4 . 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.

1. 192.168.10.5

* Class: Class C
* Private : Falls within **192.168.0.0 – 192.168.255.255** (Private IP Range)

1. 172.20.15.1

* Class: class B
* Private : Falls within **172.16.0.0 – 172.31.255.255** (Private IP Range)

1. 8.8.8.8

* Class: class A
* Public: Falls within 1.0.0.0 – 126.255.255.255

**How NAT Handles Private IPs for Internet Access**

1. **Private IPs Cannot Access the Internet Directly**
   * Private IPs (like 192.168.x.x and 172.20.x.x) are **not routable** on the public internet.
   * They must be translated to a **public IP** using **Network Address Translation (NAT)**.
2. **NAT Process (Example with 192.168.10.5 → Internet)**
   * **Before NAT**: 192.168.10.5 (Private IP)
   * **Router with NAT**:
     + Maps 192.168.10.5 to a **public IP** (e.g., 200.100.100.5).
     + Uses **Port Address Translation (PAT)** to allow multiple private IPs to share one public IP.
   * **After NAT**: External websites see 200.100.100.5, not 192.168.10.5.
3. **Types of NAT**
   * **Static NAT**: Maps one private IP to one public IP (1:1).
   * **Dynamic NAT**: Maps private IPs to a **pool** of public IPs.
   * **PAT (Overloaded NAT)**: Maps multiple private IPs to **one** public IP using different ports