

I 202: INFORMATION ORGANIZATION & RETRIEVAL FALL 2025

Class 7: Faceted Categories & Navigation

Today's Outline

Hierarchy / Taxonomy Brief Review

Faceted Categories

Review Tuesday's Exercise

Facets vs Tags

WHAT DEFINES A HIERARCHY?

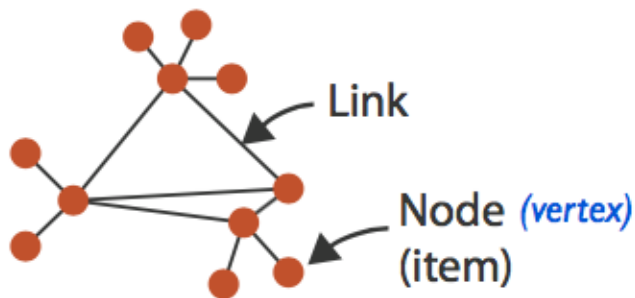
- Can be represented as a tree data structure:
 - *There is one root node*
 - *Every node except the root has exactly one parent*
- How this relates to category systems:
 - *Nodes represent categories and subcategories*
 - *An information item is assigned to one and only one node at some level in the tree*

→ *Trees*



Tree = network with hierarchical structure

→ **Networks**



Network = graph of relationships between discrete objects

Primary Ways to Visualize Trees / Hierarchies



Node-Link Diagrams

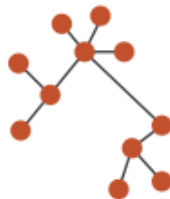
Connection Marks



NETWORKS



TREES



Enclosure

Containment Marks



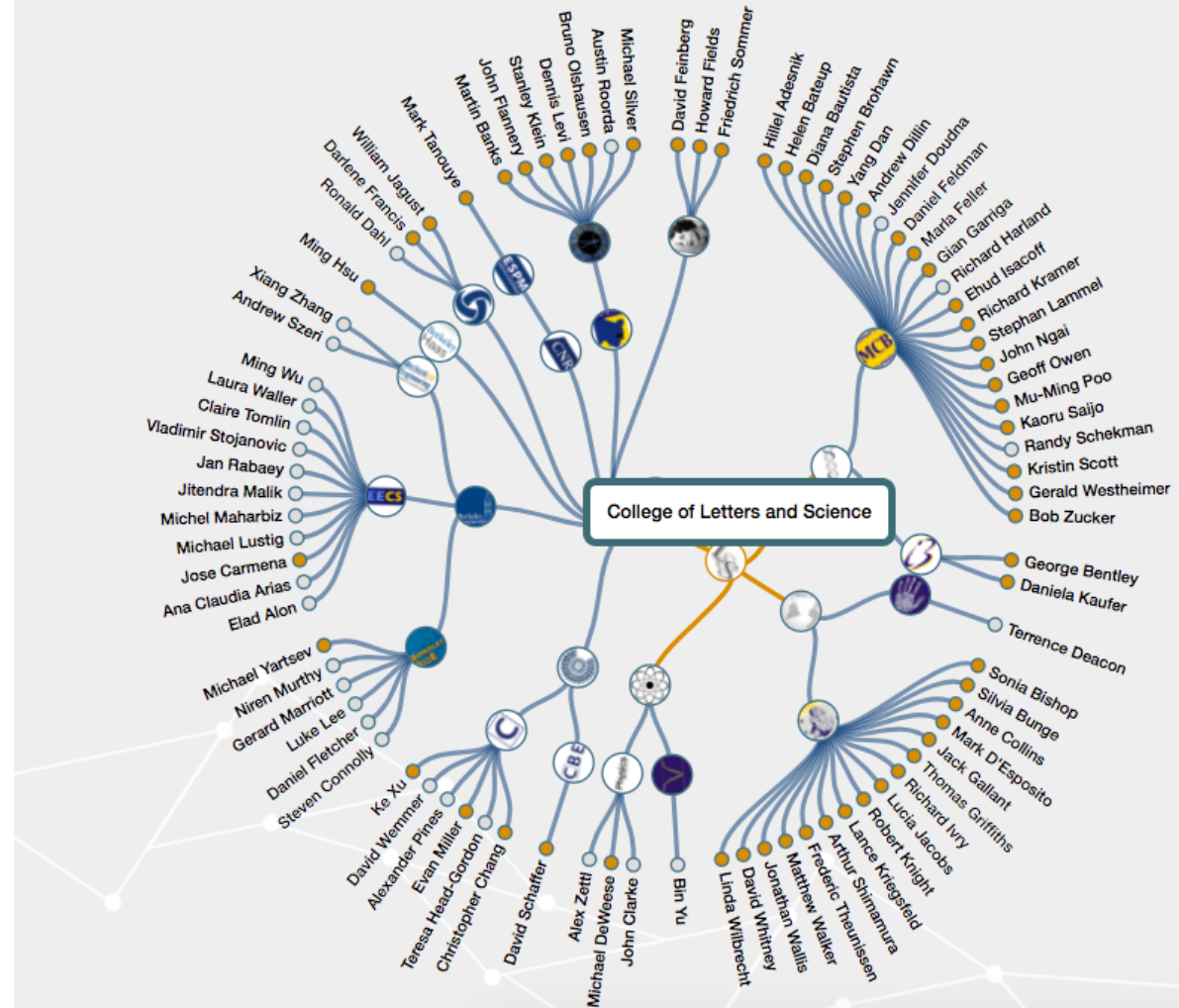
NETWORKS



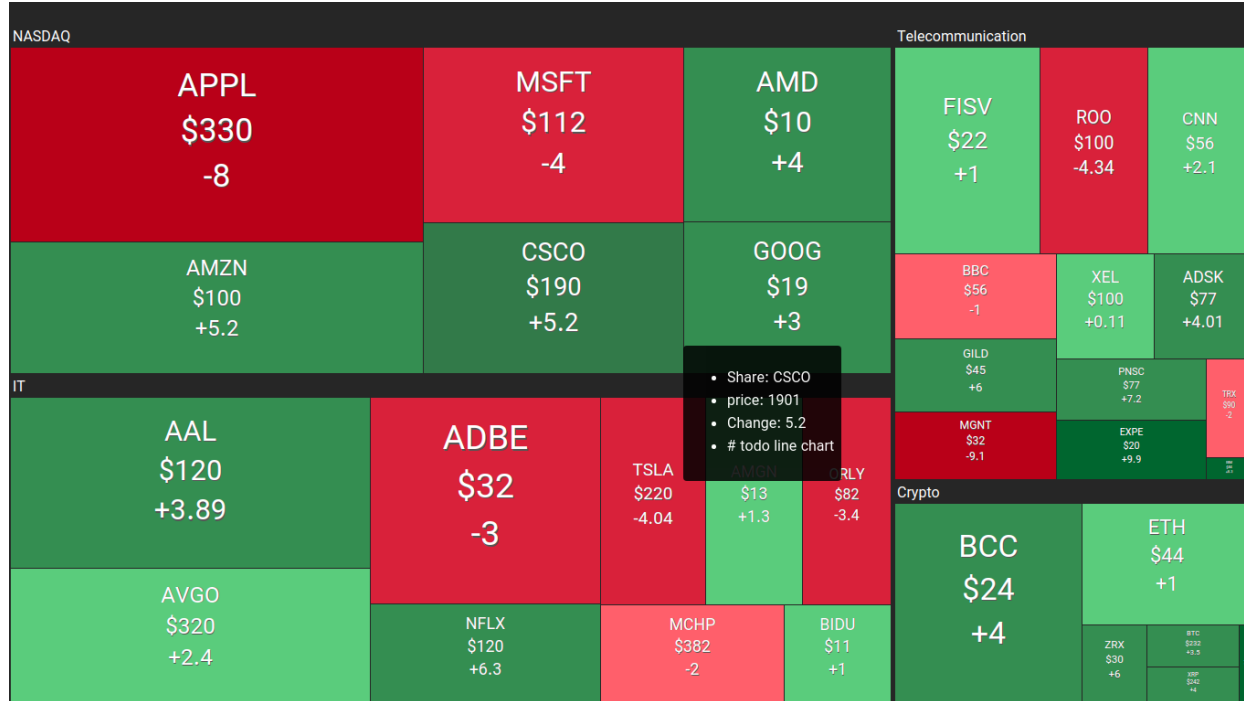
TREES



Showing a Hierarchical Org Chart with a Node and Link Diagram



Using Enclosure to Show Nested Hierarchy



The Treemap visualization organizes stocks into a hierarchy by their market sector. The relative size shows the market capitalization, and color shows if prices increased or decreased

Often the Entire Tree is Too Large to Visualize



D3 [Follow](#)

Bring your data to life.

Fc



Published



2 collections



By Mike Bostock



Edited Aug 26, 2020



ISC



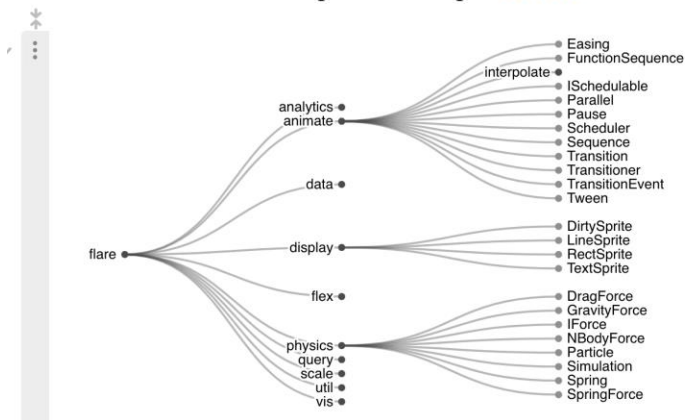
536 forks



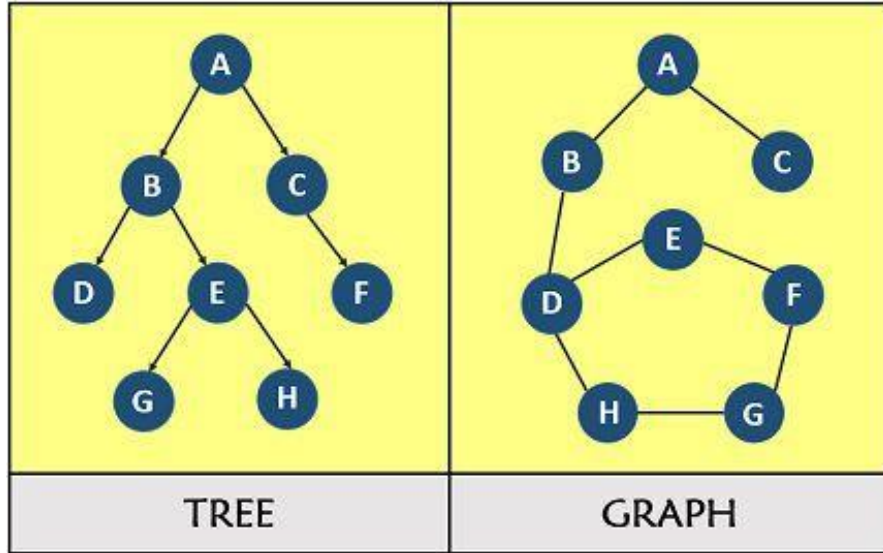
Importers

Collapsible Tree

Click a black node to expand or collapse [the tree](#).



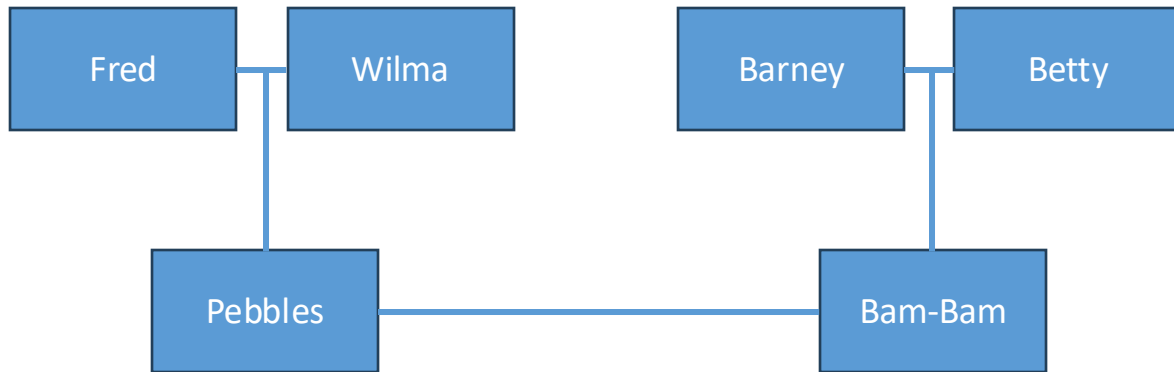
Tree vs Network (Graph): Comparison



BASIS FOR COMPARISON	TREE	GRAPH
Root node	It has exactly one root node.	Graph doesn't have a root node.
Cycles	No cycles are permitted.	Graph can have cycles.
Complexity	Less complex	More complex comparatively
Number of edges	$n-1$ (n = # of nodes)	Not defined
Model type	Hierarchical	Network

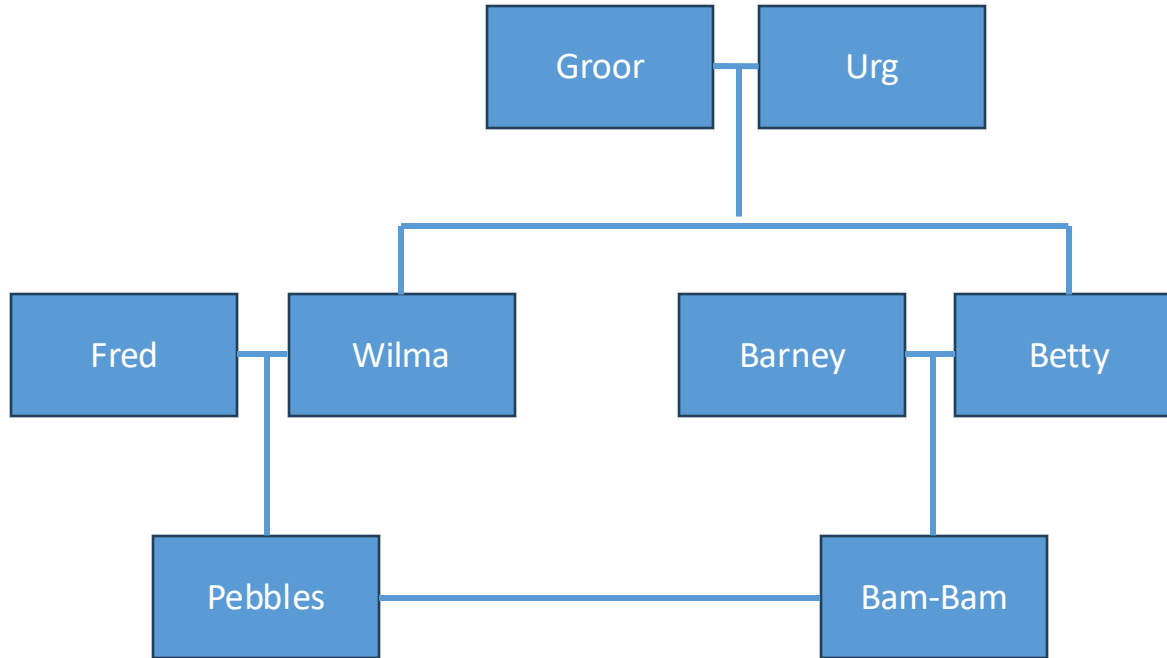
Family Trees?

(Not really a tree ... people have more than one parent)



Family Trees

(And people can be distantly related, thus making a cycle...)



HIERARCHY VS TAXONOMY

- Both have hierarchical organization
- In a taxonomy, the principle for containment is consistent all the way down the tree;
 - *is-a*
 - *part-of*
- By contrast, for a hierarchy, the principle for containment can vary
 - *In our find-the-bird hierarchy, the first level is sound-of, the second level is habitat-of, and the third level is beak-type-of*

Hierarchy Composed of a Mix of Concepts Is Difficult to Navigate

Chirps > Swimmer > Stubby beak
 Long beak
 Tree climber > Stubby beak
 Long beak
 Ground Based > Stubby beak
 Long beak
Caws > Swimmer > Stubby beak
 Long beak
 Tree climber > ...
 Ground Based
Sings > Swimmer
 Tree climber
 Ground Based



Solution:

For easier navigation, we should break these out into different features or facets

Sound: Chirps, Caws, or Sings

Habitat: Swimmer, Tree climber, or Ground Based

Beak: Stubby or Long

Navigation systems with faceted categories let the information explorer decide which facet to start with.

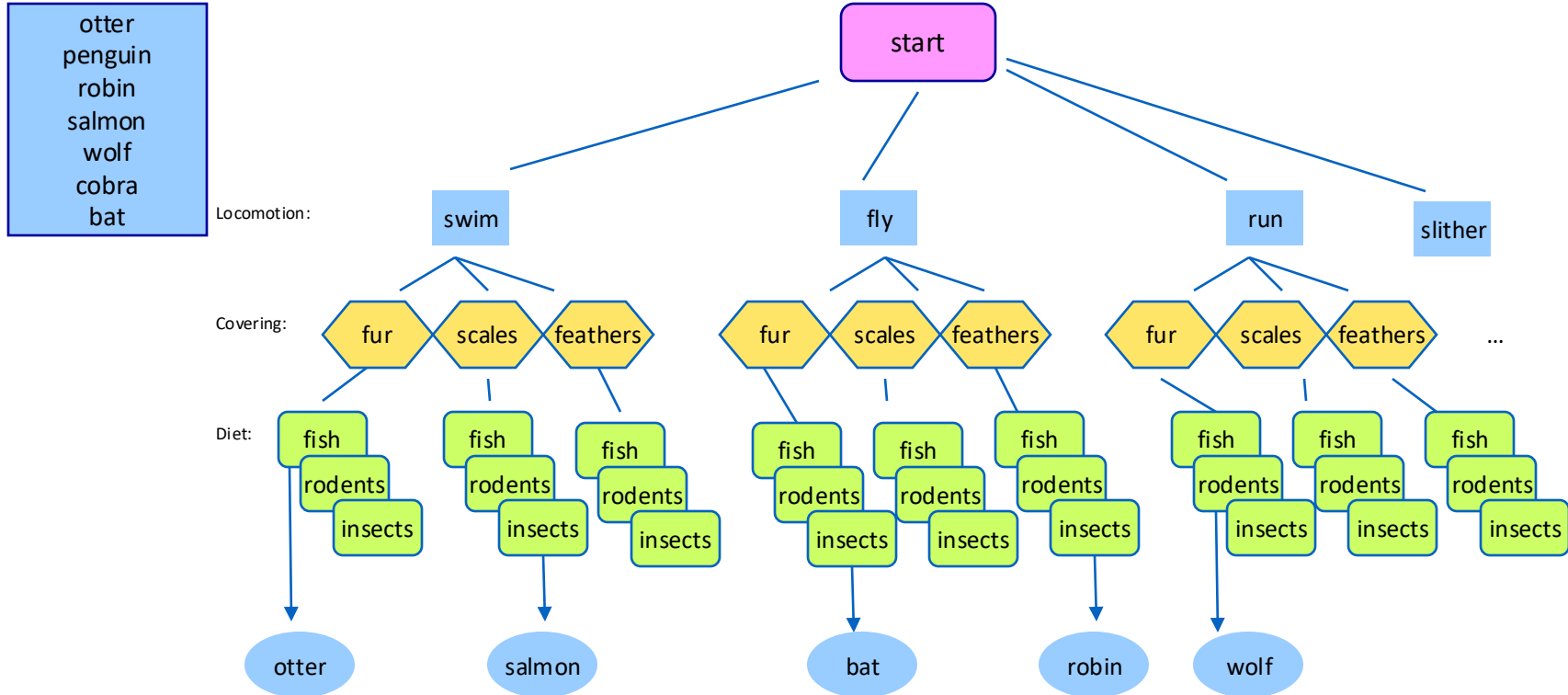
By using facets instead of hierarchy, we don't have to repeat each category multiple times.



Say I want to classify these animals along 4 features

otter
penguin
robin
salmon
wolf
cobra
bat

A hierarchy requires me to repeat the features



THE PROBLEM WITH HIERARCHY

- Inflexible
 - *Force the user to start with a particular category*
 - *What if I don't know the animal's diet, but the interface makes me start with that category?*
- Wasteful
 - *Have to repeat combinations of categories*
 - *Makes for extra clicking and extra coding*
- Difficult to modify
 - *To add a new category type, must duplicate it everywhere or change things everywhere*

FACETED CATEGORIES

Also known as Faceted Metadata, Faceted Navigation, Faceted Search, Poly
Hierarchy

FACETED CATEGORIES

- A **set** of categories for describing a collection
 - Each facet has **distinct** attributes, or features
 - Resources are identified by **multiple** categories
 - Each category can be **hierarchical**
 - **Consistent relationship within each hierarchy**

The background of the slide is a photograph of a plate of fish tacos. The tacos are made with soft, yellow corn tortillas and are filled with chunks of cooked fish, diced red tomatoes, and sliced red onions. The plate is white and sits on a wooden surface. A blue object, possibly a napkin or part of a chair, is visible in the background.

Example: Recipes

Would you want to browse
a hierarchy of recipes?

Faceted Categories Instead!

Dish > tacos

Cuisine > Mexican

Occasion > Party
Occasion > Tailgate

Ingredients > Cod
Ingredients > Red Onion
Ingredients > Tortilla

Preparation > Saute

We can (optionally) add hierarchy to facets

Dish > main > tacos

Cuisine > Mexican

Occasion > Party
Occasion > Tailgate

Ingredients > Meat > Fish > Cod
Ingredients > Veg > Onion > Red Onion
Ingredients > Bread > Tortilla

Preparation > Saute

CONSTRUCTING FACETS

- Break out each of the important concepts into their own facet
- Sometimes the facets are flat, sometimes hierarchal
- Assign labels to items from **multiple** facets

Preparation Method

Fry
Saute
Boil
Bake
Broil
Freeze

Desserts

Cakes
Cookies
Ice Cream
Sorbet
Flan

Fruits

Cherries
Berries
 Blueberries
 Strawberries
Bananas
Pineapple

ASSIGNING FACETS

This allows multiple navigation paths to each

item

Preparation Method

- Fry
- Saute
- Boil
- Bake
- Broil
- Freeze

Desserts

- Cakes
- Cookies
- Ice cream
- Sorbet
- Flan

Fruits

- Cherries
- Berries
 - Blueberries
 - Strawberries
- Bananas
- Pineapple

Fruit > Pineapple
Dessert > Cake
Preparation > Bake




Dessert > Sorbet
Fruit > Berries > Strawberries
Preparation > Freeze

Flamenco Project: (Prof Hearst's Research in the 2000's)

Theory and Practice behind Faceted Navigation

flamenco search

uc berkeley school of information



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The Flamenco Search Interface Project

Search Interfaces that Flow

The *Flamenco* search interface framework has the primary design goal of allowing information spaces in a flexible manner without feeling lost. A key property of the interface is the use of hierarchical category metadata, to guide the user toward possible choices, and to organize the interface. The interface uses hierarchical faceted metadata in a manner that allows users to both explore and search while maintaining a consistent representation of the collection's structure. This use of faceted metadata, along with text search, allows the user to follow links, then add search terms, then follow more links, creating a fluid interaction flow.

FLAMENCO stands for FLeXible information Access using MEtadata in NOvel COMputational Environments, funded by a CAREER grant awarded to Prof. [Marti Hearst](#) from the [National Science Foundation](#).

Flamenco goes open source!

EXAMPLE: NOBEL PRIZE WINNERS

Faceted navigation to easily explore who won which awards when

(Data from 2004)

Overview shows which categories are available

Nobel Prize Winners

1901 to 2004

[Save Search](#) [History and Settings](#) [Return to Search](#) [New Search](#) [Logout](#)

Username Password

[Create a New Account](#)

☒ Show tooltip previews of subcategories

GENDER

[female](#) (33) [male](#) (698)

COUNTRY

Argentina (5)	China (2)
Australia (6)	Colombia (1)
Austria (12)	Costa Rica (1)
Belgium (11)	Czechoslovakia (2)
Burma (1)	Denmark (13)
Canada (9)	more...
Chile (2)	

AFFILIATION

Allied Reparation Commission (1)	Brussels (1)
Argentina (3)	Canada (6)
Australia (2)	Committee for the Defense of National Interests and International Conciliation (1)
Austria (6)	Conseil national économique (1)
Belgium (7)	Costa Rica (1)
Berlin University (1)	more
Briand-Kellogg Pact (3)	

PRIZE

chemistry (138)	medicine (182)
economics (55)	peace (108)
literature (101)	physics (166)

YEAR

1900s (57)	1960s (79)
1910s (40)	1970s (103)
1920s (54)	1980s (97)
1930s (56)	1990s (98)
1940s (43)	2000s (56)
1950s (72)	

Let's start with the prize for literature

Nobel Prize Winners

1901 to 2004

[Save Search](#) [History and Settings](#) [Return to Search](#) [New Search](#) [Logout](#)

☒ Show tooltip previews of subcategories

Username Password

[Create a New Account](#)

GENDER

[female](#) (33) [male](#) (698)

COUNTRY

Argentina (5)	China (2)
Australia (6)	Colombia (1)
Austria (12)	Costa Rica (1)
Belgium (11)	Czechoslovakia (2)
Burma (1)	Denmark (13)
Canada (9)	more...
Chile (2)	

AFFILIATION

Allied Reparation Commission (1)	Brussels (1)
Argentina (3)	Canada (6)
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Austria (6)	Conseil national économique (1)
Belgium (7)	Costa Rica (1)
Berlin University (1)	more
Briand-Kellogg Pact (3)	

PRIZE

chemistry (138)	medicine (182)
economics (55)	peace (108)
literature (10)	physics (166)

YEAR

1900s (57)	1960s (79)
1910s (40)	1970s (103)
1920s (54)	1980s (97)
1930s (56)	1990s (98)
1940s (43)	2000s (56)
1950s (72)	

This shows us that 40 people have won for literature, 10 women, 91 men, and the country distribution

Nobel Prize Winners

1901 to 2004

Save Search History and Settings Return to Search New Search Logout

☒ all items ☐ within current results

These terms define your current search. Click the **x** to remove a term.

PRIZE: literature **x**

Items 1 to 40 of 101 results

Group by: [prize](#)

Sort by: usual name, [year of birth](#), [year of death](#), [country](#)

Refine your search further within these categories:

GENDER ([group results](#))

[female](#) (10) [male](#) (91)

COUNTRY ([group results](#))

Australia (1)	Denmark (3)
Austria (1)	Egypt (1)
Belgium (1)	Federal Republic of
Chile (2)	Germany (2)
Colombia (1)	Finland (1)
Czechoslovakia (1)	more...









AFFILIATION ([group results](#))

PRIZE: [all](#) > literature

YEAR ([group results](#))

1901-1904 (10)	1905-1908 (11)
--------------------------------	--------------------------------

1 41 81

 <p>Albert Camus 1913-1960</p>	 <p>Alexandr Solzhenit... 1918-</p>	 <p>Anatole France 1844-1924</p>	 <p>André Gide 1869-1951</p>
			

Let's group these results by the decade they were awarded in

Nobel Prize Winners

1901 to 2004

Save Search History and Settings Return to Search New Search Logout

☒ all items ☐ within current results

These terms define your current search. Click the **x** to remove a term.

PRIZE: literature **x**

Items 1 to 40 of 101 results

Group by: [prize](#)

Sort by: usual name, [year of birth](#), [year of death](#), [country](#)

Refine your search further within these categories:

GENDER ([group results](#))

[female](#) (10) [male](#) (91)

COUNTRY ([group results](#))

Australia (1)	Denmark (3)
Austria (1)	Egypt (1)
Belgium (1)	Federal Republic of
Chile (2)	Germany (2)
Colombia (1)	Finland (1)
Czechoslovakia (1)	more...



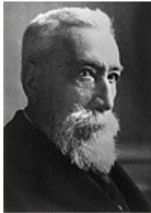





AFFILIATION ([group results](#))

PRIZE: [all](#) > literature

YEAR ([group results](#))

1895-1900 (4) 1901-1905 (4) 1906-1910 (4) 1911-1915 (4) 1916-1920 (4) 1921-1925 (4) 1926-1930 (4) 1931-1935 (4) 1936-1940 (4) 1941-1945 (4) 1946-1950 (4) 1951-1955 (4) 1956-1960 (4) 1961-1965 (4) 1966-1970 (4) 1971-1975 (4) 1976-1980 (4) 1981-1985 (4) 1986-1990 (4) 1991-1995 (4) 1996-2000 (4) 2001-2004 (4)

1 41 81

 <p>Albert Camus 1913-1960</p>	 <p>Alexandr Solzhenit... 1918-</p>	 <p>Anatole France 1844-1924</p>	 <p>André Gide 1869-1951</p>
			

Let's narrow down to just the literature winners in the 1920s.

Nobel Prize Winners

1901 to 2004

[Save Search](#) [History and Settings](#) [Return to Search](#) [New Search](#) [Logout](#)

☐ all items ☐ in current results

search

These terms define your current search. Click the to remove a term.

PRIZE: literature

101 items, grouped by YEAR ([view ungrouped items](#))

Refine your search within these categories:

GENDER ([group results](#))

[female](#) (10) [male](#) (91)

COUNTRY ([group results](#))

Australia (1)	Denmark (3)
Austria (1)	Egypt (1)
Belgium (1)	Federal Republic of
Chile (2)	Germany (2)
Colombia (1)	Finland (1)
Czechoslovakia (1)	more...

AFFILIATION





PRIZE: [all](#) > literature

YEAR

1900s (10)	1960s (11)
1910s (9)	1970s (11)
1920s (10)	1980s (10)
1930s (9)	1990s (10)
1940s (6)	more...
1950s (10)	





Recently Viewed Items
[Go to Item History](#)

1900s (10)

 Bjørnstjerne Bjørn... 1832-1910	 Frédéric Mistral 1830-1914	 Giosuè Carducci 1835-1907	 Henryk Sienkiewicz 1846-1916
---	--	---	--





[all 10 items...](#)

1910s (9)

 Carl Spitteler 1845-1924	 Gerhart Hauptmann 1862-1946	 Henrik Pontoppidan 1857-1943	 Karl Gjellerup 1857-1919
--	--	--	--

[all 9 items...](#)

1920s (10)

			
---	--	---	---

Notice we've made a complex query with a few easy clicks: Prize > literature AND Year > 1920s

Nobel Prize Winners

1901 to 2004

Save Search

History and Settings

Return to Search

New Search

Logout

search



all items



within current results

Refine your search further within these categories:

GENDER ([group results](#))

[female](#) (2)

[male](#) (8)

COUNTRY ([group results](#))

[France](#) (2)

[Norway](#) (2)

[Germany](#) (1)

[Poland](#) (1)

[Ireland](#) (1)

[Spain](#) (1)

[Italy](#) (1)

[United Kingdom](#) (1)

AFFILIATION ([group results](#))

PRIZE: [all](#) > literature ([group results](#))

YEAR: [all](#) > 1920s ([group results](#))

[1920](#) (1)

[1925](#) (1)

[1921](#) (1)

[1926](#) (1)

[1922](#) (1)

[1927](#) (1)

These terms define your current search. Click the **x** to remove a term.

PRIZE: literature **x**

YEAR: 1920s **x**

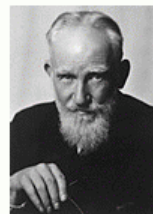
10 results

Group by: [prize](#), [year](#)

Sort by: usual name, [year of birth](#), [year of death](#), [country](#)



[Anatole France](#)
1844-1924



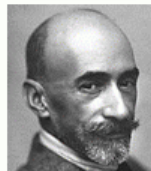
[George Bernard Shaw](#)
1856-1950



[Grazia Deledda](#)
1871-1936



[Henri Bergson](#)
1859-1941



Now we can **broaden** the query by removing one of the categories; this changes the query to just Year > 1920s

Nobel Prize Winners

1901 to 2004

[Save Search](#) [History and Settings](#) [Return to Search](#) [New Search](#) [Logout](#)

☒ all items ☐ within current results

These terms define your current search. Click the **x** to remove a term.

PRIZE: literature **x**

YEAR: 1920s **x**

Refine your search further within these categories:

GENDER ([group results](#))
[female](#) (2) [male](#) (8)

COUNTRY ([group results](#))
[France](#) (2) [Norway](#) (2)
[Germany](#) (1) [Poland](#) (1)
[Ireland](#) (1) [Spain](#) (1)
[Italy](#) (1) [United Kingdom](#) (1)

AFFILIATION ([group results](#))


PRIZE: [all](#) > literature ([group results](#))

YEAR: [all](#) > 1920s ([group results](#))
[1920](#) (1) [1925](#) (1)
[1921](#) (1) [1926](#) (1)
[1922](#) (1) [1927](#) (1)

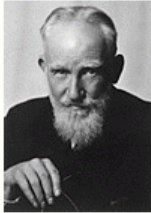
10 results

Group by: [prize](#), [year](#)


Sort by: usual name, [year of birth](#), [year of death](#), [country](#)




[Anatole France](#)
1844-1924



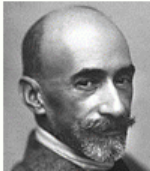
[George Bernard Shaw](#)
1856-1950





[Grazia Deledda](#)
1871-1936




[Henri Bergson](#)
1859-1941









The Flamenco system allowed the user to group by a category value; this hasn't been adopted by commercial systems

Nobel Prize Winners
1901 to 2004

Save Search History and Settings Return to Search New Search Logout

search

☒ all items results ☐ within current results

These terms define your current search. Click the **x** to remove a term.

YEAR: 1920s **x**

Items 1 to 40 of 54 results


Group by: **year**
Sort by: usual name, [year of birth](#), [year of death](#), [country](#)


GENDER ([group results](#))
[female](#) (2) [male](#) (52)


COUNTRY ([group results](#))
[Austria](#) (2) [Italy](#) (1)
[Canada](#) (2) [Norway](#) (4)
[Denmark](#) (3) [Poland](#) (1)
[France](#) (8) [Spain](#) (1)
[Germany](#) (11) [more...](#)
[Ireland](#) (1)


AFFILIATION ([group results](#))
[Allied Reparation Commission](#) (1) [Dawes Plan](#) (1)
[Austria](#) (2) [Denmark](#) (3)
[Berlin University](#) (1) [France](#) (6)
[Briand-Kellogg Pact](#) (2) [Parliament](#) (1)
[more...](#)





1 **41**


[Adolf Windaus](#)
[1876-1959](#)


[Albert Einstein](#)
[1879-1955](#)


[Anatole France](#)
[1844-1924](#)


[Archibald V. Hill](#)
[1886-1977](#)

Notice across all of the 1920's, only 2 women got awards, while 52 men did. Let's drill into 1921

Nobel Prize Winners

1901 to 2004

Save Search

History and Settings

Return to Search

New Search

Logout

search

☒ all items ☐ in current results

Refine your search within these categories:

GENDER [\(group results\)](#)

[female](#) (2)

[male](#) (52)

COUNTRY [\(group results\)](#)

[Austria](#) (2)

[Canada](#) (2)

[Denmark](#) (3)

[France](#) (8)

[Germany](#) (11)

[Ireland](#) (1)

[Italy](#) (1)

[Norway](#) (4)

[Poland](#) (1)

[Spain](#) (1)

[more...](#)

AFFILIATION [\(group results\)](#)

[Allied Reparation](#)

[Commission](#) (1)

[Austria](#) (2)

[Berlin University](#) (1)

[Briand-Kellogg](#)

[Pact](#) (2)

[Brussels](#) (1)

[Canada](#) (2)

[Dawes Plan](#) (1)

[Denmark](#) (3)

[France](#) (6)

[French Parliament](#) (1)

[more...](#)

PRIZE [\(group results\)](#)

[chemistry](#) (10)

[literature](#) (10)

[medicine](#) (11)

[peace](#) (11)

[physics](#) (12)

These terms define your current search. Click the ☒ to remove a term.

YEAR: 1920s ☒

54 items, grouped by YEAR ([view ungrouped items](#))

1920 (5)



[August Krogh](#)
1874-1949



[Charles Edouard Guisot](#)
1861-1938



[Knut Hamsun](#)
1859-1952



[Léon Bourgeois](#)
1851-1925



[Walther Nernst](#)
1864-1941

1921 (5)

Einstein! Cool! Let's take a detailed look at him

Nobel Prize Winners

1901 to 2004

[Save Search](#) [History and Settings](#) [Return to Search](#) [New Search](#) [Logout](#)

☒ all items ☐ in current results

These terms define your current search. Click the to remove a term.

YEAR: 1920s > 1921

Refine your search within these categories:

GENDER ([group results](#))
[male](#) (5)


COUNTRY ([group results](#))
[France](#) (1) [Sweden](#) (1)
[Germany](#) (1) [Switzerland](#) (1)
[Norway](#) (1) [United Kingdom](#) (1)


AFFILIATION ([group results](#))
[Brussels](#) (1) [Sweden](#) (1)
[Germany](#) (1) [United Kingdom](#) (1)
[League of Nations](#) (1)


PRIZE ([group results](#))
[chemistry](#) (1) [peace](#) (2)
[literature](#) (1) [physics](#) (1)


YEAR: [all](#) > [1920s](#) > 1921


5 results
Group by: [year](#)
Sort by: [usual name](#), [year of birth](#), [year of death](#), [country](#)


[Albert Einstein](#)
1879-1955


[Anatole France](#)
1844-1924


[Christian Lange](#)
1869-1938


[Frederick Soddy](#)
1877-1956


[Hjalmar Branting](#)
1860-1925

Recently Viewed Items
[Go to Item History](#)

We can see the associated metadata and categories in the item description

Nobel Prize Winners

1901 to 2004

Save Item

History and Settings

Return to S

Item 1 of 4 ([back to results](#))

[next](#) ►

Current search:



Albert Einstein
1879-1955

[Biography](#)

[Nobel Lecture](#)

Select any link to see items in a related category.

Find Similar Items

more general categories

GENDER

information about this item

GENDER

[male](#) (698)



COUNTRY

COUNTRY

[Germany](#) (44)



[Switzerland](#) (27)



AFFILIATION

AFFILIATION

[Germany](#) (41)

[Berlin](#) (10)

[Kaiser-Wilhelm-Institut für Physik](#) (2)



PRIZE

PRIZE

[physics](#) (166)



YEAR

YEAR

[1920s](#) (54)

[1921](#) (5)



USUAL NAME:

Albert Einstein

LONG NAME:

Albert Einstein

YEAR OF BIRTH:

1879

YEAR OF DEATH:

1955

Let's do a free text search, find all the awardees from California

Nobel Prize Winners

1901 to 2004

[Save Search](#) [History and Settings](#) [Return to Search](#) [New Search](#) [Logout](#)

[all items](#) [in current results](#)

Refine your search within these categories:

GENDER ([group results](#))
[male](#) (4)


COUNTRY: [all](#) > [Switzerland](#)

AFFILIATION ([group results](#))
[France](#) (1) [Switzerland](#) (2)
[Germany](#) (1)

PRIZE: [all](#) > [physics](#)

YEAR ([group results](#))
[1920s](#) (2) [1980s](#) (2)








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These terms define your current search. Click the to remove a term.

PRIZE: [physics](#)

Items 1 to 40 of 166 results
Group by: [prize](#)
Sort by: [usual name](#), [year of birth](#), [year of death](#), [country](#)

1	41	81	121	161
 Aage N. Bohr 1922-	 Abdus Salam 1926-1996	 Albert A. Michelson 1852-1931	 Albert Einstein 1879-1955	
 Aleksandr M. Prokhorov 1916-2002	 Alexei A. Abrikosov 1928-	 Alfred Kastler 1902-1984	 Anthony J. Leggett 1938-	

Note that category structure remains after the free text search

"California" appears in these category names:

- affiliation > [California](#)
- affiliation > ... > Berkeley > [University of California](#)
- affiliation > ... > Irvine > [University of California](#)
- affiliation > ... > La Jolla > [University of California](#)
- affiliation > ... > [University of California](#)

- affiliation > ... > [University of Southern California](#)
- affiliation > ... > [California Institute of Technology](#)
- affiliation > ... > San Diego > [University of California](#)
- affiliation > ... > [University of California](#)
- affiliation > ... > [University of California](#)

☒ all items ☐ in current results

search

These terms define your current search. Click the to remove a term.

keyword "California"

Refine your search within these categories:

GENDER [\(group results\)](#)

[female](#) (1) [male](#) (64)

COUNTRY [\(group results\)](#)

[Canada](#) (1) [Norway](#) (1)
[Egypt](#) (1) [United Kingdom](#) (2)
[Federal Republic of Germany](#) (1) [United States of America](#) (60)

AFFILIATION [\(group results\)](#)

[Federal Republic of Germany](#) (1) [United States of America](#) (65)

PRIZE [\(group results\)](#)

[chemistry](#) (20) [peace](#) (1)
[economics](#) (8) [physics](#) (25)
[medicine](#) (12)

YEAR [\(group results\)](#)

[1920s](#) (1) [1970s](#) (3)
[1930s](#) (3) [1980s](#) (11)
[1940s](#) (1) [1990s](#) (15)

Items 1 to 40 of 65 results

Sort by: usual name, [year of birth](#), [year of death](#), [country](#)

1 41



[A. Michael Spence](#)
[1943-](#)



[Ahmed Zewail](#)
[1946-](#)



[Alan Heeger](#)
[1936-](#)



[Arthur Kornberg](#)
[1918-](#)



[Arthur L. Schawlow](#)
[1921-1999](#)



[Burton Richter](#)
[1931-](#)



[Carl D. Anderson](#)
[1905-1991](#)



[Clive W.J. Granger](#)
[1934-](#)

So let's select a category -- economics

"California" appears in these category names:

- affiliation > [California](#)
- affiliation > ... > Berkeley > [University of California](#)
- affiliation > ... > Irvine > [University of California](#)
- affiliation > ... > La Jolla > [University of California](#)
- affiliation > ... > [University of California](#)

- affiliation > ... > [University of Southern California](#)
- affiliation > ... > [California Institute of Technology](#)
- affiliation > ... > San Diego > [University of California](#)
- affiliation > ... > [University of California](#)
- affiliation > ... > [University of California](#)

☒ all items ☐ in current results

Refine your search within these categories:

GENDER [\(group results\)](#)

[female](#) (1) [male](#) (64)

COUNTRY [\(group results\)](#)

[Canada](#) (1) [Norway](#) (1)
[Egypt](#) (1) [United Kingdom](#) (2)
[Federal Republic of Germany](#) (1) [United States of America](#) (60)

AFFILIATION [\(group results\)](#)

[Federal Republic of Germany](#) (1) [United States of America](#) (65)

PRIZE [\(group results\)](#)

[chemistry](#) (20) [peace](#) (1)
[economics](#) (6) [physics](#) (25)
[medicine](#) (12)

YEAR [\(group results\)](#)

[1920s](#) (1) [1970s](#) (3)
[1930s](#) (3) [1980s](#) (11)
[1940s](#) (1) [1990s](#) (15)

These terms define your current search. Click the to remove a term.

keyword "California"

Items 1 to 40 of 65 results

Sort by: usual name, [year of birth](#), [year of death](#), [country](#)

1 41



[A. Michael Spence](#)
[1943-](#)



[Ahmed Zewail](#)
[1946-](#)



[Alan Heeger](#)
[1936-](#)



[Arthur Kornberg](#)
[1918-](#)



[Arthur L. Schawlow](#)
[1921-1999](#)



[Burton Richter](#)
[1931-](#)



[Carl D. Anderson](#)
[1905-1991](#)



[Clive W.J. Granger](#)
[1934-](#)

Cool! Economists from UC Berkeley!

Nobel Prize Winners

1901 to 2004

Save Search

History and Settings

Return to Search

New Search

Logout

☒ all items ☐ in current results

search

Refine your search within these categories:

GENDER [\(group results\)](#)

[male](#) (8)

COUNTRY [\(group results\)](#)

[Norway](#) (1)

[United Kingdom](#) (1)

[United States of](#)

[America](#) (6)

AFFILIATION [\(group results\)](#)

[United States of America](#) (8)

PRIZE: [all](#) > [economics](#)

YEAR [\(group results\)](#)


[1980s](#) (1)

[1990s](#) (2)

[2000s](#) (5)

Recently Viewed Items

[Go to Item History](#)

These terms define your current search. Click the  to remove a term.

keyword "California" 

PRIZE: [economics](#) 

8 results

Group by: [prize](#)

Sort by: usual name, [year of birth](#), [year of death](#), [country](#)



[A. Michael Spence](#)
[1943-](#)



[Clive W.J. Granger](#)
[1934-](#)



[Daniel L. McFadden](#)
[1937-](#)



[Finn E. Kydland](#)
[1943-](#)



[George A. Akerlof](#)
[1940-](#)



[Gerard Debreu](#)
[1921-2004](#)



[John C. Harsanyi](#)
[1920-2000](#)



[William F. Sharpe](#)
[1934-](#)

FACETED METADATA ALLOWS FOR FLEXIBLE NAVIGATION

- Faceted categories can be taxonomic
- They can also be based on properties of the items being organized
- They can also be based on cross-cutting themes

Mixing and Matching with Facets

If you have cleanly separated facets, you can mix and match in really powerful ways, to allow many kinds of navigation

clothing

equipment

season

sport

age

gender

size

color

price

material

Mixing and Matching with Facets

This boot can be assigned to **clothing**, **season**, **sport**, **age**, **gender**, **size**, **color**, **price**, and **material**, and shown under any combination of these.

clothing
equipment
season
sport



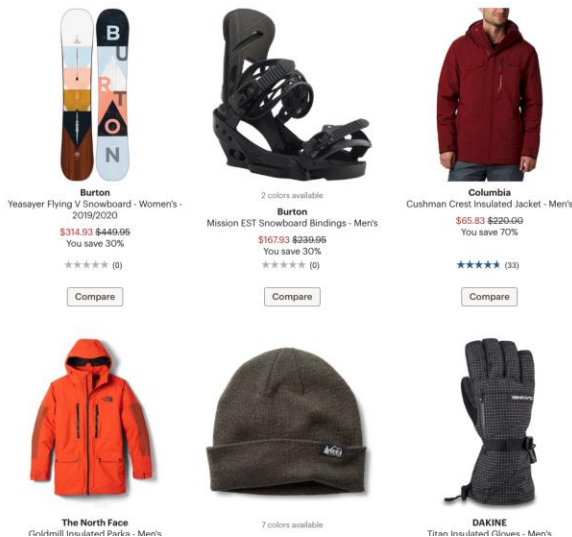
age
gender

size color price material

Mixing and Matching with Facets

These items can appear after filtering by **sport > snowboarding**

clothing
equipment
season
sport



age
gender

size color price material

Mixing and Matching with Facets

Filtering by **equipment > snowboards** narrows these results to contain only snowboards

clothing
equipment
season
sport



Lucky Bums
nowplay Snowboard - 120 cm



Lib Tech
T. Rice Pro Snowboard - 2021/2022



Lib Tech
T. Rice Orca Snowboard - 2021/2022

age
gender

size color price material

Mixing and Matching with Facets

Filtering by **age** can then narrow the results to show only kids' snowboards

clothing
equipment
season
sport



age

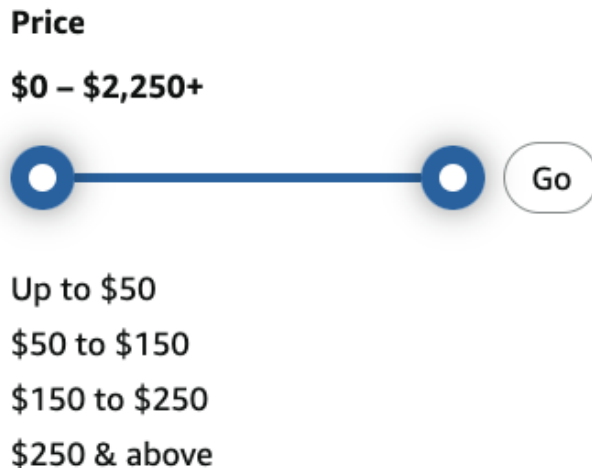
gender

size color price material

Quantitative facets

For quantitative facets like price, a range of numbers is often better than selecting individual values

clothing
equipment
season
sport



age
gender

size color price material

HOW TO DEFINE THE FACETS?

- Depends on the makeup of the collection
- Depends on the goals of the use
- Then ask the classic questions:
 - *Who, what, when, where, why, how much, under what circumstances?*

ADVANTAGES OF FACETED METADATA

- Seamless to add new facets and subcategories
- Seamless to add new items.
- Helps with “categorization wars”
 - *Don't have to agree exactly where to place something*
- Can be implemented using a relational database.
- May be easier for automatic categorization

ADVANTAGES OF FACETED NAVIGATION

- Helps user infer what is in the collection;
- Evokes a feeling of “browsing the shelves”
- Let's the user decide how to start, what order to apply categories
- Seamlessly integrates keyword search with the organizational structure
- Easy to build complex queries without encountering empty results
- After refinement, categories that are no longer relevant to the results disappear.

DRAWBACKS OF FACETED NAVIGATION

- Need good metadata
- There are **many** ways to design the interface poorly
 - *Not showing results, just categories*
 - *Not showing item count previews*
 - *Not integrating search*
 - *Not allowing flexible breadcrumb manipulation*
 - *Poor layout, poor font use*

HOW DID YOU ORGANIZE THE ART IMAGES?



The Magpie, 1869
Claude Monet
Giclee Print
18" x 12", Multiple Sizes
From \$32



Monet: Sailboat
Claude Monet
Giclee Print
16" x 12", Multiple Sizes
From \$32



Dog and Squirrel
Robert Rauschenberg
Giclee Print
12" x 16", Multiple Sizes
From \$32



Pooping on People
Lucia Jefferman
Art Print
16" x 16", Multiple Sizes
From \$20



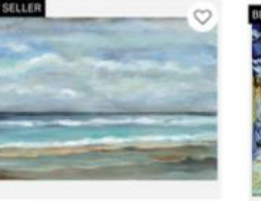
Garden in Bloom Arles, c.1888
Vincent van Gogh
Giclee Print
12" x 16", Multiple Sizes
From \$32



Colorful Coastal House 6
Willow Studio
Art Print
9" x 12", Multiple Sizes
From \$20



Great Blue Heron
John James Audubon
Giclee Print
12" x 16", Multiple Sizes
From \$32



Seashore
Sibelius Vasaliev
Art Print
18" x 12", Multiple Sizes
From \$20

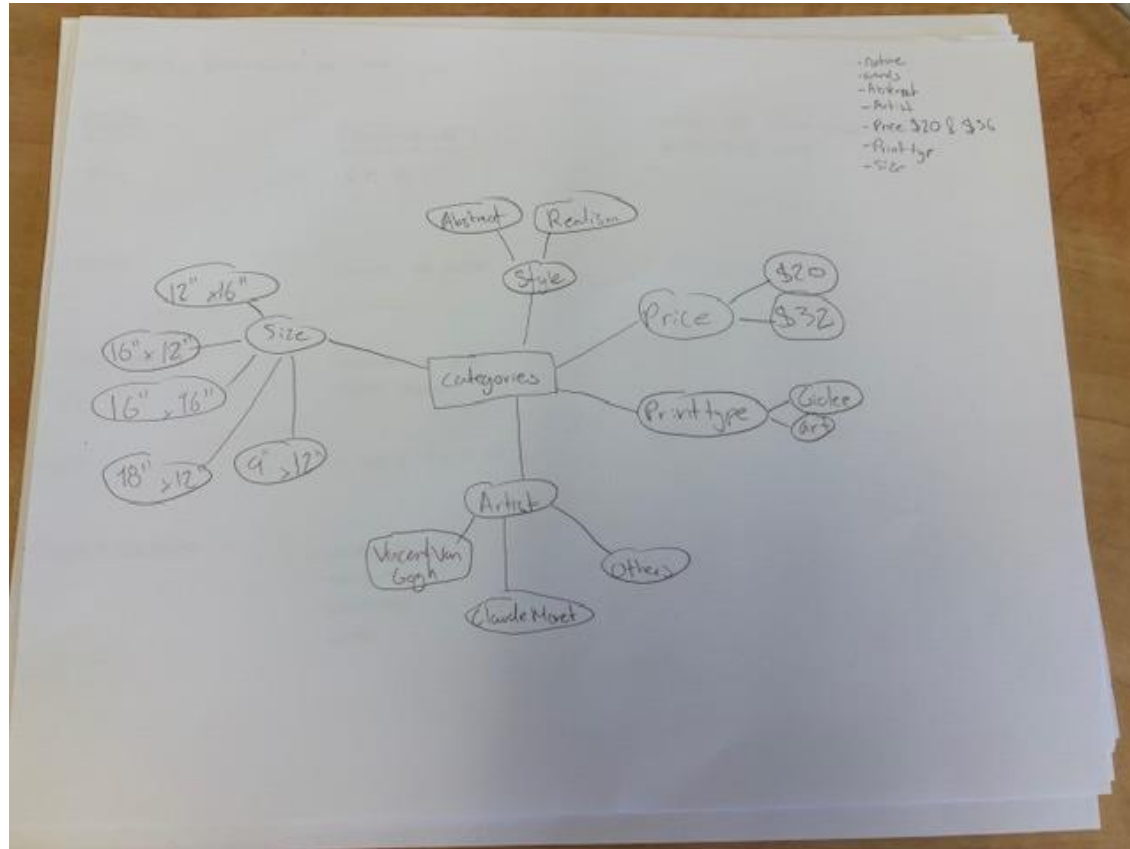


Mulberry Tree, c.1889
Vincent van Gogh
Giclee Print
16" x 12", Multiple Sizes
From \$32

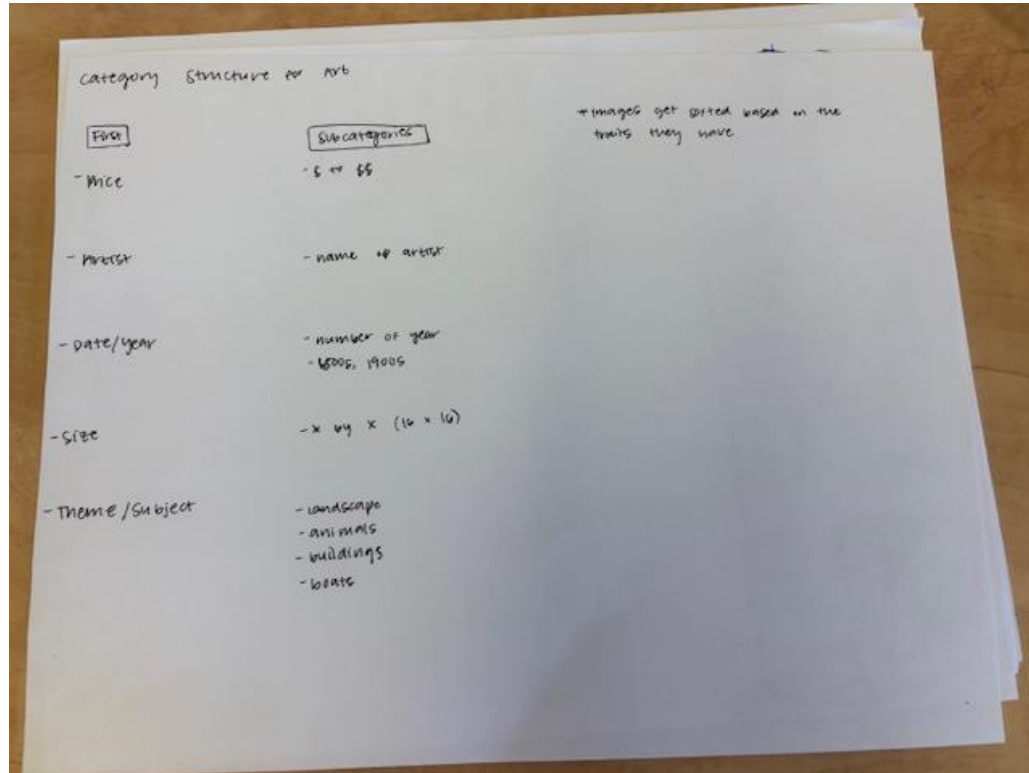
CHALLENGES

- Navigate by the subjects / content of the images
 - *Can you find images with both birds and trees?*
 - *Can you find images with red birds?*
 - *Can you find images with trees in a seascape?*
- Need to support metadata-type attributes in all combinations
 - *Price*
 - *Artist (this needs to be in a hierarchy, or an alphabetical list)*
 - *Print type*
 - *Size*

Hierarchical Facets Focused on Metadata (does not have subject of painting)



Flat Facets with an underspecified subject category

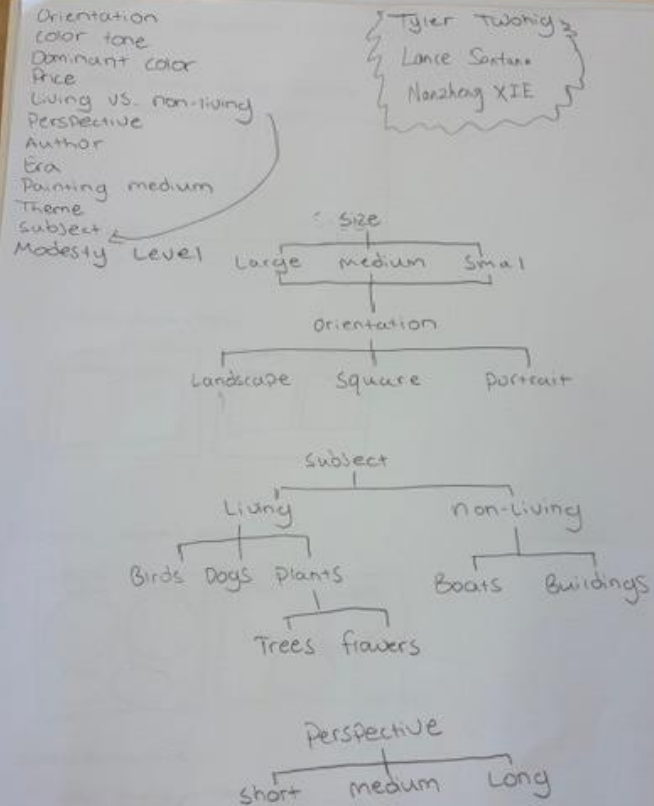


Hierarchical structure on top
Interlinked structure beneath
No subject category

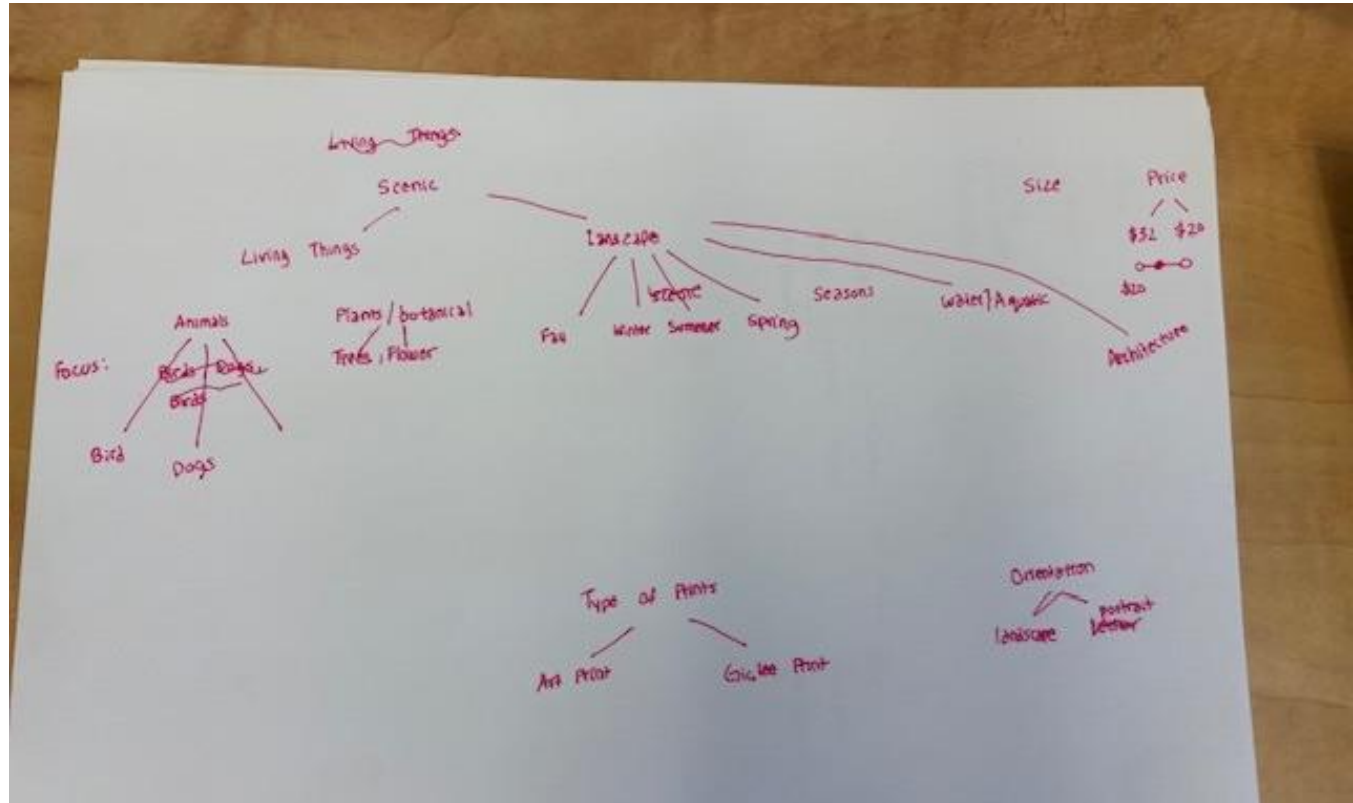


artwork att. / print

Hierarchical Taxonomy
for subject
Hierarchical Taxonomy
for perspective
Size and orientation
combined into a
hierarchy
(so orientation has to
be repeated 3 times,
under large, medium
and small)



Attempted to cover subject matter
However, concepts are mixed; living things are under
scenic, but what about non-scenic bird pictures?



Art Categories

- Artist (by name of Artist)
 - seascapes
 - cityscapes
 - natural landscapes
- Landscapes
- Animals
- Art Styles
 - Realism
 - abstract
 - etc...
- Price
 - High to low
 - Low to High
- Size
 - 16" x 12"
 - 18" x 12"
 - 12" x 16"
 - Etc...

by Artist
→ Van Gogh
→ Claude Monet
...

Landscapes
→ Seascapes
→ Cityscapes
→ Natural landscapes
...

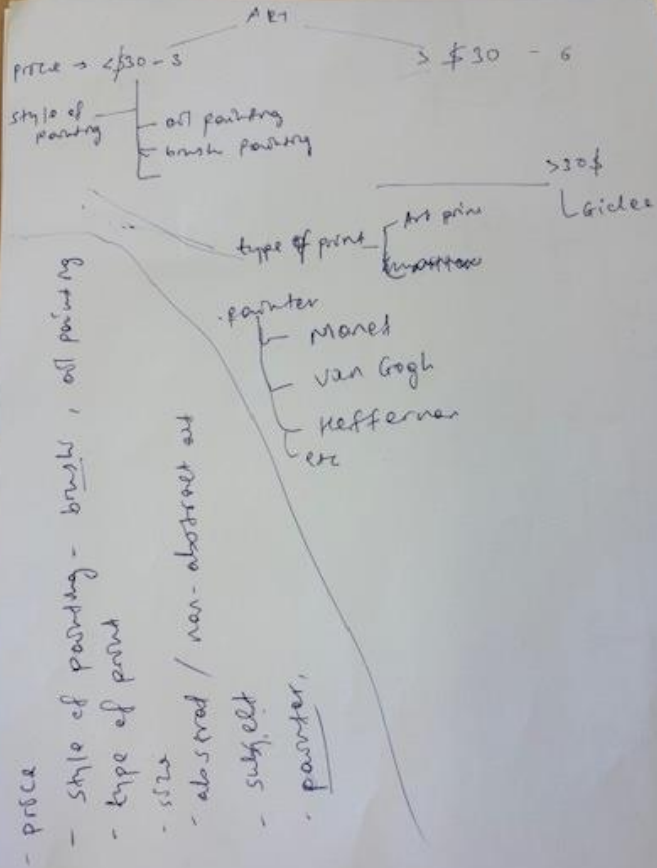
Art Styles
→ Realism
→ Abstract
...

Price
→ Sort by
High to low
→ Sort by
Low to high
→ Items on
Sale

Size
→ 16" x 12"
→ 18" x 12"
→ 12" x 16"
→ etc.

Very clean
hierarchical faceted
organization

Still missing some
subjects like trees
and metadata like
print type



A mixture of organizations with some facets and some mixed hierarchy

THESE CHALLENGES CAN BE MET WITH WELL-DESIGNED HIERARCHICAL FACETED METADATA

- The key is to be able to mix from many different hierarchically-organized attributes
- Say I want to see seascapes with pine trees in them that are romantic style, in acrylic, cost less than \$100, silver print, and with blue and red colors in them
- Well-designed hierarchical facets can allow me
 - *Media > Paint > Acrylic*
 - *Style > Romantic*
 - *Subject > Nature > Trees > Pine Trees*
 - *Subject > Nature > Sea/Ocean*
 - *Color > Red*
 - *Color > Blue*
 - *Price > 50 - 100*

Subject matter is often the hardest part because it is huge!

HOMEWORK EXERCISE

- Three different questions
- Question 3 shows some images and asks you to first make a hierarchical taxonomy and then make a faceted category system

NEXT WEEK

- Information Architecture and Categories
- Ontologies
- Overlapping categories / clusters