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|  | **Experiment No: 9** |
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| **Date of Performance** | 16th October 2024 |
| **Title** | Write a program that performs DNS Lookup |
| **Theory (short)** | **Domain Name System (DNS)** is a fundamental component of the internet that translates human-readable domain names (like www.google.com) into IP addresses (such as 142.250.190.14), which computers use to identify and communicate with each other. DNS functions like a phonebook for the internet, enabling users to access websites without needing to memorize complex numerical IP addresses. When a user types a URL into a browser, the DNS resolver sends a query to find the corresponding IP address by searching through a hierarchical network of servers, including root servers, top- level domain (TLD) servers, and authoritative name servers. DNS caching improves speed by storing recent lookups temporarily, but if a domain cannot be resolved, users encounter errors like DNS\_PROBE\_FINISHED\_NXDOMAIN. Additionally, DNS plays a critical role in network security through protocols like DNSSEC (DNS Security Extensions), which protects against spoofing and cache poisoning attacks. |
| **Program** | import socket  def dns\_lookup():      print("DNS Lookup")      link = "a"      while link != "end":          link = input("Enter website name: ")          if link != "end":              host = socket.gethostbyname(link)              print("IP address of ", link, " is ", host, "\n")      print("Closed.")  if \_\_name\_\_ == "\_\_main\_\_":      dns\_lookup() |

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| **Output Screenshots** | Vaibhav Sharma  Fig 1: Implementation of DNS lookup |
| **Observation** | **Successful DNS Resolution:**  1. The DNS lookup successfully resolved the domain names to their respective IP addresses:   1. www.kali.org→ 104.18.4.159 2. www.overleaf.com→ 34.120.52.64 3. www.chess.com→ 104.18.141.67 |
| **Self-assessment Q&A** | Q: What is the role of DNS in internet communication?  Ans: DNS translates human-readable domain names into IP addresses, allowing computers to identify and communicate with servers without needing numerical IP addresses.  Q: How does DNS caching improve lookup speed?  Ans: DNS caching temporarily stores recent DNS lookups to avoid repeatedly querying DNS servers, speeding up the process of resolving domain names to IP addresses.  Q: What security protocol does DNS use to prevent spoofing?  Ans: DNS uses DNSSEC (DNS Security Extensions) to protect against spoofing and cache poisoning attacks by ensuring the authenticity of DNS data. |
| **Conclusion** | This DNS lookup program showed us how **DNS translates website names into IP addresses** to make browsing possible. |

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