

# Example for bucket elimination algorithm

What are the most probable values for all variables such that a person doesn't catch dyspnea?

$$P(\alpha) = (0.01, 0.99)$$

$\tau$	$\alpha$	$P(\alpha)$	$P(\tau \alpha)$	$H_\alpha(\tau)$
T	T	0.01	0.05	0.0099
T	F	0.99	0.01	
F	T	0.01	0.95	0.9801
F	F	0.99	0.99	

$\tau$	$\beta$	$\lambda$	$\epsilon$	$P(\epsilon \tau, \lambda)$	$H_\delta(\epsilon, \beta)$	$H_\epsilon(\epsilon)$	$H_\epsilon(\tau, \beta, \lambda)$
T	T	T	T	1	0.1	0.98	0.098
T	T	T	F	0	0.2	0.95	
T	T	F	T	1	0.1	0.98	0.098
T	T	F	F	0	0.2	0.95	
T	F	T	T	1	0.3	0.98	0.294
T	F	T	F	0	0.9	0.95	
T	F	F	T	1	0.3	0.98	0.294
T	F	F	F	0	0.9	0.95	
F	T	T	T	1	0.1	0.98	0.098
F	T	T	F	0	0.2	0.95	
F	T	F	T	0	0.1	0.98	0.190
F	T	F	F	1	0.2	0.95	
F	F	T	T	1	0.3	0.98	0.294
F	F	T	F	0	0.9	0.95	
F	F	F	T	0	0.3	0.98	0.855
F	F	F	F	1	0.9	0.95	

$\epsilon$	$\xi$	$P(\xi \epsilon)$	$H_\xi(\epsilon)$
T	T	0.98	0.98
T	F	0.02	
F	T	0.05	0.95
F	F	0.95	

$\delta=F$	$\epsilon$	$\beta$	$H_\delta(\epsilon, \beta) = P(\delta=F \epsilon, \beta)$
F	T	T	0.1
F	T	F	0.3
F	F	T	0.2
F	F	F	0.9

$\tau$	$\beta$	$\sigma$	$P(\beta \sigma)$	$P(\sigma)$	$H_\lambda(\tau, \beta, \sigma)$	$H_\sigma(\tau, \beta)$
T	T	T	0.6	0.5	0.0882	0.02646
T	T	F	0.3	0.5	0.09702	
T	F	T	0.4	0.5	0.2646	0.101871
T	F	F	0.7	0.5	0.29106	
F	T	T	0.6	0.5	0.171	0.0513
F	T	F	0.3	0.5	0.1881	
F	F	T	0.4	0.5	0.7695	0.2962575
F	F	F	0.7	0.5	0.84645	

$\tau$	$\beta$	$\sigma$	$\lambda$	$P(\lambda \sigma)$	$H_\epsilon(\tau, \beta, \lambda)$	$H_\lambda(\tau, \beta, \sigma)$
T	T	T	T	0.1	0.098	0.0882
T	T	T	F	0.9	0.098	
T	T	F	T	0.01	0.098	0.09702
T	T	F	F	0.99	0.098	
T	F	T	T	0.1	0.294	0.2646
T	F	T	F	0.9	0.294	
T	F	F	T	0.01	0.294	0.29106
T	F	F	F	0.99	0.294	
F	T	T	T	0.1	0.098	0.171
F	T	T	F	0.9	0.190	
F	T	F	T	0.01	0.098	0.1881
F	T	F	F	0.99	0.190	
F	F	T	T	0.1	0.294	0.7695
F	F	T	F	0.9	0.855	
F	F	F	T	0.01	0.294	0.84645
F	F	F	F	0.99	0.855	

$\tau$	$\beta$	$H_\sigma(\tau, \beta)$	$H_\beta(\tau)$
T	T	0.02646	0.101871
T	F	0.101871	
F	T	0.0513	0.2962575
F	F	0.2962575	

$\tau$	$H_\alpha(\tau)$	$H_\beta(\tau)$	$H_\alpha(\tau) * H_\beta(\tau)$	MPE probability
T	0.0099	0.101871	0.0010085229	0.29036197575
F	0.9801	0.2962575	0.29036197575	

$$T' = 0.29036197575 = F \quad \sigma' = 0.2962575 = F \quad \epsilon' = 0.855 = F$$

$$\xi' = 0.95 = F$$

$$B' = 0.2962575 = F$$

$$\lambda' = 0.84645 = F$$

$$\delta' = F$$

$$\alpha' = 0.9801 = F$$

