## Particle filter

t = 2

Sample parents' indices of 2nd generation

$A_1^{(k)} \sim \operatorname{Cat}(W_1^{(1)}, \dots, W_1^{(5)})$				
$oxed{\mathbf{x}_1^{(1)}}$	$oldsymbol{oldsymbol{x}_1^{(2)}}$	$oldsymbol{\mathbf{x}}_1^{(3)}$	$oxed{\mathbf{x}_1^{(4)}}$	$oxed{\mathbf{x}_1^{(5)}}$
0/5	2/5	2/5	0/5	1/5

$$A_1^{(1)} = 2$$
  $A_1^{(2)} = 3$   $A_1^{(3)} = 5$   $A_1^{(4)} = 3$   $A_1^{(5)} = 2$