Information Systems
ISM 3011

Unit 3B

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Printers

FIGURE 3-16
Laser Printer
Laser printers, available in a wide variety of speeds and price ranges, have many features, including color capabilities. They are the most common solution for outputting hard copies of information.
(Source: Courtesy of Epson America, Inc.)

Apply Your Knowledge: TCO

- Calculate and compare the TCO of one ink-jet and one laser printer model.
- Make necessary assumptions and name them!

Total Cost of Ownership (TCO)

Purchase Price } determined by
+ Installation, Training } the chosen brand
+ Supplies } determined by
+ Maintenance } usage and brand
TCO

TCO: Cost of Supplies and Maintenance

- In order to determine the cost of all supplies and maintenance, one must make assumptions about the product usage, e.g.
  - how many pages will be printed per week
  - how many hours will the machine run per day (->power consumption)

TCO: Examples of Printer Supplies

Paper: 10 $ per 500 sheets

Toner: 50 $ for a unit that will last for 2,000 pages

Drum unit: 200 $, needs to be replaced after 10,000 pages

Approach 1: Divide Price for Each Part by Amount of Pages

Paper: 10 $/500 sheets → $ 0.02/page
Toner: 50 $/2,000 pages → $ 0.025/page
Drum unit: 200 $/10,000 → $ 0.02/page

$ 0.065/page

When one prints 12,000 pages over the whole life span of the printer, you have to pay for 2 drum units, **not 1.2!**

Pape[illegible] sheets → $ 0.02/page
Toner: [illegible] $/2,000 pages → $ 0.025/page
Drum unit: 200 $/10,000 → $ 0.02/page

Approach 2

- To solve this problem, you can determine the actual number of supply units needed to print the total number of pages.
- Example for 12,000 pages:
  - 24 boxes of paper, 6 toner kits, 2 drum kits

Example

- Assumptions:
  - Printer costs $ 300 including installation, but without first drum kit and toner
  - Costs of supplies as on the previous slides
  - Printer will be used for 3 years
- Usage:
  - 20 pages per day → 100 pages per week (Mo – Fr) → 5,000 per year (50 weeks) → 15,000 within 3 years

Example

Approach 1		Approach 2	
Purchase Price	$ 300	Purchase Price	$ 300
Supplies 15,000 * 0.065	$ 975	30 Boxes of Paper 30 * $ 10	$ 300
TCO	**$ 1275**	8 Toner Kits 8 * $ 50	$ 400
		2 Drum Kits	$ 400
		TCO	**$ 1400**

Case Studies

Case 1: Electronic Voting Question 1

- 215,000 / 313,000 = 2/3 = 66 %
  - 66 % of Canberrans voted
- 16,500/215,000 = 7,67 % of the voters tried the new electronic system
- Reasons for the low percentage:
  - Voting is a rare task, thus people are more reluctant to learn new procedures
  - Lack of transparency

Case 1: Electronic Voting Question 2

- Concerns:
  - Canberra is atypical of the country
  - Rural areas would require a huge number of computer systems
  - Security issues
- Security, Privacy, and Transparency are the most serious issues.
  - Physical recount is impossible
  - Voting decisions can be traced

Case 1: Electronic Voting Question 3

- Improvements:
  - Print paper ballots as backup
  - Support online voting (but: increases security issues etc.)

Case 1: Electronic Voting Question 4

- Electronic voting systems in the US
  - Search the Internet and read about the ongoing discussions

Case 2: Land Warrior Question 1

- Power/Battery
- Cannot be repaired by the soldier

Case 2: Land Warrior Question 2

- Access to satellite image data (e.g. to look behind the buildings etc.)

Case 2: Land Warrior Question 3

- Soldiers must receive special training to use the device
- On the other hand, one must make sure that traditional skills remain present, in case the Land Warrior fails.
- Availability of devices that do tasks for us tend to weaken our own skills, because we lack training.

Case 2: Land Warrior Question 4

- Special forces could be equipped with the Land Warrior first.
- In case of injuries or death, relatives of such soldiers without access to the Land Warrior might regard this as the reason for the incident.

Case 3: Smaller Servers Question 1

- Advantages:
  - require less space
- Disadvantages
  - higher server density per s/f requires changes in power supply, air-conditioning, and data lines

Case 3: Smaller Servers Question 2

- Advantages of Server Blades:
  - require even less space than ultra slim servers
  - improved flexibility and performance
  - heat and power issues less critical than with ultra slim servers
- Disadvantages
  - limits: power supply, air-conditioning, and data lines
  - management software required

Case 3: Smaller Servers Questions 3 & 4

- Question 3:
  - check whether heat and power issues need extra attention
- Question 4:
  - Provide effective management and maintenance software

Thank you!

Any questions? Please send an e-mail to mhepp@computer.org!

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