

FFT(a, n)

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1  if  $n == 1$ 
2      return  $a$                                 // DFT of 1 element is the element itself
3   $\omega_n = e^{2\pi i/n}$ 
4   $\omega = 1$ 
5   $a^{\text{even}} = (a_0, a_2, \dots, a_{n-2})$ 
6   $a^{\text{odd}} = (a_1, a_3, \dots, a_{n-1})$ 
7   $y^{\text{even}} = \text{FFT}(a^{\text{even}}, n/2)$ 
8   $y^{\text{odd}} = \text{FFT}(a^{\text{odd}}, n/2)$ 
9  for  $k = 0$  to  $n/2 - 1$                         // at this point,  $\omega = \omega_n^k$ 
10      $y_k = y_k^{\text{even}} + \omega y_k^{\text{odd}}$ 
11      $y_{k+(n/2)} = y_k^{\text{even}} - \omega y_k^{\text{odd}}$ 
12      $\omega = \omega \omega_n$ 
13 return  $y$ 
```