Algorithm 1 Parallel SMC program execution

Assume: N observations, L particles
launch L copies of the program (parallel)
for $n = 1 \ldots N$ **do**
  wait until all L reach `observe` y_n (barrier)
  update unnormalized weights $\tilde{w}_n^{1:L}$ (serial)
  if $ESS < \tau$ **then**
    sample number of offspring $O_n^{1:L}$ (serial)
    set weight $\tilde{w}_n^{1:L} = 1$ (serial)
    for $\ell = 1 \ldots L$ **do**
      fork or exit (parallel)
    end for
  else
    set all number of offspring $O_n^{\ell} = 1$ (serial)
  end if
  continue program execution (parallel)
end for
wait until L program traces terminate (barrier)
`predict` from L samples from $\hat{p}(\mathbf{x}_{1:N}^{1:L} | y_{1:N})$ (serial)