

LS. M2- exam prep

Compiled Notes

▼ Subnetting Questions

Question 1

Complete

Mark 14.80 out of 20.00

An ISP has provided your company with the /25 network 192.111.2.0. Divide this into four (4) subnets. Complete the following table; both Network addresses and Broadcast addresses should be in dotted-decimal notation.

Assume the all zero's and all one's subnets are usable.

Network	Broadcast
192.111.2.0	192.111.2.31
192.111.2.32	192.111.2.63
192.111.2.64	192.111.95
192.111.2.96	192.111.2.255

What is the subnet mask in dotted-decimal notation

192.111.2.128

What is the maximum number of *hosts* each subnet can contain?

30

SOLUTION:

- Subnet mask: **255.255.255.224**
- Maximum number of hosts: **32 (the 0's and the 1's are used)**

Question 1

Complete

Mark 20.00 out of 20.00

Flag question

An ISP has provided your company with the /27 network 200.54.170.0. Divide this into four (4) subnets.

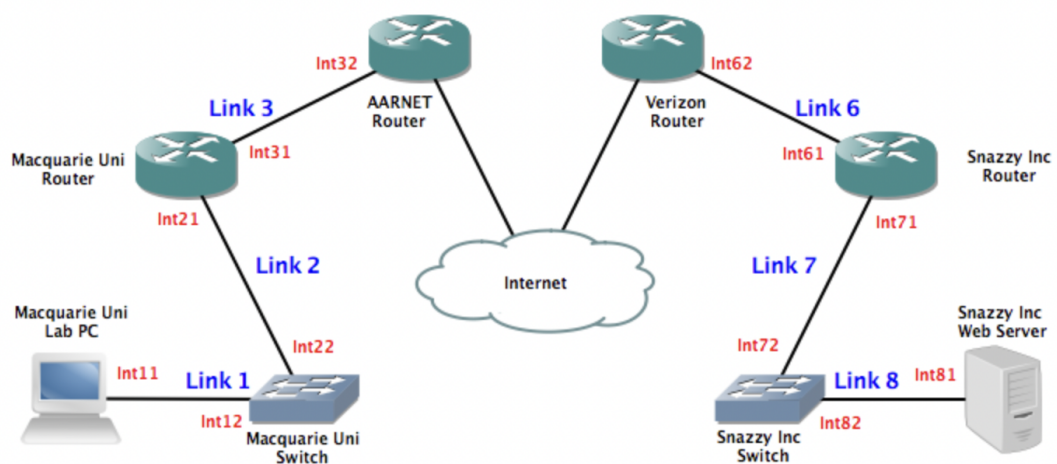
Complete the following table; both Network addresses and Broadcast addresses should be in dotted-decimal notation.

Assume the all zero's and all one's subnets are usable.

Network	Broadcast
200.54.170.0	200.54.170.7
200.54.170.8	200.54.170.15
200.54.170.16	200.54.170.23
200.54.170.24	200.54.170.31

What is the subnet mask in dotted-decimal notation

What is the maximum number of *hosts* each subnet can contain?

▼ Link question

A message is to be delivered from a web browser to a web server.

- The destination web server is www.snazzy.com.
 - At Snazzy Inc the web server is being run on port 8080.
 - Snazzy Inc is located in the United States and it's service provider is Verizon.
- The client is at Macquarie University.
 - The tab in the web browser is given dynamic port 5362.
 - Macquarie University's service provider is AARNet.

The following table show the addresses for each interface in the diagram.

Device	Interface Name	Interface MAC Address	Interface IP Address
Macquarie Uni Lab PC	Int11	34:23:45:cb:25:a5	137.111.46.5
Macquarie Uni Switch		52:23:9e:81:d3:71	
Macquarie Uni Router	Int21	25:63:f3:a6:3e:d5	137.111.46.1
Macquarie Uni Router	Int31	25:63:f3:a6:3e:d6	137.111.0.1
AARNet Router	Int32	61:45:f3:da:97:1e	
Verizon Router	Int62	85:32:98:4d:ea:91	
Snazzy Inc Router	Int61	73:63:f3:52:44:c2	154.65.0.1
Snazzy Inc Router	Int71	73:63:f3:52:44:c3	154.65.3.1
Snazzy Inc Switch		49:23:9e:21:fa:3d	
Snazzy Inc Web Server	Int81	63:23:45:fa:4e:3a	154.65.3.45

Link	Src MAC	Dest MAC	Src IP	Dest IP	Src Port	Dest Port
1	34:23:45:cb:25:a5	25:63:f3:a6:3e:d5	137.111.46.5	154.65.3.45	5362	8080
2	34:23:45:cb:25:a5	25:63:f3:a6:3e:d5	137.111.46.5	154.65.3.45	5362	8080
3	25:63:f3:a6:3e:d6	61:45:f3:da:97:1e	137.111.46.5	154.65.3.45	5362	8080
6	85:32:98:4d:ea:91	73:63:f3:52:44:c2	137.111.46.5	154.65.3.45	5362	8080
7	73:63:f3:52:44:c3	63:23:45:fa:4e:3a	137.111.46.5	154.65.3.45	5362	8080
8	73:63:f3:52:44:c3	63:23:45:fa:4e:3a	137.111.46.5	154.65.3.45	5362	8080

▼ Network addresses of the Network *add limited broadcast

▼ What are the phases of the TCP 3-way handshake?

- Phase 1: Client sends an SYN
- Phase 2: Server sends a SYN + ACK
- Phase 3: Client sends an ACK

▼ TCP flags

- FIN flag: Sender has reached the end of the byte stream
- ACK flag: Confirmation of delivery
- PSH flag: Send immediately, even if the buffer isn't full
- RST flag: Start the connection over again

▼ Transport layer port assignment

- Dynamically assigned:
 - Associated with client-server applications
 - Available for user applications
 - The application has to inform the other end of the connection which port number is being used
- Statically assigned:
 - Also known as 'Well known ports'
 - Have an assigned value less than 1024
 - Used for frequently used services
 - Predetermined

▼ Architectures

	Host-Based	Client-Based	Client-Server
Cost of infrastructure	High	Medium	Low
Cost of development	Low	Medium	Medium
Scalability	Low	Medium	High

- Host-based:
 - **High** cost of infrastructure

- **Low** cost of development
- **Low** scalability
- Client-based:
 - **Medium** cost of infrastructure
 - **Medium** cost of development
 - **Medium** scalability
- Client-server:
 - **Low** cost of infrastructure
 - **Medium** cost of development
 - **High** scalability

▼ Attributes of Data-Link Protocols (***Asynchronous and Synchronous***)

1. ***Asynchronous***

- Single character per transmission
- Sends extra information to delineate frames such as start bits, stop bits, and parity bits
- Allows medium to be idle for arbitrary periods between frame transmissions
- Overhead of 3 bits per 7 bits (approx. 30%)

2. ***Synchronous***

- Data sent in a large block
- Includes addressing information
- Especially useful in multipoint circuits
- Includes a series of synchronisation (SYN) characters

▼ Middleware Characteristics

- Software that connects two otherwise separate applications.
- The software that makes a distributed system programmable

▼ Parity

1. Even

- 1110001 - 0

2. Odd

- 1110001 - 1

▼ Frame the following message (wx DLE y ETX z)

- DLESTXwxDLEDEyETXzDLEETX ****DO NOT PUT SPACES IN THE ANSWER**

▼ Bit Rate

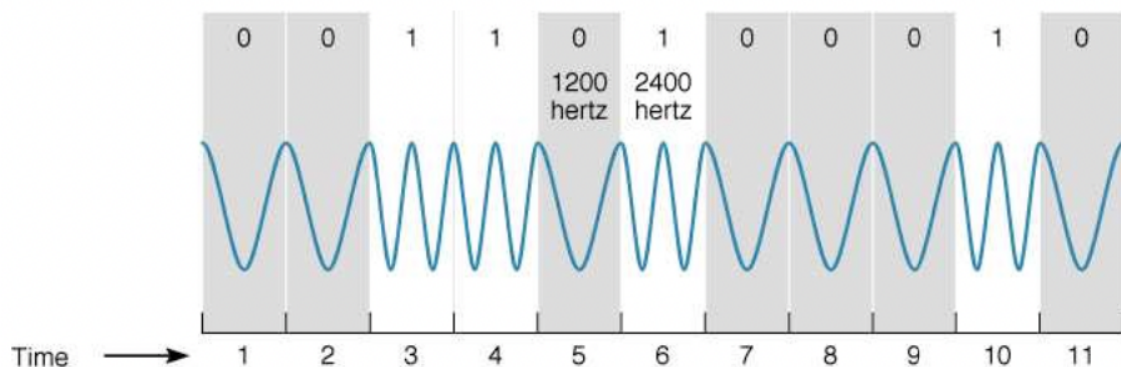
- If the baud rate is 2400 and there are 2 bits per symbol, what is the bit rate? **2400 * 2 = 4800**
- If the baud rate is 600 and there are 2 bits per symbol, what is the bit rate? **600 * 2 = 1200**

▼ Guided media

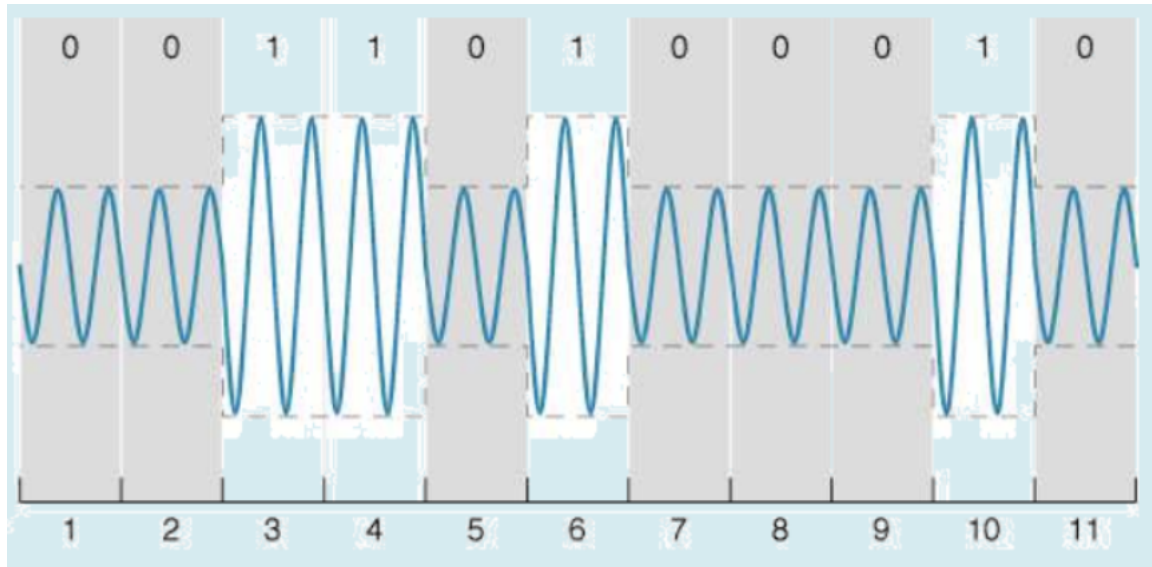
- Twisted pair
- Coaxial cable
- Fibre optics

▼ Kinds of modulation

- **Frequency** Modulation:

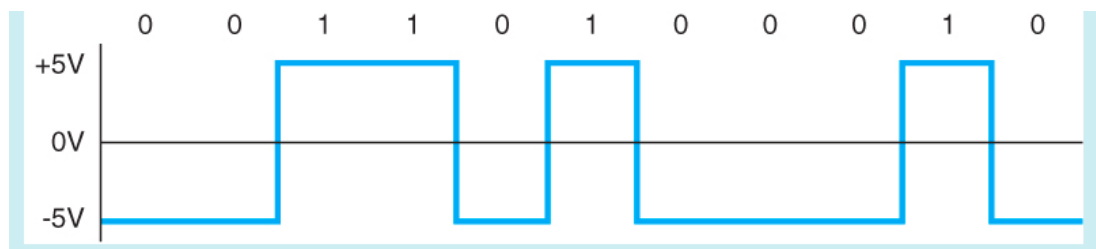


- **Amplitude** Modulation:

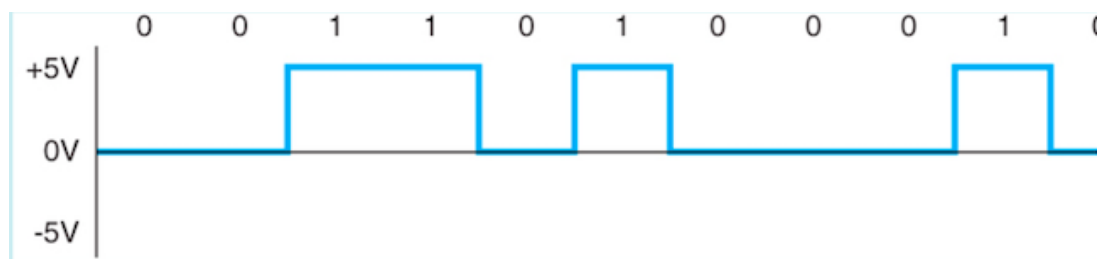


▼ Signalling

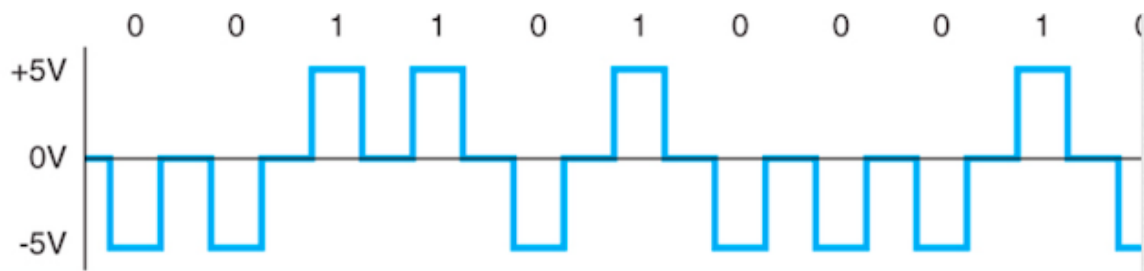
- **Bipolar: non-return to zero (NRZ) voltage**



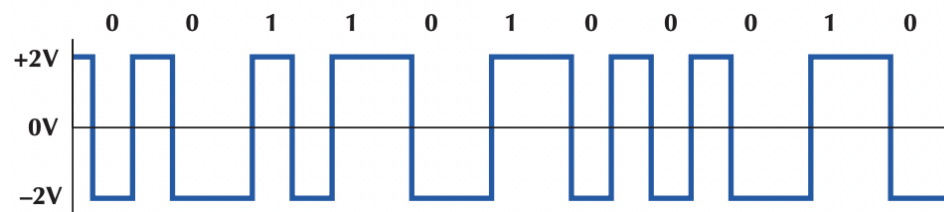
- **Unipolar**



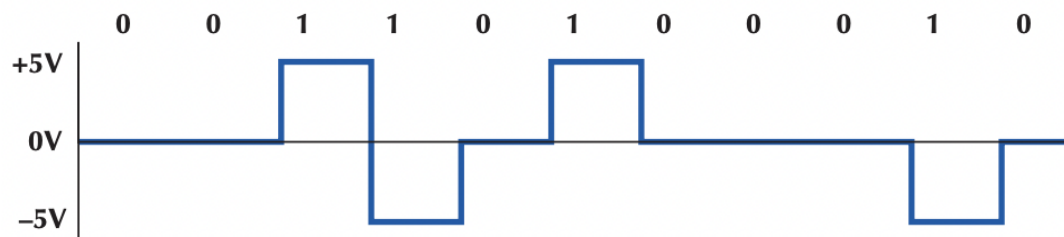
- **Bipolar: return to zero (RZ) voltage**



- **Manchester encoding:**



- **Bipolar: alternate mark inversion (AMI)**



▼ Types of fibre

▼ Error detection techniques

- LRC (Column Parity): **>50%**
- Row Parity: **50%**
- Checksum: **95%**
- CRC: **99.99%**

Datalink layer

▼ Automatic Repeat Request (ARQ)

1. stop and wait ARQ(half-duplex)

- both sides wait for acknowledgement before sending
- Advantage: requires on half-duplex channel
- Disadvantage: wastes time, low throughput

2. continuous ARQ (full-duplex)

- continuously sends messages without acknowledgement of receiving
- continuously receives messages without acknowledging them right away
- Typically, only the Packet corresponding to the NAK is re-transmitted.
- Advantages: offers greater throughput efficiency than stop-and-wait ARQ at the cost of greater memory requirements.
- Disadvantages:

▼ Sliding Window

- If there can be eight (for example) frames in transit then we'd like the sender to be able to transmit the ninth when the ACK for the first comes in
- more generally, if N frames in transit then transmit frame N+1 when ACK for frame 1 arrives

▼ Asynchronous Transmission

- Single character per transmission
- Thus sends extra information to delineate frames
 - Start bits, stop bits
 - Parity bits
- Allows medium to be idle for arbitrary periods between frame transmissions
- Used for older devices

- Connect dumb terminals to computers
- Overhead of 3 bits per 7 bits - 30%

▼ Synchronous Transmission

- Data sent in a large block
- Includes addressing information
 - Especially useful in multipoint circuits
- Includes a series of synchronisation (SYN) characters

▼

hi

- i will turn these into proper notes before the final exam

▼

▼ Link-local network

- Default network address: **169.254.0.0**
- Default netmask: **255.255.0.0**

▼ Statically assigned transport layer ports

- Have an assigned value less than 1024
- Used for frequently used services
- Also known as 'Well known ports'
- Are predetermined

▼ TCP *FIN* Flag

- Means that the sender has reached the end of the byte stream

▼ Client-based architectures

- Cost of infrastructure: **Medium**
- Cost of development: **Medium**
- Scalability: **Medium**

▼ Synchronous Data-Link Protocols

- Includes a series of synchronisation (SYN) characters to delineate frames

- Data sent in a large block, not a fixed length
- Useful in multipoint circuits
- Includes addressing information

▼ Stop and Wait ARQ

- Sender sends a message and waits for acknowledgement
- Receiver receives the message and sends an acknowledgement, then waits for the next message
- When acknowledgement is received, send the next message
- Half-duplex operation