# AI1110: Probability and Random Variables
## Assignment 7

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# Outline

1. Question

2. Solution
   - Data Given from Question
   - Result

# Question

Show that if $AB = \{\phi\}$, then $\Pr(A) \leq \Pr(B')$

# Data Given from Question

Theory

$$Pr(A + B) = Pr(A) + Pr(B) - Pr(AB) \qquad (1)$$

Given,

$$AB = 0 \qquad (2)$$
$$\implies Pr(AB) = 0 \qquad (3)$$

# Result

By (3) and (1),

$$\Pr(A + B) = \Pr(A) + \Pr(B) \leq 1 \tag{4}$$
$$\implies \Pr(A) + 1 - \Pr(B') \leq 1 \tag{5}$$
$$\implies \Pr(A) \leq \Pr(B') \tag{6}$$

By (6), Proved.