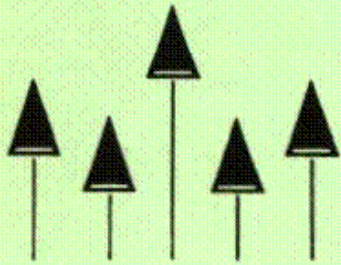




Journal
of the ISTE
Special Interest Group
for Logo-Using
Educators

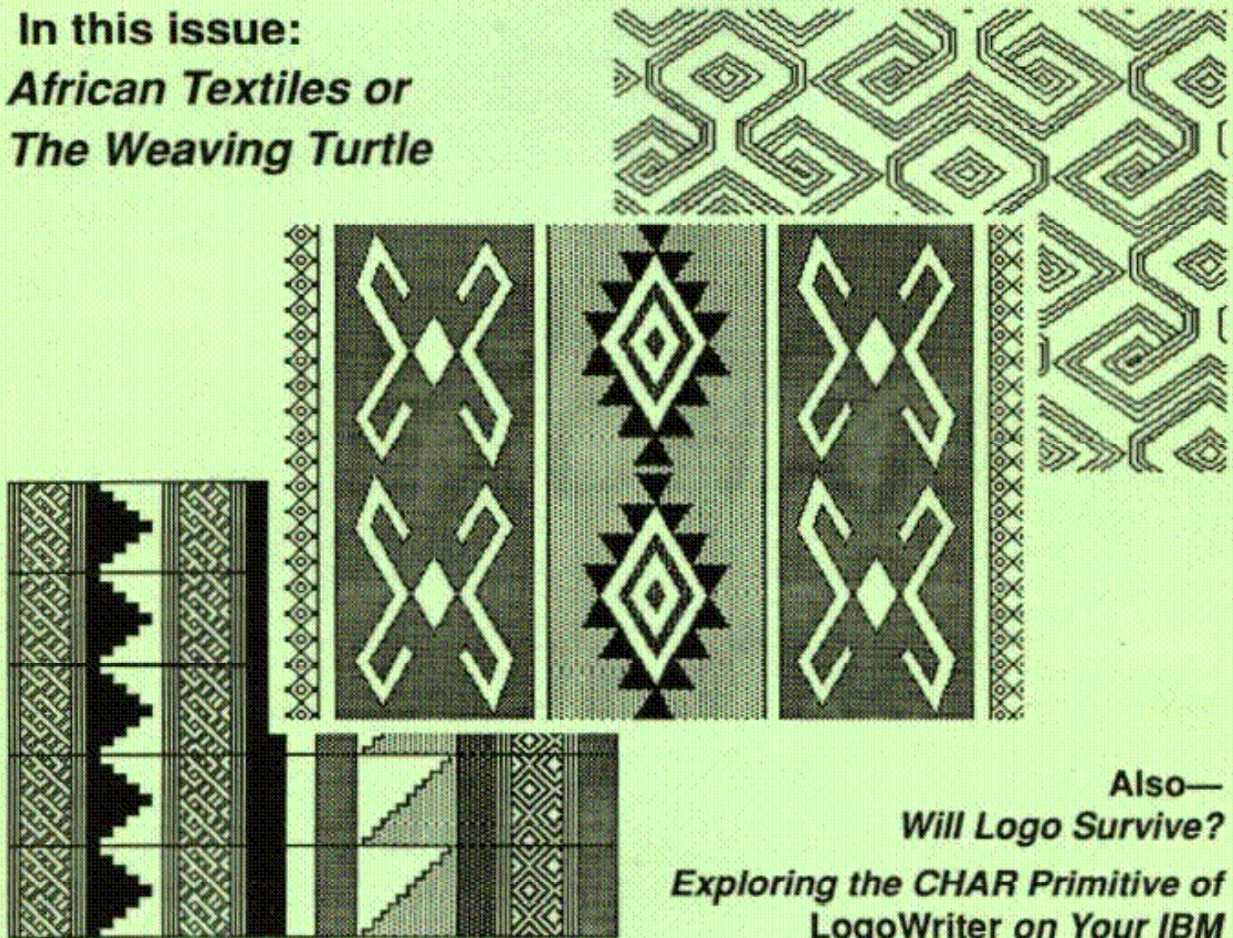


LOGO EXCHANGE

Winter 1992

Volume 11 Number 2

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*African Textiles or
The Weaving Turtle*



Also—
Will Logo Survive?
*Exploring the CHAR Primitive of
LogoWriter on Your IBM*

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Exploring the CHAR Primitive of LogoWriter on Your IBM

by Charles E. Crume

Recently, as I was working on a *LogoWriter* program, I noticed that when I tried to print a number followed by a parenthesis, *LogoWriter* displayed a space before the parenthesis. After some thought, I realized that parentheses are special characters. After consulting my *LogoWriter* manual, I found a primitive named CHAR that accepts a decimal value between 1 and 255 and returns the character corresponding to that value. The manual listed the right parenthesis as having a decimal value of 40. When I executed the command:

```
PRINT (WORD 1" CHAR 40 CHAR 32 "CIRCLE)
```

LogoWriter displayed:

- 1) CIRCLE

I could display a parenthesis adjacent to whatever I wanted. Now, however, I was interested in what else could be done with the CHAR primitive. To simplify the task, I wrote a procedure to display all 256 characters on my IBM PC. The procedure is called CHARSET, and the source code is shown below:

```
TO CHARSET
  RG
  HT
  CT
  REPEAT 27 [INSERT CHAR 32]
  PRINT [1 1 1 1 1 1]
  REPEAT 7 [INSERT CHAR 32]
```

```
PRINT [0 1 2 3 4 5 6 7 8 9 0 1 2 3 4
      5]
PRINT [ ]
ROW 0
TOP
END
```

```
TO ROW :VALUE
  IF :VALUE = 256 [STOP]
  INSERT CHAR 32
  IF :VALUE < 100 [INSERT CHAR 32]
  IF :VALUE < 10 [INSERT CHAR 32]
  (INSERT :VALUE WORD "-" CHAR 32)
  ROW COLUMN :VALUE :VALUE + 16
END
```

```
TO COLUMN :NEXT :LAST
  IF :NEXT = :LAST [PRINT [ ] OUTPUT
    :LAST]
  IFELSE (OR (:NEXT = 9) (:NEXT = 10)
    (:NEXT = 13)) [(INSERT CHAR 32
    ")] [(INSERT CHAR :NEXT ")]
  COLUMN :NEXT + 1 :LAST
END
```

The characters are arranged in a table consisting of 16 rows and 16 columns. Each row and column is numbered to facilitate determining the value of any particular character. The values down the left side (0 through 240) are the beginning value for characters in

	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
1	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
2	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
3	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
4	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
5	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
6	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102
7	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
8	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134
9	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
10	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166
11	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182
12	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198
13	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214
14	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
15	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246
16	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262



that row. The values across the top (0 through 15) are the offset within a row. A character's value is computed by adding the row value and the column value.

For example, the digit 3 (4th row, 4th character from the left) has the value 51 (row value 48 plus column value 3). The copyright symbol (12th row, 9th character from the left) has the value 184 (row value 176 plus column value 8).

CHARSET displays a graphic symbol (i.e., character) for every value except 0, 9, 10, 13, 32, and 255. A blank space is shown for these values because:

- The values 0 and 255 have no character representation
- The values 9, 10, and 13 cause the cursor to perform a horizontal tab, line feed, and carriage return, respectively—actions that would affect the table
- The value 32 is truly a space.

Examining the table shows a number of interesting and useful characters. Among them are:

- The four suits in a deck of cards— hearts, diamonds, clubs, and spades (values 3 through 6)
- The biological symbols for male and female organisms and cells (values 11 and 12)
- Four directional arrows (values 24 through 27)
- A copyright and registered trademark symbol (values 184 and 169)
- A plus/minus sign for indicating probability error (value 241)
- Numerous international characters.

Some sample *LogoWriter* commands making use of these symbols are:

```
(PRINT [RESULTS ACCURATE TO WITHIN]
CHAR 241 [3%])
```

displays

```
RESULTS ACCURATE TO WITHIN ± 3%
```

The command:

```
(PRINT WORD "4 CHAR 4 WORD "9 CHAR 6
WORD "J CHAR 4 WORD "3 CHAR 5
WORD "O CHAR 3)
```

displays

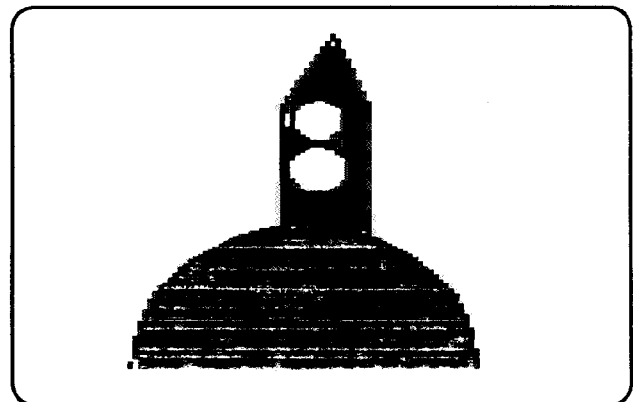
```
4♦ 9♣ J♦ 3♣ Q♥
```

Some of you are probably thinking, "But I could create a shape or draw these characters using turtle graphics." After all, mixing text and graphics is one of *LogoWriter*'s major features. Technically speaking, one could use shapes or turtle graphics. However, this

could be quite tedious and messy. Imagine the instructions needed to move the turtle to each place in the text where a parenthesis was to go and stamping the shape at that location and the work involved if the format of the text changed—all turtle movement instructions would require changing. Using CHARSET characters facilitates using international characters for foreign language programs or for writing a card game.

Charles E. Crume is a software development programmer at a medical research laboratory in Cincinnati, Ohio. His continuing interest in Logo and educational computing stimulates the writing of articles and utility programs.

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Raymond Longobardi, a third grader, did research on Mars. This page from his hypermedia presentation shows how one day we may be able to land on Mars and colonize it.