Computer Models
For
Fire and Smoke

Model Name:	EVACNET4
Version:	1.4
Classification:	Evacuation/egress model
Very Short Description:	Determines optimal building evacuation plan
Modeler(s), Organization(s):	Thoma Kisko, University of Florida
User's Guide:	EVACNET4 User's Guide, http://www.ise.ufl.edu/kisko/files/evacnet/EVAC4UG.HTM
Technical References:	See: http://www.ise.ufl.edu/kisko/files/evacnet/
Validation References:	See: http://www.ise.ufl.edu/kisko/files/evacnet/
Availability:	Free download at http://www.ise.ufl.edu/kisko/files/evacnet/
Price:	Full version is now free
Necessary Hardware:	Windows **95, 98, NT, XP, Vista and 2000**
Computer Language:	FORTRAN
Size:	Less than 1MB if disk space, 1MB to 40MB or RAM
Contact Information:	Thomas Kisko, 352-392-1293, kisko@ise.ufl.edu

Detailed Description:

EVACNET4 is a user-friendly interactive computer program that models building evacuations. The program accepts a network description of a building and information on its initial contents at the beginning of the evacuation. From this information, EVACNET4 produces results that describe an optimal evacuation of the building. Each evacuation is optimal in the sense that it minimizes the time to evacuate the building. People are evacuated as quickly as possible.
EVACNET4, the Windows 95/NT version of EVACNET+ has been released. The new version, EVACNET4, handles larger networks and is easier to use.

What's new?

1. COMPILED FOR WIN32 INTEL COMPUTERS - Runs in Windows 95 or Windows NT as a console application.
2. ALLOCATABLE NETWORK SIZES - User specified arrays dimensions; you can customize to fill available memory and to match your modeling needs; 10 megabytes for 400 nodes and 480 time periods.
3. READ FEATURE - Allows off-line editing of model input; EVACNET4 reads ASCII text files.
4. IMPROVED MENU AND DATA ENTRY PROCESSING - Case insensitive; shortcuts.

What is required as input to EVACNET4?

EVACNET4 requires a network description of a building and information about the initial placement of occupants at the beginning of the evacuation. The network is called an EVACNET4 network model. The network model consists of a set of nodes and arcs. The nodes of the network model represent building components such as rooms, halls, stairs, and lobbies. The initial contents (people) in each node must also be specified. The arcs represent the passageways between the building components.

What data needs to be supplied?

For each node, one must to define a capacity. This is the upper limit on the number of people that can be contained in the building component the node represents. One can also (optionally) specify an initial contents of a node. This is the number of people in the "node" at the initiation of the evacuation. The initial contents of a node will default to zero unless the user specifies otherwise.

For each arc, one will need to supply an arc traversal time and arc flow capacity. The traversal time is the number of time periods it takes to traverse the passageway the arc represents. The arc flow capacity is the upper limit on the number of people that can traverse the passageway the arc represents per time period. EVACNET4 breaks up time into time periods of fixed length. The length of each time period is user-definable. The default time period length is 5 seconds. Traversal times and flow capacities are based on this time period.

How big of a model can EVACNET4 handle?

EVACNET+ PC could handle 100 nodes, 130 arcs and 60 time periods.

EVACNET4 is limited by available memory. 400 nodes, 520 arcs and 480 time periods requires about 10 megabytes. Doubling the number of nodes and arcs or doubling the number of time periods requires about 20 megabytes. Doubling everything requires about 40 megabytes.

What does EVACNET4 do when it "runs" a model?

EVACNET4 takes the network model one provides and determines an optimal plan to evacuate the building in a "minimum" amount of time. This is done using an advanced capacitated network flow transshipment algorithm, a specialized algorithm used in solving linear programming problems with network structure. From the user's point of view, all the user does is supply the model, ask EVACNET4 to run it, and then examine the results.

What kind of results does EVACNET4 provide?

The EVACNET4 results menu has many options for one to choose from in selecting specific results. A summary of the results is provided in the first option. The other options give results such as:

- Destination allocation.
- Arc movement summaries.
- Floor clearing times.
- Evacuation profiles and snap shots.
- Bottleneck identification.

What kind of buildings can one model with EVACNET4?

EVACNET4 has been designed to be flexible enough to model the evacuation of almost any conceivable structure representable as a network. This includes office buildings, hotels, skyscrapers, auditoriums, stadiums, retail establishments, restaurants, and schools. Entire structures or selected parts of a structure may be modeled. The cause of the evacuation may be fire, smoke, earthquake, drill or any other reason requiring the quick removal of people from the building.