[A3] The Worst Mathematician Ever

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Reflection

In this mathematician implementation, the bot was observed to fail due to many reasons. Originally, the bot was prompted with the mathematical request provided in the assignment details verbatim. In other words, it was prompted to complete an equation based off of verbal instructions that could be misinterpreted. Since the example provided to the model was with (n, i) values $(2, 3)$, the model misunderstood the iterative calculation, and computed the following instead: $n^{(2^i)}$. In this case, it was failing due to a misinterpretation of the prompt, leading to consistent erroneous results. To resolve this, I simplified the prompt, telling it simply to compute $n^{(n^i)}$, the same equation used to compute the result achieved with manual computation. I hoped that this direct approach would lead to correct responses since ambiguity and misinterpretation were no longer possible. However, while the model would at times compute the correct result (with smaller input values), it was often observed that the model would give two distinct answers to the same input at contiguous test rounds. This could be explained by the actual functioning of generative AI models as well as the model's inputs. Firstly, the model does not actually compute anything with the given inputs, as the numbers and the prompt are broken down into tokens. Therefore, $n^{(n^i)}$ is not actually arithmetically calculated by the model. The result returned is probabilistic, based on patterns & approximations that may vary based on its training (hence the difference in accuracy between nano & mini). The erroneous outputs are also a result of the model's temperature and top_p values. The higher temperature & top_p values increase the variability of the result and the pool of possible results. Therefore, the output is both incorrect and inconsistent.