1. Wellquasiorders and Betterquasiorders .... Dr. T. E. Forster

A well-quasi-order is a reflexive transitive relation with no infinite descending chains and no infinite antichains. Although this may not sound natural there are many natural examples, at least one of which is famous: the theorem of Seymour and Robertson that finite graphs under the graph minor relation form a WQO. There is Laver's theorem that the isomorphism types of scattered total orders (orders in which the rationals cannot be embedded) form a WQO. Finite trees with nodes labelled with elements of a WQO are also WQO-ed. The class of WQO's lacks certain nice closure properties and this leads to a concept of *Better*-quasi-ordering. The class of BQOs is algebraicly nicer.
These combinatorial ideas have wide ramifications in graph theory, logic and computer science (lack of infinite descending chains is always liable to be connected with termination of processes) and the area has a good compact literature and some meaty theorems. Recommended for those of you who liked the Logic course and the Combinatorics course.
A Big plus for this topic is that there is no textbook! There is a wealth of literature, some of which I have photocopies of. Interested students should discuss this with me. In 2009/10 we organised a reading group on this topic, and it was a huge success. Several participants of that group will be in Cambridge in 2010/11 and have expressed a willingness to repeat the exercise.

Relevant Courses

Essential: None
Useful: Combinatorics, If therre is a reading course in Set Theory that might be useful too