

Winnowing Tools

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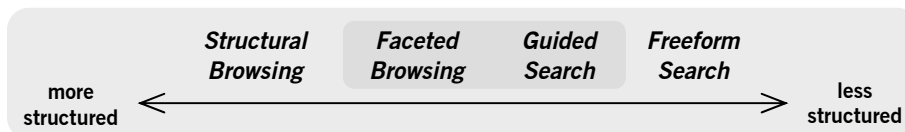
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The navigation spectrum

Users can navigate a site in several different ways, depending on how structured the process of getting down to content is. Here are the four most common modes of navigation, ordered from most to least structured:



The navigation spectrum

Structural browsing is basically what you do when you click structural links to move around the site. This kind of interaction is highly structured, because you're moving along predefined paths established by the topology used for organization. Freeform search—often just an empty search box and a submit button—sits at the opposite end of the navigation spectrum as the least structured way to navigate: an empty text box does not offer users much guidance.

While structural browsing requires little knowledge about the things you're seeking, freeform search relies exclusively on your knowledge about them. The other two modes of navigation—faceted browsing and guided search—allow you to draw on more of your knowledge about the items, while not having to actually come up with the exact terms to describe them. This is what makes these tools so powerful and flexible.

So how do you decide which of the four navigation tools to use? While your site's audience and goals will certainly affect your decision, the degree of homogeneity of the items to be navigated plays an important part too. Heterogeneous items lend themselves best to structural—usually hierarchical—browsing. Faceted browsing and guided search are best suited for homogeneous item sets. Freeform search works well for both.

Winnowing

Jakob Nielsen and his team at Nielsen/Norman Group used the term winnowing in their "E-Commerce User Experience" report to refer to "any method of interaction that lets the user refine a set of products, reducing the number of items in the set according to criteria chosen by the user."¹ The two most popular types of winnowing tools—faceted browsing and guided search—are discussed next.

¹ Jakob Nielsen et al., "E-Commerce User Experience" (Nielsen Norman Group, 2001), p. 137.

Faceted Browsing

In its most general form faceted browsing allows users to filter a collection of homogeneous items by applying several restrictive criteria in succession to arrive at a subset of items meeting all of the criteria. The steps for creating a framework for faceted browsing are:

- choose a set of aspects that is shared by all of the items in the collection. These are your facets. For example, if you are organizing dress shirts, the facets may be fabric material, fabric color, sleeve length, and collar type.
- identify a set of attributes for each of the facets. These are called facet values and are based on the metadata describing the items. To continue with the dress shirt example, the values for the **fabric material** may be *100% cotton, 60% cotton / 40% polyester*; **fabric color**: *blue, green, yellow*; **sleeve length**: *long, short*; **collar type**: *button-down, straight, spread, tab*.
- present each facet along with its set of facet values, linking the values and sorting both in a meaningful way. In most cases facets are sorted according to their importance to the users or alphabetically. Facet values may be sorted by the number of items in the collection that share the value, from large to small, or, again, alphabetically.
- optional: show the complete collection of items below or to the side of the facets on the initial screen. This is optional because a complete collection is rarely small enough to be useful. It is better to let the users specify at least one facet value before showing the results.

Once the user clicks on a facet value a result set comprised of all of the items that share the facet value is shown along with the name of the chosen facet and the remaining facets/facet values. From here, the user can continue narrowing down the collection by clicking on more facet values, back up by removing a facet value constraint, or view an item from the result set. Let's now look at a simple example to see how this works.

Example 1: Epicurious.com

MAIN INGREDIENT Beans, Beef, Berries, Cheese, Chocolate, Citrus, Dairy, Eggs, Fish, Fruits, Garlic, Ginger, Grains, Greens, Herbs, Lamb, Mushrooms, Mustard, Nuts, Olives, Onions, Pasta, Peppers, Pork, Potatoes, Poultry, Rice, Shellfish, Tomatoes, Vegetables	PREPARATION METHOD Advance, Bake, Broil, Fry, Grill, Marinade, Microwave, No Cook, Poach, Quick, Roast, Sauté, Slow Cook, Steam, Stir Fry
CUISINE African, American, Asian, Caribbean, Eastern European, French, Greek, Indian, Italian, Jewish, Mediterranean, Mexican, Middle Eastern, Scandinavian, Spanish	SEASON/OCCASION Christmas, Easter, Fall, Fourth of July, Hanukkah, New Year's, Picnics, Spring, Summer, Superbowl, Thanksgiving, Valentine's Day Winter
SPECIAL CONSIDERATIONS Kid-Friendly, Low Fat, Meatless	COURSE/DISH Appetizers, Bread, Breakfast, Brunch, Condiments, Cookies, Desserts, Hors d'Oeuvres, Main Dish, Salads, Sandwiches, Sauces, Side Dish, Snacks, Soup, Vegetables

Epicurious.com's recipe browsing tool greets you with six groups of facet values. Any one of the dozens of facet values can be the starting point for narrowing down the list of 15,000+ recipes.

Browse > Beef

Refine by : [Course / Meal](#) | [Preparation](#) | [Cuisine](#) | [Season / Occasion](#)

Appetizers (37)	Brunch (6)	Hors d'Oeuvres (21)	Sandwiches (33)	Side (6)
Bread (1)	Condiments (2)	Main Dish (664)	Sauce (6)	Soup (31)
Breakfast (5)	Dessert (2)	Salad (27)		

1 - 15 of 762 | [Next >](#)

[ALBONDIGAS SOUP](#)
Bon Appétit

[ANNABEL'S BABY BACK RIBS](#)
Simply Delicious® by Sheila Lukins PARADE®

[ANTOINETTE'S GULYAS](#)
Matt Cabot, Sugar and Spice
Gourmet March 1997

[ARGENTINE BEEF, PORK, AND HOMINY STEW](#)
Gourmet April 2000

[AROMATIC RICE-NOODLE AND BEEF SOUP](#)
Gourmet September 1999

ADVERTISEMENT

Choosing “Beef” from the main ingredient list yields the first set of results: 762 recipes. From here, you can either (a) choose another facet to narrow the list down further (notice that you can specify a value for any of the remaining five facets *in any order* by clicking on the facet name and then its value); (b) search within these 762 recipes; (c) choose a recipe to view from the results list; or (d) back up to the initial screen. Note that each facet value includes in parentheses the number of recipes you will see if you click it. Note also the breadcrumb trail starting to build across the very top of the page.

Browse > Beef > Appetizers > Grill

1 - 4 of 4

[BEEF SATES WITH HOISIN DIPPING SAUCE](#)
Gourmet August 1998

[BEEF SATES WITH SOUTHEAST ASIAN SAUCE](#)
Gourmet June 1996

[CHICKEN, SHRIMP AND BEEF SATES WITH PEANUT SAUCE](#)
Bon Appétit August 1992

[STEAK TAQUITOS](#)
Bon Appétit September 1995

1 - 4 of 4

ADVERTISEMENT

Choosing “Appetizer” for the Course/Meal facet value and then “Grill” as the Preparation facet's value yields this page. Even though there are three other facets that can be specified in theory, there are no more facets shared by the recipes associated with the chosen combination of facet values (beef, appetizers, and grill). Therefore, there's nothing to list under the remaining three facets. From here you can search within these results again, view a recipe, or use the location breadcrumbs to remove one or more of the constraints. For example, to remove “Grill” you would click “Appetizers.” You can also click “Beef” to remove both “Grill” and “Appetizers.”

Epicurious.com's implementation is kept relatively simple because:

- **Each facet is flat.** That is, the facet values are organized as a simple list rather than a hierarchy. This means that once you've chosen a facet value, you're done with that facet; no further refinement for that facet takes place. Unfortunately, this also means that facets that are in fact hierarchical are “flattened” to conform to this standard (i.e. “Spring” and “Easter”). In addition, both coarsely and finely grained facet values are listed together in a single list. For example a coarsely grained “Main Dish” is right next to somewhat more finely grained “Vegetables.”
- **The facet value constraints can only be removed in the direction opposite to the one in which they were applied.** While this makes the location breadcrumbs behave like path (or history) breadcrumbs, this approach is not quite as flexible as the one we'll look at next.

The next example is more complex in that some facets are hierarchical and the facet values can be removed in any order. In addition, there are also facets whose values are actually ranges of values.

Example 2: beachhouse.com

The initial advanced search screen at beachhouse.com

Advanced Search

Text Search Within These Results

2842 items

Showing 1 to 10 of 2842 items | [Next](#)

Sort by
[Sleeps](#) ▾
[Bathrooms](#) ▾
[Bedrooms](#) ▾
[Weekly rate](#) ▾

Refine your search by clicking on the links below. For example you can find all houses in Florida that sleep more than 10 and cost more than \$2000/week and less than \$4000/week.

☐ **Country**

[AUSTRALIA](#) 4
[BELIZE](#) 8
[CANADA](#) 12
[CARIBBEAN ISLANDS](#) 932
[COSTA RICA](#) 20
[FRANCE](#) 8
[GREECE](#) 5
[INDONESIA](#) 1
[IRELAND](#) 2
[ITALY](#) 6
[MEXICO](#) 30
[NEW ZEALAND](#) 41
[SOUTH AFRICA](#) 18
[SPAIN](#) 6
[UNITED STATES](#) 1749


☐ **Weekly rate**

[Under \\$1000](#) 188
[Under \\$2000](#) 766
[Under \\$4000](#) 1656
[Under \\$5000](#) 1932
[Under \\$7500](#) 2301
[Over \\$1000](#) 2516
[Over \\$2000](#) 1938
[Over \\$4000](#) 1048
[Over \\$5000](#) 772
[Over \\$7500](#) 403
[Monthly/Other](#) 138

☐ **Sleeps**


[Under 4](#) 119
[Under 6](#) 445
[Under 10](#) 1854
[Over 4](#) 2723
[Over 6](#) 2397
[Over 10](#) 988
[Over 15](#) 222

1. Destin Florida

 [4th Of July Availability!](#)
\$4,800 per week
5 Bedrooms 2.5 Baths
Sleeps 12 ([Details...](#))


UNITED STATES

2. Kailua - Kona Hawaii - Big Island

 [Lako House](#)
\$4,830 per week
4 Bedrooms 5.0 Baths
Sleeps 22 ([Details...](#))


UNITED STATES

3. Los Encantos Ambergris Caye

 [Villa Del Sol](#)
See details for rates.
2 Bedrooms 3.0 Baths
Sleeps 8 ([Details...](#))


BELIZE

4. Playa Azul Guanacaste

 [The Sanctuary Resort At Playa Azul](#)
\$2,000 per week
3 Bedrooms 2.0 Baths
Sleeps 6 ([Details...](#))

COSTA RICA

5. Hilton Head Island South Carolina

 [Kozy Rental](#)
\$2,500 per week
4 Bedrooms 3.0 Baths
Sleeps 8 ([Details...](#))

UNITED STATES

The “weekly rate” and “sleeps” facets are ranges. However, instead of presenting them as a typical static range (i.e. Under \$1000, \$1000 - \$2000, \$2000 - \$4000, etc.) this implementation makes it easy for the user to create a custom range from the options provided. This makes the tool more flexible. For example, you can create a range like \$4000 - \$7500, or \$1000 - \$4000 - something you couldn't do with predefined ranges. I am not sure how practically useful this is—I can't imagine many people being *that* flexible in their price range—but it is creative and makes the tool more flexible.

FacetMap, yet another implementation of faceted browsing, lets the user specify a custom range by typing numbers into the “from” and “to” fields:

Browse Price

[Bargains under \\$20 \(237\)](#), [Top shelf \(over \\$100\) \(11\)](#)

Set your own Price: from

to

Beachhouse.com's system is based on Siderean Software's Seamark™ (www.siderean.com). The major differences between Epicurious' and beachhouse.com's initial screens are:

- The entire unrestricted collection of items is presented. While most of the items will be irrelevant to the user at this point, this can be beachhouse.com's way of simply showing a sample selection of houses to whet the user's appetite. Maybe Epicurious should have done that with its recipes...
- A sorting tool is provided for the house listings based on the four range facets.

- The number of items sharing each facet value is given at this point rather than only after the initial facet value is specified. This makes the facet values consistent in presentation across the entire application.
- The facet values are left aligned in a column, making them easier to scan.
- Facet value lists are collapsible: irrelevant facets can stay out of the way.

Clicking on “UNITED STATES” reveals a new facet—State—indicating that the Country facet is hierarchical. The most rigid definition of a hierarchical facet would require that its title doesn’t change. In this case using something like “Location” would work for states, provinces, and territories. However, only user testing can determine which approach is best.

1749 items matching
☒ Country is UNITED STATES


Refine your search by clicking on the links below. For example you can find all houses in Florida that sleep more than 10 and cost more than \$2000/week and less than \$4000/week.

☐ **State**
[Alabama](#) 5
[Alaska](#) 1
[California](#) 240
[Florida](#) 157
[Georgia](#) 3
[Hawaii - Big Island](#) 39
[Hawaii - Kauai](#) 15
[Hawaii - Maui](#) 3
[Hawaii - Molokai](#) 18
[Hawaii - Oahu](#) 55
[Maine](#) 3
[Massachusetts](#) 409
[New Jersey](#) 13
[New York](#) 8
[North Carolina](#) 476
[Oregon](#) 52
[South Carolina](#) 215

Showing 1 to 10 of 1749 items | [Next](#)


Sort by
[Sleeps](#) ▾
[Bathrooms](#) ▾
[Bedrooms](#) ▾
[Weekly rate](#) ▾

1. Destin Florida


[4th Of July Availability!](#)
\$4,800 per week
5 Bedrooms 2.5 Baths
Sleeps 12 ([Details...](#))


UNITED STATES

2. Kailua - Kona Hawaii - Big Island


[Lako House](#)
\$4,830 per week
4 Bedrooms 5.0 Baths
Sleeps 22 ([Details...](#))

UNITED STATES

3. Hilton Head Island South Carolina


[Kozy Rental](#)
\$2,500 per week
4 Bedrooms 3.0 Baths

Drilling down to “Hawaii – Kauai” yields:

15 items matching
☒ Country is UNITED STATES
☒ State is Hawaii - Kauai

Refine your search by clicking on the links below. For example you can find all houses in Florida that sleep more than 10 and cost more than \$2000/week and less than \$4000/week.


☐ **City**
[Kekaha](#) 3
[Mokihana](#) 1
[Poipu](#) 2
[Wailua Bay](#) 9

☐ **Weekly rate**
[Under \\$1000](#) 11
[Under \\$2000](#) 13
[Under \\$4000](#) 14
[Under \\$5000](#) 14
[Under \\$7500](#) 14
[Over \\$1000](#) 3
[Over \\$2000](#) 1
[Monthly/Other](#) 1

Showing 1 to 10 of 15 items | [Next](#)


Sort by
[Sleeps](#) ▾
[Bathrooms](#) ▾
[Bedrooms](#) ▾
[Weekly rate](#) ▾

1. Poipu Hawaii - Kauai


[Honu Kai Villas](#)
See details for rates.
2 Bedrooms 2.5 Baths
Sleeps 4 ([Details...](#))


UNITED STATES

2. Wailua Bay Hawaii - Kauai


[Wailua Bay View #203](#)
\$770 per week
1 Bedrooms 1.0 Baths
Sleeps 4 ([Details...](#))

UNITED STATES

3. Wailua Bay Hawaii - Kauai


[Wailua Bay View #115](#)

Clicking on “Under \$2000” and then on “Under \$1000” yields:

It would be nice if the system recognized the fact that the “Weekly rate is Under \$2000” constraint is unnecessary here, because the “Weekly rate us Under \$1000” constrains the result set more.

11 items matching

- ☒ Country is UNITED STATES
- ☒ State is Hawaii - Kauai
- ☒ Weekly rate is Under \$2000
- ☒ Weekly rate is Under \$1000

Refine your search by clicking on the links below. For example you can find all houses in Florida that sleep more than 10 and cost more than \$2000/week and less than \$4000/week.

☐ City
[Kekaha](#) 2
[Wailua Bay](#) 9

☐ Sleeps

☐ Bedrooms

Showing 1 to 10 of 11 items | [Next](#)

Sort by
[Sleeps](#) ▾
[Bathrooms](#) ▾
[Bedrooms](#) ▾
[Weekly rate](#) ▾

1. Wailua Bay Hawaii - Kauai
[Wailua Bay View #203](#)
 \$770 per week
 1 Bedrooms 1.0 Baths
 Sleeps 4 ([Details...](#))

UNITED STATES

2. Wailua Bay Hawaii - Kauai
[Wailua Bay View #115](#)
 \$840 per week
 1 Bedrooms 1.0 Baths
 Sleeps 4 ([Details...](#))

UNITED STATES

Now let's remove the “Under \$1000” constraint and add “Kekaha”:

Note that the applied facet values are not arranged as breadcrumbs, as they are at Epicurious. If they were, the breadcrumb chain would necessarily wrap. If you really wanted to arrange facet values as breadcrumbs you could remove the facet name, leaving just the value. On the other hand, listing both the facet name and the value adds clarity. In addition, arranging the “applied” facet constraints vertically works just as well as “breadcrumbing” them across the page.

3 items matching

- ☒ Country is UNITED STATES
- ☒ State is Hawaii - Kauai
- ☒ Weekly rate is Under \$2000
- ☒ City is Kekaha

Refine your search by clicking on the links below. For example you can find all houses in Florida that sleep more than 10 and cost more than \$2000/week and less than \$4000/week.

☐ Weekly rate
[Under \\$1000](#) 2
[Over \\$1000](#) 1

☐ Bathrooms

☐ Bedrooms

Showing 1 to 3 of 3 items

Sort by
[Sleeps](#) ▾
[Bathrooms](#) ▾
[Bedrooms](#) ▾
[Weekly rate](#) ▾

1. Kekaha Hawaii - Kauai
[Kekaha La #1](#)
 \$700 per week
 1 Bedrooms 1.0 Baths
 Sleeps 4 ([Details...](#))

UNITED STATES

2. Kekaha Hawaii - Kauai
[Hale Aloha-honeymoon Cottage](#)
 \$750 per week
 2 Bedrooms 1.0 Baths
 Sleeps 4 ([Details...](#))

UNITED STATES

One of the things that makes beachhouse.com's system more flexible is the fact that constraints can be removed in any order. However, when several levels of hierarchical facets have been specified—in this case its “United States” > “Hawaii – Kauai” > “Kekaha”—what happens when you remove “Hawaii – Kauai”? Does only “Hawaii – Kauai” get removed, or does the city (Kekaha) go too? You would assume that both would be removed since that would interpret your intention correctly: you don't want to “be” in Hawaii anymore at all. In fact, only “Hawaii – Kauai” was removed, while the city remained, and the results pane was still showing houses in Kekaha. While this is not a major flaw, the city should have been removed automatically when the state was removed.

Now that you've seen two different faceted browsing systems in action let me use these examples to summarize what makes these systems easier to use.

The features of good faceted browsing systems

Basic principles:

- › Make sure that facet values for each facet are mutually exclusive, just like at a level in a hierarchy. If this is not possible, consider using a hierarchical facet or dropping the facet altogether;
- › Let the user specify facet constraints in any order;
- › Include the number of results sharing the facet value next to each remaining facet value and do not show facet values that have no items associated with them;
- › Do not “flatten” hierarchical facets into a single list as this puts “parents” and “children” together. This creates ambiguity;
- › Make sure there is no ambiguity in applying the facet value to the actual items. For example, if you are organizing furniture you may have the construction material as a facet. But where do you put a piece of furniture that is made up of both veneer and solid wood? Under veneer? Solid wood? Both? Neither? See the problem? Do not use ambiguous facets.

Performance enhancers:

- › Let users remove facets in any order. Make sure that the facet values that “live” hierarchically under the one being removed are automatically dropped;
- › When several ranges for a single facet are applied, the system should automatically remove the non-constraining ranges;
- › Allow the user to create custom ranges if this will likely be useful to them. Both form fields (FacetMap) and links (Siderean) will work fine. Be sure to indicate the allowable minima/maxima if you use form fields;
- › Allow the results to be sorted by any facet that has not yet been specified, except for range facets which should always be available as sorting criteria;
- › For hierarchical facets try to pick a facet name that will not change as facet values at deeper levels in the facet’s hierarchy are applied;
- › Keep the facet value granularity consistent within each facet value set.

Minicase: Nordstrom.com women’s boot shop (continued)

What do recipes, beach houses, and boots have in common? They are all homogeneous items that lend themselves wonderfully to faceted browsing.

A faceted browsing system would indeed eliminate the rampant cross-listing that plagues nordstrom.com's boot shop.

Let's see what kind of facets and facet values the latest version of the boot shop will yield.

Boot shop for women "home" at Nordstrom.com (May 2003)



There are already three facets here that we can use without much alteration:

- **Boot height.** Even though the three facet values (*Ankle*, *Mid-Calf*, *Knee-High*) can be a little ambiguous if a boot's height is just below the knee, for example, the majority of boots fall into one of these height categories.
- **Price.** Use the ranges as they are. Letting the users to specify their own range is optional, and probably isn't useful enough here to warrant the added complexity.
- **Brand.** See the one with the dropdown at the bottom of the picture? That's right, brand is also a facet.

The first five categories under the "Shop By Feature" heading can be used as facet values for the following two facets:

- **Heel height** with the existing *High-Heel* and *Low-Heel* categories for facet values. You can also omit the word "*-Heel*" from the facet value labels.
- **Closure type** with *Zip-Up*, *Pull-On*, and *Lace-Up* facet values. Even though pull-on is really the absence of closure, the other two values in this list clarify the unlikely confusion.

As for the remaining categories:

- Do not use "Outdoor," "Young and Hip," "Everyday Comfort" and "Go to Work"—they're much too ambiguous. What exactly do they mean?
- Do not use "Waterproof." You could, however, include it as a checkbox in a filter that appears once the result set is displayed.

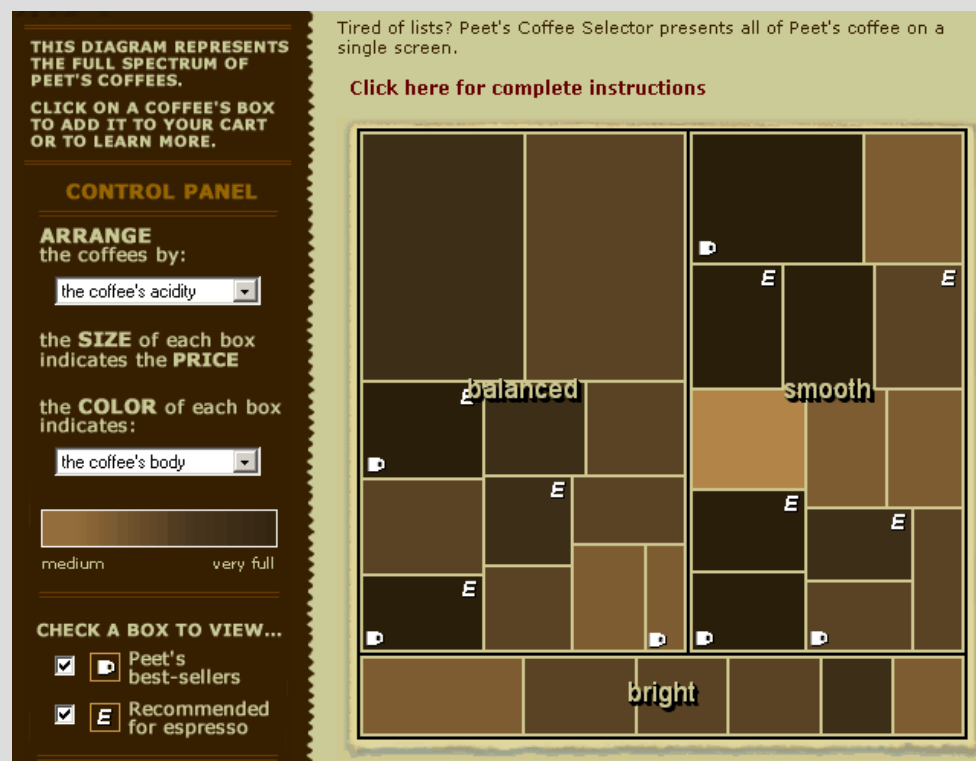
Treemaps: using faceted metadata to visualize hierarchies and data

Treemaps were developed by Ben Shneiderman at the University of Maryland around 1990 to visualize the tree structure of hard drive folders used by his HCI lab students. Dr. Shneiderman wanted to find any large files that could be deleted to free up space. To do this, he came up with a two-dimensional space-filling map where files were represented by small rectangles. These small rectangles were nested within larger rectangles that represented folders. The larger rectangles were nested in yet larger rectangles representing folders at a higher level in the hierarchy, and so on until the entire hierarchy was visualized. The neatest thing about this map was the fact that the rectangle size on the map was proportional to the size of the object it represented. This way Ben was able to see at a glance what the largest files were and identify the “space-hogging” students who “owned” the largest folders.

The main advantage of a treemap over the traditional, tree-like visualization approach is that it does not just show what's part of what, but also visually represents the relative *size* of the items in the hierarchy. This means that, if all of the items share an attribute, you can visualize facet values. Peet's coffee selector uses a treemap to visualize Peet's entire coffee selection, diagramming up to three sets of facet values for their coffees at a time. The diagram in the screenshot below visualizes two of the facet value sets while groping the coffees by the third facet:

- the size of each rectangle is proportional to the coffee's price;
- the shading color indicates the coffee's relative “body” (an excellent example of using color as a quantifier);
- all of the coffees are grouped by their acidity level (balanced, smooth, and bright).

In addition, each bestseller or espresso coffee can be marked, further increasing the chart's information density.



Of course all of this information can be overwhelming; especially the nature of hierarchical relationships among the groups of items. To this end, however, Dr. Shneiderman points out that while “[i]t does take some learning for novices to grasp the tree structure layout in treemaps, [...] the benefits are great.” I agree.

Guided search

Like faceted browsing, guided search (a.k.a. limited vocabulary search) tools require that the criteria used to winnow the collection must be shared among all the items in the collection. In other words only facets are allowed. However, the *mechanics* of applying facet values are what sets faceted browsing and guided search apart. Namely, a guided search tool:

- **may allow a user to enter freeform facet values** instead of selecting them from a list.²
- **may, and usually does, allow the user to apply *more than one* facet constraint** before showing/updating the result set.
- **may allow the user to specify more than one *facet value* at a time for *each facet*.** For example, Epicurious will let you choose both “Rice” and “Lamb” as “Main Ingredient,” and then indicate whether to search for items that match both or either (see illustration on the next page).

This also allows ambiguous facets to be used successfully. Remember the solid wood and veneer furniture example from faceted browsing a few pages back? You can let users specify both “solid wood” and “veneer” to search for items that are made of either one or both.

While these three characteristics make guided search faster and more flexible than faceted browsing, they also make it easy for users make the set of winnowing criteria too constricted and end up with no results. Fortunately, there are things you can do to minimize and even prevent this. Here are a few tips for *minimizing* the chance that an empty result set is produced:

- › **Reduce the number of facets.** This one’s obvious: the fewer constraints are placed on the collection, the smaller the chance that no results will be returned.
- › **Do not allow users to enter their own facet values.** In fact, letting users enter their own facet values without some kind of synonym support is an invitation for empty result sets. Do not do it unless:
 - users are very familiar with the attributes of the items they’re looking for;
 - the number of attributes is so high that listing them becomes impractical. For example, Photonica—a company that licenses and sells stock images—simply lets users type image keywords³ into a text field:

² While it is true that some faceted browsing systems allow users to specify range values, this represents a mixing in the usage of these two winnowing tools rather than an overlapping of standards.

³ In this case “keyword” is the facet and all the keywords are facet values. Imagine a page with 10,000 checkboxes—one for every possible value of the keyword facet!

Image search at photonica.com.

Because the Keywords facet has thousands of values, letting users enter their own values is not likely to yield an empty result set.

In fact, because there are thousands of keywords, the chance of getting no matches is small, even when several keywords are specified.

- › Let users specify more than one facet value for each facet to make the facet constraint less restrictive. Here's an example of this from Epicurious:

A piece of the advanced recipe search at epicurious.com

Of course, in this case it makes logical sense to do so: the main ingredient is an ambiguous facet, because a dish can have more than one of the ingredients in this list. Note that the “May include any selection” radio is selected by default.

Your target audience will in part dictate how restrictive you make your guided search tool. Obviously, the more advanced the users, the fewer restrictions you may impose. If some of your users are total beginners (this applies to most eCommerce sites), consider adding an explanation of how the tool works, making it clear that the more facet constraints are applied, the smaller the result set is; that is selecting *more* options *decreases* the number of items found.

Minimizing overconstriction is not enough? Here are two things you can do to eliminate empty result sets altogether:

- › **Use a multi-step wizard, letting the user specify only one facet per step.**
 However, doing this actually makes the guided search tool less flexible than faceted browsing, because not only is the user limited to specifying one facet per step, he is also forced to go through facets in a predefined order. In some cases you may be able to choose an order that most people are used to. For example, specifying a car's make and then the model. In most cases, however, you are better off using faceted browsing, where the user is free to apply facet constraints in any order.
- › **Show a running total of the matching items after each facet value is applied and dynamically remove the links to “empty” facet values.**
 Historically this has been done by refreshing the page containing the search form every time a criterion is specified. Since it required a trip to the server to update the total, refreshing the page took at least a couple of seconds. This surprised and eventually annoyed users. To overcome this, however, it is possible to download the data about the entire item collection to the user's machine. A browser plug-in running on the user's PC would then use the data to dynamically update the page without having to reload it. This is basically how Peet's coffee selector works: once the coffee data is loaded the system's response is instantaneous.

Search by Feature ▶ Portable Power Tools: Drills, Cordless

60 Drills, Cordless exist in this category.

- To narrow this list, select **only** the features below that are **important** to you.
- In general, the more features you select, the **higher the price** will be.
- To **view all** items without narrowing your search, click [Find Matching Products](#).

▶ Please Select a Brand: (Select all that apply)

<input checked="" type="checkbox"/> No Preference	<input type="checkbox"/> Black & Decker	<input type="checkbox"/> Bosch Tools
<input type="checkbox"/> Chicago Pneumatic	<input type="checkbox"/> Craftsman	<input type="checkbox"/> DeWalt
<input type="checkbox"/> Makita	<input type="checkbox"/> Milwaukee	<input type="checkbox"/> Panasonic

FIND MATCHING PRODUCTS

▶ Select by Type:

- ☒ No Preference
- ☐ 4.8 to 9.6 Volt
- ☐ Combo or Value Kit
- ☐ Hammer Drill or Driver
- ☐ Impact driver
- ☐ Mini Driver
- ☐ One-half in. 12.0 to 14.4 Volt
- ☐ One-half in. 14.5 Volt and Above
- ☐ Right Angle or Close Quarter
- ☐ Three-Eighths in. 9.7 to 11.9 Volt
- ☐ Three-eighths in. 12.0 to 14.4 Volt
- ☐ Three-eighths in. 14.5 Volt and Above

FIND MATCHING PRODUCTS

▶ Select By Price

- ☒ No Preference
- ☐ Input a price range below:

Minimum:
 \$ (The least expensive product in this category is \$19.88)

Maximum:
 \$ (The most expensive product is \$539.99)

FIND MATCHING PRODUCTS

Click [Find Matching Products](#) to view results.

Minicase: “Search by Feature” at Sears

Navigating to most products at sears.com is a combination of structural browsing and guided search. Clicking through a three-level hierarchy gets you to:

- *either* the “Search by Feature” tool for categories with more than 20 items;
- *or* the product list for categories with fewer than 20 items.

I will use the “Search by Feature” tools for drills (see left) and washers (next page) as examples. The things that sears does right are that it:

- indicates the total number of items in the collection;
- allows the users to view the entire collection without narrowing it;
- keeps the number of facets low (at least in the case of the guided search tool for drills);
- allows the user to specify any combination of brands;
- allows the user to specify a custom price range and includes the maximum and minimum values as hints.

Unfortunately, a user test coupled with a usability inspection uncovered a few problems:

- › none of users were sure how each of the “Find Matching Products” buttons related to the items on the page. They didn’t know whether these buttons were identical or belonged to the facet next to it. The users were not sure whether they could specify many criteria at a time or just one. Nevertheless, all users ended up dutifully specifying a value for all or most of the facets and clicking the “Find Matching Products” *link* at the bottom of the page to view the results. That is, they avoided the buttons altogether!
- › the “Find Matching Products” buttons and links did exactly the same thing. While their label suggested this, their appearance certainly did not. Real and perceived affordances clearly did not match here. One user clicked the Find Matching Products link at the top of the page to see all products after a couple of unsuccessful searches, but could not understand at first why she was getting the same results. Only after the second try did she realize she needed to “uncheck” all of the search options.
- › one user had difficulty making the appropriate “Select by type” selection in the drills search. He didn’t understand:
 - why one voltage range didn’t have a chuck size listed with it while the others did;
 - why he could not select several things in the list at once. For example, he wanted a drill with either a $\frac{3}{8}$ " or $\frac{1}{2}$ " chuck and 12 volts or more, but could only select one chuck size with a predefined voltage range. An analogous issue came up with another user on the washers search (right): she wanted to select both “Off-White” and “White” as the color. She didn’t like the prospect of “pogo sticking” between search results and search form for each color she considered, but neither did she want to have to “wade” through all of the colors.

One user could not understand why other features, like the maximum torque, were not listed. To him the torque rating was more important than the voltage.

- › selecting some drill types (impact driver, mini driver) produced no results even if this was the *only* facet constraint that was applied.
- › even though every facet had a “No Preference” option users felt like they had to specify as many attributes as possible. After they all got at least two

Search by Feature ▶ Laundry Care: Conventional Washers

113 Conventional Washers exist in this category.

- To narrow this list, select **only** the features below that are **important** to you.
- In general, the more features you select, the **higher the price** will be.
- To **view all** items without narrowing your search, click [Find Matching Products](#).

Please Select a Brand: (Select all that apply)

☒ No Preference
☐ Frigidaire
☐ GE

☐ Kenmore
☐ Maytag
☐ Whirlpool

Find Matching Products

Select by Color:

☒ No Preference
☐ Almond
☐ Black
☐ Gray
☐ Off-White (Biscuit, Bisque)
☐ White

Find Matching Products

Select by Overall Type:

☒ No Preference
☐ Front loader
☐ Top loader

Find Matching Products

Energy Star Compliant:

☒ No Preference
☐ Yes

Find Matching Products

Select by Overall Capacity Range:

☒ No Preference
☐ 2.0 - 2.49 cu. ft.
☐ 2.5 - 2.99 cu. ft.
☐ 3.0 cu. ft. and over

Find Matching Products

Select by Approximate Width:

☒ No Preference
☐ 22 in.
☐ 24 in.
☐ 25 - 25.9 in.
☐ 27 in.

Find Matching Products

Select By Price

☒ No Preference
☐ Input a price range below:

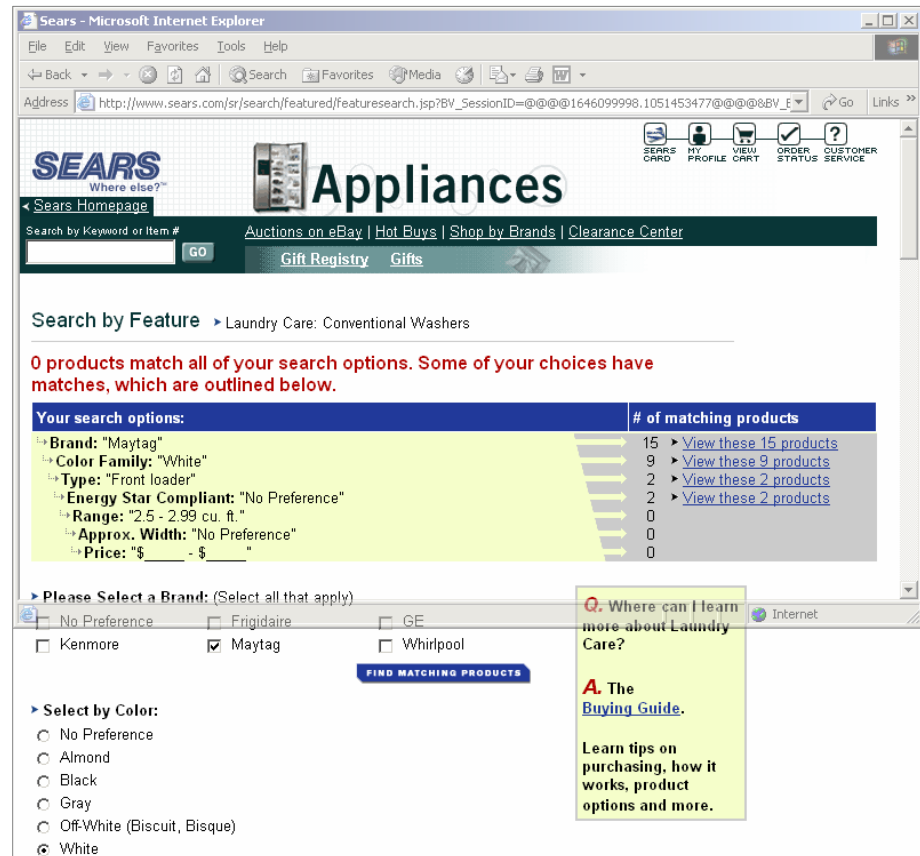
Minimum: \$ (The least expensive product in this category is \$237.49)
Maximum: \$ (The most expensive product is \$1,396.49)

Find Matching Products

Click [Find Matching Products](#) to view results.

no results pages at first, they relaxed the search criteria enough to get some results. This was especially true for the washer search. With so many facets and so few items in the collection over-constraining the search criteria was almost a certainty.

The “Search by Feature” tool’s “no results” page fared a somewhat better than the search form.



Sears.com really made a solid effort to help get users out of no results situations. Instead of displaying a useless “no results, try again” message:

- it clearly indicated that there were no results that matched all of the specified criteria. All users understood this message and the page itself.
- it explained how the different options they chose on the previous screen affected the number of items found. While one user didn’t immediately understand how the number of matching products related to the criteria she specified, this was eventually clear to her with a couple of additional searches. One user wished she could “drop” a search option from the list without having to go back to the search page.
- it let users view products that matched *some* of the constraints they specified, while making it clear that these products didn’t match *all* of the

criteria they specified. That is, the system didn't second-guess the users by automatically showing products they *might* be interested in;

- it also let users repeat/refine their search without having to leave the “no results” page: the search form was repeated just below the no results summary box. Even the users' choices were prepopulated into the form's fields. Ironically, none of the users used the search form on this screen to modify their search options, but clicked the “Back” button to return to the original search form. A reason for this could have been that the “refine search” form fell just below “the fold” for some users. I did, however, observe this behavior even in cases where a portion of the search form (the drill brand checkboxes) was visible.

The features of good guided search tools

In addition to those listed at the beginning of this section, here are a few more things to consider when designing guided search tools:

- › **Place a *prominent* link at the top of the search form to let your customers see all items** without having to specify any search criteria. Keeping the link prominent ensures that the customers who just want to see everything can do so.
- › **Consider eliminating the guided search for product categories with too few items.** For example, Sears did not show the “Search by Feature” wizard at all for categories with fewer than 20 items. Instead, the user was taken directly to the product list.
- › Depending on the nature and number of the items in the collection **do not offer your customers more than five or six facets to specify in their search.** In addition to reducing the chance of empty result sets, limiting the number of facets will also ensure that you choose only the most important ones. Work with your sales/marketing teams to decide which criteria are most important for your customers.
- › **List the least restrictive of the most important criteria first.** Less restrictive criteria will reduce the frequency of empty result sets. And if you choose sears.com's approach for the no results page, listing most important criteria first will make that page more useful to customers, because the first few options will have the most items listed.
- › **Avoid confusing facet values.** None of the users knew what a mini driver was on sears.com. If you can't make any of the values clear (i.e. “Shop by Style” in Nordstrom.com's boot shop), consider not using the facet at all.
- › **Do not combine values belonging to different facets.** Make sure that facet values are atomic; that is, there is one-to-one mapping between the facet

and the value. For example, chuck size and voltage are two different facets, but their values were often paired up to create a single facet value on Sears.

- › **Do not list facet values belonging to different facets under a single facet.** The mishmash of different choices under in the drill's "Select by Type" option at sears.com made this facet so ambiguous that it was hardly a facet at all!
- › **Place a single "submit" button at the bottom of the page** to avoid the kind of multiple-button confusion you saw at sears.com.
- › Of course, the guidelines from faceted browsing—**keeping facet value granularity consistent and not flattening hierarchical facets**—apply here as well.

On the search results and no results pages:

- › **Clearly state the facets and facet values used in the search.**
- › **On the no results page: make it clear how the application of each facet constraint affected the number of matches.** Sears.com's approach worked fairly well: all users understood that the more constraints they applied, the smaller the result set became.

Performance enhancers:

- › **Let the users choose several facet values at once for each facet.** At sears.com one user wanted to select "white" and "off-white" as washer colors. When asked why, she said it would have been useful to be able to select more than one color, because "it didn't matter if its completely white or close enough."

Doing this would not only decrease the chance of no results but also let the customers create custom ranges. Remember how the faceted browsing tool at beachhouse.com let the user create custom price ranges by letting them specify the upper and lower limit separately? Sears.com could do the same with washer widths and capacities. Admittedly, using predefined values to let users specify ranges is not quite as flexible as the two text field approach. On the other hand, it has the advantage of not asking the user to think too hard about generating their own values, and leaves less room for error.

- › **Let users remove facet constraints individually from the no results page.** This will make it easier for users to "toss out" the constraints that are less important to them "on the spot" without having to use the search form.

Epilogue.

“Films are not released; they escape,” said Ben Burtt, the Editor-Sound Designer for “Star Wars: Attack of the Clones,” in his interview for the “Attack of the Clones” DVD. This book was very much like that: even though there are many other things I wanted to include and tweak the copy every time I read it, I also wanted *you* to read the book. This meant that at some point I had to stop writing and let the book “escape” into your hands. I tried not to repeat a lot of what others have already said, so I hope you learned something new and useful.

Don’t forget to visit my site—www.paulgokin.com—for an occasional free article and usability reports. And if you have a web site and want to make it more usable, I provide a slew of usability services to help you do just that.