

Assistant's Note: Is this the whole intended checklist? My view: The structure is sound and covers the critical inequalities and dependencies; key cautions are ensuring strictness where required for limit absorption, verifying $\omega_0 \leq C$ before using absorption, and handling corner cases (e.g., both-void) explicitly. Below is the checklist as provided.

Strong Normalization Proof Skeleton and Checklist

A. $\mu_{lt_eq_diff}$ and $merge_inner_bound_simple$ (inner core) - Summary

(Condensed from earlier plan; no code here, only what must be true and checked.)

1. Inner bound ($merge_inner_bound_simple$)

Goal: With $C := \mu a + \mu b$, show:

$$\mu (merge\ a\ b) + 1 < \omega_0^{(C + 5)}$$

Checklist:

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2. Total lemma $\mu_{lt_eq_diff}$ (with case split)

Goal: $\mu (integrate\ (merge\ a\ b)) < \mu (eqW\ a\ b)$. Checklist:

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B. Required lemmas / properties (verify presence in existing code)

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C. Extension to full SN proof (high-level skeleton beyond current lemma)

Checklist:

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D. Early warning signs / dead ends (what to watch for)

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E. Next Milestones

1. Finalize and verify `merge_inner_bound_simple` and `mu_lt_eq_diff` with all dependencies green.
2. Eliminate any remaining `sorry` in measure-decrease chain (`mu_decreases`, `mu_lt_rec_succ`, etc.).
3. Complete the well-foundedness argument to seal strong normalization.
4. Perform a consistency audit: ensure no circular dependencies and all used lemmas are from whitelisted sources.
5. Prepare a concise math write-up for the paper describing the structure of the SN proof, referencing this checklist.

End of skeleton.