Fingerprint Basics

Fingerprint Principles

According to criminal investigators, fingerprints follow 3 fundamental principles:

▶ A fingerprint is an **individual** characteristic; no two people have been found with the **exact** same fingerprint pattern.

▶ A fingerprint **pattern** will remain **unchanged** for the **life** of an individual; however, the print itself may change due to permanent scars and diseases.

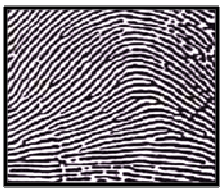
▶ Fingerprints have general characteristic **ridge** patterns that allow them to be systematically identified.

Fingerprint Classes

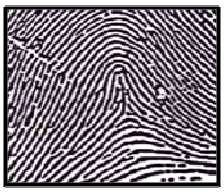
Fingerprints can be classified into three different groups based on the pattern of the ridges.

Arches

Ridges enter on one side & exit on the other side.



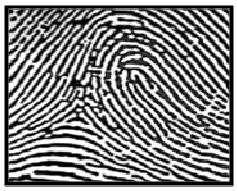
Plain Arch



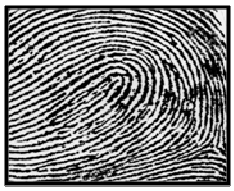
Tented Arch

Loops

Ridges enter on one side & exit on the same side



L - Radial Loop
R - Ulnar Loop



L - Ulnar Loop
R - Radial Loop

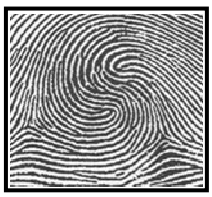
Whorls

Consists of circles, more than one loop, or a mixture of pattern types

Plain Whorl

Central Pocket Whorl

Double Loop Whorl



Accidental Whorl

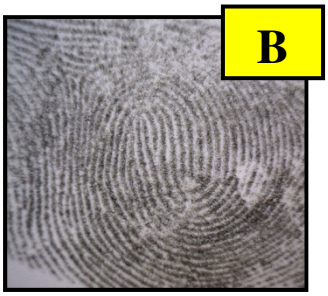
Did you know?

Dactyloscopy is the study of fingerprint identification. Police investigators are experts in collecting "**dactylograms**", otherwise known as fingerprints.

Can you identify each pattern?

A

B



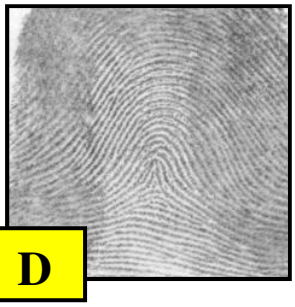
(L) **(R)**

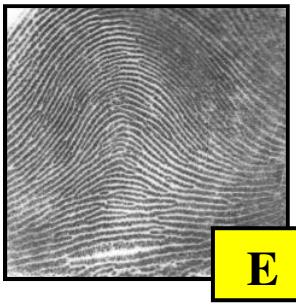
C

(R)

(R) **(L)**

D





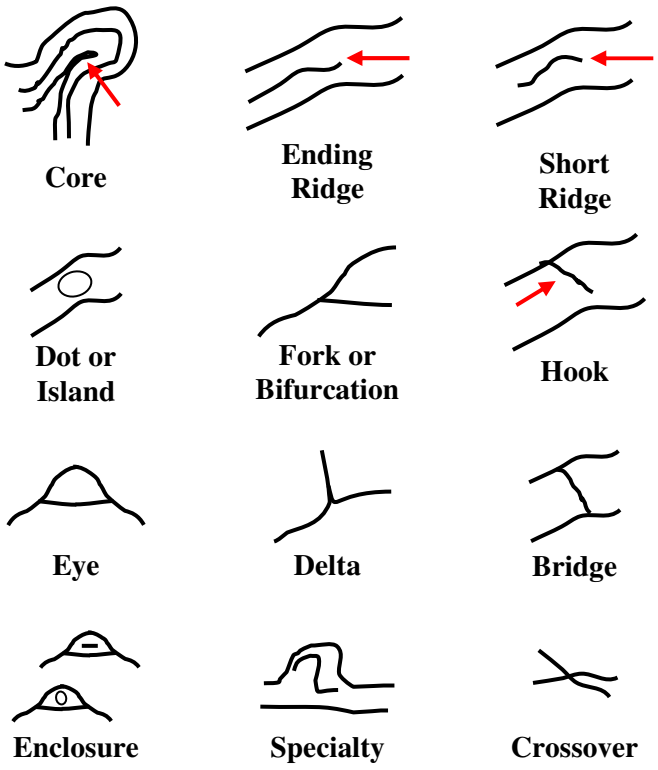
E

Fingerprint Factoid

Approximately 60% of people have loops, 35% have whorls, and 5% have arches.

Ridge Characteristics

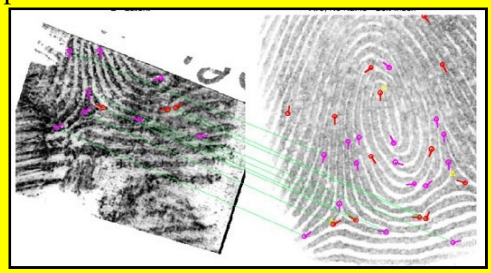
Fingerprints also have minutiae points, which are points where the ridge structure changes. These are useful in matching a fingerprint to a specific person.



How many different ridge characteristics can you find on this fingerprint?

http://www.dkfz.de/tbi/projects/bmcv/images/iu_it246_04s_fingerprint1.jpg

The **Automated Fingerprint Identification System (AFIS)** is a computerized system capable of reading, classifying, matching, and storing fingerprints for criminal justice agencies. It uses computer algorithms to mark all minutia points, cores, and deltas on the print, which are used to find possible matches with fingerprints in the database.



Did you know?

Camel hair is the most common animal hair used to make fingerprint brushes. Now many brushes are made out of fiberglass.

Latent Prints

Latent prints: Impressions left by friction ridge skin on a surface, such as a tool handle, glass, door, etc.

Prints may be collected by revealing them with a dusting of **black powder** and then lifted with a piece of **clear tape**.

Some investigators use **fluorescent** powder and UV lights to help them find latent prints on multi-colored or dark surfaces.

Magnetic powder can also be used to reveal latent prints and works on shiny surfaces or plastic baggies or containers.

The **cyanoacrylate** fuming method (super glue method) is a procedure that is used to develop fingerprints on a variety of objects.

Ninhydrin is a chemical that bonds with the amino acids in fingerprints and will produce a blue or purple color. It works well on paper or cardboard surfaces.