NON-CONFIGURABLES

p_{mean}: mean unit price
p_{std}: unit price standard deviation
q_{mean}: mean product quality
q_{std}: product quality standard deviation
q_{max}: maximum product quality
ρ: price quality correlation, range: [0, 1]
$c_{resources}$: cost of resources to produce an unit
$c_{logistics}$: logistics cost to store/produce/transport/sell an unit
$c_{best\_equipment}$: cost of best equipments
c_{best_worker}: wage of best workers
$c_{best\_architect}$: cost of best architects designing production facilities
$c_{best\_constractor}$; cost of best contractors building production facilities
$c_{most\_marketing}$: marketing spending that would enable full coverage
$c_{best\_research}$: R&D spending that would result in maximum product quality
n_{market}: market size
$n_{equipment\_per\_unit}$: number of equipments needed to produce an unit
$n_{worker\_per\_unit}$: number of workers needed to produce an unit
w_{emit}: carbon emmission per unit produced (in kgs)
w_{waste}: industrial waste per unit produced (in kgs):
c_{emit}: emmision cost per kg
c_{waste}: waste disposal cost per kg

CONFIGURABLES

p: unit price
$n_{equipment}$: number of equipments to buy
$q_{equipment}$: equipment quality, range: [0, 1]
n_{worker}: number of workers to hire
c_{worker}: wage of workers being hired
$s_{marketing}$: marketing budget
$s_{research}$: R&D spending
s_{design}: facility design spending
$s_{construction}$: facility construction spending

PROFIT ESTIMATION

worker skill level: $q_{worker} = \min\left(\dfrac{c_{worker}}{c_{best\_worker}}, 1\right)$
product quality: $q = \max(\min(s_{research}, 1) \cdot q_{max}, 1) \cdot q_{equipment} \cdot q_{worker}$
facility efficiency: $q_{facility} = \min\left(\dfrac{s_{design}}{c_{best\_architect}} \cdot \dfrac{s_{construction}}{c_{best\_constractor}}, 1\right)$
quantity produced: $n_{product} = floor\left(q_{facility} \cdot \min\left(\dfrac{n_{equipment}}{n_{equipment\_per\_unit}}, \dfrac{n_{worker}}{n_{worker\_per\_unit}}, 1\right)\right)$
equipments cost: $s_{equipment} = n_{equipment} \cdot q_{equipment} \cdot c_{best\_equipment}$
facility cost: $s_{facility} = s_{design} + s_{construction} + s_{equipment}$
payroll: $s_{worker} = n_{worker} \cdot c_{worker}$
logistics cost: $s_{logistics} = n_{product} \cdot c_{logistics}$
manufacture cost: $s_{manufacture} = c_{resources} \cdot$
operating cost: $s_{operating} = s_{manufacture} + s_{worker} + s_{logistics}$
enviromental cost: $s_{enviromental} = n_{product} \cdot (w_{emit} \cdot c_{emit} + w_{waste} \cdot c_{waste})$

$$\%\_\mathrm{sat} = \int_{-\infty}^{q}\int_{p}^{\infty} \frac{1}{2\pi p_{std}\, q_{std}\sqrt{1-\rho^2}} \exp\left(-\frac{1}{2(1-\rho^2)}\left[\left(\frac{x-p_{mean}}{p_{std}}\right)^2 - 2\rho\left(\frac{x-p_{mean}}{p_{std}}\right)\left(\frac{y-q_{mean}}{q_{std}}\right) + \left(\frac{y-q_{mean}}{q_{std}}\right)^2\right]\right) dxdy$$

$$\%\_\mathrm{cover} = \min\left(\frac{s_{marketing}}{s_{most\_marketing}}, 1\right)$$

market demand: $n_{demand} = \%\_\mathrm{sat} \cdot \%\_\mathrm{cover} \cdot n_{market}$
revenue $= p \cdot \min(n_{product}, n_{demand})$
cost $= s_{facility} + s_{research} + s_{operating} + s_{marketing} + s_{enviromental}$
profit = revenue - cost

NON-CONFIGURABLES: Wafer Manufacturing

p_{mean}: \$20,000
p_{std}: \$4,000
q_{mean}: 1.6
q_{std}: 0.2
q_{max}: 2.0
ρ: 0.75
$c_{resources}$: \$2,000
$c_{logistics}$: \$6,000
$c_{best\_equipment}$: \$160,000,000
c_{best_worker}: \$80,000
$c_{best\_architect}$: \$20,000,000
$c_{best\_constractor}$: \$4,000,000,000
$c_{most\_marketing}$: \$30,000,000
$c_{best\_research}$: \$20,000,000,000
n_{market}: 15,000,000
$n_{equipment\_per\_unit}$: 0.00005
$n_{worker\_per\_unit}$: 0.01
w_{emit}: 1 kg
w_{waste}: 200 kgs
c_{emit}: \$0.001
c_{waste}: \$0.05