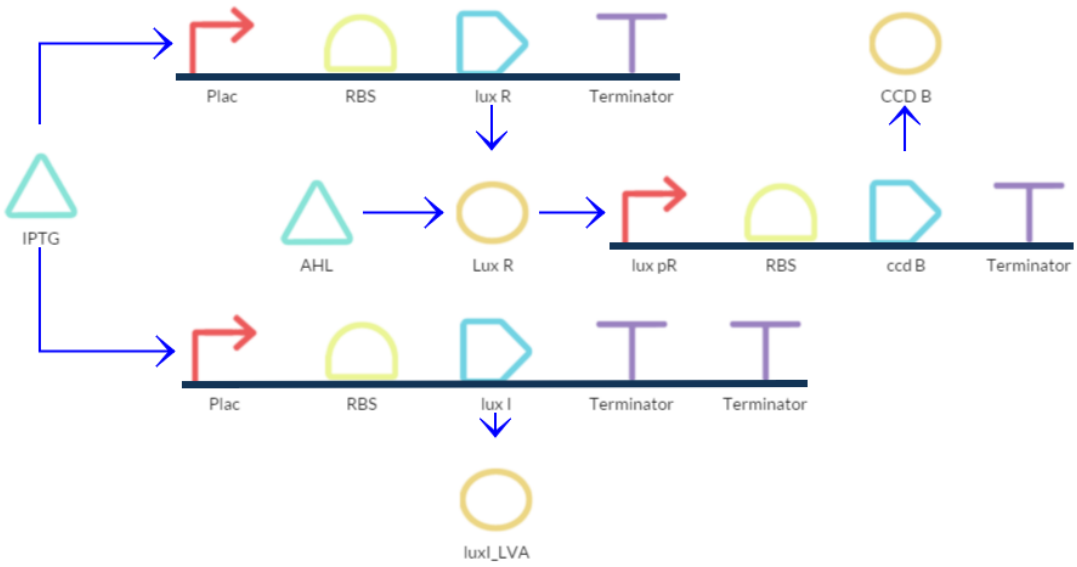
Kill switch



Formulae for two certain parts

$$\frac{d[\text{luxI}-LVA]}{dt} = \chi_{pLac1}\, \text{k}_1[\text{luxI}^F] - \text{d}[\text{LuxI}-\text{LVA}]$$

$$[\text{luxI}^F] = [\text{luxI}]\frac{[\text{IPTG}]^n}{[\text{IPTG}]^n + \chi_{Plac1}K_d}$$

$$\frac{d[\text{luxI}-LVA]}{dt} = k_1[\text{AHL}] - \text{d}[\text{LuxI}-\text{LVA}]$$

$$\frac{d[\text{LuxR}]}{dt} = \chi_{pLac2}k_2[\text{luxR}] - \text{d}[\text{LuxR}]$$

$$\frac{d[\text{LuxR}]}{dt} = k_2[\text{AHL}] - \text{d}[\text{LuxR}]$$

$$\frac{d[\text{CCDB}]}{dt} = \chi_{luxpR_1}k_4[\text{cCDB}^F] - \text{d}[\text{CCDB}]$$

$$[\text{cCDB}^F] = [\text{cCDB}]\frac{1}{1+\left(\frac{[\text{LuxR}]}{K_{LuxR}}\right)^{n_{LuxR}}}$$

Formulae for numerical simulation

$$\frac{d[\text{luxI}-LVA]}{dt} = \chi_{pLac1}\, \text{k}_1[\text{luxI}^F][\text{AHL}] - \text{d}[\text{LuxI}-\text{LVA}]$$

$$[\text{luxI}^F] = [\text{luxI}]\frac{[\text{IPTG}]^n}{[\text{IPTG}]^n + \chi_{Plac1}K_d}$$

$$\frac{d[\text{LuxR}]}{dt} = \chi_{pLac2} k_2 [\text{luxR}][\text{AHL}] - \text{d}[\text{LuxR}]$$

$$\frac{d[\text{CCDB}]}{dt} = \chi_{luxpR_1} k_4 [\text{cCDB}^F] - \text{d}[\text{CCDB}]$$

$$[\text{cCDB}^F] = [\text{cCDB}] \frac{1}{1 + \left(\frac{[\text{LuxR}]}{K_{LuxR}} \right)^{n_{LuxR}}}$$

Parameter Table

Symbols	Parameters	Values and Units
k_1	LUXI-LVA production rate	6.74umol*min^-1
k_2	LuxR production rate	4.69umol*min^-1
k_4	CCDB production rate	5.93umol*min^-1
d	Degradation rate	3.55 s^-1
n	Hill coefficient	3
Kd	IPTG Repression coefficient	3.84
K_LuxR	LuxR Repression coefficient	3.46
n_LuxR	LuxR cooperativity coefficient	2

Reference: http://2011.igem.org/Team:XMU-China/Project/Protocols