Lecture 12 - Answers to Lecture Exercises
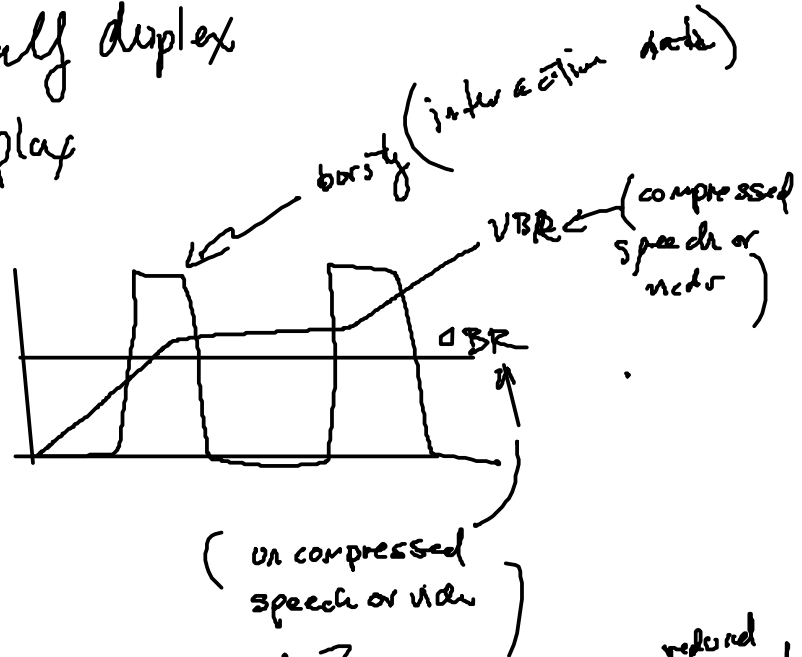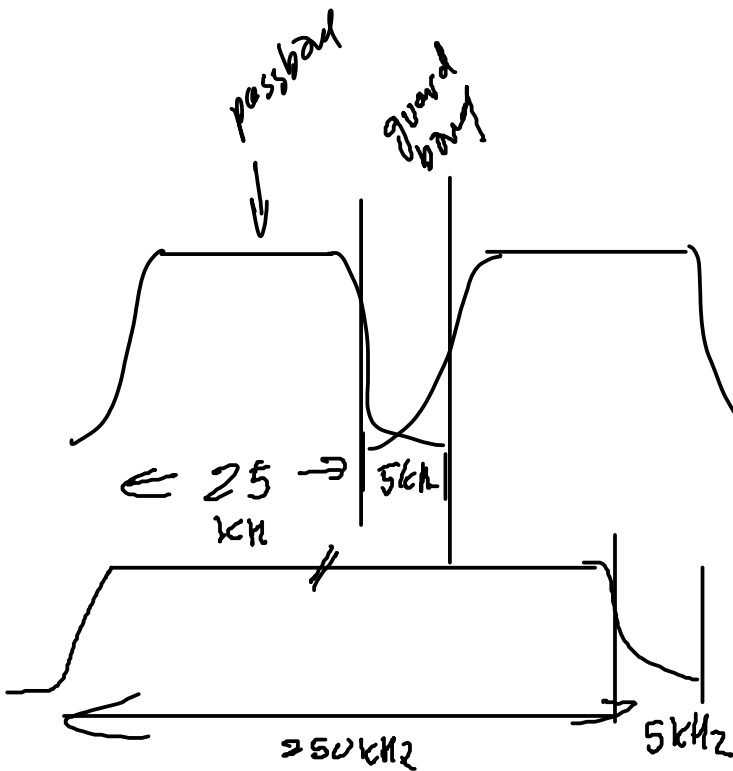
Exercise 1: Is a phone call half-duplex, full-duplex or simplex?
How about a radio broadcast? A typical taxi dispatch radio?

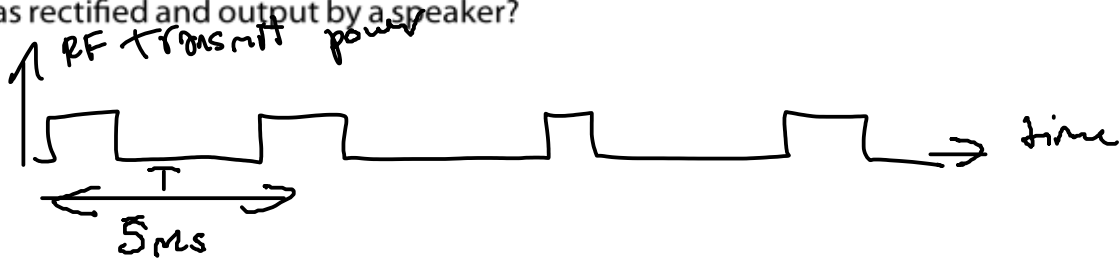phone calls: full duplex

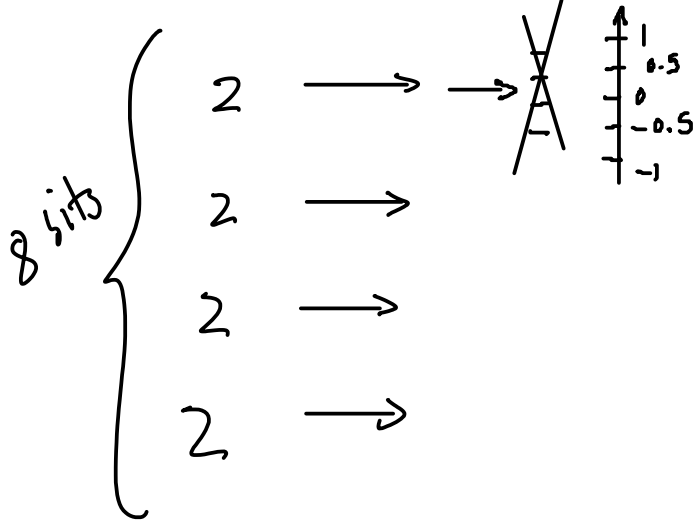taxi dispatch (PTT): half duplex

radio broadcast: simplex

passband

guard band

bursty (interactive data)

VBR ← (compressed speech or video)

CBR

(un compressed speech or video)

← 25 → | 5kh |
kH

≥ 50 kHz

5kHz

WHY TDMA?
① improved spectral efficiency → reduced guard band o/h
② more flexible allocation of B/W.

Exercise 2: The GSM TDMA frame duration is approximately
5ms. What frequency would you expect to hear if the GSM RF
signal was rectified and output by a speaker?

RF Transmit power

time

T
5ms

$f = \frac{1}{T} = 200 Hz$

8 sits {

2 $\longrightarrow$ $\rightarrow$ ✕ | 1, 0.5, 0, -0.5, -1

5

✕

2 $\longrightarrow$

5

✕

2 $\longrightarrow$

5

2 $\longrightarrow$

5

✕ 125 M symbols/s

$= 5^4 = 625$ possible symbols.

only need $256 = 2^8$

$= 1$ Gb/s