

# SHARE PROGRAM LIBRARY AGENCY



PROGRAM NUMBER

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SHARE PROGRAM LIBRARY SUBMITTAL FORM

SHARE PROGRAM LIBRARY AGENCY  
Triangle Universities Computation Center  
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27709 USA

SPLA CONTROL NUMBER: 190

This form should be completed and submitted with the program package to the SHARE Program Library Agency at the address shown above. Standards and instructions for submitting programs are in the "SHARE Reference Manual".

- (1) Program Number (to be filled in by SPLA)..... 360D-23.0.002
- (2) System Type (machine)..... 360/370
- (3) Search Key..... Plant Layout, Office  
Layout, Relationship  
Chart
- (4) Programming Systems/Languages..... Fortran IV
- (5) Author's Name and Address..... J. M. Moore, Dept. Indust. Engr.  
Virginia Polytechnic Institute  
Blacksburg, Virginia 24061
- (6) Direct Technical Inquiries to Name & Address (if different than Author) and J.A. Tompkins  
Box 5511  
North Carolina State University  
Raleigh, North Carolina 27607
- (7) Title of Program..... CORELAP: Computerized Relationship  
Layout Planning
- (8) Submitter's Installation Membership Code..... NCS
- (9) Submitter's Own Program Identification and Suffix(Optional)..CORELAP
- (10) Primary Subject Code..... 230
- (11) Minimum System Requirements OS/Fortran IV
- (12) New or Revision Code (if revision, show prior Program Number in Item 1) N
- (13) Year Completed..... 1975
- (14) Date of Submittal..... 4/15/76
- (15) Documentation (number of original pages submitted)..... 5
- (16) Abstract (should contain sufficient information for a reader to determine the value of the program). Listed on the reverse side of this form are subjects which may serve as a guide for a descriptive abstract.

SHARE PROGRAM LIBRARY SUBMITTAL FORM

Subject Guide:

- a. Purpose
- b. Programming Language used
- c. Version and modification level or release number
- d. Field of application
- e. Type of routine (main program, subroutine, etc.)
- f. Specific description of machine requirements

ABSTRACT

CORELAP 9.3 (Computerized Relationship Layout Planning) is a computer program designed to generate a layout for a facility based upon the relationships among the departments within the layout. CORELAP 9.3 consists of a selection routine and a placement routine. The departments are selected and placed in an effort to maximize the relationships among departments as indicated on the originally input relationship chart. CORELAP 9.3 differs from earlier versions of CORELAP in that a plotter may be utilized to plot the final layout. CORELAP 9.3 is written in Fortran IV and requires 200k of storage to be implemented.

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(Please attach additional pages if necessary).....Total pages attached 0

Permission to Publish

"I hereby give the SHARE Program Library Agency permission to reprint, re-produce, and distribute this program."

- (17) Signature of Submitter and Date J. A. Tompkins (James A. Tompkins) 4/15/76
- (18) Signature of Installation Addressee H. R. [Signature] (NCS)

## CORELAP USER'S GUIDE

CORELAP, an acronym representing Computerized Relationship Layout Planning, is a plant layout construction routine which consists of a selection procedure and a placement procedure. The selection procedure determines the order in which departments should enter the layout and the placement procedure determines the location within the layout where the department should be positioned. The basis for selection and placement is a relationship chart which indicates the desired closeness among the departments to be included with the layout. Detailed information on CORELAP may be obtained from either of the references stated at the end of this guide.

This guide is divided into three sections. The first section describes the input format, the second section lists the input for an example problem and the last section lists and interprets CORELAP'S diagnostics.

### Section 1: Input Format

<u>CARD</u>	<u>COLUMN</u>	<u>EXPLANATION</u>
1	Weighted Ratings Card	
	1-5	KER(7)=Weighted rating for X rating (e.g. -729)
	6-10	KER(6)= " " " U " (e.g. 1)
	11-15	KER(5)= " " " O " (e.g. 9)
	16-20	KER(4)= " " " I " (e.g. 27)
	21-25	KER(3)= " " " E " (e.g. 81)
	26-30	KER(2)= " " " A " (e.g. 243)
	31-35	KER(1)= " " " pre-assign (e.g. 2187)
2	ID Card	
	1-3	ID=Identification Number (e.g. 101)
	4	Blank
	5-80	TEXT=Anything to identify the problem (FORMAT 19A4)
3	Parameter Card	
	1-3	N=Number of departments (e.g. 12)
	4-6	MSIDE=Wanted element square side length (e.g. 5)
	7-9	MSH=Maximum length to width ratio (e.g. 5)
	10-14	WSH=Strict wanted length to width ratio
	15-17	FILLRA=Layout filling ratio (<1.0) (FORMAT F3.2)
	18	IOP2=2 If punched deck of final layout wanted =1 If plot from on-line digital plotter is desired =0 If neither plot nor deck are desired
	19	IOPT=1 If each partial layout is desired =0 If only final layout is wanted

4 to  
N+3

#### Data Cards

1-6  
7-10

NARAY(I,2)=Department Area. I=1,N  
IFIXED(I,J)=Wanted Place fro pre-assignng I=1,N;J=1,4.  
e.g. COL SIDE  
7 N  
8 W  
9 S  
10 E  
11- NREL(I,J)=Closeness ratings. I=1,N;J=1,N.

If more than one problem is to be made during this run, information for the next problem can commence here starting with the ID card. If no further problems are to be run, then add the

#### LAST CARD

1-3 End of data. Leave col. 1 blank and insert -1 in cols.  
2-3.  
11-80 Anything, such as LAST or END CARD.

#### Section 2: Input for an Example Problem

Column 1  
↓  
-729\_\_1\_\_9\_\_27\_\_81\_\_243\_\_729  
\_73\_EXAMPLE\_PROBLEM  
\_\_7  
\_12000\_\_\_0534322  
\_\_8000\_\_\_025442  
\_\_6000\_\_\_02232  
\_12000\_\_\_0422  
\_\_8000\_\_\_064  
\_12000\_\_\_05  
\_12000\_\_\_0

#### Section 3: CORELAP Diagnostics

##### 1. ERROR ON INPUT

Something is wrong with N, the number of departments. It is either missing or it is zero or less or greater than 70. Check columns 1 through 3 on the Parameter Card. N must be a positive number less

than 70. Also check your card deck order. This error is fatal and will terminate calculation. The parameter card must be corrected.

2. TOTAL AREA = NNNNNN

Explanation: NNNNNN is the sum of all the departmental areas.  
Response: None needed.

3. NO SHAPE PARAMETER GIVEN RATIO = 1 ASSUMED

Explanation: You have defaulted on both MSH and WSH, so the program will continue using a square layout area in lieu of any specific information from you.  
Response: None.

4. MAXIMUM RATIO NNN IS USED FOR BUILDING SHAPE

Explanation: You have specified MSH but not WSH.  
Response: None needed.

5. WANTED STRICT RATIO FF.FF IS USED FOR BUILDING SHAPE

Explanation: You have specified WSH as indicated.  
Response: None required.

6. NO FILLING RATIO SPECIFIED .FILLRA = 0.50 IS ASSUMED

Explanation: You have defaulted on the Filling Ratio, so the program assumes a value of 0.50 for you and continues.  
Response: None required.

7. NO ELEMENT SQUARE SIDE SPECIFIED

Explanation: You have not specified the side of the element square, so the program will calculate one for you and use it. It may be an unusual figure and difficult to work with, however, defaulting on this parameter on your first run is not a bad way to get a rough estimate of what might make a reasonable element square side. You have a chance to evaluate what size square will make sense and on the second run specify a figure which is close to the calculated figure from the first run and yet easy to work with.  
Response: None required, but you may want to specify it on your next run.

8. GIVEN ELEMENT SQUARE TOO SMALL

Explanation: You have specified an element square side so small that the width of the paper in your printer has been exceeded. The layout will go right off of your paper.  
Response: Make the value of MSIDE larger on the Parameter Card.

9. SMALLEST DEPARTMENT TOO SMALL FOR ELEMENT SQUARE  
THE AREA OF DEPARTMENT KK IS CHANGED TO NNNNNN

Explanation: Smallest departmental area is smaller than the element square. Program will assign one unit square to the department with this notice serving as an announcement that this has been done.

Response: Program continues, but you may want to change MSIDE.

10. ELEMENT SQUARE = NNN

Explanation: The area of the element (or unit) square is NNN.

Response: None needed.

11. TOTAL NUMBER OF ELEMENT SQUARES NEEDED FOR LAYOUT IS NNNNNN

Explanation: Given the size of the element square, this problem requires NNNNNN squares.

Response: None needed.

12. NN COLUMNS AND MM ROWS ARE RESERVED FOR LAYOUT

Explanation: Number of rows and columns in memory that are reserved for this problem are shown.

Response: None.

13. FIRST NOT PRE-ASSIGNED DEPARTMENT NN IS TOO BIG  
WIDTH = KK LENGTH = LL WILL BE USED

Explanation: When departments are being pre-assigned to specific locations, this message will appear if the first department being placed by the program does not fit the space remaining.

Response: Check relative sizes of pre-assigned departments against the size of the department in question.

14. MAXIMUM RATIO EXCEEDED

Explanation: Message printed when a calculated width to length ratio + 0.5 exceeds the maximum length to width ratio.

Response: None required. Program continues. You may want to check length to width relationships.

#### REFERENCES

1. Moore, J. M., "Computer Program Evaluates Plant Layout Alternatives," Industrial Engineering, January, 1971, pp. 19-25.
2. Tompkins, J. A., and Moore, J. M., Computer Aided Facilities Design: A User's Guide, Facilities Planning and Design Division, American Institute of Industrial Engineers, 25 Technology Park, Norcross, Georgia, 1976, Chapter 6.

## MAGNETIC TAPE KEY

The tape volume contains two files and three tape marks (TM) as shown below. The DCB information is the same for all files:

DCB=(RECFM=FB,LRECL=80,BLKSIZE=1600)

File 1: CORELAP source program  
EBCDIC  
1799 card images  
90 blocks  
TM

File 2: Sample input data  
EBCDIC  
19 card images  
1 block  
TM  
TM