

For the next generation:

$$f(G_1) = f(G_1 G_1) + \frac{1}{2} f(G_1 G_2)$$

$$= p^2 + \frac{1}{2} [2 \cdot p \cdot q]$$

$$= p^2 + p \cdot q = p \underbrace{(p+q)}_{=1} = p$$

$$f(G_2) = f(G_2 G_2) + \frac{1}{2} f(G_1 G_2)$$

$$= q^2 + \frac{1}{2} [2 \cdot p \cdot q] = q$$

Under HWE: Allele frequencies and genotype frequencies are constant over generations!
