MATH 249 PROBLEM SET 2 (DUE OCTOBER 3)

(1) Find an example of two CW complexes which are not homotopic, but which have have isomorphic face posets.

(2) Find an example of a matroid which is not representable. Hint: A classical theorem from Euclidean geometry states that given one set of collinear points A, B, C and another set of collinear points a, b, c, then the intersection points X, Y, Z of line pairs Ab and aB, Ac and aC, Bc and bC are collinear. Try to use this theorem to find your example.

(3) Decide on a topic for a final project. Please discuss your idea with me in advance (during office hours or by email is fine). The final project should be an exposition of a recent (last 30 years) research paper on a topic related to this course. I'll post some possibilities to the course webpage, but you can choose something else if you like!. You'll also be expected to give a brief (30-minute) presentation during one of the last 3 weeks of the course.