SLIDE MAKER: A BASIC program to create 35-mm slides of verbal materials

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Despite the widespread use of computers to control experiments involving verbal materials, it still is necessary in many instances to present these materials on slides. This is particularly the case when an experiment is to be carried out using multiple subjects in a single session, or when a set of items includes pictures intermingled with words or sentences. Unfortunately, photographic preparation of slides can be both costly and time-consuming. As a quick and inexpensive alternative, we have developed a computerized procedure for making slides. The program, called SLIDE MAKER, is a BASIC program for the Apple II family of microcomputers (see the Appendix for a listing).

The first step in using SLIDE MAKER is to create an ASCII file of the desired verbal stimuli. Because of the flexible editing capabilities, this is best done in a word processing environment. For demonstration purposes, imagine that the materials consist of 60 single words. Each word is typed on a single line, followed by a RETURN, resulting in a column of 60 words. In the line above the first word, the number 60 is entered, to tell SLIDE MAKER the length of the file. This file is then saved to the disk containing SLIDE MAKER, and the file is named, for example, WORDS.

The listing in the Appendix presents a DOS 3.3 version of SLIDE MAKER, which accepts any DOS 3.3 text file as input. Thus, a text file created in Apple Writer would be suitable. If a ProDOS word processor is used, an ASCII file, rather than a word processor file, should be saved. Thus, with Apple Works, select the print option and print to the disk. In addition, four lines must be modified for SLIDE MAKER to run with ProDOS. In line 680, 'PR#0' should be changed to 'PRINT CHR\$(4); 'PR#0'.' Lines 5010 and 5110 should be modified similarly. In line 1210, 'CHR\$(13) +' should be omitted, so that the line reads 'D\$ = CHR\$(4).'

In running SLIDE MAKER, the only constraint is that a single run can accommodate no more than 247 items, due to APPLE's limit on the length of a string array. We tend to think in terms of 240 as a maximum, because this constitutes 10 pages of letter-size paper (see below). Thus, if more than 240 items are to be created, separate text

files should be prepared and the program should be run once for each file.

SLIDE MAKER permits the typed output to be in either 12-pitch elite or 10-pitch pica font. To avoid touching the inner edges of a 35-mm slide mount (35 mm in width $\times$ 24 mm in height), the maximum number of characters per item in the text file is 15 in elite and 12 in pica. Any keyboard character can be used, in either upper- or lower-case. Thus, eligible items are single words such as "HORSE" or "mother," sets of digits such as "973" or "4 ... 6 ... 2 ... 8," paired associates such as "27-FROG" or "glue-CHAIR," brief sentences such as "See Spot run," warning stimuli such as "*****," and a variety of other possibilities.

Once the stimulus file has been created and saved, it is time to run SLIDE MAKER. The program requires only three inputs: the name of the relevant file (e.g., WORDS, as above), the number of lines per slide (1 or 2), and the font (E or P, for elite or pica). If the response to the number of lines question is 1, a single line will appear on each slide. In the case of the example file WORDS, 60 slides will be created. If the answer is 2, two lines will appear on each slide, one above the other. Again, in the case of the file WORDS, 30 slides will be produced, each with two printed lines. The first slide contains Word 1 above Word 2, the next Word 3 above Word 4, and so on. It is possible to modify SLIDE MAKER to accommodate up to 8 lines per slide. Any more will not fit comfortably within the boundaries of the 35-mm slide mount.

After the file has been loaded into memory (Subroutine 1000), SLIDE MAKER reminds the user to turn on the printer and to align the printer paper prior to starting the printout (Subroutine 5000). Setting the page at the same location used to start a word-processed document is optimal. Next, slide output begins (Subroutine 500). In the case of one line per slide (Subroutine 2000), each word in the file is printed horizontally at the center of a 38 mm wide $\times$ 35.5 mm high rectangle. If this rectangle is thought of as consisting of 8 lines, the word appears on line 4 from the top. The boundaries of each rectangle consist of solid and dashed lines horizontally (Subroutine 2500) and hash marks vertically (Subroutine 4000). Each letter-size page of printout contains 24 slide rectangles (4 columns $\times$ 6 rows).

In the case of two items per slide (Subroutine 3000), the first item appears on line 3 and the second on line 5, so that they appear quite centered. SLIDE MAKER also centers each item in its rectangle by inserting appropriate spacing to the left of the item. If desired, this centering could be defeated by altering line 2040 for one-line items or Subroutine 3300 for two-line items. Page feeds are done automatically after each 4 $\times$ 6 matrix, and the printout stops after the last row containing an item.

A couple of features of SLIDE MAKER should be noted. The program expects to find the printer in Slot 1;

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if the user's printer is located elsewhere, line 5110 should be modified. Also, because of the centering and the maximum number of character constraints, if the printer's default mode is not 12-pitch elite or 10-pitch pica, the appropriate control sequence to switch to one of those modes should be entered in line 5115 or before running the program. Otherwise, the printed material may not fit (or be centered) in the 35-mm slide frame. A daisy-wheel printer with carbon ribbon is preferable, but a good dot matrix printer with a new ribbon will also produce acceptable quality.

When the program run is completed, the user will have a series of pages of items in rectangles. The next step is to copy these pages onto clear plastic sheets. This can be done in a single step on some photocopying machines, and produces very good quality slides. If such a photocopier is not available, the process involves two steps. The first is to make a clean, crisp photocopy of the printout page. The image of this photocopy then can be transferred to a specially treated plastic sheet by a thermal process using a Thermofax or similar machine. Using a photocopy in the thermal process results in better transfer than does using the original. With a little practice, the quality of these slides can be quite acceptable, although perhaps not as good as in the one-step procedure.

The last step is to cut out the individual rectangles and insert them into slide mounts. Two kinds of slide mounts are available at most photographic supply stores. With the first kind, plastic mounts snap together for quick assembly, although extended usage may lead to some movement of the plastic sheet within the mount. A small piece of tape that attaches the plastic sheet to one side of the mount will help to solve this problem. The second kind involves cardboard mounts that are sealed using heat. Although not quite as quick, there is no danger of slippage and these are cheaper than plastic mounts. The only

drawbacks of cardboard mounts are that they can become dog-eared with extended use, and there is a risk of burning the plastic sheet during sealing if care is not taken.

We have used this program and technique successfully for several years. It is inexpensive and quick: On a number of occasions, we have produced several hundred slides in an afternoon for under \$20 (the cost of the slide mounts). It is particularly handy for such things as undergraduate projects and classroom demonstrations, but it has also been used to prepare materials for a variety of published experiments.

Although the procedure is intended for verbal materials, it can be used with other types of stimuli as well. For instance, if the file is filled with blanks followed by returns, a set of blank matrices will be generated. Using the reduce/enlarge function of a photocopier, line drawings can be created that fit within the slide rectangles. These can be glued into the rectangles, and then picture slides can be created. Indeed, the reduction function of a photocopier can even allow reduced versions of verbal stimuli longer than 15 characters to be inserted in a slide.

When slides must be used, SLIDE MAKER is an attractive alternative to slower, and much more expensive, photography. Although admittedly not photographic in quality, slides made using our procedure are very good.

Availability. The interested researcher who would like a copy of SLIDE MAKER on disk for the APPLE should send a disk and mailer to Colin M. MacLeod, Division of Life Sciences, Scarborough Campus, University of Toronto, Scarborough, ON M1C 1A4, Canada. Please indicate your preference for DOS 3.3 or ProDOS. The program will be sent by return mail. Of course, given its brevity, SLIDE MAKER is easily input from the keyboard. For those using other microcomputers, the program should be easily modifiable.

APPENDIX

Listing of SLIDE MAKER Program

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10 REM -----
20 REM ----- **      WORD PREP FOR SLIDES      ** -----
30 REM -----
40 :
50 GOSUB 1000: REM ** READ ITEMS AND SET UP **
60 GOSUB 5000: REM ** READY PRINTER **
70 GOSUB 500: REM ** PRINT SLIDES **
80 END
90 :
500 REM ----- ** PRINT ** -----
510 :
520 MB = INT ((SZ / L + 3) / 4): REM ** MAX # OF ROWS OF 4 SLIDES **
530 :
540 FOR B = 1 TO MB: REM ** ROWS OF 4 SLIDES **
550 FOR I = 0 TO 7: REM ** LINES WITHIN EACH ROW **
560 :
570 IF I = 0 THEN GOSUB 2500: GOTO 620: REM **PRINT UPPER & LOWER BORDERS**
580 IF I = 3 AND L = 2 THEN GOSUB 3000: GOTO 620: REM **PRINT 1ST LINE OF 2**
590 IF I = 4 AND L = 1 THEN GOSUB 2000: GOTO 620: REM **PRINT SINGLE LINE **
600 IF I = 5 AND L = 2 THEN GOSUB 3000: GOTO 620: REM **PRINT 2ND LINE OF 2**
610 GOSUB 4000: REM **PRINT VERTICAL BORDERS**
620 NEXT I
630 IF FN M6MOD(B) > 0 AND B < MB THEN GOTO 670
640 REM **IF 6 ROWS PRINTED ON THIS PAGE, PRINT BORDER FOR LAST ROW**
650 GOSUB 2500: REM **PRINT BORDER**

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APPENDIX (Continued)

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660 IF B < MB THEN PRINT CHR$(12): REM **IF MORE TO DO, FORM FEED**
670 NEXT B
680 PR#0
690 PRINT "DONE."
700 RETURN
710 :
1000 REM ----- ** READ ITEMS AND SET UP ** -----
1010 :
1020 DEF FN M6MOD(Z) = INT (((Z / 6) - INT (Z / 6)) * 6 + 0.5)
1030 REM * M6MOD(Z) IS A FUNCTION THAT RETURNS THE VALUE 'Z MOD 6' *
1040 LMW = 10: REM * LEFT MARGIN WIDTH; ALTER TO '4' FOR PRINTERS
1050 REM * THAT ONLY PRINT 80 COLUMNS.
1060 HOME
1070 PRINT "**** WORD PREP FOR SLIDES ****": PRINT : PRINT
1080 PRINT "ENTER FILE NAME--";: INPUT FI$
1090 PRINT : PRINT "NO. OF LINES PER SLIDE (1 OR 2)--";: INPUT L
1100 IF L < 1 OR L > 2 THEN GOTO 1090
1110 PRINT : PRINT "PITCH: 12-ELITE OR 10-PICA? (E/P)";
1120 POKE - 16368,0: GET AS: POKE - 16368,0
1130 IF NOT (AS = "E") THEN GOTO 1170
1140 LL = 73:FS = 17
1150 PR$ = CHR$(27) + "E"
1160 GOTO 1210
1170 IF NOT (AS = "P") THEN GOTO 1120
1180 LL = 61:FS = 14
1190 PR$ = CHR$(27) + "N"
1200 REM * FS = FRAME SIZE * LL = LINE LENGTH *
1210 DS = CHR$(13) + CHR$(4)
1220 PRINT DS;"OPEN ";FI$
1230 PRINT DS;"READ ";FI$
1240 INPUT SZ
1250 DIM WDS(SZ + 8):W = 0
1260 FOR I = 1 TO SZ
1270 INPUT WDS(I)
1280 NEXT I
1290 PRINT DS;"CLOSE"
1300 RETURN
1310 :
2000 REM ----- ** PRINT SINGLE ITEM IN ROW 4 ** -----
2010 :
2020 PRINT SPC(LMW);
2030 FOR C = 1 TO 4
2040 PRINT "|"; SPC( INT ((FS - LEN (WDS(W + C))) / 2));WDS(W + C);
2050 SP = FS - INT ((FS - LEN (WDS(W + C))) / 2) - LEN (WDS(W + C))
2060 PRINT SPC( SP);
2070 NEXT
2080 PRINT "|"
2090 W = W + 4
2100 RETURN
2110 :
2500 REM ----- ** PRINT UPPER & LOWER BORDERS ** -----
2510 PRINT SPC( LMW);
2520 FOR J = 1 TO LL: PRINT CHR$(95);: NEXT
2530 PRINT : PRINT SPC( LMW)
2540 FOR J = 1 TO LL: PRINT CHR$(45);: NEXT
2550 PRINT
2560 RETURN
2570 :
3000 REM -----** PRINT ITEMS IN ROWS 3 & 5 ** -----
3010 PRINT SPC( LMW);
3020 IF I = 3 THEN X = 1
3030 IF I = 5 THEN X = 2
3040 FOR C = 0 TO 3
3050 P = W + X + (2 * C)
3060 GOSUB 3300: REM ** DETERMINE SP **
3070 PRINT "|"; SPC( SP);WDS(P);
3080 SP = FS - SP - LEN (WDS(P))
3090 PRINT SPC( SP);
3100 NEXT C
3110 PRINT "|"
3120 IF I = 5 THEN W = W + 8
3130 RETURN
3140 :
3300 REM ----- ** DETERMINE SPACING ** -----
3310 :
3320 IF I = 3 THEN L0 = LEN (WDS(P)):L1 = LEN (WDS(P + 1))
3330 IF I = 5 THEN L0 = LEN (WDS(P - 1)):L1 = LEN (WDS(P))
3340 REM ** IF WDS(P) & WDS(P+1) ARE BOTH EVEN OR ODD IN LENGTH ... **

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APPENDIX (Continued)

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3350 IF ((LO / 2 = INT (LO / 2)) AND (L1 / 2 = INT (L1 / 2))) OR ( NOT (LO / 2
= INT (LO / 2)) AND NOT (L1 / 2 = INT (L1 / 2))) THEN SP = INT ((FS - LEN
(WD$(P))) / 2): GOTO 3380
3360 IF I = 3 THEN GOSUB 3500
3370 IF I = 5 THEN GOSUB 3800
3380 RETURN
3390 :
3500 REM ----- ** CENTRE 3RD LINE ** -----
3510 :
3520 REM * WHEN FS & LEN WD$(P) BOTH EVEN OR ODD, NO CORRECTION
3530 IF ((FS / 2 = INT (FS / 2)) AND (LO / 2 = INT (LO / 2))) OR ( NOT (FS / 2
= INT (FS / 2)) AND NOT (LO / 2 = INT (LO / 2))) THEN GOTO 3560
3540 IF LO > L1 THEN LO = LO - 1
3550 IF LO < L1 THEN LO = LO + 1
3560 SP = (FS - LO) / 2
3570 RETURN
3580 :
3800 REM ----- ** CENTRE 5TH LINE ** -----
3810 :
3820 REM * WHEN FS & LEN WD$(P) BOTH EVEN OR ODD, NO CORRECTION *
3830 IF ((FS / 2 = INT (FS / 2)) AND (L1 / 2 = INT (L1 / 2))) OR ( NOT (FS / 2
= INT (FS / 2)) AND NOT (L1 / 2 = INT (L1 / 2))) THEN GOTO 3860
3840 IF L1 > LO THEN L1 = L1 - 1
3850 IF L1 < LO THEN L1 = L1 + 1
3860 SP = (FS - L1) / 2
3870 RETURN
3880 :
4000 REM ---- ** PRINT APPROPRIATE VERTICALS ** ----
4010 :
4020 PRINT SPC( LMW);
4030 PRINT "|"; SPC( FS);"|"; SPC( FS);"|"; SPC( FS);"|"; SPC( FS);"|";
4040 RETURN
4050 :
5000 REM ----- ** ALIGN PRINTER PAPER ** -----
5010 PR#0
5020 HOME : PRINT CHR$( 7); CHR$( 7)
5030 FLASH
5040 PRINT "ATTENTION": NORMAL : PRINT : PRINT
5050 PRINT "PLEASE TURN ON PRINTER."
5060 PRINT : PRINT "PLEASE ALIGN PRINTER PAPER TO"
5070 PRINT : PRINT "BEGIN PRINTING."
5080 PRINT : PRINT "PRESS ANY KEY WHEN READY."
5090 POKE - 16368,0: GET AS$
5100 HOME
5110 PR#1
5115 PRINT PR$;: REM * SET PRINTER PITCH *
5120 PRINT CHR$( 9);"90N"
5130 RETURN
5140 :

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