Can do with tubes and strings

**May 04-10**

8:55 AM

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**Allowed moves:**
1. \( \leftrightarrow \) (an isomorphism).
2. All crossings: \( \times \times \times \times = \times \times \).
3. Vertices:
   - "hard"
   - "trivial"
   - "smooth"

4. Likely fails

5. String delete

6. Likely forbidden. The price \( \Delta \) is too high, and if allowed, \( \Psi \) would be too.

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**Goal**

Come to \( \Psi \) from a tube-only shape. Presumably \( \Delta \) will fail, but \( \Psi \) will do.

**Attempt 1**

\[ \begin{array}{c}
\Delta \\
\downarrow \\
\triangleleft \rightarrow \bigcirc \\
\downarrow \\
\Delta \\
\end{array} \]

\[ \begin{array}{c}
\bigcirc \\
\downarrow \\
\bigcirc \\
\downarrow \\
\Psi \end{array} \]
Attempt 2

\[ \ \varnothing \rightarrow \ \Psi \]

Question: If an operation is doable, in what sense does its price tag?

Attempt 3

\[ \ \Psi \rightarrow \ \Psi \rightarrow \ \Psi \]

Question: What's \( A(\Psi) \) (less than \( A(\Psi) \) for sure)

Attempt 4

Aside:

is a \( K_{3,3} \)

Does this give the right output?

\[ \ \Theta \rightarrow \ \Theta \rightarrow \ \Theta \rightarrow \ \Theta \]

compare with \[ \ \cdot \]
Why not $\triangle \subseteq \circ$ \\
Why not $\circ \subseteq \circ$