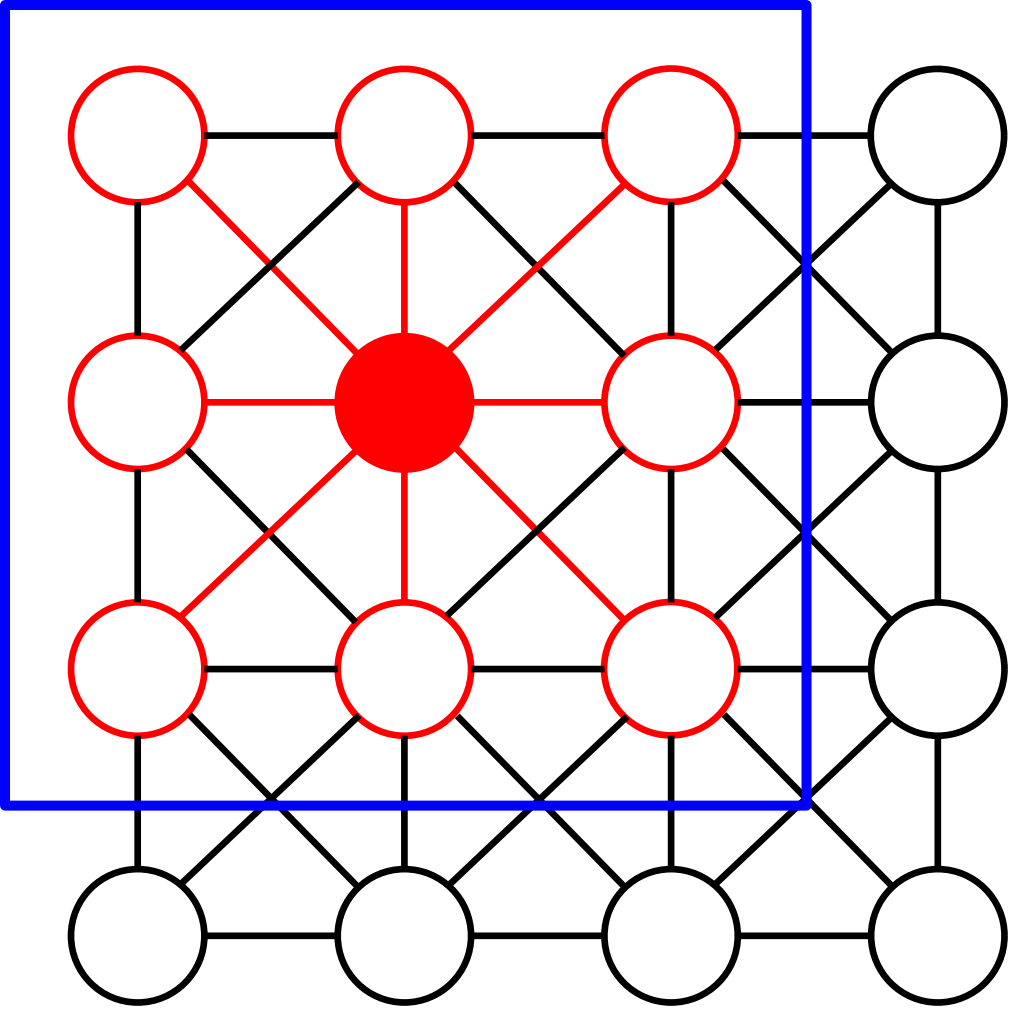
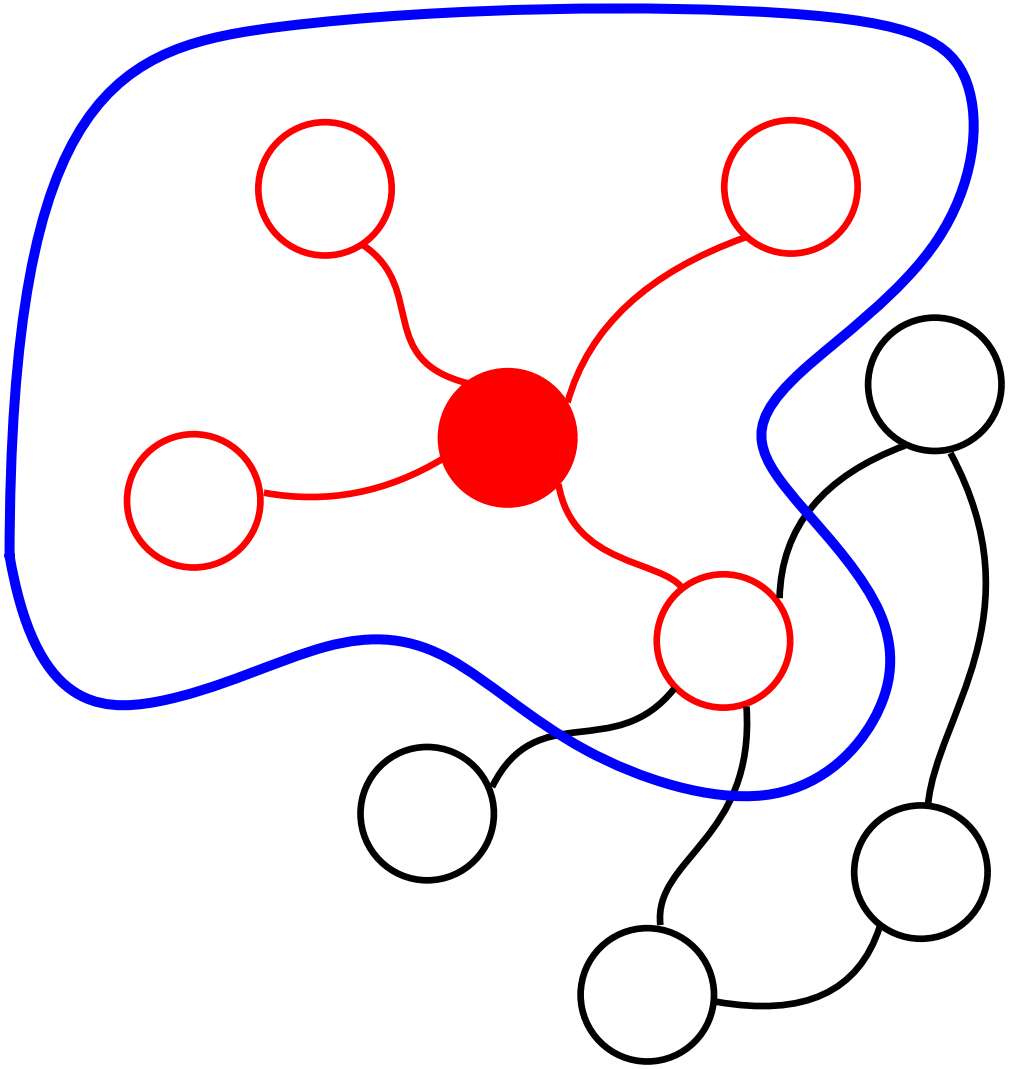
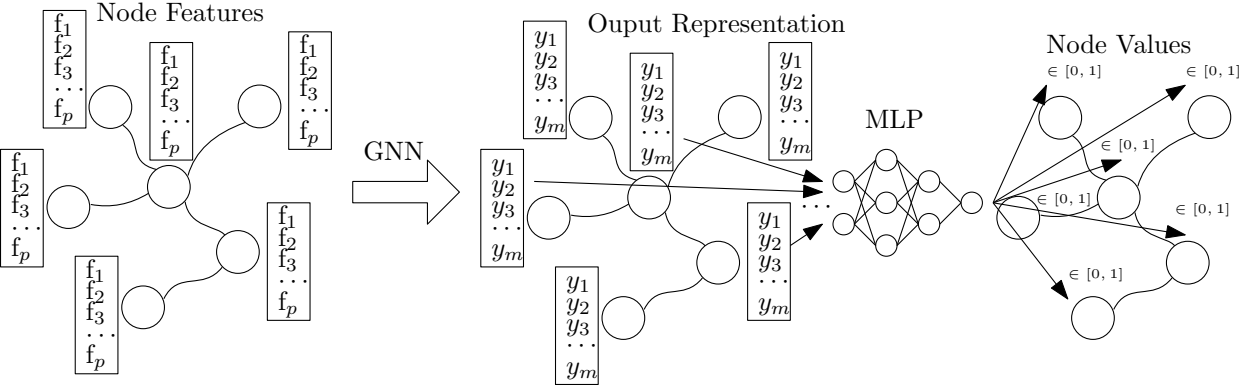
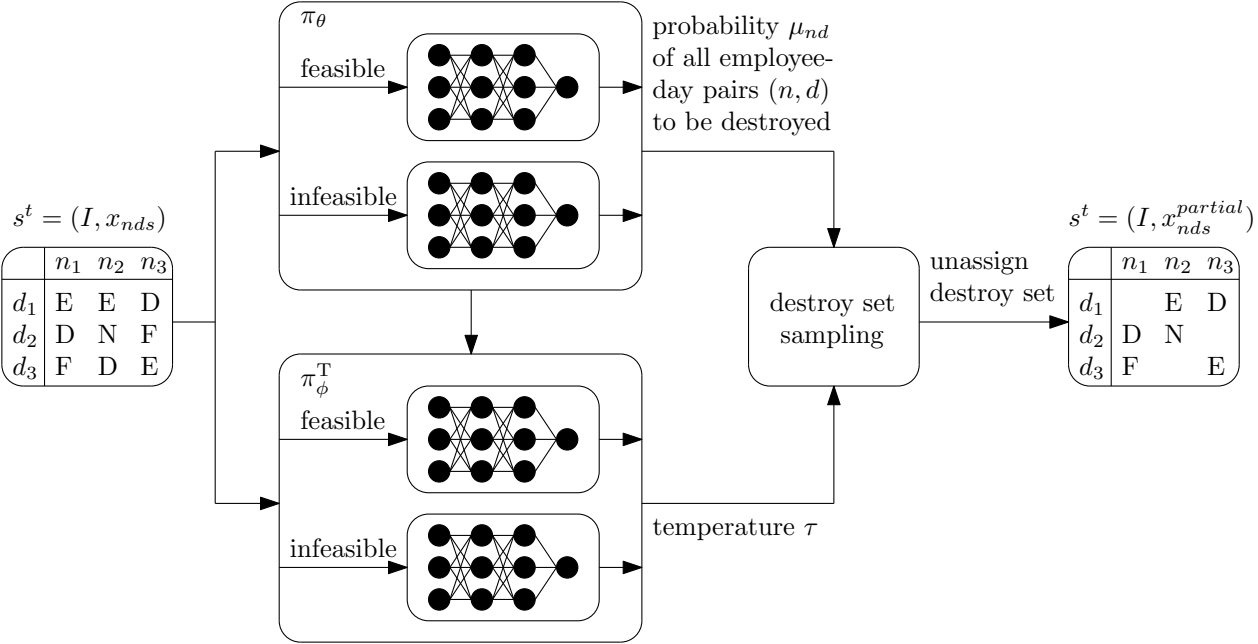
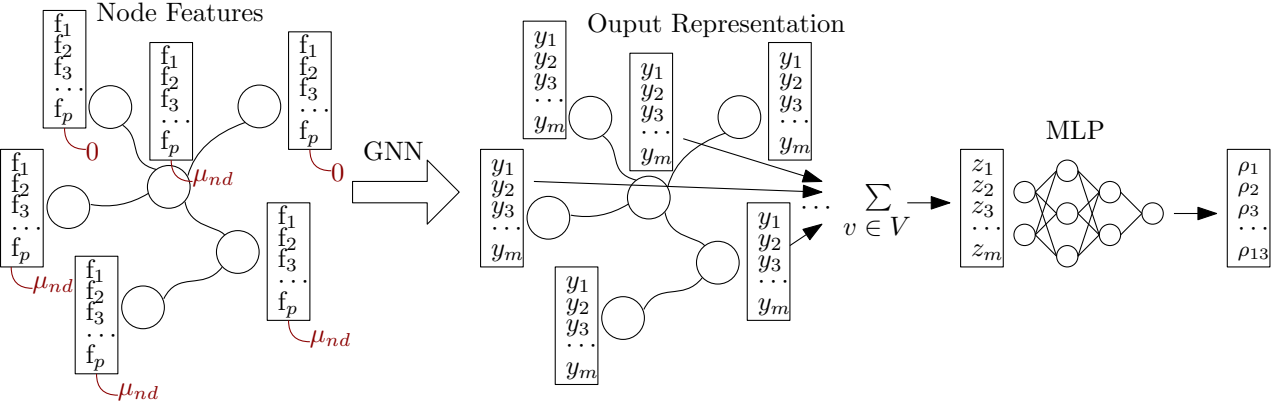
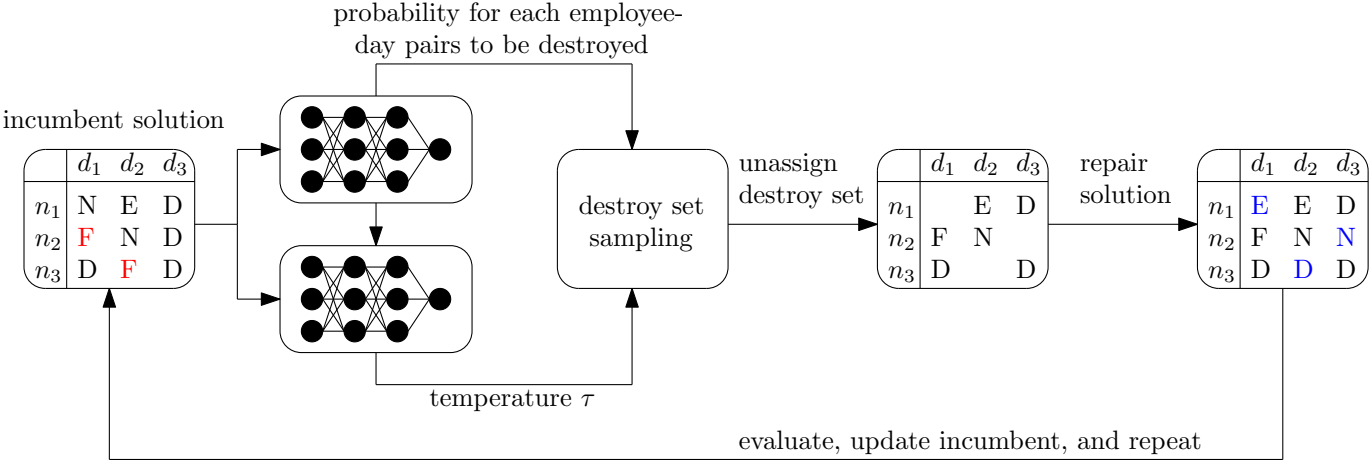


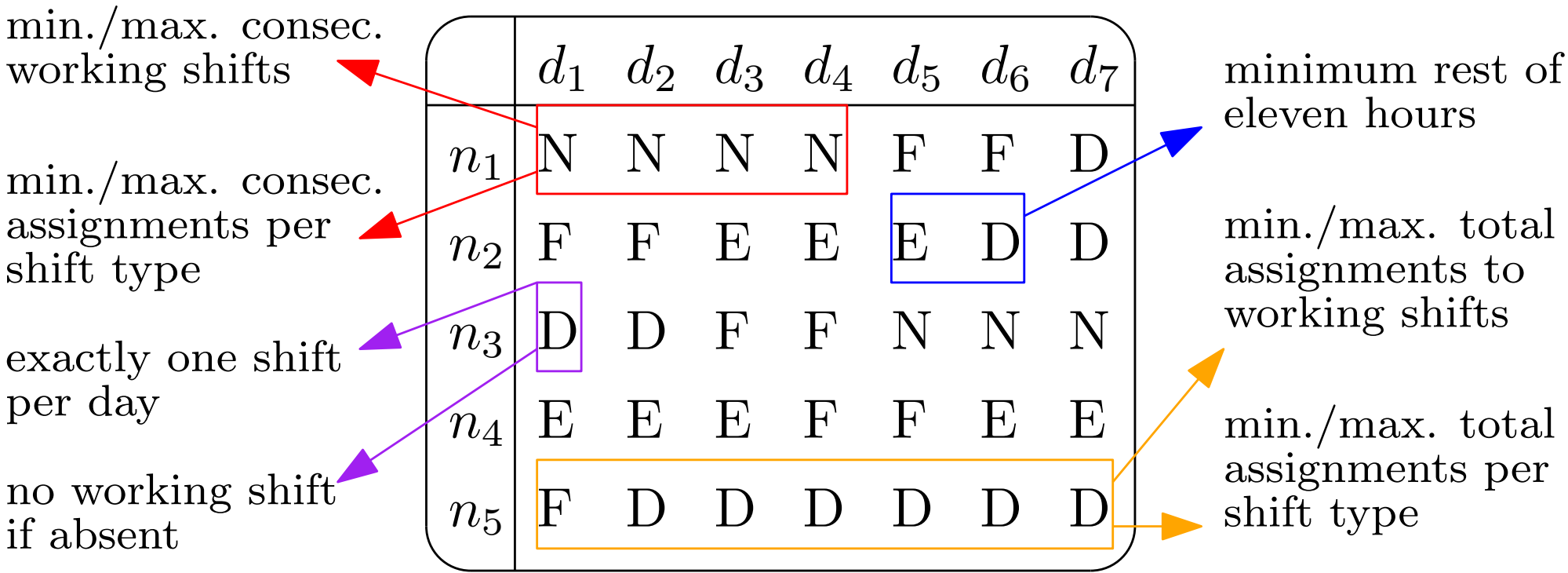



Node Features
GNN
Ouput Representation
MLP
Node Values
∈ [0, 1]
∈ [0, 1]
∈ [0, 1]
∈ [0, 1]
∈ [0, 1]

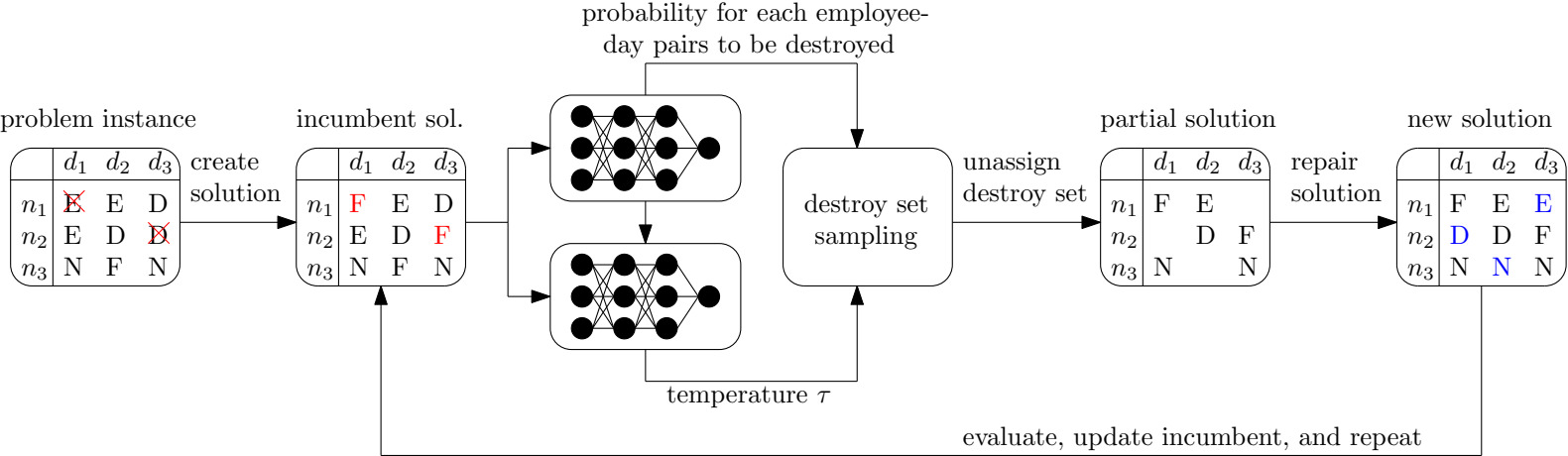

$s^t = (I, x_{nds})$
n_1 n_2 n_3
d_1 E E D
d_2 D N F
d_3 F D E
π_θ
feasible
infeasible
probability μ_{nd} of all employee-day pairs (n, d) to be destroyed
π_ϕ^{T}
feasible
infeasible
temperature τ
destroy set sampling
unassign destroy set
$s^t = (I, x_{nds}^{partial})$
n_1 n_2 n_3
d_1 E D
d_2 D N
d_3 F E

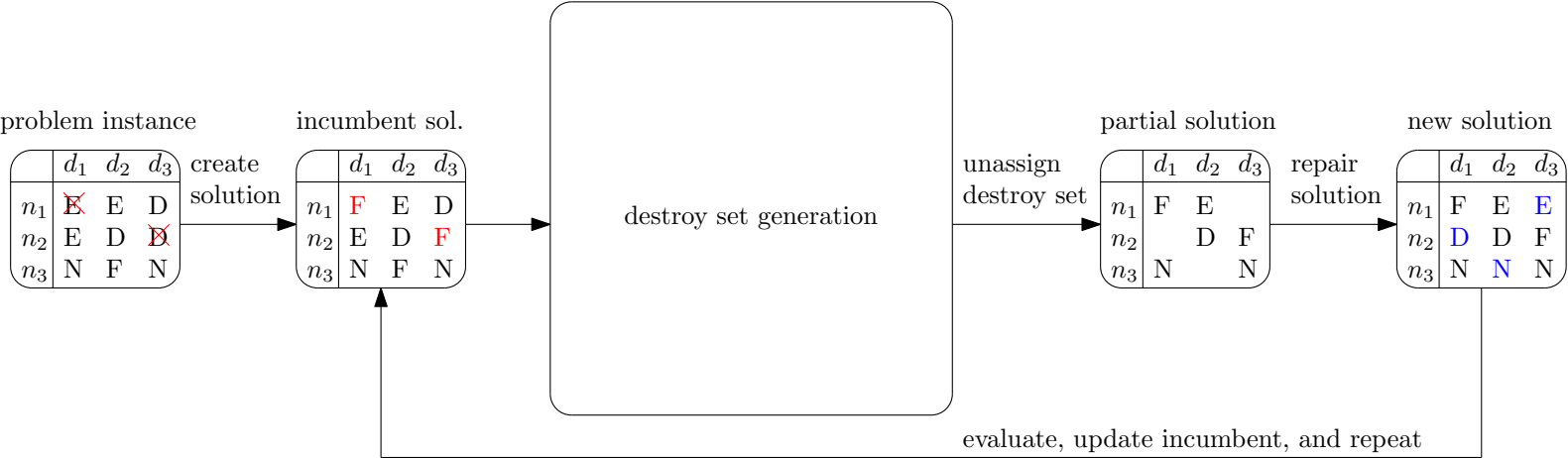

Node Features
GNN
Ouput Representation
MLP
$\sum_{v \in V}$
μ_{nd}
0

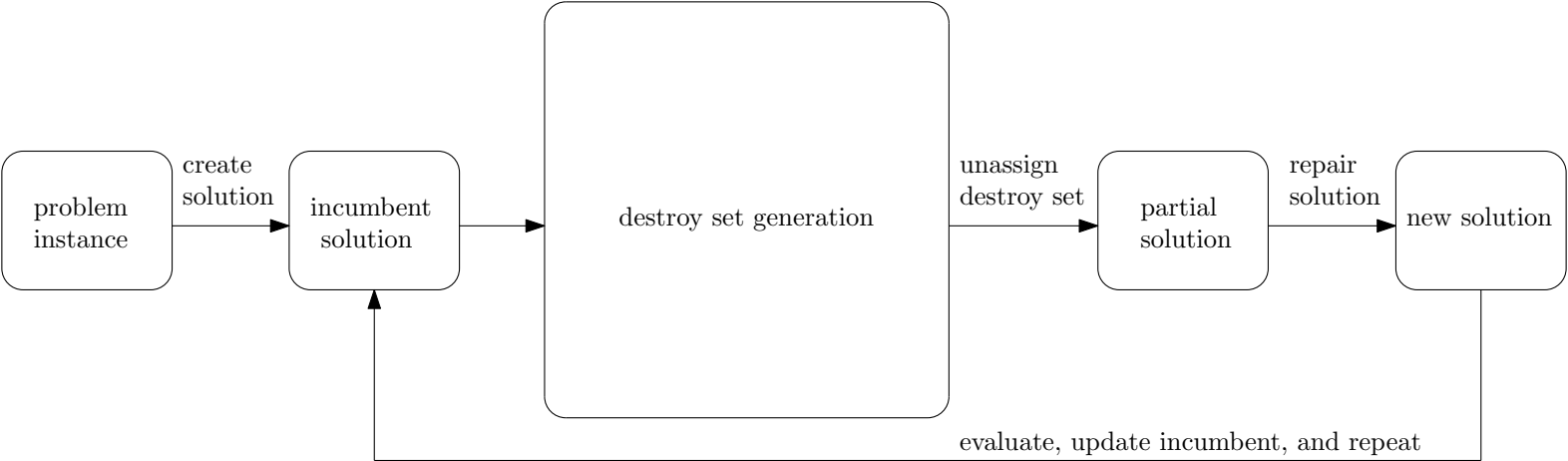

probability for each employee-day pairs to be destroyed
incumbent solution
destroy set sampling
unassign destroy set
repair solution
temperature τ
evaluate, update incumbent, and repeat


min./max. consec. working shifts
min./max. consec. assignments per shift type
exactly one shift per day
no working shift if absent
d_1 d_2 d_3 d_4 d_5 d_6 d_7
n_1 N N N N F F D
n_2 F F E E E D D
n_3 D D F F N N N
n_4 E E E F F E E
n_5 F D D D D D D
minimum rest of eleven hours
min./max. total assignments to working shifts
min./max. total assignments per shift type

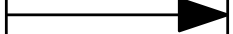
	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	~~N~~	~~N~~	~~N~~	N	F	F	D
n_2	F	F	E	E	E	~~E~~	E
n_3	D	D	F	F	N	N	N


probability for each employee-day pairs to be destroyed
problem instance
create solution
incumbent sol.
destroy set sampling
unassign destroy set
partial solution
repair solution
new solution
temperature τ
evaluate, update incumbent, and repeat
d_1 d_2 d_3
n_1 E E D
n_2 E D D
n_3 N F N
n_1 F E D
n_2 E D F
n_3 N F N
n_1 F E
n_2 D F
n_3 N N
n_1 F E E
n_2 D D F
n_3 N N N

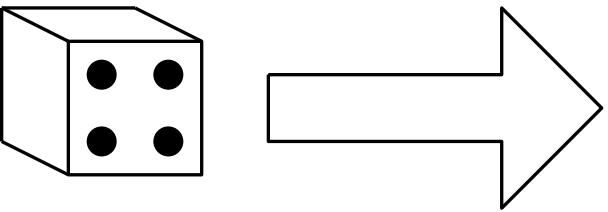

problem instance
create solution
incumbent sol.
destroy set generation
unassign destroy set
partial solution
repair solution
new solution
evaluate, update incumbent, and repeat


problem instance
create solution
incumbent solution
destroy set generation
unassign destroy set
partial solution
repair solution
new solution
evaluate, update incumbent, and repeat

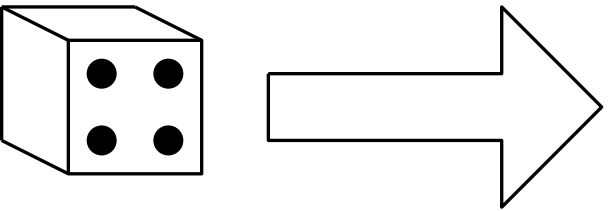
	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	~~N~~	~~N~~	~~N~~	N	F	F	D
n_2	F	F	E	E	E	~~E~~	E
n_3	D	D	F	F	N	N	N
n_4	E	~~E~~	E	F	F	E	E
n_5	F	D	D	D	~~D~~	~~D~~	D



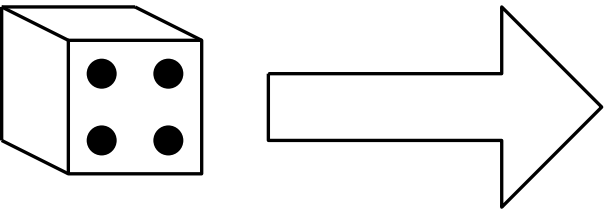
	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	F	F	F	N	F	F	D
n_2	F	F	E	E	E	F	E
n_3	D	D	F	F	N	N	N
n_4	E	F	E	F	F	E	E
n_5	F	D	D	D	F	F	D



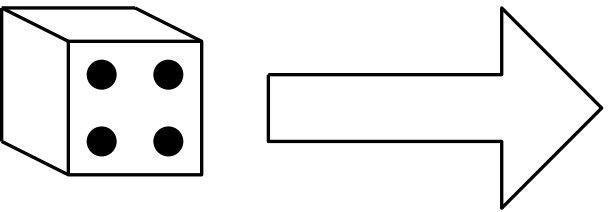
	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	~~N~~	~~N~~	~~N~~	N	F	F	D
n_2	F	F	E	E	E	~~E~~	E
n_3	D	D	F	F	N	N	N
n_4	E	~~E~~	E	F	F	E	E
n_5	F	D	D	D	~~D~~	~~D~~	D



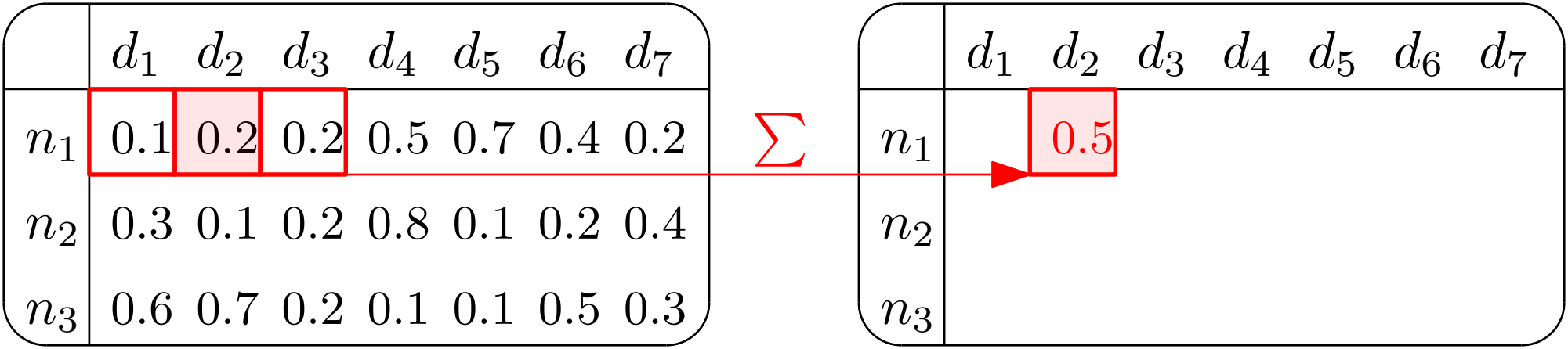
	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	~~N~~	~~N~~		N	F	F	D
n_2	F	F	E	E	E		E
n_3	D	D	F		N	N	N
n_4	E		E	F	F	E	
n_5	F	D	D	D		~~D~~	D

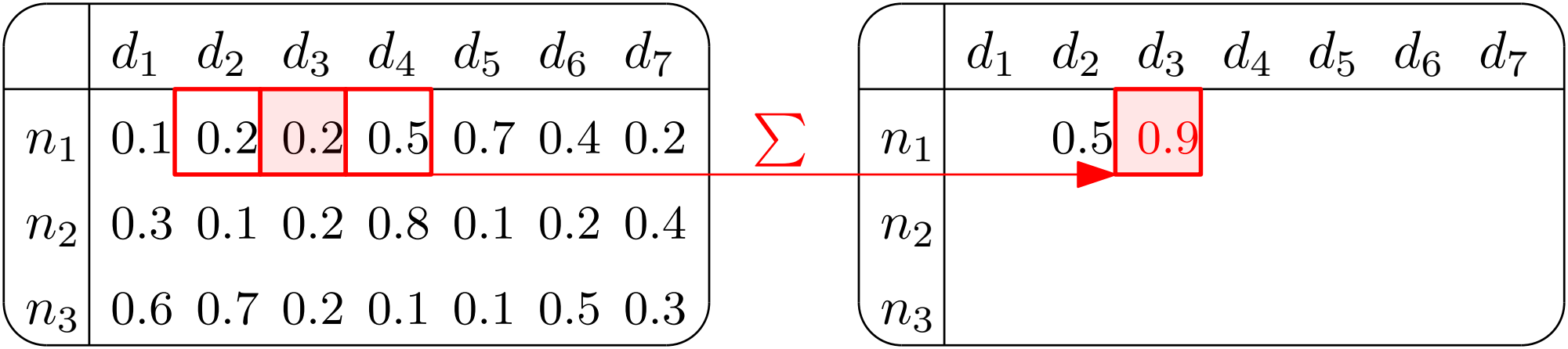


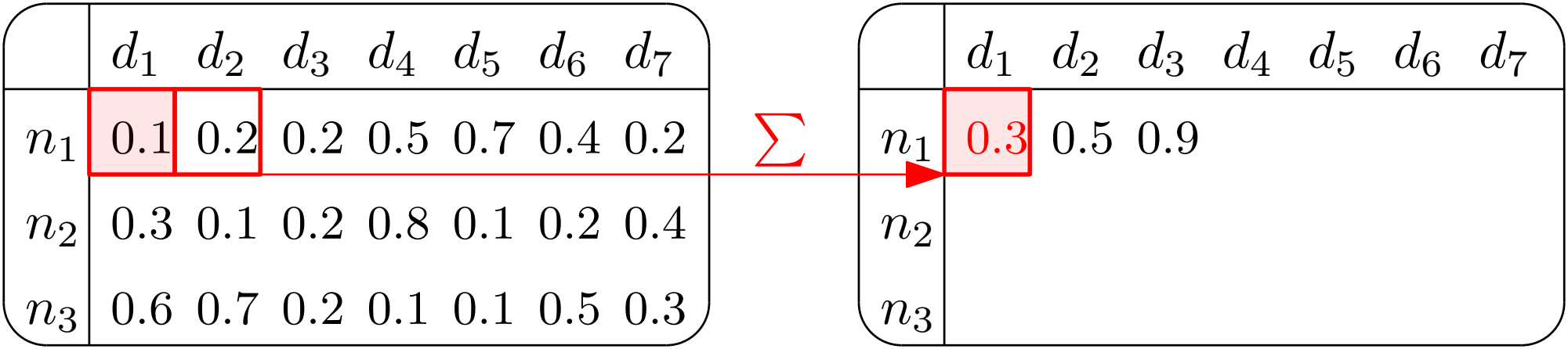
	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	~~N~~	~~N~~	~~N~~	N	F	F	D
n_2	F	F	E	E	E	~~E~~	E
n_3	D	D	F	F	N	N	N
n_4	E	~~E~~	E	F	F	E	E
n_5	F	D	D	D	~~D~~	~~D~~	D

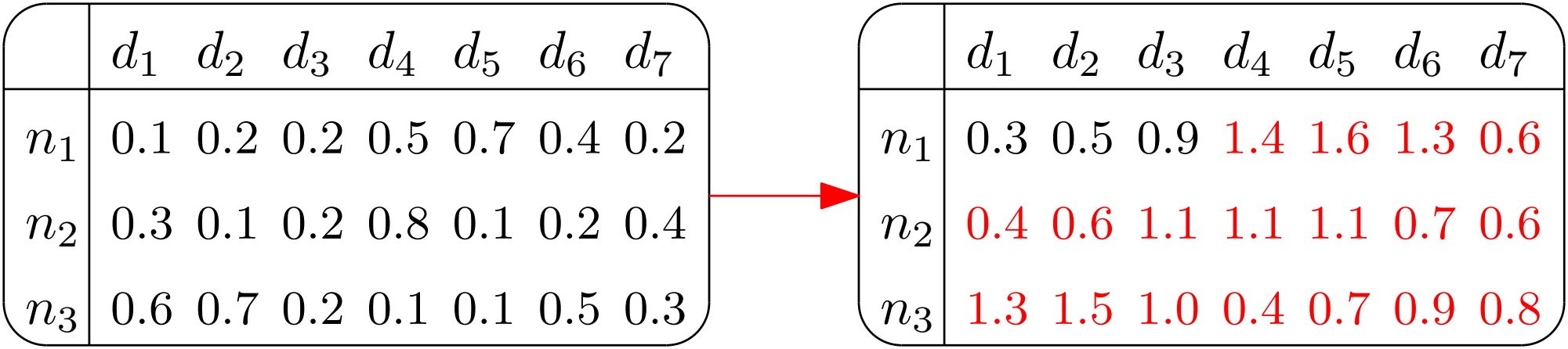


	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	~~N~~	~~N~~	~~N~~	N	F	F	D
n_2	F	F	E	E			
n_3	D	D	F	F	N	N	N
n_4				F	F	E	E
n_5	F	D	D	D	~~D~~	~~D~~	D

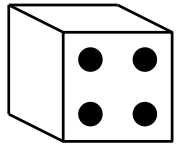

d_1 d_2 d_3 d_4 d_5 d_6 d_7
n_1 0.1 0.2 0.2 0.5 0.7 0.4 0.2
n_2 0.3 0.1 0.2 0.8 0.1 0.2 0.4
n_3 0.6 0.7 0.2 0.1 0.1 0.5 0.3
$\sum$
d_1 d_2 d_3 d_4 d_5 d_6 d_7
n_1 0.5
n_2
n_3


d_1 d_2 d_3 d_4 d_5 d_6 d_7
n_1 0.1 0.2 0.2 0.5 0.7 0.4 0.2
n_2 0.3 0.1 0.2 0.8 0.1 0.2 0.4
n_3 0.6 0.7 0.2 0.1 0.1 0.5 0.3
$\sum$
d_1 d_2 d_3 d_4 d_5 d_6 d_7
n_1 0.5 0.9
n_2
n_3


d_1 d_2 d_3 d_4 d_5 d_6 d_7
n_1 0.1 0.2 0.2 0.5 0.7 0.4 0.2
n_2 0.3 0.1 0.2 0.8 0.1 0.2 0.4
n_3 0.6 0.7 0.2 0.1 0.1 0.5 0.3
$\sum$
d_1 d_2 d_3 d_4 d_5 d_6 d_7
n_1 0.3 0.5 0.9
n_2
n_3

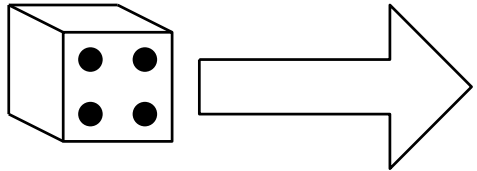

d_1 d_2 d_3 d_4 d_5 d_6 d_7
n_1 0.1 0.2 0.2 0.5 0.7 0.4 0.2
n_2 0.3 0.1 0.2 0.8 0.1 0.2 0.4
n_3 0.6 0.7 0.2 0.1 0.1 0.5 0.3
d_1 d_2 d_3 d_4 d_5 d_6 d_7
n_1 0.3 0.5 0.9 1.4 1.6 1.3 0.6
n_2 0.4 0.6 1.1 1.1 1.1 0.7 0.6
n_3 1.3 1.5 1.0 0.4 0.7 0.9 0.8

random selection
proportional to weights



	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	0.3	0.5	0.9	1.4	1.6	1.3	0.6
n_2	0.4	0.6	1.1	1.1	1.1	0.7	0.6
n_3	1.3	1.5	1.0	0.4	0.7	0.9	0.8

random selection
proportional to weights

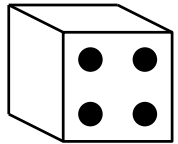


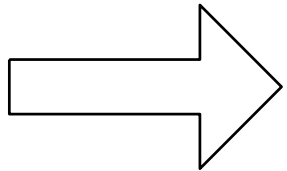
	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	0.3	0.5	0.9	1.4	1.6	1.3	0.6
n_2	0.4	0.6	1.1	1.1	1.1	0.7	0.6
n_3	1.3	1.5	1.0	0.4	0.7	0.9	0.8

update underlying weights

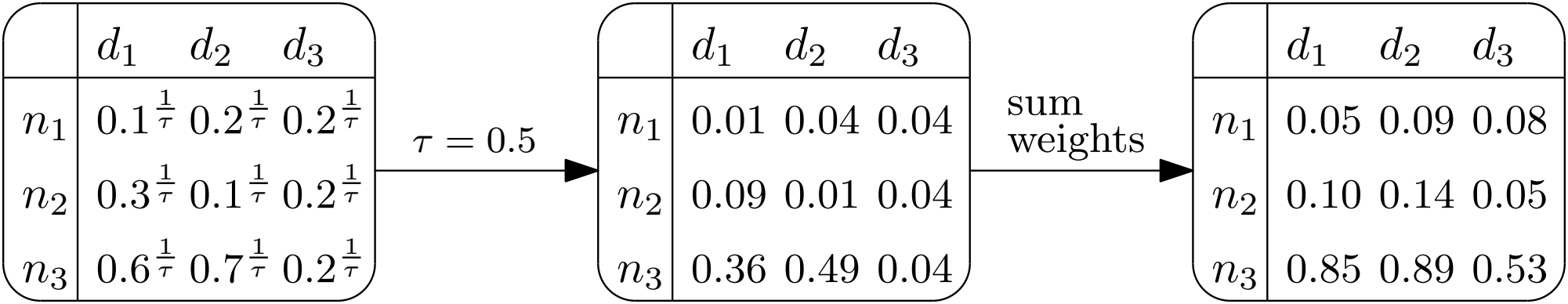
	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	0.3	0.5	0.4	0.0	0.0	0.0	0.2
n_2	0.4	0.6	1.1	1.1	1.1	0.7	0.6
n_3	1.3	1.5	1.0	0.4	0.7	0.9	0.8

random selection
proportional to weights





	d_1	d_2	d_3	d_4	d_5	d_6	d_7
n_1	0.3	0.5	0.4	0.0	0.0	0.0	0.2
n_2	0.4	0.6	1.1	1.1	1.1	0.7	0.6
n_3	1.3	1.5	1.0	0.4	0.7	0.9	0.8


d_1 d_2 d_3
n_1 $0.1^{\frac{1}{\tau}}$ $0.2^{\frac{1}{\tau}}$ $0.2^{\frac{1}{\tau}}$
n_2 $0.3^{\frac{1}{\tau}}$ $0.1^{\frac{1}{\tau}}$ $0.2^{\frac{1}{\tau}}$
n_3 $0.6^{\frac{1}{\tau}}$ $0.7^{\frac{1}{\tau}}$ $0.2^{\frac{1}{\tau}}$
$\tau = 0.5$
d_1 d_2 d_3
n_1 0.01 0.04 0.04
n_2 0.09 0.01 0.04
n_3 0.36 0.49 0.04
sum weights
d_1 d_2 d_3
n_1 0.05 0.09 0.08
n_2 0.10 0.14 0.05
n_3 0.85 0.89 0.53

	d_1	d_2	d_3	d_4	d_5	d_6	d_7
E	0	0	1	1	1	1	1
D	1	1^{+1}	0	0^{+1}	0	0	1
N	1	1	1	1	1_{-1}	1	1