Web Design Methods:

IDM Model – part 1

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Outline

- A model for conceptual design: what and why
- IDM at a glance
  - A "dialogic" metaphor
  - Design dimentions and submodels
    - C-IDM : Conceptual IDM
    - L-IDM: Logic IDM
    - P-IDM: Page IDM
- C-IDM and L-IDM
  - Primitives
  - Notations
  - Examples
- Esercises

A design model: What

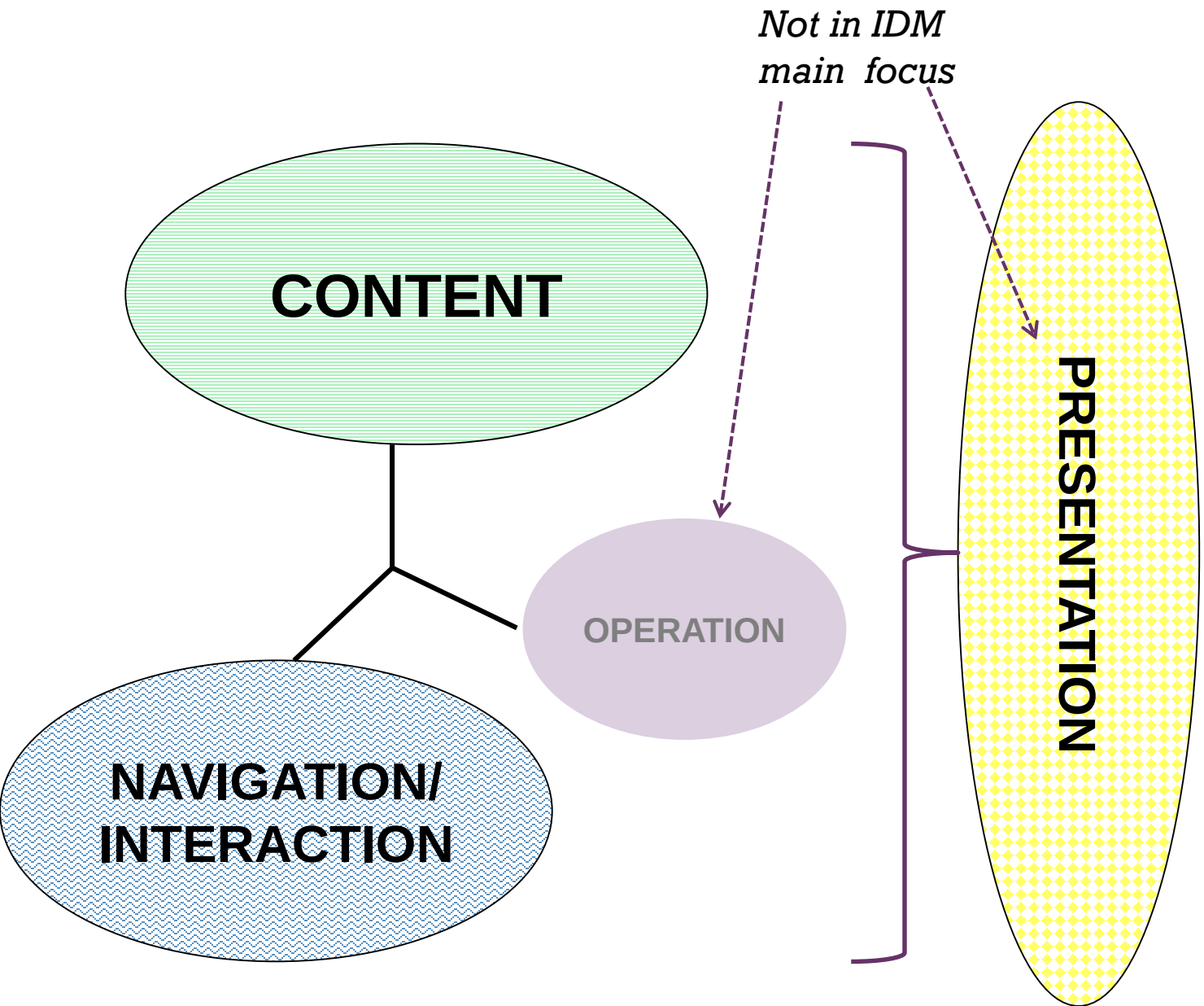
- A design **model** is a **language** to describe design decisions
- It provides a set of concepts, terms, and notation, and rules to use them
- Example of design languages: ER (for data bases)

An application design model: why?

When designing an interactive multimedia application, a model (a language) can help to

- externalize
- give shape to design ideas and decisions
- communicate and share them
- support (team) brainstorming
- Stimulare discussion
- Stimulate reflection on requirements
- …

Design Dimensions



IDM = Interactive Dialogue Model

https://it.wikipedia.org/wiki/Interactive_Dialogue_Model

- Joint effort by TEC-Lab (University of Lugano) and HOC LAB(Politecnico di Milano)
- A revised version of HDM (Hypermedia Design Model)

  Garzotto F., Paolini P., Schwabe D. HDM- A *Model for the Design of Hypertext Applications.* **Proc. ACM Hypertext '91**, S. Antonio (TX, USA), **ACM Press**, Dec. 1991

  - the first design model for hypertext/hypermedia
  - the ancestor of more recent web engineering models (OOHDM, WebML, …)
- Focus on **in-the-large** features for content and navigation

IDM Metaphor

A web experience is a human↔application **dialogue**

Designing a web application means designing the human/application **dialogue**

Link= what does the user ask for

Page= the system's answer

Example

- Consider a web site, e.g.:
  http://www.nga.gov/

- Focus on "Collection" and describe the dialogue, i.e., define the user's questions in some pages

Traditional Design Dimensions and IDM submodels

Design Dimensions	**IDM**	**IDM submodels**
Content Design	Designing what can be said: what the dialogue is about, and how the different subject are organized and mutually related	C-IDM (content IDM) L-IDM (Logical IDM)
Navigation/ Interaction Design	Designing how to move across pieces of content	P-IDM (Page IDM)
Presentation Design	*Designing the visual features of the pages*	*Not covered by IDM*

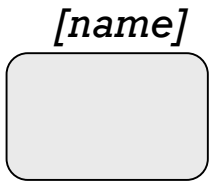
What C-IDM is about

- What should be said? What are the types of **subjects** addressed during the conversation?
- What are the relevant **changes of subject** to be supported?
- What are the possible different ways to **group** the dialogue subjects

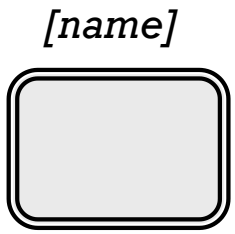
Basic primitives of C-IDM

Design Issue	**C-IDM primitive**
What should be said?	Topic Kind of Topic (or "Multiple Topic")
What are the relevant relationships among topics (i.e., the changes of subjects to be supported?)	Relevant relation
How to organize the dialogue contents?	Group of Topics Multiple Group of Topics

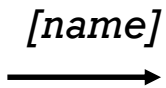
IDM – Graphic notation



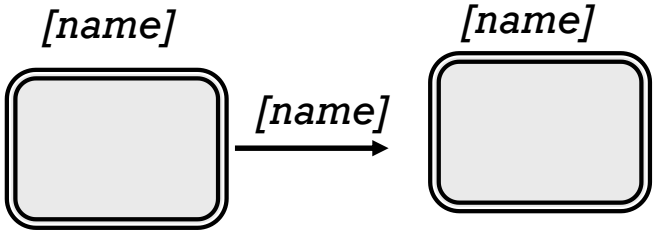
Topic (T)

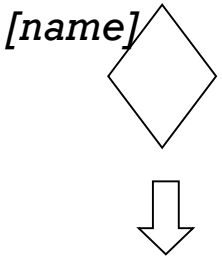


Kind of Topic or Multiple Topic (MP))

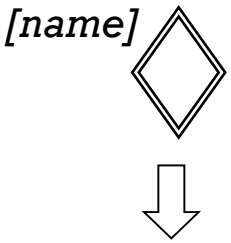


Relevant Relation (RR)





Group of Topics (GOT): the arrow points to the kind topics that are grouped



Multiple (parametric) group of topic - MGOT
(the arrow points to the kind topics that are grouped)

Design example

- **Website multimedia guide** for an temporary exhibition **of** Edvard Munch‘s prints**, hosted at the State Museum in Berlin.**

- The website mainly aims at presenting the **temporary exhibition**

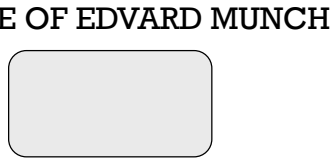
  (to be used before and after the visit, at home or at the musuem entrance)

Topic

Something **“unique”** that can be the subject of conversation between the user and the interactive application

Example of topics

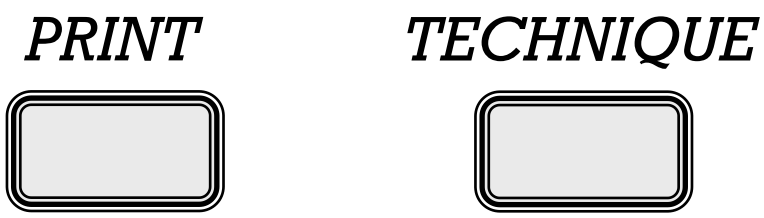
- The Museum
- The exhibition
- “the life of Edvard munch”



Multiple topic or Kind of Topics

- A category of possible subjects of conversation

- E.g.
  - "PRINT "is a Kind of Topic
    - "The sick child" - a Topic - example or INTANCE of -"PRINT "
  - "TECHNIQUE" is a Kind of Topic
    - "DRYPOINT" is a Topic - example or INTANCE of "TECHNIQUE"



Relevant Relation

- It models how topics and instances of kind of topics are related
- It determines how the dialogue can switch from a topic to a different one
- Example
  - "made with" is a possible change of subject from a PRINT to the TECHNIQUE used for it

Relevant relationship are typically symmetric, i.e., for each relevant relationshipo there is an inverse one (e.g., TECHNIQUE "used for" PRINTS

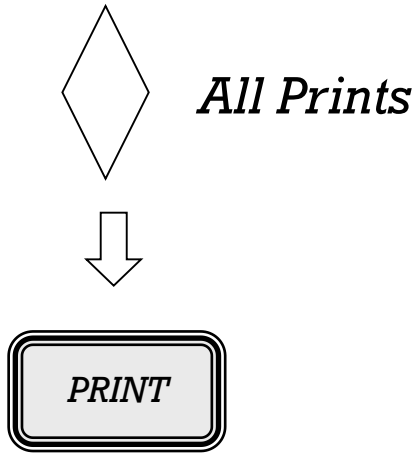
Defining Relevant Relationships

- More than one relevant relationships can be defined among two kind of topics
  - E.g., Artworks can be related to Painters becaouse “are painteb by” or “have inspired”
- A relevant relationship can relate topics of the same kind
  - (e.g., Artworks can “inspire”, or “be located close to”, other Artworks
- In general, relevant relationships are estalished among topics, seldom among topics and groups of topics

Group of topic

- A **set** of possible subjects (Topics) of conversation
  - Starting points for the dialogue
  - Helping to understand what the application is about
  - Helping to locate and access the content

- Examples
  - **Top-10 MASTERPIECES**
  - **ALL PRINTS**



Groups of topics: grouping criteria

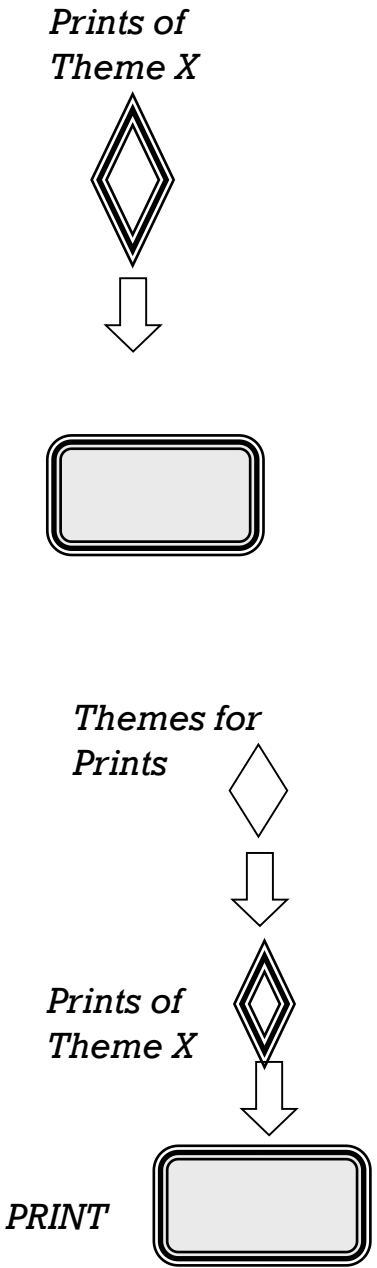
- **objective or subjective characteristics of topics**, e.g.
  - "All prints created using Drypoint technique" (objective)
  - "The museum's curator favourite prints" (subjective)
- Addressing **user's activities**, e.g.
  - In a food web site: "Food for a romantic dinner" "Food for Christmas Eve"…
- Addressing user's profile, e.g.
  - In a university web site: "All courses **for bachelor students**"
- **marketing**
  - In an e-commerce web site"This week's undercost products"

Multiple (parametric) group of topics

- Determines a **family** of group of topics
  - E.g.: "prints on a theme X"
- All groups in the family share a set of characteristics, but differ for at least one "parameter X": There is one group **for each** value of the parameter X

IMPORTANT!

- *Each multiple group of topics has a corresponding "higher-level" group of topics*
  - E.g.: "Themes-The groups of all groups of prints for the various themes"
- The high level group allows to select the <u>specific</u> group of topics of interest in the family (e.g.: "Prints about theme "sickness"),



Multiple (parametric) groups of topics

- Examples : a online book store
  - Books of genre X:
    - X = Triller (GOT)
      - Triller 1 (Topic)
      - Triller 2 (Topic)
      - …
    - X = Novel (GOT)
      - Novel 1 (Topic)
      - Novel 2 (Topic)
      - …
    - …

MGOT = "Genres" (All groups of books of a given genre, e.g., Triller, Novel, Fantasy, …)

CARDINALITY

- Cardinality = size of a set (mathematical definition)
- Our definition:

  cardinality = **expected (minimum and max) number of instances**
- **Cardinality must be associated to**
  - Multiple topics
  - Relevant relationships
  - Multiple group of topics

CARDINALITY

[X:Y] or [X,Y] where

- X = min (meaning "at least, e.g., in the first delivery of the web site");
- Y= max (meaning "at most – we do not expect more than this")

- For relevant relationships: cardinality can be "0" to indicate an "optional relationship"

Adding cardinality: Notation

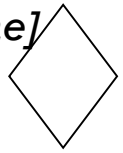
[name] N:M

Kind of Topic or Multiple Topic *(MP)*

[name] N:M

Relevant Relation

[name]
N:M



Group ***of Topics*** *(GOT): the arrow points to the kind topics that are grouped*

[name]
N:M

Multiple group of topic

CARDINALITY: WHY?

- To plan the overal size of the application
- To estimate the editorial effort
- Plan the content production resources
- To guide the definition of (multiple) groups of topics
  - E.g. If the cardinality of a kind of topic T is very large, we should design several groups to organize the dialogue around them; if the cardinality is very small, perhaps one group "All topics of kind T" is enough
- To guide the definition of navigation patterns in L-IDM
- To set contraints and requirements on lay-out
  - E.g., for menus, lists etc.

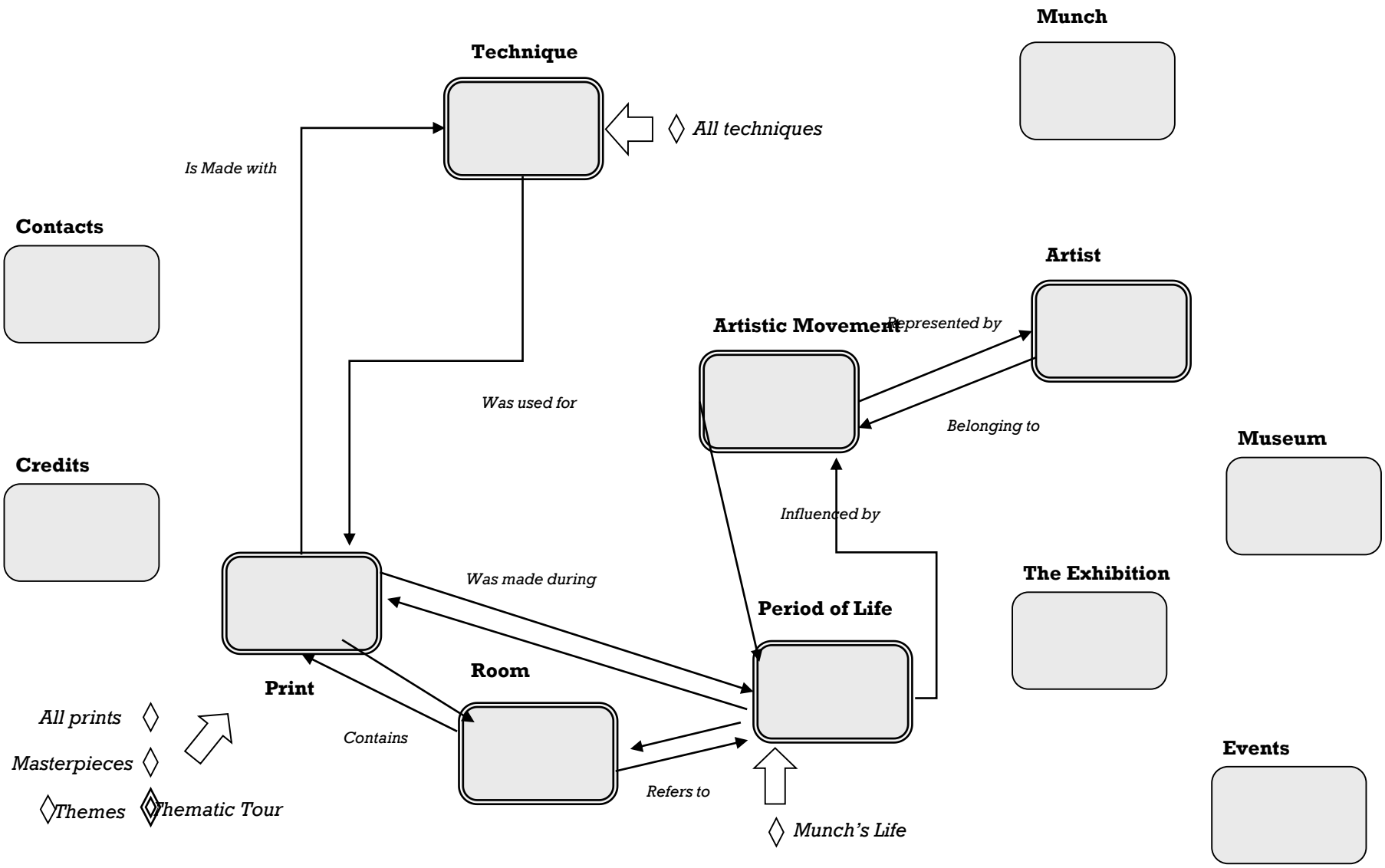
DOCUMENTATION: How to represent the above concepts for a specific application?

- Diagram (called **C-IDM Schema)**

(Optional: Textual descriptions and comments)

C-IDM _schema (cardinality missing: add it as an exercise)

Munch und Berlin exhibition – www.munchundberlin.org



Textual documentation

Each element that have a non obvious semantics can be described **shortly**:

- **Name** : meaningful very short description
- **Description**: what the element is about
- (for groups of topics and multiple groups of topics): **selection criteria** (how to select the members of the group(s)

Examples of textual descriptions

(comments in italics)

Topics:

- EXHIBITION: *an introduction to the exhibition*
- MUNCH: *a brief introduction to Edvard Munch*
- CONTACT US: *relevant contacts for this web site*

Kinds Of Topic:

- PRINT: *the description of a print of the exhibition*
- PERIOD OF LIFE: *the description of a specific period of Munch's life*
- ARTIST: *the description of an artist, living during Munch's time*
- ARTISTIC MOVEMENT: *the description of a relevant artistic movement that may have influenced Munch*
- TECHNIQUE: *description of a technique used by Munch for his prints*

Examples of textual descriptions

RELEVANT RELATIONS

CREATED IN: print →period of life; *if a print is the subject, you can switch to the corresponding period of life*

MADE WITH: print → technique; *if a print is the subject, you can switch to the corresponding technique*

HAS BEEN USED FOR: technique → prints; *if a technique is the subject, you can switch to the prints made with it*

CONTEMPORARY: period of life → artistic movement; *if a period of life is the subject, you can switch to the artistic movements active at the same time*

ACTIVE IN: artistic movement → artist; *if an artistic movement is the subject, you can switch to the artists being part of it*

Examples of textual descriptions

GROUPS OF TOPICS:

MASTERPIECES: *those prints that the curator consider the most representatives of the exhibition*

ALL PRINTS: *the complete set of the prints in the exhibition*

TECHNIQUES: *the complete set of techniques used by Munch*

MUNCH'S LIFE: *the complete set of periods of life of Munch*

MULTIPLE GROUPS OF TOPICS:

- **PRINTS OF THE SAME THEME T**: *the set of prints of theme T*

C-IDM wrap up

- **Topic** (e.g. Munch's life)
- **Multiple topic** or **Kind of Topic** (e.g. an artwork)
- **Relevant relation** (e.g. artwork MADE BY Munch)
- **Group of topic** (e.g. Artworks of the theme "Landscapes")
- **Multiple group of topic** (e.g. artworks of theme "X")
- **Cardinality** associated to multiple topics, multiple groups of topics, and relevant relationships

Advanced Issues: Nested MOTs

- What is Topics can be modeled along multiple parameters, e.g. in a online book store "By genre (thriller, novel, fantasy) and by area (US, Europe, Japan, China, Africa, …)"
- Multiple **groups of topics**, one for each possible combination of parameters
- But… What about **multiple groups of topics**?

Advanced Issues: Nested MOTs

SOLUTION 1: **N sets of "**nested" multiple groups of topics (MOTs) one for each parameter (levels of nesting **N+1**)

Example: N= 2 (genre, area); 2 sets, levels of nesting= 3

Set 1:

- Top level MOT "Genres for all Areas" grouping "level 2" MOTS
- Level 2 MOTs: genre X= specific value **g** (e.g., Thriller); Area: A (parameter); each level 2 MOT (**g**, A) collects GOTs for a specific genre **g**, but for multiple areas A;
- Lower level groups – GOTs – are NOT parametric and finally collect books of that specific genre **g** and in a specific area
- Set 2: similar, starting from Area

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- Lower level groups – GOTs – are NOT parametric and finally collect books of that specific genre **g** and in a specific area
- Set 2: similar, starting from setting the Area parameter

Advanced Issues: Nested MOTs

SOLUTION 2:

1 multiple group of topics (MOT) grouping all **groups of topics**, one for each possible combination of parameters

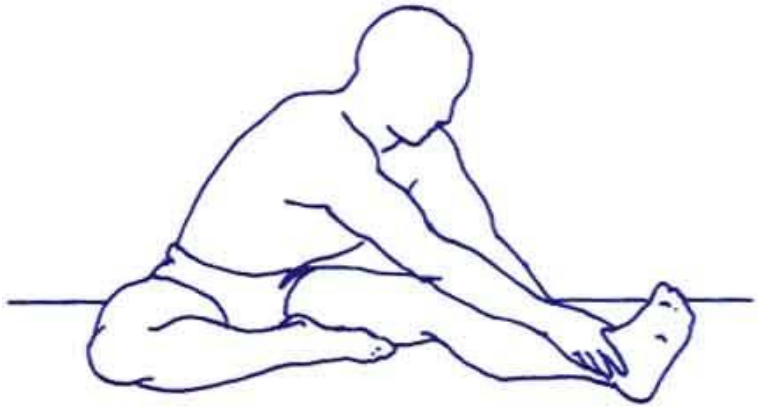
UX design issues – how to specify the values of all parameters **simoultaneously** to select the proper group is posponed to presentation design

Example: MOT "Available Book Genres and Areas" – here all genres and areas are available to the user - grouping Gots NON parametric, that collect all books of a specific genre and a specific area

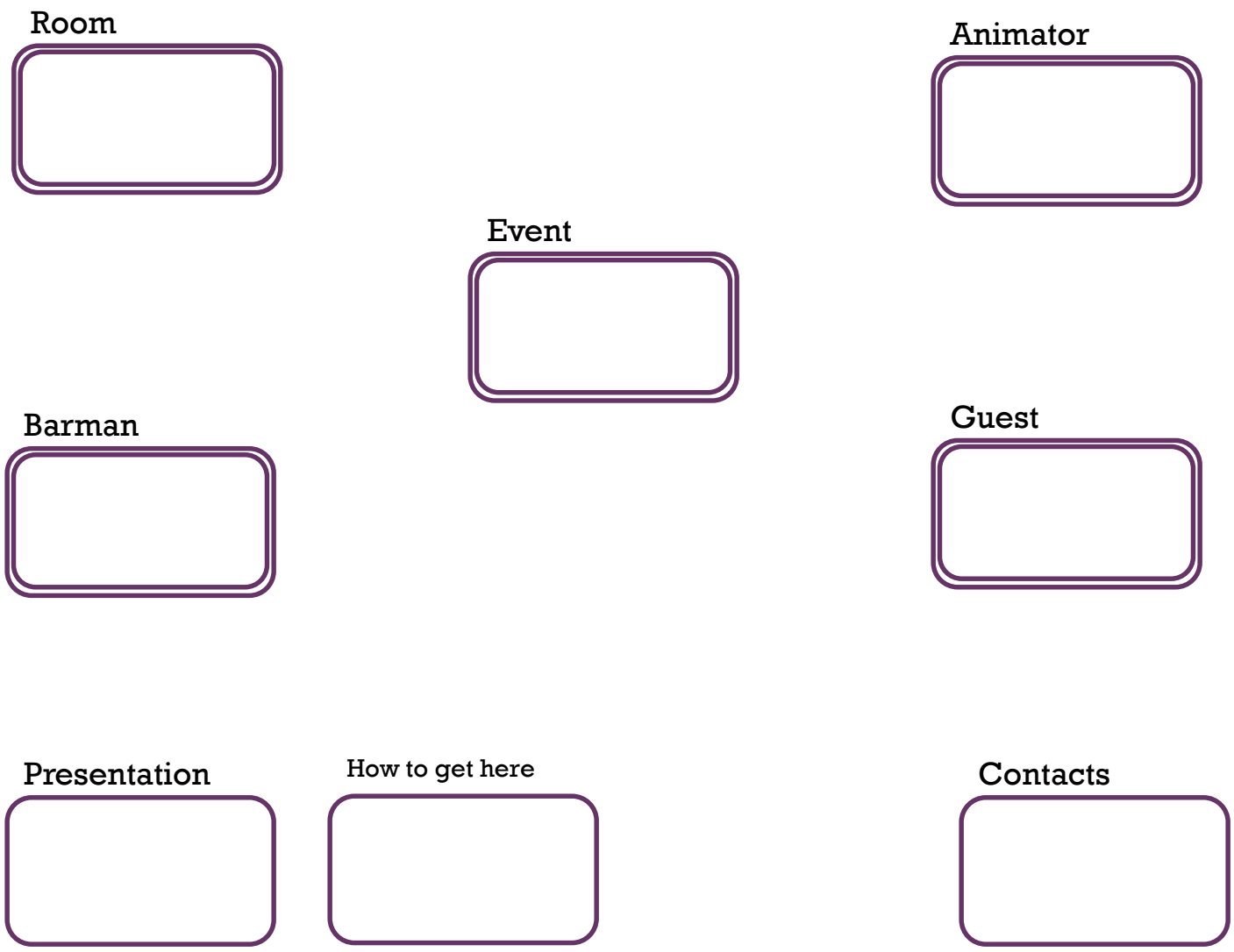
Note that solution 1 and 2 can be combined in case of >2 parameters

Exercise C-IDM

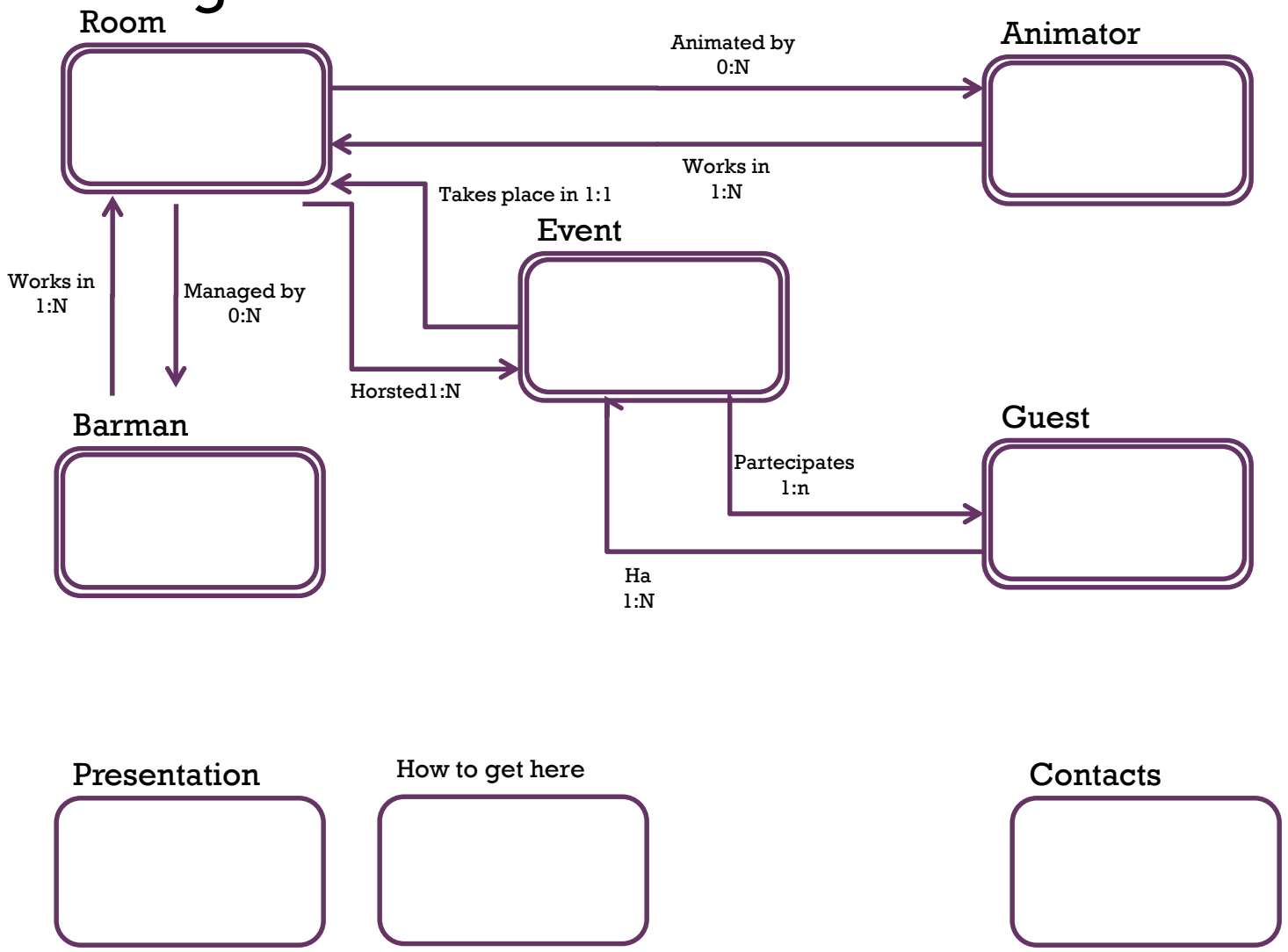
- Imagine a web site for a disco-pub, which aims at promoting its activitity providing information about the place and the events organized there. In the pub there are several **rooms** where you can have a drink and where live **events** (e.g., concerts) are organized. In the pub several **staff** people work, playing several roles (**barman**, **animators, DJs)**. During event, **guest stars** can be invited (e.g., singers, top models, movie actors, …)



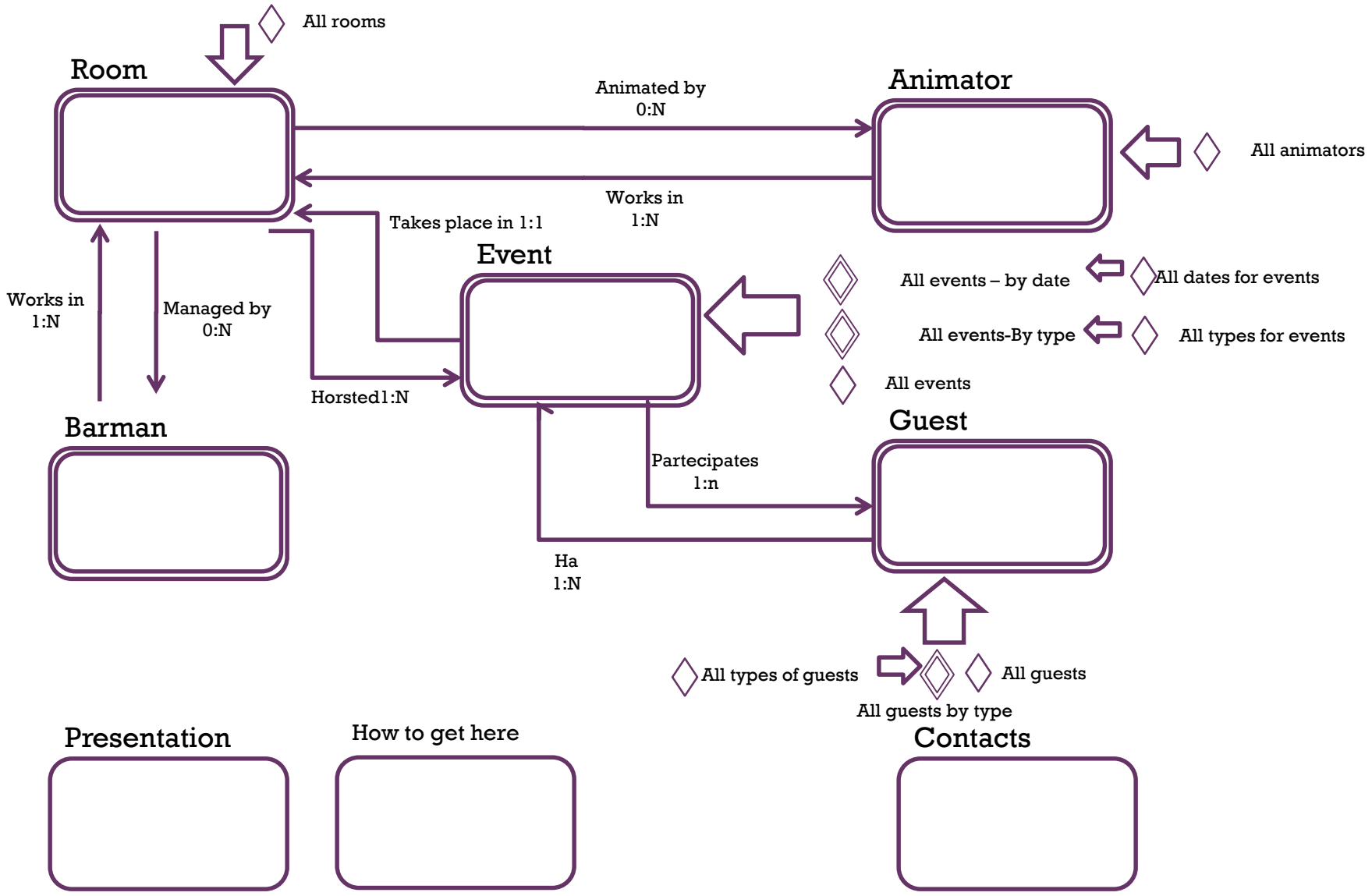
Possible solution (1)



Possible solution (2)-complete with missing cardinalities



Possible solution (3))-complete with missing cardinalities



From C-IDM to L-IDM

- L-IDM: Logic Design
  - Creating the building blocks upon which pages will be designed (during Page Design phase)
  - An intermediate step
  - **Slicing** topics and kind of topic
    - Sometimes **topics** (of a given kind) are "big"
    - What should be said about each (kind of) topic?
    - Which are the **self-contained units** of dialogue about a topic (of a given kind)?

L-IDM key concept: DIALOGUE ACT

a unit (i.e., **atomic** element) of **content** that describes a "**CHARACTERISTIC**" of a **TOPIC** (of a given kind)

Dialogue Acts (DAs)

- They risult from a **FRAGMENTATION PROCESS** of «big» topics
  - Example
    - «Paitings» are fragmented in Dialogue Acts: Introduction, Full screen image, Bibliography, Provenance

- DAs can be
  - mandatory (this is the default) or optional (this must be explicitly specified)
  - Single (default) or multiple (thus must be specified)

Representative Dialogue Acts

- Usually, one "fragment" (DA) is "more important", more "representative" than others, and is mandatory, i.e., always present in all topics of a given kind

- This DA is called REPRESENTATIVE Dialogue Act (underlined)

Dialogue Act: Notation

- *[name]*
- ***[name]*** **(Representative dialogue act)**

Placed inside the element from which it derives…

Multiple Topic

Topic

- Example:

Painting

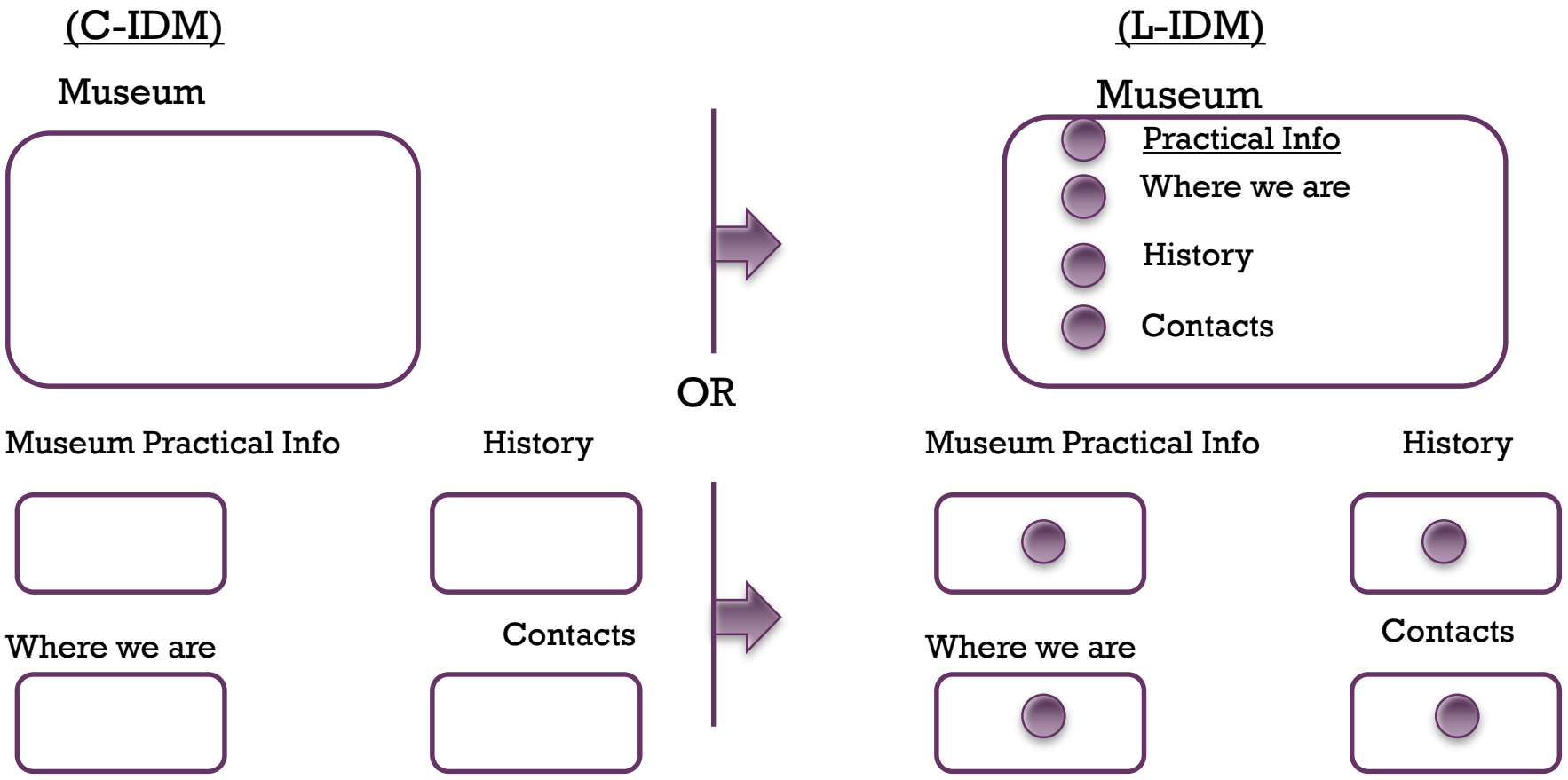
- Introduction
- Full screen image
- In-depth

Museum

- Practical Info
- Where we are
- History
- Contacts

From Topic to DAs: Fragmentation Criteria

FRAGMENTATION IS A SUBJECTIVE somehow arbitrary ACTIVITY



From Topic to DAs: Fragmentation Criteria

- Content size (large amount of content should be split to be more readable, more usable….)
- Content nature
- User profile
- Multiple media

Example Issues

Multiple Topic "Print" can be fragmented:

- By size:
  - DAs "Introduction", "Further details"
- By content nature:
  - DAs "Subject" "Technical info", "Historical info", "Artistic comments"
- By user profile:
  - DAs "Description for non experts)" "Description for experts"
- By media:
  - DAs "Textual + Small image description" "Full screen Image" "Animated Image".

Introductory Dialogue Act (IDA)

Content is needed in (multiple) groups of topic

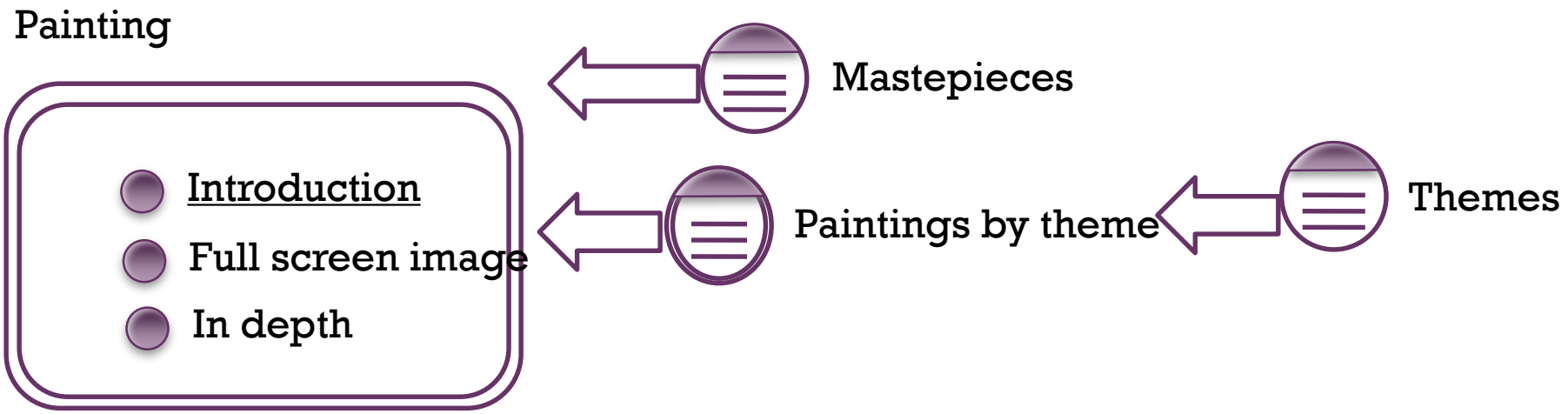
- A list of items (for the grouped items) – each one described by a "preview" of the group member (name, thumbnail image, …)
- Sometimes, also a descriptive/explanatory text for the whole set of grouped items

http://www.deib.polimi.it/eng/research-areas

This unit of content is called INTRODUCTORY DIALOGUE ACT

L-idm Notation for Introductory Dialogue Acts (in Group of Topics and Multiple Groups of Topics)

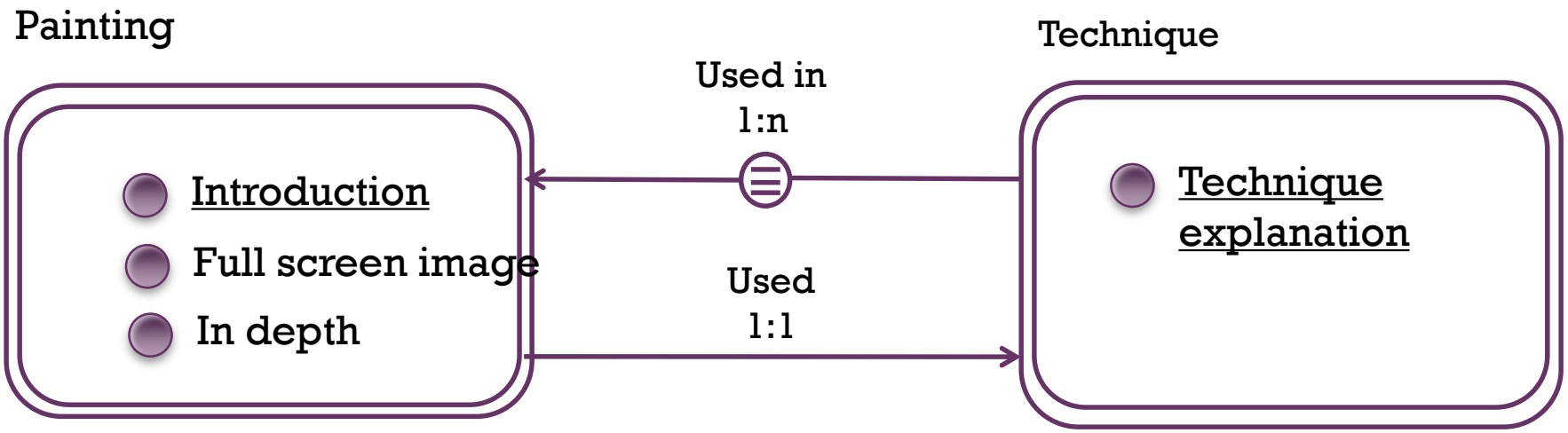
- Eg



L-IDM Notation for relevant relationships

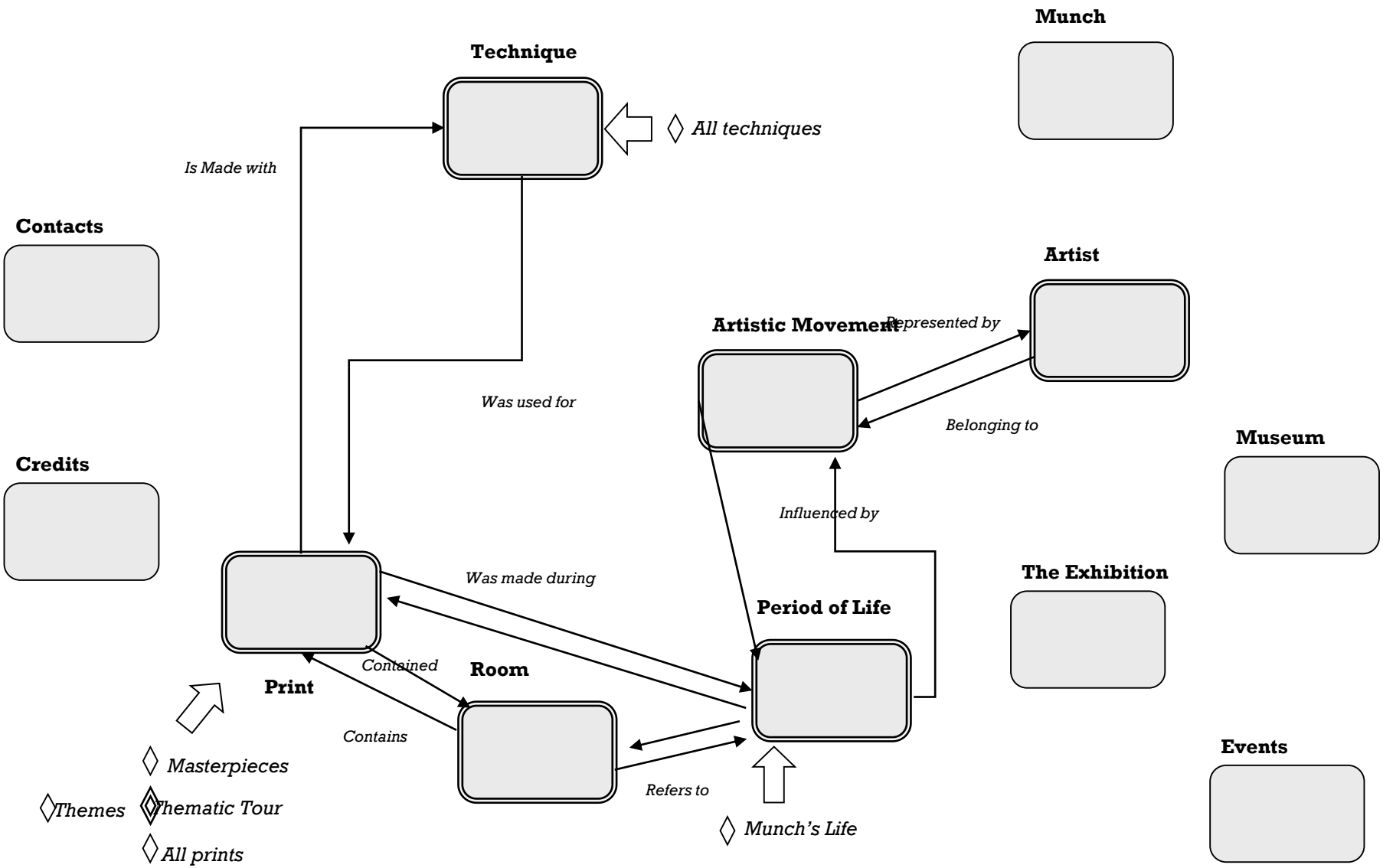
n,m : cardinaly
n: min
m: max

- Eg

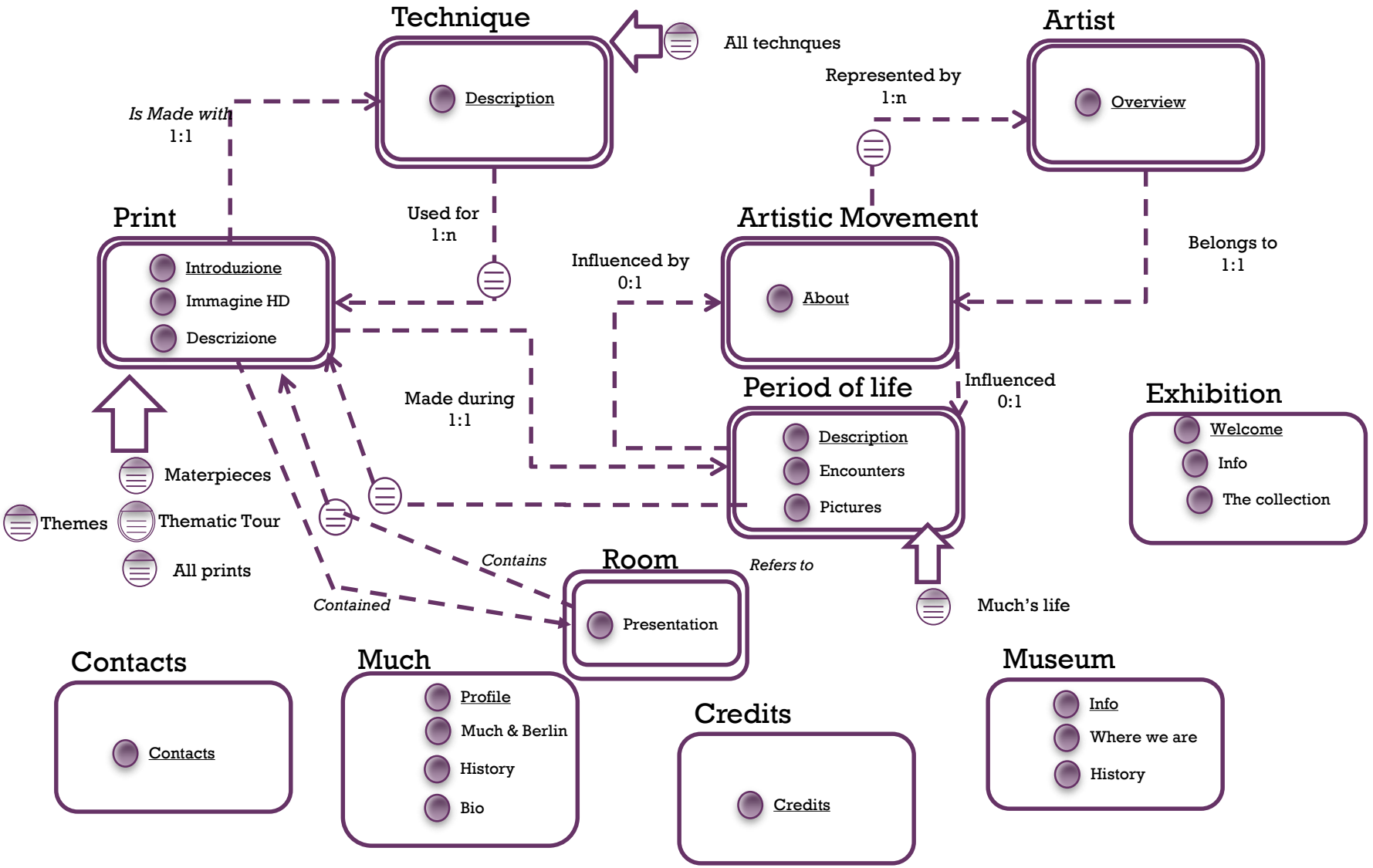


C-IDM _schema (see C-IDM slides - cardinality missing: add it as an exercise)

Munch exhibition– C-IDM



L-IDM: Munch


Technique
Description
All technques
Artist
Overview
Represented by
1:n
Is Made with
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Used for
1:n
Print
Introduzione
Immagine HD
Descrizione
Artistic Movement
About
Influenced by
0:1
Belongs to
1:1
Influenced
0:1
Period of life
Description
Encounters
Pictures
Made during
1:1
Exhibition
Welcome
Info
The collection
Materpieces
Themes
Thematic Tour
All prints
Contains
Contained
Room
Presentation
Refers to
Much's life
Contacts
Contacts
Much
Profile
Much & Berlin
History
Bio
Credits
Credits
Museum
Info
Where we are
History

Exercise

Analize the following web site:http://www.moma.org/

and identify

- Topics
- Multiple topics
- Group of topics
- Multiple groups of topic
- Dialogue acts