
THE PIGEON WORKBENCH

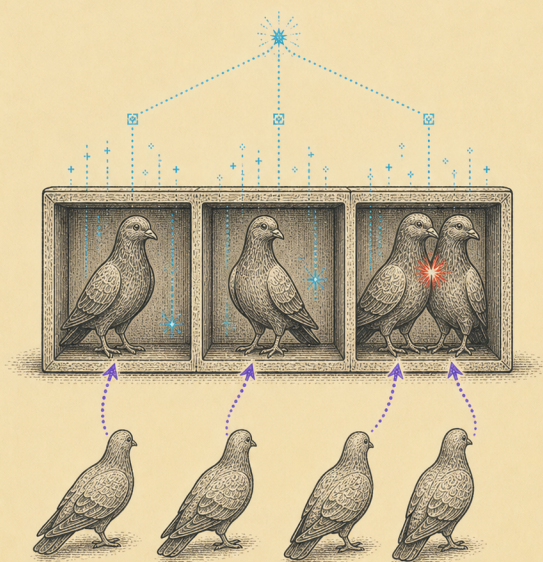
A TINY GUIDE TO DEEP WORLDS



A small machine can store rules, addresses, remembered changes, and a reusable place to draw the part of a deep world you ask for.

FIXED HOLES LOSE

THE OLD THEOREM IS STILL UNDEFEATED



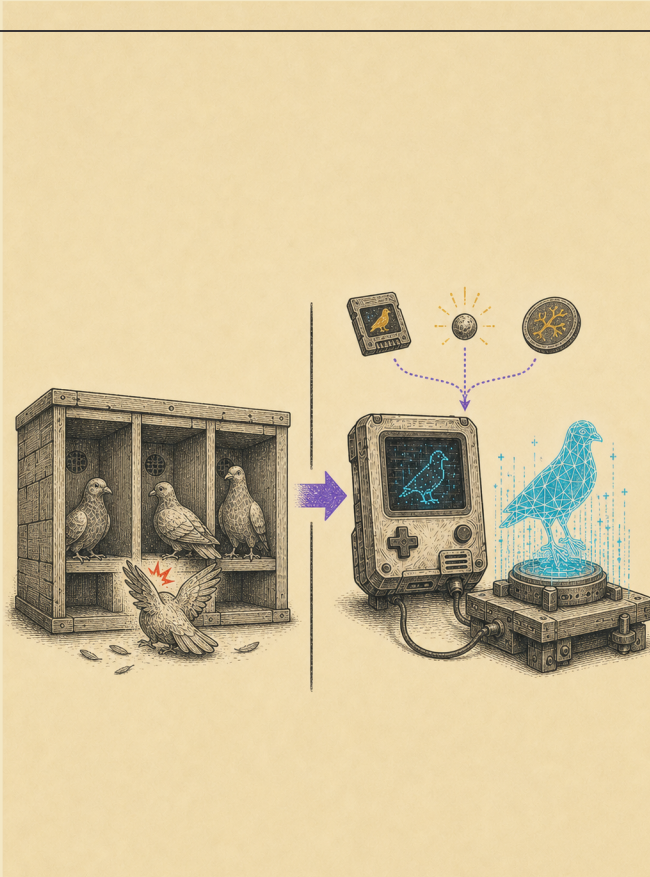
If four independent pigeons must occupy three fixed holes at the same time, two must share. In general, a map from more pigeons to fewer holes cannot be one-to-one.

■ $|P| > |H| \Rightarrow \text{COLLISION}$

Recursion does not change that.

STORE THE MAKER

CHANGE THE REPRESENTATION



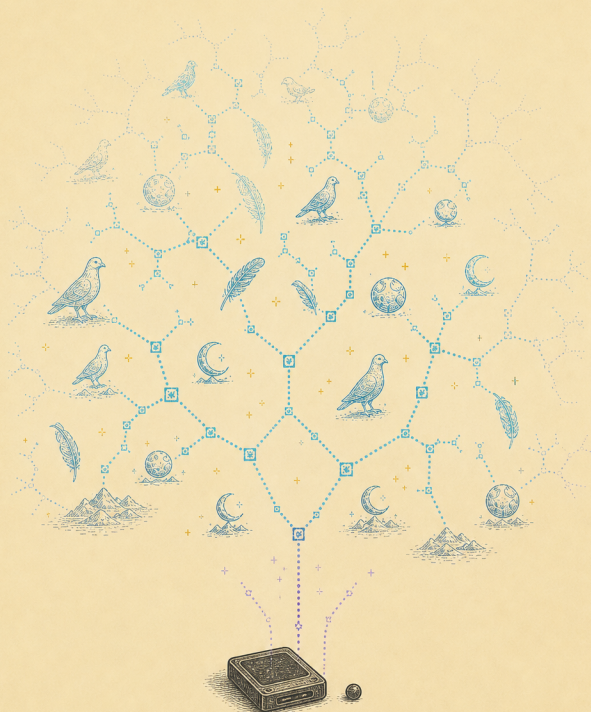
Instead of keeping every finished pigeon, keep a compact generator, a seed, and an address. The machine uses them to build the pigeon currently requested.

| $\text{answer} = G(\text{seed}, \text{address}, \text{time})$

The missing specificity moved into the rule and query. It did not vanish.

EVERY HOLE IS A DOOR

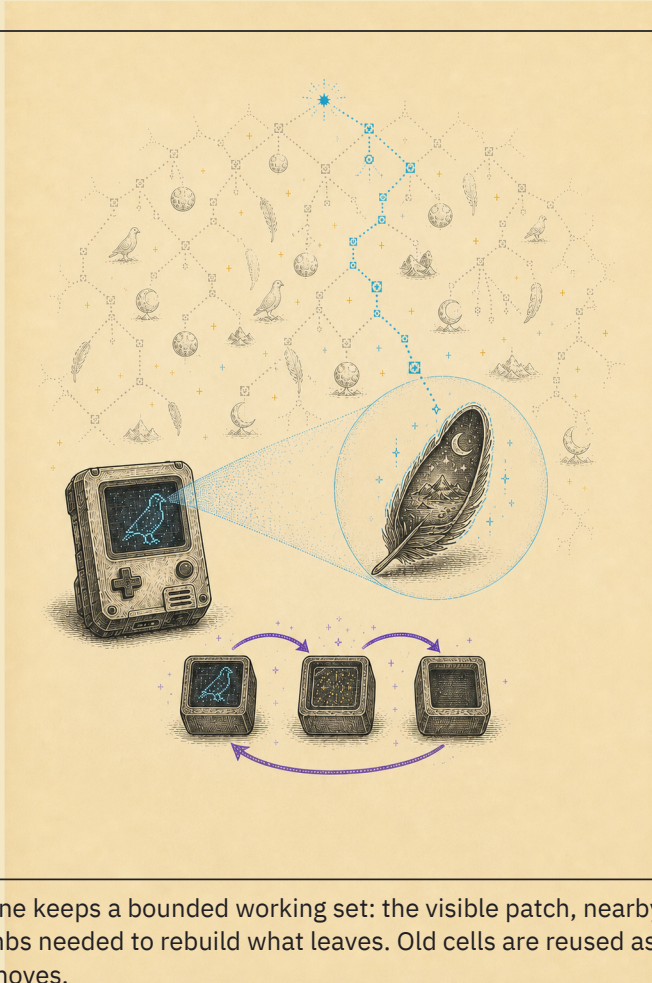
RECURSION TURNS SLOTS INTO ADDRESSES



An address can open another question: moon / crater / stone / grain. The path may continue to any finite depth the machine can compute. Only the branch being visited needs to be materialized now. The rest remains a rule for possible answers.

REUSE THE SCREEN

ONLY PAY FOR THE BRANCH YOU TOUCH

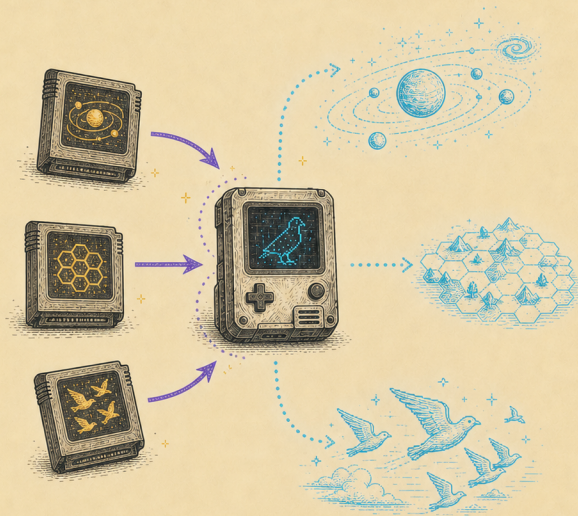


The machine keeps a bounded working set: the visible patch, nearby state, and breadcrumbs needed to rebuild what leaves. Old cells are reused as the observer moves.

The pigeons are served across time. They are not all parked in memory at once.

ONE MACHINE, MANY PROGRAMS

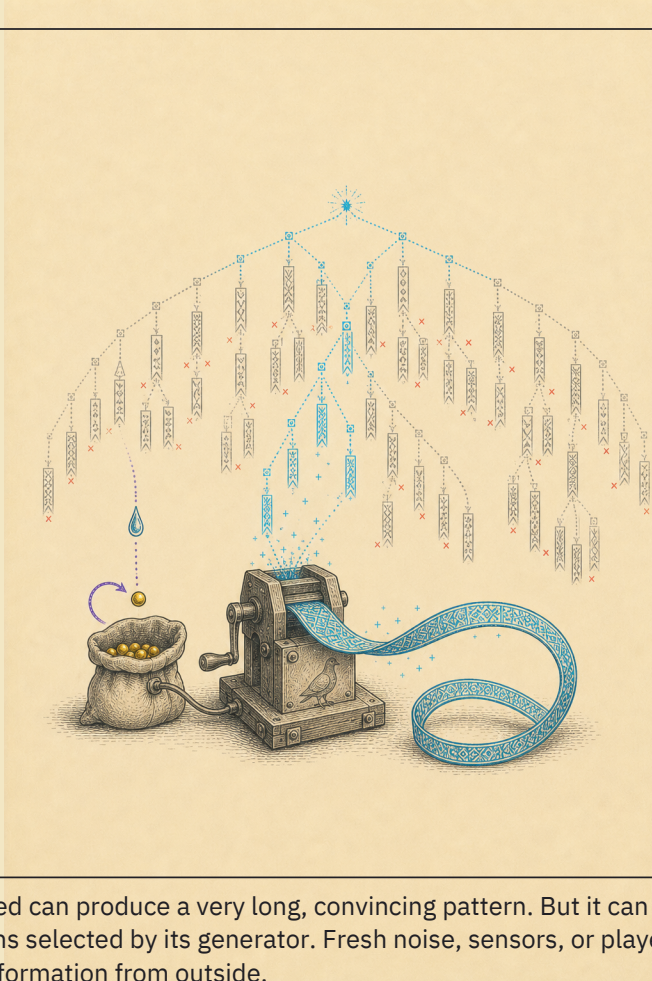
UNIVERSAL DOES NOT MEAN MAGICAL



A generic interpreter can run a planet program, a cell program, or a flock program. Each program carries the distinctions for its own world. A finite handheld still produces one finite view at a time, within its memory and time budget.

LONG IS NOT INDEPENDENT

PSEUDORANDOM DETAIL HAS A SOURCE



A short seed can produce a very long, convincing pattern. But it can reach only the patterns selected by its generator. Fresh noise, sensors, or player actions can add information from outside.

■ B stored bits => at most 2^B physical states

THE EXACT BARGAIN

SMALL BOX. DEEP WORLD.



We did not store four pigeons, bit for bit, in three slots. We changed the question we were asking.

Instead of storing every pigeon, we stored a tiny program that can describe any pigeon we want.

The result is a finite recursive machine that gives a finite observer coherent access to finite views at arbitrary depth within a structured, computable world.