HW 4: Channel capacity
(due October 15th, before tutorial)

1. Given two channels $W_{Y_1|X_1}^1$ and $W_{Y_2|X_2}^2$ with input spaces $X_1, X_2$ and outputs spaces $Y_1, Y_2$. Consider the channel $W_{Y_1,Y_2|X_1,X_2}^{12}$ defined on input space $X_1 \times X_2$ and output space $Y_1 \times Y_2$ and $W_{Y_1,Y_2|X_1,X_2}^{12}(y_1y_2|x_1x_2) = W_{Y_1|X_1}^1(y_1|x_1) \cdot W_{Y_2|X_2}^2(y_2|x_2)$. Compute $C(W^{12}) = \max_{P_{X_1,X_2}} I(X_1,X_2 : Y_1Y_2)$ (where $Y_1Y_2$ is the output of $W^{12}$ when the input is $X_1X_2$) as a function $C(W^1)$ and $C(W^2)$. 