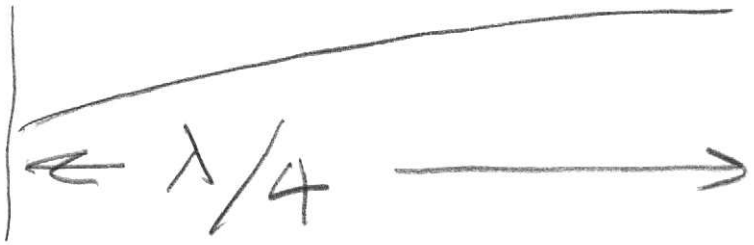
More fun... open an end...

amplitude node
pressure amplitude

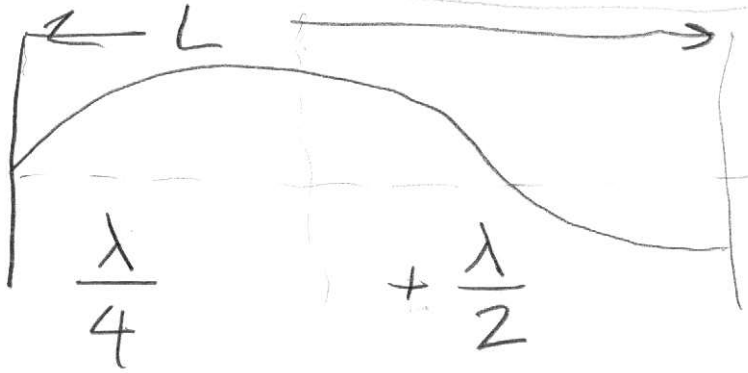
pressure node
amplitude antinode



$\frac{\lambda_1}{4} = L$ $\quad \lambda_1 = 4L$

$\lambda_1 \cdot f_1 = v$ $\quad f_1 = \frac{v}{4L}$

tricky



$$\frac{\lambda_n}{4} + (n-1)\frac{\lambda_n}{2} = L$$

$$n\frac{\lambda_n}{2} - \frac{\lambda_n}{4} \Rightarrow \frac{\lambda_n}{4}(2n-1) = L$$

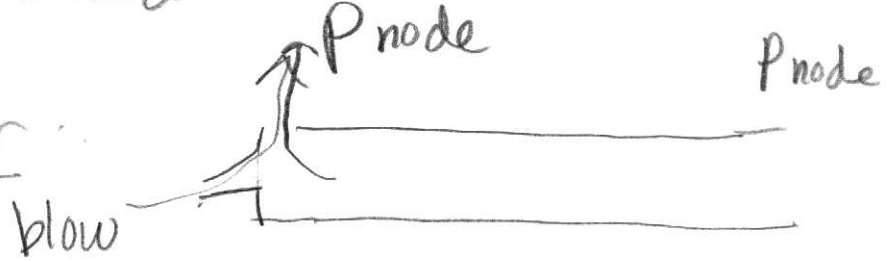
$$\lambda_n = \frac{4L}{2n-1} \qquad n = 1, 2, 3$$

or $$\lambda_m = \frac{4L}{m} \qquad m = 1, 3, 5, \ldots$$

$$f_m = \frac{mv}{4L} \qquad m = 1, 3, 5$$

double open ... same as double closed ...

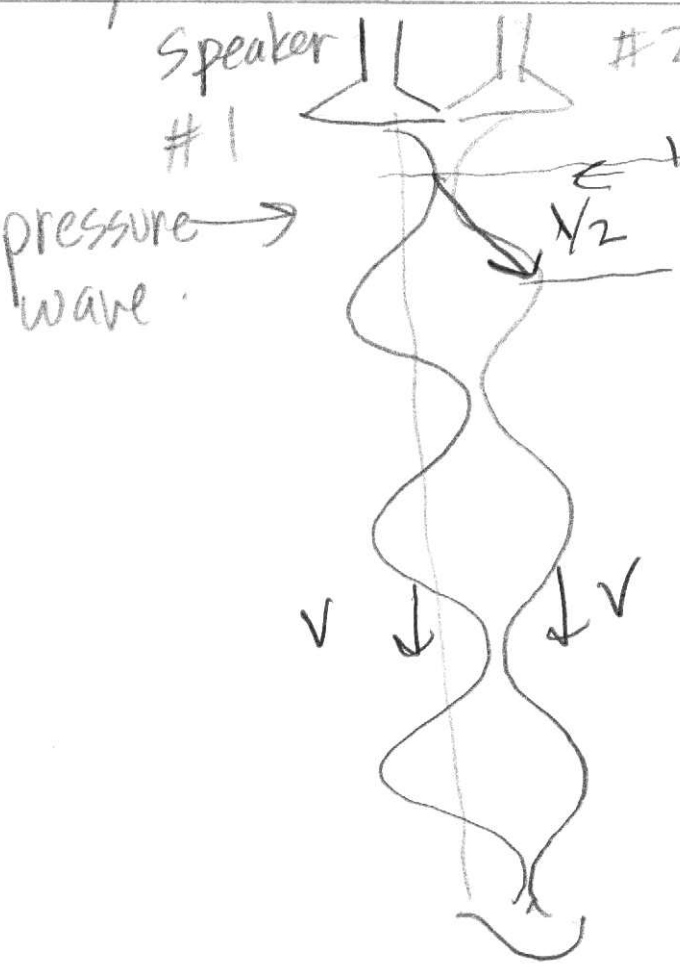
Recorder.



think of a flag flapping.

Saxophone ... one closed

Interference already present in open-ended tube ... Ear responds to pressure, at end of tube, none ...



Hear sund (#1 alone)

nothing (#1 + #2)
↑ 180°

sound (#2 alone)

Destructive Interference

sources $\frac{\lambda}{2}$ or 180° out of phase

Where does sound go?

In Phase

Intensity . . quadruples

More Fun