This is an exercise to give you some additional practice in using some of the methods of network analysis that have been introduced in the course, and to give me a sense of what you have learned from the lectures, workshop sessions, and reading.

Please answer the questions posed below, making use of the UCINET 5 software where useful. Please turn in a hardcopy (no electronic submissions, please), to my mailbox in William James by Wednesday, May 10.

Ground rules for this exam. I expect you to work independently in preparing your answers. You are welcome to make use of your books, notes, and so on. In accord with ordinary understandings about take-home examinations, however, collaboration with one another on the problems is not appropriate.

Notice: I will be out of the country between May 5 and May 10, and it is quite unlikely that I will be in email contact during that period. So I urge you to read the examination problems soon, such that you can pose any questions you may have about the exam before I leave.

I. A UCINET data set that you have not seen yet has been placed on the course website (you can download it from there). It has also been attached to the email distribution of this exam, and will be placed in the UCINET 5/DATA directory of computers in the Sociology Department on which UCINET 5 is installed. The data set, called “Storey”, is about relationships among 13 organizations involved in rural development in a county of Iowa. The data were collected by David L. Rogers. They are discussed (I believe) in David L. Rogers (1974) “Sociometric Analysis of Interorganizational Relations: Application of Theory and Measurement.” *Rural Sociology* 39: 487-503. (You do not need to consult this source for purposes of this exam.)

“Storey” is a one-mode data set including four different types of tie. Data were collected by survey. The actors are as follows:

1 Agricultural Stabilization and Conservation Service
2 Community Action Agency
3 Farmer’s Home Administration
4 County Employment Security Office
5 Soil Conservation Service
6 Forest Service
7 Rural Electric Cooperative
8 County Welfare Office
9 County Extension Office
10 County Planning and Zoning Commission
11 Farm Bureau
12 County Development Committee-Industrial
13 County Conservation Board
These actors are identified by abbreviations in the data set. The four separate matrices/types of tie (each is binary, with 1 indicating presence and 0 absence of a relationship) are as follows:

1. Administrator in row met director of organization in column (past year)
2. Row organization provided resources to, or shared resources with, column organization (past 3 years)
3. Member of row organization sits on board/council of column organization
4. Unit of row organization has joint activities/programs with column organization (past 5 years)

Use the “Storey” data set to answer questions 1-5 below.

1. Make the “joint programs” relation symmetric via the “Maximum” method. How many cliques containing three or more actors are found in that relation, after it has been so symmetrized? What organizations are included in each?

2. Report the numbers of, and memberships in, strong components, separately for the “met director” and “sent resources” relations.

3. You are charged with reporting on the relative visibility/prominence of the agencies within the community. How would you measure this, given the data made available? Which of the four relationships would you use in developing the measure, and why? If you use more than one relationship, how would you choose to combine data? What centrality measure would you choose, and why?

Give a table including the scores of the agencies on your preferred measure of visibility/prominence.

4. Construct a blockmodel summarizing the structure of the agencies in this county, briefly summarizing the methods you use to construct it (i.e. similarity/dissimilarity measure, clustering method, etc.). Your blockmodel should rely on a criterion of structural equivalence (not role or regular equivalence). Report the actors assigned to each block, density matrices for inter-block relations, and image matrices. Then give your characterization of the patterns of relationships they summarize.

5. Using the “met director” relationship, obtain and report indices describing egocentric networks (ignore directionality of ties when doing so, i.e. assume they are symmetric by a “Maximum” criterion). Which agencies have the most “open” and which the most “closed” local networks?

II. A second data set (in UCINET 5 format) called “PERFORM” has been made available to you in the manner described above. This is a two-mode data set in which the rows refer to cultural products and the columns refer to performers involved in producing them (they may be lead artists, guest artists, or “side” musicians). The data were obtained via a rather unsystematic
coding of liner notes from CDs. There are 20 products and 25 performers (though many more than that number are actually listed on the liner notes) included in the data set.

Use the data in “PERFORM” to answer the following questions.

6. Construct and report a matrix in which entries give the number of times each pair of performers has collaborated on a cultural product.

7. Construct a bipartite graph, and then obtain the geodesic distance matrix for that graph. Are all products and performers linked, at some finite distance? What is the longest geodesic path separating any two (connected) products? Any two (connected) performers? (You should report the geodesic distance matrix; you need not report the bipartite graph.)

8. Which performers seem most centrally involved in creating connections among the products? Give a numerical measure, explaining why you selected it and how you obtained it.