Q4) You are given three IP addresses: 192.168.10.5, 172.20.15.1, and 8.8.8.8. Identify the class of each IP address. Determine if it is private or public. Explain how NAT would handle a private IP when accessing the internet.

Class of Each IP Address:

IP Address	First Octet	Class	Default Subnet Mask
192.168.10.5	192	Class C	255.255.255.0 (/24)
172.20.15.1	172	Class B	255.255.0.0 (/16)
8.8.8.8	8	Class A	255.0.0.0 (/8)

IP Address	Private/Public	Reason
192.168.10.5	**Private**	Falls within `192.168.0.0 – 192.168.255.255` (Private Class C range)
172.20.15.1	**Private**	Falls within `172.16.0.0 – 172.31.255.255` (Private Class B range)
8.8.8.8	**Public**	Not in any private IP range; a well-known public Google DNS server

How NAT Handles Private IPs for Internet Access

- **Problem:** Private IPs **cannot be routed on the public internet**.
- **Solution: Network Address Translation (NAT)** maps private IPs to a public IP before sending packets to the internet.
- **Process:**
    - A device with a **private IP** (e.g., 192.168.10.5) sends a request to an external server (e.g., 8.8.8.8).
    - The router performing **NAT** replaces the **private source IP** with its **public IP**.
    - The external server replies to the **public IP** of the router.
    - The NAT router maps the response back to the originating **private IP** inside the network.
- **Example (Before and After NAT)**
    - **Before NAT:** 192.168.10.5 → 8.8.8.8
    - **After NAT:** 50.50.50.1 → 8.8.8.8 (Where 50.50.50.1 is the router's public IP)