Problem Set 8

1. (**Salience I**)

   Consider the model of salience and competition from the lecture. Let $x \in \{p, q\}$ be an attribute with average value $\bar{x}$ as explained in the lecture.

   (a) Prove that the function

   $$\sigma(x, \bar{x}) = \frac{|x - \bar{x}|}{\bar{x}}$$

   is a salience function that verifies the defining properties "zero homogeneity" and "ordering". State a verbal interpretation of this function.

   (b) Prove that if $\sigma(x, \bar{x})$ is a salience function, then the salience of attribute x is an increasing function of the percentage difference between x and $\bar{x}$. That is: If $\frac{x' - \bar{x}'}{\bar{x}'} > \frac{x - \bar{x}}{\bar{x}}$ then $\sigma(x', \bar{x}') > \sigma(x, \bar{x})$.

2. (**Salience II**) Consider the salience model with price competition from the lecture. There are two firms $j \in \{1, 2\}$, where quality levels verify $q_1 > q_2$ and unit costs verify $c_1 \geq c_2$, such that firm $j = 1$ is the high-quality firm. Let the salience parameter $\delta \in (0, 1)$ satisfy

   $$\delta(c_1 - c_2) < q_1 - q_2 < \frac{c_1 - c_2}{\delta}$$

   (a) Let $\frac{q_1}{c_1} > \frac{q_2}{c_2}$. Show that a quality-salient equilibrium exists, where only firm $j = 1$ makes positive profits ($j = 2$ sets $p_2 = c_2$) and

   $$p_1 = \min \left\{ \frac{q_1}{q_2} c_2, \frac{q_1 - q_2}{\delta} + c_2 \right\}$$

   (b) Suppose that $q_1 - c_1 > q_2 - c_2$ and $\frac{q_1}{c_1} > \frac{q_2}{c_2}$. Prove that firm $j = 1$ makes *less* profits in the salience equilibrium compared to the rational benchmark model (where $\delta = 1$). Why does such a *pro-competitive effect* of salience emerge?