Lec-3, CT303, 24-25, Sec A

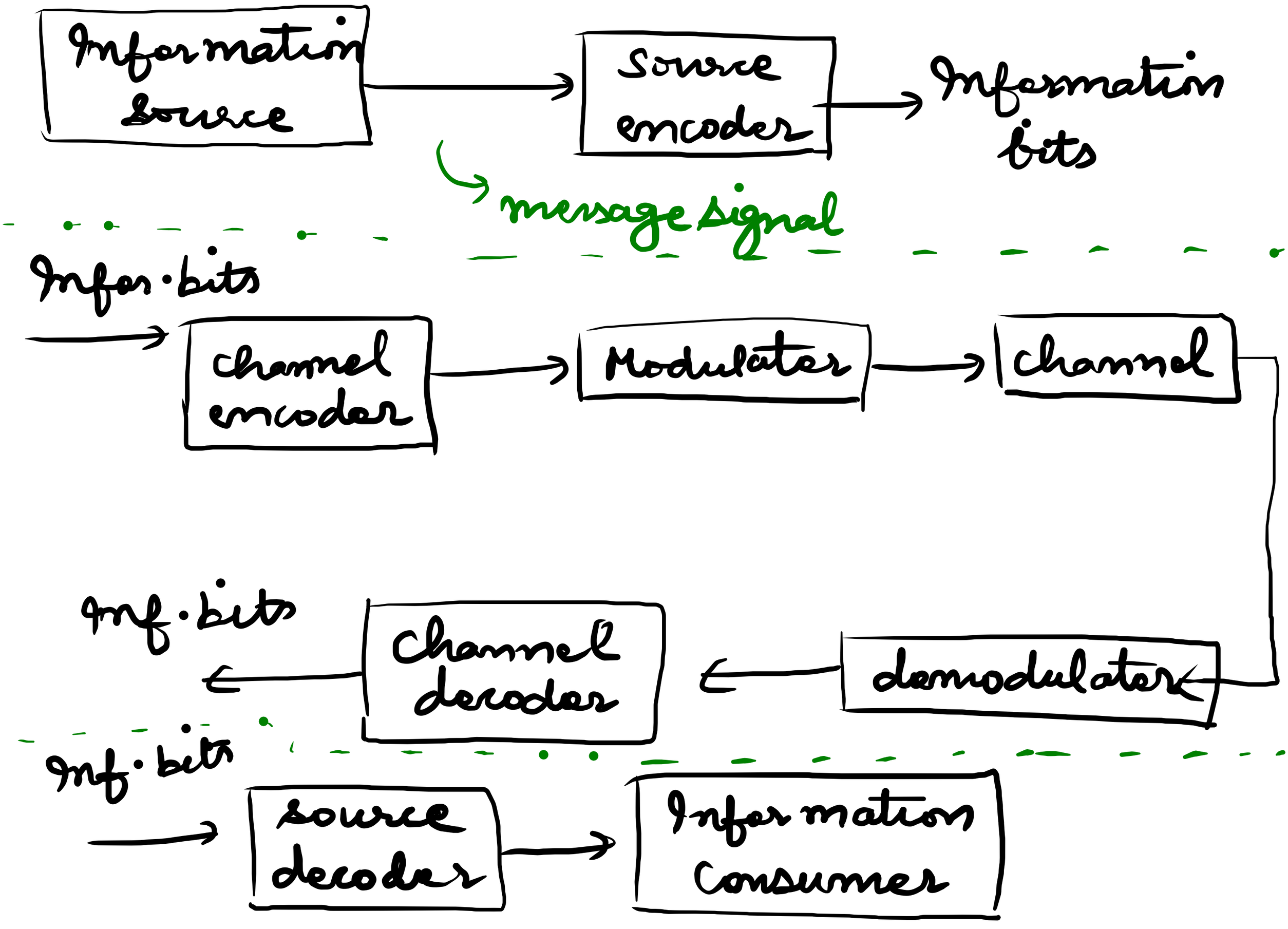
Contrast Ac with DC

↙ ⟶ Sharp transition b/w reliable & unreliable communication

quality of reproduced source signal typically degrades gradually as the channel conditions get worse

See the PC system diag. on next slide.

1. Src. encoder :- msg. sig. → seq. of bits
   choice heavily dependent on setting.
   ex - video sig. to be highly compressed if sent to wireless mobile device.


Information source
Source encoder
Information bits
message signal
Infor. bits
channel encoder
Modulater
channel
Inf. bits
Channel decoder
demodulater
Inf. bits
source decoder
Information Consumer

2. It can be decoupled from entire design except when a bit rate is req. which can be easily supported by comm. media.

Channel encoder:- for error recovery after Tx over the channel. Controlled redundancy

Modulator :- coded bits after channel encoder $\longrightarrow$ Txd. signals

req :- Tx. sig. to fit within a given freq. band & adhere to stringent power constraint & manage interference.

ex- bit

0 ⟶ s(t)

1 ⟶ −s(t)

1011

s(t) must fit into spectral constraint

no interf. to other users.

successive bits of the same user should not interfere with each other

Channel:- add noise, distorts & possible interference.

Demodulator, channel decoder — self study

why digital? ① DC involves far more processing than AC. - the benefits are made

possible through "increase in the computational power of low-cost silicon integrated circuits".

② Optimality:- source-channel separation principle design is generally "source-independent" & "channel optimized" (You can revise AM/FM/PM)

For AM, waveform Txd. depends on the message signal, which is beyond the control of the link designer, hence no freedom to optimize link performance over all possible Comm^n. scheme.

3) Scalability :- DC allows ideal regeneration of bits — hence if you can communicate over a link reliably, you are done. Comm. is in the form of packets.

→ Infor. bits are transported without interpretation, the same link can be used for multiple kinds of messages.

→ Multiple links can be present b/w src encoder & decoder, with proper error recovery mechanisms such as retransmission.

SE ——————— SD