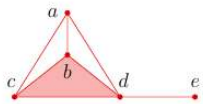
HW6

Thursday, October 31, 2024 7:03 PM

1. **Alexander duality**. Consider the simplicial complex Δ over $X = \{a, b, c, d, e\}$ shown below:



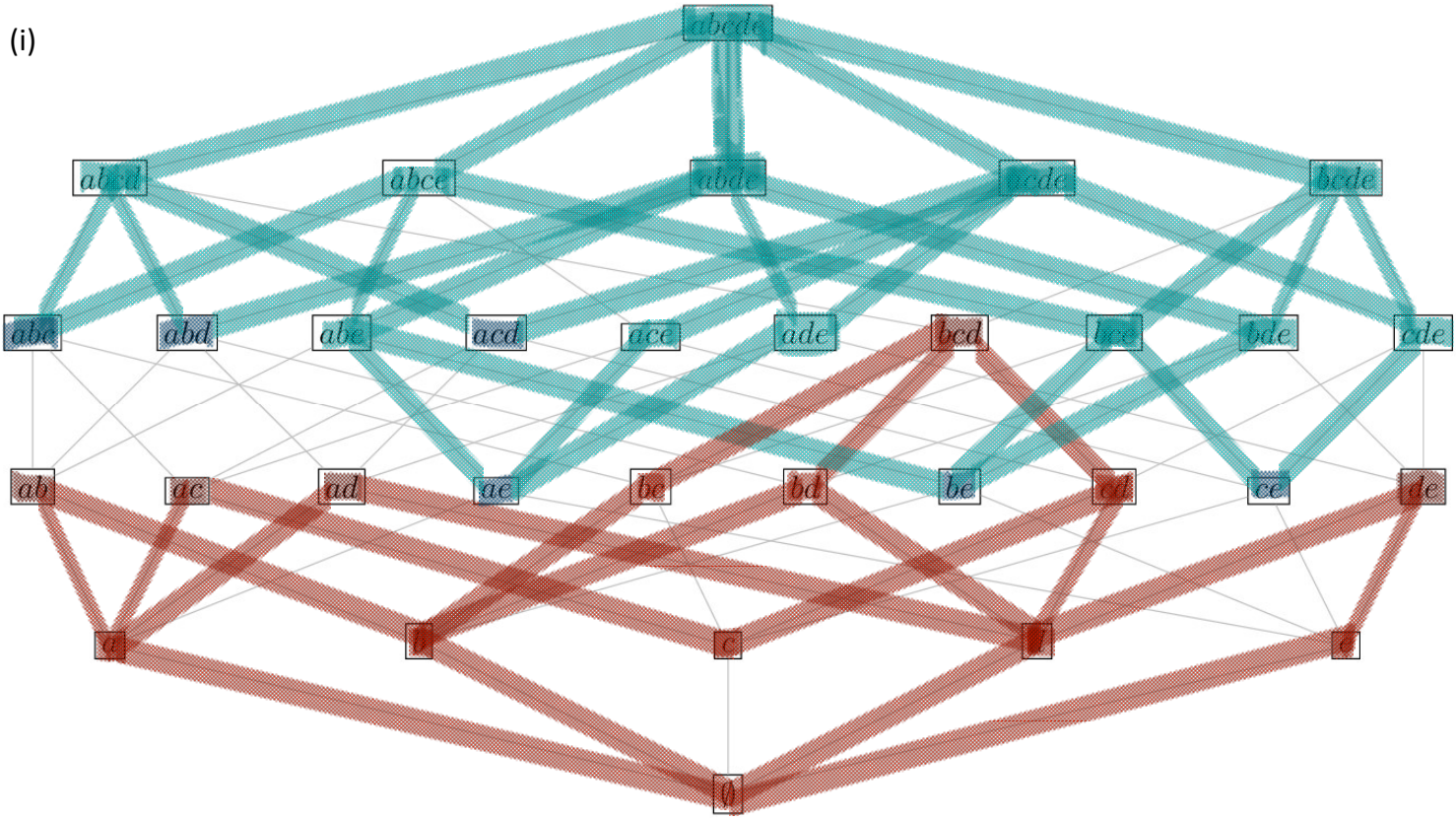
The 5-dimensional Boolean lattice 2^X also appears below.

(i) In the Boolean lattice, color the faces red, and the nonfaces blue.

(ii) Find the maximal faces, and the minimal generators of the Stanley-Reisner ideal I_{Δ^c}.

(iii) Compute the primary decomposition of I_{Δ^c}.

(i)



(ii)

{de, bcd, ac, ab, ad}

{abc, abd, acd, ae, be, ce}

(iii)

$I_{\Delta^c} = \langle a,b,c\rangle \cap \langle a,e\rangle \cap \langle b,d,e\rangle \cap \langle c,d,e\rangle \cap \langle b,c,e\rangle$