**Méthode 01**

Fan out de title avec les autres tales

Estimated cost

leftDeepTiltle= [150721.41, 688564.33, 115218.63, 829313.1, 505283.31, 503924.32, 498796.86, 524105.99, 768678.98, 474121.47, 757050.35, 1183134.6, 1061621.06, 1097063.38, 107843.15, 72107.51, 366302.0, 1365570.97, 1281179.42, 1280679.69, 1513677.33, 1511950.36, 1513682.06, 1696706.94, 1409239.07, 1938420.26, 753589.09, 81166.28, 2244554.85, 2244554.85, 1042682.73, 462995.46, 1130594.03, 1134841.04, 1016751.97, 1026609.42, 1079825.51, 1498813.98, 69822.1, 3976458.1, 3976462.27, 504242.88, 504188.77, 535338.82, 621958.28, 1506943.15, 2785449.59, 2069519.57, 1888056.64, 2425630.85, 1965120.9, 1965120.9, 1965120.9, 2588668.63, 2434932.41, 1521867.51, 90205.54, 1553166.09, 1746518.54, 144747.46, 129895.82, 130231.84, 1190065.06, 1111085.83, 2887235.49, 535189.87, 504157.37, 535191.42, 1628963.14, 111664.24,290216.28, 258385.5, 315854.3, 833394.96, 583469.18, 1483685.71, 2900.01, 1528.23, 1498060.89, 1655.81, 1655.81]

postgres= [72499.91, 70176.57, 67152.32, 79206.91, 1624.97, 1624.97, 1624.97, 1625.0, 25228.19, 24690.32, 25046.93, 24965.46, 24781.64, 25322.93, 67104.25, 72028.63, 69223.85, 2411.92, 14396.78, 1960.3, 17608.75, 2928.65, 17613.48, 101443.16, 57266.58, 110244.64, 90562.13, 80414.42, 1063648.21, 1063648.21, 136384.93, 136351.83, 856338.52, 862238.24, 338045.36, 259581.29, 1035679.83, 1597.87, 1592.78, 4797.8, 4861.49, 81241.96, 681.15, 374418.61, 361037.5, 1779.21, 3432.71, 2477.4, 2483.55, 2880.93, 4022.56, 4022.56, 4022.56, 2880.89, 4418.93, 141633.28, 90203.54, 569861.18, 879555.97, 2559.29, 2560.26, 2560.26, 1600.05, 1599.62, 1604.74, 4605.06, 4601.73, 4621.64, 7908.39, 967.52,2695.16, 2739.94, 2740.13, 1595.97, 1595.41, 1596.27, 617.75, 554.06, 2696.77, 1655.81, 1655.81]

run time jusq’ua 16b

leftDeepTiltle [1.432384, 8.876971, 9.757161, 4.273841, 16.488464, 0.679489, 4.800084, 16.059853, 30.078356, 31.776595, 7.669669, 6.215196, 71.99329399999999, 4.44622, 11.965872, 3.071677, 7.092738000000001, 0.10446899999999999, 337.211087, 1.418771, 1.769817]

Postgres [1.258081, 0.903224, 0.95602, 0.678294, 0.249128, 0.265904, 0.365459, 2.56448, 13.526932, 13.621599, 4.895255, 5.9446639999999995, 30.554965, 1.848997, 9.698201999999998, 1.386502, 5.782211, 0.935283, 26.469675, 0.683524, 8.27251]

**methode 2**

Fan out de title avec les autres tables et trier les tables restantes par cardinality

leftDeepTiltleCar [150721.41, 688564.33, 115218.63, 829313.1, 505283.31, 503924.32, 498796.86, 524105.99, 833238.0, 713448.55, 806312.62, 1031156.69, 960813.62, 1098640.46, 107843.15, 72107.51, 366302.0, 1365570.97, 1281179.42, 1280679.69, 1513677.33, 1511950.36, 1513682.06, 1908180.23, 1561683.79, 2559963.15, 753029.86, 81165.45, 1960878.02, 1960878.02, 1161150.59, 470871.26, 1320214.77, 1352456.41, 1067002.33, 1017817.33, 1086292.41, 1507122.46, 69820.63, 3978645.74, 7505605.56, 203110.81, 151711.45, 876185.82, 758013.69, 1317672.8, 1929093.78, 1591006.43, 1494213.06, 1900089.27, 2421669.22, 2421669.22, 2421669.22, 1900089.25, 2421669.39, 909293.56, 90205.5, 1598718.74, 2142763.35, 125425.6, 116304.19, 116320.42, 2863699.23, 2723435.06, 9409840.63, 98859.29, 98816.6, 106397.96, 1719383.71, 112962.74, 249421.8, 225438.11, 275397.05, 168233.81, 79020.01, 212709.16, 767.92, 694.64, 996224.37, 1655.81, 1655.81]

Postgres [72499.91, 70176.57, 67152.32, 79206.91, 1624.97, 1624.97, 1624.97, 1625.0, 25228.19, 24690.32, 25046.93, 24965.46, 24781.64, 25322.93, 67104.25, 72028.63, 69223.85, 2411.92, 14396.78, 1960.3, 17608.75, 2928.65, 17613.48, 101443.16, 57266.58, 110244.64, 90562.13, 80414.42, 1063648.21, 1063648.21, 136384.93, 136351.83, 856338.52, 862238.24, 338045.36, 259581.29, 1035679.83, 1597.87, 1592.78, 4797.8, 4861.49, 81241.96, 681.15, 374418.61, 361037.5, 1779.21, 3432.71, 2477.4, 2483.55, 2880.93, 4022.56, 4022.56, 4022.56, 2880.89, 4418.93, 141633.28, 90203.54, 569861.18, 879555.97, 2559.29, 2560.26, 2560.26, 1600.05, 1599.62, 1604.74, 4605.06, 4601.73, 4621.64, 7908.39, 967.52, 2695.16, 2739.94, 2740.13, 1595.97, 1595.41, 1596.27, 617.75, 554.06, 2696.77, 1655.81, 1655.81]

**Méthode 3**

Trier les clauses par : |sel(Ti) join sel(Tj)|

Bushy Tree [602238.9, 540830.01, 582058.4, 540847.7, 106990.25, 79843.92, 16981.62, 208774.25, 704662.85, 496974.78, 661286.25, 522897.84, 521147.7, 524444.2, 69968.14, 72103.89, 69223.85, 465069.07, 475669.46, 465068.99, 475670.08, 465069.17, 17613.48, 145270.11, 200588.54, 372360.32, 906284.58, 81166.28, 1196465.68, 1196465.68, 429997.46, 414569.39, 1065588.11, 1093687.74, 1001310.22, 861966.69, 1051090.79, 109671.96, 69820.29, 203433.31, 325612.81, 507787.74, 507763.16, 535188.26, 597511.16, 184876.71, 392529.36, 374657.47, 383125.52, 1318579.93, 704517.4, 704517.4, 704517.4, 201615.27, 1368734.47, 920292.81, 90205.54, 1613524.93, 1414861.25, 972202.93, 577982.89, 969588.3, 782336.42, 685771.27, 758147.85, 535188.54, 510363.9, 535188.58, 1001586.42, 111742.03, 1469541.18, 1459409.79, 1445382.07, 616740.48, 578838.67, 720997.17, 636.5, 1522.87, 1709228.1, 332238.04, 332238.04]

Postgres [72499.91, 70176.57, 67152.32, 79206.91, 1624.97, 1624.97, 1624.97, 1625.0, 25228.19, 24690.32, 25046.93, 24965.46, 24781.64, 25322.93, 67104.25, 72028.63, 69223.85, 2411.92, 14396.78, 1960.3, 17608.75, 2928.65, 17613.48, 101443.16, 57266.58, 110244.64, 90562.13, 80414.42, 1063648.21, 1063648.21, 136384.93, 136351.83, 856338.52, 862238.24, 338045.36, 259581.29, 1035679.83, 1597.87, 1592.78, 4797.8, 4861.49, 81241.96, 681.15, 374418.61, 361037.5, 1779.21, 3432.71, 2477.4, 2483.55, 2880.93, 4022.56, 4022.56, 4022.56, 2880.89, 4418.93, 141633.28, 90203.54, 569861.18, 879555.97, 2559.29, 2560.26, 2560.26, 1600.05, 1599.62, 1604.74, 4605.06, 4601.73, 4621.64, 7908.39, 967.52, 2695.16, 2739.94, 2740.13, 1595.97, 1595.41, 1596.27, 617.75, 554.06, 2696.77, 1655.81, 1655.81]

**Méthde 4**

Trier les clauses par : |sel(Ti) join sel(Tj)|

Estimated cost

left deep Tree [128868.37, 70176.57, 108600.9, 75658.52, 1624.97, 1624.97, 15820.68, 1625.0, 25226.27, 474121.47, 25513.42, 24965.46, 24781.64, 25191.24, 69968.14, 72103.89, 69223.85, 2411.92, 470568.71, 1960.3, 475256.56, 2928.65, 17613.48, 101543.41, 101545.52, 1151474.69, 906284.58, 81166.28, 4141791.46, 1117867.43, 249691.68, 249532.69, 994489.05, 1293990.9, 936303.59, 803919.0, 1065220.27, 1605.17, 69820.29, 24318.84, 4861.07, 507787.74, 507763.16, 535188.26, 597511.16, 1779.21, 8708.56, 4957.73, 4084.27, 7352.64, 6991.24, 512134.47, 6991.24, 7978.37, 7622.78, 249810.56, 90205.54, 990026.45, 881130.92, 875329.27, 469103.58, 14973.78, 1774.12, 1760.68, 3528.24, 535188.54, 6451.55, 535188.58, 9740.96, 111742.03, 18182.01, 8478.61, 18259.29, 1664.24, 577269.76, 2053.47, 636.5, 1522.87, 3766.91, 1655.81, 1655.81] => somme : 23609211.80999999

Postgres [72499.91, 70176.57, 67152.32, 79206.91, 1624.97, 1624.97, 1624.97, 1625.0, 25228.19, 24690.32, 25046.93, 24965.46, 24781.64, 25322.93, 67104.25, 72028.63, 69223.85, 2411.92, 14396.78, 1960.3, 17608.75, 2928.65, 17613.48, 101443.16, 57266.58, 110244.64, 90562.13, 80414.42, 1063648.21, 1063648.21, 136384.93, 136351.83, 856338.52, 862238.24, 338045.36, 259581.29, 1035679.83, 1597.87, 1592.78, 4797.8, 4861.49, 81241.96, 681.15, 374418.61, 361037.5, 1779.21, 3432.71, 2477.4, 2483.55, 2880.93, 4022.56, 4022.56, 4022.56, 2880.89, 4418.93, 141633.28, 90203.54, 569861.18, 879555.97, 2559.29, 2560.26, 2560.26, 1600.05, 1599.62, 1604.74, 4605.06, 4601.73, 4621.64, 7908.39, 967.52, 2695.16, 2739.94, 2740.13, 1595.97, 1595.41, 1596.27, 617.75, 554.06, 2696.77, 1655.81, 1655.81]=> somme : 9501931.120000003

Run time

left deep Tree [1.266115, 0.9035380000000001, 1.073729, 0.681654, 0.253383, 0.273843, 0.381807, 0.427719, 0.415231, 13.40216, 0.299354, 2.6699859999999997, 44.079809000000004, 0.582456, 10.468956, 3.016521, 5.310810999999999, 0.09985899999999999, 29.098377, 1.3933, 1.4792850000000002, 66.602103, 3.156473, 44.757822999999995, 0.710279, 56.852222999999995, 0.509672, 3.6980479999999996, 0.428937, 1.6600709999999999, 3.006067, 0.25635399999999997, 1.966216, 168.854919, 0.719406, 1.456213, 0.6112430000000001, 23.136256, 8.3e-05, 2.1290430000000002]

Postgres [1.2381199999999999, 0.884192, 1.0091459999999999, 0.662553, 0.232078, 0.27183300000000005, 0.31806, 2.267398, 12.805218, 13.422674, 4.885096, 5.8287640000000005, 20.109791, 0.5668650000000001, 9.312883, 1.403712, 5.7563450000000005, 0.095535, 25.933013, 0.681061, 8.334421, 32.033856, 2.236344, 23.151541, 21.640988, 44.824942, 0.468964, 16.543394, 2.556035, 0.41571199999999997, 0.447247, 0.438459, 1.89591, 2.932716, 0.341399, 0.6757430000000001, 0.022651, 1.10041, 4.6e-05, 2.0668960000000003]

Execution time in second: 2209.7809960842133