Day 13 - Forensics – 9-12-24 to 9-13-24

NO CELL PHONES, EARBUDS, HEADPHONES - On Schoology: Submit WarmUp after completing.

WARMUP - (10 min) - Fingerprints

1) Explain the difference between a fingerprint arch and a loop.

2) List (5) fingerprint minutiae.

Submit WarmUp on Schoology as soon as completed.

NOTES:

A **fingerprint arch** and a **fingerprint loop** are two of the fundamental patterns used to classify fingerprints. Here's a breakdown of their key differences:

1. **Arch**:
    - In an arch pattern, ridges enter from one side of the finger, rise in the center, and exit on the opposite side, forming a wave-like appearance.
    - There are no **deltas** (triangular points where ridge lines diverge) in a simple arch, but in a tented arch, there may be a single delta.
    - Arches are the least common fingerprint pattern, making up around 5% of all fingerprints.
    - There are two main types of arches:
        - **Plain Arch**: A smooth wave of ridges with a gentle rise.
        - **Tented Arch**: Sharper, more pointed ridges resembling a tent.
2. **Loop**:
    - A loop pattern has ridges that enter from one side of the finger, curve around, and exit on the same side from which they entered.
    - Loops always contain at least **one delta**.
    - This is the most common fingerprint pattern, making up about 60-70% of all fingerprints.
    - Loops are further classified based on the direction of the ridges:
        - **Ulnar Loop**: Ridges open toward the little finger (ulna side of the hand).
        - **Radial Loop**: Ridges open toward the thumb (radius side of the hand).

In summary, an **arch** has a wave-like ridge structure without a delta, while a **loop** has a curving ridge pattern with a delta and the ridges loop back on themselves.

Fingerprint minutiae refer to the small details in the ridge patterns that help identify individuals. These minutiae are crucial for matching fingerprints in forensic science. Here's a list of the most common fingerprint minutiae:

1. **Ridge Ending**: A ridge that simply ends abruptly.
2. **Bifurcation**: A ridge that splits into two ridges, forming a fork-like structure.
3. **Dot (or Island)**: A very short ridge, almost like a small dot between two ridges.
4. **Short Ridge (or Independent Ridge)**: A ridge that is shorter than the surrounding ridges but still longer than a dot.
5. **Enclosure (or Lake)**: A ridge that forms an oval or circular shape, enclosing a space.
6. **Ridge Crossing**: Two ridges that intersect each other at a point.
7. **Spur (or Hook)**: A small ridge that branches off from a longer ridge but then ends abruptly.
8. **Delta**: A triangular-shaped ridge formation where ridges radiate outward. It is often found in loops and whorls.
9. **Core**: The center point of a loop or whorl fingerprint pattern. It is the innermost point of the pattern's ridge system.
10. **Bridge**: A small ridge that connects two parallel ridges.
11. **Crossover**: A ridge that connects two separate parallel ridges, forming a bridge-like structure.
12. **Trifurcation**: A ridge that splits into three ridges at a single point, similar to a bifurcation but with three branches.
13. **Ridge Dot (Poroscopy)**: Tiny sweat pores along the ridges, used in advanced fingerprint analysis (not always considered minutiae, but important in some identification cases).