DESIGN OF AN ELEVATOR SYSTEM

SENIOR PROJECT
by

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INTRODUCTION

The company Cargill Ltd. operates a grain transfer elevator in Baie-Comeau, Quebec. The basic operations of this elevator are to unload lakers (ships loaded with grain from the Prairies) and to load salties (ocean going vessels) . The holding capacity of the elevator is more than 400,000 tonnes of grain in 64 bins, tanks and warehouses. Theoretically then, up to 64 different kinds and grade of grain. For this, planning is necessary to insure maximum efficiency for loading and unloading. An area where a computer simulator would be of great help.

OBJECTIVES

When receiving a laker loaded with grain the decision as to where the grain will be stored must be taken. This not only to provide the maximum efficiency when unloading but also when loading salties.

The grain has to be handled the least possible to prevent damage and loss. The simulator would help provide the best planning possible to insure maximum efficiency.

Here is a resume of the 4 main tasks the program would accomplish :

1- As a laker docks, the kind and quantity of grain it holds would be entered into the computer. A list of all available reservoirs, either empty or with the same grade of grain, would appear on the screen. The supervisor could then select the reservoirs in which the grain would go. If the supervisor is satisfied with this selection then the new quantity of grain would be registered for all affected reservoirs.

2- For the loading of salties a similar procedure would be used as for unloading but with reservoirs to be unloaded being selected.

3- It may occur that for whatever reason the

supervisor wants to transfer grain from one holding area to another. To make room for a coming laker for example. For this the supervisor would go through the transfer option. The supervisor would select a bin to empty, the computer would treat the rest of the operation as for unloading.

4- Finally, at any one time, to provide a list of all the reservoirs with respective grade and quantity of grain. This for a weekly inventory report.

PLANT DESCRIPTION

As was mentionned earlier, the 2 basic operations of the elevator are to unload lakers and load salties. It is the responsibility of the supervisor in the control room to insure that operations run as smoothly and efficiently as possible.

Presently the supervisor has in his office a board on which he keeps track of the location of the grain in the elevator. Circles are drawn on this board representing each reservoir in the elevator.

In the circles representing the different reservoirs, the supervisor writes a code indicating the kind and grade of grain it holds. This code will be underlined if the reservoir is full. If the reservoir is empty the area inside the circle will remain blank. There is however not enough space to indicate how much grain there is if the reservoir is not full. It would be important, at this stage to point out that there are no level indicators in the reservoirs to indicate the room available.

Thus, if the supervisor wishes to know how much room is available in a reservoir an employee has to be sent to measure the reservoir. In the busy seasons there will 3 different supervisors working in the control room during the

day's different shifts. The incoming supervisor might not know that the previous supervisor had a certain reservoir measured and will send another employee to remeasure the reservoir.

The simulator would help prevent this duplication of tasks by providing the supervisor with an instant reading for any desired reservoir.

As the supervisor gets ready to unload a laker he must make sure that there are enough reservoirs to receive the grain. The simulator would avoid delays or at least, where unavoidable, decrease the delays by helping plan the operations. At a key stroke he can see where it is easiest and best to make room for the incoming grain.

Another task the simulator would simplify is the weekly storage report. Every Friday afternoon a secretary has to write down what grade of grain each reservoir contains. For this she has to recopy what is written on the board in the supervisor's office. The simulator would provide a printout of the inventory without the secretary's help thus freeing her for other duties. This report would have the added feature of indicating the quantity of grain in each reservoir.

MATERIAL AND METHODS

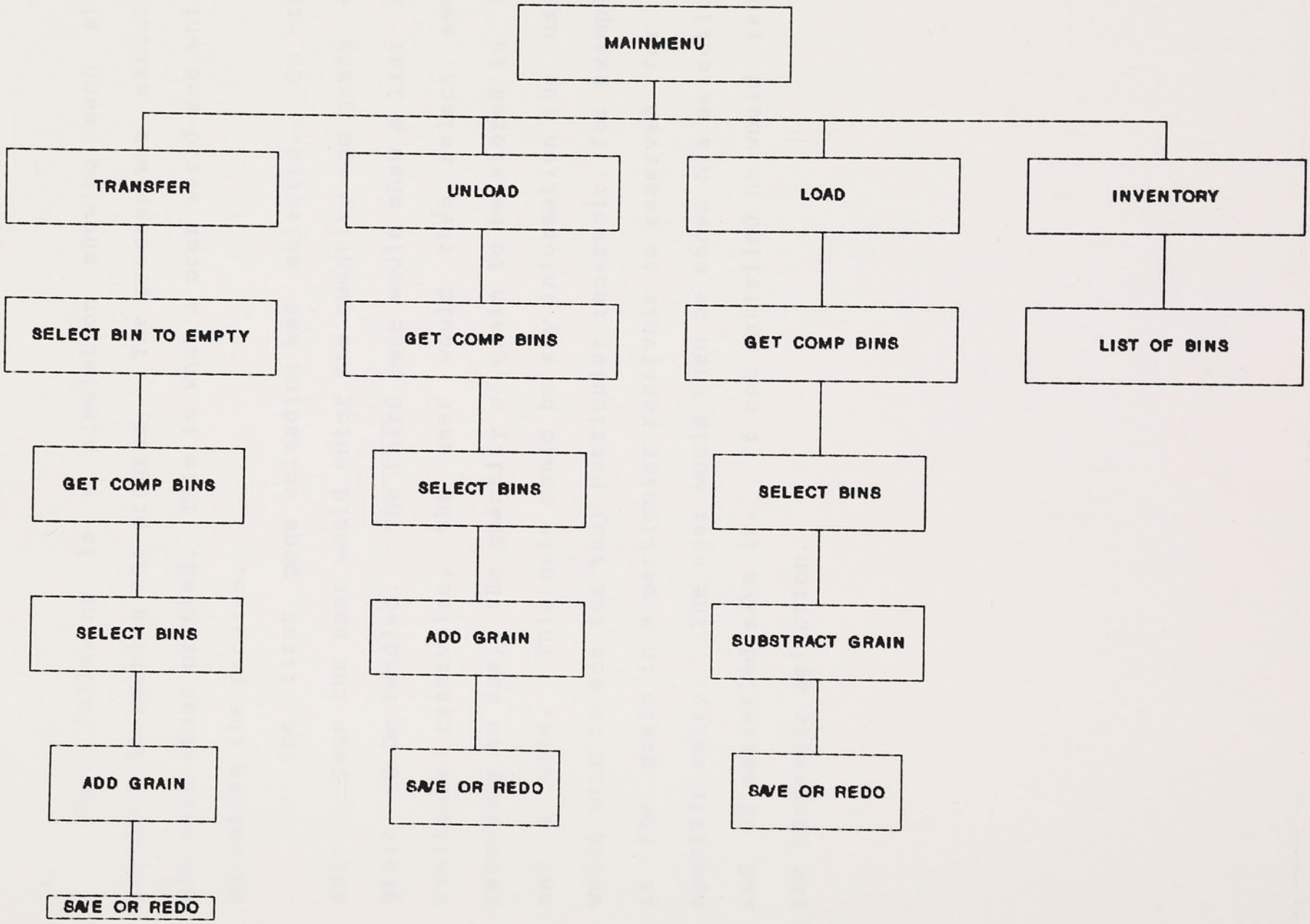
As far as material is concerned, it is very basic. All one needs is an IBM-PC or compatible with no special feature or hardware necessary except for a printer.

The program is written in basic and could easily be adapted to any elevator. The program is presently set up to use 2 disk drives, however it could be modified to use only 1 drive quite easily.

As the computer is turned on the program would be automatically executed. The user would then enter the information as demanded by the computer.

FLOWCHART

On the next page is a very basic flowchart of the program to help visualize the operations of the program. It shows a general idea of what are the steps involved while running the program.


MAINMENU
TRANSFER
UNLOAD
LOAD
INVENTORY
SELECT BIN TO EMPTY
GET COMP BINS
GET COMP BINS
LIST OF BINS
GET COMP BINS
SELECT BINS
SELECT BINS
SELECT BINS
ADD GRAIN
SUBSTRACT GRAIN
ADD GRAIN
SAVE OR REDO
SAVE OR REDO
SAVE OR REDO

SIMULATION

The following is a simulation showing each step involved in running the program. The program was executed and each stage printed. This is what a user would see while executing the program.

On the first page unloading was selected. On the second page the user would enter the quantity and grade of grain to be handled. The third page would show a list of available reservoirs, the user would then select each reservoir to use, the quantity of grain to be stored in it and a note. This note could be any information the user would wish to see for that particular reservoir, for example if the grain in a particular reservoir is reserved for a specific salty. The user would then be shown his selection and if satisfied save it. If not satisfied he would redo the reservoir selection.

```
                    ***  GRAIN FLOW SIMULATION  ***

                                                              01-01-1980

PLEASE SELECT YOUR OPTION

TO UNLOAD                  , SELECT 1
TO LOAD                    , SELECT 2
TO TRANSFER                , SELECT 3
TO SEE INVENTORY           , SELECT 4
TO UPDATE GRAIN CODES      , SELECT 5
TO RESUME UNLOADING        , SELECT 6
TO RESUME LOADING          , SELECT 7
TO RESUME TRANSFER         , SELECT 8
TO EXIT                    , SELECT 9

    ENTER YOUR SELECTION  : 1

                                          BE SURE `Caps Lock' IS ON
```

UNLOADING

ENTER QUANTITY OF GRAIN TO UNLOAD, IN TONNES :21000

ENTER THE GRAIN CODE OR
'HELP' TO SEE THE LIST OF CODES :1CWRS 13.5

TANK #	VOLUME	ROOM	GRADE	NOTE
10	5100	5000	1CWRS 13.5	FIRST
20	5200	5200	EMPTY	SECOND
100	21000	11000	1CWRS 13.5	FOURTH

```
 ENTER FIRST TANK TO DUMP INTO : 10
ROOM AVAILABLE =    5000     NOTE : FIRST
QUANTITY TO DUMP HERE = 5000
ENTER NEW NOTE : SEALED FOR TREATMENT

TOTAL = 21000      TO DATE =  5000     REMAINING =  16000
ENTER NEXT TANK : 20
ROOM AVAILABLE =    5200     NOTE : SECOND
QUANTITY TO DUMP HERE = 5000
ENTER NEW NOTE : SEALED FOR TREATMENT

TOTAL =  21000      TO DATE =  10000     REMAINING =  11000
ENTER NEXT TANK : 100
ROOM AVAILABLE =   11000     NOTE : FOURTH
QUANTITY TO DUMP HERE = 11000
ENTER NEW NOTE : SEALED FOR TREATMENT
```

```
   LIST OF TANKS SELECTED
   DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
   | TANK #|  NEWRM |   GRADE      |         NOTE                     |
   DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
   | 10     |  0     | 1CWRS 13.5 | SEALED FOR TREATMENT             |
   | 20     |  200   | 1CWRS 13.5 | SEALED FOR TREATMENT             |
   | 100    |  0     | 1CWRS 13.5 | SEALED FOR TREATMENT             |
   DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

RE YOU SATISFIED OR START OVER
 ENTER `1' IF SATISFIED
 OR   `2' IF NOT SATISFIED : 1
```

```
> COPY CON B:ADD
10     0      1CWRS 13.5SEALED FOR TREATMENT
20     200    1CWRS 13.5SEALED FOR TREATMENT
100    0      1CWRS 13.5SEALED FOR TREATMENT

IT THE `F6' KEY THEN THE `RETURN' KEY
IT `Ctrl-Alt-Del' THEN `RESUME UNLOADING'

NTER THE INFORMATION BELOW AS INDICATED TO SAVE THIS OPERATION

> COPY CON B:ADD
10     0      1CWRS 13.5SEALED FOR TRAETMENT
20     200    1CWRS 13.5SEALED FOR TREATMENT
100    0      1CWRS 13.5SEALED FOR TREATMENT
Z
```

```
                    ***  GRAIN FLOW SIMULATION  ***

                                                              01-01-1980

PLEASE SELECT YOUR OPTION

TO UNLOAD                  , SELECT 1
TO LOAD                    , SELECT 2
TO TRANSFER                , SELECT 3
TO SEE INVENTORY           , SELECT 4
TO UPDATE GRAIN CODES      , SELECT 5
TO RESUME UNLOADING        , SELECT 6
TO RESUME LOADING          , SELECT 7
TO RESUME TRANSFER         , SELECT 8
TO EXIT                    , SELECT 9

    ENTER YOUR SELECTION  : 6

                                          BE SURE `Caps Lock' IS ON
```

```
                    ***  GRAIN FLOW SIMULATION  ***

                                                              01-01-1980

PLEASE SELECT YOUR OPTION

TO UNLOAD                 , SELECT 1
TO LOAD                   , SELECT 2
TO TRANSFER               , SELECT 3
TO SEE INVENTORY          , SELECT 4
TO UPDATE GRAIN CODES     , SELECT 5
TO RESUME UNLOADING       , SELECT 6
TO RESUME LOADING         , SELECT 7
TO RESUME TRANSFER        , SELECT 8
TO EXIT                   , SELECT 9

    ENTER YOUR SELECTION  : 9

                                          BE SURE `Caps Lock' IS ON
```

CONCLUSION

The computer program can improve elevator efficiency by helping plan operations in advance. Before a laker is prepared to be unloaded the question as to where the grain will go will already have been determined.

At the touch of a button the supervisor will be able to see how much room is available in each reservoir in order to plan operations.

The program will also eliminate the need for an employee just for the purpose of measuring the reservoirs. At the employee's salary of more than $50,000.00 annually the system would be paid for in less than 1 month.

APPENDIX

```
    '     SENIOR PROJECT BY STEPHEN LEONARD
    '     GRAIN FLOW SIMULATION
    '     MARCH 23rd 1988
  DIM BV$(70,2) : DIM BD$(70,4)
0 FOR B=1 TO 10
 EY B,""
0 NEXT
0 KEY OFF
0 CLS ' **** TO UNLOAD+LOAD+TRANSFER+INVENT0+MAJ+GOODBIN0+CODE1 *** " PROJ2 "
0 LOCATE 3,25 :PRINT " ***  GRAIN FLOW SIMULATION  *** "
0 LOCATE  6,65:PRINT DATE$
0 PRINT " "
0 PRINT "     PLEASE SELECT YOUR OPTION "
00 PRINT " "
10 PRINT "      TO UNLOAD                , SELECT 1 "
20 PRINT "      TO LOAD                  , SELECT 2 "
30 PRINT "      TO TRANSFER              , SELECT 3 "
40 PRINT "      TO SEE INVENTORY         , SELECT 4 "
60 PRINT "      TO RESUME UNLOADING      , SELECT 5 "
70 PRINT "      TO RESUME LOADING        , SELECT 6 "
80 PRINT "      TO RESUME TRANSFER       , SELECT 7 "
90 PRINT "      TO EXIT                  , SELECT 8 "
00 'PRINT "
05 LOCATE 22,55 : PRINT "BE SURE `Caps Lock' IS ON "
10 LOCATE 20,5 : INPUT "     ENTER YOUR SELECTION  : ", CH$
30 '
40 IF CH$ <> "1" THEN GOTO 250 ELSE GOTO 380
50 IF CH$ <> "2" THEN GOTO 260 ELSE GOTO 380
60 IF CH$ <> "3" THEN GOTO 270 ELSE GOTO 380
70 IF CH$ <> "4" THEN GOTO 280 ELSE GOTO 380
 IF CH$ <> "5" THEN GOTO 290 ELSE GOTO 380
9 IF CH$ <> "6" THEN GOTO 300 ELSE GOTO 380
00 IF CH$ <> "7" THEN GOTO 320 ELSE GOTO 380
20 IF CH$ <> "8" THEN GOTO 340 ELSE GOTO 440
30 '
40 PRINT " YOUR SELECTION MUST BE BETWEEN 1 AND 8 PLEASE TRY AGAIN"
   ,CHR$(7) '  FOR ENTERING THE WRONG SELECTION
50 LOCATE 20,34 :PRINT "_"
60 LOCATE 20,5 : INPUT "     ENTER YOUR SELECTION  : ", CH$
70 GOTO 230
80 CH = VAL (CH$)
90 ON CH GOSUB 1000,2000, 3000, 16000, 23000, 23000, 23000
00 ' 1000 TO UNLOAD, 2000 TO LOAD, 3000 TO TRANSFER, 16000 INVENTORY
     23000 RESUME UNLOADING + RESUME LOADING +RESUME TRANSFER
10 PRINT "  WILL RETURN TO MAINMENU IN 2 SECONDS          "
20 FOR B = 1 TO 1500 :NEXT      '  THIS IS TEMPORARY, TO SEE MESSAGE
30 GOTO 50
40 PRINT "  THE END                    " :  END
50 '
60 '  THE START OF THE SUBROUTINES
000  '
010  ' **** TO UNLOAD+GOODBIN0+CODE1 *** " GOODUN4 "
020 CLS
030 LOCATE 3,30 : PRINT "UNLOADING"
040 LOCATE 8,3: INPUT "ENTER QUANTITY OF GRAIN TO UNLOAD, IN TONNES :",QUANT%
050 LOCATE 11,3: PRINT " ENTER THE GRAIN CODE OR ";
 LOCATE 12,37: PRINT "     "
070 LOCATE 12,3: INPUT " `HELP' TO SEE THE LIST OF CODES :",KIND$
080 IF KIND$ = "H" THEN GOSUB 20000 ELSE GOTO 1100
090 GOTO 1050
100 IF KIND$ = "HELP" THEN GOSUB 20000 ELSE GOTO 1120
110 GOTO 1050
120 GOSUB 15000            ' GET LIST OF COMPATIBLE BINS
130 '
```

```
140 R=0 : S=1
150 TOT=QUANT% : OLDQUANT=0 : NEWQUANT=0
160 INPUT "  ENTER FIRST TANK TO DUMP INTO : ",SEL$(R)
170 P =1
180 FOR T=1 TO 5
190  SEL=VAL(SEL$(R)) : BIN02=VAL(BIN02$(P,4)) : RM02=VAL(RM02$(P,4))
200  IF BIN02 = SEL THEN GOTO 1230
210  P = P + 1
220 NEXT
230 PRINT "ROOM AVAILABLE = ";RM02$(P,4)," NOTE : ";NT02$(P,4)
240 INPUT " QUANTITY TO DUMP HERE = ",NEWQUANT
243 NEWRM(R) = RM02 - NEWQUANT
245 INPUT " ENTER NEW NOTE : ",NEWNT$(R)
250 ALL = OLDQUANT + NEWQUANT : REMA = TOT - ALL :PRINT ""
260 PRINT "TOTAL = ";TOT;"    TO DATE = ";ALL;"    REMAINING = ";REMA
270 IF TOT > ALL THEN GOSUB 1400  ELSE IF TOT = ALL THEN GOSUB 1500
      ELSE GOSUB 1700
280 IF F = 11 GOTO 1170 ELSE GOTO 1290
290 IF F = 22 GOTO 1320 ELSE GOTO 1300
300 IF F = 33 GOTO 1130 ELSE GOTO 1310
310 IF F = 44 GOTO 1230
320 '
360 CLS : GOSUB 10000
370 RETURN      ' END
400 '       1400
410 OLDQUANT=OLDQUANT+NEWQUANT
420 R =R+1 : S =S+1
440 INPUT " ENTER NEXT TANK : ",SEL$(R)
450 F=11
460 RETURN
500 '      1500
505 CLS : H = S - 1 : PRINT "     LIST OF TANKS SELECTED"
510 FOR R = 0 TO H
511  T = R + 5 : V = R + 4
512  FOR N=6 TO 68 :LOCATE 2,N:PRINT CHR$(196)
513  NEXT
515  PRINT "      | TANK #|  NEWRM |   GRADE   |      NOTE
"
517  FOR N=6 TO 68 :LOCATE 4,N:PRINT CHR$(196)
518  NEXT
525  LOCATE T,5:PRINT F$:LOCATE T,13:PRINT F$:LOCATE T,22:PRINT F$ :
      LOCATE T,35:PRINT F$:LOCATE T,67:PRINT F$
530  LOCATE T,8: PRINT SEL$(R):LOCATE T,16:PRINT NEWRM(R):
      LOCATE T,25:PRINT KIND$: LOCATE T,38: PRINT NEWNT$(R)
535  PRINT
540 NEXT
544 T=T+1 : FOR N=6 TO 68 :LOCATE T,N:PRINT CHR$(196)
546 NEXT
550 PRINT : PRINT "ARE YOU SATISFIED OR START OVER "
560 PRINT "  ENTER `1' IF SATISFIED"
570 INPUT "  OR    `2' IF NOT SATISFIED : ",STA$
580 IF STA$ <> "1" GOTO 1590 ELSE GOTO 1610
590 IF STA$ <> "2"  GOTO 1600 ELSE GOTO 1610
600 PRINT CHR$(7): GOTO 1560
610 STA=VAL(STA$) : ON STA GOSUB 1900, 1950
620 RETURN
700 '     1700
710 PRINT "YOU HAVE EXCEEDED THE TOTAL, ADD LESS TO THIS BIN "
720  F = 44
730 RETURN
900 '
910 F =22
920 RETURN
950 '
960 F =33
970 RETURN
```

```
000  '
010  ' **** TO LOAD    *** " LOADING1 "
020 CLS
030 LOCATE 3,30 : PRINT "LOADING"
040 LOCATE 8,3: INPUT "ENTER QUANTITY OF GRAIN TO LOAD, IN TONNES :",QUANT%
050 LOCATE 11,3: PRINT " ENTER THE GRAIN CODE OR ";
060 LOCATE 12,37: PRINT "    "
070 LOCATE 12,3: INPUT " `HELP' TO SEE THE LIST OF CODES :",KIND$
080 IF KIND$ = "H" THEN GOSUB 20000 ELSE GOTO 2100
090 GOTO 2050
100 IF KIND$ = "HELP" THEN GOSUB 20000 ELSE GOTO 2120
110 GOTO 2050
120 GOSUB 15000            ' GET LIST OF COMPATIBLE BINS
130 '
140 R=0 : S=1
150 TOT=QUANT% : OLDQUANT=0 : NEWQUANT=0
160 INPUT "  ENTER FIRST TANK TO PULL FROM : ",SEL$(R)
170 P =1
180 FOR T=1 TO 5
190  SEL=VAL(SEL$(R)) : BIN02=VAL(BIN02$(P,4)) : RM02=VAL(RM02$(P,4)) :
     VOL01 = VAL(VOL01$(P,2))
200  IF BIN02 = SEL THEN GOTO 2230
210  P = P + 1
220 NEXT
230 VOL = VOL01 - RM02
238 PRINT "QUANTITY AVAILABLE = ";VOL," NOTE : ";NT02$(P,4)
240 INPUT " QUANTITY TO PULL FROM HERE = ",NEWQUANT
243 NEWRM(R) = RM02 + NEWQUANT
245 INPUT " ENTER NEW NOTE : ",NEWNT$(R)
250 ALL = OLDQUANT + NEWQUANT : REMA = TOT - ALL :PRINT ""
260 PRINT "TOTAL = ";TOT;"    TO DATE = ";ALL;"    REMAINING = ";REMA
270 IF TOT > ALL THEN GOSUB 2400  ELSE IF TOT = ALL THEN GOSUB 2500
     ELSE GOSUB 2700
290 IF F = 11 GOTO 2170 ELSE GOTO 2310
290 IF F = 22 GOTO 2320 ELSE GOTO 2320
300 IF F = 33 GOTO 2130 ELSE GOTO 2310
310 IF F = 44 GOTO 2230
320 '
360 CLS : GOSUB 10000
370 END
400 '        1400
410 OLDQUANT=OLDQUANT+NEWQUANT
420 R =R+1 : S =S+1
430 INPUT " ENTER NEXT BIN : ",SEL$(R)
440 INPUT " ENTER NEXT TANK : ",SEL$(R)
450 F=11
460 RETURN
500 '      1500
505 CLS : H = S - 1 : PRINT "     LIST OF TANKS SELECTED"
510 FOR R = 0 TO H
511  T = R + 5 : V = R + 4
512  FOR N=6 TO 68 :LOCATE 2,N:PRINT CHR$(196)
513  NEXT
515  PRINT "     | TANK #|  NEWRM |   GRADE    |      NOTE
"
517  FOR N=6 TO 68 :LOCATE 4,N:PRINT CHR$(196)
518  NEXT
525  LOCATE T,5:PRINT F$:LOCATE T,13:PRINT F$:LOCATE T,22:PRINT F$ :
      LOCATE T,35:PRINT F$:LOCATE T,67:PRINT F$
530  LOCATE T,8: PRINT SEL$(R):LOCATE T,16:PRINT NEWRM(R):
      LOCATE T,25:PRINT KIND$: LOCATE T,38: PRINT NEWNT$(R)
535  PRINT
540 NEXT
544 T=T+1 : FOR N=6 TO 68 :LOCATE T,N:PRINT CHR$(196)
546 NEXT
550 PRINT : PRINT "ARE YOU SATISFIED OR START OVER "
```

```
560 PRINT "  ENTER `1' IF SATISFIED"
570 INPUT "  OR   `2' IF NOT SATISFIED : ",STA$
580 IF STA$ <> "1" GOTO 2590 ELSE GOTO 2610
590 IF STA$ <> "2"  GOTO 2600 ELSE GOTO 2610
600 PRINT CHR$(7): GOTO 2560
610 STA=VAL(STA$) : ON STA GOSUB 2900, 2950
620 RETURN
    '     1700
710 PRINT "YOU HAVE EXCEEDED THE TOTAL, ADD LESS TO THIS BIN "
720 F = 44
730 RETURN
800 F = 44
810 RETURN
850 '
860 F =22 : RETURN
900 '
910 F =22
920 RETURN
950 '
960 F =33
970 RETURN
000 '
010 '  ***** TRANSFER **** FILE " TRANS01 "
020 INPUT "SELECT BIN TO TRANSFER FROM  : ",FROM$
030 GOSUB 5000
040 ZZZ = 1
050 INPUT "ENTER QUANTITY OF GRAIN TO TRANSFER, IN TONNES : ",QUANT%
060 GOSUB 1120
070 CLS
080  LOCATE T,1:PRINT "M":LOCATE T,2: PRINT SEL$(R):LOCATE T,7:
     PRINT NEWRM(R):LOCATE T,14:PRINT KIND$: LOCATE T,24: PRINT NEWNT$(R)
090 GOSUB 10000
    '
    '  ******** file "newbin02 *** FILE GOODBIN0
020          ' ** LIST available bins for dumping
060 CLS : P =0
070 FOR N=2 TO 78 :LOCATE 1,N:PRINT CHR$(196)
080 NEXT
090 PRINT " | TANK #|  VOLUME |   ROOM  |   GRADE    |       NOTE
      |"
100 FOR N=2 TO 78 :LOCATE 3,N:PRINT CHR$(196)
110 NEXT
120 N = 4
130 GOSUB 5180                                          ' START
140 WHILE FIN=0 : GOSUB 5310                            ' RECORD
150 WEND
155 KD02$(P,4)=MID$(BD$(P,4),SKD,LKD)
157 KIND$ = KD02$(P,4)
160 GOSUB 5550
170 RETURN
180 '
190 '   DIM BV$(70,2) : DIM BD$(70,4)
200 OPEN "B:VOLUME" FOR INPUT AS 1
210 FIN = 0
220 SBIN = 1 : LBIN=5
230 SVOL=6 : LVOL=7
240 INPUT#1,BV$(P,2)
250 OPEN "B:ROOM" FOR INPUT AS 2
    SRM=6 : LRM=7
270 SKD=13 : LKD=10
280 SNT=26 : LNT=29
290 INPUT#2,BD$(P,4)
300 RETURN
310 '
320 BIN02$(P,4)=MID$(BD$(P,4),SBIN,LBIN)
330 W=CVI(BIN02$(P,4))
```

```
350 X=CVI(FROM$)
370  IF W = X THEN GOSUB 5400 ELSE GOTO 5380
380 GOSUB 5510
390 RETURN
400 '
410 BIN01$(P,2)=MID$(BV$(P,2),SBIN,LBIN)
420 VOL01$(P,2)=MID$(BV$(P,2),SVOL,LVOL)
    KD02$(P,4)=MID$(BD$(P,4),SKD,LKD)
440 RM02$(P,4)=MID$(BD$(P,4),SRM,LRM)
450 NT02$(P,4)=MID$(BD$(P,4),SNT,LNT)
460 F$=CHR$(32)+CHR$(124)+CHR$(32)
470 LOCATE N,1:PRINT F$;BIN01$(P,2);F$;VOL01$(P,2);F$;RM02$(P,4);F$;
                  KD02$(P,4);F$;NT02$(P,4)
480 LOCATE N,78:PRINT "|"
490 N = N+1
500 RETURN
510 '
520 P=P+1
530 IF EOF(1) THEN FIN=1 ELSE IF EOF(2) THEN FIN=1
     ELSE INPUT#1,BV$(P,2) : INPUT#2,BD$(P,4)
540 RETURN
550 '
560 FOR A=2 TO 78 :LOCATE N,A:PRINT CHR$(196)
570 NEXT
580 CLOSE 1 : CLOSE 2
590 RETURN
0000 '
0005 ' ******* FINALSEL
0010 H = S - 1
0015 PRINT :PRINT "A> COPY CON B:ADD"
0020 FOR R = 0 TO H
0030 T = R + 3 : V = R + 2
     LOCATE T,1:PRINT "M":LOCATE T,2: PRINT SEL$(R):LOCATE T,7:
     PRINT NEWRM(R):LOCATE T,14:PRINT KIND$: LOCATE T,24: PRINT NEWNT$(R)
0110 PRINT
0120 NEXT
0130 PRINT "HIT THE `F6' KEY THEN THE `RETURN' KEY"
0135 PRINT "HIT `Ctrl-Alt-Del' THEN `RESUME UNLOADING'":PRINT
0140 PRINT "ENTER THE INFORMATION BELOW AS INDICATED TO SAVE THIS OPERATION"
0145 PRINT " SUB WITH SYSTEM      "
0150 RETURN
5000 '
5005 '******** GOODBIN0
5040 EMPTY$="EMPTY"
5050 CLS : P =0
5060 FOR N=2 TO 78 :LOCATE 1,N:PRINT CHR$(196)
5070 NEXT
5080 PRINT " | TANK #|  VOLUME |   ROOM  |   GRADE    |       NOTE
      |"
5090 FOR N=2 TO 78 :LOCATE 3,N:PRINT CHR$(196)
5100 NEXT
5110 N = 4
5120 GOSUB 15200                                              ' START
5130 WHILE FIN=0 : GOSUB 15400                                ' RECORD
5140 WEND
5150 GOSUB 15900
5160 RETURN
5200 '
5220 OPEN "B:VOLUME" FOR INPUT AS 1
5230 FIN = 0
5240 SBIN = 1 : LBIN=5
5250 SVOL=6 : LVOL=7
5260 INPUT#1,BV$(P,2)
5270 OPEN "B:ROOM" FOR INPUT AS 2
5280 SRM=6 : LRM=7
5290 SKD=13 : LKD=10
```

```
5300 SNT=23 : LNT=29
5310 INPUT#2,BD$(P,4)
5320 RETURN
5400 '
5410 KD02$(P,4)=MID$(BD$(P,4),SKD,LKD)
5420 W=CVS(KD02$(P,4))
5430 Z=CVS(KIND$)
5440 X=CVS(EMPTY$)
5450  IF W = Z THEN GOSUB 15600 ELSE GOTO 15460
5460  IF W = X THEN GOSUB 15600 ELSE GOTO 15470
5470 GOSUB 15800
5480 RETURN
5600 '
5610 BIN01$(P,2)=MID$(BV$(P,2),SBIN,LBIN)
5620 VOL01$(P,2)=MID$(BV$(P,2),SVOL,LVOL)
5630 BIN02$(P,4)=MID$(BD$(P,4),SBIN,LBIN)
5640 RM02$(P,4)=MID$(BD$(P,4),SRM,LRM)
5650 NT02$(P,4)=MID$(BD$(P,4),SNT,LNT)
5660 F$=CHR$(32)+CHR$(124)+CHR$(32)
5670 LOCATE N,1:PRINT F$;BIN01$(P,2);F$;VOL01$(P,2);F$;RM02$(P,4);F$;
                      KD02$(P,4);F$;NT02$(P,4)
5680 LOCATE N,78:PRINT "|"
5690 N = N+1
5700 RETURN
5800 '
5810 P=P+1
5820 IF EOF(1) THEN FIN=1 ELSE IF EOF(2) THEN FIN=1
        ELSE INPUT#1,BV$(P,2) : INPUT#2,BD$(P,4)
5830 RETURN
5900 '
5910 FOR A=2 TO 78 :LOCATE N,A:PRINT CHR$(196)
5920 NEXT
5925 PRINT ""
5930 CLOSE 1 : CLOSE 2
5940 RETURN
6000 '  ******** file "INVENT0
6010          ' ** LIST ALL BINS FOR INVENTORY
6020 CLS : P =0
6030 PRINT " FOR INVENTORY "
6040 FOR N=2 TO 78 :LOCATE 2,N:PRINT CHR$(196)
6050 NEXT
6060 PRINT " | TANK #|  VOLUME |   ROOM  |   GRADE    |       NOTE
        |"
6070 FOR N=2 TO 78 :LOCATE 4,N:PRINT CHR$(196)
6080 NEXT
6090 N = 5
6100 GOSUB 16200                                              ' START
6110 WHILE FIN=0 : GOSUB 16600                                ' RECORD
6120 WEND
6130 GOSUB 16900
6140 END
6200 '
6220 OPEN "B:VOLUME" FOR INPUT AS 1
6230 FIN = 0
6240 SBIN = 1 : LBIN=5
6250 SVOL=6 : LVOL=7
6260 INPUT#1,BV$(P,2)
6270 OPEN "B:ROOM" FOR INPUT AS 2
6280 SRM=6 : LRM=7
6290 SKD=13 : LKD=10
6300 SNT=23 : LNT=30
6310 INPUT#2,BD$(P,4)
6320 RETURN
6600 '
6610 BIN01$(P,2)=MID$(BV$(P,2),SBIN,LBIN)
6620 VOL01$(P,2)=MID$(BV$(P,2),SVOL,LVOL)
```

```
6630 BIN02$(P,4)=MID$(BD$(P,4),SBIN,LBIN)
6640 RM02$(P,4)=MID$(BD$(P,4),SRM,LRM)
6650 KD02$(P,4)=MID$(BD$(P,4),SKD,LKD)
6660 NT02$(P,4)=MID$(BD$(P,4),SNT,LNT)
6670 F$=CHR$(32)+CHR$(124)+CHR$(32)
6680 LOCATE N,1:PRINT F$;BIN01$(P,2);F$;VOL01$(P,2);F$;RM02$(P,4);F$;
                    KD02$(P,4);F$;NT02$(P,4)
6690 LOCATE N,78:PRINT "|"
6700 N = N+1
6710 GOSUB 16800
6720 RETURN
6800 '
6810 P=P+1
6820 IF EOF(1) THEN FIN=1 ELSE IF EOF(2) THEN FIN=1
       ELSE INPUT#1,BV$(P,2) : INPUT#2,BD$(P,4)
6830 RETURN
6900 '
6910 FOR A=2 TO 78 :LOCATE N,A:PRINT CHR$(196)
6920 NEXT
6930 CLOSE 1 : CLOSE 2
6940 RETURN
0000 '
0005  '************ CODE1
0010 PRINT "SUB FOR GRAIN CODES ": RETURN
0015 N = 6
0020 LOCATE 3,3 : PRINT "TO SEE CANADIAN GRAIN      , SELECT 1 "
0030 LOCATE 4,3 : PRINT "OR SEE AMERICAN GRAIN      , SELECT 2 "
0040 LOCATE 5,3 : INPUT " ENTER YOUR SELECTION "; NAT$
0050 IF NAT$<>"1" GOTO 20060 ELSE GOTO 20080
0060 IF NAT$<>"2" GOTO 20070 ELSE GOTO 20080
0070 PRINT " SELECT 1 OR 2, START AGAIN";CHR$(7) : GOTO 20040
0080 LOCATE 8,3 : PRINT "TO SEE LIST OF WHEATS      , SELECT 3 "
0090 LOCATE 9,3 : PRINT "OR SEE OTHER GRAINS        , SELECT 4 "
0100 LOCATE 10,3 : INPUT " ENTER YOUR SELECTION "; SORTE$
0110 IF SORTE$<>"3" THEN GOTO 20120 ELSE GOTO 20140
0120 IF SORTE$<>"4" THEN GOTO 20130 ELSE GOTO 20140
0130 PRINT " SELECT 3 OR 4 START AGAIN";CHR$(7) : GOTO 20080
0140 '
0150 GOSUB 21000                                    ' START
0160 WHILE FIN = 0 : GOSUB 21200                    'RECORD
0170 WEND
0180 GOSUB 21500                                    ' END
0185 LOCATE 15,4:INPUT "   WHEN YOU HAVE SEEN ENOUGH HIT THE ENTER KEY",JUNK$
0187 CLS
0190 RETURN
1000                                                ' START
1010 CLS
1020 OPEN "B:LISTCODE" FOR INPUT AS 1
1030 FIN = 0
1032 SNAT=1 :LNAT=1
1034 SSORTE=2 :LSORTE=1
1040 SCODE=3 : LCODE=11
1050 SNAME=14: LNAME=50
1060 INPUT#1,NAM$
1070 RETURN
1200                                                ' RECORD
1202 IF NAT$="1" THEN LOCATE 4,5 :PRINT "CANADIAN "
1203 IF NAT$="2" THEN LOCATE 4,5 :PRINT "AMERICAN "
1204 IF SORTE$="3" THEN LOCATE 4,14:PRINT "WHEAT GRAIN"
1205 IF SORTE$="4" THEN LOCATE 4,14:PRINT "GRAIN OTHER THAN WHEAT "
1210 A$=MID$(NAM$,SNAT,LNAT)
1220 B$=MID$(NAM$,SSORTE,LSORTE)
1230 IF A$=NAT$ AND B$=SORTE$ THEN GOSUB 21300
1240 GOSUB 21400
1250 RETURN
1300 '
```

```
1310 PRINT
1320 NUM$=MID$(NAM$,SCODE,LCODE)
1330 NOM$=MID$(NAM$,SNAME,LNAME)
1340 LOCATE N,3: PRINT " CODE : ";NUM$;" >> GRADE :";NOM$
1350 N = N+1
1360 PRINT
1370 RETURN
1400 IF EOF(1) THEN FIN=1 ELSE INPUT#1,NAM$          ' END RECORD
1410 RETURN
1500                                                 ' END
1510 CLOSE 1
1520 RETURN
3000 '
3010 '       ********  FILE  MAJ  == ROOM MISE A JOUR
3015 E = 1
3020 GOSUB 23200                                                  ' START
3030 WHILE NMT <> 99 OR NFILL<> 99 : GOSUB 23400                ' RECORD
3040 WEND
3050 GOSUB 23900                                                  ' END
3060 END
3200 '                                                            ' START
3210 OPEN "B:START" FOR INPUT AS 1
3220 OPEN "B:ADD"   FOR INPUT AS 2
3230 OPEN "B:ROOM"  FOR OUTPUT AS 3
3240 INPUT#1,MT$    : NMT=VAL(LEFT$(MT$,5))
3250 INPUT#2,FILL$ : NFILL = VAL(MID$(FILL$,2,5)) : OP$=LEFT$(FILL$,1)
3260 RETURN
3400 '                                                            ' RECORD
3402 E = E+1
3404 IF E =70 GOTO 23050
3410 D=0                                                          ' START REC
3420 IF NFILL > NMT THEN GOSUB 23500 ELSE IF NFILL=NMT THEN
       GOSUB 23600 ELSE GOSUB 23700
3430 IF D=0 THEN GOSUB 23800                                      ' END REC
3440 RETURN
3500                                                              ' COPY
3510 ROOM$ = MT$
3520 IF EOF(1) THEN NMT=99 ELSE INPUT#1,MT$ : NMT=VAL(LEFT$(MT$,5))
3530 RETURN
3600                                                              ' CORRECTI
3610 ROOM$=MID$(FILL$,2,52)
3620 IF OP$="S" THEN D=1                                          ' NO USE
3630 IF EOF(1) THEN NMT   = 99 ELSE INPUT#1,MT$    : NMT=VAL(LEFT$(MT$,5))
3640 IF EOF(2) THEN NFILL = 99 ELSE INPUT#2,FILL$ :NFILL=VAL(MID$(FILL$,2,5))
       : OP$ = LEFT$(FILL$,1)
3650 RETURN
3700                                                              ' INSERT
3710 ROOM$ = MID$(FILL$,2,52)
3720 IF OP$ <> "I" THEN PRINT "ERROR";NFILL;NMT
3730 IF EOF(2) THEN NFILL = 99 ELSE INPUT#2,FILL$ :NFILL=VAL(MID$(FILL$,2,5))
       : OP$ = LEFT$(FILL$,1)
3740 RETURN
3800 '                                                            ' END REC
3810 PRINT#3,ROOM$
3820 RETURN
3900                                                              ' END
3910 CLOSE 3
3920 CLOSE 1 : CLOSE 2
3930 RETURN
```