**2. Describe the frame format of the 802.11 MAC header and explain the purpose of each fields.**

In wireless communication (Wi-Fi), the 802.11 MAC header has several fields that help manage how data is sent between devices.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Frame Control | Duration/ID | Address 1 | Address 2 | Address 3 | Sequence Control | Address 4 | OoS Control | HT Control |

**Frame Control (2 octets):**

* Tells the type of frame (management, control, or data).
* Also includes flags like To DS, From DS, Retry, etc.

**Duration/ID (2 octets):**

* Shows how long the channel will be busy.
* Helps in avoiding collisions by letting other devices wait.

**Address 1 (6 octets):**

* Usually the **receiver address** – the device meant to receive the frame.

**Address 2 (6 octets):**

* The **transmitter address** – the device sending the frame.

**Address 3 (6 octets):**

* Can be the final destination or the BSSID depending on the frame type.

**Sequence Control (2 octets):**

* Contains fragment and sequence numbers.
* Helps reorder frames correctly if they are broken into pieces.

**Address 4 (6 octets):**

* Used only in certain modes like WDS (when frames go through multiple access points).
* It holds extra addressing info.

**QoS Control (2 octets):**

* Quality of Service information.
* Helps prioritize traffic like voice or video.

**HT Control (4 octets):**

* Used in high-throughput (802.11n) networks.
* Helps in managing advanced features like beamforming.