Chapter 6

Application Software: Desktop and Mobile Apps
Business-IT-Society

• Business Considerations
  – Return on Investment - ROI
  – Total Cost of Ownership – TCO
  – Efficiency -> doing things optimally
  – Effectiveness -> doing right thing and achieving goals

• Societal Considerations
  – Open Source
  – DRM (digital rights management)
  – Location services & privacy
  – Etc.

• Ethics
  – Responsibility
  – Stockholder vs Stakeholder vs Social Contract
Software Stack

Application Software (User mode)

(System Calls)

System Software (OS & Device Drivers)

(Kernel/SU/root mode)

Computer Hardware
Application Software Categories

• Vertical Software
  – Useful for specific industry
  – Airline reservation system

• Horizontal Software
  – Broad utility
  – MS Word, Excel, etc.
The Basics of Application Software

• Software ownership rights of **application software (apps)**
  – Specify the allowable use of the program
  – A **software license** gives you the right to use a software program
    • Specifies the conditions under which the software can be used
    • Also called an end user license agreement (EULA)
    • Often terms of use instead for mobile apps
    • More complex due to Virtual Desktops
Software Licensing Types

- Commercial Software (e.g. MS Office, Adobe)
- Shareware (e.g. Winzip)
  - Proprietary software initially provided free of charge
  - Often urged to make donation
- Freeware (e.g. Chrome, VLC Media)
  - Free to use and keep
- Public Domain
  - no legal, copyright or editing restrictions
- Open Source
  - Free to modify
- Software Subscription (* added by JGL)
  - New model
Commercial Software

• **Commercial software** is developed and sold for profit
  – Typically comes with a single-user license
    • Sometimes can be installed on one desktop and one personal computer (see license to know)
    • Site licenses or network licenses are available for some software
  – Some software is available in a demo or trial version to test out the program before buying
  – Licenses may be per running instance or use license tokens to better fit some business uses
Shareware, Freeware, and Public Domain Software

• **Shareware** consists of copyrighted software distributed on the honor system
  – Consumers should either pay for it or uninstall it after the trial period

• **Freeware** consists of copyrighted software programs that are given away by the author for others to use free of charge
  – Many apps available at the app stores used with mobile devices are freeware

• **Public domain software** is not copyrighted
  – Ownership rights have been donated to the public domain (i.e. no copyright)
Inside the Industry

Open Source Software are programs with source code made available to the general public

• Linux was the first widely used open source software
• There are many other open source apps (GIMP, LibreOffice, etc.)
• Cheaper than other software
• Increased stability and security
• Ability to modify application’s source code

The free GIMP program.
Software Subscription

• Software Subscription Emerging Model
  – Based on running instances
  – Recurring fees
  – What to do about thin-client/VDI
Installed vs. Cloud Software: Installed Software

- Installed software must be installed on the computer before it can be run
  - Can be purchased in physical form (DVD, etc.) and then installed
  - Can be downloaded from the Internet and then installed
  - Can be free or fee-based software
Cloud Software

• **Cloud software** is delivered on-demand via the Web
  – Also called Software as a Service (SaaS), Web-based software, and cloudware
  – Includes free software and fee-based software
  – Advantages of cloud software
    • Files can be accessed from any computer or device with an Internet connection
    • Ease of implementation
    • Improved collaboration and interface capabilities
    • Always working with the most current version of software
Cloud Software (cont’d)

• Potential disadvantages of cloud software
  – Online applications tend to run more slowly
  – Cannot use during a server outage or without Internet access
    • Some programs like Google Docs allow some offline access
  – Some cloud software may have file size limits
  – Cost may eventually exceed the cost of purchasing a similar installed version of the software
Dealing with Crapware

• Many manufacturers preinstall third-party software on new PCs
  – Can also be bundled with a software program you download
• Download software from the manufacturer’s site whenever possible
• Read each installation screen carefully
• Security software can detect PUPs (potentially unwanted programs)

Pay close attention to the options listed on installation screens to avoid installing crapware.
Software Suites

• A **software suite** is a collection of software programs bundled together and sold as a single software package
  – Office suites are used by most businesses/individuals to produce documents and typically include:
    • Word processing software
    • Spreadsheet software
    • Database software
    • Presentation graphics-software
  – **Microsoft Office** 2016/19 and Office 365
  – Provide a common interface among programs in the suite
  – Typically less expensive than buying the programs individually
• Note Mac OSX forces consistent interface across applications to some extent
Common Software Commands

- Commands are similar from program to program
- Usually commands are issued via menus, keyboard shortcuts, or command buttons located on a toolbar or Ribbon
- **Keyboard shortcut** key combinations are faster ways of issuing commands
- *Mac use CMD instead of CTRL*
Word Processing Concepts

• **Word processing** uses a computer and **word processing software** to create, edit, save, and print written documents
  – Letters, contracts, manuscripts, etc.

• Common word processing software programs
  • Microsoft Word
  • Corel WordPerfect
  • Google Docs
  • Apple Pages
• **Formatting** changes the appearance of the document
  – Font face, font size, font style, and/or font color
  – Line spacing or margins
  – Page numbers
  – Shading or borders to a paragraph, image or other item

**This is 10-point Arial.**

**This is 12-point Times New Roman.**

**This is 16-point Lucida Handwriting.**

**This is 20-point Calibri.**

**This 16-point Calibri text is bold and italic.**

**This 16-point Calibri text is red and underlined.**

**FIGURE 6-11**
Fonts. The font face, size, style, and color used with text can be specified in many application programs.
Creating a Word Processing Document

• **Word wrap** automatically returns the insertion point to the next line when the end of the screen line is reached
• Character formatting (font face, size, style, or color)
• Paragraph formatting (line spacing, indentation, alignment, and styles)
• Page formatting (margins, paper size, orientation, headers, footers, etc.)
• Document formatting (footnotes, end notes, table of contents, index, background, theme)
Spreadsheet Concepts

• A **spreadsheet** contains a group of numbers and other data organized into rows and columns
  
  – **Spreadsheet software** is used to create computerized spreadsheets
  
  – Most widely used spreadsheet programs:
    • Microsoft Excel
    • Corel Quattro Pro
    • Google Sheets
    • Apple Numbers
Creating a Spreadsheet

- A **worksheet** is a single spreadsheet divided into rows and columns.
- A **workbook** is a collection of worksheets saved in a single file.
- A **cell** is the intersection of a **row** and a **column**.
  - Each cell is identified by a cell address, such as A1.
  - Cell pointer is used to select a cell.
  - Cell pointer can be used to select more than one cell (range or block).
Entering Data into a Spreadsheet Cell

• Data is entered into the appropriate spreadsheet cell
• **Labels** are text-based entries that identify data on the worksheet
• **Constant values** are numerical entries
• **Formulas** perform mathematical operations on the content of other cells
  – Usually reference the cell address, not the current data in a cell
  – Use mathematical operators; begin with an = sign

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>OPERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>Addition</td>
</tr>
<tr>
<td>−</td>
<td>Subtraction</td>
</tr>
<tr>
<td>*</td>
<td>Multiplication</td>
</tr>
<tr>
<td>/</td>
<td>Division</td>
</tr>
<tr>
<td>^</td>
<td>Exponentiation</td>
</tr>
</tbody>
</table>

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Spreadsheet Functions

- A **function** is a named, pre-programmed formula
  - Hundreds of functions that can be used in spreadsheets

<table>
<thead>
<tr>
<th>EXAMPLES OF FUNCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>=SUM(range)</td>
</tr>
<tr>
<td>=MAX(range)</td>
</tr>
<tr>
<td>=MIN(range)</td>
</tr>
<tr>
<td>=AVERAGE(range)</td>
</tr>
<tr>
<td>=PMT(rate, number of payments, loan amount)</td>
</tr>
<tr>
<td>=IF(conditional expression, value if true, value if false)</td>
</tr>
<tr>
<td>=NOW()</td>
</tr>
</tbody>
</table>

**FIGURE 6-17**
Common spreadsheet functions.
Absolute vs. Relative Cell Referencing in Formulas

• Relative cell references
  – Cell addresses are adjusted as the formula is copied to reflect the new location of the formula

• Absolute cell references
  – Formulas are copied exactly as they are written
  – Appropriate when you want to use a specific cell address in all copies of the formula
  – Use $ to make cell references absolute: $B$6

• A single formula can contain both relative and absolute cell references as needed
Examples of Relative and Absolute Cell Referencing

**COPYING WITH RELATIVE CELL REFERENCES**
In most formulas, cell addresses are relative and will be adjusted as the formula is copied.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>April</td>
<td>600</td>
<td>200</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>May</td>
<td>800</td>
<td>500</td>
<td>1300</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>June</td>
<td>1500</td>
<td>600</td>
<td>2100</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Total</td>
<td></td>
<td></td>
<td>4200</td>
<td></td>
</tr>
</tbody>
</table>

Results when the formula in cell D2 is copied to cells D3 and D4.

Formula in cell D2: \(=B2+C2\).

**COPYING WITH ABSOLUTE CELL REFERENCES**
A dollar sign ($) marks a cell reference as absolute; it will be copied exactly as it appears in the source cell.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>April</td>
<td>600</td>
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<td>800</td>
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<td>3</td>
<td>May</td>
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<tr>
<td>4</td>
<td>June</td>
<td>1500</td>
<td>600</td>
<td>2100</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Total</td>
<td></td>
<td></td>
<td>2400</td>
<td></td>
</tr>
</tbody>
</table>

Results when the formula in cell D2 is copied to cells D3 and D4.

Formula in cell D2: \(=$B2+$C2\).

**IMPROPER USE**
Formula in cell D4 is \(=B4+C4\).

**PROPER USE**
Formula in cell E4 is \(=D4/$D$5\).
Charts and What-If Analysis

• Most spreadsheet programs include some type of charting or graphing capability
  – Can create charts from the data in the spreadsheet (do not have to reenter it)
• Charts change accordingly if the data in the spreadsheet changes
• When cell contents are changed, formulas are automatically recalculated
• What-if-analysis
  – Tool frequently used to help make business decisions
Database Concepts

• A database is a collection of related data that is stored in a manner enabling information to be retrieved as needed
  – Database management system (DBMS) or database software allows the creation and manipulation of an electronic database
  – Most widely used relational database programs
    • Microsoft Access
    • Corel Paradox
    • Oracle Database
    • IBM’s DB2
Database Organization

- Data in a database is organized into fields (columns), records (rows), and tables
  - A **field (column)** is a single type of data to be stored in a database
  - A **record (row)** is a collection of related fields
  - A **table** is a collection of related records
  - Database file is a collection of related tables
Creating a Database

• Create the database file first
  – Contains objects, such as tables, forms, and queries

• Create one or more tables
  – Can use either the table’s Datasheet view or Design view
  – The table structure is created:
    • Field name (unique identifying name)
    • Data type (text, number, date, object)
    • Field size (maximum number of characters)
    • Default value (initial content of the field)
  – Data is entered into the table
  – A form can be create to use for data entry if desired
Queries and Reports

• A query is a question, or a request for specific information from the database
  – Contains criteria to specify the records and fields to be included in the query results
  – Named and saved so it can be run again at a later time
  – Displays the current data meeting the criteria each time it is opened

• A report is created when a more formal output is desired
  – Associated with either a table or a query
  – Displays the current data in the report format each time it is opened
A presentation graphic is an image designed to visually enhance a presentation
- Can be used in electronic slide shows
- Can be inserted into reports and other written documents

### Examples of presentation graphics.

**COLUMN CHART**
- Average Daily Ice Cream Sales
  - Chocolate Chip 40%
  - Butter Pecan 20%
  - Fudge Ripple 30%

**PIE CHART**
- Chocolate Chip 40%
- Butter Pecan 20%
- Fudge Ripple 30%

**ORGANIZATIONAL CHART**
- President
  - Vice President, Finance
  - Vice President, Operations
  - Store Manager
  - Marketing Manager

**DRAWN OBJECTS**
- Heart emoji
Presentation Graphics Terms

• An electronic **slide** is a one-page presentation graphic that can contain images, text, video, and more

• An **electronic slide show** is a group of electronic slides that are displayed one after the other on a computer monitor or other display device

• **Presentation graphics software** is used to create presentation graphics
  – Microsoft PowerPoint
  – Corel Presentations
  – Google Slides
  – Apple Keynote
Finishing a Presentation

• Objects can be animated
• Transitions between slides can be added
• Slide Sorter view can be used to rearrange the slide order
• Show can be set up to run automatically or manually
• Can print slides to create overhead transparencies or an audience handout
• Speaker tools include:
  – Speaker notes and pens
  – Presenter view
Graphics and Multimedia Concepts

• **Graphics** are digital representations of images, such as digital photographs, clip art, scanned drawings, and original images created using a software program.

• **Multimedia** technically refers to any application that contains more than one type of media.
  – Often used to refer to audio or video content.

• There is a large variety of **graphics software** to create or modify graphics, edit digital audio or video, play multimedia files, and burn CDs and DVDs.
Types of Graphics Software

• Painting programs typically create bitmap images
  – Don’t usually support layers
  – Microsoft Paint

• Drawing programs (illustration programs) typically create vector graphics using mathematical formulas
  – Adobe Illustrator CC, Corel Painter

• Image editing or photo editing programs are designed for touching up or modifying images
  – Adobe Photoshop, Picasa, Apple Photos
• Audio editing software is used to create and edit audio files
  – Sound recorder software captures sound from a microphone
  – Ripping software captures sound from a CD
• Audio can be edited, spliced, and otherwise modified
• Professional and consumer software
  – Adobe Audition CC
  – Apple GarageBand
  – Audacity
Video Editing and DVD Authoring Software

• Video editing software modifies existing videos
  – Prepares video clips for presentations, Web sites, YouTube, etc.
  – Video is first imported into the computer
• DVD authoring software organizes content to be transferred to DVD
• DVD burning software records data on recordable or rewritable DVDs
• Professional and consumer software
  – Adobe Premiere Elements, Corel VideoStudio, Apple iMovie, etc.
Media Players

• Media players are programs designed to play audio and video files
  – Music CDs, downloaded music, streaming audio, etc.
  – Video stored on device or streamed from the Internet
  – Typically allow you to arrange your stored music and videos into playlists
    • Transfer them to a CD or smartphone
    • Some players include the ability to purchase and download music via an associated music store
  – Important to adhere to copyright laws when using digital music
Graphics, Multimedia, and the Web

• Often used by individuals and businesses to create content to be included on a Web sites or shared via the Web
  – Company logos
  – Web site banners
  – Games
  – Tutorials
  – Videos
  – Demonstrations

• Web multimedia content can be created using animation (Adobe Flash) and multimedia authoring (Adobe Director) software
Remote Access Software

**FIGURE 6-34**
Remote access software. Allows you to use a computer from a remote Internet-enabled device.

This Windows computer is being accessed remotely via this smartphone.

Source: TeamViewer; Chandharm/Shutterstock.com; Bombeart/Patrick/Shutterstock.com
Summary

• The Basics of Application Software
• Word Processing Concepts
• Spreadsheet Concepts
• Database Concepts
• Presentation Graphics Content
• Graphics and Multimedia Concepts
• Other Types of Application Software