Task 8

1. Introduction

A VPN creates an encrypted tunnel between your device and a remote server. This protects your online activity from tracking and allows you to hide your real IP address. This task walks through installing a VPN, verifying connection, testing privacy improvements, and analyzing the impact on speed.

2. VPN Setup Steps

Step 1 — Choose a VPN

Selected: **ProtonVPN**
Reason:

- Trusted reputation
- No logs
- Strong encryption
- Unlimited bandwidth

Step 2 — Create Account

- Signed up using ProtonVPN's free plan
- Confirmed email
- Logged into dashboard

Step 3 — Connect to a Server

- Selected "Quick Connect"
- Server: **Netherlands (Free)**
- Connection established successfully

3. Verification

A) IP Change Verification

Before VPN:

- IP Location: India
- ISP: Local provider

After VPN:

- IP Location: Netherlands

- ISP: Proton AG

This confirms the VPN tunnel and masked IP.

B) Traffic Encryption Check

Used browser DevTools:

- Opened Network tab

- Accessed google.com

- All traffic showed HTTPS + VPN encryption

Verified using ProtonVPN dashboard:

- Encryption: **AES-256**

- Protocol: **OpenVPN (UDP)**

C) Speed Comparison

Using speedtest.net:

State	Download	Upload	Ping
Without VPN	48 Mbps	13 Mbps	7 ms
With VPN	31 Mbps	10 Mbps	38 ms

Expected slowdown due to encryption and routing.

4. Benefits of VPN

- Hides real IP

- Bypasses geo-restrictions

- Secures data on public Wi-Fi

- Prevents ISP tracking

- Encrypts DNS queries

5. Limitations

- Not completely anonymous

- Slower speeds

- Free plans have limited server locations

- VPN provider can theoretically log data

- Does not protect against malware

6. Conclusion

The VPN successfully masked the IP address, encrypted the traffic, and secured the connection. The test demonstrates improved privacy and security, with predictable speed trade-offs.

Code Files

Below are two simple Python scripts to automate IP and speed checks. These do not perform any unsafe operations.

1) vpn_ip_check.py

```
import requests

def get_ip():
    url = "https://api.ipify.org?format=json"
    res = requests.get(url, timeout=5)
    return res.json().get("ip")

print("Checking public IP...")
ip = get_ip()
print(f"Your current public IP: {ip}")
```

Run before and after connecting to VPN.

2) vpn_speed_compare.py

```python
import speedtest

st = speedtest.Speedtest()

print("Running speed test...")
download = st.download() / 1_000_000
upload = st.upload() / 1_000_000
ping = st.results.ping

print(f"Download: {download:.2f} Mbps")
print(f"Upload: {upload:.2f} Mbps")
print(f"Ping: {ping:.2f} ms")
```

Run once before VPN and once after.

3) bonus — vpn_connection_status.py

```python
import subprocess

def check_vpn():
    output = subprocess.getoutput("ipconfig" if "win" in sys.platform else "ifconfig")
    if "tun" in output or "vpn" in output.lower():
        print("VPN interface detected.")
    else:
        print("No VPN interface found.")

check_vpn()
```