MATH 532/736I, LECTURE 3

1. Finish Previous Notes
2. Homework: Assign further problems from Homework 1.
   Quiz: 01/27/09, Tuesday
3. **Finite Projective Planes** (Given a positive integer n called the order.)

   Axiom P1: There exist at least 4 points no 3 of which are collinear.

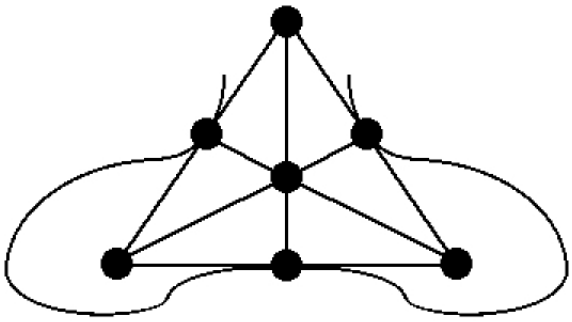
   Axiom P2: There exists at least 1 line with exactly $n + 1$ (distinct) points on it.

   Axiom P3: Given 2 distinct points, there is exactly 1 line that they both lie on.

   Axiom P3: Given 2 distinct lines, there is at least 1 point on both of them.

   Questions:

   - Are there finite projective planes of order 1? Why or why not?
   - Are there finite projective planes of order 2? Hey look at this:



   Comments: For most n, one expects that there is no finite projective plane of order n. Only in 1988 was it first shown that there is no finite projective plane of order 10.

4. **Duality and the Principle of Duality:**

   Definition: An axiomatic system in which the dual of any theorem is also a theorem is said to satisfy the *principle of duality*.

   Comment: Finite projective planes satisfy the principle of duality.