18.904 HOMEWORK FIVE
DUE 3-29-2005

I will be out of town on March 15th and 17th. You should still meet and discuss the following topics. You may choose to discuss this topics in an informal or formal manner. Please read the sections before you class so that you can add to the discussion.

Tuesday (3-15): Discuss the proof of Van Kampen's theorem (pp. 44-46). It is ok if you do not understand every detail of the proof. Just make sure you have an idea of what is going on. Also, you may just discuss the proof of Van Kampen's theorem in the case that X is covered by two sets A_1 and A_2. In this case, you don't have to worry about the condition that the triple intersections are path-connected.

Thursday (3-17): Discuss Section 6 of the handout from Massey (pp. 78-81). In particular, you should recall the definition of the free group on a set S (we talked about this in class and it is also defined on p.75 of the handout), discuss the proof of Proposition 6.1 of the handout, and discuss some of the examples in the section.

Complete the following problems. You are encouraged to work with other students in the class on the problems. Please write up your own solutions. Each problem is worth 10 points.

(1) Exercise 2, p.53
(2) Exercise 4, p.53
(3) Exercise 8, p. 53
(4) Compute $\pi_1(X)$ where X is the the 1-skeleton of a 3-dimensional tetrahedron (i.e. the connected graph with four vertices and six edges).
(5) Exercise 6.1 on p. 81 of the handout. (For this problem, you will need to read Section 6 of the handout.)