

Practice for Final Exam, part 2
Math 2770
30 June 2004
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Test is 2 July 2004

1) The exact value of $R(6, 6)$ is not known, but it is known that $R(6, 6) \leq 165$. Suppose that any two people are not only either mutual friends or mutual enemies, but they also either mutually admire each other or mutually disapprove of each other. If there are 165 people at a party, show that at least one of the following cases holds:

- a) There are three mutual friends who all admire one another
- b) There are three mutual friends who all disapprove of one another
- c) There are three mutual enemies who all admire one another
- d) There are three mutual enemies who all disapprove of one another.

5) We will not define "transmogrify". But, suppose you can directly transmogrify a vector of n things in Cn^3 steps, and that given the transmogrification of two vectors, you can find the transmogrification of the concatenated vector in n^2 steps. Suggest a faster (divide-and-conquer) algo than the direct one for transmogrification, and give a big-O bound on its running time.

6) Consider the complete graph K_5 on five vertices.

a) What is the spanning tree produced by depth-first search?

b) What is the spanning tree produced by breadth-first search?