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Assignment 4 Question 3:

Separation Example:

R = Central Obesity , A = Gender, Y = Hyperlipidemia

$R \perp A \mid Y$

CentralObesity ⊥ Gender | Hyperlipidemia

CentralObesity	Hyperlipidemia	Gender	P(co|hl,gd)
YES	YES	Male	0.7877
YES	YES	Female	0.7877
YES	NO	Male	0.5832
YES	NO	Female	0.5832
NO	YES	Male	0.2123
NO	YES	Female	0.2123
NO	NO	Male	0.4168
NO	NO	Female	0.4168

While Sufficiency does not hold

Hyperlipidemia	CentralObesity	Gender	P(hl|co,gd)
YES	YES	Male	0.5153
YES	YES	Female	0.4381
YES	NO	Male	0.2862
YES	NO	Female	0.2272
NO	YES	Male	0.4847
NO	YES	Female	0.5619
NO	NO	Male	0.7138
NO	NO	Female	0.7728

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Sufficiency Example:

R = Hyperlipidemia, A = Gender, Y = Region,

$Y \perp A \mid R$

Region ⊥ Gender | Hyperlipidemia

Region	Hyperlipidemia	Gender	P(rg|hl,gd)
City	YES	Male	0.4968
City	YES	Female	0.4968
City	NO	Male	0.4678
City	NO	Female	0.4678
Countryside	YES	Male	0.5032
Countryside	YES	Female	0.5032
Countryside	NO	Male	0.5322
Countryside	NO	Female	0.5322

While Separation Does not hold

Hyperlipidemia	Region	Gender	P(hl|rg,gd)
YES	City	Male	0.4266
YES	City	Female	0.3531
YES	Countryside	Male	0.4553
YES	Countryside	Female	0.3801
NO	City	Male	0.5734
NO	City	Female	0.6469
NO	Countryside	Male	0.5447
NO	Countryside	Female	0.6199