

Computer Tells Books Where To Go: A BASIC Program for Shifting Collections

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Shifting a sequence of volumes from one set of shelves to another, more numerous set, calls for some careful preliminary calculating. Usually, one counts the number of shelves currently occupied by the volumes to be shifted; measures the amount of space left on each shelf; and counts the number of shelves to be occupied in the new distribution. Given the length of the shelves (36"), it is a matter of determining how many linear inches are occupied by the volumes and dividing that figure by the number of shelves in the new set. This produces the approximate number of inches of books which should be placed on each "new" shelf to fill the entire set.

For an occasional expansion, these arithmetical manipulations can be carried out with a simple calculator. The librarian doomed to shift the stacks frequently, however, could save a lot of trouble by using a computer program. One example of such a program, written in BASIC on an Apple II+ micro, is printed below. It is by no means an example of sophisticated programming; but if entered into a micro and saved to disk, it can be used to produce two useful pieces of information: (1) the approximate number of inches to be filled with books in each "new" shelf; and (2) the current location of the book which should be the last one placed in a face (i.e., half-range) of new shelving. It is worthwhile to use these volumes as tentative markers. Failure to finish filling a face with a book somewhere near the marker provides a clear warning that the shift is drifting off course. Without timely adjustment, there could be several empty shelves at the end of the set, or (worse yet) several linear feet of books left over.

```
10 DIM E(1200), Q(60), W(60)
20 INPUT "HOW MANY SHELVES HAVE BEEN
   MEASURED? ";N
40 INPUT "HOW MANY RANGE FACES ARE
   TO BE FILLED ";F
50 FOR J = 1 TO F STEP 1
55 PRINT "HOW MANY SHELVES IN FACE ";
   J;"# ?"
60 INPUT Q(J)
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65 M = M + Q(J)
70 NEXT J
80 PRINT "NUMBER OF SHELVES TO BE
   FILLED=" ;M
90 FOR I = 1 TO N STEP 1
100 PRINT "HOW MANY INCHES OF SPACE
   ON SHELF ";I;" ?"
105 INPUT E(I)
130 S = S + E(I)
140 NEXT I
150 PRINT "TOTAL EMPTY SPACE
   MEASURED=" ;S;" INCHES"
160 T = N * 36
170 PRINT "TOTAL SPACE AVAILABLE ON
   MEASURED SHELVES=" ;T;"# INCHES"
180 B = T - S
190 PRINT "NUMBER OF INCHES OF BOOKS
   TO BE DISTRIBUTED=" ;B

195 K = B/M
200 C = INT (100 * K + .5) / 100

210 PRINT "EACH NEW AREA SHELF SHOULD
   HOLD ";C;" INCHES OF BOOKS"
250 FOR J = 1 TO F STEP 1
255 PRINT "J=" ;J
260 W(J) = C * Q(J)
265 PRINT "W(J)=" ;W(J)
270 IF J = 1 THEN X = 1
280 IF J > 1 THEN X = I + 1
300 FOR I = X TO N STEP 1
310 U = U + (36 - E(I)) + V
312 V = 0
315 L = U - W(J)
320 IF U > W(J) THEN V = INT (100 * L + .5) /
   100
325 IF V > 0 THEN U = 0
330 IF V > 0 THEN PRINT "END FACE ";J;"
   WITH BOOK LOCATED ";V;" INCHES FROM
   RIGHT ON SHELF ";I
338 IF V > 0 THEN GOTO 360
339 R = INT (U / C + .5)
340 IF I = N THEN PRINT "LAST BOOKS
   PLACED ON SHELF ";R;" IN FACE ";J
350 NEXT I
360 NEXT J
999 END
```

Some lines in the program require a bit of explanation. Line 10, for example, will require different quantities inside each pair of parentheses. E(1200) reflects the maximum number of shelves to be filled; if you plan to fill 1756 shelves, I recommend typing in E(1800) rather than E(1200). Q(60) indicates that no face in the new area contains more than 60 shelves. If yours contain 77 shelves, then type Q(80). Use the same number for W: W(80).

Line 20 is asking how many shelves are currently occupied by the books to be shifted. Lines 40 and 55 pertain to the shelving in the new area. Those who are comfortable with programming may opt to type a different statement in line 105: READ E(I). This would require you to put each

measurement of empty space into the program as a data statement. Starting with line 361, type the line number, a space, the word DATA, space, and the number of inches of space (to the nearest half inch) measured on the shelf. If you are emptying more than 638 shelves, omit the 999 END statement and keep going. Whether you use INPUT E(I) or READ E(I) in line 105, it is *essential* that you enter the space measurements for the old shelves in the order the books will be shifted. In most cases, this means in call number order. The difference between using INPUT and READ is notable: with INPUT you will have to start all over again if you make an error; with READ you can correct an error without losing the rest of your data.

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