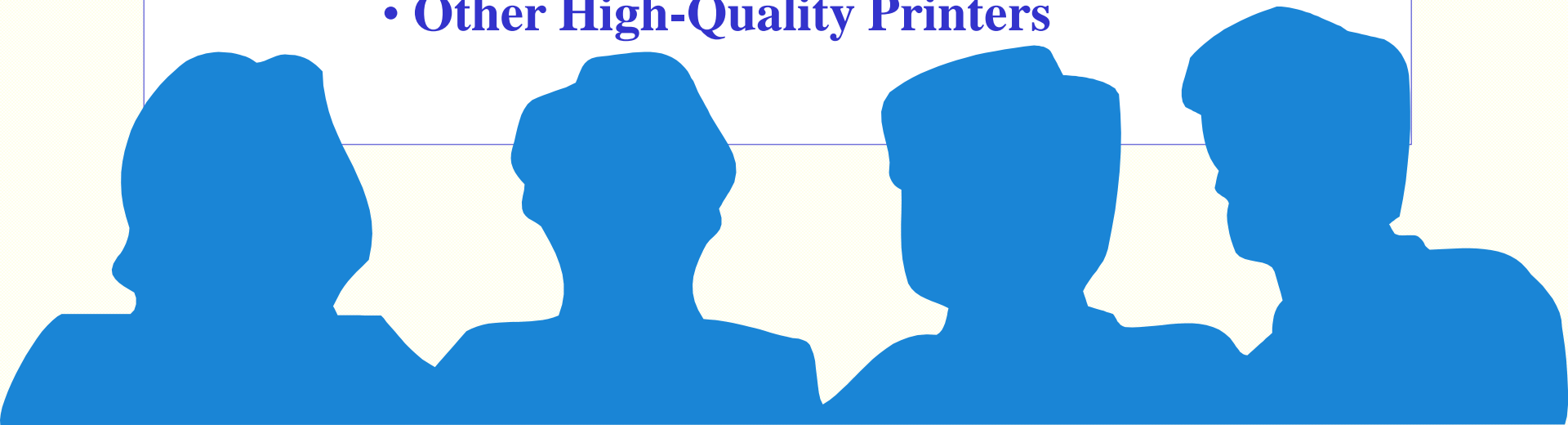


LESSON 6

Devices that Output Hard Copy

This lesson includes the following sections:

- **Overview of Printers**
- **Dot Matrix Printers**
- **Ink Jet Printers**
- **Laser Printers**
- **Snapshot Printers**
- **Other High-Quality Printers**



Overview of Printers

- **Categorizing Printers**
- **Evaluating Printers**

Overview of Printers - Categorizing Printers

Printers fall into two categories:

- **Impact printers use a device to strike an inked ribbon, pressing ink from the ribbon onto the paper.**
- **Non-impact printers use different methods to place ink (or another substance) on the page.**

Overview of Printers - Evaluating Printers

When evaluating printers, consider four criteria:

- **Image quality** – Measured in dots per inch (dpi). Most printers produce 300 – 600 dpi.
- **Speed** – Measured in pages per minute (ppm) or characters per second (cps).
- **Initial cost** – Consumer printers cost \$250 or less, but professional printers can cost thousands of dollars.
- **Cost of operation** – This refers to the cost of supplies used by the printer.

Overview of Printers - Evaluating Printers

- **Impact Printers**— The impact printers print the characters by striking them on the ribbon which is then pressed on the paper.

Characteristics of Impact Printers are the following:

- Very low consumable costs
- Very noisy
- Useful for bulk printing due to low cost
- There is physical contact with the paper to produce an image

Overview of Printers - Evaluating Printers

- **Non-impact Printers**—Non-impact printers print the characters without using ribbon. These printers print a complete page at a time so they are also called as Page Printers.

Characteristics of Non-impact Printers

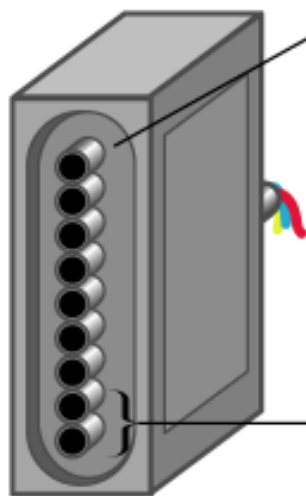
- Faster than impact printers.
- They are not noisy.
- High quality.
- Support many fonts and different character size.

Dot Matrix Printers

- **How Do Dot Matrix Printers Work?**
- **Performance**

Dot Matrix Printers - How Do Dot Matrix Printers Work?

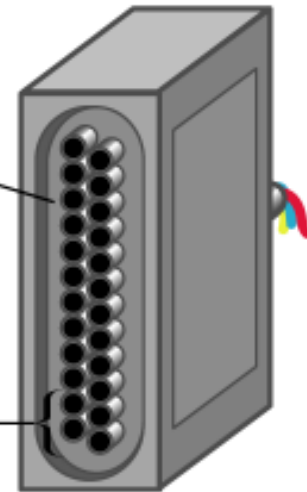
- **Dot matrix printers are a common type of impact printer.**
- **A dot matrix printer's print head contains a cluster of pins. The printer can push the pins out to form patterns in rapid sequence.**
- **The pins press an inked ribbon against the paper, creating an image.**



In a 9-pin print head, the pins are aligned in a single row.

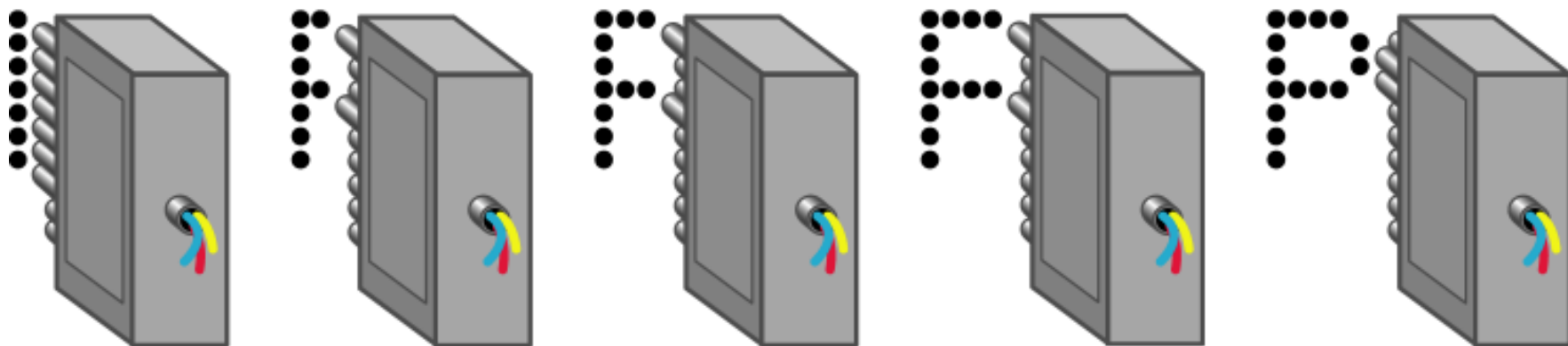
In a 24-pin print head, the pins are "staggered" in two rows. This enables it to print overlapping dots, creating finer characters and lines.

The bottom pins are used for the portions of lowercase letters that extend below the line, such as *g* or *q*.



PRINT HEAD

PRINT HEAD



Direction of print head

Dot Matrix Printers - Performance

- **Lower-resolution dot matrix printers use nine pins. Higher-resolution models have 24 pins.**
- **Speed is measured in characters per second (cps). Some dot matrix printers print 500 cps.**

Advantages

- Inexpensive
- Widely Used
- Other language characters can be printed

Disadvantages

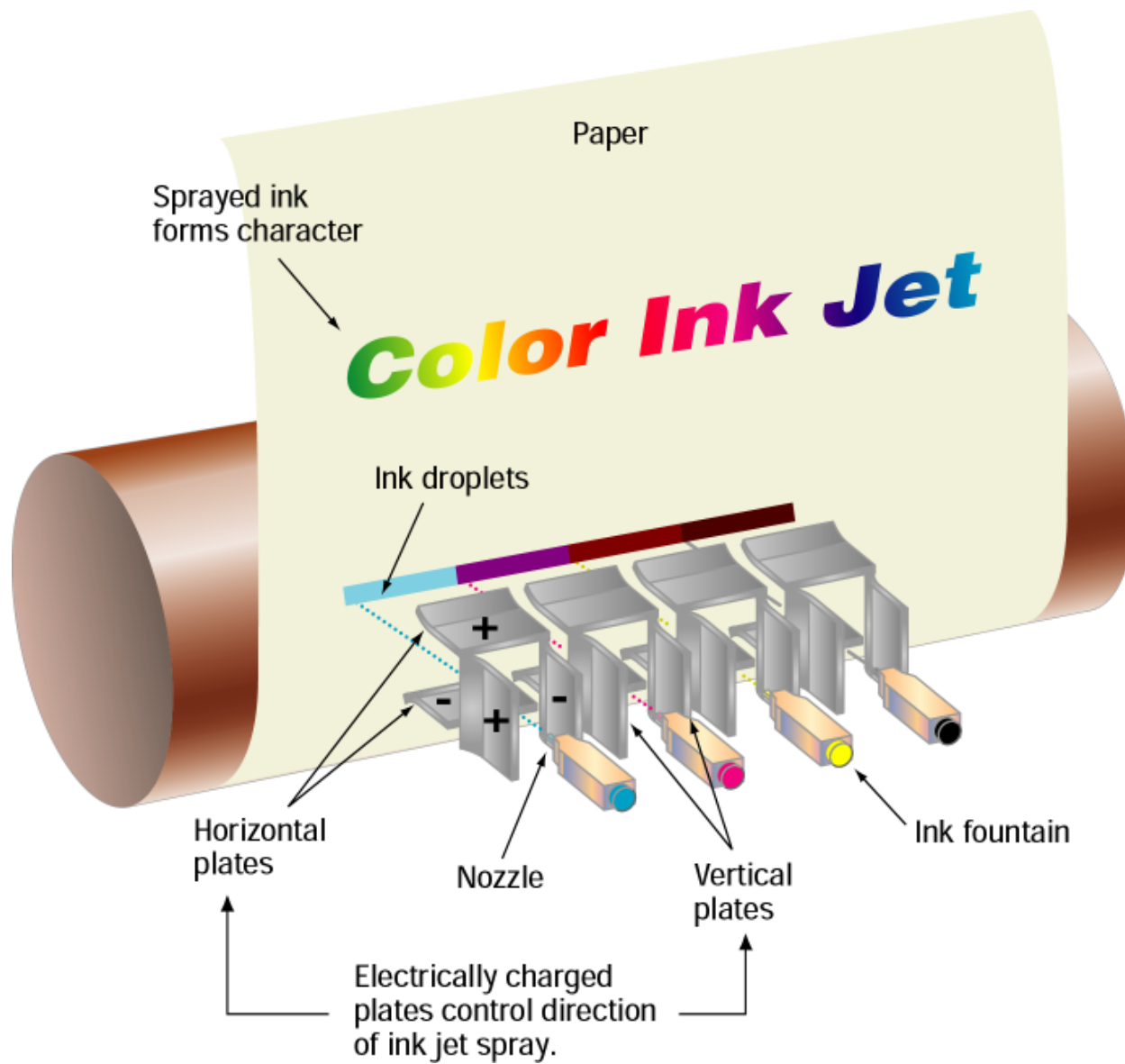
- Slow Speed
- Poor Quality

Ink Jet Printers

- **How Do Ink Jet Printers Work?**
- **Performance**

Ink Jet Printers – How Do Ink Jet Printers Work?

- **Ink jet printers are an example of non-impact printers.**
- **The printer sprays tiny droplets of ink onto the paper.**
- **Ink jet printers are available for color and black-and-white printing.**



Ink Jet Printers - Performance

- Ink jet printers offer speeds of (2 – 4 pages per minute **ppm**) and resolution (300 – 600 dots per inch **dpi**), comparable to low-end laser printers.
- Ink jet printers are inexpensive and have low operating costs.

Laser Printers

- **How Do Laser Printers Work?**
- **Performance**

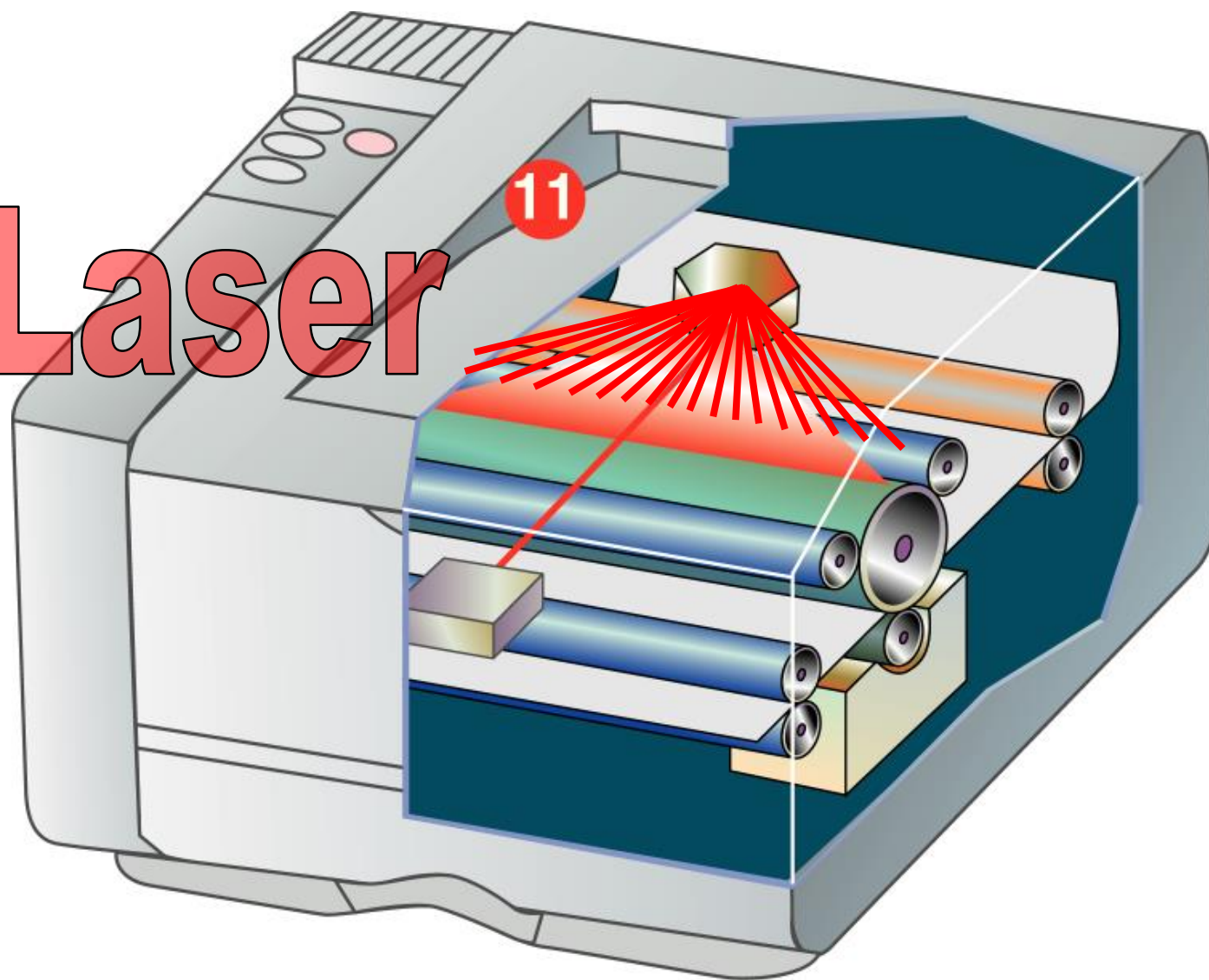
Laser Printer Advantages

- Very high speed
- Very high quality output
- Give good graphics quality
- Support many fonts and different character size

Laser Printer Disadvantages

- Expensive
- Cannot be used to produce multiple copies of a document in a single printing.

Laser

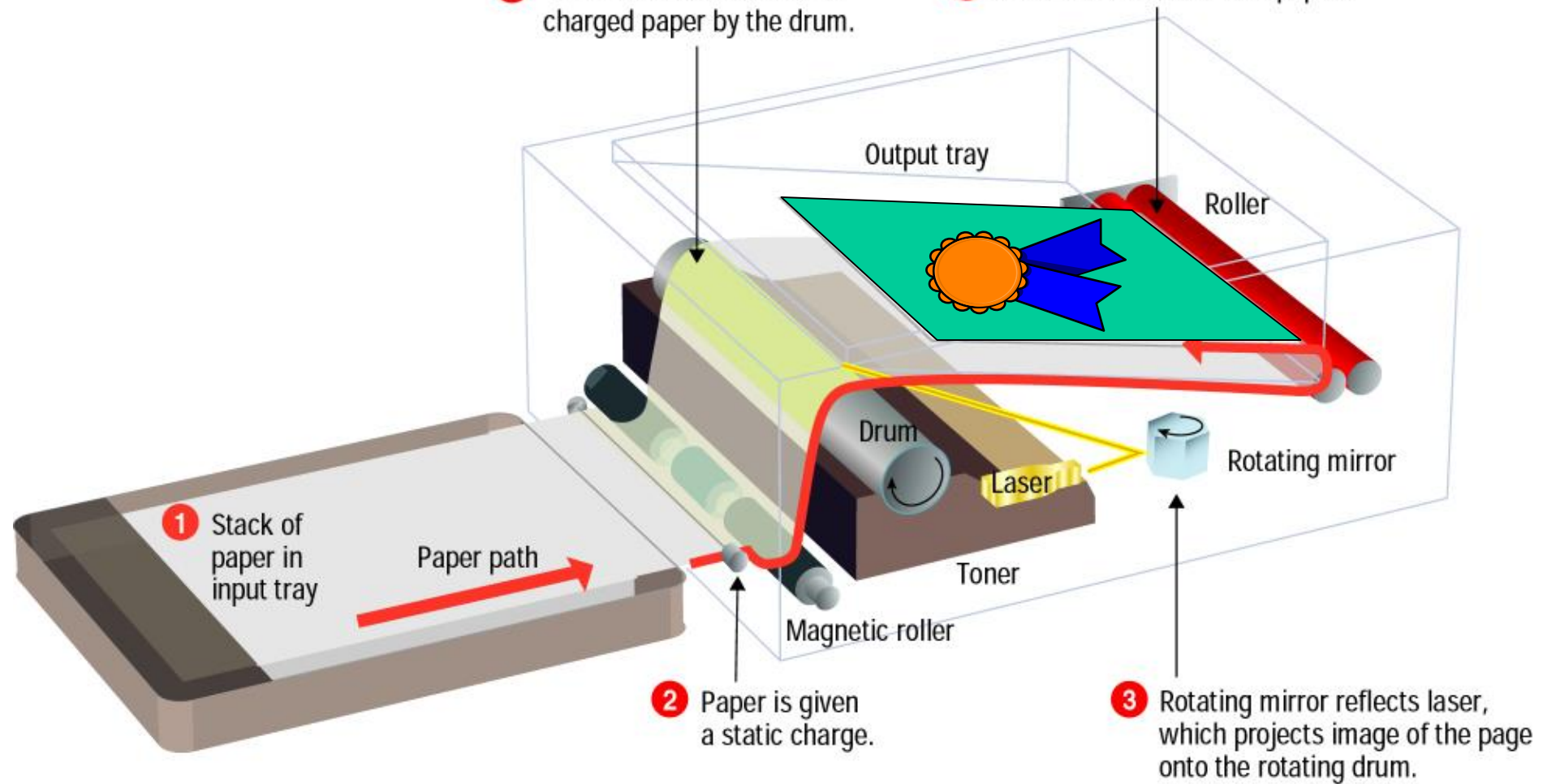


Laser Printers – How Do Laser Printers Work?

- **Laser printers are non-impact printers.**
- **They use heat and pressure to bond particles of toner to paper.**
- **Laser printers are available for color and black-and-white printing.**

4 Toner is transferred to the charged paper by the drum.

5 Hot roller bonds toner to paper.



Laser Printers - Performance

- **Laser printers provide resolutions from 300 – 1200 dpi and higher.**
- **Black-and-white laser printers usually produce 4 – 16 ppm.**
- **Laser printers produce higher-quality print than ink jet printers, but are more expensive.**

Snapshot Printers

- Snapshot printers are specialized, small-format printers that print digital photographs.
- Snapshot printers are fairly slow, and can be more expensive to operate



Snapshot printers are popular among digital camera users

Other High-Quality Printers

Print shops and publishers use these printers to create high-quality color images:

- **Thermal-wax**
- **Dye-sublimation**
- **Fiery**
- **IRIS**
- **Plotters**



Inkjet Plotter

Plotters use mechanical, ink jet, or thermal technology to create large-format images for architectural or engineering uses.