

# Mutable Instruments – Branches

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## Using Mutable Instruments Branches for Complex Percussion and Polyrhythms in Eurorack

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The **Mutable Instruments Branches** is a dual Bernoulli gate—basically a probabilistic trigger router. It's not a voice or an effect, but a gate/trigger utility that introduces randomness or switching logic into rhythmic signal flows. This makes it an incredibly powerful tool for creating dynamic, densely-layered, and ever-evolving percussion or rhythmic sequences, perfect for polyrhythms, odd time signatures, and generative patterns.

Here's how you can leverage Branches in the quest for **hyper-complex rhythmic results**:

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### 1. Generating Polyrhythms with Branches

**Application:**

- **Feed two different rhythmic triggers** (for instance, from a clock divider and a sequencer) into the two INs of Branches (or just one IN, letting the internal normalized routing do the rest).
- **Use the Probability knob or CV input** to alter how incoming triggers are routed — one output could go on to fire a kick, the other a snare, for example.

- By **modulating probability with an LFO or stepped random voltage**, you can dynamically change the polyrhythmic structure over time.

#### Result:

- As triggers are probabilistically switched or split, you achieve unexpected but musical re-distribution of events, ideal for layering contrasting time signatures and evolving rhythmic interplay between percussion elements.

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## 2. Complex Time Signatures & Algorithmic Patterns

#### Application:

- **Feed a simple clock or trigger train** (say, 16th notes).
- Use **toggle mode**: Now, Branches doesn't just route the trigger at random, but can "flip-flop" between outputs based on probability. This can create complex, semi-algorithmic pulses and pseudo-random pattern lengths.
- Sequence the **Probability knob via CV** from a sequencer or a stepped random source to change patterning on a per-step basis, injecting controlled chaos into time signatures.

#### Result:

- Shifting between semi-deterministic and random pathing results in phasing, unexpected accents, or shifting downbeats—core ingredients for dense, jazzy, or IDM-like percussion.

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## 3. Hyper-Complex Percussion Patterns

#### Application:

- **Daisy-chain both sections**: Connect OUT A of section 1 to IN of section 2 for nested coin-flips, creating cascading branching structures akin to probability trees.

- **Route each output to different percussion modules or samplers** (e.g., OUT A to a hi-hat, OUT B to a rimshot, and so on).
- **Use Latch mode:** A hit will keep an output high (+5V) until the next trigger swaps to the other output. This can be used to gate a complex percussion voice, holding it open for irregular durations –excellent for glitchy or stuttering fills.

#### Result:

- This introduces both micro-variation (which drum hits when) and macro-structure (which voices may temporarily dominate the pattern), maximizing rhythmic interest.

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## 4. Creative Modulation/Extensions

- **Mult the output(s) of Branches** into effects, envelopes, or other modulators that shape percussion timbre (filter cutoff, wavefolder CV, etc.) for per-hit variance.
- **Patch Branches at the end of a clock division chain:** Use it to redirect triggers from heavily divided clocks to accent or “ghost” percussive elements, or to generate fills that aren’t on a fixed schedule.

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### Patch Inspiration Example

- Clock/funky sequencer → Branches IN 1
- Probability CV → Stepped random voltage or a slow LFO
- OUT A → Trigger input of main hi-hat
- OUT B → Trigger input of woodblock
- Branches IN 2 left unpatched (uses internal normalization)
- Use Toggle and Latch modes to evolve the pattern over time
- Mix OUTs through a VCA/waveshaper for extra randomness in texture

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**TIP:**

Pairing Branches with a voltage-addressed switch or sequential switch can further route its probabilistic triggers to even *more* voices, breaking out of “just two-way” patterning!

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For full details and patch examples:

[Branches Manual PDF](#)

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