NORM COX

CONFessions of a

DESIGN THERAPIST
The hamburger icon is a classic. Even if you don't know it by that name, its three black bars are as familiar as your mouse's cursor—a constant companion on your cyber journey since the day you got your first computer. But who designed this icon?

The hamburger is one of those UI features that's so old, so ubiquitous, that it seems author-less. But someone designed this little visual nugget, and software designer Geof Alday recently set out to discover who. In a blog post yesterday, he described what he found.

It turns out that the burger comes from the Xerox "Star" personal workstation, one of the earliest graphical user interfaces. Its designer, Norm Cox, was responsible for the entire system's interface—including the icons that would effectively communicate functionality to the earliest computer users. The hamburger, which looks like a list, seemed like a good way to remind users of a menu list. Skip to about 2:40 in the following video to see an explanation:

Inspired, Alday reached out to Cox, who now owns his own UX and UI company, to find out more. Here's how Cox responded:

You've done your homework and found the right guy. I designed that symbol many years ago as a "container" for contextual menu choices. It would be somewhat equivalent to the context menu we use today when clicking over objects with the right mouse button.

Its graphic design was meant to be very "readable" simple, functionally memorable, and mimic the look of the resulting displayed menu list. With so few pixels to work with, it had to be very distinct, yet simple. I think we only had 16x16 pixels to render the image. (Or possibly 12x12... can't remember exactly).

Interestingly inside joke... we used to tell potential users that the image was an "air vent" to keep the window cool. It usually got a chuckle, and made the
Construction Tech
Journalism
Advertising
Computer Programming
Mechanical Engineering
Art
Landscape Architecture
Psychology
Anthropology
Library Sciences
Graphic Design
Philosophy
Typography
ARCHITECTURE
Civil Engineering
Marketing
Visual Communication

CHINESE
Division: Humanities, Social Sciences, and Mathematics

CHIN-101A Elementary Mandarin Chinese I
90.00 hrs lecture, 18.00 hrs lab
Units: 5.00
Admitted For Credit: CSU & UC
This course is an introduction to modern standard Chinese language (Mandarin). Students will acquire listening, speaking, reading, and writing skills in formal and informal Chinese for communicative purposes. The course teaches the Chinese phonetic system, the structures of Chinese characters, the basic Chinese grammatical concepts, and aspects of Chinese culture in relation to the topic of the concurrent lesson. (GR)

CHIN-101B Elementary Mandarin Chinese II
90.00 hrs lecture, 18.00 hrs lab
Units: 5.00
Prerequisite: CHIN-101A or two years of high school Chinese
Accepted For Credit: CSU & UC
This course is a continuation of CHIN-101A. Students will continue to acquire listening, speaking, reading, and writing skills in Mandarin and will continue to cultural studies as an integral part of the course. (GR)

CHIN-102A Intermediate Mandarin Chinese I
90.00 hrs lecture, 18.00 hrs lab
Units: 5.00
Prerequisite: CHIN-101B or two years of high school Chinese
Accepted For Credit: CSU & UC
This course is a continuation of CHIN-101B with emphasis on the four skills of listening, speaking, reading, and writing in Mandarin; as well as the study of Chinese culture with greater depth. (GR)

CHIN-102B Intermediate Mandarin Chinese II
90.00 hrs lecture, 18.00 hrs lab
Units: 5.00
Prerequisite: CHIN-102A
Accepted For Credit: CSU & UC
This course is a continuation of CHIN-102A. Students will continue to acquire listening, speaking, reading, and writing skills in Mandarin, as well as the study of Chinese culture with greater depth. (GR)

COMMUNICATION
Division: Fine Arts, Business, and Communication Studies

COMM-100 Introduction to Communication Theory
54.00 hrs lecture
Units: 3.00
Advisory ENGL-101A
Accepted For Credit: CSU & UC
This course explores the major communication theories and research in the communication studies field. (GR)

COMM-100 Visual Communication
54.00 hrs lecture, 36 hrs lab
Units: 3.00
Cross-Listed Course: MM-100
Accepted For Credit: CSU & UC
This course explores the fundamental elements of visual communication presented through lectures and applied through studio experiences. Explore the methods of visual communication from Gutenberg to Google, analyzing examples in a variety of visual forms, including print, newspaper and magazine graphics, illustrations, photographs, video, motion pictures, and digital media. (GR)
XEROX, c. 1972 - 1982

June 6, 1976

Dear John,

Xerox Memorywriter 8010

Xerox 820 Word Processor
HARDWARE
• Bitmap CRT display
• Detachable keyboard
• 3-button “mouse”
• Ethernet connectivity

SOFTWARE
• First email program (Laurel, Hardy)
• First WYSIWYG text editor (Bravo, Gypsy)
• Vector graphics editor (Sil)
• Raster (paint) editor (Markup)

UI FEATURES
• Cursors
• Windows
• Menus
• Direct manipulation (point, click, drag)
• Portrait (page) screen orientation
XEROX | ALTO, c. 1976
Invent the office of the future...
THE PARC CULTURE
Alto’s bitmapped display (far left)

Doug Englebart’s “mouse” (far left)

Early commercial 3-button mouse (left)

Laser Printing

Ethernet

Smalltalk graphical UI (left)
THE ORIGINAL "DESKTOP" CONCEPT, c. 1976

Taken from Dave Smith’s Stanford doctoral thesis entitled “Pygmalion”.

Dr. David Canfield Smith

FILE
DIRECTORY
DATABASE
RECORD
BUFFER
DRIVE
SERVER
RAM

“user friendly...”
THE “STAR” DESKTOP

- 17” black/white CRT display
- 1024 x 860 resolution
- 72 dpi (perfect typography units)
- “Desktop gray”
- 72 x 72 icon size
- Status and states
Traffic signage
• Shape emphasis
• Simplified imagery

Cartooning | Cave painting
• Minimal line work
• Representational
• Pictograms/ideograms

Mechanical drawing
• Purposeful line weights
• Precision rendering
• Visual hierarchy
THE “STAR’ ICONS

- Traffic sign simplicity
- Shape emphasis
- Consistent style and visual weight
- User friendly | familiar
- Natural language naming
- Representational/concrete images
- Office metaphor context
- Intuitive | understandable | memorable
- User friendly
STAR ICON USABILITY TESTING, c. 1979

- Naming | describing tests
- Timed response (*pick from group*)
- Semantic differential tests
- Personal preference

*Final icon designs refined from test results.*

Hmm... shredder?

Tissue box?

Uhh... Fax machine?

Suggestion box?

Ooh!... It's a toilet paper dispenser?
STAR ICON USABILITY TESTING, c. 1979

Printer!
Size and Positioning Considerations

- Careful positioning of angles assures smooth lines.
- Splitting background pixels creates a cleaner edge.

Icon width of 4n + 1 and positioned against white column eliminates ragged edges.
STAR UNIFORM VISUAL LANGUAGE

- Consistent design elements
- "Soft" appearance
- Non-computer-y
- "User friendly"
THE "HAM BURGER"

XEROX 8010 Star Information System

Star provides integrated text and graphics. A variety of type sizes and styles may be used.

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>$0.29</td>
</tr>
<tr>
<td>Beans</td>
<td>$0.50</td>
</tr>
</tbody>
</table>

This is some text in a text frame.

Form field

Button
This manual describes the Bravo system for creating, reading, and changing text documents on the Alto. It is supposed to be readable by people who do not have previous experience with computers. You should read the first four sections of the Non-Programmers Guide to the Alto before starting to read this manual.

You will find that things are a lot clearer (I hope) if you try to learn by doing. Try out the things described here as you read.
“SCROLL” BAR

We see it from the corner of our eye every time we log on to the simple black bars at the top of a browser that resemble our beloved yet important purpose: it takes users to a secondary menu listing through the halls and meeting rooms. The designers at PARC in those early days of personal computing had a near blank slate to work on. However, a realization that they faced was the simple hardware of

Where did this icon originate? It was designed by Norm Cox of PARC for the Xerox Star workstation in the early 1980s nearly a decade before the birth of the world wide web. That was a whimsical era at PARC, when developers were tasked with building a new way of interacting with computers. Remember, this was a time when most people outside of a lab didn’t know their way around a personal computer. One task for the PARC researchers was to introduce new ways to navigate around machines.

“The challenge was daunting, but the creativity, the free exchange of ideas, and the opportunity to change the world was infectious,” says Cox. “The environment fostered both heated debate and way-cool collaboration and camaraderie. Cutting edge thinking, innovative ideas and Peet’s coffee flowed unabated through the halls and meeting rooms. The designers at PARC in those early days of personal computing had a near blank slate to work on. However, a realization that they faced was the simple hardware of
Xerox Star 8010 Workstation, c. 1981
**XEROX STAR c. 1981**

*Document-centric model*

**APPLE MAC c. 1984**

*Application-centric model*

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**MacPaint**

**MacWrite**

**MacDraw**
METAPHOR COMPUTER SYSTEMS, c. 1983

“Joystick” scroll/pan

OPENLOOK | Sun Microsystems, 1987

GOOGLE WAVE | Google, 2010
IBM CORPORATE DESIGN PROGRAM, c. 1988 - 98

Tom Hardy
Director: IBM Corp.
Design Program

Sam Lucente
Manager, Corporate Design

Richard Sapper
Industrial Design Consultant
Milan, Italy

Paul Rand
Graphic Design Consultant
Yale University

Edward Tufte
Information Design Consultant
Yale University

Norm Cox
Experience Design Consultant
EDWARD TUFTE  
Professor emeritus of Political Science, Statistics and Computer Science, Yale University 
Author, Artist and Pioneer in the field of Data Visualization

for Norm 
with warmest regards 
Edward Tufte  
May 1990
OS/2 Operating System
an.thro.po.morph.ism

n: To attribute human qualities or characteristics to an animal, object or organization.

“Clippy”
Microsoft’s obnoxious and annoying, on-screen “help” agent
Apple Computer

Plaintiff

v.

Microsoft

Hewlett-Packard

Defendants

THE STAKES

- $14B in damages
- Ownership of GUI
- “Bundling” of concepts
- New precedent copyright law
- Value of intellectual property
1980
Flat, simple, minimal
Literal

1990
Isometric | Color
Shiny plastic | Shadows

2000
Jellybeans & Glass
Skeuomorphic | Hyper-realism

2010
Flat, simple, minimal
Mnemonic gestures

- Tap
- Double tap
- Drag
- Flick
- Pinch
- Spread
- Press
- Press and tap
- Press and drag
- Rotate

Mnemonic gestures
Mnemonic gestures
• 12,000 outlets in 90 countries.

• Employs more than 300,000 staff.

• Parent company (YUM Brands) is largest restaurant company in the world.

• Serves more than 1.3 million pizzas daily.

• Offers approx. 500,000+ different combinations of pizza.
H O L I S T I C   D E S I G N

P I Z Z A   H U T ,   c . 2000

“Uhh... We want this!”
WHY?

- Reduce production errors.  
  50% of all pizzas are incorrectly made or out of spec.

- Reduce complexity of instructions.  
  Nobody can figure it out.

- Reduce cost of translation/printing.  
  Expensive to print for 90+ countries

- Reduce employee training time.  
  200+% employee turnover each year. (~600k)

- Improve employee confidence.  
  Complexity of back-of-house materials leads to low confidence in job performance.

- Reduce managers’ stress  
  Store managers were underperforming and stressed.
HOLISTIC DESIGN APPROACH

Consistent visual language

Expanded “natural language” order tickets

Visual job aids redesigned to be simpler, more flexible, and easy to read and understand.

Ergonomic recommendations for “just in time” information and maximum task efficiency.

Proposed redesign of order entry terminals.
Reducing RGM Stress...

Opinionaire: 400 respondents
On-site observations: 12 restaurants

Restaurant General Manager (RGM)

Identifying Stress Factors In Restaurant Operations

Operations Questionnaire and Opinionaire

Facilitated by:
COX & HALL
June, 2001
Compensation Policies for franchisees were actually encouraging “violations” of quality standards in the restaurants.
Training time for pizza production staff (no. of shifts)

Time to achieve proficiency (no. of shifts)

Confidence level of staff (50% improvement)
THE NUMBERS...

Production accuracy

Training time for pizza production staff (no. of shifts)

Time to achieve proficiency (no. of shifts)

Confidence level of staff (50% improvement)

$400M per year savings
THE TOOLS...

Psychology
Interactive systems
Information design
Visual language design
Task analyses
Ethnography
Anthropometrics
Ergonomics
Human Factors
Process analysis
User surveys
Statistical analysis
Contextual inquiry
Graphic design
Usability testing
Anthropology
Instructional design
“If you only have a hammer, you tend to see every problem as a nail.”

Abraham Maslow, American Psychologist, Creator of “Maslow’s Hierarchy of Needs” (1908 - 1970)
Thank you.