## MATH 249 PROBLEM SET 5 (DUE NOVEMBER 19)

(1) Find the flag $\beta$-vector and $c d$-index of the three-dimensional associahedron. Do the same for the three-dimensional permutohedron.
(2) Let $B_{n}$ denote the Boolean algebra. Find a Morse matching on the Hasse diagram of $B_{n} \backslash \emptyset$ which has precisely one unmatched vertex (of rank 0 ). Give a topological interpretation of this Morse matching. (Hint: interpret the poset as the face poset of a simplicial complex.)

