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SDS 383 D - Statistical Modeling 2  
Homework

**Exercise 1**

$$X_1, \dots, X_n \sim \text{Bernoulli}(p), \quad h(p) \sim \text{Beta}(\alpha, \beta)$$

$$\begin{aligned} p|X_1, \dots, X_N &\propto f(x_1, \dots, x_n|p) \cdot h(p) \\ &\propto p^{\sum x_i} (1-p)^{n-\sum x_i} \cdot p^{\alpha-1} (1-p)^{\beta-1} \\ &\propto p^{\sum x_i + \alpha - 1} (1-p)^{\beta + n - \sum x_i - 1} \end{aligned}$$

$$p|X_1, \dots, X_N \sim \text{Beta}(\sum x_i + \alpha, \beta + n - \sum x_i)$$

**Exercise 2**