**INTRODUCTION:**

1. Implement Basic network operations related command of Linux: ifconfig, route, netstat, ping,arp,traceroute, tcpdump, xxd, host, nslookup, dig,nmap etc.
2. Find IP address, Mac address of your system, port numbers of different processes running in your system.
3. Install Cisco packet tracer (CPT) simulator and use all network devices.(Hub,Switch,Router,Bridge,etc)
4. Assign different addresses to network devices using CPT.
5. Create LAN using Hub, Switch in CPT.
6. Create a WAN using Router in CPT.
7. Install Wireshark and capture packets for any interface.
8. Compare Wireshark and CPT.

**DATALINK LAYER:**

1. Implement error detection algorithims (checksum,CRC) in C/C++/PYTHON
2. Write a program to implement Hamming code, Bit Stuffing in C/C++/Python
3. Implementation and study of Goback-N and selective repeat protocols

**Medium Access Control Sublayer:**

1. Create computer network with Ethernet cables in CPT

# Configure fast ethernet on router in CPT

**NETWORK LAYER:**

1. Implement distance vector routing using CPT
2. Implement Link state routing using CPT
3. open shortest path first (OSPF)routing using CPT

**TRANSPORT LAYER:**

1. Implement socket programming using multithreading in C/C++/Python.
2. Packet capture and header analysis by wire-shark (TCP,UDP)

**PRESENTATION LAYER:**

1. Implement Huffman coding data compression technique in c/c++/python

**APPLICATION LAYER:**

1. Configure FTP, Telnet, DNS servers in CPT
2. Configure HTTP, SMTP, SNMP servers in CPT

**SECURITY IN COMPUTER NETWORK:**

1. Implement RSA cryptographic algorithim in C/C++/PYTHON
2. Secure network devices in CPT
3. Create IPSec VPN tunnel in CPT

Go Back N,Selective Repeat:<https://www2.tkn.tu-berlin.de/teaching/rn/animations/gbn_sr/>

configure fast ethernet on router in cpt  
<https://www.youtube.com/watch?v=uzTgDr_u7zI>  
  
distance vector routing on cpt-  
<https://www.youtube.com/watch?v=LOqmx4Foyj4>  
  
link state routing on cpt  
<https://www.youtube.com/watch?v=M148uAt23XA>

packet capture header analysis by wireshark tcp:  
<https://www.youtube.com/watch?v=CmjdLlh5ko0>  
  
  
packet capture header analysis by wireshark udp:  
<https://www.youtube.com/watch?v=afO7hGrYIc0&t=37s>  
  
  
socket programming using multi-threading :   
  
<https://www.youtube.com/watch?v=g1Jyi0qLuoU>  
  
configuring servers (ftp,telnet,dns) in CPT:  
  
<https://www.youtube.com/watch?v=bAzB43u17cg>  
  
configuring servers (http,smtp,snmp) in CPT:  
<https://www.youtube.com/watch?v=Ol1h8N8IOl4>