ALGORITHM 84
SIMPSON'S INTEGRATION

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```
real procedure SIM (n, a, b, y);
value n, a, b; real a, b; integer n; array y;
comment This is a method for obtaining the approximate value
  of the definite integral of a continuous function when the in-
  tegral cannot be evaluated in elementary functions. Given
  y = f(x) and the ∫ₐᵇ y dx to be evaluated. Plot the curve f(x),
  and divide [a, b] evenly into n equal parts, erecting the ordi-
  nates y₀, y₁, ···, yₙ. Then the approximate value of the
  definite integral by Simpson's rule states that:
  ∫ₐᵇ f(x) dx = (b − a)/3n (y₀ + 4y₁ + 2y₂ + ··· + 4yₙ₋₁ + yₙ);
begin real s; integer i;
  s := (y[0] − y[n])/2;
  for i := 1 step 2 until n − 1 do s := s + 2 × y[i] + y[i+1];
  SIM := 2 × (b − a) × s/(3 × n)
end
```

CERTIFICATION OF ALGORITHM 84
SIMPSON'S INTEGRATION [P. E. Hennion, *Comm. ACM 5* (Apr. 1962)]

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Simpson's Integration was translated using the DEUCE ALGOL compiler and, with no corrections, gave satisfactory results.

It is not stated in the comment that integer n needs to be even.

REMARK ON ALGORITHM 84
SIMPSON'S INTEGRATION [Paul E. Hennion. *Comm. ACM*, Apr. 1962]

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In performing integration by the use of Simpson's rule, it is well known that the interval $[a, b]$ must be divided evenly into n equal parts, and that *it is essential for n to be an even number.*

In the published algorithm, there is neither a comment on this important restriction, nor a programmed test for the parity of n. It is therefore a potential trap for the unwary programmer.

CERTIFICATION OF ALGORITHM 84
SIMPSON'S INTEGRATION [P. E. Hennion, *Comm. ACM*, Apr. 62]

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SIM was successfully run on FACIT EDB using FACIT-ALGOL 1, which is a realization of ALGOL 60 for FACIT EDB. No changes in the program were necessary. To test SIM some polynomials were integrated.