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# 1. Formatting text and graphics

1. Operating systems and interfaces
2. Application software
3. Text formatting
4. Web-page formatting

*Reading: Evans et al,  
Chs. 4, 5; handouts*

## Inquiry

- What are the coolest features of MS Word and PowerPoint?
- What are the main principles that support productivity in text formatting and in spreadsheets?

## Objectives

- 1a. Distinguish operating-system from application software
- 1b. Describe the hierarchical file system concept
- 1c. Recognize and use the basic terminology of text formatting and presentation software
- 1d. Format text in diverse ways
- 1e. Explain and use global control of formatting
- 1f. Use or explain HTML formatting
- 1g. Import and export data

## 1. Operating systems and interfaces

### *Operating systems*

- *Examples:* Windows, UNIX, Mac OS, Linux
- Run all the time
- Provide I/O services to users and apps
- Provide graphical user interface (GUI)
- Provide file-system services (e.g., via Windows Explorer)
- Support multitasking (e.g., multiple apps running at same time)
- Manage memory shared by programs
- Support networked computing

## Operating systems vs. applications

- *Application*: software that a person uses to create or edit a document or other artifact or to retrieve Internet data
- *Examples*: MS Word, WordPerfect, Excel, Power Point, Internet Explorer, Firefox, Google Docs
- OSs offer *services* to apps, such as file management, management of shared memory, and access to output devices

## File management

- The *storage metaphor* for most OSs is a *file system* consisting of *files* and *folders* (*subdirectories*)
- Folders may contain folders or files in a *hierarchy*
- Each file may be short, long, or empty; may be changed in size and content if on hard disk
- File is stored physically in a linked sequence of disk sectors
- A folder may be displayed sorted on any attribute
- Operations on files: *copy, move, delete, rename*

## File names and extensions

- A *file* has a name, name extension, path name, disk location, date stamp, format, and size
- File names may be up to 255 characters in Windows; names cannot use characters \* \ : < > | “ / ?
- Some file names are reserved by OS
- Name extensions (*.doc*, *.ppt*, etc.) refer to associated apps and format
- *.exe* files (Windows) are executable

## File and path names

- Windows file system has file-naming rules, including use of extensions and limits on use of special characters
- *Pathname* of a file is the list of nested folders containing the file, e.g.,  
*c:\rsrch\iit\proposal.doc*
- *Backslash* separates names of folders

## Backup and recovery

### *Professional Guidelines:*

- Prepare for loss of data in case of a crash or an external upgrade by net administrator
- Save data during sessions
- Print important items or save email to directory
- Mirror data on multiple machines using emails
- Backup media: server; CDRW; USB “drive”
- *Principle: Keep all data up to date in at least two physical locations – separate devices*

## Standard graphical user interface

- Windows, menus, dialogs, etc., in Windows or Mac OS apps are similar due to use of *application programming interfaces* (APIs)
- Screen buttons, sliders, check boxes, text entry, menus
- Use feedback, intuitiveness, and metaphors, e.g., picture of file folder to represent disk subdirectory
- *Dialog box*: A window with interactive features, e.g., buttons

## Manipulating screen objects

- Icons represent *objects* in a computer system; e.g., files, folders, devices
- Click selects the object
- Right-click selects and displays a menu of operations and properties
- The operations are those associated with the object's class (category)
- You may see and change the object's data properties by selecting "Properties"

## Saving screen image

If your computer has a problem, you can show the screen image to a technician who might be able to help you. *To save the screen image to a file, on a Windows system:*

1. Press the "Print Screen" or "PrtScr" button at the top right corner of the keyboard, third from right.
2. *Open Start / Program / Accessories / Paint.*
3. *Edit / Paste*
4. *File / SaveAs ; type an appropriate file name.*

## Memory management

- In Windows, the *Clipboard* is a part of memory that is shared among all applications
- Data that is copied or cut is stored in the Clipboard
- *Example of use:* Under Windows, the *PrtScr* key causes a bit map of the screen image to be copied to the clipboard
- *Virtual memory* allows access to more data than will fit in RAM chips, storing on disk *swap file* some RAM data not recently used, a process called *paging*

## Linking and shortcuts

- A *shortcut* (alias) is an icon that is a small file storing only the location of the object it stands for, but that *acts* like the object (file or folder)
- A shortcut *links* to an object, but does not *embed* the data linked-to in the directory where the shortcut is created
- Contrast creating *shortcut* with copying or moving a file or folder
- Shortcuts are a kind of *metadata*

## Ergonomics

- *Definition:* arrangement of devices to minimize physical risks to users
- *Monitor* should be at or below eye level
- *Keyboard* should be level to keep wrists straight
- *Chair* should support lower back
- *Users take breaks* to avoid repeated-stress injuries (RSI)
- *Light* should be adequate

## 2. Application software

- *Document preparation:* E.g., word processing, desktop publishing, web design
- *Spreadsheet:* Decision support with reusable cell-based formulas – VisiCalc (1970s-80s), Lotus 1-2-3, Excel
- *Presentation:* Slide preparation; e.g., PowerPoint
- *Database:* Information management, e.g., Access, Oracle
- Music, video editing, entertainment
- *Business:* horizontal (see above) and vertical market (vertical for specialization, e.g., dental-office management software)

## Example applications

- Office suites (word processing, spreadsheet, presentation): MS Office, Open Office
- Graphics editors (WordDraw, Paint)
- Browsers (Internet Explorer, Firefox, Chrome, Safari)
- *Common principles:*
  - Cross-platform standards
  - Global control of formatting

## Commonly offered features

- Keyboard shortcuts (e.g., *Ctrl-B* = Bold)
- Global control of format (named styles, templates, master slides)
- Tables, lists, named styles, tables of contents
- Creating and exporting graphics
- Nonlinearity of text (hyperlinks)
- Absolute vs. relative referencing
- Linking vs. embedding

## Keyboard notes

- The tab, space, and *Enter* keys generate characters
- Use of tab, repeated *Enter*, or multiple space characters is not recommended for controlling document format
- The caps-lock key causes all letter keypresses to generate capital letters; it *toggles*

## Learning applications

- *Methods*: clicking around, blazing away, watching others
- When stuck, start over
- Focus on *task* to accomplish, not on means
- *Form follows function* — task dictates software behavior, similar apps have similar features, hence reuse your knowledge
- *Debugging*: overcoming erroneous results
- *Source*: L. Snyder

## Troubleshooting

*When you don't know how to get back...*

- *ESC* to end current operation
- *Ctrl-F4* to close application window or document
- *Alt-F4* to close app
- Right-click app icon in status bar (bottom of screen) to close, minimize, restore
- *Ctrl-alt-del* to shut down or restart
- Press power button and hold to shut down; wait 1 minute before restarting

## File and application compatibility

- *Backward* compatible versions of an application read files produced by previous versions (e.g., Word and Excel 2007 read *.doc* and *.xls* files saved in Word and Excel 2003)
- *Forward* compatible apps produces only files readable in previous versions (e.g., MS Office is not forward compatible between 2003 and 2007 versions)
- Distinct apps may be in part *file compatible* (e.g., Word and WordPad can both edit *.rtf* files; Word and Notepad can both edit text files)

### 3. Text formatting

- Document, section, and paragraph formatting
- Named styles
- Tables, tables of contents
- Output
- Import, export
- Page headers and footers
- Creating, importing, exporting graphics

## Text-formatting elements

*Levels:*

- *Document*
- *Section* (with heading)
- *Paragraph*: any text terminated with *Enter*
- *Sentence, line, word*
- *Character*: *Color, size, ...*
  - *Font*: a named design for a set of letters and other characters (e.g., Arial, Times)
  - *Style*: italic, boldface, underline, strikeout, superscript, subscript

## Document, section, and paragraph formatting

- *Multi-column*: Alt-O, C [number]
- *Paragraph*
  - *Indent* (including hanging, first-line)
  - Vertical spacing before or after
  - *Keep together, keep with next*
  - *Bullet or numbering*: Format / Numbering
  - *Alignment*: Left, center, right, justified
- MS Word documents may be divided into multi-paragraph *sections*

## Headers and headings

- *Page headers* appear automatically at the top of each page
- An option is to include automatic page numbering
- Alternative: page footers at bottom of page
- *Section headings* appear above paragraphs or bullets
- Headings have predefined styles:  
*Heading 1, Heading 2, etc.*

## Indents, bullets, numbering

- Efficient paragraph indenting uses the *first-line indenting* paragraph attribute, so that indenting may be adjusted uniformly throughout a document
- *Bulleted text* usually also has *hanging indent* (indent after first line)
- *Numbered text* uses the numbering paragraph attribute

## Named styles

- *Named style*: A standard paragraph format that is reusable because it may be invoked by name
- *Examples*: titles, headings, paragraphs, bulleted text, numbered text
- *Advantage*: Changing the definition of a style causes new definition to be applied to each instance where style is used
- A style may be associated with a function key for easy application
- If “Heading 1” style is used, user may generate an automatic table of contents in MS Word

## Global control of formatting

- Named styles are an instance of the key concept of *global control of formatting*
- This means that the user can change major formatting elements of a whole document in one operation
- Other instances of GCF in MS Word:
  - Page headers and footers
  - Document-wide Page Layout, e.g., for margins
- Named styles, headers and footers are instances of *metadata*, data about data

## Tables of contents, indexes, tables

- To generate table of contents in MS Word, choose *Insert / Reference / Index and tables / Table of contents*
- To insert an index, mark each entry (highlight, ctrl-shift-X, see MS Word Help), then *Insert / Reference / Index and tables / Index*
- A *table* may be inserted (Table / Insert) or created by converting from text

## Screen and printer output

- User controls zoom, window size, use of multiple windows
- *Print view* shows pages as they will appear on printer
- Printing controls
  - Device
  - Page selection
  - Number of copies
  - Orientation
  - Paper size

## Importing and exporting data

- For an application to *export* means for it to make available data in a format other than the standard format for the app; importing makes data in other formats available to the app
- Export (*File, Save, SaveAs*) to
  - *.htm* (web page)
  - *.txt* (text file)
  - *.rtf* (Rich Text file, formatted)
  - *.pdf* (readable by Adobe Reader)
- Text, numbers, tables, and formatted text may be imported from many other applications, e.g., browser, by copying

## Tracking changes

- For *collaborative* creation and editing of documents, *Track Changes* in MS Word enables viewing all *proposed changes*
- Deletions and insertions are colored in red with strikethroughs
- To use Track Changes, choose *Review/Track Changes*
- *Option:* include editing comments

## Presentation graphics

- Microsoft's *PowerPoint* application illustrates concepts of graphical presentation software
- Editing text and inserting pictures are similar to in a text-editing app
- PowerPoint enables slide shows with animation; slide footers with numbering; rearranging slides with *Slide Sorter* view; printing slides as handouts; editing notes with slides

## Global control of slide format

- Slide footers and numbering are controlled globally
- In PowerPoint, *Master slide view* controls format of all slides
- *Templates* also enable control of master view (*Format / Slide layout*)
- Slide Sorter view enables getting overview of a slide show
- Multiple slides may be printed on a page using *Handout* or *Notes* option in *Print* dialog

## Creating and using graphics

- Images with *.gif*, *.wmf*, *.bmp*, *.tif* formats may be inserted into Word, PowerPoint, other documents
- *Drawing tools* (e.g., line, oval, rectangle tools; WordArt in PPT) enable creation of editable *vector graphics* such as logos
- *Bitmap graphics editors* (MS Paint, PhotoShop) allow editing of images at the pixel level
- A PowerPoint slide may be saved in graphical format and inserted into a document or slide show (*File / Save As* with file type: *.GIF*)
- *Insert / Picture* or *Insert / Object* enable linking or embedding of pictures, spreadsheets, etc.

## 4. Web-page formatting

- Encoding of a web page is an HTML file (a *text* file, Notepad-editable)
- To view pages, HTML file is downloaded from server to browser
- Part of text in HTML file is to display
- Part is *tags* to format info or to introduce executable code
- Tagged information can include hyperlinks; names of other HTML files; GIF (graphics)

## Exporting from MS Word to HTML

- To insert a hyperlink, select text, right click, and fill in form with URL
- To save as HTML, use *SaveAs*, select *Web Page*
- HTML file may be uploaded to a web server
- Note that while pictures may be embedded in Word files, they may not in HTML files

## HTML tags

- Delimited by <, >
- Tags surround text to format it
- *Examples:*
  - **This <i> is </i> HTML**  
This *is* HTML
  - **<title> 63.120 </title>**  
(Designates text as a page title that appears in title bar in browser)
  - **<p> ... </p>** designates a paragraph
  - **<hr>** (generates horizontal rule)
  - **<a href =**  
**"http://www.cnn.com">Search</a>**  
(hyperlink [Search](http://www.cnn.com))

## Skeleton HTML file

- **<html>**  
**<head> ... <title> ... </title> ... </head>**  
**<body> ... </body>**  
**</html>**
- Every tag above should appear, in this order, in every HTML file
- Text to display, and other tags, appears in place of “...” above
- File name must have extension *.htm* or *.html*

## Hyperlinks

- Hyperlinks contain *link text* (blue, underlined) and *URL* (of site linked to)
- When user clicks on link text
  - Browser places current HTML file on a *stack* maintained by browser
  - Browser downloads Internet file referenced by hyperlink URL
  - Browser displays referenced file
  - Clicking “Back” button returns browser to HTML file at top of stack

## Internal hyperlinks

- A hyperlink may link to a location in the same HTML document (e.g., for a table of contents consisting of hyperlinks)

- *Example:*

```
<a href = #ch2> Chapter 2 </a>
```

...

```
<a name = ch2></a>
```

```
Chapter 2
```

...

## Absolute and relative references

- An *absolute reference* is a URL, which specifies the exact location of data from whatever origin
- *Example:*  
`<a href="http://framingham.edu">FSC</a>`
- Single slashes designate directory/subdirectory relationships
- A relative reference specifies a file's server location in relation to location of current HTML file
- *Example, one directory up from current:*  
`<a href = "../index.htm"> Home </a>`

## Image and other links

- To display a graphic image, use an *image tag*, e.g.,  
``
- Attributes controlled by tags: vertical and horizontal alignment, text wrap
- Formats: GIF (Graphic Image Format), JPG (Joint Photographic Experts Group)

## Style tags and definitions

- Headings may be generated with *named styles*

```
<head>
<style> h1 {color: red} </style>
</head>
<body>
<h1>This is my web page</h1>
<h1>More about my web page</h1>
```
- The *definition* (line 2) above of the *h1* heading style say that when the style is used (last 2 lines), the text within it will be red
- HTML styles are an instance of global control of formatting

## Other tags

- *Comments* occur between angle-brackets with “!”: `<!-- [Comment] -->`
- *Script* tag enables embedding of code from non-HTML languages, e.g., CGI, JavaScript (see topic 7, JavaScript)

## Attributes and elements specified by tags

- Background: `<body bgcolor="yellow">`
- Text and link colors:  
`<body text="red" link="green">`  
`<font color="red">FSC</font>`
- Rules: `<hr>` (horizontal rule)
- Lists (need `<li>` for each item):
  - `<ul>` (unnumbered, bulleted)
  - `<ol>` (numbered)
  - `<dl>` (definitional)
- Tables: `<table border>`
- See files `list-example.htm`, `table-example.htm`

## HTML features

- Text links (hypertext)
- Graphic links (e.g., buttons)
- *Hot spots*: areas used as links
- *Forms*: Enable collection of data from user uploaded to server and processes by CGI script
- *Tables*: grids of cells for layout
- *Frames*: areas that scroll independently of the rest of page

## Extensions to HTML

- Dynamic HTML: enables animation, mousover effects
- XML (Extensible Markup Language): supports structuring of data with tags, e.g., for fields of a database
- Scripting languages: JavaScript, VBScript, PerlScript
- Client-side scripts are embedded in HTML code, server-side scripts generate custom HTML files

## Questions

- What most stayed in your mind in discussing this topic?
- For you, what was the *least* clear concept that you encountered in this topic?

## Operating-system concepts

application software	metaphor
backup	mouse pointer
boot	navigation
cursor	operating system
Debugging	optical character recognition
directory	shortcut
file system	software
graphical user interface	UNIX
hierarchical file system	user interface
Mac OS	Windows
menu	

## Word-processing concepts

boldface	multi-column text	save
bullet	multi-window view	scroll bar
character attribute	named style	search
document	new page	search and replace
document layout	numbered list	sort
export	operating system	space before/after
font	outline format	spell checking
form follows function	page header/footer	table
global control of formatting	pagination	table of contents
hanging indent	paragraph format	text box
Indent	picture box	text editing
keep together	point size	text file
<i>keep with next</i>	portrait layout	text formatting
landscape layout	print preview	underline
margin	print queue	undo
	retrieve	space before/after
		word count

## Presentation-graphics concepts

animate	notes page view
design template	outline view
design view	slide footer
drawing tools	slide master view
.GIF file	slide number
handout format	slide-sorter view
handout master view	

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