ALGORITHM 19
BINOMIAL COEFFICIENTS

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```
comment          This procedure computes binomial coeffi-
                 cients C_m^n = n!/m!(n — m)! by the re-
                 cursion formula C_{i+1}^n = (n — 1)C_i^n/(i + 1)
                 starting from C_0^n = 1  ;
integer procedure C(m, n)  ;
integer          m, n  ;
begin            integer i, a, b  ;
                 a := 1  ;
                 if 2 × m > n then b := n — m else
                   b := m  ;
                 for i := 0 step 1 until b do
                 begin a := (n — i) × a ÷ (i + 1) end
                 C := a
end              Binomial Coefficients
```

REMARK ON ALGORITHM 19
RINOMIAL COEFFICIENTS (Richard R. Kenyon, *Comm. ACM*, Oct. 1960)

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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:

$$C_{i+1}^n = (n-i)\ C_i^n/(i+1).$$

CERTIFICATION OF ALGORITHM 19
BINOMIAL COEFFICIENTS [Richard R. Kenyon, *Comm. ACM* Oct., 1960]

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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

$$C_{i+1}^n = (n - 1)C_i^n/(i + 1)$$

should be

$$C_{i+1}^n = (n - i)C_i^n/(i + 1)$$

(2) The line defining the iteration loop

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

should be

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

(3) The sequence

end $C := a$ **end**

should be

end; $C := a$ **end**