Tryptophane sensitive sensor system for switchable production

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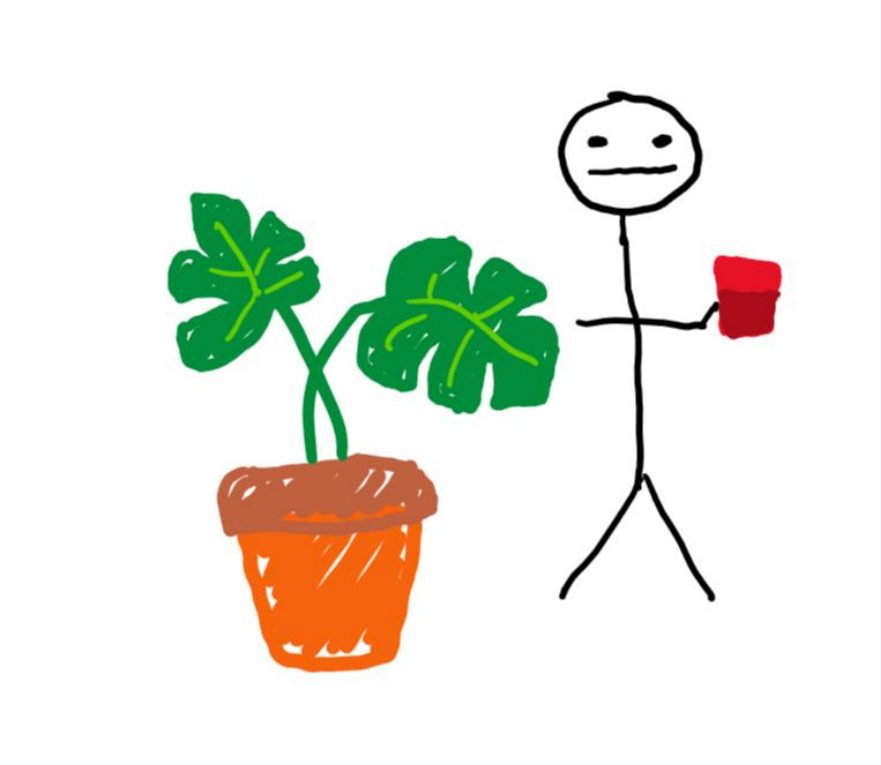
Normal plants are boring



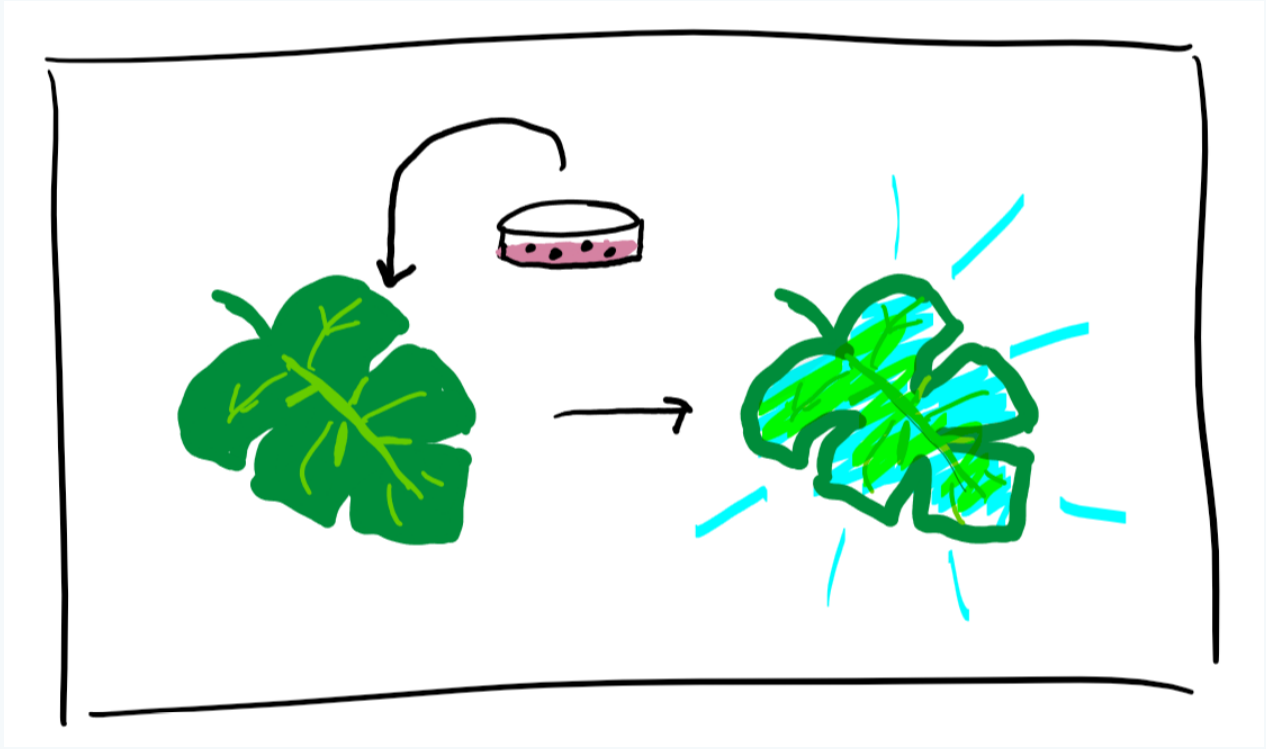
When did anyone ever get in the mood to party from the poorly plants in your crammed studio apartment?

Never.

But what if...

We could make the plant a little bit more interesting?

By letting UV-activated glowing bacteria live on your plant, you could have a neon plant in the flick of a switch!



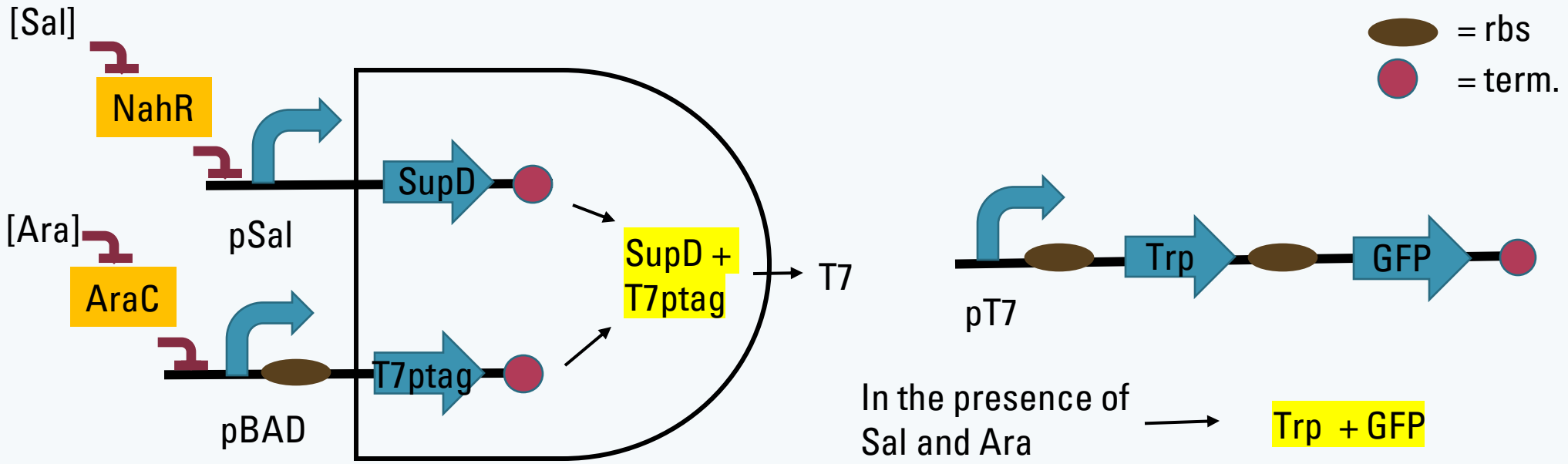
The result

… it would be a 1000 % cooler plant and increased popularity with your guests.

How would we do this?

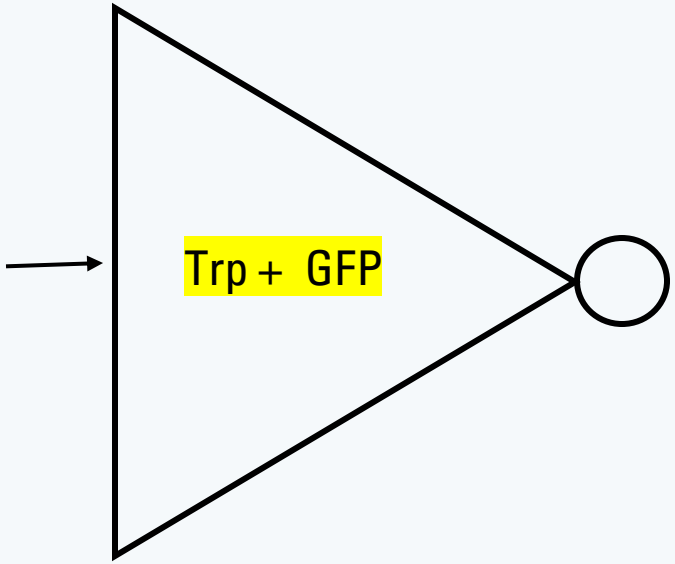
- *E. coli* strain that is tryptophan deficient and is engineered to produce fluorescent proteins
  - The Trp-operon moved from the genome into the plasmids.
- A tryptophan sensor for the production of two glowing proteins which consist of two parts – AND & NOT logic gates:
- The first product (Trp, GFP) is produced by a phage promoter when the system is in the presence of both (L)arabinose and salicylate (**inducible system**)
- The second product (Trp, RFP) is produced when there is no tryptophan present aka the first system is not induced (**repressible system**)

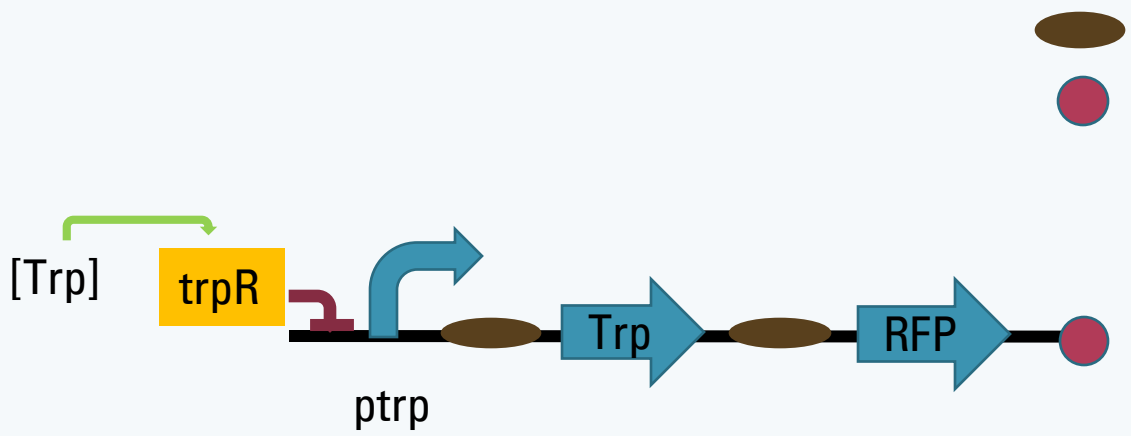
Assembly – AND Gate (Inducible System)



Is AraC a repressor, and arabinose inhibits its function??

Assembly – NOT Gate (Trp repressible system)





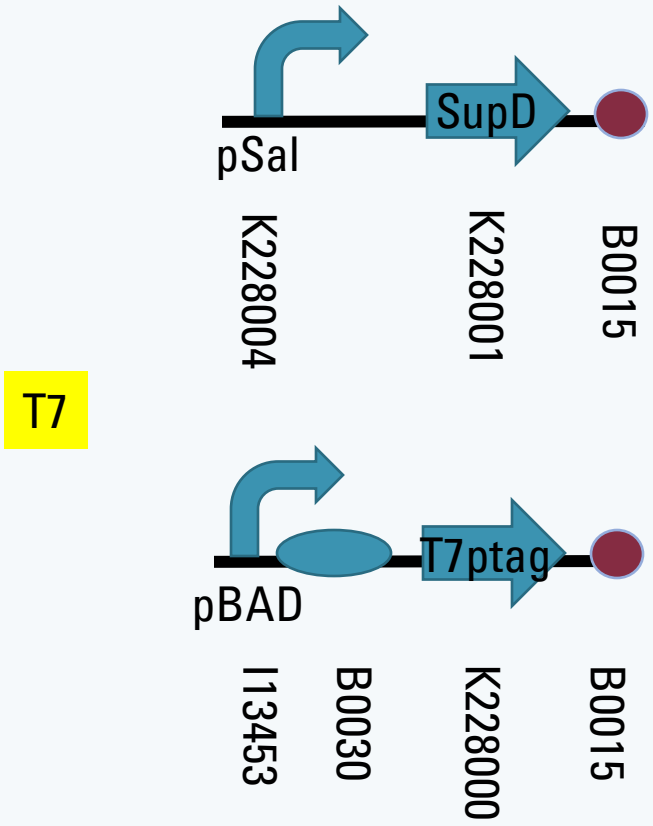
If no trp present,
repressor trpR not bound → Trp + RFP

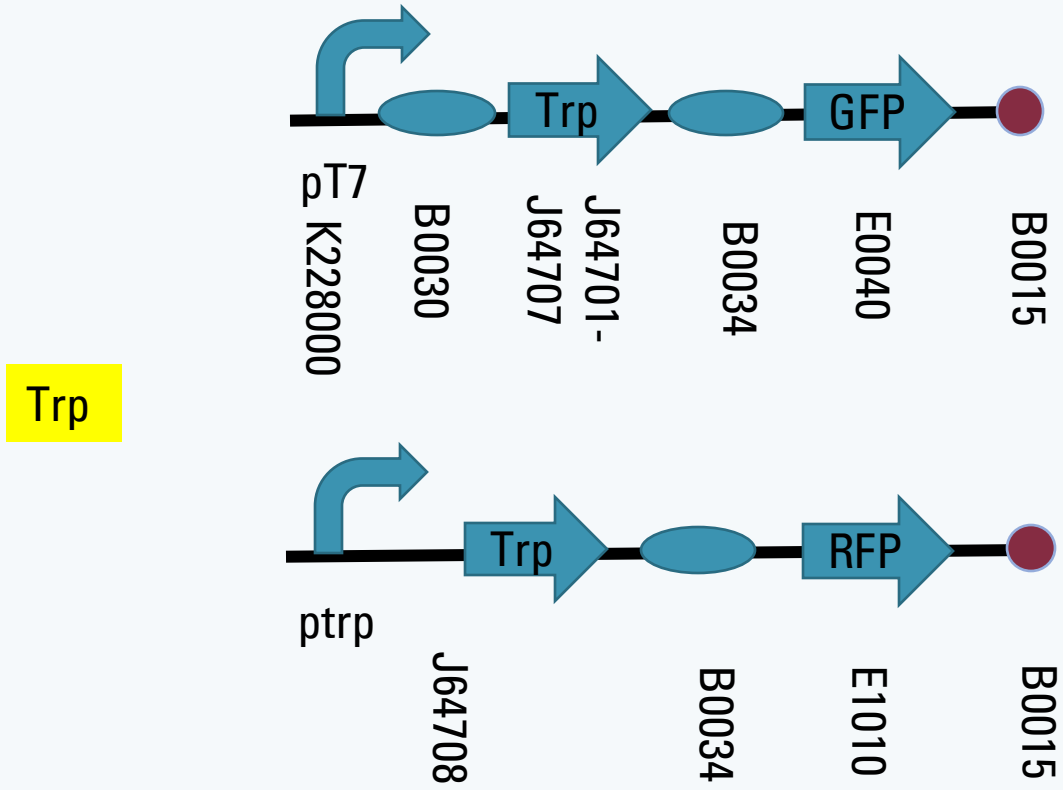
Truth table NAND

(L)-arabinose	salicylate	**Trp + GFP**
0	1	0
1	0	0
0	0	0
1	1	1

(L)-arabinose	salicylate	**Trp + RFP**
0	1	1
1	0	1
0	0	1
1	1	0

iGEM parts and how they work





Assembly standards

- More general view of what is happening? Chassis, basic parts, composite part.. In terms of IGEM
- Parts are autonomous and to meet the standards, parts have a DNA sequence from the registry and doesn't have any restriction sites that would interfere with the assembly.
- Parts together in series form a composite (functioning) part according to assembly methods that are facilitated through assembly standards. The assembly method is via cutting and ligating parts together.
- Plasmid backbone will define assembly standard for the part it maintains.

Thank you!