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# Information Systems

## ISM 3011

Spring 2004  
Unit 3B


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## Apply Your Knowledge: TCO

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

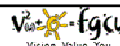
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## Total Cost of Ownership (TCO)

Purchase Price	} determined by the chosen brand
+ Installation, Training	
+ Supplies	} determined by usage and brand
+ Maintenance	
<hr/> <b>TCO</b> <hr/>	


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## 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)

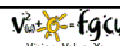
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## TCO: Examples of Printer Supplies

**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


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## 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**


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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!**

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


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## 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

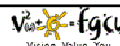
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## Example

- 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


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## Example

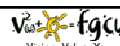
Approach 1		Approach 2	
Purchase Price	\$ 300	Purchase Price	\$ 300
Supplies	\$ 975	30 Boxes of Paper	\$ 300
	<span style="color: red;">15,000 * 0.065</span>	30 * \$ 10	
<span style="color: red;">TCO</span>	<span style="color: red;">\$ 1275</span>	8 Toner Kits	\$ 400
		8 * \$ 50	
		2 Drum Kits	\$ 400
		<span style="color: red;">TCO</span>	<span style="color: red;">\$ 1400</span>

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## Case Studies


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## 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


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### 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

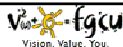
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### Case 1: Electronic Voting Question 3

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

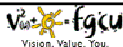
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### Case 1: Electronic Voting Question 4

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

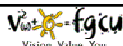
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### Case 2: Land Warrior Question 1

- Power/Battery
- Cannot be repaired by the soldier

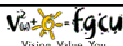
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### Case 2: Land Warrior Question 2

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


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### 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.


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**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.

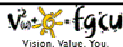
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**Case 3: Smaller Servers**  
**Question 1**

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

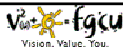
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**Case 3: Smaller Servers**  
**Question 2**

- 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

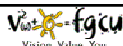
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**Case 3: Smaller Servers**  
**Questions 3 & 4**

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

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**Thank you!**

The slides will be available on the internet at  
<http://ruby.fgcu.edu/courses/mhepp/>  
(-> CRN10033)

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