ALGORITHM 72
COMPOSITION GENERATOR

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```
procedure comp (c, k); value k; integer array c;
  integer k;
comment Given a k-part composition c of the positive integer n,
  comp generates a consequent composition if there is one. If
  comp operates on each consequent composition after it is found,
  all compositions will be generated, provided that 1, 1, . . ., 1,
  n−k+1 is the initial c. If c is of the form n−k+1, 1, 1, . . . , 1,
  there is no consequent, and c will be replaced by a k vector of
  0's. Reference: John Riordan, An Introduction to Combi-
  natorial Analysis, John Wiley and Sons, Inc., New York, 1958,
  Chapter 6;
begin integer j; integer array d [1:k];
  if k = 1 then go to last;
  for j := 1 step 1 until k do d [j] := c [j] − 1;
test: if d[j]>0 then go to set;
      j := j−1;
      go to if j = 1 then last else test;
set:  d [j] := 0;
      d [j − 1] := d [j − 1] + 1;
      d [k] := c [j] − 2;
      for j := 1 step 1 until k do c [j] := d[j] + 1;
      go to exit;
last: for j := 1 step 1 until k do c [j] := 0;
exit: end comp
```

CERTIFICATION OF ALGORITHM 72
COMPOSITION GENERATOR [L. Hellerman and S. Ogden, *Comm. ACM*, Nov. 1961]

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After

for j := 1 **step** 1 **until** k **do** $d[j]$:= $c[j]-1$;

the statement

$j := k;$

should be inserted (see ALGOL 60 report, para 4.6.5). With this alteration, the algorithm was successfully run using the Elliott ALGOL translator on the National-Elliott 803.