This was a question I had on an interview with FB on 1/16/14 with John Maier.

- You have 100 marbles, 1/2 are red, and the other 1/2 are blue.
- Place the balls in 2 bags such that you maximize the probability of picking a blue ball.
- Assume the probability of picking each bag is the same

P(blue) = P(blue | bag1)P(bag1) + P(blue | bag2)P(bag2)
$= 1\frac{}{2\times[P(blue|bag1)+P(blue|bag2)]}$ So we want to maximize P(blue | bag1) + P(blue | bag2)
Caution: Don't assume you have the same number of balls in each bag! define
b = number of blue balls in bag 1
r = number of red balls in bag 1
P(blue | bag1) = $b\frac{}{b+rP(blue|bag2)=\frac{50-b}{(50-b)+(50-r)}}$