of knowledge base use.

Making Hypertrail Networks Linear: Definition

Linearizing hypertrails is a process of selecting from the networks of links a series that makes sense as the primary hypertrail for the user who selects a command to be guided through the detail of the hypertrail.





Commentary

Other hypertrails have been identified. But these will serve to provide a good overview of the functioning of hypertrails when used with information blocks and maps. (REH)

Prerequisite Hypertrails

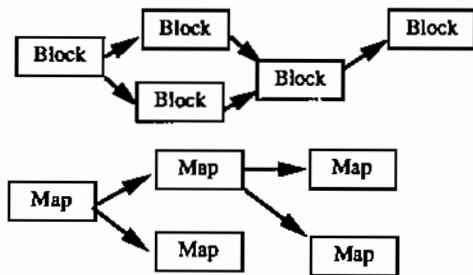
Introduction

Prerequisites are one of the basic ways of organizing information for users of hypertext learning systems.

Definition

A prerequisite hypertrail provides a set of linkages between information maps, information blocks (or other larger chunks of information, such as units, chapters, articles, books, or courses). These connections specify which maps learners must understand (or which tasks they must be able to do) in order to understand more advanced topics or accomplish more advanced skills.

Example



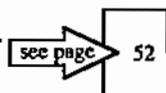
Use

The prerequisite hypertrail is typically used to sequence chunks of text in a linear way so that the learner may always be sure of having encountered significant information needed to understand the present information.

Thus, if the learner has informed the system that he or she is an initial learner and knows little or nothing about the subject matter, then the text in the system should be linearized using the prerequisite hypertrail linkages.

The prerequisite hypertrail is of most use to the user who:

1. is interested in the prerequisite structure of a subject matter, OR
2. has never studied the subject before, and is a serialist learner Δ OR
3. has never studied a similar subject before, OR
4. is interested in the most efficient (i.e., straightest) path through the material.



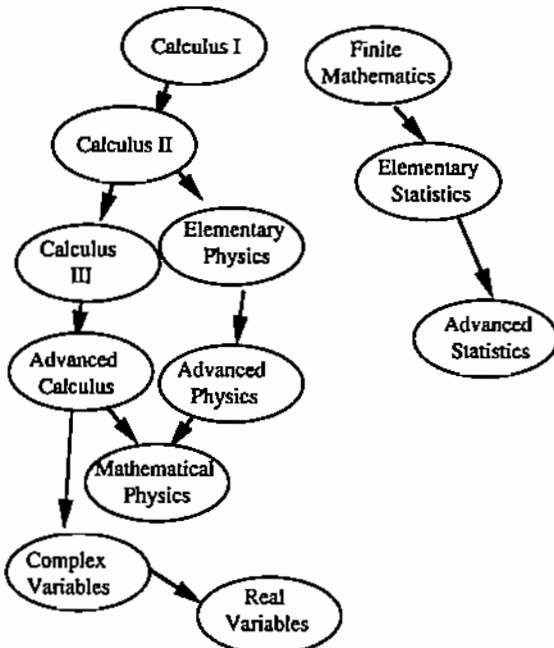
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Two Levels of Prerequisite Analysis

Course Level Prerequisites

Example

Here is an example of a prerequisite hypertrail at the level of courses in math and physics:



Concept Level Prerequisites

Example

In analyzing the beginning concepts in the topic vector mathematics, we find these prerequisite relationships:

This ASPECT	has these concepts as PREREQUISITES
Displacement	<ul style="list-style-type: none"> • Distance • Direction
Vector	<ul style="list-style-type: none"> • Direction from a point • Magnitude
Magnitude	<ul style="list-style-type: none"> • Number • Unit of measurement

Fairness to Learners Principle

Synonym

The Principle of Guaranteed Access to Prerequisites

Introduction

"If ya'da told me that first, I woulda understood what you were talkin' about." Almost everybody has an intuitive notion that you have to learn some things before you can learn others. Too often in textbooks and training manuals, readers are stranded at mid-text by the introduction of concepts they are expected to be able to understand without ever having previously encountered the concepts, the words or experience.

Principle

We take as a basic principle for sequencing initial learning materials the principle, called "Fairness to Learners Principle." It says:

Learners should have previously encountered the prerequisites to all concepts they are presented with in learning materials, or should have immediate access to that prerequisite information.



Implementation

Access to all major prerequisites is provided by

1. developing a prerequisite hypertrails that can be activated by learners if they want that kind of sequence through the text, and
2. providing hypertext linkages from the currently displayed text to prerequisite information such as where terms are introduced.

Classification Hypertrails

Introduction

Classification is one of the basic ways of organizing information. It uses the basic principle of grouping similar things together into classes and distinguishing these classes from other classes by differences.

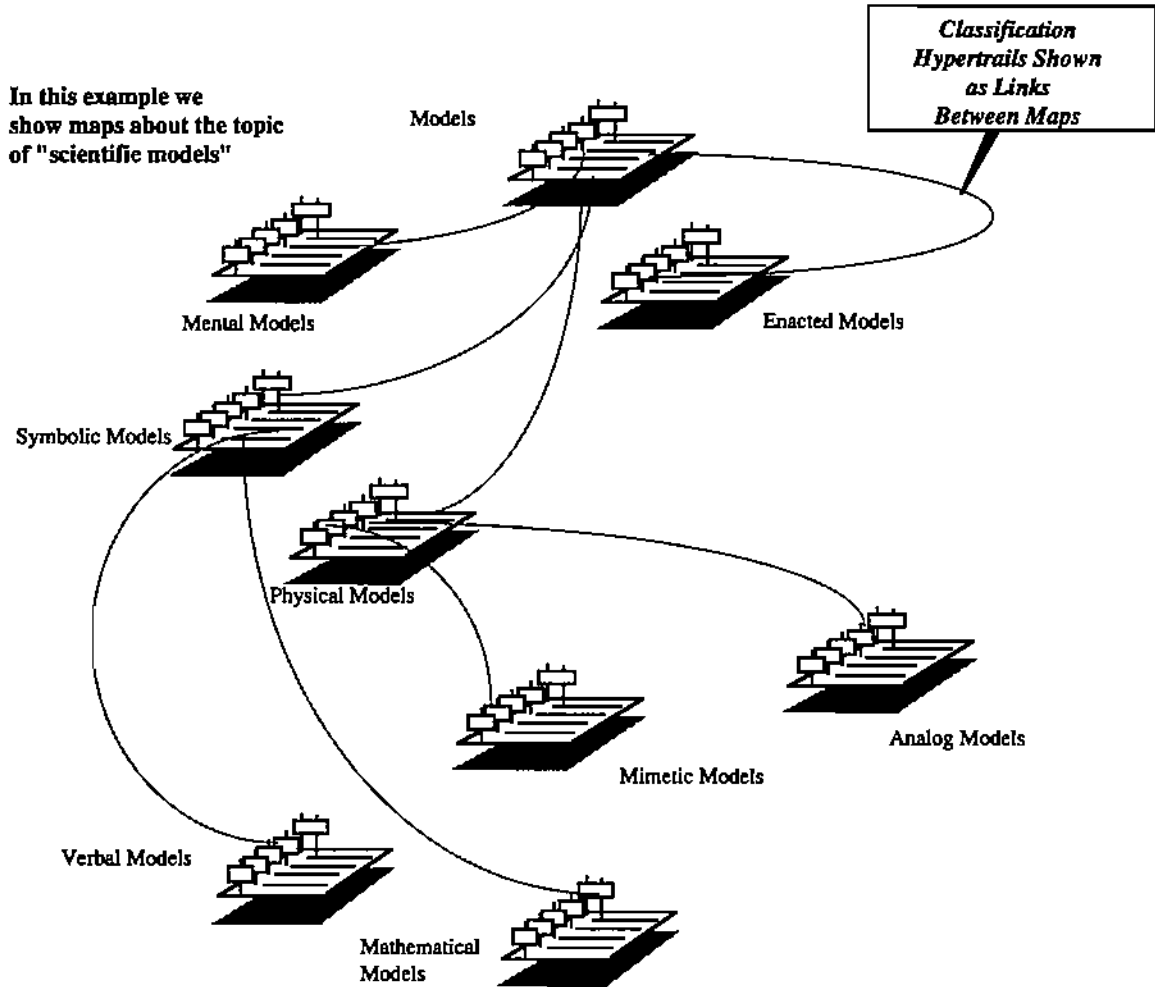
The ability to follow and display large classifications is an important characteristic of efficient hypertext systems.

Definition

A classification hypertrail is a set of linkages in a hypertext database that enables a user to

- find any linkages higher or lower on a classification tree for a particular subject
- display a classification structure of a given hypertext region.

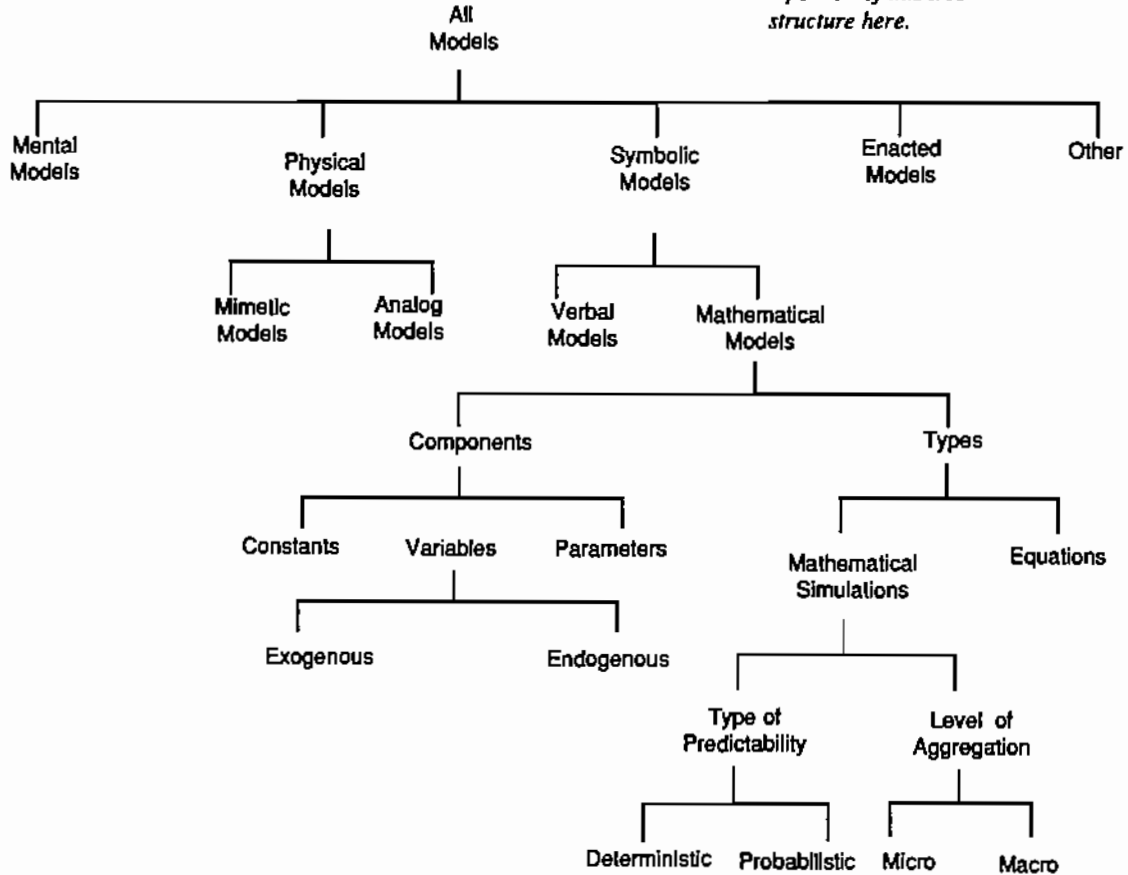
Example of a Classification Hypertrail





Classification Tree of Models for Biological and Social Sciences

Note: We show only a portion of this tree structure here.



Chronological Hypertrails

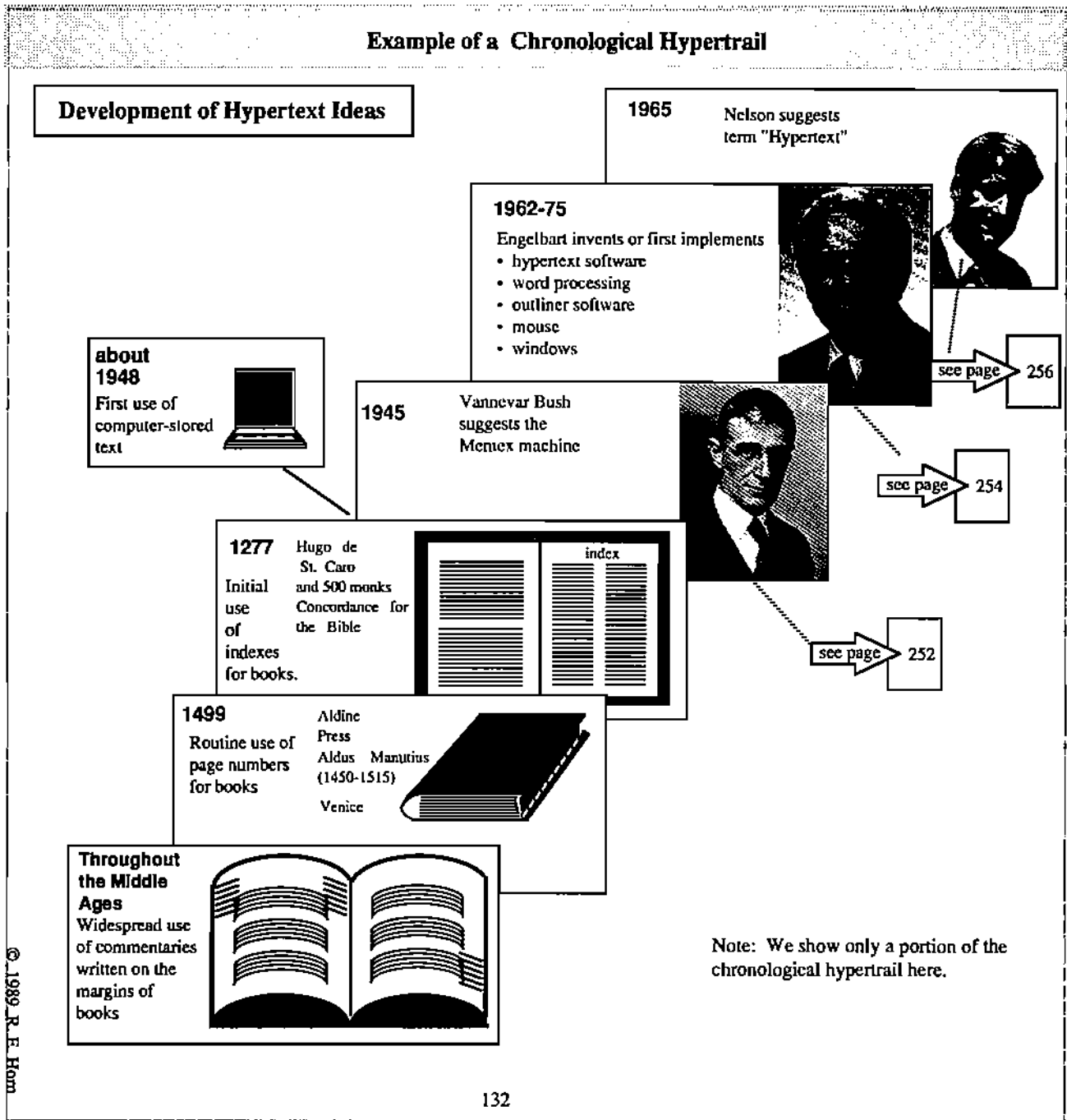
Introduction

Chronological hypertrails resemble the familiar time lines. But they go beyond these graphical tools in organizing large amounts of data.

Definition

Chronological hypertrails are linkages of nodes that organize information with time.

Example of a Chronological Hypertrail



Note: We show only a portion of the chronological hypertrail here.

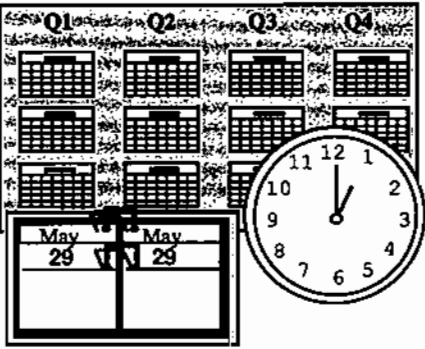
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Three Kinds of Chronological Hypertrails

1 Sequence of Events-Hypertrail

Description
A sequence of events hypertrail follows some time measurement, such as

daily
weekly
monthly
annually.



Example

- Time line of events in a Presidential campaign
- Sequence of events in a complicated industrial manufacturing process

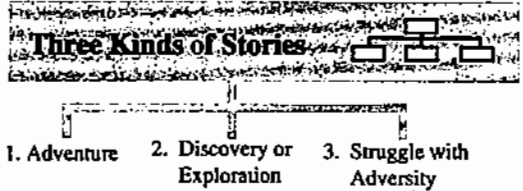
2 Storyline Hypertrail

Description
A storyline hypertrail tells a sequence of occurrences in the life of a particular person or group of persons.

Examples

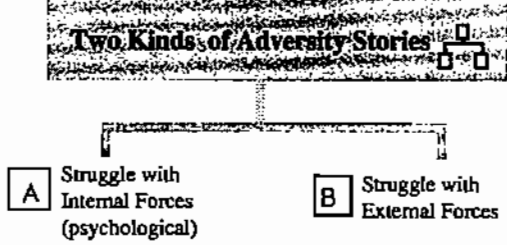
- scenarios
- stories
- docudramas

Narrative has been classified by literary critics in many ways. Here is just one such classification:



Three Kinds of Stories

1. Adventure
2. Discovery or Exploration
3. Struggle with Adversity



Two Kinds of Adversity Stories

A Struggle with Internal Forces (psychological)

B Struggle with External Forces

Comment
In hypertext, branching can produce stories with different trails.

3 Natural Development Hypertrail

Description
A natural development hypertrail follows the sequence of development of a particular process or system.

Example

- Evolution
- Development of an organization

Geographic Hypertrails

Introduction

One of the major ways that we organize information is spatially. We draw maps to help us get around in space. We use word descriptions of how to get from one place to another and to describe the contents of geographical space. Geographic hypertrails link these information blocks.

Definition

Geographic hypertrails link together descriptions and maps of geographical information.

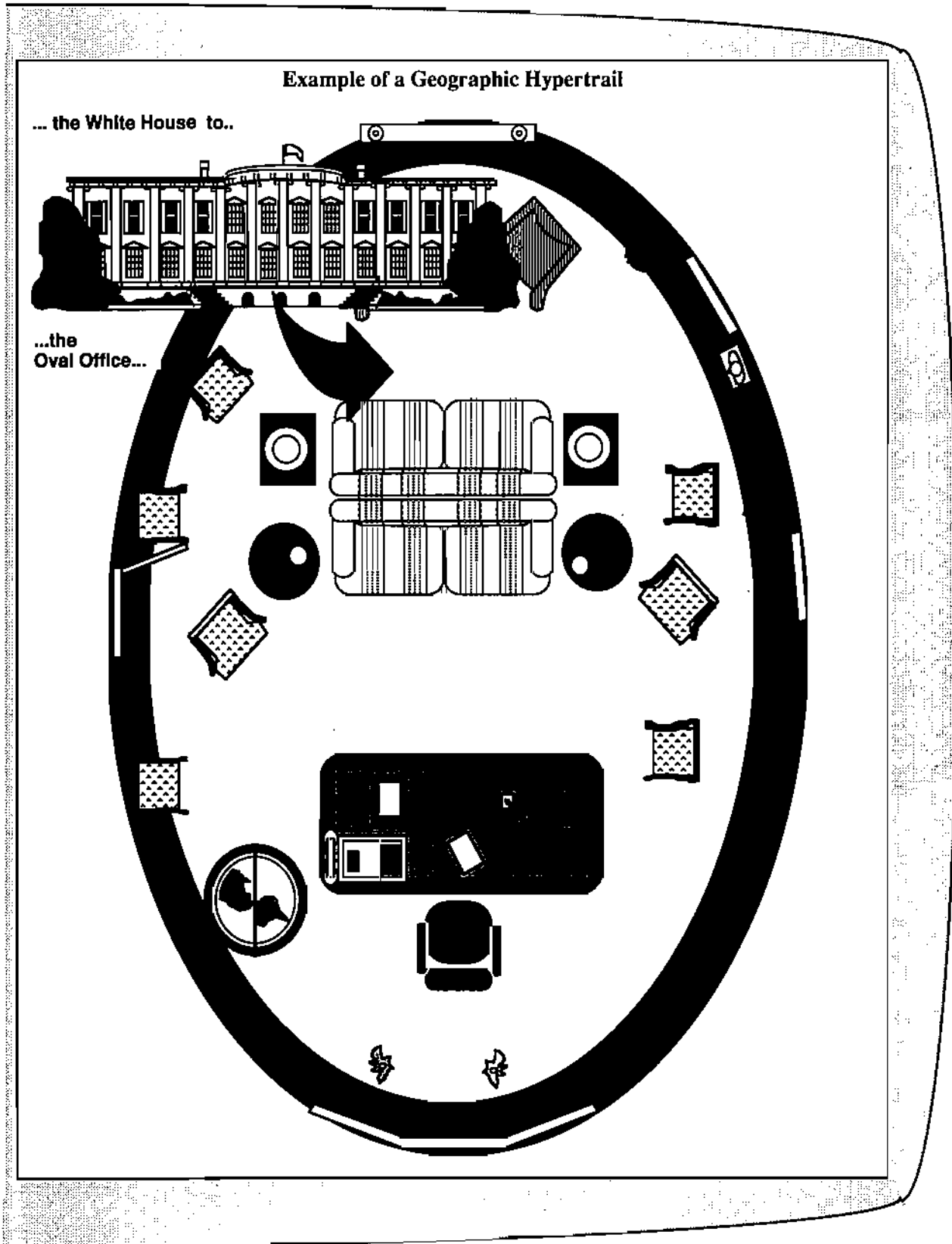
Contrast with Structure Hypertrails

Note that one of the other hypertrails, structure hypertrails, is closely related to geographic hypertrails. The major difference is that in geographic hypertrails we are linking spatial relationships between different structures. In structure hypertrails we are linking the subparts to the larger structure.

Example of a Geographic Hypertrail

Here is an example of a geographic hypertrail that zooms in on the White House starting from a look at the earth from space.





Project Hypertrails

Introduction

One of the ways we frequently organize our work is by projects. We think of projects as work organized around a specific goal that will take a period of time longer than a simple task. Hypertrails should follow natural work linkages, so a project hypertrail becomes a necessity.

Definition

Project hypertrails are specific kinds of chronological hypertrails that link planned and past events all focused on a personal or group project.

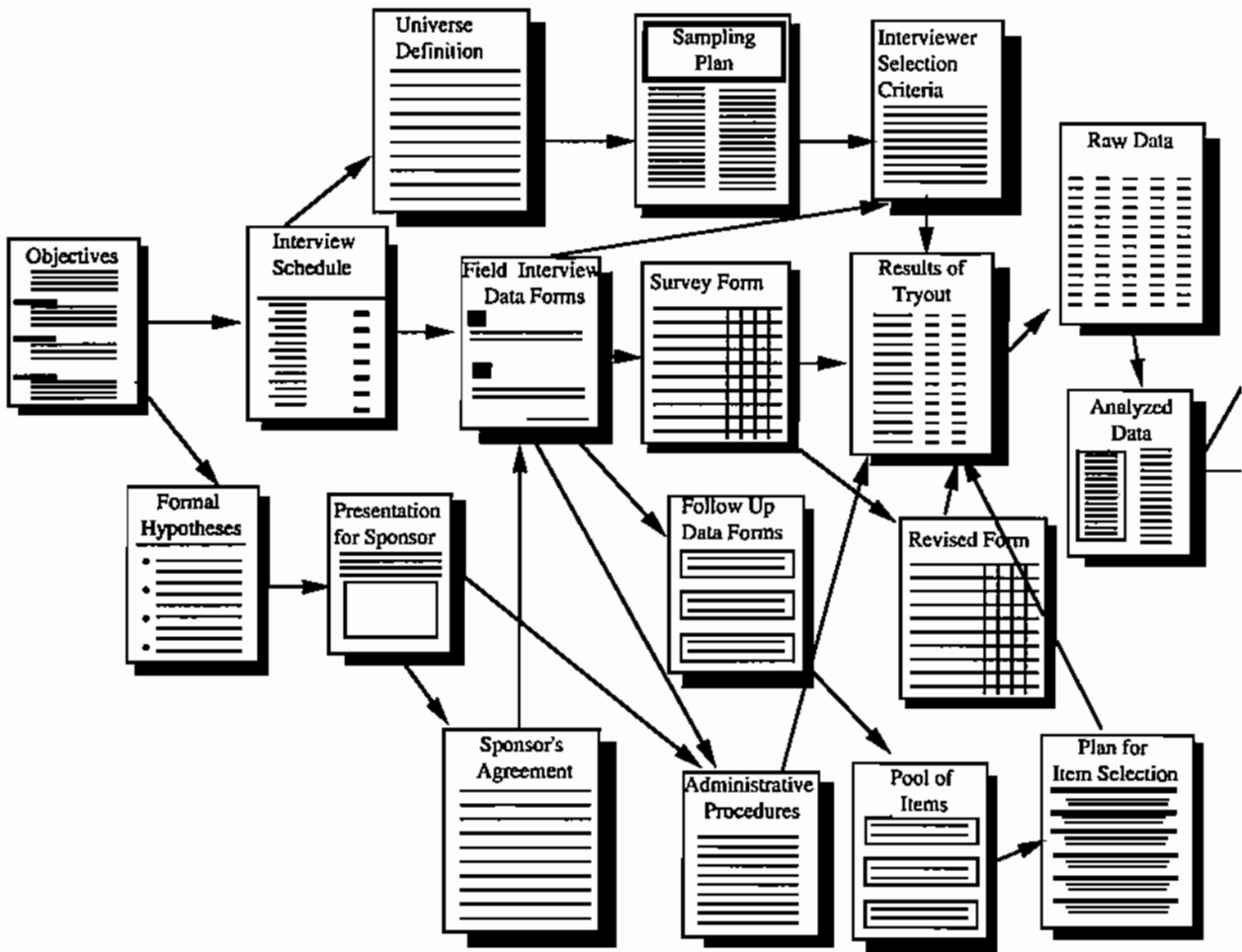
Two Kinds of Display Metaphors for Project Hypertrails



1

Example of a Document Event Network Hypertrail

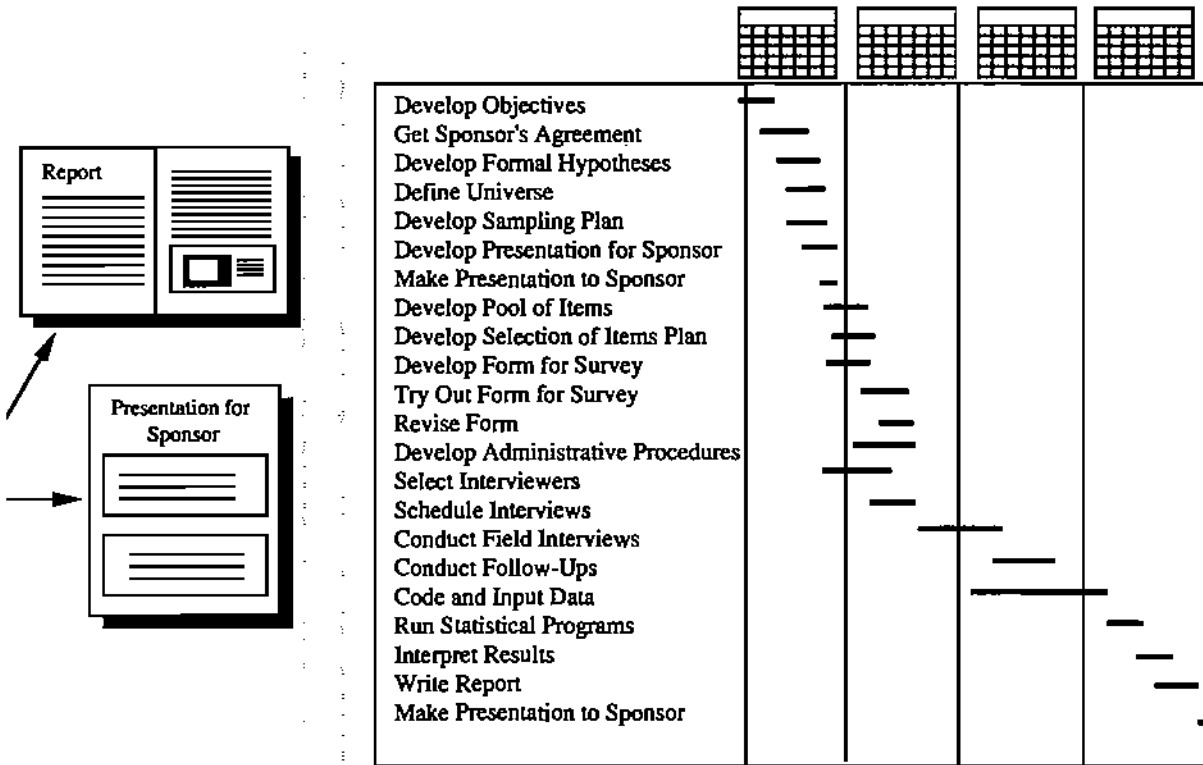
In this example we show project hypertrails for a survey research project :



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2 Example of a Document Event Network Hypertrail

In this example we show project hypertrails for a survey research project :



Structure Hypertrails

Definition: Structures

Structures are physical objects. They have boundaries and occupy physical space. They have parts. A useful hypertrail links the parts to the large structures.

Definition: Structure Hypertrails

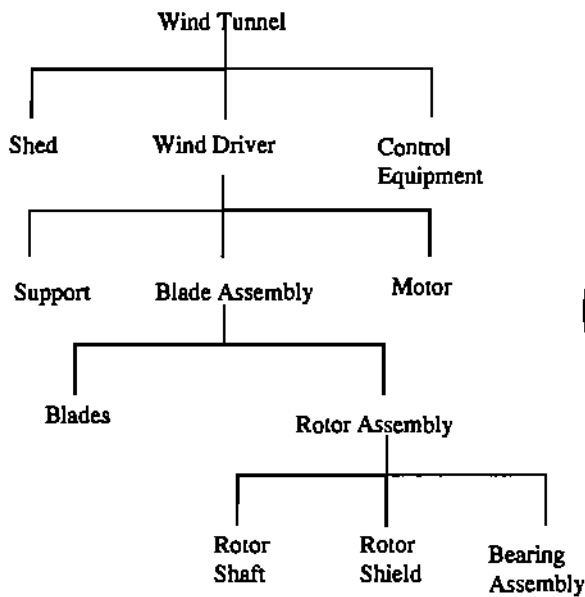
Structure hypertrails link specific substructures described in information blocks to the larger structure. A user can begin searching a structure hypertrail from any part of the structure or substructure in the hypertrail.

Boundaries: Alternative Way of Defining Structure Hypertrails

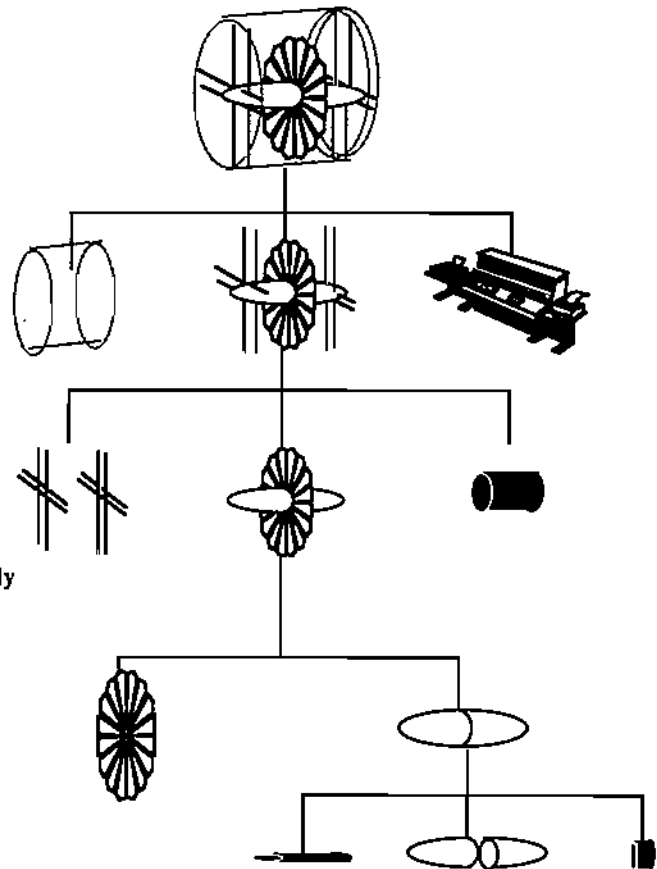
A variation on the standard structural hypertrail is a structural hypertrail that links a structure by its physical boundaries, i.e., by the name of the boundary lines or by the boundary itself (where the two structures or substructures meet).

Example of a Structure Hypertrail

Here is a structure hypertrail of a wind tunnel arranged by names of the subassemblies:



Here is a structure hypertrail of a wind tunnel by picture of the equipment subassemblies:

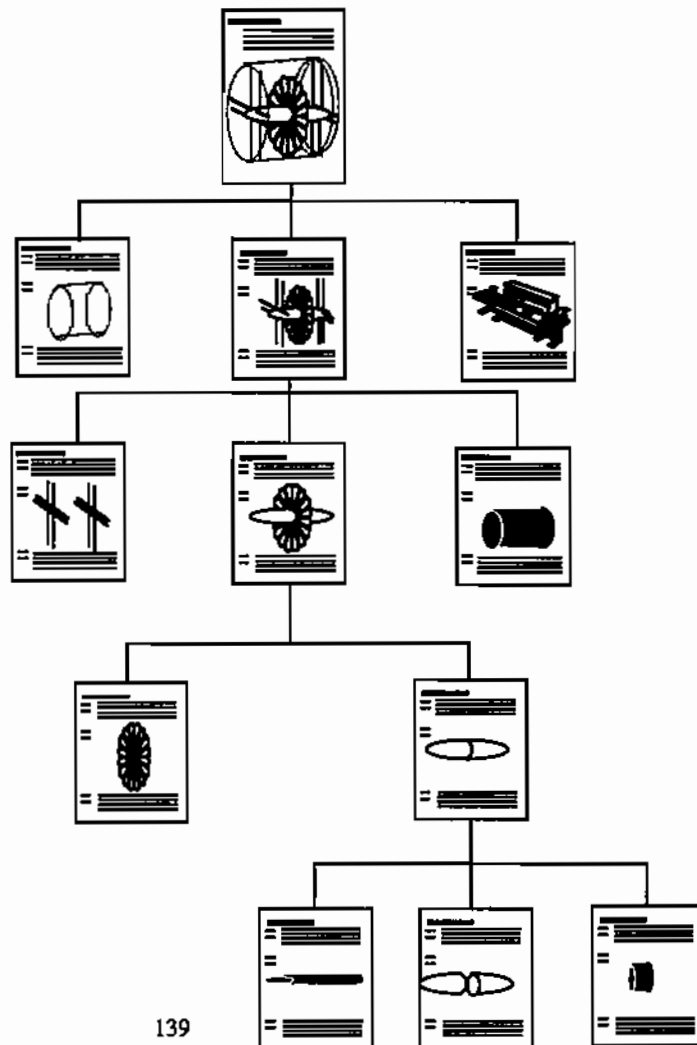


Buttons at Each Node

A button can be put at each node on these trees so that more detail comes up on the screen when a position is clicked.



Here is a structure hypertrail of the maps describing a wind tunnel divided into subassemblies:



Popup Menu
 When clicked, the button might bring up a popup menu which contains these options:

- Description
- Specifications
- Source
- Manufacturer
- Maintenance Information
- Troubleshooting Guides

Decision Hypertrails

Introduction

Organizations are shaped around processes for making decisions. They must have orderly ways to prepare for, make, implement, and document decisions. In the framework of hypertext systems using Information Mapping, decision hypertrails help track all information about a given decision.

Definition: Decision Hypertrails

Decision hypertrails link all of the information (blocks, maps, or documents) about a particular decision that a person (or organization) has made (or is in the process of making).

Layering and Structuring Required

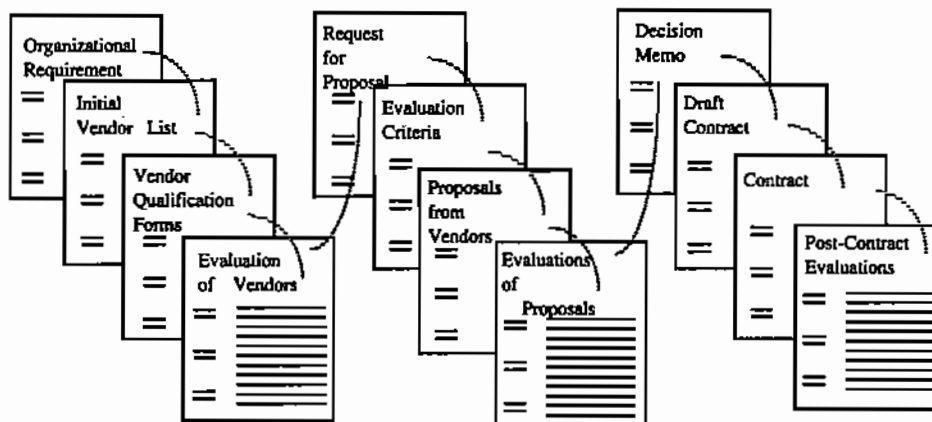
To make a reader's job manageable, decision hypertrails need to be layered and structured. That is, they require the specification information blocks and maps to provide the components of the trail.

Types of Decisions

There are many kinds of decisions and many "sizes" of decisions. The approach to assembling and displaying information for each type of decision must follow an analysis of these kinds of decisions. We do not go into these details in this book.

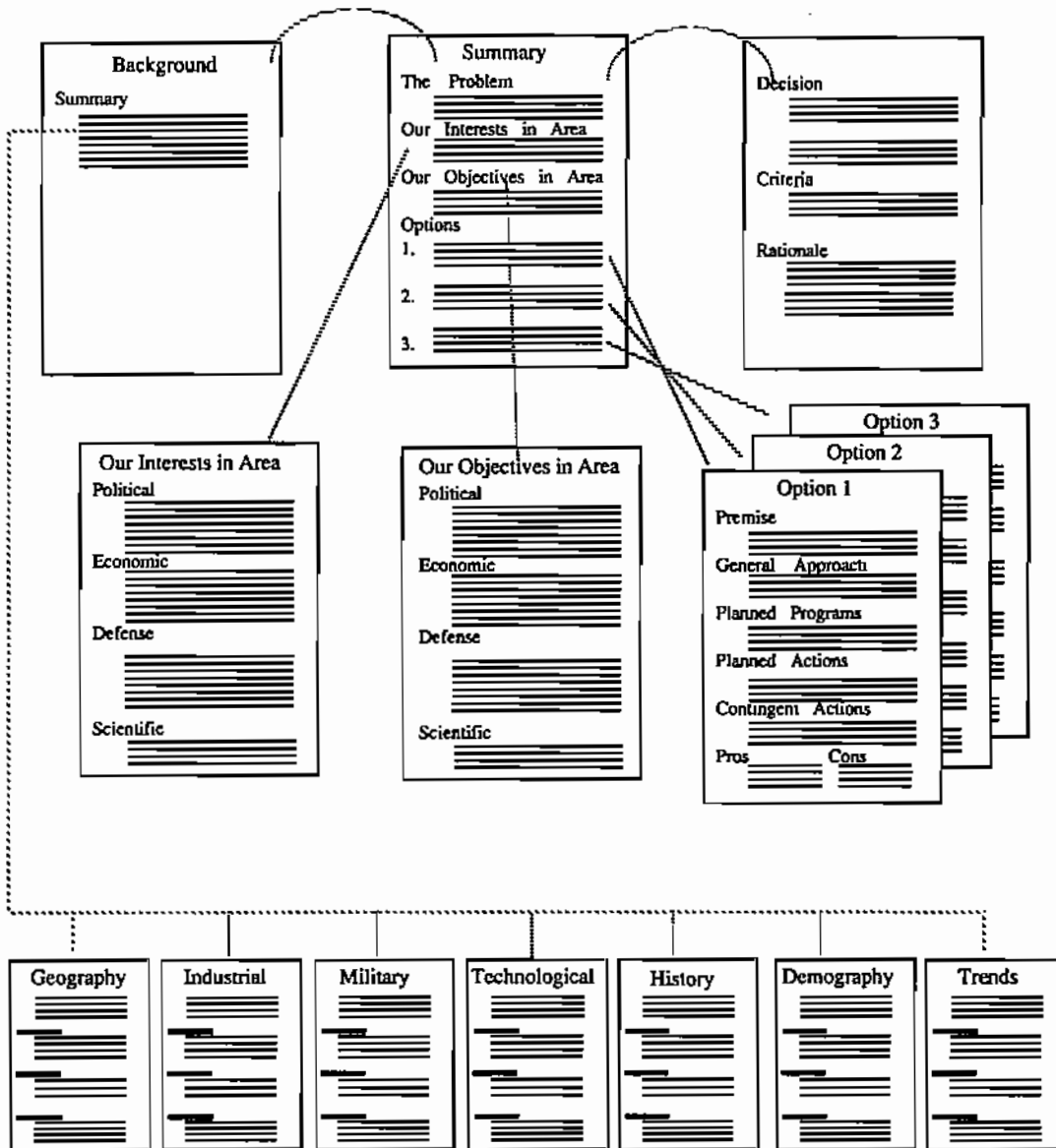
Example of a Decision Hypertrail

Following is an example of a decision hypertrail linking documents in the purchasing process of a large organization:



Example of a Decision Hypertrail

A policy decision hypertrail could display links between relevant documents at different "layers" of information about that decision.



Definition Hypertrails

Introduction

Most words are ambiguous. They have more than one meaning. For the 500 most-used words in the English language, the Oxford dictionary lists 14,070 meanings. Thus, each has an average of almost 30 meanings.

So, dictionaries have proven their worth over the centuries. Using definition hypertrails within the context of an Information Mapping hypertext knowledge base will prove to be a significant advance for dictionary users.

Definition: Definition Hypertrails

A definition hypertrail provides links between the different meanings of a single term in a hypertext document, or between related terms in one or more documents.

Context designators for each of the meanings are provided, as well as examples of the use of such words in context.

Comment

The process of creating definition hypertrails is quite easy since all definitions in Information Mapping are segregated into separate information blocks and are distinctively labeled. The dictionary hypertrail approach makes a particularly useful form of dictionary since the other links (such as example blocks) are readily available.

Obviously, it may be useful to load a large conventional dictionary into the knowledge base as well, and link it to the growing definition hypertrail.

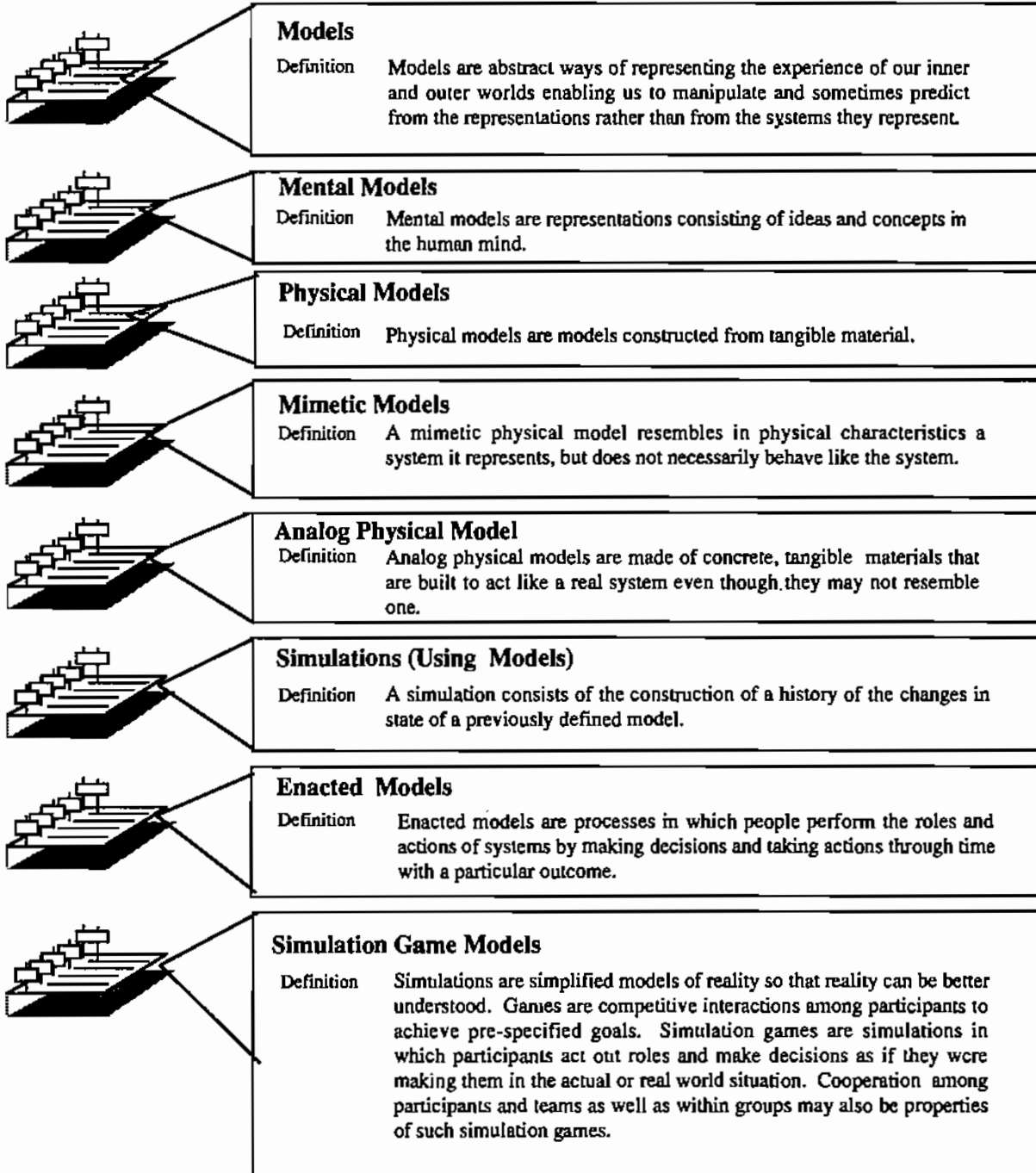


In Chapter One of this book, for example, you can find these definitions that comprise a definition hypertrail:

- hypertext
- links (hypertext)
- nodes (hypertext)
- buttons (hypertext)
- system-supplied links
- user-created links
- author-created links
- semantic nets
- branching stories
- relational databases
- simulations
- commentaries
- anthologies
- hypermedia

Example of a Definition Hypertrail

The blocks below illustrate taking definitions from several related information maps to form a definition hypertrail:



Example Hypertrails

Introduction

Some text is organized so that there are one or more running examples throughout. Different topics are introduced and defined, then examples are presented. Some examples are "extended," i.e., they exemplify many of the topics made.

Definition: Example Hypertrails

An Example Hypertrail is a linking of

- all of the different appearances of a single extended example that appears in a single document
- all of the specific appearances where the same example is used in different places in different documents.

This permits the user to request of the system: "Show me all of the places where this example is used."

Example One

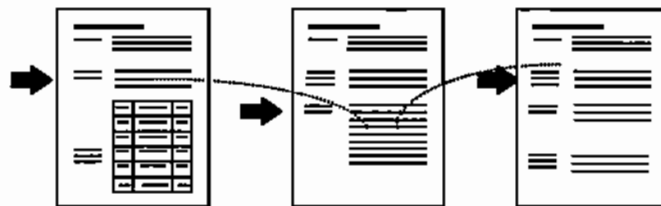
In a book on dream theory and dream interpretation, specific dreams are the examples. Each dream has a name (e.g., Grandma on the Ceiling, My Boat Sinks, etc.). The full dreams are described the first time they are introduced. Parts of the dreams may be requoted in specific sections (e.g., in sections on "symbols," or on "different ways of interpreting dreams"). The dreams may also be referred to by name in other discussions.

Clearly a useful hypertrail would be to link all of the appearances of a given dream on a single trail and to be able to link all of these individual example hypertrails into a large master example hypertrail.

Hypertrails like this were used by Walter Bonime in his book, *The Clinical Use of Dreams*. In the book there is a "dream index" so that you can go look at all of the places where the dream occurs.

Example Two

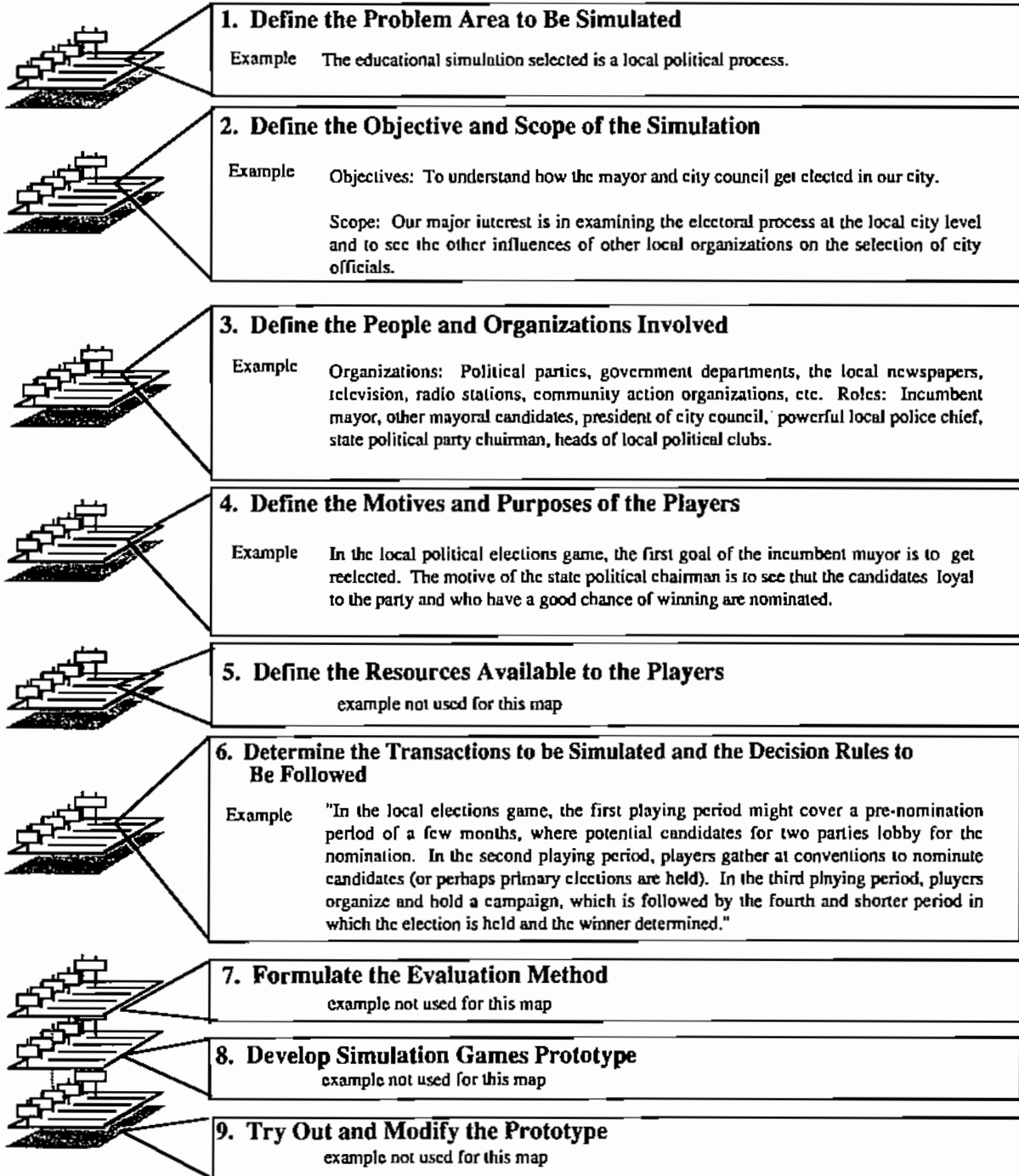
In many business procedure manuals, we use the same example in a procedure that runs several pages. These individual examples linked together in an example hypertrail form a case study of the use of this procedure.



The arrows identify the appearance of the same example hypertrail in a sequence of different Information Maps.

Example of an Example Hypertrail

Here, we show how the description of a single simulation game about political process at the local level can be used as an example on several different information maps. All of these maps together provide the procedure for making an educational simulation game. Note that only the map title and an example block are presented in this example, not the whole map.



Hypertrail Webs into Linearized Sequences

Introduction

Because human beings live in a linear, time-sequenced world, we must always have some "next" event in our lives. In hypertext that means whatever the button is called, it is always in some sense a "next" button.

If the structure of the subject matter is a two-dimensional or multi-dimensional network or web, we must nevertheless follow some next link in the net. We must go to some next node. This raises the question of how we shall linearize the nodes of hypertrails, because there is always some limit to the size of the web that can be displayed on a single screen.

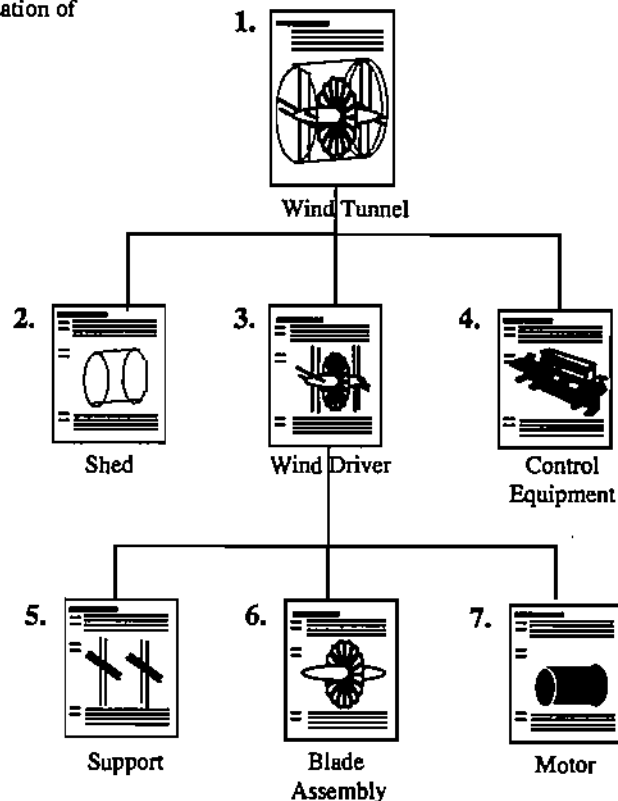
Definition: Linearized Sequences for Hypertrails

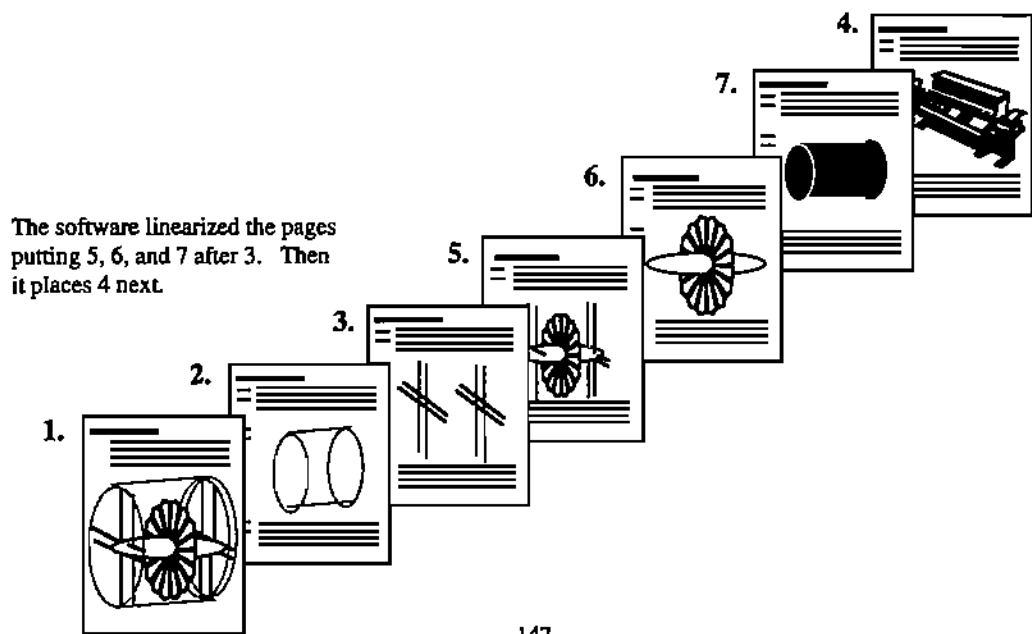
A linearized sequence for a hypertrail puts each of the elements of a hypertrail into a sequence in such a way that the user can be shown some next information. As an automatic facility of a hypertext system, it must also provide organizing elements of a document for the user, such as a table of contents, index and other "maps" of the structure of the subject.

Example of a Linearized Sequence

Here we show a structure hypertrail of a series of information maps about a wind tunnel. The linearization of this network is shown to the right.

Note: For a more complete example of structure hypertrails





Chapter 5. Resolving Some Hypertext Problems

Overview of This Chapter	150
At the Nodes, Blocks and Maps Structure Hypertext	152
Clustering Documents From Different Domains	154
Addressing Lost in Hyperspace and Overload	156
Addressing the Major Reading Cues Problem	158
Addressing Creation and Maintenance Issues	160
Addressing Group Analysis and Writing Issues	162
Some Navigational Options	164