

Critical Path Analysis (Model A)

Even if critical path analysis does not exactly excite you, this program can be used to find the longest or shortest route through a large maze. As dimensioned, it will handle a network of up to 50 nodes or junctions, each of which may have up to 5 outlets. The joining links can represent distance or time and the program will list all possible paths, or the longest path, or the one with most nodes. Loop back conditions are automatically rejected by the program. Draw your own network on paper and enter the separate link details in the DATA statements onwards. Then press the key sit back and watch the computer display the path analysis.

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1  REM *** BBC VERSION ***
2  REM *** CRITICAL PATH ANALYSIS ***
10 GOTO 500
20 CRITICAL PATH ANALYSIS
30 CONVERTED & MODIFIED FOR BBC MICRO
40   BY Max Lang      25 June 1983
50   :
60   FROM A SPECTRUM PROGRAM BY
70   MICHAEL BEWS
80   :
90   ROUTINE INDEX
100  -----
110  MAIN PROGRAM:.....500
120  INITIATE:.....1000
130  DATA:.....1200
140  DISPLAY:.....1500
150  SEEK PATH:.....2000
160  RECORD A PATH:...2200
170  UPDATE:.....2300
180  TITLE:.....10000
190  WAIT:.....10200
200  YN:.....10300
210  SPACEBAR:.....10500
220  ::::::::::::::::::::::::::::
500  REM MAIN PROGRAM
510  MODE 7
520  PROC_TITLE("CRITICAL PATH ANALYSIS",1
)

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530    PROC_INITIATE
540    PROC_DATA
550    MODE 4
560    PROC_DISPLAY
570    PRINT
580    INPUT "Enter number of start node",ST
ART
590    INPUT "Enter number of finish node",F
INISH
600    PRINT
610    NE(FINISH)=-1:REM SET NUMBER OF EXITS
AT FINISH NODE TO -1
620    PROC_SEEK_PATH(START)
630    PRINT:PRINT "Number of paths from ";S
TART;" to ";FINISH;" =";TAB(33);TP
640    IF TP=0 THEN GOTO 680
650    PRINT:PRINT "Path No.";MNP;" has the
most nodes =";TAB(33);MN
660    PRINT:PRINT "Path No.";LP;" is the lo
ngest =";TAB(33);L
670    PRINT:PRINT "Path No.";SP;" is the sh
ortest =";TAB(33);S
680    VDU 26:REM RESTORE WINDOWS
690    VDU 15:REM PAGE MODE OFF
700    PRINT TAB(0,31);
710    END
720    ::::::::::::::::::::::::::::::::::::
1000   DEF PROC_INITIATE
1010   DIM F(30,5): REM FINISH NODE(START,NO
DE,PATH NUMBER)
1020   DIM L(30,5): REM LENGTH OF PATH(START
,NODE,PATH NUMBR)
1030   DIM NE(30): REM NUMBER OF EXITS(STAR
T NODE)
1040   DIM FL(30): REM FLAG OF NODE PASSED
THROUGH(NODE NUMBER)
1050   DIM P(30): REM PATH FOLLOWED(ORDER
OF NODES)
1060   TP=0: REM TOTAL NUMBER OF PATH
S FOUND
1070   MNP=0: REM PATH WITH MOST NODES
1080   MN=0: REM NUMBER OF NODES IN P
ATH WITH MOST NODES
1090   PL=0: REM LENGTH OF PATH FOLLO
W 1070

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1100    LP=0:          REM LONGEST PATH
1110    L=0:          REM LENGTH OF LONGEST PA
TH
1120    SP=0:          REM SHORTEST PATH
1130    S=999999:      REM LENGTH OF SHORTEST P
ATH
1140    NC=0:          REM NODE COUNTER
1150    ENDPROC
1160    ::::::::::::::::::::::::::::::::::::::
1200    DEF PROC_DATA
1210    RESTORE 1280
1220    READ start,finish,length
1230    IF start=-1 THEN ENDPROC
1240    NE(start)=NE(start)+1
1250    F(start,NE(start))=finish
1260    L(start,NE(start))=length
1270    GOTO 1220
1280    DATA 1,4,4
1290    DATA 1,2,2
1300    DATA 1,3,4
1310    DATA 1,8,11
1320    DATA 2,3,1
1330    DATA 2,5,3
1340    DATA 3,7,5
1350    DATA 4,5,1
1360    DATA 5,6,1
1370    DATA 6,7,2
1380    DATA 6,11,7
1390    DATA 7,8,0
1400    DATA 7,12,11
1410    DATA 8,9,3
1420    DATA 8,10,3
1430    DATA 9,10,2
1440    DATA 10,12,9
1450    DATA 11,12,3
1460    DATA -1,-1,-1
1470    ::::::::::::::::::::::::::::::::::::::
1500    DEF PROC_DISPLAY
1510    MOVE 0,825:DRAW 225,975:DRAW 425,875:
DRAW 500,975:DRAW 825,975:DRAW 1125,825
1520    MOVE 0,825:DRAW 225,875:DRAW 425,750:
DRAW 550,875:DRAW 1125,825
1530    MOVE 0,825:DRAW 625,575:DRAW 725,525:
DRAW 825,575:DRAW 1125,825
1540    MOVE 0,825:DRAW 425,750
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1550    MOVE 625,575:DRAW 825,575
1560    MOVE 225,875:DRAW 425,875
1570    MOVE 500,975:DRAW 550,875
1580    MOVE 550,875:DRAW 625,550
1590    COLOUR0:COLOUR129
1600    PRINTTAB(0,6)"1"
1610    PRINTTAB(7,1)"4"
1620    PRINTTAB(7,4)"2"
1630    PRINTTAB(13,4)"5"
1640    PRINTTAB(13,8)"3"
1650    PRINTTAB(19,14)"8"
1660    PRINTTAB(22,15)"9"
1670    PRINTTAB(15,1)"6"
1680    PRINTTAB(25,1)"11"
1690    PRINTTAB(17,4)"7"
1700    PRINTTAB(25,14)"10"
1710    PRINTTAB(34,6)"12"
1720    PRINTTAB(0,13)"NODE"
1730    COLOUR1:COLOUR128
1740    PRINTTAB(3,3)"4"
1750    PRINTTAB(4,5)"2"
1760    PRINTTAB(7,7)"4"
1770    PRINTTAB(10,6)"1"
1780    PRINTTAB(10,10)"11"
1790    PRINTTAB(10,2)"1"
1800    PRINTTAB(10,4)"3"
1810    PRINTTAB(14,3)"1"
1820    PRINTTAB(16,3)"2"
1830    PRINTTAB(15,6)"5"
1840    PRINTTAB(20,1)"7"
1850    PRINTTAB(18,9)"0"
1860    PRINTTAB(24,5)"11"
1870    PRINTTAB(22,13)"3"
1880    PRINTTAB(20,15)"3"
1890    PRINTTAB(24,15)"2"
1900    PRINTTAB(30,10)"9"
1910    PRINTTAB(30,3)"3"
1920    PRINTTAB(30,13)"LENGTH"
1930    VDU 28,0,31,39,17
1940    VDU 14
1950    ENDPROC
1960    ::::::::::::::::::::::::::::::::::::::::::::
1970    DEF PROC_SEEK_PATH(NODE)
2000    DEF PROC_SEEK_PATH(NODE)
2010    FL(NODE)=1

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2020     NC=NC+1
2030     P (NC) =NODE
2040     LOCAL C
2050     C=0
2060     REPEAT
2070         C=C+1
2080         PL=PL+L (NODE,C)
2090         IF NE (F (NODE,C) ) <0 THEN PROC_RECORD
_PATH:GOTO 2120
2100         IF NE (F (NODE,C) ) =0 THEN GOTO 2120
2110         IF FL (F (NODE,C) ) <>1 THEN PROC_SEEK_
PATH (F (NODE,C) )
2120         PL=PL-L (NODE,C)
2130         UNTIL C=NE (NODE)
2140         FL (NODE) =0
2150         P (NC) =0
2160         NC=NC-1
2170     ENDPROC
2180     ::::::::::::::::::::::::::::::::::::::::::::
2200     DEF PROC_RECORD_PATH
2210     TP=TP+1
2220     PRINT;TP;" ";TAB(4);
2230     Z=0
2240     Z=Z+1
2250     IF P (Z) =0 THEN PRINT;FINISH:PROC_UPDA
TE:ENDPROC
2260     PRINT ;P (Z) ;", ";
2270     GOTO 2240
2280     ::::::::::::::::::::::::::::::::::::::::::::
2300     DEF PROC_UPDATE
2310     IF MN<Z THEN MN=Z:MNP=TP
2320     IF L<PL THEN L=PL:LP=TP
2330     IF S>PL THEN S=PL:SP=TP
2340     ENDPROC
2350     ::::::::::::::::::::::::::::::::::::::::::::
2400     DEF PROC_INSTRUCT
2410     CLS
2420     PRINT "CRITICAL PATH ANALYSIS"
2430     PRINT "-----"
2440     PRINT:PRINT "Critical Path Analysis c
an be applied wherever several inter-depend
ent activities need to be carried out
in a specified sequence to achieve a final
goal."
2450     PRINT:PRINT "The goal might be the co
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mpletion of a large project or, more simply
 , arrival at a distant metro station by the
 shortest possible route."

2460 PRINT:PRINT "This program is suitable
 for use in either case."

2470 PRINT:PRINT "A demonstration network
 is shown and the program will trace out all po
 ssible paths through the network, indicat
 ing the longest and shortest routes."

2480 PROC_SPACEBAR

2490 ENDPROC

2500 ::::::::::::::::::::::::::::::::::::::

10000 DEF PROC_TITLE(T\$,I):REM I=0 - NO INS
 TRUCTION OPTION, I=1 - OPTION

10010 CLS

10020 PRINT TAB(1,1) "Max Lang"

10030 PRINTTAB(19-LEN(T\$)/2,10)CHR\$(141);T\$

10040 PRINTTAB(19-LEN(T\$)/2,11)CHR\$(141);T\$

10050 PROC_WAIT(150)

10060 IF I=0 THEN ENDPROC

10070 PRINT TAB(0,22) "Do you require instru
 ctions ? ";

10080 PROC_YN

10090 IF YES THEN PRINT "Yes"; ELSE PRINT "
 No";

10100 PROC_WAIT(150)

10110 IF YES THEN PROC_INSTRUCT

10120 ENDPROC

10130 ::::::::::::::::::::::::::::::::::::::

10200 DEF PROC_WAIT(T)

10210 LOCAL NOW

10220 NOW=TIME

10230 REPEAT

10240 UNTIL TIME=NOW+T

10250 ENDPROC

10260 ::::::::::::::::::::::::::::::::::::::

10300 DEF PROC_YN

10310 *FX21,0

10320 LOCAL G

10330 REPEAT

10340 G=GET

10350 G=G+32*(G>95): REM CONVERT TO CAPIT
 ALS

10360 YES=(G=89)

10370 NO=(G=78)

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10380    UNTIL YES OR NO
10390    ENDPROC
10400    ::::::::::::::::::::::::::::::::::::
10500    DEF PROC_SPACEBAR
10510    PRINT TAB(0,23)"Press SPACEBAR to con
tinue.";
10520    LOCAL G
10530    *FX21,0
10540    REPEAT
        G=GET
10560    UNTIL G=32
10570    CLS
10580    ENDPROC
10590    ::::::::::::::::::::::::::::::::::::
```

