Homework 3. January 30, 2018.

1. Let Δ be an $n+1$-simplex. Its boundary is homeomorphic to the sphere S^n, and thus induces a delta-complex structure on S^n. Write down a generator of the simiplicial homology group $H_n(S^n)$.

2. (a) Let X be a Hausdorff space and let $x_0 \in X$ be a point such that $(X, \{x_0\})$ is a good pair. Let Y be a Hausdorff space and let $y_0 \in Y$. Define $X \vee Y = X \times \{y_0\} \cup \{x_0\} \times Y$. Show that the inclusion maps induce isomorphisms $\widetilde{H}_i(X) \oplus \widetilde{H}_i(Y) \to \widetilde{H}_i(X \vee Y)$ in singular homology, whose inverse is induced by the projections of $X \vee Y$ to X and Y.

   (b) Is the homology of the disjoint union $X \sqcup Y$ different from that of the wedge?

3. Problem 16 in Hatcher p 132.

4. Problem 17 in Hatcher p 132.

5. Problem 18 in Hatcher p 132.

6. Problem 20, 21 in Hatcher p 132.