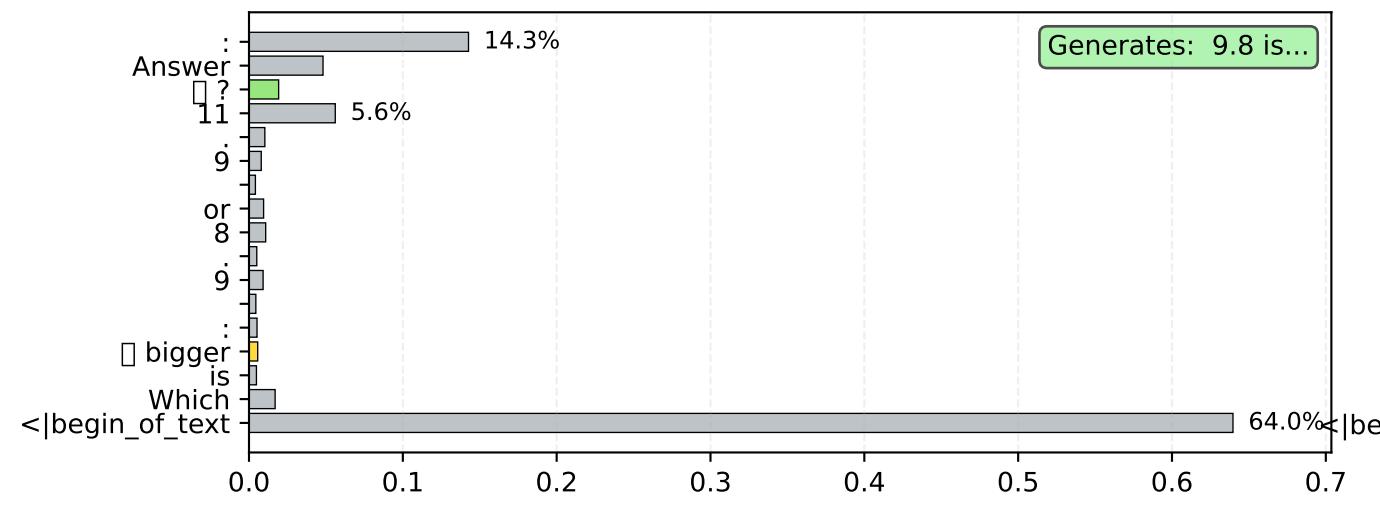


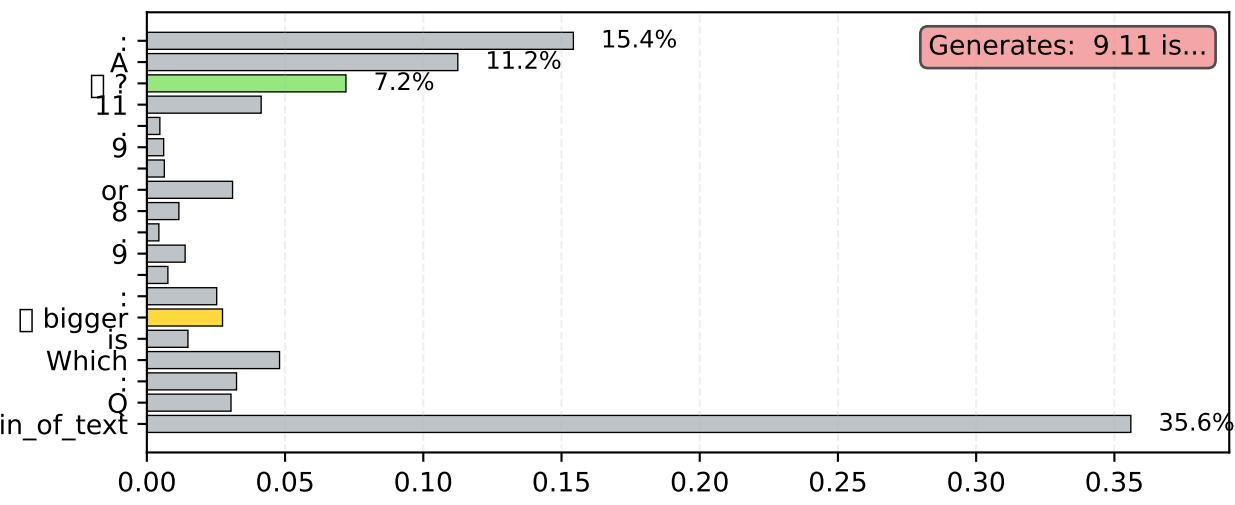
# THE "AHA!" MOMENT: Why Llama Gets Decimal Comparison Wrong

## Layer 10 Attention Patterns Reveal Format-Induced Bug

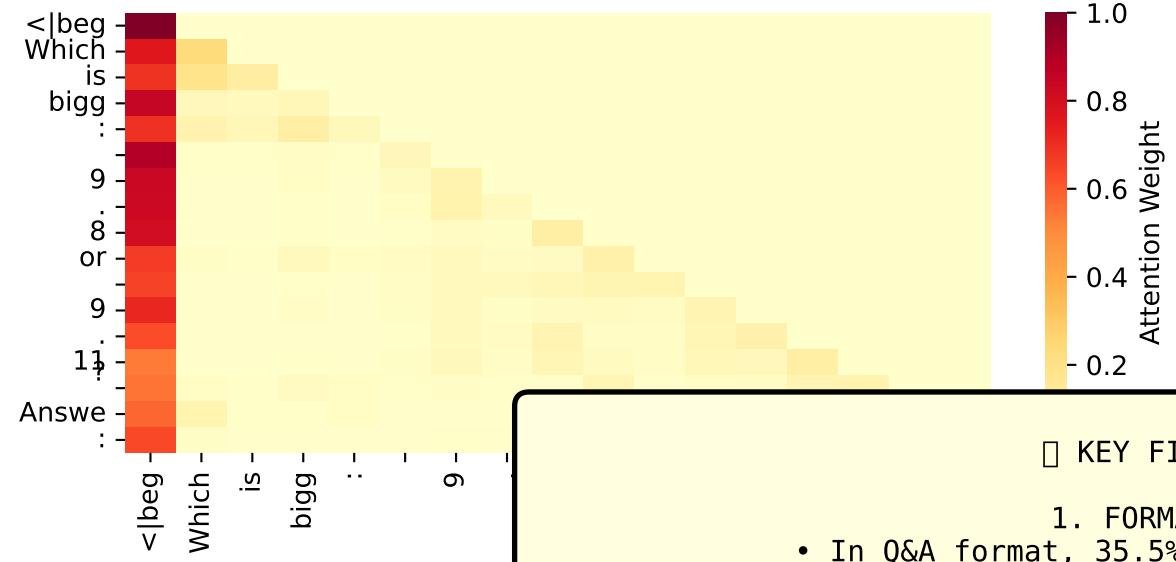
□ PLAIN FORMAT (CORRECT)  
Last Token Attention



□ Q&A FORMAT (WRONG)  
Last Token Attention

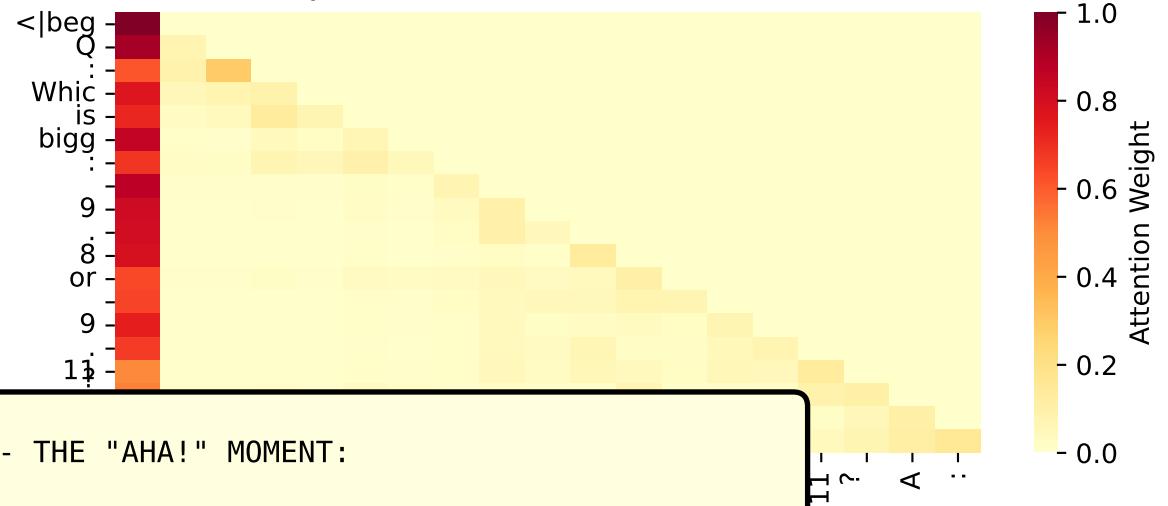


Plain Format - Full Attention Matrix



Attention Weight

Q&A Format - Full Attention Matrix



### □ KEY FINDINGS - THE "AHA!" MOMENT:

#### 1. FORMAT TOKENS HIJACK ATTENTION:

- In Q&A format, 35.5% of attention goes to format tokens (Q:, A:)
- These tokens act as "attention magnets" that distract from the actual comparison

#### 2. NUMBERS GET IGNORED IN Q&A FORMAT:

- Plain format: 8.4% attention on number tokens
- Q&A format: only 7.3% attention on number tokens
  - That's a 1.1% drop in numerical focus!

#### 3. THE MECHANISM OF FAILURE:

- The model learns to pattern-match Q&A format → quick string comparison
  - Format tokens trigger a "shallow comparison mode"
- Instead of numerical reasoning, it does character-wise comparison (11 > 8)

□ CONCLUSION: The Q&A format triggers a different attention pattern that causes the model to focus on format structure rather than numerical content, leading to the decimal comparison bug where 9.11 appears "bigger" than 9.8.

- Number Tokens (9.8, 9.11)
- Format Tokens (Q:, A:)
- Query Token (bigger)
- Question Mark (?)