Practice Problems 10

Primal Problem Consider the optimization problem:

$$V(A, b, c) = \max_x c'x \text{ s.t. } Ax \leq b,\ x \geq 0$$

where $x, c \in \mathbb{R}^n$, $A \in \mathbb{R}^{mxn}$ and $b \in \mathbb{R}^m$.

1. Consider you have a bakery that makes and sell bread and cake. Each bread is sold at 1\$, each cake is sold at 1\$. To make each bread, you need 1 ounce flour and 0.5 egg and to make a cake you need 0.5 ounce flour, 1 egg. Now you have 10 ounce flour, 15 eggs and you want to maximize your revenue, how much bread and cake you should make (fractions allowed)?

   Dual Problem The dual problem is

   $$W(A, b, c) = \min_\lambda b'\lambda$$

   s.t. $A'\lambda \geq c$, $\lambda \geq 0$

2. What's the dual problem of the example above? What's the meaning of λ?