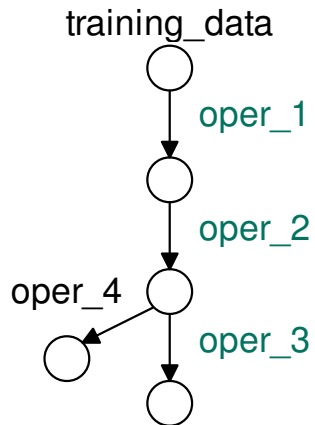
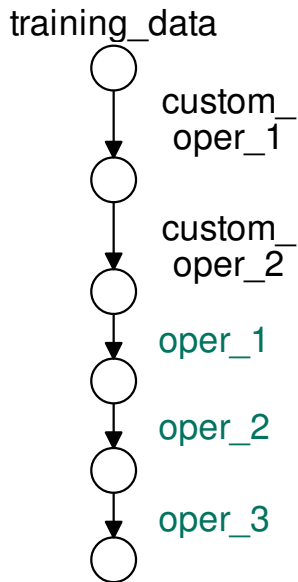


materialized graph



scenario 1: operations prepended



scenario 2: operations reordered

