**Lab 1 total\_cost\_of\_ownership.md**

**A screenshot of a device

AI-generated content may be incorrect.** **A screen shot of a printer

AI-generated content may be incorrect.**  
**HL-1110 Laser Printer VS DCP-T730DW Ink Tank Printer  
Comparing Specs  
A close-up of a printer

AI-generated content may be incorrect.  
A table with text and images

AI-generated content may be incorrect.**

**A blue and white document with white text

AI-generated content may be incorrect.  
A screenshot of a computer

AI-generated content may be incorrect.**

**A screenshot of a computer

AI-generated content may be incorrect.  
HL-1110 Laser Printer Supplies**

**A screenshot of a screen

AI-generated content may be incorrect.  
DCP-T730DW Ink Tank Printer**

**A box with a price tag

AI-generated content may be incorrect.  
A4 Paper Cost 27.99**

**Report**

**Using The Lab Assumptions:**

* Time period: 5 years
* Usage: 750 pages per week
* Power on: 40 hours/week
* Total pages in 5 years:  
  750 pages/week × 52 weeks × 5 years = 195,000 pages
* Assuming people use all ink available before buying new cartridges

|  |  |
| --- | --- |
| **Inkjet: Brother DCP-T730DW** | **Laser: Brother HL-1110** |
| SGD 288.00 | SGD 108.00 |
| Uses BTD100BK,  BTD100C, BTD100M, BTD100Y inks | Uses TN1000 toner & DR1000 drum |
| Black (BTD100BK): $14 – 7,500 pages -Needs: 195,000 ÷ 7,500 = 26 × $14 = $364  Color (C, M, Y): Assume 20% of pages are color -> 39,000 pages -Each bottle covers 5,000 pages -> 7.8 -> round up to 8 bottles per color -Total color bottles: 8 × 3 colors × $11 = $264 | Toner (TN1000): $62 – lasts 1,000 pages -Needs: 195,000 ÷ 1,000 = 195 toners -> 195 × $62 = $12,090  Drum (DR1000): $42 – lasts 10,000 pages -Needs: 195,000 ÷ 10,000 = 19.5 -> round to 20 × $42 = $840 |
| Total Consumables: $364 (black) + $264 (color) = $628 | Total Consumables: $12,930 |
| $2183.22 for all the paper | $2183.22 for all the paper |
| Total TCO: $288.00+$628.00+$2,183.22 =$3,099.22 | Total TCO: $108.00+$12,930.00+$2,183.22 =$15,221.22 |

**Add paper costs – 27.99 per box**

* Needs: 195,000 ÷ 500 = 390 reams   
  -> 390 ÷ 5 = 78 boxes  
  -> 78 x $27.99 = $2183.22

**1. Based on the TCO which printer is the “best”?**The Inkjet Printer (Brother DCP-T730DW) is clearly the better choice based on Total Cost of Ownership (TCO).

* TCO over 5 years: ~$3,099.22 compared to the Laser Printer (Brother HL-1110): ~$15,221.22
* That’s over 5x cheaper, largely because the toner for laser printing is much more expensive for high-volume usage.

**2. Would your answer be the same for a home user who prints 5 pages per week?**No, the answer would likely change.

* 5 pages/week × 52 weeks × 5 years = 1,300 pages in total.
* In this case, the Laser Printer may be better because:
  + Lower initial cost ($108 vs $288).
  + May not require replacement toner or drum during the 5 years.
  + Less maintenance, no worry about ink drying out (common in low-use inkjet printers).

So, for low-volume users, laser printers are often more cost-effective and hassle-free.

**3. What other factors could/should we have considered apart from the TCO?**Besides TCO, important factors include:

* Print quality (especially for photos or colored graphics — inkjet tends to be better).
* Print speed — laser printers are usually faster.
* Maintenance needs — inkjets may clog if not used regularly.
* Reliability and durability — some printers last longer than others.
* Noise levels — quieter operation may be important in office/home settings.
* Paper handling — tray size, duplex printing, envelope support, etc.
* Footprint — physical size and fit in the workspace.
* Environmental impact — energy usage, recycling options for cartridges, etc.
* Wireless/network support — useful for multiple users in workgroups.
* Manufacturer warranty and support.

**4. Knowing something about the cost structure of printers, what would you look for in a large workgroup printer?**

For a large workgroup, I would look for:

* High-yield toners or ink tanks with low cost/page.
* Fast print speed and high duty cycle (pages/month rating).
* Multi-functionality (print, scan, copy, fax).
* Network printing (Ethernet/Wi-Fi for multiple users).
* Paper capacity — large trays, automatic feeders.
* Secure printing features (PIN printing, access control).
* Low downtime — easy maintenance and quick toner/ink changes.
* Long-term support — driver updates, service availability.
* Energy-efficient with low running costs.

A business-grade mono laser or enterprise inkjet is often ideal here.

**5. What is the time period where both printers will cost the same?**

We already know:

* Inkjet TCO: $3,099.22
* Laser TCO: $15,221.22
* Let x be the number of pages where both printers cost the same.

Let’s find cost per page:

* Inkjet: $628 / 195,000 = ~$0.00322 per page (excluding base + paper)
* Laser:$12,930 / 195,000 = ~$0.0663 per page (excluding base + paper)

Now, solve for x where total cost = same:

Inkjet TCO=Laser TCO288+(x×0.00322)=108+(x×0.0663)\text{Inkjet TCO} = \text{Laser TCO} \\ 288 + (x \times 0.00322) = 108 + (x \times 0.0663)Inkjet TCO=Laser TCO288+(x×0.00322)=108+(x×0.0663) 180=x(0.0663−0.00322)x=1800.06308≈2,853 pages180 = x(0.0663 - 0.00322) \\ x = \frac{180}{0.06308} ≈ 2,853 \text{ pages}180=x(0.0663−0.00322)x=0.06308180​≈2,853 pages

Break-even point ≈ 2,853 pages

**Lab 2 amazon\_ec2\_web\_services.md**

**A screenshot of a computer

AI-generated content may be incorrect.**setup AWS instance named ISEA **A screenshot of a computer program

AI-generated content may be incorrect.**setup ssh and able to login to AWS server

**Lab 2 bash\_coding\_lab.md**

**Reflection Answers**

Navigating the File System and Managing Files

1. What command did you use to create a new directory?  
   mkdir LabFiles
2. How can you view the contents of a file without opening it in a GUI-based text editor?  
   Use cat, less, or more. For example: cat notes.txt
3. What is the difference between cp and mv commands?
   * cp copies the file or directory, keeping the original intact.
   * mv moves or renames it, removing the original.

Creating and Executing Basic Bash Scripts

1. What is the purpose of the chmod +x command?  
   It makes a script file executable by setting execute permissions.
2. Why do we use the shebang (#!/bin/bash) at the beginning of scripts?  
   It tells the system which interpreter to use to execute the script.
3. How can you modify the script to display a personalized message?  
    Add a variable and use read, like:  
   bash  
   CopyEdit  
   read -p "Enter your name: " name  
   echo "Welcome, $name, to the Bash scripting lab!"

**Implementing Loops and Conditionals**

1. How does the for loop in the script operate?  
   It iterates from 1 to 5 and prints the current iteration with a 1-second pause
2. What happens if a user enters a number greater than 10?  
   It prints "Number out of range."
3. How can you modify the script to handle invalid inputs gracefully?  
   Use a while loop to keep prompting until a valid number is entered, instead of using continue outside a loop context (which is invalid in this case)

**Automating System Monitoring Tasks**

1. What information does the free -h command provide?  
   It shows memory usage (total, used, free, etc.) in a human-readable format
2. How can you modify the script to monitor network usage?  
   Add:  
   bash  
   echo "Network Usage:"  
   ifconfig
3. Why is automating system monitoring beneficial for administrators?
   * Saves time by automating repetitive checks.
   * Enables regular and consistent monitoring.
   * Can be used for logging and alerting for anomalies.