Connecting with Computer Science
Greg Anderson
David Ferro
Robert Hilton

chapter

software tools for techies
Objectives

• Learn what tasks you need to be prepared to accomplish within the computer industry and which tools can help you succeed in completing the tasks

• Learn how even computer scientists have to use word processors to create documents

• Learn what tools can be used to create a presentation

• Learn about the different types of graphics and what tools allow you to create and modify them
Objectives (continued)

• Refresh your understanding of e-mail and how it benefits the computer industry

• Learn what tools are used to compress files

• Understand how files can be shared through the use of FTP

• Learn about creating spreadsheets to manage projects and which spreadsheet tools are best to use
Objectives (continued)

• Realize that there are many different programming languages to choose from and that using a particular programming environment may make it easier to create an application

• Learn that Web development is an essential task to add to your skills

• Learn about database design and maintenance tools

• Learn that project management is essential to the success of a project
Why You Need to Know About...Software Tools

• Specific tools designed for specific tasks
  – Scissors cut fabric, paper, threads, etc.
  – Hammers drive nails into a board

• Software products are also customized tools
  – Word processors are used to create documents
  – Desktop publishers are used to create brochures

• Benefit of picking the right tool from the “box”
  – Enhance progress toward task completion
Different Tools for Different Rules

• Learning about a task precedes tool selection
• Tasks are grouped into (3) main categories:
  – Office tasks
  – Programming tasks
  – Internet or Web Tasks
• Meeting the challenge of matching tool to task
  – A critical factor in achieving goals
  – The chief objective of Chapter 2
Office Tools

- Office tools support overall professional development
- Office tools help generate the following:
  - Documents
  - Presentations
  - Spreadsheets
  - Budgets
  - Work schedules
Figure 2-1, Office tools play a supporting role in computer science

Office Tools

- word processor
- presentation software
- spreadsheet
- project management
Document Tools

• Document-creation tools improve experiences of career, education, and personal life

• List of specific document tools:
  – Word processors
  – Text Editors
  – Desktop publishing software
Word Processors

• Word Processor: multipurpose document creation tool
• A partial list of items generated by word processor:
  – Letters, resumes, design documents, project proposals, faxes, memos, assignments, resumes
• Broad range of capabilities
  – Formatting options (such as font selection)
  – Graphics
  – Spell and grammar check
• Microsoft Word: the word processor of choice for both Windows and Mac operating systems
A string walked into a bar and asked the bartender for a drink.

The bartender looked at the string and said, “Wait a minute. Aren’t you a string?”

To which the string replied, “Why yes I am.”

The bartender said, “Get out of here string. We don’t serve your type. One drink and you will be all over the place tying people up and causing problems.”

The string left the bar and stood there on the rough cement. It then began to get angry at the treatment by the bartender and became so angry that it threw itself down on the rough cement and began twisting and turning and turning and twisting. It continued to twist and turn on the rough cement until finally it got up and walked back into the bar.

The string went up to the bar tender and said “Give me a drink.”

The bartender looked at the string and said, “Wait a minute. Aren’t you a string?”

To which the string replied, “I’m a frayed knot.”
Word Processors (continued)

- StarOffice Writer: popular word processor in UNIX and Linux operating system environments
Figure 2-3, StarOffice Writer is a word-processing tool used in UNIX and Linux

Courtesy of Sun Microsystems, Inc.

Connecting with Computer Science
Text Editors

- Text editor: generic tool with basic editing capabilities
- Used for entry of straight text such as program commands
- Text editors built into most operating systems
  - Windows: Notepad
  - Unix and Linux: vi
Figure 2-4, Notepad is a simple text editor that comes with Windows

Figure 2-5, vi is a text editor used in UNIX and Linux operating systems

Connecting with Computer Science
Desktop Publishers

- Desktop publisher: tool emphasizing the generation and coordination of graphical content
- Provide page-layout for brochures, magazines, newspapers, and books
- Relationship to word processors
  - Embed document input into templates, figures, photos
  - May share most features, including a text editor
Presentation Tools

• Presentation software: supports oral presentation with visual and acoustic effects

• Example: Microsoft PowerPoint + data projector
  – “A picture is worth a thousand words”
  – Add sensory dimension to spoken word

• Some special PowerPoint Techniques
  – Slide transitions
  – Custom animation
Figure 2-6, A presentation tool helps you present information in an organized, attractive way.

Connecting with Computer Science
Spreadsheet Tools

- Spreadsheet: document that organizes information in rows and columns
  - Tool of choice for budgets
  - Utilized by project leaders and managers
- Powerful tool: Microsoft Excel
  - Allows category definitions
  - Accommodates math operations, functions, and graphs
Figure 2-7, With a spreadsheet you can organize information in rows and columns and perform calculations.
Project Scheduling and Management Tools

• Project Schedulers/Managers: tools track status of project development

• Ingredients for successful project
  – Define and organize major tasks
  – Map course of project
  – Mark milestones on the path toward completion
  – Adhere to budget constraints
  – Seek ways of improving efficiency

• Popular Tool: Microsoft Project
  – Charts project progress
  – Outputs info in various report formats
Figure 2-8, Project management software tracks the schedule of tasks that need to be completed
Programming Tools

• Programs consist of many components
  – Various components call for various tools
• Partial list of tasks supported by toolkit
  – Graphics
  – Diagram and flowchart construction
  – Database management
  – Technical support
Connecting with Computer Science

Figure 2-9, Programming tools play a supporting role in computer science

Programming Tools

- graphics
- integrated development environment (IDE)
- flowcharts
- technical support
- database tools
Creating Graphics

- Graphic content takes a number of forms
  - Picture
  - Photo
  - Logo
  - Animation
  - Map

- Resources
  - Internet downloads (with permission)
  - Graphics tools
Graphic Formats

- Variety of graphic formats
  - .BMP (bitmap): 16.7 million colors, no animation
  - .GIF (Graphics Interchange Format): allows 256 colors and includes transparency feature
  - .JPG (Joint Photographic Experts Group): most efficient storage method and Internet friendly
  - .TIF (Tag Image File Format): format of choice for professional photographers
- Right image should match right task
Graphic Compression

- Graphic compression: reduces file size
- Two compression techniques
  - Lossless compression: removes redundant areas
  - Lossy compression: removes redundant areas and information not perceptible by the human eye
- Choose compression technique based on need
  - Lossy compression trades quality for efficiency
  - Most video compression (MPEG) and JPEG formats use Lossy compression
Working with Graphics

• Selection of graphics tool based on features
• (4) ways to modify graphics (not inclusive)
  – Scaling: resizing image
  – Rotating: repositioning image based on 360° circle
  – Cropping: Trimming portions of images
  – Format conversion: Converting image from one file format to another
• Tradeoff between image control and quality
Figure 2-10, Scaling resizes an image
Figure 2-11, Rotation

Connecting with Computer Science
Figure 2-12, Cropping

Connecting with Computer Science
Working with Graphics (continued)

• Economic classes of graphics tools
  – Proprietary: for sale
  – Freeware: absolutely free
  – Shareware: initial free trial use followed up with fee

• Popular graphics tools
  – Macromedia Fireworks
  – JASC Paint Shop Pro
  – Adobe Photoshop
Diagramming Tools

- Diagramming software: tool that creates diagrams analogous to builder’s blueprint

- Flowcharts
  - Geometric symbols that model program flow
  - Roadmap for system development

- UML (Universal Modeling Language) diagrams
  - Represent object-oriented systems and designs

- Comprehensive tool: Microsoft Visio
  - Produces flowcharts plus a number of other diagrams such as organizational hierarchies, graphs, and maps
Figure 2-13, Microsoft Visio creates a wide variety of diagrams, including flowcharts.
Integrated Development Environments

- Integrated Development Environment (IDE): single user interface incorporating programming tools such as
  - text editor
  - compiler
  - debugger

- Product choice dependent on features needed, developer language used, and cost
Database Tools

• Definition of terms
  – Database: data warehouse comprised of tables
  – Table: data organized by rows and columns
  – Row: represents a record of information
  – Column: represents a field within a record

• Database purpose: facilitate information collection and sharing

• Chief tool: database management system (DBMS)
  – Stores, extracts, organizes, and maintains data
Database Tools

• Variety of database formats
  – Oracle (with or without Toad support)
  – SQL server
  – Microsoft Access
  – MySQL

• Criteria for product selection
  – Purchasing entity: corporation? small business? individual?
  – Cost
  – Features
Figure 2-14, Toad is a support tool for Oracle

Connecting with Computer Science
Figure 2-15, Microsoft Access provides a visual interface for working with databases

<table>
<thead>
<tr>
<th>SongCode</th>
<th>Title</th>
<th>Artist</th>
<th>CatCode</th>
<th>NumDownloads</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good for the Soul</td>
<td>Qingo Boinga</td>
<td>ALT</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Two</td>
<td>Two</td>
<td>ALT</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Three</td>
<td>Three</td>
<td>ALT</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Four</td>
<td>Four</td>
<td>ALT</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Five</td>
<td>Five</td>
<td>CL</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Six</td>
<td>Six</td>
<td>CL</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Seven</td>
<td>Seven</td>
<td>EZ</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Eight</td>
<td>Eight</td>
<td>EZ</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Eight</td>
<td>Eight</td>
<td>EZ</td>
<td>3</td>
</tr>
</tbody>
</table>

Connecting with Computer Science
Technical Support Tools

• Example tool: pcAnywhere
  – Affords control of PC at remote location via Internet
  – Activities on remote PC simulcast on controlling PC
  – Requires software installation at both sites

• Technicians greatly empowered with tools such as pcAnywhere
Figure 2-16, pcAnywhere allows you to remotely access another computer

Connecting with Computer Science
Internet Tools

- Areas impacted by the Internet (aka the Net)
  - Research
  - Communication
  - Commerce
- Internet tools
  - Browsers
  - E-mail software
  - File transfer software
  - Remote access software
Connecting with Computer Science

Figure 2-17, Internet tools are increasingly important in computer science.
Web Browsers

• Browser: Internet interface program
  – Retrieves and displays Web pages and other files
  – Provides user with visual friendly environment

• Popular browsers
  – Microsoft Internet Explorer
  – Netscape Navigator
  – Mozilla
  – Mosaic
  – Lynx
  – Opera
Connecting with Computer Science

Figure 2-18, Microsoft Internet Explorer is a popular browser
E-mail Tools

• E-mail: communication format that leverages the Internet for delivery of electronic post

• E-mail benefits
  – Global reach at the “touch of a button”
  – Speedy and low cost transmission

• Common tools
  – Microsoft Outlook or Outlook Express
  – Netscape Navigator
  – Novell GroupWise
  – ELM
  – Pine
Figure 2-19, Microsoft Outlook Express

Connecting with Computer Science
Figure 2-20, Pine is a UNIX/Linux e-mail software product

Copyright 1989-1997. PINE is a trademark of the University of Washington.

[Folder "INBOX" opened with 290 messages]

Help
PrevCmd
RelNotes
[ListFldrs]
NextCmd
KBLock
Compressing Files

• Data compression: technique used to reduce size and transmission speed of a file
• Decompression: restores compressed file to original format
• Compression formats
  – Have deep mathematical foundations
  – Come in wide variety such as .zip, .tar, .lzh
• Popular compression tool: WinZip
Figure 2-21, WinZip compresses and decompresses files

Connecting with Computer Science
File Transfer Tools

- File Transfer Protocol (FTP): system used to transmit files across the Internet
  - Provides common location called (FTP) site for storage and retrieval
  - FTP site defined and accessed by FTP address
  - FTP sites possess electronic security gates
- Purpose: provide more complex and secure communication structure than e-mail
- Many tools available such as WS_FTP Pro
Connecting with Computer Science
Web Development Tools

- Definition: help create and maintain Web sites
- Various products
  - Adobe GoLive
  - Macromedia Dreamweaver MX
  - Microsoft FrontPage
- Selection criteria
  - Cost
  - Ease of use
  - Level of expertise
  - Professional need
Figure 2-23, Dreamweaver incorporates WYSIWYG during Web development

Connecting with Computer Science
Figure 2-24, Microsoft FrontPage focuses on ease of use when creating Web pages

Connecting with Computer Science
Extra Web Tools

• Extra Web tools: enhance Web site appearance

• Popular product: Macromedia Flash MX
  – Provides animation and interactivity
  – Helps distinguish a site from the commonplace

• Web developer goals
  – Drive traffic to site
  – Induce visitors to return
One Last Thought

• Using is believing
  – Experiment with the various tools available
  – Discover pros and cons for yourself
• Construct an inventory matching tool to task
• Sustain marketability with dynamic toolkit
Summary

- Computer scientists interested in career development need a well stocked software toolbox
- Specific tools are fitted to specific tasks
- There are three broad task categories
  - Office
  - Programming
  - Web or Internet
Summary (continued)

• A variety of tools exist for each task
• Generic tool selection criteria
  – Need
  – Cost
  – Level of expertise
  – Ease of use
  – Testimonials
• The development of tool and task knowledge is an ongoing process