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Transistor Oddities II - I FOUND A USE!!!

A project log for Random Ridiculosities and Experiments

Sometimes yah's just gots tah try somethin',
regardless of whether it'll become a
full-fledged "project"...

 esot.eric • 4 hours ago • 2 Comments

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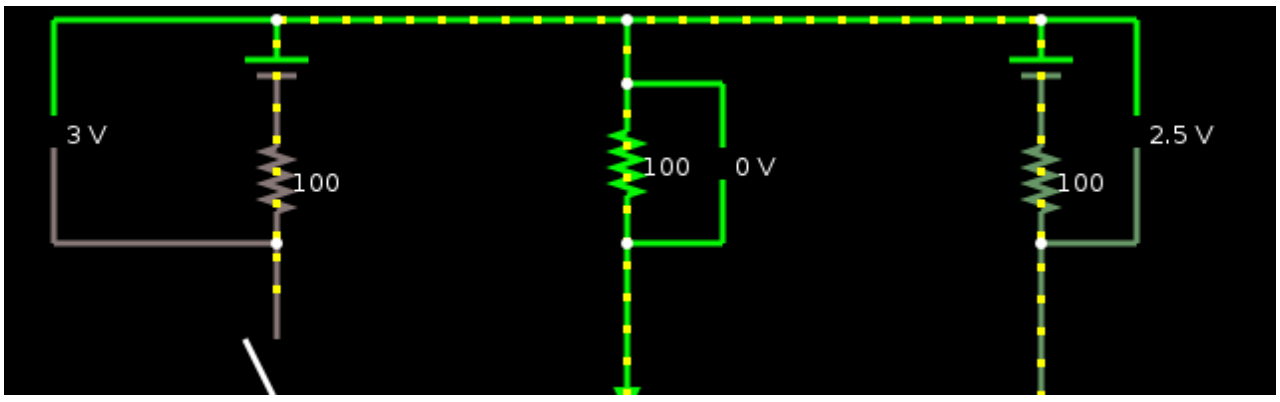
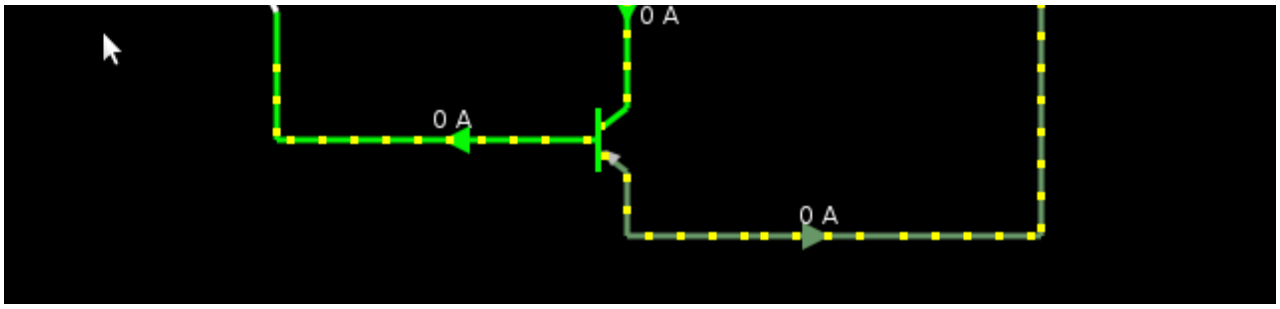
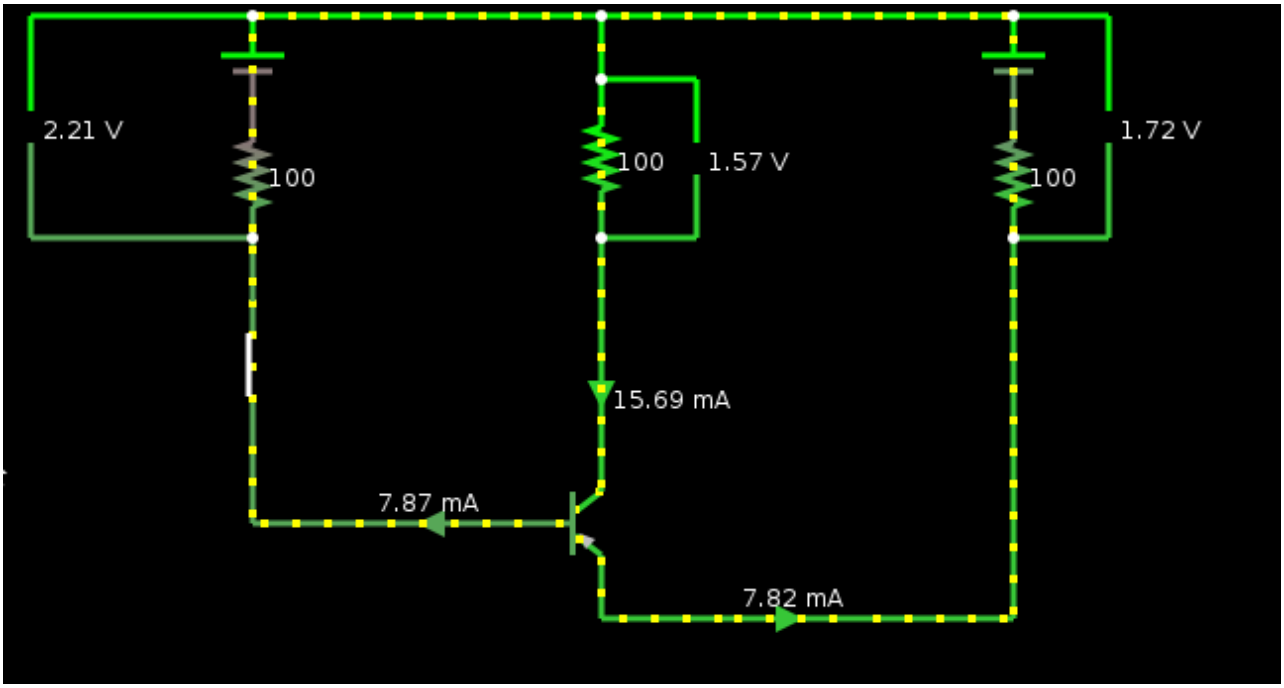
UPDATE II: Throwing random images and notes up at https://github.com/esot-eric-test/transistorOddities

UPDATE: Isn't this a [single transistor] current-mirror? Gotta explore this in a bit more depth... Some notes at the bottom.

Split The Current, and switch it from one side.







So, imagine we have two 3V coin-cells with slightly different charges, or two solar-cells which may receive slightly different amounts of light, and want to draw darn-near twice their maximum-rated current.

Putting them directly in parallel isn't so smart, right? Especially when the system's powered-down.

So, with this circuit--using a PNP on the ground-side, or an NPN on the positive-side, with its emitter tied to ground/positive, respectively--roughly half the current comes through each coin-cell, and the on/off switch (or maybe another normally-wired transistor?) controls them both.

So, here I'm simulating two coin-cells; one's at 3V, and one's at 2.5V, when unloaded. But their *internal* series resistance is roughly 100 ohms (represented by the 100 ohm resistors on each branch).

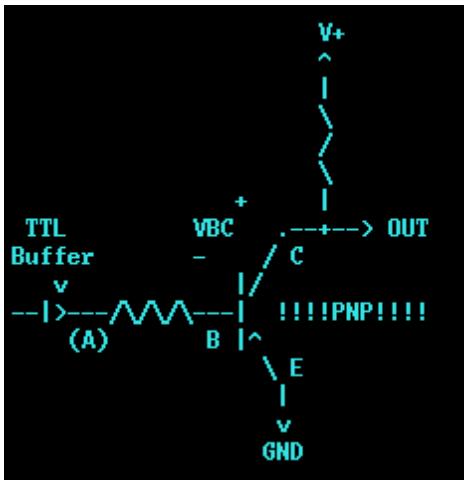
In the middle we have a load (a circuit, LED, etc...) simulated by another 100 ohm resistor,

getting about 1.5V.

The switch could be anything, maybe a "normally-wired" transistor controlled by a pushbutton and flip-flop as part of the load, etc.

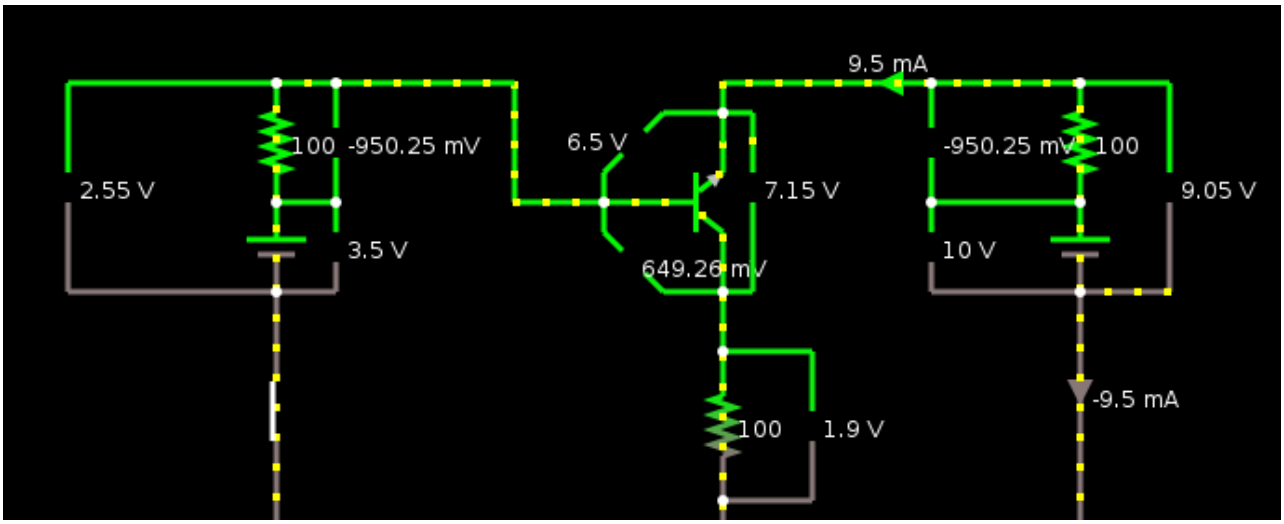
Note the directions of the current entering/leaving the transistor... Current is *exitting* the *PNP*'s emitter, and *enterring* its collector. That's why this guy's a weird setup that's been boggling my mind for weeks.

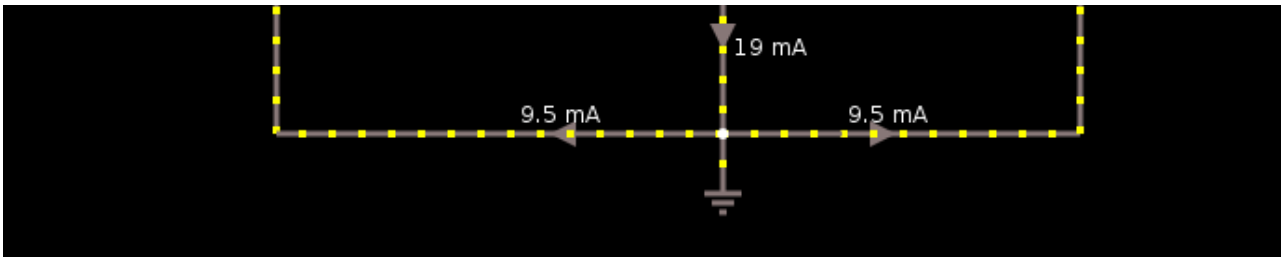
Here's the original weird circuit:



Check out the simulation.

And here's another, in a more logical topology.





Note that as long as the right-side "battery" is greater-than or equal to the right-side "battery's" voltage, the two branches carry the same current. Doesn't that make it a single-transistor current-mirror? Hmmm...

If you haven't been following the saga, check out The mistake that started it all, and Some more rambling.

Previous Log

Transistor Oddities

2 days ago • 11 comments

DISCUSSIONS

Yann Guidon / YGDES wrote 2 hours ago

Do you know those cheap solar powered garden lamps with a single AA rechargeable battery ? I suspect they use a somewhat similar system...

That's intriguing...

reply

esot.eric wrote 2 hours ago

hmmm, I was thinking more like calculators, but you might be on to something, there

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Going up?