Project 1 Packet Format

Ethernet Frame

Destination address	Source address	Type	Payload

Type: ARP or IPv4

ARP packet

Opcode	Src MAC address	Src IP address	Dst MAC address	Dst IP address	Payload

Opcode: ARP request or ARP reply

IPv4 packet

Version	…	TTL	Checksum	Src IP address	Dst IP address	Payload

ICMP packet

Type	Code	Checksum	Identifier	Sequence num	Data

IPv4 header also contains header length, total length, ID, flags, fragment offset, and protocol fields.

Forwarding Pseudocode: ARP

- 1. Find input network interface: findIfaceByName. Drop packet if interface is unknown

2. Read ethernet header and check the eth_type field. Ignore all but ARP and IPv4 types

3. If eth_type is ARP:

   a. If ARP Request packet:

   - Prepare and send ARP response packet

   b. If ARP Response packet:

   - record IP-MAC mapping information in ARP cache
   - send out all enqueued packets for ARP entry

Forwarding Code: IPv4

- 4. If eth_type is IPv4:
  - verify checksum, length, discard invalid packets
  - if packet is to router: GO TO 7
- 5. Use the Longest Prefix Match algorithm to find a next-hop IP address in the routing table
- 6. Lookup ARP cache for MAC address mapped to the next hop destination IP address
  -- If valid entry found: forward packet
  - Else: queue received packet and send ARP request to discover the IP-MAC mapping.
- 7. If ICMP packet:
  - handle Ping: send ICMP echo reply back