

## Minishell Bonus Features Checklist

This checklist helps track implementation of bonus features for the Minishell project, such as command grouping, logic operators, and proper file descriptor behavior across pipelines.

- [ ] Support for command grouping with parentheses: ( )
- [ ] Parse nested token structures within parentheses
- [ ] Recursively build AST from grouped sublists
- [ ] Execute grouped commands in isolated subshell
- [ ] Handle logical AND (&&) and OR (||) operators
- [ ] Respect short-circuit logic during execution
- [ ] Ensure correct operator precedence
- [ ] Ensure multiple redirections per command are handled properly
- [ ] Handle cases like: cmd < infile1 < infile2 > out
- [ ] Ensure correct file descriptor closing between commands
- [ ] Prevent file descriptor leaks in pipelines and subshells
- [ ] Support chained commands using pipes combined with logic
  - [ ] e.g., cmd1 | cmd2 && cmd3 || cmd4
- [ ] Implement return value handling across pipelines and logic blocks
- [ ] Handle nested groupings and multiple operator types
  - [ ] e.g., (cmd1 && cmd2) || (cmd3 | cmd4)
- [ ] Test bonus features with complex edge cases and mixed syntax

*Use this checklist to plan and validate bonus feature implementations.*