**PART 2: UNERSTANDING THE SAMPLE CONTROLLER**

Switch Feature Handler: The switch\_features\_handler function is a critical component of the SDN controller. It handles the initial handshake between a switch and the controller by processing the EventOFPSwitchFeatures event. During this interaction, the controller learns about the switch's capabilities and installs a table-miss flow. This setup ensures that the switch has default behavior for unmatched packets, enabling the controller to dynamically manage flows and take control of packet forwarding decisions.

Table-Miss Flow: The table-miss flow acts as a fallback mechanism for packets that do not match any pre-installed flow rules in the switch. Without this rule, such packets would be dropped, leading to data loss and inefficiency in the network. By creating a rule with the lowest priority that matches all packets and directs unmatched packets to the controller, the SDN controller can analyze these packets and decide the next steps dynamically. This functionality is vital for network adaptability, as it allows the controller to dynamically install flow rules or take custom actions based on real-time traffic patterns.

Packet-In Handler: The packet\_in\_handler is responsible for processing packets sent to the controller by the switch, typically as a result of the table-miss flow. This handler extracts critical information about the packet, such as the input port and raw data, and uses it to determine the appropriate action. In this implementation, unmatched packets are flooded to all switch ports to ensure they reach their destination. This behavior can be modified to implement advanced logic, such as learning switch functionality or more complex routing decisions. Additionally, the handler provides a logging mechanism, which helps in monitoring the network and debugging issues.