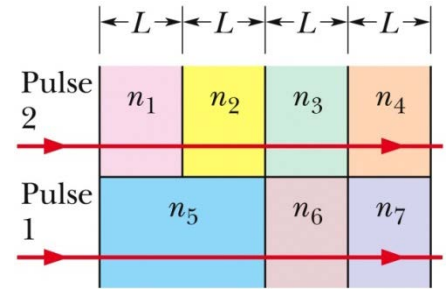


3. In the figure below, two light pulses are sent through layers of plastic with thicknesses of either L or $2L$ as shown. The indexes of refraction for each material are $n_1 = 1.55$, $n_2 = 1.70$, $n_3 = 1.60$, $n_4 = 1.45$, $n_5 = 1.59$, $n_6 = 1.65$, and $n_7 = 1.50$.
- Which pulse travels through the plastic in less time?
 - What multiple of L/c gives the difference in the transversal times of the pulses?



4. If the first order reflection occurs in a crystal at Bragg angle 3.4° , at what Bragg angle does second-order reflection occur from the same family of reflecting planes?
5. A grating has 400 lines/mm, How many orders of the entire visible spectrum (400-700 nm) can it produce in a diffraction experiment, in addition to the $m = 0$ order?