ALGORITHM 19
BINOMIAL COEFFICIENTS

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comment

This procedure computes binomial coefficients \( \binom{n}{m} = \frac{n!}{m!(n-m)!} \) by the recursion formula \( \binom{n}{i+1} = \frac{(n-i)\binom{n}{i}}{i+1} \) starting from \( \binom{n}{0} = 1 \).

integer procedure C(m, n);
integer m, n;
begin
integer i, a, b;
a := 1;
if 2 \times m > n then b := n - m else b := m;
for i := 0 step 1 until b do begin
  a := (n - i) \times a + (i + 1)
end
C := a
end

Binomial Coefficients

REMARK ON ALGORITHM 19

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The for clause of Algorithm 19 should read:

for i := 0 step 1 until b-1 do

With this correction the algorithm was certified on the Armour Research Foundation UNIVAC 1105.

The recursion formula stated in the comment should read:

\( \binom{n}{i+1} = \frac{(n-i)\binom{n}{i}}{i+1} \).

CERTIFICATION OF ALGORITHM 19

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This procedure was tested on the LGP-30, using the compiler ALGOL-30 from Dartmouth College Computation Center. The following changes were found necessary:

(1) Within the comment, the line

\[ \binom{n}{i+1} = \frac{(n-i)\binom{n}{i}}{i+1} \]

should be

\[ \binom{n}{i+1} = \frac{(n-i)\binom{n}{i}}{i+1} \]

(2) The line defining the iteration loop

for i := 0 step 1 until b do