Author of Article or Chapter   _____

Title of Article or Chapter   _____

Title of Journal or Book   _____

Publisher   _____

Place of Publication   _____

Date of Publication   _____

Course   _____

Instructor   _____

Behind the Scenes

Here are the steps I take when I design a puzzle, using Process of Elimination as an example.

1. Choose a topic. The first NewMedia puzzle, created by editor Ben Calica, was a multiple choice trivia quiz about the multimedia industry. The first NeXTWORLD puzzle, created by editors Dan Ruby and Dan Lavin, was a crossword puzzle that contained many words from NeXT culture. In both cases the editors started with a standard puzzle format, then adapted it to a particular a topic. Crossword puzzles and jigsaw puzzles, by far the most popular types of puzzles, are created this way.

My approach is different: I start with a topic, then find a suitable form. Teachers create exercises for students this way. Of course school exercises can be boring; my challenge is to make puzzles that both teach and entertain.

When I began Process of Elimination, I had just heard about the CD-ROM Making It Macintosh (now published as the *Electronic Guide to Macintosh Human Interface Design*). I learned that the visual design had been done by Lauralee Alben and Jim Faris of Alben & Faris, an established graphic design firm that had recently entered the field of user interface design.

When I visited Alben & Faris I put on my journalist hat, looking for an interesting story angle. The two designers showed me pages of preliminary icons they had sketched for the program MacInTax. I was struck by the quantity and variety of their sketches. So I decided to create a puzzle about the process of icon design.

2. Identify a key skill. Once I had chosen the topic of icon design, my next step was to isolate a particular mental skill that I wanted readers to exercise. Process of Elimination focuses on the skill of critiquing alternative designs. A Matter of Interpretation, which also concerns icon design, focuses on the skill of considering alternate interpretations, while An Eye for an Icon focuses on the skill of making pictures look good at a low resolution

My puzzles focus on skills, like how to critique an icon, rather than facts, like the pixel width of a Windows icon, for four reasons: fact-based puzzles require knowledge that many readers do not have, facts in a fast moving field like computers go out of date quickly, terminology varies from computer to computer, and skills have wider application than facts.

3. Break it into simple pieces. When readers do puzzles they do not just read about a topic, they participate. To make participation easy, a puzzle designer must keep the mechanics simple. The trick is to retain the essential experience while eliminating irrelevant details. For instance, toys like wooden blocks retain the experience of building three-dimensional structures while eliminating the need for manual dexterity.

For Process of Elimination I simplified icon design by giving readers predefined icon sketches and evaluations, eliminating the need for drawing or writing skills. Even though the choices are limited, the puzzle retains the essential experience of looking at icons with a critical eye and weighing alternatives.

4. Choose a form. Process of Elimination takes the form of a matching game: each icon matches exactly one evaluation, and there are the same number of icons as evaluations. Alternatively, I could have chosen a multiple choice format with several possible evaluations for each icon.

I prefer the matching format because it has a natural drama missing in the multiple choice format. Every time the reader makes a match, the pool of potential matches shrinks. If the reader makes a wrong match at some point, then later in the game the reader will get stuck with matches that don't make sense and will know to back up. In contrast, multiple choice tests give the reader no feedback as to whether the answers are right. Finally, there is a pleasing sense of closure when all matches are complete.

The matching format lets me address many different issues at once, from purely graphic criticisms to considerations of meaning. I used a similar format for the puzzle You Call the Shots, which covers an equally wide range of issues. In contrast, the puzzle Look on the Bright Side, which uses a ranking format, looks at only one issue: the brightness of an image.

Puzzles that use a matching form are easy to grade—an important consideration for a contest that cansometimes receives thousands of entries. I always include at least one worked-out example, so readers are sure they are writing answers in the correct form.

5. Compose the Puzzle. Once I had figured out the general architecture of Process of Elimination, I had to fill in the details. First I decided which icons to use. Then I wrote the evaluations, making sure that there was only one possible right answer. Finally I put the evaluations in a random order.

Different types of puzzles pose different compositional problems. To compose You Call the Shots I studied the movie *It's a Wonderful Life* in detail to find a single sequence that included many types of shots. To compose mathematical puzzles like Once a Pong a Time or Go Non-Linear I exhaustively checked out all possibilities to see if there were alternate solutions. For Lost in HyperText I first composed the solution, then added extra paths while being careful not to introduce alternate solutions. I wrote computer programs to help me compose Format Maze and Get with the Program. I commissioned Larry Kay to write the story for A Likely Story.
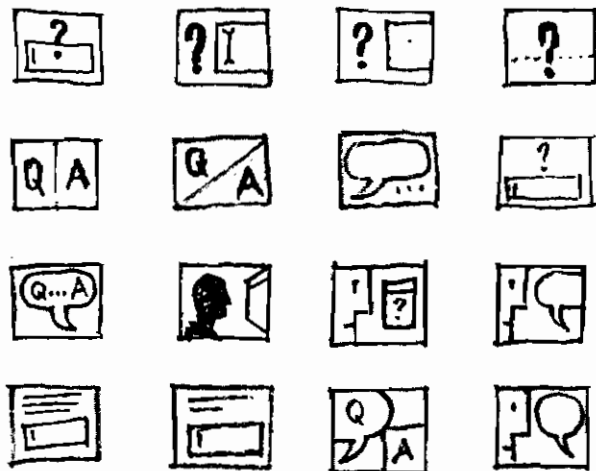
6. Test It and Tune A good puzzle should be hard enough to be challenging, but not so hard that it is discouraging.

The only way to tell for sure how well a puzzle works is to test it on other people. A puzzle that seems easy to me often turns out to be too hard for other people.

In the first draft of Process of Elimination, the twenty evaluations were divided into five sets of four evaluations each. Each of the first four icons went with one from the first four evaluations, each of the second set of four icons went with one from the second set of four evaluations, and so on. Since the reader only had to match four icons at a time, this version turned out to be too easy.

To make the puzzle harder I merged all the evaluations into a single list, so that any of icon might go with any of the twenty evaluations. I also had to rewrite a couple of the evaluations to fit the new form.
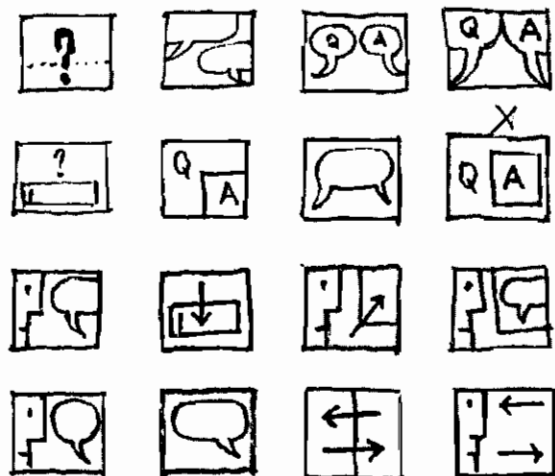
Alben & Faris

7. Add Finishing Touches. The final step is to dress up the puzzle with an interesting presentation. First I chose the title Process of Elimination. Then my editor Gillian Newson added the quotation and put it in Greek letters just for fun. Finally graphic artist Marcos Vergara added the gray screens behind the icons to add visual interest and make the groupings clearer. If I had been designing a computer game instead of a paper game, I would have also added animation and sound.

I often have the final presentation in mind when I begin a puzzle. When I saw Alben & Faris's sketches I imagined how intriguing a page full of icon sketches would look. Once I had chosen the actual icons, Jim Faris redrew the sketches so they would go together better.

Puzzle makers often wrap their puzzles in fictional settings that motivate the peculiar circumstances of the puzzle. I added brief fictional settings to Who's in Front? and The Scarlet Letter, but usually I find that the real-life story provides plenty of motivation.

The purpose of a skill-based puzzle like Process of Elimination is to let you experience a particular style of thinking. The answer gives you a goal to work toward, and a way of checking your progress, but is not an end in itself. The important thing is what happens to your mind in the process. I want you to leave Process of Elimination seeing the world a bit differently from when you began. Perhaps you will find yourself looking at an icon one day and wonder how it might have been designed differently.

Process of Elimination

Ιχον: Φρομ τηε Γρεεκ εικον, αν ιμαγε ορ συμβολ τηατ ρεπρεσεντσ α σπεχιφιχ χομμανδ

Like dressing for a special occasion or choosing a name for a baby, designing a good icon is a search for perfection. A graphic interface designer may reject dozens of alternatives before finding one that satisfies all the design criteria. Shown at right are sketches by interface designers Alben & Faris that led to five icons for Chipsoft's tax preparation program MacInTax. In each row there are four sketches, three that were eliminated and one that led to the final solution.

Each icon illustrates a different design challenge: "Electronic Filing" shows how changing the position of elements can change its meaning; "Open Forms" icons draw on computer conventions; "Interview" shows ways an icon can be misinterpreted; "Tax Summary" represents different degrees of abstraction; and "Filing Cabinet" shows how even the simplest icon can have many different graphic variations.

To the right of the icon sketches is a list of evaluations. Can you match each icon with its evaluation? Each evaluation is used just once. Sometimes an icon may have more than one plausible evaluation; pick the one that seems most relevant and write your answers in the blanks. Answers on page 111.
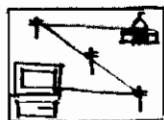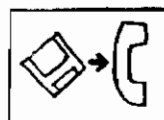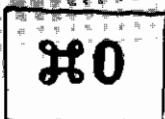
ICONS

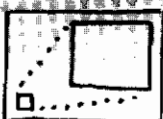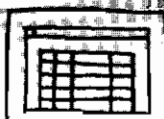**Electronic Filing**

1. _____

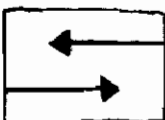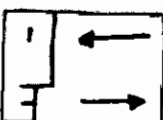2. _____

3. _____

4. _____

Open Forms

5. _____

6. _____

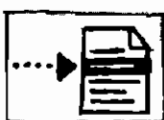
7. _____

8. _____

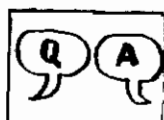**Interview**

9. _____

10. _____
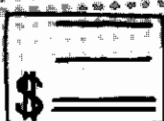

11. _____

12. _____

Tax Summary

13. _____

14. _____

15. _____

16. _____

Filing Cabinet

17. _____

18. _____

19. _____

20. _____

EVALUATIONS

A. No: Too far.

B. No: Too close.

C. No: A floppy wants to talk on the telephone.

D. No: Lacks a cabinet.

E. No: Something is going two ways, but what?

F. No: Party, shirt or time out?

G. No: Animation of an icon opening into a window.

H. No: The bottom line, literally.

I. No: Does not show that the documents are moving.

J. No: Makes you think of William Tell.

K. No: Is there a scale model of a building on your desk?

L. No: Might not see it's a calculator key.

M. No: Only if you are familiar with keyboard commands.

N. No: An open window, not a list of forms.

O. No: Only if you know the look of the official IRS forms arrow and menu selection.

P. Yes: Two lines means "total" to an accountant.

Q. Yes: Select one of many forms.

R. Yes: Ask a question, get an answer.

S. Yes: Just the right distance.

T. Yes: From the computer, over telephone lines, to the government, far away.

Lost in Hypertext

We read books sequentially from beginning to end. In the new interactive media, we can read non-sequentially, skipping from topic to topic as we choose. Ted Nelson coined the word "hypertext" to refer to any form of non-sequential writing.

It's easy to get lost in hypertext, especially if the links from page to page get complicated. At right is a 16-page hypertext document. From any page you can travel to either of the two pages listed at the bottom of the page. Can you find a way to start on Page 1, visit every page just once, and end on Page 16? Fill in your answers in the blanks.

Hints: From page 1 the next page is 12. Consider which pages you can come from to get to a particular page. You may want to draw a diagram of the connections. Answers on page 115.

Transportation images courtesy of Peoria, Ill.-based Multi-Ad Services Inc. from its ProArt Professional Art Library CD-ROM.

"How many roads must a man walk down before you can call him a man?"
—Bob Dylan

1 START

Go to page **8** or **12**

2

Go to page **8** or **13**

3

Go to page **1** or **16**

4

Go to page **9** or **15**

5

Go to page **11** or **13**

6

Go to page **3** or **9**

7

Go to page **11** or **15**

8

Go to page **5** or **12**

9

Go to page **14** or **15**

10

Go to page **6** or **9**

11

Go to page **4** or **13**

12

Go to page **2** or **16**

13

Go to page **7** or **8**

14

Go to page **6** or **16**

15

Go to page **10** or **11**

16 FINISH

1   12   16