Q3

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Ex 1: Seperated but not sufficient.

Let A= Gender, C=Diabetes, Y= Hyperlipidemia

Then $A \perp\!\!\!\perp C \mid Y$ but $A \not\perp\!\!\!\perp Y \mid C$.

The following is the joint probabilities table representing

P(Hyperlipidemia, Diabetes, Gender)

Hyperlipidemia	Diabetes	Gender	P(Hyperlipidemia, Diabetes, Gender)
Yes	Yes	Male	$0.405 \times 0.646 \times 0.571 = 0.149$
Yes	Yes	Female	$0.405 \times 0.646 \times 0.429 = 0.112$
Yes	No	Male	$0.405 \times 0.354 \times 0.571 = 0.082$
Yes	No	Female	$0.405 \times 0.354 \times 0.429 = 0.062$
No	Yes	Male	$0.595 \times 0.385 \times 0.494 = 0.113$
No	Yes	Female	$0.595 \times 0.385 \times 0.506 = 0.116$
No	No	Male	$0.595 \times 0.615 \times 0.494 = 0.181$
No	No	Female	$0.595 \times 0.615 \times 0.506 = 0.185$

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Ex 2: Sufficient but <u>not</u> seperated.

Let A= Gender, C= Hyperlipidemia, Y = Central Obesity.

Then $A \perp\!\!\!\perp Y | C$, but $A \not\perp\!\!\!\perp C | Y$.

The following is the joint probabilities table representing:

P(Central Obesity, Hyperlipidemia, Gender)

Central Obesity	Hyperlipidemia	Gender	P(Central Obesity, Hyperlipidemia, Gender)
Yes	Yes	Male	0.666 x 0.479 x 0.571 = 0.182
Yes	Yes	Female	0.666 x 0.479 x 0.429 = 0.137
Yes	No	Male	0.666 x 0.521 x 0.494 = 0.171
Yes	No	Female	0.666 x 0.521 x 0.506 = 0.176
No	Yes	Male	0.334 x 0.258 x 0.571 = 0.049
No	Yes	Female	0.334 x 0.258 x 0.429 = 0.037
No	No	Male	0.334 x 0.742 x 0.494 = 0.122
No	No	Female	0.334 x 0.742 x 0.506 = 0.125