Management Information Systems

Chapter 2
Information Technology Foundations
Outline

- Types of Data
- Trends
- Hardware Components
- Application Software
- Operating Systems
- Multitasking
### Data Types

**Numbers**

12 + 8 = 20

**Text**

This is a test

**Images**

![Image of a cat]

**Sound**

[Sound wave diagram]

**Video**

[Video clip]

### Input

![Keyboard]

### Process

```
000001100
000001000
000010100
```

### Output

20

This is a test

---

**Pitch or Volume**

Time →

84 104 73 115 ...

This is a test

---

**Data Types**

8 9 0 5 ...

---

**Text**

This is a test 84 104 73 115 ...

This is a test
Sample Bitmap: Bryce Canyon

Bitmap file: 2,245,008 bytes
PNG bitmap: 435,575 bytes
Sample Vector Image

Stored internally as mathematical objects:
- Lines
- Points
- Rectangles
- Circles

WMF: Windows Meta File
12,430 bytes
Bitmap Images: Adobe Photoshop

(1) Set a light source.
(2) Twirl.

Hundreds of tools and options.
You can add and delete items from photographs.
Professional editing is hard to detect.
You need a really good monitor to edit photos.
### Size Complications

<table>
<thead>
<tr>
<th>Object</th>
<th>Raw</th>
<th>Compressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text and Numbers</td>
<td>5 K/page</td>
<td>0.6 KB/page</td>
</tr>
<tr>
<td>Image (300 dpi, 24-bit color, 4 x 6 in.)</td>
<td>2 MB</td>
<td>0.5 MB</td>
</tr>
<tr>
<td>Sound (44.1 KHz stereo)</td>
<td>150 KB/sec</td>
<td>100 KB/sec</td>
</tr>
<tr>
<td>Video (NTSC 30 fps, stereo sound)</td>
<td>25 MB/sec</td>
<td>3 MB/sec</td>
</tr>
</tbody>
</table>

Video presents the most problems:
- Full screen (640 x 480), 24-bit color.
- Requires hardware compression/decompression (codec).
- Capturing full-screen video requires ultra-fast computer.
- Older drive systems cannot transfer data fast enough.
- Full-screen video with compression fills up 2 GB in 10 minutes.
Trends

- Hardware
  - Size (capacity)
  - Speed (performance)
  - Reliability
  - Data Types

- Software and Operating System Trends
  - Original: User/Programmer
  - Early: Sequential Questions
  - Easier: Menus
  - Current: User/Event Driven
Technology Trends

- Cost of workers increasing
- Cost of technology decreasing
- Capabilities increasing
  - Processing speed
  - Storage capacity
  - Types of data
    - text
    - image
    - sound
    - video
  - Quality and reliability
  - Communications
Processor is faster than disk drive.
Reads ahead and stores several pieces of the file into cache memory.
Pulls data from cache as needed.
Especially fast for small sets of data used repeatedly.
What is a Server?

- Reliability
- Easy backup
- Easy maintenance
- Multi-user
- Scalability
  - Product family consistency (Sun)
  - Server Farm (Microsoft)
What is a Client/Browser?

- Display device/standards
- User interface
- Data collection
- New: Wireless
  - Cell phones (3G)
  - PDAs
  - Tablets
Software Categories

- Operating System
- Utilities
- Programming Languages and Tools
- Application
  - General purpose examples
    - Word processing
    - Spreadsheets
    - Graphics
  - Single purpose examples
    - Accounting
    - Tax preparation
    - Games
    - CAD-CAM
- Database Management Systems (DBMS)
Operating Systems

- Operating system tasks.
  - Identify user (security).
  - User interface.
  - Load applications.
  - Coordinate devices.
- Device drivers for independence.
  - Input.
  - Process.
  - Output.
  - Secondary storage.
Multitasking & Components

- Components operate at different speeds
  - Processor: nanoseconds
  - Input: seconds or milliseconds
  - Output: seconds or milliseconds
  - Secondary Storage: milliseconds

- Time comparison
  - 1 ns / 1 sec == 31.7 years
  - 1 micro / 1 sec == 11.6 days
  - 1 ms / 1 sec == 16:40 min:sec
Multitasking

Single Tasking

Task 1  Task 2  Task 3

Multitasking