Course Code	**:**	**BCS-052**
Course Title	**:**	**Network Programming and Administration**
Assignment Number	**:**	**BCA(V)/052/Assignment/2026-27**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**31st October, 2026 (For July 2026 Session)**
	:	**30th April, 2027 (For January 2027 Session)**

There are three questions in this assignment. In total, they carry 80 marks. Answer all the questions. 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: What is Network Programming? Explain the Client-Server model of communication with a neat diagram. Discuss the role of sockets in network programming and differentiate between TCP sockets and UDP sockets. **(30 marks)**

Q2: Explain the concept of IP addressing. Discuss IPv4 addressing classes (A, B, C, D, E), subnetting, and the need for IPv6. Also, explain the features of IPv6. Explain the working of DHCP in dynamic IP address allocation. **(30 marks)**

Q3: What is Network Security? Explain common threats to a network (viruses, worms, DoS/DDoS attacks, sniffing, spoofing) and describe how firewalls, VPNs, and encryption techniques help in securing a network and its administration. **(20 marks)**

Q1: What is Network Programming? Explain the Client-Server model of communication with a neat diagram. Discuss the role of sockets in network programming and differentiate between TCP sockets and UDP sockets. (30 marks)

Answer

Network programming is the process of developing software that exchanges data between computers, phones, servers and other devices through a network. Instead of performing every task on one computer, a network program communicates with another program using agreed rules called protocols. For example, a web browser sends a request to a website, an email application exchanges messages with a mail server, and a banking app contacts a secure server to retrieve account information. Network programming uses an application protocol, an IP address to identify a host, and a transport protocol to move the data.

Client-Server model of communication

In the client-server model, a client is the program that asks for a service, while the server is a program that waits for requests and provides the service. A single server may communicate with many clients. Clients may be browsers, mobile apps or desktop applications. A server may store data, authenticate users, perform calculations or deliver web pages. The client and server can run on separate computers or on the same machine during testing.

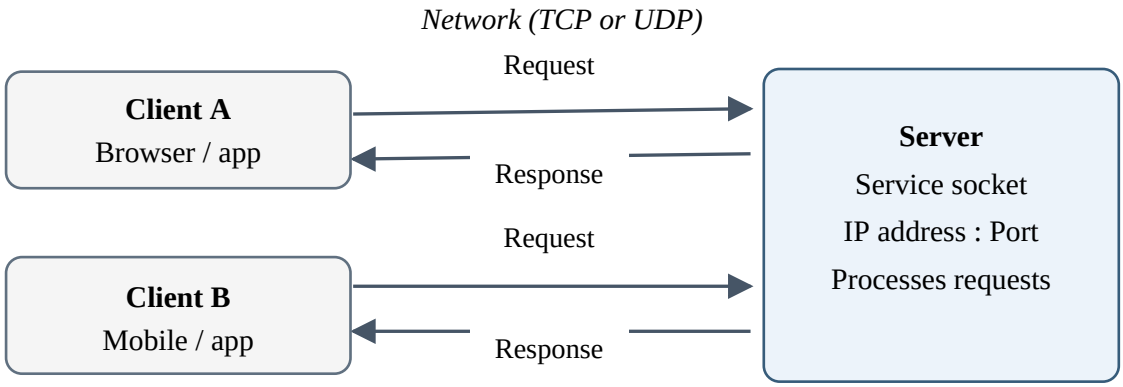


Figure: Client-server communication using requests, responses and sockets.

The communication normally follows a clear sequence. First, the server starts and makes its service available at a particular IP address and port number. The client finds the server address through a configured address or DNS lookup. It then communicates with the server using the selected transport protocol. The