**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 omega0 ≤ 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 < omega0^(C + 5)

Checklist:

### 2. Total lemma mu\_lt\_eq\_diff (with case split)

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

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

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

Checklist:

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

## 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.*