1 Token Efficiency for Game of 24

RAFA is superior in terms of token complexity in Game of 24. Methods that lack planning like Reflexion has a low token demand, however, it is not enough to compensate for the drop in performance. Methods that lack in-context learning like ToT would generate unnecessarily repeated trials due to lack of reflection and improvement, which makes the method token inefficient.
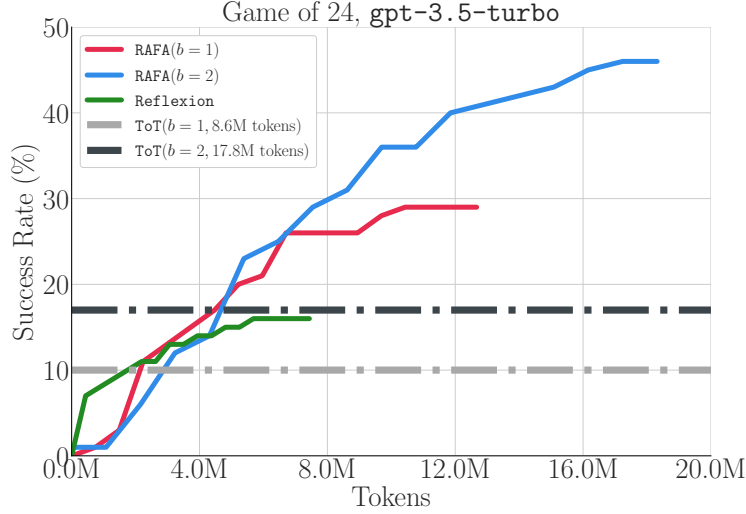

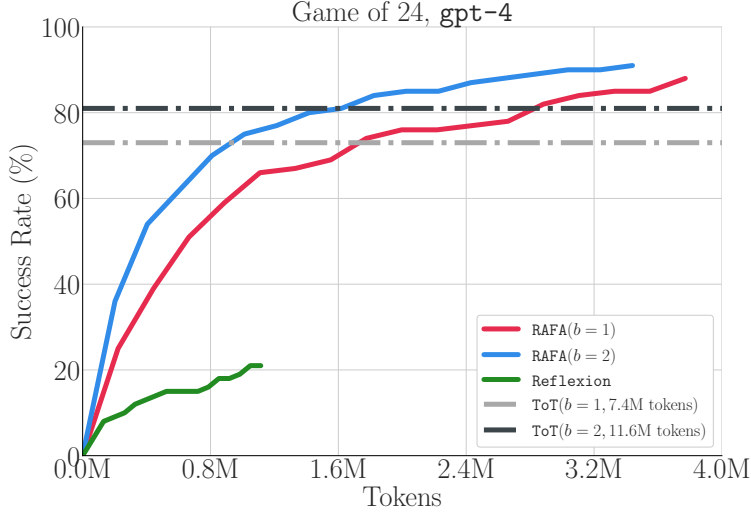Figure 1: Token efficiency on Game of 24 using GPT-3.5-turbo.

Figure 2: Token efficiency on Game of 24 using GPT-4

2 Token Efficiency for BlocksWorld

Compared with RAP, RAFA uses nearly the same number of tokens to perform better in BlocksWorld. The key difference between RAP and RAFA is that RAFA uses the collected feedback from online interactions as the context.
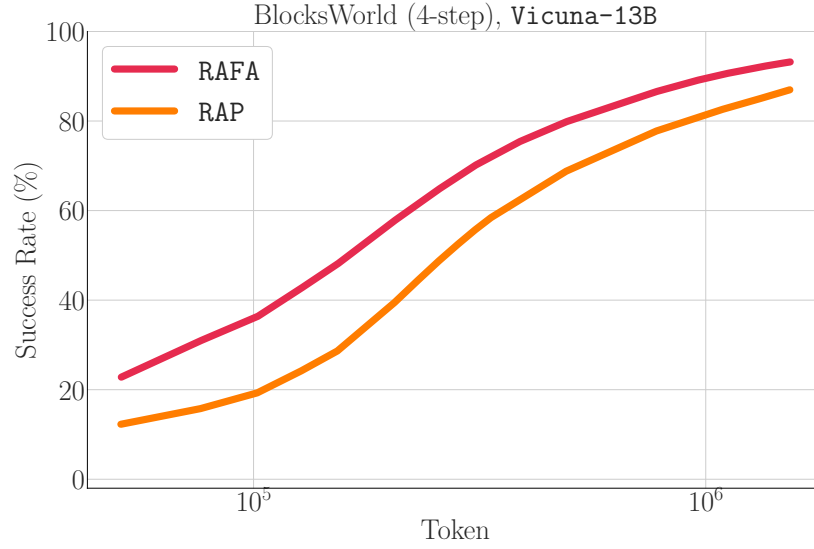
Figure 3: Token efficiency for RAFA and RAP on 4-step task of BlocksWorld, where the used LLM is Vicuna-13B (v1.3).
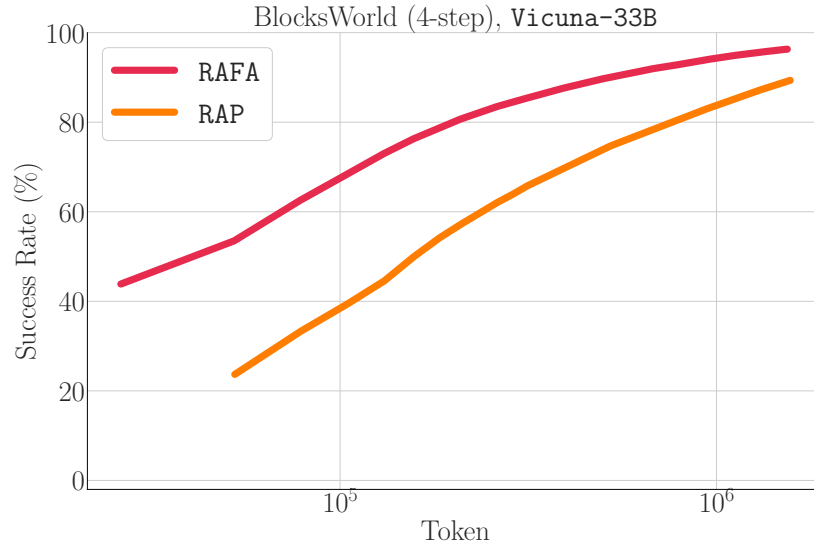
Figure 4: Token efficiency for RAFA and RAP on 4-step task of BlocksWorld, where the used LLM is Vicuna-33B (v1.3).
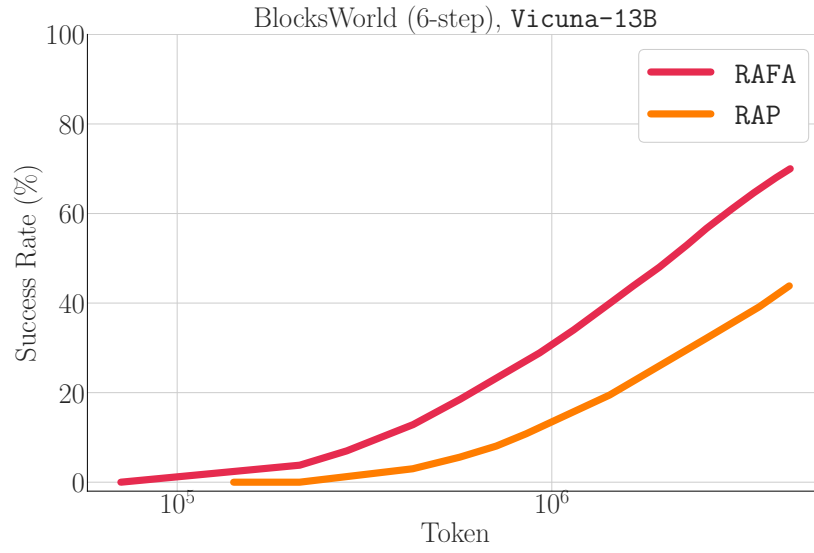
Figure 5: Token efficiency for RAFA and RAP on 6-step task of BlocksWorld, where the used LLM is Vicuna-13B (v1.3).
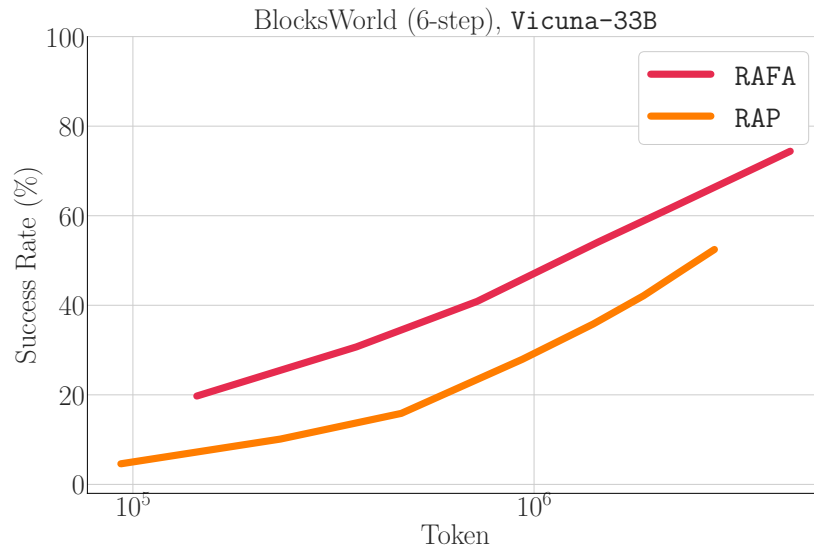

Figure 6: Token efficiency for RAFA and RAP on 6-step task of BlocksWorld, where the used LLM is Vicuna-33B (v1.3).

3   Token Efficiency for ALFWorld

In Figure 7, we observe that RAFA initially requires a marginally higher number of tokens compared to Reflexion to achieve equivalent performance. This can be attributed to the incorporation of a planning subroutine in RAFA, which necessitates not only the elicitation of actions but also the estimation of dynamics and values. Nonetheless, as the episodes progress, RAFA demonstrates superior performance over Reflexion while utilizing the same quantity of tokens, owing to its learning capabilities.
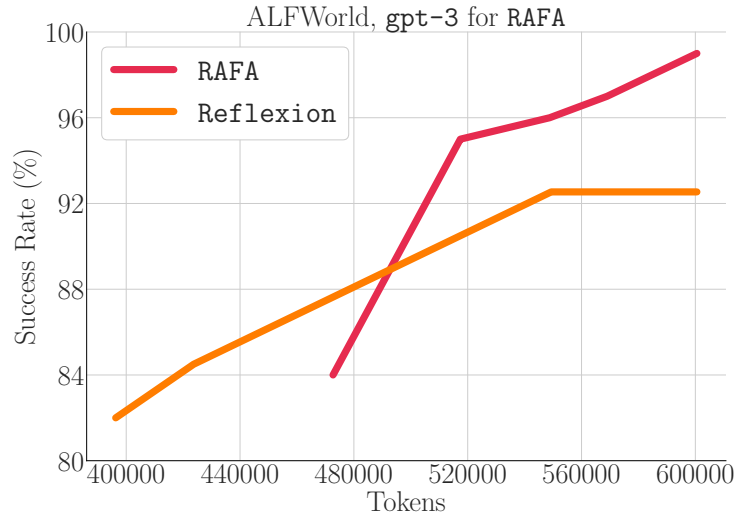

Figure 7: Token efficiency for RAFA and Reflexion in ALFWorld using GPT-3.