Online help

- Available, consistent for all system functions
- Including currently unavailable options
- Situation-sensitive and concrete
- Written in terms of user's task
- Not obscuring relevant items; movable
- Initially short with details on request
- Good ID reduces need for explicit help

Tours, tutorials, manuals

- Tour should be short, hit highlights
- Encourage active learning (e.g., user actions, quizzes), address users directly, give examples
- Manuals are last-resort, comprehensive sources
- Use tech writing specialists where possible

Command interface guidelines

- Use action words, verb first (`move a b`), direct object as first argument
- Use congruent names (advance/retreat, not move/back)
- Allow abbreviations, syntax flexiblity, aliases
- Provide command history (edit, re-enter recent commands)
- Multiple args, wildcards, macros, scripts

Menu interaction overview

- Activities: navigation, selection, activation
- Selection: mouse, keys, key + return, touch
- Types of menus •:
  - Text, graphical •, combination
  - Linear, tabular •
  - Static (e.g., menu bar), pull-down, pop-up
  - Isolated, connected (hierarchical)
  - Pie menus •

Menu item guidelines • •

- Head/title: short, meaningful, centered, upper/lower case, clean design
- Show: selectable items, non-selectable items, already-selected items, submenu availability, how to select (besides mouse)
- Entries: short, meaningful, distinguishable (most significant word first)
- Shortcuts (first letter); external consistency

Menu length, item order guidelines

- Keep short for beginners

- Group according to task

- Put frequent items near top for beginners

- When multiple selection allowed, group frequent combinations

- Separate dangerous items from frequent ones

- As last resort, use alpha, time, numerical order

Menu dynamics guidelines

- Highlight item under cursor
- Show submenus of item under cursor
- Maintain indication of selected items
- Allow leaving without any selection
- Maintain positional constancy (grey out)
- Maintain visibility against all backgrounds •

Menu hierarchy guidelines

- Avoid deep nesting
- Top, bottom level menus can be longer
- Longer menus better when under pressure
- Avoid scrolling
- Construct hierarchy by theme
- As before: show submenus, moderate length, external consistency, shortcuts to deeper items

Graphical menu guidelines

- Make items (icons) recognizable, distinct
- Emphasize global properties (form, color, size) over fine details
  - Abstract icons faster than concrete, text • •
- Give similar icons to similar objects/functions
- Use easily understandable (or learnable) icons
- Textual labels help beginners, infrequent users

Adaptable vs. adaptive menus

- Adaptable: user (or admin) can change (shortcuts, hide/delete/move/duplicate items)

- Adaptive: automatic change (e.g., based on usage frequency) violates constancy

Form design guidelines

- Allow entry in tables or labeled data fields •
- Left-align labels, fields, columns in tables •
- Arrange sequences in columns •
- Use meaningful, unambiguous labels
- Mirror layout of paper source document
- Use adequate white space • •
- Tell user expected form of data; indicate if required
- Allow enough space for expected data

Data entry in forms

- Tab or return should move to next field
- Fill fields with default/most recent/inference
- Allow entry in arbitrary order
- Allow abbreviation/expansion
- Show alternatives if entry not unique •
- Don't supply dangerous values as auto entries
- Detect, indicate, explain errors; allow multiple corrections
- Don't require re-entry of correct data

General screen guidelines

- Reflect structure of task, not of implementation
- Group info for coherent subtask on one screen
- With multiple, related screens
  - Use same headlines
  - Present necessary info on each screen in same place
  - Allow navigation to previous screen, access to help, ability to exit subtask or whole program

Special screen areas

- Title at top, distinguished
- Can use bottom for status info, explanation, warnings
- Logos typically upper left or upper right
- Clocks (no seconds, no ticking)

Screen layout

- Use proximity, alignment, consistency, contrast
- Use adequate whitespace (60%–80%)
- Alternatives to whitespace for grouping:
  - Lines
  - Boxes
 - Colored/shaded backgrounds

Guidelines for windows

- Windows make it easy to distinguish
  - applications
  - info or objects within applications
  - events stacked in time (e.g., errors, dialogs)
- Tiled windows easiest for beginners, but overlapping ones are far more flexible
- Signal which window is on top or active
  - partial occlusion
 - 3D effects (shadow, lighting) or graying out

Typography

- HCI for documents, affects effectiveness
- Display type vs. body type
  - Quick recognition of letters, words, lines
- Great control now in user's hands
  - "With more power comes the power to mess up in new and more spectacular ways." —DGK
- Differences between displays and paper
- Less designer control for text on the WWW

Typography terms
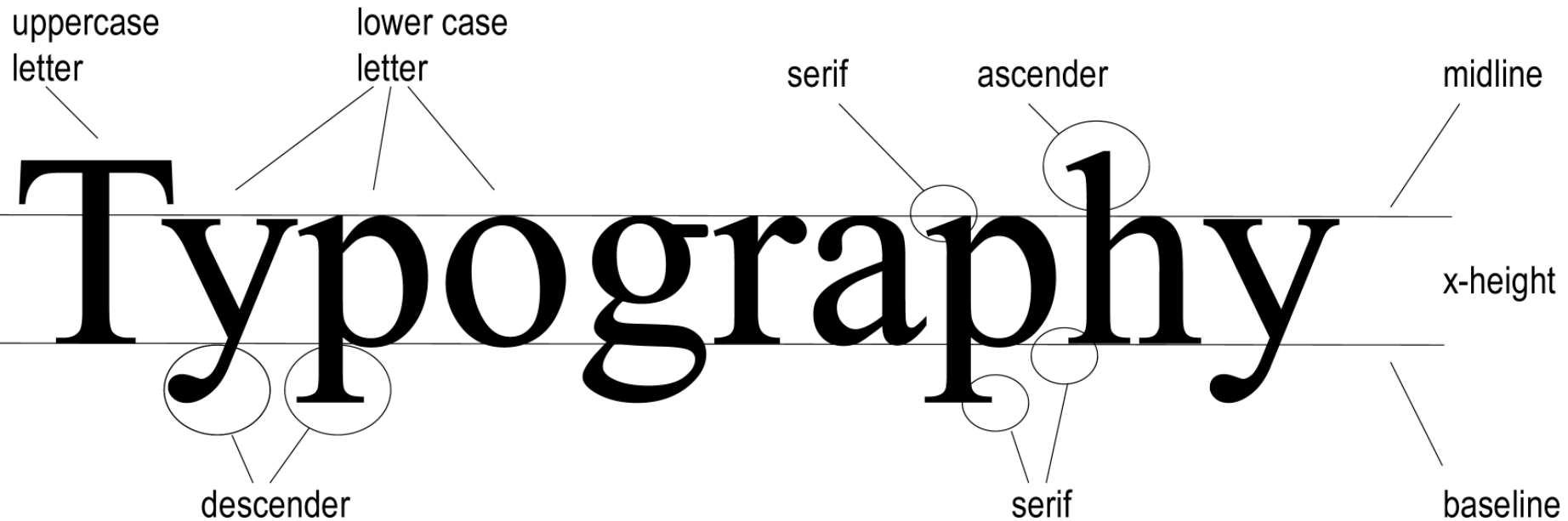
From McCracken and Wolfe,
User-Centered Website Development

Font size: baseline to baseline

Tulip

72 points

the "little bit"

Tulip
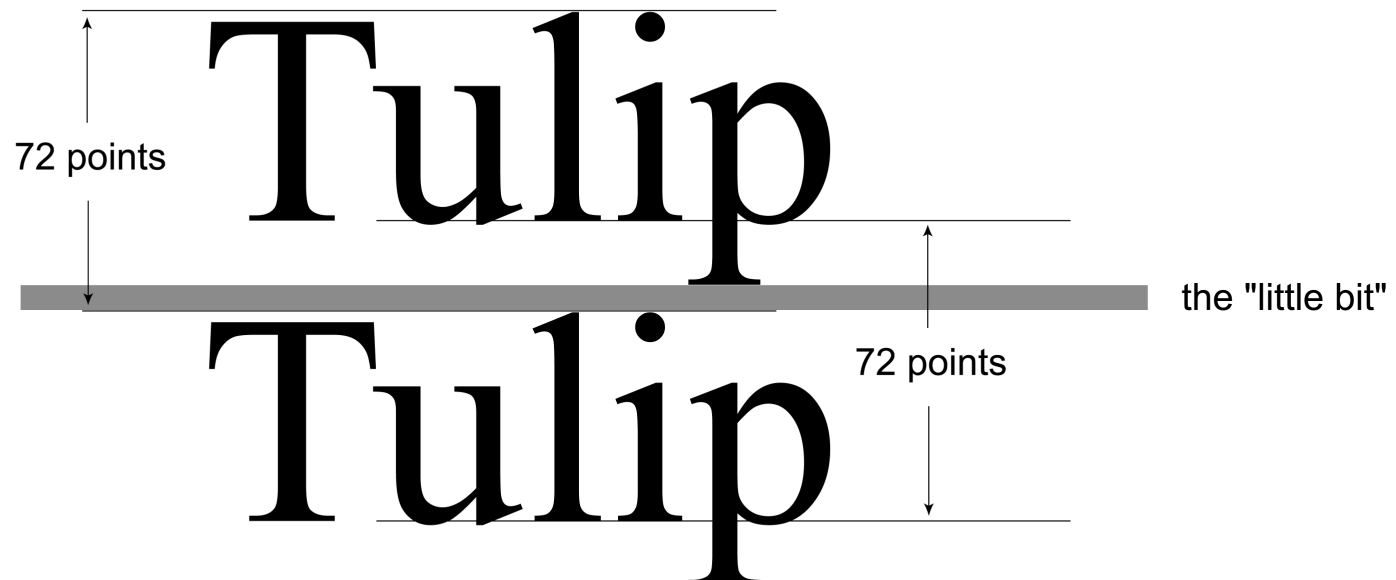
72 points

From McCracken and Wolfe,
User-Centered Website Development

Line spacing (leading) matters

- The point size is also the distance between successive baselines, assuming no space is added between lines as is commonly done. It is clear that without the "little bit," the letters in successive lines would touch, seriously hampering legibility.

From McCracken and Wolfe,
User-Centered Website Development

Serif vs. sans serif

Times New Roman
Georgia
Arial
Verdana

Monospace vs. proportional spacing

```
f("It's")-1; // Courier
f("It's")-1; // Andale
```
f("It's")-1; // Times
f("It's")-1; // Georgia

Typeface guidelines (characters)

- Mix upper and lower case
- Choose proportional spacing over monospace
- Use fonts with varying stroke width
- Choose serif over sans-serif fonts
  - But on the web …

Margin justification

The sun did not shine, it was too wet to play, so we sat in the house all that cold, cold wet day. I sat there with Sally, we sat there, we two, and I said, "How I wish we had something to do." Too wet to go out and too cold to play ball, so we sat in the house. We did nothing at all.

And then something went, "Bump!" How that bump made us jump! We looked and we saw him step in on the mat. We looked and we saw him: The Cat in the Hat. And he said to us, "Why do you sit there like that?"

The sun did not shine, it was too wet to play, so we sat in the house all that cold, cold wet day. I sat there with Sally, we sat there, we two, and I said, "How I wish we had something to do." Too wet to go out and too cold to play ball, so we sat in the house. We did nothing at all.

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Rag-right

Flush right

Typography/text guidelines

- Keep lines short (max chars 35? 50? 70?)
- Don't justify margins
  - Extra white space
  - Justification and monospace fonts
- Consider extra leading
- Minimize number of fonts
- Use emphasis minimally

Color depends on context

- What other colors are nearby •
- Cultural connotations

Recommended uses of color

- Emphasis, grouping (especially as background)
- Coding discrete or continuous data • •
- Distinguishing window types
- Visual separation of overlapping graphics
- Depth in 3D graphics (red closer, blue farther)
- Warnings, status reports
- Increasing attractiveness (within guidelines)

Users with disabilities

- Manual/dexterity; visual; auditory; cognitive
- Various legal requirements to make software and websites accessible:
  - Americans with Disabilities Act (ADA)
  - 1998 amendment to Rehabilitation Act of 1973 (www.section508.gov)
  - Institutional directives (e.g., UCI's Electronic Communications Policy)

Considerations/guidelines (manual)

- Provide access by keyboard and by pointer
- Provide alternative to simultaneous keystrokes
- Provide alternatives to voluminous data entry (defaults, completion, aliases/shortcuts, cycling through until user hits key to stop)
- Provide special devices (head mouse, foot mouse, suction tube, speech recognition)

Considerations/guidelines (visual)

- Allow magnification
- Color-code only large areas
- Avoid frequent color switches
- Color deficiencies ("color blindness"): 8% of European-descended males (0.5% of females) see red/green as medium gray
  - Design for monochrome first; add color for redun-dancy; at least don't just differ by red vs. green
- Special devices, software, design guidelines

Virtual reality

- Three-dimensional objects and environments
- Multi-sensory input (visual, auditory, haptic)
- User feels immersed: user controls scene movement, receives feedback
- Integrated technologies: displays, position sensing for head/hand, force feedback, audio input/output

Virtual reality applications

- Scientific exploration • •

- Architectural exploration •

- Augmented reality

- Training

- Virtual co-presence (meetings, entertainment)

Improving immersion

- Match input from at least two sensors
- Provide high refresh rate
- Minimize response time
- Provide stereoscopic vision
- Provide three-dimensional sound

Information visualization

- Allows understanding of huge amounts of data
- Allows perception of unanticipated properties
- Reveals problems with data itself
- Facilitates understanding of large- and small-scale features of data
- Facilitates hypothesis formation

Ware, *Information Visualization*

Edward Tufte (Yale)

- *The Visual Display of Quantitative Information*
- *Envisioning Information*
- *Visual Explanations*
- *Beautiful Evidence*

Tufte on graphical integrity

- Make physically measured representation proportional to quantity being represented
- Use clear, detailed, thorough labeling
- Show data variation, not design variation
- Deflate and standardize monetary figures
- Dimensions in representation ≤ dimensions in the data
- Don't quote data out of context

Tufte on producing data graphics

- Above all else show the data
- Maximize the data-ink ratio
- Erase non-data-ink
- Erase redundant data-ink
- Revise and edit

Tufte on graphical excellence

- Well-designed presentation of interesting data—substance, statistics, design
- Complex ideas communicated with clarity, precision, efficiency
- Greatest number of ideas in the shortest time with the least ink in the smallest space
- Multiple variables presented
- Data represented truthfully

What would Tufte say
about reducing his principles
to bullet points?