PROGRAM MAINTENANCE MANUAL

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# Program Maintenance Manual

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CHAPTER I
DISCUSSION

CAM is written in BASIC. The code for CAM has been carefully structured to meet the following conditions:

1) The software is composed of modularized programs with each module being functionally discrete.

2) Each module has a flexible and modifiable substruction.

3) Each module has minimal dependence of the operation of a module on the internal details of another.

4) The code is self explanatory with extensive, embedded documentation and with input and output specifications provided in each module header block.

5) The code has been written so that no portion of the software is explicitly dependent upon the properties of the operating system except for the general provision that the software must be run under DOS, version 2.0 or higher.

CAM has three components – CAM, CAM2, and CAM3. Source code for CAM is presented in Chapter II, Sections A, B, and C. CAM gets the user up and running by first presenting the introductory text and getting transferring control of the program to CAM2 which does the actual computations. If feasibility analysis is required, then CAM3 is called by either CAM or CAM3.
Because of the embedded comments and clear logical flow, users familiar with BASIC can easily follow the code. Users wishing to understand what the computational procedures are doing should consult Volume 1, Chapter 6.
CHAPTER II

PROGRAM LISTING
10 'COMPETITION ANALYSIS MODEL  "CAM.BAS"
20 DEFINT I
30 COMMON IW
40 KEY OFF:IW=0:WIDTH "LPT1":.80
50 CLS:LOCATE 2,33:PRINT"Welcome to":LOCATE 4,26:PRINT"COMPETITION ANALYSIS MODEL"
60 LOCATE 7,23:PRINT"* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
70 LOCATE 9,23:PRINT"CAM"
80 LOCATE 11,23:PRINT"* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
90 LOCATE 20,21:PRINT"Administrative Sciences Corp. 1987"
100 LOCATE 24,25:GOSUB 570
110 PRINT:PRINT TAB(30);"PURPOSE":PRINT
120 PRINT" CAM, the Competition Analysis Model, helps you do a cost analysis of production competition. It will be valuable only if you take care to assemble realistic assumptions. CAM has the ability to simplify sensitivity analyses, and it can perform various breakeven analyses where second source parameter values are determined that equate costs under Sole Source and Competition."
130 PRINT:PRINT TAB(30);"METHODOLOGY":PRINT
140 PRINT" The model calculates competitive savings by comparing estimated SOLE SOURCE costs with estimated COMPETITIVE costs. To use the model, establish a set of base case parameters based on sole source assumptions. Then, enter data for the same case using parameters expected in a competitive environment. After performing this base case analysis, sensitivity analysis can be conducted on each parameter."
150 PRINT:PRINT:PRINT TAB(30);"PROCEDURE":PRINT
160 PRINT" CAM allows you to do the following:
(1) Input, change, or display data
(2) Analyze competition when the factors are known
(3) Perform breakeven analysis when all factors are known except on e"
170 PRINT:GOSUB 570
180 IF QS="Y" OR QS="y" THEN IW=1:WIDTH "LPT1":132:GOTO 320
190 IF QS<>"N" AND QS<>"n" THEN BEEP:GOTO 300
200 PRINT" Is your printer set for 132 columns (or more)? If not and you want wide" screen, hit Control Break and set printer before running the program.
210 PRINT:PRINT" The program is designed to accept data input from the terminal or from data files on diskette. Terminal input accepts data in the following order:
(1) # of years during which costs will be incurred
(2) First year (a two digit code such as 87)
(3) Discount rate at which future costs are converted to present value
(4) Sole Source, 1st Competitive Source, 2nd Competitive Source
(5) Non-Recurring Costs by Year, Quantity By Year, 1st Unit Cost,"
(6) Progress (Learning) & Production (Lot Size) Rate Parameters"
(7) Timing of Shift/Rotation in Progress Rate Parameter (specified by year)"
460 PRINT" or unit # of sole source production schedule). A shift to a lowe
r/more"
470 PRINT" efficient progress curve and/or steeper progress curve can be en
tered"
480 PRINT" for the 1st or 2nd competitive source or both. The user may spec
ify up"
490 PRINT" to 5 different times for shift/rotation, or none."  
500 PRINT:PRINT" You will be given menu prompts. When you make a selection you w
ill move to "
510 PRINT" a lower menu for more specific prompts. You can move back up the menu
hierarchy by typing 'M' for menu up." 
520 PRINT:PRINT" There is a HELP facility which is currently on. By typing 'H' a
fter the prompt"
530 PRINT" you can toggle this capability from ON to OFF and from OFF to ON."  
540 PRINT:GOSUB 570
550 PRINT:CHAIN "CAM2"
560 'Press any key subroutine
570 "Press any key to continue"
580 Q$=INKEYS:IF Q$="" THEN 590
600 RETURN
10 'COMPETITION ANALYSIS MODEL "CAM2.BAS"
20 DEFINT I-R,M,N
30 COMMON I,W
40 LOG2=LOG(2):IFIRST=0:H=1:IEVEN=0:ON ERROR GOTO 5530
50 ' DIMENSIONED FOR 25 YEARS
60 DIM YR(25),Q(25,5),COST(25,9),P(25),A(3),B(3),C(3),R(3,5),S(3,5)
70 DIM JYR(5),QAMT(5),PCT(5),MESSAGES(3),TCOST(5),Q2(25,3)
80 ' DISPLAY TABLE
90 MESSAGES(2)="********** FIRST SOURCE UNDER COMPETITION **********"
100 MESSAGES(3)="********** SECOND SOURCE UNDER COMPETITION **********"
110 T0S=" COMPETITION ANALYSIS "
120 T1S=" *** SOLE SOURCE *** ******* COMPETITIVE *********"
130 T11S=" DISCOUNT"
140 T2S=" COMPETITIVITY *** 2ND COMPETITIVE***"
150 T22S=" COMPET COMPET"
160 T3$=" FY QTY COST COST 1ST 2ND COST COST"
170 T33S=" TOTAL RECUR N.REC TOTAL QUANTITIES RECUR N.REC"
180 S1S=" ******* SOLE SOURCE ******** COMPETITIVE 1ST COMPETITIVE***"
190 S2S=" RECUR N.REC TOTAL QUANTITIES RECUR N.REC"
200 S3S=" FY QTY COST COST 1ST 2ND COST COST"
210 DI$="DATA SUMMARY ":D2$="***** QUANTITIES ***** * NON-RECURRING COST *"
220 D3$="FY SOLE 1ST C 2ND C SOLE 1ST C 2ND C"
230 F71$="#,###.#":F80$="###,###.#":F88$="##,###.#":F92$="#,###.#":F93$="#,###.#"
240 F90$="#,###0###":F91$="#,###.#":F92$="#,###.##":F93$="#,###.###,
250 CLS
260 CLOSE:PRINT:PRINT " OLD DATA FILES"
270 NF$=0:FILES ".CAM":NF$=1
280 IF H=0 THEN PRINT:PRINT " (O)ld or (N)ew data file, (D)elete file, (F)easibility, (H)elp - turn ON, or (Q)uit":GOTO 320
290 PRINT" (O)ld data file from disk":PRINT" (N)ew data file with data to be entered from the terminal"
300 PRINT" (D)elete old data file from disk"
310 PRINT" (F) easibility analysis of price reduction":PRINT" (H)elp - turn OFF":PRINT" (Q)uit program and return to operating system"
320 INPUT" ENTER THE APPROPRIATE LETTER":QS
330 IF QS="H" OR QS="h" THEN H=(H+1)MOD 2:GOTO 260
340 IF QS="O" OR QS="o" THEN 410
350 IF QS="N" OR QS="n" THEN 460
360 IF QS="D" OR QS="d" THEN 410
370 IF QS="F" OR QS="f" THEN CLS:PRINT" Loading Feasibility Computation":"CAM3"
380 IF QS="Q" OR QS="q" THEN SYSTEM
390 GOTO 260
400 "**** IFIRST=-1 FOR DATA FILE INPUT, 0 FOR TERMINAL INPUT, 1 AFTERWARDS *
410 INPUT " Name of Data File (8 char or less - do not type .CAM) ":NFS
420 NFS=NFS+.CAM":IF QS="D" OR QS="d" THEN KILL NFS:GOTO 260
430 OPEN ":NF$","#1,NFS:IFIRST=-1
440 INPUT ":#1,NRF,IYR:GOTO 520
450 "**** Initialize for terminal input ***********************
460 FOR J=1 TO 25:COST(J,6)=0:COST(J,7)=0:COST(J,8)=0:NEXT J
470 CLS:PRINT" ENTER each input value at the prompt. If you make an incorrect entry followed"
480 PRINT" by <cr>, it can be corrected at the end of data entry using CHANGE DATA."
490 PRINT:IFIRST=0:INPUT ":# YEARS

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500 IF NYR>25 THEN PRINT" Maximum # of Years is 25"; GOTO 490
510 INPUT " FIRST FISCAL YR (e.g. 91) " ; IYR
520 GOSUB 2830 "D
530 I=1: IF IFIRST>-1 THEN CLS: PRINT" *********** DATA INPUT FOR SOLE SOURCE PRODUCER ***********"
540 K=6: IF IFIRST>-1 THEN PRINT: PRINT" INPUT NON-RECURRING COSTS (Millions of $) " ; PRINT
550 GOSUB 3920 "COST(J,6)
560 IF IFIRST>-1 THEN PRINT: PRINT" *********** QUANTITIES FOR SOLE SOURCE PRODUCER ***********" 
570 GOSUB 2870 "Q
580 GOSUB 3220 "A
590 GOSUB 3290 "B
600 GOSUB 3370 "C
610 I=2: IF IFIRST>-1 THEN CLS: PRINT" *********** DATA INPUT FOR FIRST SOURCE UNDER COMPETITION ***********"
620 K=7: IF IFIRST>-1 THEN PRINT: PRINT" INPUT NON-RECURRING COSTS (Millions of $) " ; PRINT
630 GOSUB 3920 "COST(J,7)
640 IF IFIRST>-1 THEN CLS: PRINT" QUANTITIES FOR FIRST COMPETITIVE SOURCE" ; PRINT
650 GOSUB 2930 "P or Q
660 GOSUB 3220 "A
670 GOSUB 3290 "B
680 GOSUB 3370 "C
690 I=3: IF IFIRST>-1 THEN CLS: PRINT" *********** DATA INPUT FOR SECOND SOURCE UNDER COMPETITION ***********"
700 K=8: IF IFIRST>-1 THEN PRINT: PRINT" INPUT NON-RECURRING COSTS (Millions of $) " ; PRINT
710 GOSUB 3920 "COST(J,8)
720 GOSUB 3220 "A
730 GOSUB 3290 "B
740 GOSUB 3370 "C
750 IF IFIRST>-1 THEN CLS: PRINT" TIMING OF SHIFT AND ROTATION DUE TO COMPETITION " 
760 GOSUB 3450 "FY
770 IF NSR=0 THEN JYR(1)=-100: QAMT(1)=0: GOTO 840
780 FOR ISR=1 TO NSR: IF IFIRST>-1 THEN CLS
790 FOR I=2 TO 3: IF IFIRST>-1 THEN PRINT: PRINT MESSAGES(I)
800 GOSUB 3770: NEXT I 'S
810 FOR I=2 TO 3: IF IFIRST>-1 THEN PRINT: PRINT MESSAGES(I)
820 GOSUB 3810: NEXT I 'R
830 NEXT ISR
840 GOSUB 3850 "Least Cost
850 IFIRST=1: Q$="D": GOTO 970
860 'Options menu **********************************************
870 IF H=0 THEN 890
880 PRINT: GOSUB 6190
890 PRINT
900 IF H=0 THEN PRINT" (A)nalysis, (B)reakeven, (C)hange data, (D)isplay data, (P)rint" ; PRINT" (S)ave data, (H)elp - turn ON, (M)enu up - be sure to save new data first"; GOTO 960
910 CLS: PRINT" (A)nalysis - Calculate all costs over the program life" ; PRINT" (B)reakeven - Find second source parameter values that lead to same costs" ; PRINT" with or without competition" 
920 PRINT" (C)hange data - Any input factors may be altered" ; PRINT" (D)isplay in put data on screen only"
930 PRINT" (P)rint input data and analysis on printer and screen"
940 PRINT" (S)ave data on disk"
950 PRINT" (H)elp - turn OFF" ; PRINT" (M)enu change to higher level - be sure to save new data first"

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960 INPUT "ENTER THE APPROPRIATE LETTER";QS:NYRP=NYR+1:FOR I=1 TO 3:Q(NYRP,I)=0: NEXT I
970 IF QS="H" OR QS="h" THEN H=(H+1) MOD 2:GOTO 890
980 IF QS="P" OR QS="p" THEN GOSUB 4240:GOSUB 1610:GOTO 870
990 IF QS="D" OR QS="d" THEN GOSUB 4240:GOTO 870
1000 IF QS="A" OR QS="a" THEN GOSUB 1610:GOTO 870
1010 IF QS="S" OR QS="s" THEN GOSUB 5050:GOTO 890
1020 IF QS="B" OR QS="b" THEN GOSUB 5570:GOTO 890
1030 IF QS="M" OR QS="m" THEN 260
1040 IF QS="C" OR QS="c" THEN 1050 ELSE BEEP:GOTO 890
1050 PRINT:IF H=1 THEN 1090
1060 PRINT" (A)first unit cost, (B)progress curve rate, (C)production rate param "
1070 PRINT" (D)iscount Rate (%), (L)east cost, (N)on-recur Costs, (Q)uantity, (Y)ears #"
1080 PRINT" (R)otation %, (S)hift %, (T)ime r/s, (#) of r/s, (H)elp - turn ON, (M)enu up":GOTO 1160
1090 CLS:PRINT" CHANGES ALLOWED":PRINT" (A)first unit cost in SM":PRINT" (B)progress curve rate - e.g. 90% means that the unit cost of the 2Nth unit":PRINT" will drop to 90% of the cost for the Nth unit"
1100 PRINT" (C)production rate parameter - e.g. 90% means that if the lot size in a year":PRINT" doubles, the cost of the 2Nth unit drops to 90% of the Nth unit cost"
1110 PRINT" (D)iscount Rate (%)- Costs N years in the future are divided by":PRINT" (L)east cost by assigning larger quantities to lowest cost producer."
1120 PRINT" (N)on-recurring Costs":PRINT" (Q)uantity of production by year for either source":PRINT" (Y)ears # in production schedule"
1130 PRINT" (R)otation % for progress curve at time of rotation/shift":PRINT" (S)hift % for progress curve at time of rotation/shift":PRINT" (T)ime of rotation/shift - either year or unit #"
1140 PRINT" (#) of rotation/shifts (maximum 5) or change type (year/unit)":PRINT" (H)elp - turn OFF":PRINT" (M)enu change to higher level"
1150 INPUT" ENTER THE APPROPRIATE LETTER";QS
1160 IF QS="H" OR QS="h" THEN H=(H+1) MOD 2:GOTO 1050
1170 IF QS<>"A" AND QS <>"a" THEN 1220
1190 GOSUB 4670:IF I1=4 THEN 1050
1200 PRINT" FIRST UNIT COST now=";A(I1);:INPUT A(I1)
1210 GOTO 1190
1220 IF QS<>"B" AND QS<>"b" THEN 1270
1230 GOSUB 4670:IF I1=4 THEN 1050
1240 IF H=1 THEN GOSUB 5400
1250 PRINT" PROGRESS CURVE RATE now=";B(I1);:INPUT B(I1)
1260 GOTO 1230
1270 IF QS<>"C" AND QS<>"c" THEN 1330
1280 GOSUB 4670:IF I1=4 THEN 1050
1290 IF H=1 THEN GOSUB 5420
1300 PRINT" PRODUCTION RATE PARAMETER now=";C(I1);:INPUT C(I1)
1310 IF C(I1)=0 THEN C(I1)=100
1320 GOTO 1280
1330 IF QS<>"R" AND QS<>"r" THEN 1380
1340 GOSUB 4750:IF I1=4 THEN 1050
1350 IF H=1 THEN GOSUB 5450:GOSUB 5520
1360 PRINT" ROTATION now=";R(I1.ISR);:INPUT R(I1.ISR)
1370 GOTO 1340
1380 IF QS<>"S" AND QS<>"s" THEN 1430
1390 GOSUB 4750:IF I1=4 THEN 1050
1400 IF H=1 THEN GOSUB 5450:GOSUB 5510

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PRINT " SHIFT now=":S(I1,ISR);:INPUT S(I1,ISR)
GOTO 1390
1410 IF QS="D" OR QS="d" THEN GOSUB 2830:GOTO 1050
1420 'IF QS="I" OR QS="i" THEN GOSUB 4040:GOTO 1250
1430 IF QS="N" OR QS="n" THEN GOSUB 3920:GOTO 1050
1440 'IF QS="O" OR QS="o" THEN GOSUB 4380:GOTO 1250
1450 IF QS="Q" AND QS<="q" THEN 1550
1460 PRINT" (S)ole Source Qty (all), (C)ompetitive Qty (all), (Y)ear (1),
(M)enu up"
1470 INPUT" ENTER THE APPROPRIATE LETTER";RS
1480 IF RS="S" OR RS="s" THEN GOSUB 2870
1490 IF RS="C" OR RS="c" THEN GOSUB 2930
1500 IF RS="Y" OR RS="y" THEN GOSUB 3140
1510 IF RS="M" OR RS="m" THEN 1050
1520 GOTO 1480
1530 IF QS="L" OR QS="l" THEN GOSUB 3850:GOTO 1050
1540 IF QS="T" OR QS="t" THEN GOSUB 4870:GOTO 1050
1550 IF QS="#" THEN GOSUB 3450:GOTO 1050
1560 IF QS="Y" OR QS="y" THEN GOSUB 4170:GOTO 1050
1570 IF QS="M" OR QS="m" THEN 890
1580 BEEP:GOTO 1050
1590 SUBROUTINE TO CALCULATE COSTS
1600 NSR is # of shift/rotations
1610 NOYEAR=1 means no year for S/R (JYR(ISR)=-100)
1620 NOQUANT=1 means no quantity (QAMT(ISR)=0)
1630 QAMT(ISR) is set to quantity at which shift/rotation occurs
1640 PCT(ISR) is cumulative percent during s/r year
1650 IF NSR=0 THEN NOYEAR=1:NOQUANT=1:QAMT(1)=100000!:JYR(1)=-100:GOTO 1800
1660 FOR ISR=1 TO NSR
1670 NOYEAR=0:IF JYR(ISR)=-100 THEN NOYEAR=1
1680 NOQUANT=0:IF QAMT(ISR)=0 THEN NOQUANT=1
1690 IF NOYEAR=1 AND NOQUANT=1 THEN QAMT(ISR)=100000!:GOTO 1770
1700 IF NSR>1 THEN 1770
1710 QOLD=0:FOR J=1 TO NYR:IF JYR(ISR)=IYR+J-1 THEN QAMT(ISR)=QOLD+1:GOTO 177
1720 QOLD=QOLD+Q(J,1):NEXT J
1730 NEXT ISR
1740 "The help option shows the detail for the calculation of recurring cost." :PRINT" This is done for the sole source by year, followed by the 1st:" :PRINT" and then 2nd sources under competition, each by year." 1750 NYRP=NYR+1:FOR II=1 TO (3+IMIN2):I=II:ISR=I:IF II>3 THEN I=I-2
1760 AA=A(I):BP1=LOG(.01*B(I))/LOG2+1:CP1=LOG(.01*C(I))/LOG2:QOLD=0:DEN=1!
1770 FOR J=1 TO NYR:CST=0
1780 FOR J=1 TO NYR:CST=0
1790 FOR J=1 TO NYR:CST=0
1800 FOR J=1 TO NYR:CST=0
1810 FOR J=1 TO NYR:CST=0
1820 FOR J=1 TO NYR:CST=0
1830 FRACT=1:RATIO=1
1840 FRACT=1:RATIO=1
1850 'Find % Splits when QAMT(ISR)>0 and II=1  1860 IF QOLD<QAMT(ISR) AND QAMT(ISR)<=QOLD+Q(J,1) THEN PCT(ISR)=(QAMT(ISR)-1-
1870 "Calculate minimum costs when no S/R 1880 IF NSR=0 AND Q(J,1)>0 AND II>3 THEN RATIO=Q(J,7-II)/Q(J,1)
1890 IF II>3 THEN Q(J,II)=0
1900 'Shift and Rotation Year and II>1 1910 -1950
1960 IF JYR(ISR)<IYR+J-1 GOTO 2140
1970 QQ=PCT(ISR)*Q(J,1)*RATIO:IF II>3 THEN Q(J,II)=Q(J,II)+QQ
1980 QNEW=QOLD+QQ:GOSUB 5210
1990 QOLD=QNEW
2000 IF H=1 AND II<4 THEN PRINT"SHIFT/ROTATION ";ISR:"PRINT" *************

2010 'Compute Shift and Rotation ****************************
2020 BP2=LOG(.0001*(100-K(I,ISR))*B(I))/LOG2+1
2030 AA=AA*(1-S(I,ISR)/100)
2040 IF QOLD>0 THEN AA=AA*QOLD*(BP1-BP2)
2050 BP1=BP2
2060 'Augment ISR and check to see if next s/r in same year *****
2070 'Subtract previous cum % in same year ***************
2080 ISR=ISR+1
2090 IF ISR>1 AND Q(J,1)>0 AND II>3 THEN RATIO=Q(J,7-II)/Q(J,1)
2100 IF (ISR>NSR OR JYR(ISR)<JYR(ISR-1)) THEN FRACT=1-PCT(ISR-1):GOTO 2140
2110 QQ=(PCT(ISR)-PCT(ISR-1))*Q(J,1)*RATIO:IF II>3 THEN Q(J,II)=Q(J,II)+QQ
2120 GOTO 1980
2130 'Finish last part of lot cost *****************************
2140 QQ=FRACT*Q(J,1)*RATIO:IF II>3 THEN Q(J,II)=Q(J,II)+QQ
2150 QNEW=QOLD+QQ
2160 GOSUB 5210
2170 QOLD=QNEW:IF J>1 THEN DEN=DEN*(1+.01*D)
2180 TCOST(J,II)=CST/DEN
2190 COST(J,II)=CST
2200 NEXT J
2210 NEXT II
2220 IF NSR=0 THEN 2290
2230 FOR ISR=1 TO NSR
2240 IF NOYEAR=1 THEN JYR(ISR)=-100
2250 IF NOQUANT=1 THEN QAMT(ISR)=0
2260 NEXT ISR
2270 II=2 to indicate that 1st and 2nd competitive source qrys changed
2280 IF IMIN=0 THEN 2320
2290 IF TGBP(2)+TGBP(3)>TGBP(4)+TGBP(5) THEN II=2
2300 DEN=DEN*(1+.01*D)
2310 IF J=1 THEN DENE=DEN
2320 COST(J,9)=(COST(J,1)-COST(J,II+2)-COST(J,II+3)+COST(J,6)-COST(J,7)-COST(J,8))/DEN
2330 FOR J=NYP TO NYR
2340 COST(NYP,J)=COST(NYP,J)+COST(J,9)
2350 NEXT J
2360 IF IEVEN=1 THEN RETURN
2370 'Generate Output ***************************************
2380 IF IEVEN=0 THEN CLS ELSE COST(NYP,9)=0
2390 PRINT TOS,DATES,TIMES:PRINT
2400 PRINT T1S,T1S
2410 PRINT T2S,T2S
2420 PRINT T3S,T3S
2430 FOR K=1 TO 8
2440 COST(NYP,K)=0
2450 IF K=5 THEN Q(NYP,K)=0
2460 NEXT K
2470 IF J=NYP THEN PRINT USING ",",(IYR+J-1)MOD 100; ELSE PRINT PRINT"TO T";
2480 IF J=NYP THEN PRINT USING ",",(IYR+J-1)MOD 100; ELSE PRINT PRINT"TO T";
2490 PRINT USING F90S;Q(J,1):PRINT USING F91S;COST(J,1):PRINT USING F71S;COST(J,6):PRINT USING F90S;Q(J,II+2):PRINT USING F80S;Q(J,II+3):PRINT USING F91S;COST(J,II+2)+COST(J,II+3);2500 PRINT USING F71S;COST(J,7)+COST(J,8):PRINT USING F81S;COST(J,1)-COST(J,II+2)-COST(J,II+3)+COST(J,6)-COST(J,7)-COST(J,8);COST(J,9)
2510 IF J=NYRP THEN 2560
2520 FOR K=1 TO 8
2530 COST(NYRP,K)=COST(NYRP,K)+COST(J,K)
2540 IF K<=5 THEN Q(NYRP,K)=Q(NYRP,K)+Q(J,K)
2550 NEXT K
2560 NEXT J
2570 IF IEVEN=0 THEN 2600
2580 PRINT:INPUT"ENTER Shift PrtScr to Print. or RETURN TO CONTINUE";QS
2590 RETURN
2600 PRINT:IF COST(NYRP,9)>0 THEN PRINT" Competitive Saving as % of Sole Source (Discounted) =";
2610 PRINT USING F71S;ABS(100*COST(NYRP,9)/CONE)
2620 IF QS<>"P" AND QS<>"P" THEN RETURN
2630 LPRINT:LPRINT:LPRINT TOS,DATES,TIMES:LPRINT:IF IW=1 THEN 2670
2640 LPRINT T1S;T11S
2650 LPRINT T2S;T22S
2660 LPRINT T3S;T33S:GOTO 2700
2670 LPRINT S1S;T11S
2680 LPRINT S2S;T22S
2690 LPRINT S3S;T33S
2700 LPRINT:FOR J=1 TO NYRP
2710 IF J<NYRP THEN LPRINT USING " #";(IYR+J-1) MOD 100; ELSE LPRINT:LPRINT "TOT";
2720 LPRINT USING F90S;Q(J,1);:LPRINT USING F91S;COST(J,1);:LPRINT USING F71S;COST(J,6);
2730 IF IW=1 THEN LPRINT USING F91S;COST(J,1)+COST(J,6);
2740 LPRINT USING F90S;Q(J,II+2);:LPRINT USING F80S;Q(J,II+3);
2750 IF IW=0 THEN LPRINT USING F91S;COST(J,II+2)+COST(J,II+3);:LPRINT USING F71S;COST(J,7)+COST(J,8);
2760 IF IW=1 AND II=0 THEN LPRINT USING F91S;COST(J,2);:LPRINT USING F71S;COST(J,7);
2770 IF IW=1 AND II=2 THEN LPRINT USING F91S;COST(J,4);:LPRINT USING F71S;COST(J,7);
2780 LPRINT USING F81S;COST(J,1)-COST(J,II+2)-COST(J,II+3)+COST(J,6)-COST(J,9)
2790 NEXT J
2800 LPRINT:IF COST(NYRP,9)>0 THEN LPRINT" Competitive Saving as % of Sole Source (Discounted) =";
2810 LPRINT USING F71$;ABS(100*COST(NYRP,9)/CONE)
2820 LPRINT CHRS(12):RETURN
2830 'D DISCOUNT RATE - ****************************
2840 IF IFIRST=-1 THEN INPUT #1,D:RETURN
2850 PRINT" DISCOUNT RATE( % or <cr> if 0) " :IF IFIRST=1 THEN PRINT" now =" :D
2860 RETURN
2870 'Q(IYR,I) QUANTITY - ****************************
2880 FOR J=1 TO NYR
2890 IF IFIRST>-1 THEN PRINT USING " #";(IYR+J-1) MOD 100; :INPUT" QUANTITY =
2900 IF IFIRST=-1 THEN PRINT USING " #";(IYR+J-1) MOD 100; :INPUT" QUANTITY =
2910 IF IFIRST=-1 THEN PRINT
2920 RETURN
2930 'Quantities for both OR % for First Source under Competition ************
PRINT" (P)ercent of sole source for 1st source under competition, (Q)uantities"
PRINT" ENTER THE APPROPRIATE LETTER";QS
IF QS="P" OR QS="p" THEN ISW=1:GOTO 3000
IF QS="Q" OR QS="q" THEN ISW=0:GOTO 3000
GOTO 2950
FOR J=1 TO NYR
IF IFIRST=-1 THEN INPUT #1,Q(J,2):GOTO 3040
PRINT" USING" ;(IYR+J-1) MOD 100;:IF ISW=1 THEN USING" PERCENT OF SOLE SOURCE QTY (0-100) = ";P(J) ELSE PRINT" FIRST COMPETITIVE SOURCE QUANTITY=";Q(J,2):GOTO 3000
FOR J=1 TO NYR
IF IFIRST=-1 THEN PRINT
PRINT" QUANTITIES FOR SECOND COMPETITIVE SOURCE":PRINT
FOR J=1 TO NYR
IF IFIRST=-1 THEN INPUT #1,Q(J,3)
IF IFIRST>-1 THEN PRINT USING" SECOND COMPETITIVE SOURCE QUANTITY=";Q(J,3)
NEXT J
IF IFIRST>-1 THEN PRINT:RETURN
PRINT '1 Year - Quantity for SS & First Source under Competition **************
PRINT" YEAR" ;JJ
J=JJ-IYR+1
IF J<1 THEN J=J+100:GOTO 3170
PRINT" SOLE SOURCE QUANTITY now =";PRINT USING" #######";Q(J,1);INPUT" = ";Q(J,1)
PRINT" 1ST COMPETITIVE SOURCE QUANTITY now =";PRINT USING" #######";Q(J,2);INPUT" = ";Q(J,2)
PRINT" 2ND COMPETITIVE SOURCE QUANTITY now =";PRINT USING" #######";Q(J,3);INPUT" = ";Q(J,3)
PRINT:RETURN
PRINT 'A(I) FIRST UNIT COST - *********************************************
IF IFIRST>-1 AND I=2 THEN PRINT" TYPE <cr> TO COPY SOLE SOURCE VALUE" ;PRINT A(I)
IF IFIRST>-1 AND I=3 THEN PRINT" TYPE <cr> TO COPY FIRST COMPETITIVE SOURCE VALUE" ;PRINT A(I)
IF IFIRST>-1 THEN PRINT" FIRST UNIT COST (SM) A= ";A(I)
ELSE INPUT #1,A(I)
IF A(I)=0 AND I>1 THEN A(I)=A(I-1):IF IFIRST=-1 THEN PRINT TAB(47);A(I)
IF IFIRST=-1 THEN RETURN
PRINT 'B(I) PROGRESS CURVE RATE - ***************************************
IF H=1 AND IFIRST>-1 THEN GOSUB 5400
IF IFIRST>-1 AND I=2 THEN PRINT" TYPE <cr> TO COPY SOLE SOURCE VALUE" ;PRINT B(I)
IF IFIRST>-1 AND I=3 THEN PRINT" TYPE <cr> TO COPY FIRST COMPETITIVE SOURCE VALUE" ;PRINT B(I)
IF IFIRST>-1 THEN PRINT" PROGRESS CURVE RATE (%) = ";B(I)
ELSE INPUT #1,B(I)
IF B(I)=0 AND I>1 THEN B(I)=B(I-1):IF IFIRST>-1 THEN PRINT TAB(47);B(I)
IF IFIRST>-1 THEN RETURN
PRINT 'C(I) PRODUCTION RATE PARAMETER - ************************************
IF H=1 AND IFIRST>-1 THEN GOSUB 5420
3390 IF IFIRST>-1 AND I=2 THEN PRINT:PRINT" TYPE <cr> TO COPY SOLE SOURCE VALUE":PRINT C(I)
3400 IF IFIRST>-1 AND I=3 THEN PRINT:PRINT" TYPE <cr> TO COPY FIRST COMPETITIVE SOURCE VALUE":PRINT C(2)
3410 IF IFIRST>-1 THEN PRINT:INPUT" PRODUCTION RATE PARAMETER (%) = ";C(I) ELSE INPUT #1,C(I)
3420 IF C(I)=0 AND I>1 THEN C(I)=C(I-1):IF IFIRST>-1 THEN PRINT TAB(47);C(I)
3430 IF C(I)=0 AND I=1 THEN C(I)=100
3440 RETURN
3450 'JYR WHEN SHIFT AND ROTATION OCCUR
3460 'Note that JYR(ISR)=-100 when no year, QAMT(ISR)=0 when no qty: one must be 
3470 IF IFIRST>-1 THEN INPUT #1,NSR:IF NSR>0 THEN FOR ISR=1 TO NSR:INPUT #1,JYR(ISR),QAMT(ISR):NEXT ISR
3480 IF IFIRST>-1 THEN RETURN
3490 IF H=1 THEN GOSUB 5450
3500 'Enter number of shifts/rotations 
3510 IF NSR>5 OR NSR<0 THEN PRINT" ERROR: MUST BE BETWEEN 0 AND 5":GOTO 3490
3520 IF NSR=0 THEN RETURN
3530 FOR ISR=1 TO NSR:IF ISR=1 THEN JYR(ISR)=-100:QAMT(ISR)=0 
3540 NEXT ISR
3550 CLEAR:PRINT" Shifts/rotations indicated by (U)nit # or (Y)ear?"
3560 INPUT" ENTER THE APPROPRIATE LETTER";QSRS
3570 IF QSRS="U" OR QSRS="u" THEN 3700
3580 IF QSRS="Y" OR QSRS="y" THEN 3610
3590 BEEP:GOTO 3550
3600 
3610 II=(IYR+NYR-1) MOD 100:FOR ISR=1 TO NSR:IF ISR=1 THEN J=IYR ELSE J=(JYR(ISR-1)+1) MOD 100
3620 IF J-II=1 THEN J=II
3630 PRINT:PRINT" SHIFT/ROTATION ";PRINT USING" #\";ISR;PRINT" YEAR (";PRINT USING"##";I;PRINT" ";PRINT USING"##";II;PRINT") =";QAMT(ISR)=0 
3640 IF JYR(ISR)>-100 THEN PRINT" now =";PRINT JYR(ISR) MOD 100; ELSE PRINT SPC(12); 
3650 PRINT SPC(30);:INPUT JYR(ISR)
3660 IF JYR(ISR)-IYR+1<0 THEN JYR(ISR)=JYR(ISR)+100
3670 IF JYR(ISR)-IYR+1>NYR THEN PRINT" INPUT ERROR - YEAR IS TOO LARGE":GOTO 363
3680 NEXT ISR:RETURN
3690 
3700 FOR ISR=1 TO NSR 
3710 PRINT:PRINT" SHIFT/ROTATION ";PRINT USING" #\";ISR;PRINT" SOLE SOURCE 
UNIT AT WHICH S/R OCCURS";JYR(ISR)=-100 
3720 IF QAMT(ISR)>0 THEN PRINT" now =";QAMT(ISR); ELSE PRINT SPC(20); 
3730 PRINT SPC(30);:INPUT QAMT(ISR) 
3740 IF ISR>1 AND QAMT(ISR)40QAMT(ISR-1) THEN PRINT" INPUT ERROR - AMOUNTS MUST INCREASE":BEEP:GOTO 3710
3750 NEXT ISR:RETURN
3760 'Minimize Costs by allocating larger qty to lower cost producer
3860 IF IFIRST=-1 THEN INPUT #1, IMIN: RETURN
3870 PRINT:PRINT" MINIMIZE COSTS BY ALLOCATING LARGER COMPETITIVE QUANTITIES"
3880 INPUT" TO LOWER COST PRODUCER: Enter (Y/N) " : QS
3890 IMIN=0: IF QS="Y" OR QS="y" THEN IMIN=1: GOTO 3910
3900 IF QS<"N" AND QS<"n" THEN BEEP: GOTO 3870
3910 PRINT: RETURN
3920 'Q(YR,4) Non-Recurring Costs - ******************************************************
3930 IF IFIRST=-1 THEN 4140
3940 IF IFIRST=1 THEN 3990
3950 INPUT" Do you want non-recurring costs (Y/N) " : Q$
3960 PRINT: IF Q$="N" OR QS="n" THEN FOR J=1 TO NYR: COST(J,K)=0: NEXT J: RETURN
3970 IF QS<"Y" AND QS<"y" THEN BEEP: GOTO 3950
3980 IF IFIRST=0 THEN 4140
3990 PRINT" (S)ole Source, (1)st Competitive, (2)nd Competitive, (M)enu up": INPUT " ENTER S, 1, 2, or M" : Q$
4000 IF Q$="S" OR QS="s" THEN K=6: GOTO 4050
4010 IF Q$="1" THEN K=7: GOTO 4050
4020 IF Q$="2" THEN K=8: GOTO 4050
4030 IF Q$="M" OR QS="m" THEN RETURN
4040 BEEP: GOTO 3990
4050 PRINT: INPUT" (A)11 years, (S)ingle year, (M)enu up: Enter A, S, or M" : Q$
4060 IF Q$="M" OR Q$="m" THEN PRINT: GOTO 3990
4070 IF Q$="A" OR Q$="a" THEN 4140
4080 INPUT" YEAR = "; JJ
4090 J=JJ-IYR+1
4100 IF J<1 THEN J=J+100: GOTO 4100
4110 IF J>25 THEN PRINT" INPUT ERROR": BEEP: GOTO 4080
4120 PRINT" NON-RECURRING COST ($M) now = "; PRINT USING" ###.##" ; COST(J,K): INPUT" = "; PRINT USING(J,K)
4130 GOTO 4050
4140 FOR J=1 TO NYR: IF IFIRST>-1 THEN PRINT USING" ###" ; (IYR+J-1) MOD 100; INPUT" COST ($M) = "; PRINT USING(J,K) ELSE INPUT #1, COST(J,K) NEXT J
4150 NEXT J
4160 RETURN
4170 'Change # Years ************** **********************************************
4180 MYR=NYR
4190 PRINT" NUMBER OF YEARS now = "; PRINT USING" ###" ; MYR: INPUT" = "; NYR
4200 IF NYR>25 THEN PRINT" INPUT ERROR: Years must not exceed 25": BEEP: GOTO 4190
4210 IF NYR=MYR THEN RETURN
4220 FOR J=MYR+1 TO NYR: JJ=(J+IYR-1) MOD 100: PRINT" YEAR = "; JJ: GOSUB 3180
4230 COST(J,6)=0: COST(J,7)=0: COST(J,8)=0: NEXT J: RETURN
4240 ' Display input data ********************************************
4250 CLS
4260 PRINT SPC(22); DS, DATES, TIMES
4270 PRINT
4280 PRINT SPC(21); D2S
4290 PRINT SPC(14); D3S
4300 PRINT
4310 NYRP=NYR+1: J=NYRP: Q(J,1)=0: Q(J,2)=0: Q(J,3)=0: COST(J,6)=0: COST(J,7)=0: COST(J,8)=0
4320 FOR J=1 TO NYRP
4330 IF J<NYRP THEN PRINT USING"###" ; (IYR+J-1) MOD 100; ELSE PRINT"TOTAL"
4340 PRINT USING F90$: Q(J,1); Q(J,2); Q(J,3); PRINT USING F91$: COST(J,6); COST(J,7)
4350 FOR I=1 TO 3: Q(NYRP, I)=Q(NYRP, I)+Q(J, I): COST(NYRP, I+5)=COST(NYRP, I+5)+COST(J, I+5): NEXT I
4360 NEXT J: PRINT: PRINT
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PRINT "FIRST UNIT COST": PRINT USING F93$;A(1);A(2);A(3); PRINT" DISCOUNT RATE (%) = ":D
4380 PRINT "PROGRESS CURVE ": PRINT USING F92$;B(1);B(2);B(3); PRINT" ASSIGN COMPETITIVE SPLIT"
4390 PRINT "PRODUCTION RATE": PRINT USING F92$;C(1);C(2);C(3); PRINT" TO MINIMIZE COST? ": IF IMIN=1 THEN PRINT"YES" ELSE PRINT"NO"
4400 IF NSR=0 THEN 4450
4410 FOR ISR=1 TO NSR
4420 PRINT "SHIFT %": PRINT USING F92$;S(2,ISR);S(3,ISR); IF JYR(ISR)<-100 THEN PRINT"YEAR OF SHIFT/ROT=":JYR(ISR) MOD 100 ELSE PRINT"
UNIT OF SHIFT/ROT=":QAMT(ISR)
4430 PRINT "ROTATION %": PRINT USING F92$;R(2,ISR);R(3,ISR)
4440 NEXT ISR
4450 IF QS<"P" AND QS<"p" THEN RETURN
4460 INPUT" Title or <cr>";TS
4470 LPRINT TS
4480 LPRINT:LPRINT:LPRINT SPC(22);D1S,DATES,TIMES
4490 LPRINT:LPRINT SPC(21);D2S
4500 LPRINT SPC(14);D3S
4510 LPRINT
4520 NYRP=NYR+1:J=NYRP:Q(J,1)=0:Q(J,2)=0:Q(J,3)=0:COST(J,6)=0:COST(J,7)=0:COST(J,8)=0
4530 FOR J=1 TO NYRP
4540 IF J<NYRP THEN LPRINT USING" TOTAL":
4550 LPRINT USING F90$;Q(J,1);Q(J,2);Q(J,3); LPRINT USING F91$;COST(J,6);COST(J,7);COST(J,8)
4560 FOR I=1 TO 3:Q(NYRP,I)=Q(NYRP,I)+Q(J,I):COST(NYRP,I+5)=COST(NYRP,I+5)+COST(J,I+5):NEXT I
4570 NEXT J:LPRINT:LPRINT
4580 LPRINT "FIRST UNIT COST": LPRINT USING F93$;A(1);A(2);A(3); LPRINT"DISCOUNT RATE (%) = ":D
4590 LPRINT "PROGRESS CURVE ": LPRINT USING F92$;B(1);B(2);B(3); LPRINT"ASSIGN COMPETITIVE SPLIT"
4600 LPRINT "PRODUCTION RATE": LPRINT USING F92$;C(1);C(2);C(3); LPRINT"TO MINIMIZE COST? ": IF IMIN=1 THEN LPRINT"YES" ELSE LPRINT"NO"
4610 IF NSR=0 THEN RETURN
4620 FOR ISR=1 TO NSR
4630 PRINT "SHIFT %": PRINT USING F92$;S(2,ISR);S(3,ISR); IF JYR(ISR)<-100 THEN PRINT"YEAR OF SHIFT/ROT=":JYR(ISR) MOD 100 ELSE PRINT"
UNIT OF SHIFT/ROT=":QAMT(ISR)
4640 PRINT "ROTATION %": PRINT USING F92$;R(2,ISR);R(3,ISR)
4650 NEXT ISR
4660 RETURN
4670 'Subroutine CHANGE ***************************************************
4680 PRINT:PRINT"(S)ole Source, (1)st Competitive, (2)nd Competitive, (M)enu up"
4690 INPUT" ENTER THE APPROPRIATE LETTER OR NUMBER";RS
4700 ICHG=0:IF RS="S" OR RS="s" THEN I1=1:ICHG=1
4710 IF RS="1" THEN I1=2:ICHG=1
4720 IF RS="2" THEN I1=3:ICHG=1
4730 IF RS="M" OR RS="m" THEN I1=4:ICHG=1
4740 IF ICHG=1 THEN RETURN ELSE 4680
4750 'Subroutine CHANGE SHIFT, ROTATION ***************************************************
4760 PRINT:IF NSR=0 THEN PRINT"There are no shifts/rotations now. If desired change ":I1=4:IF H=1 THEN GOSUB 6190:RETURN ELSE RETURN
4770 PRINT:PRINT"Enter # S/R to change (there are now":NSR;") or (M)enu up":;INPUT QS
4780 IF QS="M" OR QS="m" THEN I1=4:RETURN
4790 ISR=VAL(QS)
4800 IF ISR<1 OR ISR>NSR THEN 4770
4810 PRINT: PRINT" (1)st Competitive, (2)nd Competitive, (M)enu up"
4820 INPUT" ENTER THE APPROPRIATE LETTER OR NUMBER": R$ 
4830 ICHG=0: IF RS="1" THEN II=2: ICHG=1
4840 IF RS="2" THEN II=3: ICHG=1
4850 IF RS="M" OR R$="m" THEN II=4: ICHG=1
4860 IF ICHG=1 THEN RETURN ELSE 4760
4870 'Subroutine to CHANGE TIME OF S/R *************
4880 PRINT: IF NSR=0 THEN PRINT" There are no shifts/rotations now. If desired change 
4890 PRINT: PRINT" Enter M5R to change
4900 PRINT: PRINT" Enter M5R to change ( there are now"; NSR; "") 
4910 IF QAMT(ISR)>0 THEN 4990
4920 PRINT: PRINT" SHIFT/ROTATION "; PRINT USING" ";ISR; PRINT" :YEAR ="; QAMT(ISR)
4930 IF JYR(ISR)-IYR+1=0 THEN 4920
4940 PRINT: PRINT" INPUT ERROR - MUST BE LARGER "
4950 IF ISR>1 AND JYR(ISR)<=JYR(ISR-1) THEN PRINT" INPUT ERROR - MUST BE LARGER "
4960 IF ISR>1 AND QAMT(ISR)<-QAMT(ISR-1) THEN PRINT" INPUT ERROR - MUST BE LARGER 
4970 IF QAMT(ISR)=0 THEN 4990
4980 RETURN
4990 PRINT: PRINT" SHI+T/ROTATION "; PRINT USING" ";ISR; PRINT" :SOLE SOURCE UNIT 
5000 IF QAMT(ISR)>0 THEN PRINT" now ="; QAMT(ISR); ELSE PRINT SPC(20)
5010 PRINT SPC(20); INPUT QAMT(ISR)
5020 IF ISR>1 AND QAMT(ISR)<-QAMT(ISR-1) THEN PRINT" INPUT ERROR - MUST BE LARGER 
5030 IF QAMT(ISR)=0 THEN 4990
5040 RETURN
5050 'Subroutine WRITE File *********************
5060 INPUT " Name of Output Data File (8 char or less: do not type .CAM) 
5070 CLOSE:NFS=NFS+.CAM": OPEN "O", #2, NFS
5080 PRINT #2, NYR; IYR; D
5090 FOR J=1 TO NYR-1:PRINT #2, COST(J, 6); NEXT J: PRINT #2, COST(NYR, 6)
5100 FOR J=1 TO NYR:PRINT #2, Q(J, 1); NEXT J: PRINT #2, A(1); B(1); C(1)
5110 FOR J=1 TO NYR-1:PRINT #2, Q(J, 2); NEXT J: PRINT #2, Q(NYR, 2)
5120 FOR J=1 TO NYR-1:PRINT #2, Q(J, 3); NEXT J: PRINT #2, Q(NYR, 3); PRINT #2, A(2)
5130 IF H=0 OR II>3 THEN RETURN
5140 IF H=0 OR II>3 THEN RETURN
5150 PRINT #2, A(3); B(3); C(3)
5160 PRINT #2, NSR: IF NSR=0 THEN 5190
5170 FOR ISR=1 TO NSR:PRINT #2, JYR(ISR); QAMT(ISR); NEXT ISR 
5180 FOR ISR=1 TO NSR:PRINT #2, S(2, ISR); S(3, ISR); R(2, ISR); R(3, ISR); NEXT ISR 
5190 PRINT #2, IMIN 
5200 CLOSE 2: RETURN
5210 'Subroutine compute lot costs *********************
5220 IF QQ=0 THEN RETURN
5230 CST=CST+AA*((QNEW+.5)^BP1-(QOLD+.5)^BP1)*QQ^CP1/BP1
5240 IF H=0 OR II>3 THEN RETURN
5250 PRINT" B+1 B+1 C" 
5260 PRINT" COST = [A/(B+1)] [(Q1+.5) - (Q0+.5)]Q ="; PRINT USING F93S; CST 
5270 PRINT" A = FIRST UNIT COST "
5280 PRINT TAB(58); IF II=1 THEN PRINT"SOLE SOURCE "; 
5290 IF II=2 THEN PRINT"1ST COMPETITIVE " 
5300 IF II=3 THEN PRINT"2ND COMPETITIVE ";
5310 PRINT USING"##":(IYR+J-1) MOD 100
5320 PRINT" B+1 = LOG(.01*PROGRESS RATE)/LOG(2)+1 = ";:PRINT USING F85S:BP1
5330 PRINT" C = LOG(.01*PRODUCTION RATE)/LOG(2) = ";:PRINT USING F85S:CP1
5340 PRINT" Q = LOT SIZE = ";:PRINT USING F85S:QQ
5350 PRINT" Q0 = PREVIOUS PRODUCTION = ";:PRINT USING F85S:QOLD
5360 PRINT" Q1 = Q0 + Q = ";:PRINT USING F85S:QNEW
5370 PRINT:INPUT"ENTER (H)elp OFF, Shift PrtScr to Print, or RETURN TO CONTINUE" ;R$ 
5380 IF R$="H" OR R$="h" THEN H=(H+1) MOD 2
5390 RETURN 
5400 PRINT:PRINT" The Progress Rate accounts for learning over time that reduces cost"
5410 PRINT" - e.g. 90% means that the unit cost of the 2Nth unit will drop to 90 
5420 PRINT" % of the" :PRINT" cost for the Nth unit. A value of 100% has no effect. Typical v 
5430 PRINT" alues 85%-95%":RETURN
5440 PRINT:PRINT" The Production Rate accounts for decreases in cost due to larg 
5450 PRINT" er lot sizes." :PRINT" These cost reductions are in addition to those that occur over time"
5460 PRINT" - e.g. 95% means that if the lot size in a year doubles, the cost of the 
5470 PRINT" 2Nth" :PRINT" unit drops to 95% of the Nth unit cost. A value of 100% has no 
5480 PRINT" effect." 
5490 PRINT" Typical values are 95% - 100%":RETURN
5500 PRINT:PRINT" It is sometimes desirable to represent the effects of competit 
5510 PRINT" ion" :PRINT" by a downward shift or a steepening rotation in the progress rate 
5520 PRINT" at the point when competition begins. There may be up to five of these" :PRINT" shift/rotation points affecting the 1st or 2nd competitive sour 
5530 PRINT" ce" :PRINT" or both. Sole source curves are unaffected." 
5540 PRINT:PRINT" The point at which shift/rotation occurs is specified by year 
5550 PRINT" or unit #":PRINT" of the sole source producer. If the year is specified, it m 
5560 PRINT" eans that the" 
5570 PRINT" shift/rotation affects all units produced in that year by the 1st 
5580 PRINT" or 2nd":PRINT" competitive source. Suppose a unit # is specified so that 40% 
5590 PRINT" of the" 
5600 PRINT" sole source production in a year precedes the shift/rotation. The under":PRINT" competition, 60% of production from each competitive source d 
5610 PRINT" uring that" 
5620 PRINT" year and all subsequent production will be based on the new value 
5630 PRINT" shift/rotation.":PRINT:RETURN 
5640 PRINT:PRINT" Shift % is typically no more than 1% - 3%":PRINT" A temporary 
5650 PRINT" shift can be cancelled by a negative value at a later time." :RETURN 
5660 PRINT:PRINT" Rotation % is typically no more than 1% - 3%":PRINT" A tempor 
5670 PRINT" ary rotation can be cancelled by a negative value at a later time." :RETURN 
5680 IF ERR=53 AND NFILE=0 THEN PRINT" No Data Files":PRINT:RESUME 280
5690 IF ERR=53 THEN PRINT" File not Found" 
5700 IF ERR=10 OR ERR=62 OR ERR=66 THEN PRINT" File not Useable"
5710 PRINT:RESUME 260
5720 CLS:PRINT" There are three types of breakeven analysis that may be selected 
5730 PRINT" The first two assume that the Sole Source and 1st Competitive Source": PRINT" costs and quantities are known. All 2nd Competitive Source costs are know 
5740 PRINT" n" 
5750 PRINT" except first unit cost or the progress curve rate. You may include" 
5760 PRINT" shifts/rotations for the second source, if desired. The computer sol 
5770 PRINT" ves for" 
5780 PRINT" the 2nd Competitive Source parameter value that equates costs under Sole 
5790 PRINT" and Competition." :PRINT 
5800 PRINT" The third option adjusts the total quantity in the program to obtain 

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PRINT" breakeven."
PRINT:GOSUB 6190
CLS:PRINT" (A) First Unit Cost Solution - The computer solves for the cost of the first"
PRINT" unit produced by the 2nd Competitive Source that would result in the same total cost with or without competition. It is assumed that all other 2nd Source values are known."
PRINT:"B) Progress Curve Solution - The computer solves for the progress rate of the 2nd Competitive Source that would result in the same total cost with or without competition. It is assumed that all other 2nd Source values are known."
PRINT:"Q) Quantity Solution - The computer solves for the reduced program quantity at which the costs are equal under Sole Source and Competition."
PRINT" This option is available only if the base case has competitive savings."
PRINT:PRINT" (M)enu end and move to higher level menu"
INPUT" ENTER THE APPROPRIATE LETTER";RS
IF RS="M" OR RS="m" THEN 900
PRINT:"Breakeven calculations in progress - Please be patient"
IF RS="A" OR RS="a" THEN 5930
IF RS="B" OR RS="b" THEN 5810
IF RS="Q" OR RS="q" THEN 6050
BEEP:GOTO 5650
BEEP:GOTO 5650
Breakeven calculation progress curve **********************
IEVEN=1:BOLD=B(3):IMINOLD=IMIN:IMIN=0:HOLD=H:H=0
UP=110:B(3)=UP:GOSUB 1690:CUP=COST(NYRP,9):IF CUP<0 THEN 5850
PRINT:"Breakeven Slope Exceeds 110% - Abort Calculation":BEEP:GOTO 5910
DN=70:B(3)=DN:GOSUB 1690:CDN=COST(NYRP,9):IF CDN>0 THEN 5870
B(3)=(UP+DN)/2:GOSUB 1690:IF COST(NYRP,9)>0 THEN CDN=COST(NYRP,9):DN=B(3)
B(3)=B(3):GOSUB 1690:IF ABS(CUP-CDN)>.04 THEN 5870
CLS:PRINT" Breakeven Slope for Second Source":PRINT USING" ###.##";B(3);PRINT SPC(10);"Originally":PRINT USING" ###.##";BOLD:PRINT
GOSUB 2380:GOTO 5920
IPRINT:GOSUB 6190
IEVEN=0:B(3)=BOLD:IMIN=IMINOLD:H=HOLD:GOTO 5650
Breakeven calculation first unit cost **********************
IEVEN=1:AOLD=A(3):IMINOLD=IMIN:IMIN=0:HOLD=H:H=0
UP=180:B(3)=UP:GOSUB 1690:CUP=COST(NYRP,9):IF CUP<0 THEN 5970
PRINT:"First Unit Cost Exceeds 200% of Sole Source Cost - Abort Calculation":BEEP:GOTO 6030
DN=A(1)*.5:A(3)=DN:GOSUB 1690:CDN=COST(NYRP,9):IF CDN>0 THEN 5990
PRINT:"First Unit Cost Below 50% of Sole Source Cost - Abort Calculation":BEEP:GOTO 6030
A(3)=(UP+DN)/2:GOSUB 1690:IF COST(NYRP,9)>0 THEN CDN=COST(NYRP,9):DN=A(3)
ELSE CDN=COST(NYRP,9):UP=A(3)
IF ABS(CUP-CDN)>.04 THEN 5970
CLS:PRINT" Breakeven 1st Unit Cost for Second Source (SM)":PRINT USING F93.3:S:A(3):PRINT SPC(5);"Was":PRINT USING F93.3S:AOLD:PRINT
GOSUB 2380:GOTO 6040
PRINT:GOSUB 6190
IEVEN=0:A(3)=AOLD:IMIN=IMINOLD:H=HOLD:GOTO 5650
Breakeven calculation quantity **********************
IEVEN=1:IMINOLD=IMIN:IMIN=0:HOLD=H:H=0
-18-
6070 GOSUB 1690: CUP = COST(NYRP, 9): UP = 0: FOR J = 1 TO NYR: UP = UP + Q(J, 1): FOR K = 1 TO 3: Q2(J, K) = Q(J, K): NEXT K: NEXT J
6080 IF COST(NYRP, 9) < 0 THEN PRINT: PRINT " Quantity Breakeven not allowed as Competition leads to Losses": GOTO 6060
6090 Q9 = UP: DN = CINT(UP * .5): Q1 = DN: GOSUB 6230: GOSUB 1690: CDN = COST(NYRP, 9): IF CDN < 0 THEN 6110
6100 PRINT: PRINT " Quantity Reduction for Breakeven Exceeds 50% - Abort Calculation": BEEP: GOTO 6060
6110 Q1 = CINT((UP + DN) / 2): GOSUB 6230
6120 GOSUB 1690: IF COST(NYRP, 9) < 0 THEN CDN = COST(NYRP, 9): DN = Q1 ELSE CUP = COST(NYRP, 9): UP = Q1
6130 IF ABS(CUP - CDN) > .04 AND UP - DN > 1 THEN 6110
6140 CLS: PRINT " Reduced Quantity for Breakeven ": PRINT USING F90S; Q1; PRINT SPC(10); "Originally ": PRINT USING F90S; Q9; PRINT
6150 GOSUB 2380: GOTO 6170
6160 PRINT: GOSUB 6190
6170 FOR J = 1 TO NYR: FOR K = 1 TO 3: Q(J, K) = Q2(J, K): NEXT K: NEXT J
6180 IEVEN = 0: IMIN = IMINOLD: H = HOLD: GOTO 5650
6190 'Press any key subroutine
6200 PRINT " PRESS ANY KEY TO CONTINUE"
6210 QS = INKEY$: IF QS = "" THEN 6210
6220 RETURN
6230 'Allocate total quantity to years
6240 QOLD = 0: FOR J = 1 TO NYR: JJ = J: IF QOLD + Q2(J, 1) > Q1 THEN FRACT = (Q1 - QOLD) / Q2(J, 1)
6250 GOTO 6260
6260 QOLD = QOLD + Q2(J, 1): NEXT J
6270 FOR J = 1 TO NYR: FR = 1!: IF J = JJ THEN FR = FRACT
6280 IF J > JJ THEN FR = 0
6290 FOR K = 1 TO 2: Q(J, K) = CINT(Q2(J, K) * FR): NEXT K: Q(J, 3) = Q(J, 1) - Q(J, 2): NEXT J
6290 RETURN
'COMPETITION ANALYSIS MODEL  "CAM3.BAS"
20 DEFINT I-K,M,N
30 COMMON IW
40 CLS
50 PRINT TAB(30);"FEASIBILITY ANALYSES"
51 PRINT:PRINT" The feasibility analysis option allows the CAM user to estimate"
52 PRINT" likely (feasible) price reductions for specific industries, and if data"
53 PRINT" is available, for individual firms. The basic analytical procedures are"
54 PRINT" described in Chapter V of Volume I."
55 PRINT:PRINT" CAM will ask you to enter the appropriate values for direct"
56 PRINT" labor, material costs (including sub-contractors), indirect labor, and overhead"
57 PRINT" costs all as a percentage of sales. Chapter IV of Volume II of the CAM"
58 PRINT" User's Guide presents average values for 10 years for 22 industries (SIC"
59 PRINT" four digit codes) for use as reference. Appendix A of Volume I presents"
60 PRINT" annual values for these same categories and industries."
61 PRINT:PRINT" The final input required is the percent reduction expected for the"
62 PRINT" categories of direct labor and material. Estimated price reductions are"
63 PRINT" quite sensitive to this figure so it should be chosen with care."
64 PRINT:PRINT" PRESS ANY KEY TO CONTINUE"
65 QS=INKEY$:IF QS="" THEN 65
70 CLS:PRINT" The formula for price reduction is:"
72 PRINT:PRINT" PR = OH -.4*DL -.1*MC - 1.4*IL + C*(DL + MC)"
73 PRINT:PRINT" where PR = Price Reduction (%) MC = Material Costs (%)"
74 PRINT" OH = Overhead Rate (%) IL = Indirect Labor (%)"
75 PRINT" DL = Direct Labor (%) C = Constant - often set to .1"
76 PRINT:PRINT" NOTE: OH + DL + MC MUST EQUAL 100"
77 PRINT" IL must not exceed DL"
78 PRINT:INPUT" Overhead Rate (%)" ;OVR
79 INPUT" Direct Labor (%)" ;DL
80 INPUT" Material Costs (%)" ;XM
81 INPUT" Indirect Labor (%)" ;XL
82 INPUT" Multiplicative Constant (often .1)" ;C
83 PR=OVR-.4*DL-.1*XM-1.4*XL+C*(DL+XM)
110 PRINT:PRINT" Price Reduction (%)" ;PRINT USING "###.#";PR
115 T=OVR+DL+XM:IF T<100 THEN PRINT" OH + DL + MC =";T
116 IF XL>DL THEN PRINT" IL exceeds DL"
120 PRINT:INPUT" Do you want to do feasibility again (Y/N)" ;QS
123 IF QS="Y" OR QS="y" THEN 70
130 IF QS<>"N" AND QS<>"n" THEN BEEP:GOTO 120
140 CLS:PRINT" Loading computation program"
150 CHAIN "CAM2"
# Competition Analysis Model

The Competition Analysis Model, CAM, is designed to provide computational and analytical support to decisions on competition strategy and provide support throughout the life of a project. It is useful for decisions both early in the acquisition cycle and as a foundation for later detailed analyses at both the prime system level or for subsystems and components. CAM does not extrapolate from past experience, but outlines an approach to structuring competition based upon goals and relevant data. The Competition Analysis Model consists of three volumes (CAM Analysis Guide, CAM Computer Manual, and Program Maintenance Manual) and a disk containing the BASIC code for IBM-PC or PC compatible computers. This volume, Program Maintenance Manual, contains a listing of the BASIC code for CAM.
END
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