

4 つの 4

このパズルは古典的なパズルで英語名も Four Fours として知られている．バリエーションはいろいろあって，累乗，ルートや階乗などの数学記号を使えるルールのものもある．また 44 を四十四として扱えるとしたものもある．下に一覧にしたのはそれらを禁止している．加減乗除とカッコだけである．負の数も作れるがここでは 0 以上 256 以下の数字を作っている．加減乗除だけなのでそれより大きい数は作れない．

10 を皮切りにだんだんとできない数が増えていくのが観察できる．

その昔，N88BASIC を用いて解いたものである．最後にプログラムリストを示したが，このままの形で動くコンピュータはおそらくもうないと思われる．

$4+4-4-4 = 0$	$4-4+4-4 = 0$	$4-4-4+4 = 0$	$(4-4)*4*4 = 0$	$(4-4)*4/4 = 0$
$(4-4)/4*4 = 0$	$(4-4)/4/4 = 0$	$4*4/4-4 = 0$	$4/4*4-4 = 0$	$4+4-(4+4) = 0$
$4-(4+4-4) = 0$	$4-(4-(4-4))=0$	$4*4*(4-4) = 0$	$4/(4*(4-4))=0$	$4-4*4/4 = 0$
$4-4/(4/4) = 0$	$4-(4+4)+4 = 0$	$4-(4-4)-4 = 0$	$4*(4-4)*4 = 0$	$4*(4-4)/4 = 0$
$4/(4/4)-4 = 0$	$4-(4-4+4) = 0$	$4/((4-4)*4)=0$	$4/((4-4)/4)=0$	$4-4*4/4 = 0$
$4-4/4*4 = 0$	$(4+4)*(4-4)=0$	$(4-4)*(4+4)=0$	$(4-4)/(4+4)=0$	$4-4-(4-4) = 0$
$(4-4)*(4-4)=0$	$(4-4)/(4*4)=0$	$(4-4)/(4/4)=0$	$4*4*(4-4) = 0$	$4*4-4*4 = 0$
$4/4*(4-4) = 0$	$4/4-4/4 = 0$			
$(4+4-4)/4 = 1$	$(4-4+4)/4 = 1$	$4*4/4/4 = 1$	$4/4+4-4 = 1$	$4/4-4+4 = 1$
$4/4*4/4 = 1$	$4/4/4*4 = 1$	$4/(4+4-4) = 1$	$4/(4-(4-4))=1$	$4*4/(4*4) = 1$
$4-(4-4/4) = 1$	$4/(4*4/4) = 1$	$4/(4/(4/4))=1$	$(4-(4-4))/4=1$	$4/(4*4)*4 = 1$
$4+4/4-4 = 1$	$4/(4/4)/4 = 1$	$4/(4-4+4) = 1$	$4/(4*4/4) = 1$	$4/(4/4*4) = 1$
$(4+4)/(4+4)=1$	$4-4+4/4 = 1$	$4/4+4-4 = 1$	$4/4-(4-4) = 1$	$4/4/(4/4) = 1$
$4*4/(4+4) = 2$	$(4/(4+4))*4=2$	$4-(4+4)/4 = 2$	$4/((4+4)/4)=2$	$4/4+4/4 = 2$
$(4+4+4)/4 = 3$	$(4*4-4)/4 = 3$			
$(4-4)*4+4 = 4$	$(4-4)/4+4 = 4$	$4+4*(4-4) = 4$	$4-4*(4-4) = 4$	$4*(4-4)+4 = 4$
$4+(4-4)*4 = 4$	$4-(4-4)*4 = 4$	$4+(4-4)/4 = 4$	$4-(4-4)/4 = 4$	
$(4*4+4)/4 = 5$	$(4+4*4)/4 = 5$			
$(4+4)/4+4 = 6$	$4+(4+4)/4 = 6$			
$4+4-4/4 = 7$	$4-4/4+4 = 7$	$4-(4/4-4) = 7$		

$4+4+4-4 = 8$	$4+4-4+4 = 8$	$(4+4)*4/4 = 8$	$(4+4)/4*4 = 8$	$4-4+4+4 = 8$
$4*4-4-4 = 8$	$4*4/4+4 = 8$	$4/4*4+4 = 8$	$4-(4-(4+4))=8$	$4/(4/(4+4))=8$
$4+4-(4-4) = 8$	$4+4*4/4 = 8$	$4+(4/(4/4))=8$	$4*(4+4)/4 = 8$	$4-(4-4)+4 = 8$
$4/(4/4)+4 = 8$	$4-(4-4-4) = 8$	$4+4*4/4 = 8$	$4+4/4*4 = 8$	$4+4-(4-4) = 8$
$(4+4)/(4/4)=8$	$4*4-(4+4) = 8$	$4/4*(4+4) = 8$		
$4/4+4+4 = 9$	$4+4+4/4 = 9$	$4+4/4+4 = 9$		
$4*(4-4/4) = 12$	$(4-4/4)*4 = 12$			
$4*4-4/4 = 15$				
$4+4+4+4 = 16$	$(4+4-4)*4 = 16$	$(4-4+4)*4 = 16$	$4*4+4-4 = 16$	$4*4-4+4 = 16$
$4*4*4/4 = 16$	$4*4/4*4 = 16$	$4/4*4*4 = 16$	$4*(4+4-4) = 16$	$4*(4-(4-4))=16$
$4-(4-4*4) = 16$	$4/(4/(4*4))=16$	$4*4/(4/4) = 16$	$(4-(4-4))*4=16$	$(4+4*4)-4 = 16$
$4/(4/4)*4 = 16$	$4*(4+4-4) = 16$	$4*(4-4+4) = 16$	$4+4*4-4 = 16$	$4/(4/4/4) = 16$
$4-4+4*4 = 16$	$4*4-(4-4) = 16$	$4/4*4*4 = 16$		
$4*4+4/4 = 17$	$4/4+4*4 = 17$			
$(4/4+4)*4 = 20$	$4*(4+4/4) = 20$	$(4+4/4)*4 = 20$	$4*(4/4+4) = 20$	
$4*4+4+4 = 24$	$4+4+4*4 = 24$	$4+4*4+4 = 24$		
$(4+4)*4-4 = 28$	$4*(4+4)-4 = 28$			
$4*4+4*4 = 32$				
$(4+4)*4+4 = 36$	$4+4*(4+4) = 36$	$4*(4+4)+4 = 36$	$4+(4+4)*4 = 36$	
$(4+4+4)*4 = 48$	$(4*4-4)*4 = 48$	$4*(4+4+4) = 48$	$4*(4*4-4) = 48$	
$(4*4*4)-4 = 60$				
$(4+4)*(4+4)=64$				
$4*4*4+4 = 68$	$4+4*4*4 = 68$			
$(4*4+4)*4 = 80$	$4*(4+4*4) = 80$	$(4+4*4)*4 = 80$	$4*(4*4+4) = 80$	

$(4+4)*4*4 = 128$ $4*4*(4+4) = 128$ $4*(4+4)*4 = 128$

$4*4*4*4 = 256$

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10 ' SAVE"B:4445
20 OPEN "B:D4D4.JXW" AS #1
30 'OPEN "LPT:D4D4.JXW" AS #1
40 ON ERROR GOTO *ER
50 DEFINT E ,T
60 DIM N(256),E1(256,80)
70 DIM E2(256,80)
80 DIM E3(256,80)
90 DIM TYPE(256,80)
100 E$(1)=" +"
110 E$(2)=" -"
120 E$(3)=" *"
130 E$(4)=" /"
140 ',,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
150 FOR E1=1 TO 4
160 E=E1:X=4:Y=4:GOSUB *E:Z1=Z
170 FOR E2=1 TO 4
180 X=Z1:Y=4:E=E2:GOSUB *E:Z2=Z
190 FOR E3=1 TO 4
200 X=Z2:Y=4:E=E3:GOSUB *E
210 PRINT USING "( ( 4& &4 )& &4 )& &4 =" ;E$(E1),E$(E2),E$(E3);:PRINT Z :IF Z<0 OR Z<>INT(Z) THEN 260
220 N(Z)=N(Z)+1:E1(Z,N(Z))=E1
230 E2(Z,N(Z))=E2
240 E3(Z,N(Z))=E3
250 TYPE(Z,N(Z))=1
260 NEXT:NEXT:NEXT
270 ',,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
280 FOR E1=1 TO 4
290 E=E1:X=4:Y=4:GOSUB *E:Z1=Z
300 FOR E2=1 TO 4
310 Y=Z1:X=4:E=E2:GOSUB *E:Z2=Z
320 FOR E3=1 TO 4
330 Y=Z2:X=4:E=E3:GOSUB *E
340 PRINT USING "4& &( 4& &4 ) )& &4 =" ;E$(E3),E$(E2),E$(E1);:PRINT Z:IF Z<0 OR INT(Z)<>Z THEN 390
350 N(Z)=N(Z)+1:E1(Z,N(Z))=E1
360 E2(Z,N(Z))=E2
370 E3(Z,N(Z))=E3
380 TYPE(Z,N(Z))=2
390 NEXT:NEXT:NEXT
400 ',,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
410 FOR E1=1 TO 4
420 E=E1:X=4:Y=4:GOSUB *E:Z1=Z
430 FOR E2=1 TO 4
440 Y=Z1:X=4:E=E2:GOSUB *E:Z2=Z
450 FOR E3=1 TO 4
460 X=Z2:Y=4:E=E3:GOSUB *E
470 PRINT USING "( 4& &( 4& &4 ) )& &4 =" ;E$(E2),E$(E1),E$(E3);:PRINT Z:IF Z<0 OR INT(Z)<>Z THEN 520
480 N(Z)=N(Z)+1:E1(Z,N(Z))=E1
490 E2(Z,N(Z))=E2
500 E3(Z,N(Z))=E3
510 TYPE(Z,N(Z))=3
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