Algorithm 4 Even-Paz algorithm

Input: a cake (initially[0,1]), num of *child* n and their value density function f_i

Output: an allocation $I : \int_{I_i} f_i(x)dx \geq \frac{1}{n}\int_0^1 f_i(x)dx$

suggest the current cake is $[a, b]$

if $n = 1$ **then**

Give the cake to this *child*

end if

for each $child_i$ **do**

calculate the half-half point x_i: ▷ $O(n)$

$\int_0^{x_i} f_i(x)dx = \frac{1}{n}\left\lfloor\frac{n}{2}\right\rfloor \cdot \int_0^1 f_i(x)dx$

use medium algorithm to find the medium x_i^* ▷ $O(n)$

end for

select the $\frac{n}{2}th$ x_i to divide the cake into two parts

apply this algorithm: the former $\frac{n}{2}$ children shares the cake $[a, x_i^*]$ ▷ recursion

apply this algorithm: the children left shares the rest of the cake ▷ recursion