

## PRACTICAL 7

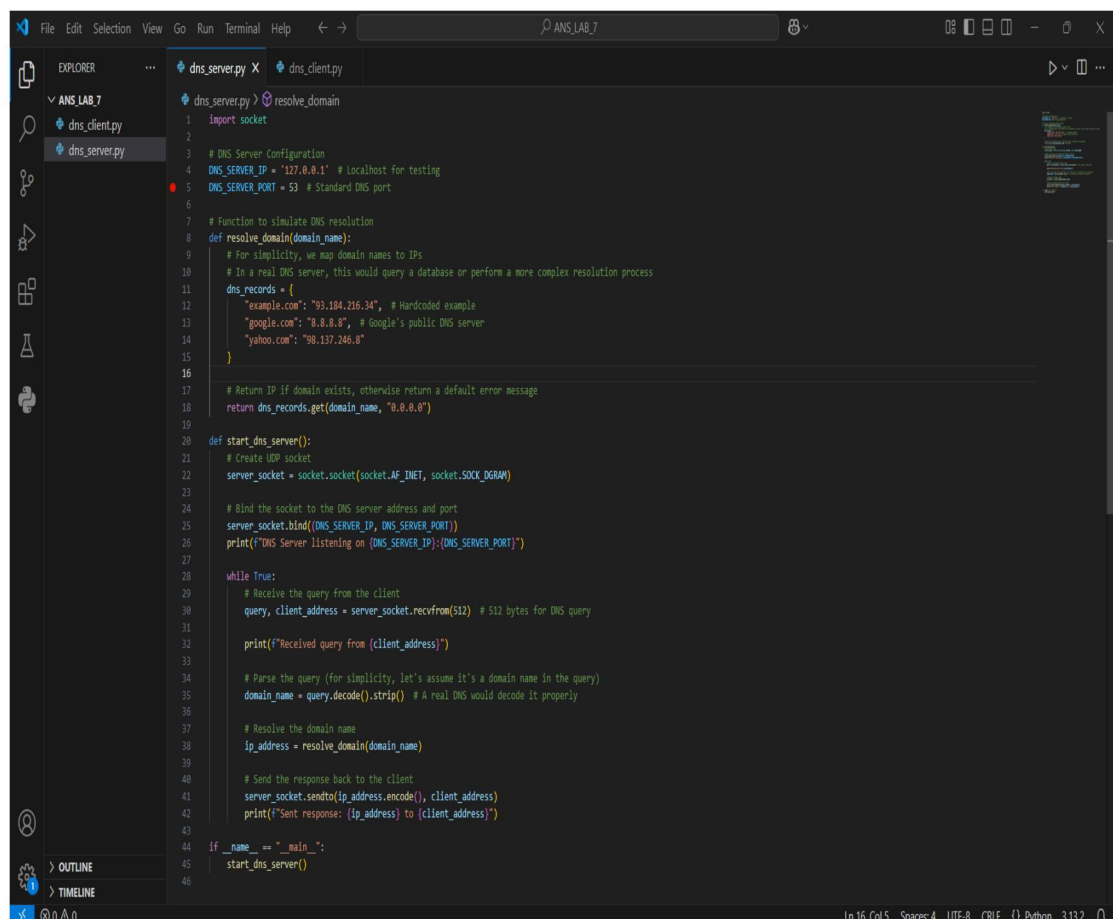
**Aim:** Simulation of DNS using UDP sockets.

**DNS Server:** A server that listens for queries and responds with the appropriate IP address.

The server will listen for DNS queries, process them, and send back an appropriate response. This example will simulate a very basic DNS server that responds with a predefined IP address.

**Code:**

**Dns\_server.py**

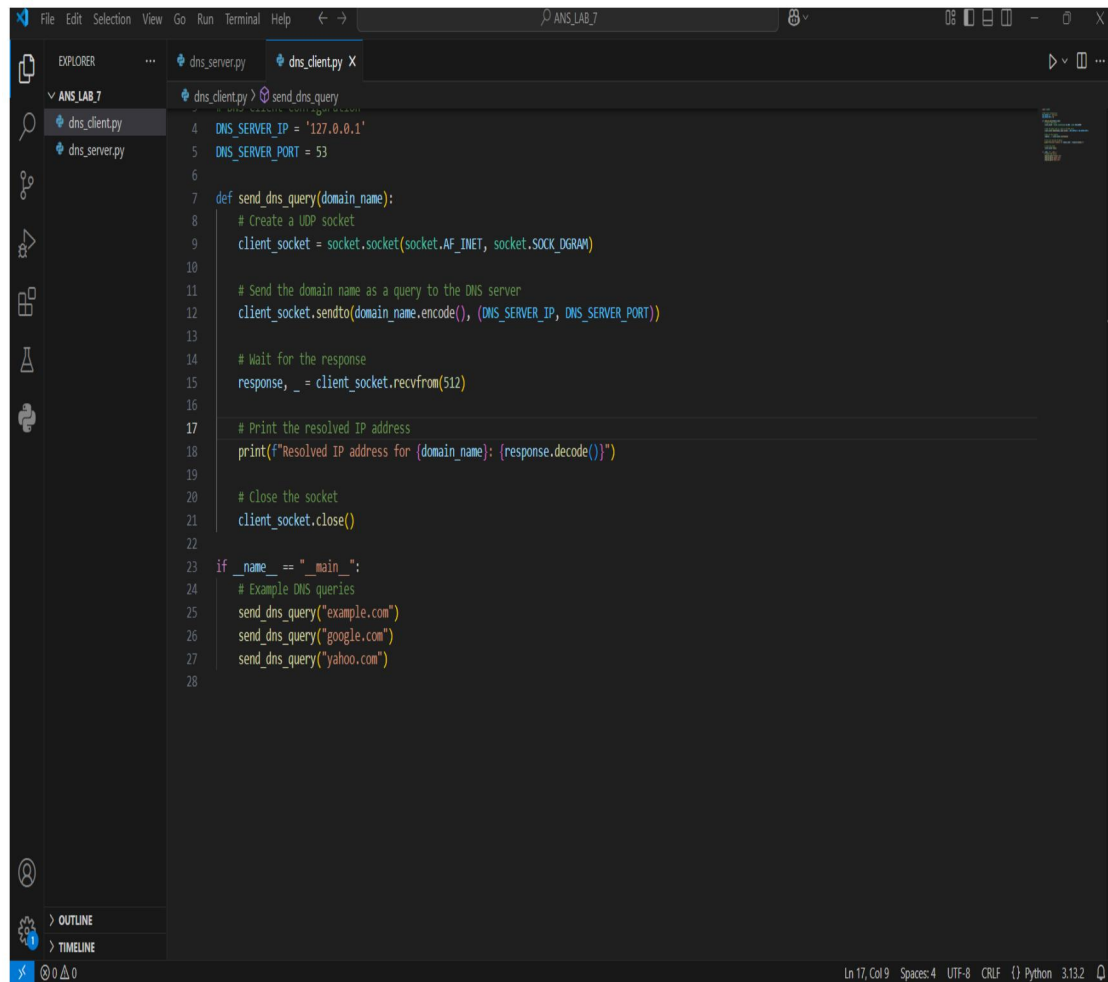
A screenshot of a code editor window titled 'ANS\_LAB\_7'. The editor shows a Python script named 'Dns\_server.py'. The script is a simple DNS server simulation using UDP sockets. It defines a 'resolve\_domain' function that maps domain names to IP addresses from a predefined dictionary. The main function, 'start\_dns\_server', creates a UDP socket, binds it to '127.0.0.1' on port 53, and enters a loop to receive and respond to client queries. The status bar at the bottom indicates 'Ln 16, Col 5', 'Spaces: 4', 'UTF-8', 'CRLF', and 'Python 3.13.2'.

```
1  import socket
2
3  # DNS Server Configuration
4  DNS_SERVER_IP = '127.0.0.1' # Localhost for testing
5  DNS_SERVER_PORT = 53 # Standard DNS port
6
7  # Function to simulate DNS resolution
8  def resolve_domain(domain_name):
9      # For simplicity, we map domain names to IPs
10     # In a real DNS server, this would query a database or perform a more complex resolution process
11     dns_records = {
12         "example.com": "93.184.216.34", # Hardcoded example
13         "google.com": "8.8.8.8", # Google's public DNS server
14         "yahoo.com": "98.137.246.8"
15     }
16
17     # Return IP if domain exists, otherwise return a default error message
18     return dns_records.get(domain_name, "0.0.0.0")
19
20 def start_dns_server():
21     # Create UDP socket
22     server_socket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
23
24     # Bind the socket to the DNS server address and port
25     server_socket.bind((DNS_SERVER_IP, DNS_SERVER_PORT))
26     print(f"DNS Server listening on (DNS_SERVER_IP):(DNS_SERVER_PORT)")
27
28     while True:
29         # Receive the query from the client
30         query, client_address = server_socket.recvfrom(512) # 512 bytes for DNS query
31
32         print(f"Received query from {client_address}")
33
34         # Parse the query (for simplicity, let's assume it's a domain name in the query)
35         domain_name = query.decode().strip() # A real DNS would decode it properly
36
37         # Resolve the domain name
38         ip_address = resolve_domain(domain_name)
39
40         # Send the response back to the client
41         server_socket.sendto(ip_address.encode(), client_address)
42         print(f"Sent response: {ip_address} to {client_address}")
43
44 if __name__ == "__main__":
45     start_dns_server()
46
```

**DNS Client:** A client that queries a DNS server for a domain's IP address.

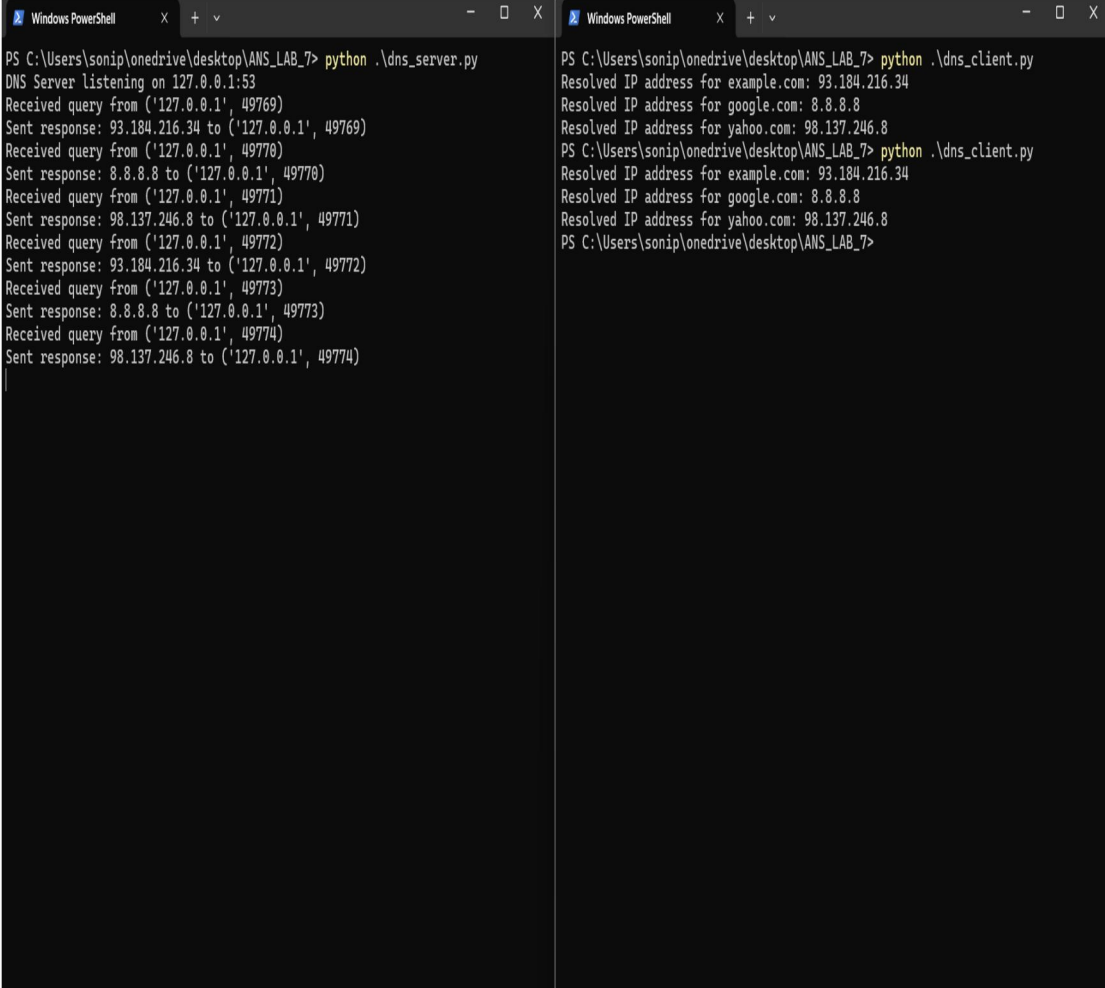
This client will create a UDP socket, send a DNS query to a DNS server, and wait for the response.

### Dns\_client.py



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ANS_LAB_7
EXPLORER
  ANS_LAB_7
    dns_client.py
    dns_server.py
  dns_client.py X
    dns_client.py > send dns query
      4 DNS_SERVER_IP = '127.0.0.1'
      5 DNS_SERVER_PORT = 53
      6
      7 def send_dns_query(domain_name):
      8     # Create a UDP socket
      9     client_socket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
      10
      11     # Send the domain name as a query to the DNS server
      12     client_socket.sendto(domain_name.encode(), (DNS_SERVER_IP, DNS_SERVER_PORT))
      13
      14     # Wait for the response
      15     response, _ = client_socket.recvfrom(512)
      16
      17     # Print the resolved IP address
      18     print(f"Resolved IP address for {domain_name}: {response.decode()}")
      19
      20     # Close the socket
      21     client_socket.close()
      22
      23 if __name__ == "__main__":
      24     # Example DNS queries
      25     send_dns_query("example.com")
      26     send_dns_query("google.com")
      27     send_dns_query("yahoo.com")
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```

## Output:



```
PS C:\Users\sonip\onedrive\desktop\ANS_LAB_7> python .\dns_server.py
DNS Server listening on 127.0.0.1:53
Received query from ('127.0.0.1', 49769)
Sent response: 93.184.216.34 to ('127.0.0.1', 49769)
Received query from ('127.0.0.1', 49770)
Sent response: 8.8.8.8 to ('127.0.0.1', 49770)
Received query from ('127.0.0.1', 49771)
Sent response: 98.137.246.8 to ('127.0.0.1', 49771)
Received query from ('127.0.0.1', 49772)
Sent response: 93.184.216.34 to ('127.0.0.1', 49772)
Received query from ('127.0.0.1', 49773)
Sent response: 8.8.8.8 to ('127.0.0.1', 49773)
Received query from ('127.0.0.1', 49774)
Sent response: 98.137.246.8 to ('127.0.0.1', 49774)

PS C:\Users\sonip\onedrive\desktop\ANS_LAB_7> python .\dns_client.py
Resolved IP address for example.com: 93.184.216.34
Resolved IP address for google.com: 8.8.8.8
Resolved IP address for yahoo.com: 98.137.246.8
PS C:\Users\sonip\onedrive\desktop\ANS_LAB_7> python .\dns_client.py
Resolved IP address for example.com: 93.184.216.34
Resolved IP address for google.com: 8.8.8.8
Resolved IP address for yahoo.com: 98.137.246.8
PS C:\Users\sonip\onedrive\desktop\ANS_LAB_7>
```

## Conclusion:

This simulation of DNS using UDP sockets, This demonstrated the basic functionality of a DNS system, where a client sends a domain name query to a server, and the server responds with a predefined IP address.