TOPOLOGY 2, HOMEWORK 12

(1) Equip S^n with the inductively-defined CW complex structure X that has two n-cells with characteristic maps given by $\Phi_n^{\pm}(\mathbf{x}) = (\mathbf{x}, \pm\sqrt{1 - \|\mathbf{x}\|^2})$, and with $X^{n-1} = S^{n-1} \times \{0\}$. Compute the CW-homology groups of X.

(2) Let T_g be the quotient of a $2g$-gon P_{2g} with edges enumerated $e_0, \ldots, e_{2g-1}$ counterclockwise, by pairing the edges as follows: for each even $i < 2g-1$, identify each point of e_i with its image in e_{i+1} under the *orientation-preserving* linear homeomorphism. That is, if $v_i = e_i \cap e_{i-1}$ for each i then for each even i we take v_i to v_{i+1}, v_{i+1} to v_{i+2}, and extend linearly over e_i. Compute the CW-homology groups of T_g, equipped with the "obvious" CW complex structure.

(3) Compute the CW-homology groups of the quotient space X of the cube I^3 described in Hatcher Section 1.2, Exercise 14, equipped with the CW complex structure described there.

(4) Hatcher, Section 2.2 #21

(5) Hatcher, Section 2.2 #23