Q1 b) Counterfactual

- for the sale of every croissant

$x(\text{roll}) \geq f(\text{croissant})$

c) Profit 62.2 making $17.\overline{7}$ croissants

counterfactual

Profit $45.\overline{3}$ making $10.\overline{6}$ rolls & croissants

Q2 a) indices i: index for machines $i \in \{x1, x2\}$

j: index for jellybean colors, $j \in \{$yellow, blue, green, orange, purple$\}$

Parameters

R_j net revenue for jelly bean color j ($/bean)

Hmax: Max available hours per machine per week (40 hrs/wk)

Prate: production rate of each machine (100 beans/hr)

Qmax: Max production ~~[illegible]~~ quantity per machine per week, Hmax · Prate = (4000 beans/week)

Decision Variable

x_{ij}: the quantity of jellybeans of color j to produce on machine i

Objective Function

Z = net revenue Max $Z = \sum_{i \in \{x_1, x_2\}} \sum_{j \in \text{colors}} R_j \cdot x_{ij}$

Constraints

- Each machine cannot exceed its weekly production capacity

$\sum_{j \in \text{colors}} x_{ij} \leq Q_{max} \quad \forall i \in \{x_1, x_2\}$

The quantity produced must be non-negative

$x_{ij} \geq 0$