



ps_partkey	ps_suppkey	ps_avallqty	ps_supplycost	ps_comment
1	2	3325	771.64	even theodolites, regular, final theodolites eat after the carefully pending foxes, furiously regular deposits sleep slyly, carefully bold re
1	25082	8076	993.49	ven ideas, quickly even packages print, pending multipliers must have to are fluff
1	50082	3956	337.09	after the fluffily ironic deposits? blithely special dependencies integrate furiously even excuses, blithely silent theodolites could have to ha
1	75082	4069	357.84	al, regular dependencies serve carefully after the quickly final pinto beans, furiously even deposits sleep quickly final, silent pinto beans. f
2	3	8895	378.49	ntic accounts, final accounts sleep furiously about the ironic, bold packages, regular, regular accounts
2	25083	4969	915.27	ptotes, quickly pending dependencies integrate furiously, fluffily ironic ideas impress blithely above the express accounts, furiously even epit
2	50083	8539	438.37	blithely bold ideas, furiously stealthy packages sleep fluffily, slyly special deposits snooze furiously carefully regular accounts, regular dep
2	75083	3025	306.39	olites, deposits wake carefully, even, express requests cajole, carefully regular ex
3	4	4651	920.92	lilent foxes affix furiously quickly unusual requests, even packages across the carefully even theodolites nag above the sp
3	25084	4093	498.13	ending dependencies haggle fluffily, regular deposits boost quickly carefully regular requests, deposits affix furiously around the pinto beans,
3	50084	3917	645.40	of the blithely regular theodolites, final theodolites haggle blithely carefully unusual ideas, blithely even r
3	75084	9942	191.92	unusual, ironic foxes according to the ideas detect furiously alongside of the even, express requests, blithely regular the
4	5	1339	113.97	carefully unusual ideas, packages use slyly, blithely final pinto beans cajole along the furiously express requests, regular orbits haggle care

P\_MFGR CHAR(25) NOT NULL,  
P\_BRAND CHAR(10) NOT NULL,  
P\_TYPE VARCHAR(25) NOT NULL,  
P\_SIZE INTEGER NOT NULL,  
P\_CONTAINER CHAR(10) NOT NULL,  
P\_RETAILPRICE DECIMAL(15,2) NOT NULL,  
P\_COMMENT VARCHAR(23) NOT NULL );

Example:

p_partkey	p_name	p_mfgr	p_brand	p_type	p_size	p_container	p_retailprice	p_comment
1	goldenrod lavender spring chocolate lace	Manufacturer#1	Brand#1	PROMO BURNISHED COPPER	7	JUMBO PKG	901.00	ly, slyly ironi
2	blush thistle blue yellow saddle	Manufacturer#1	Brand#13	LARGE BRUSHED BRASS	1	LG CASE	902.00	lar accounts ano
3	spring green yellow purple cornsilk	Manufacturer#4	Brand#42	STANDARD POLISHED BRASS	21	WRAP CASE	903.00	egular deposits hag
4	cornflower chocolate smoke green pink	Manufacturer#3	Brand#34	SMALL PLATED BRASS	14	MED DRUM	904.00	p furiously r
5	forest brown coral puff cream	Manufacturer#3	Brand#32	STANDARD POLISHED TIN	15	SM PKG	905.00	wake carefully
6	bitsque cornflower lawn forest magenta	Manufacturer#2	Brand#24	PROMO PLATED STEEL	4	MED BAG	906.00	sual a
7	moccasin green thistle khaki floral	Manufacturer#1	Brand#11	SMALL PLATED COPPER	45	SM BAG	907.00	lyly, ex
8	misty lace thistle snow royal	Manufacturer#4	Brand#44	PROMO BURNISHED TIN	41	LG DRUM	908.00	epost
9	thistle dim navajo dark gainsboro	Manufacturer#4	Brand#43	SMALL BURNISHED STEEL	12	WRAP CASE	909.00	ironic foxe
10	linen pink saddle puff powder	Manufacturer#5	Brand#54	LARGE BURNISHED STEEL	44	LG CAN	910.01	lthely final deposit
11	spring maroon seashell almond orchid	Manufacturer#2	Brand#25	STANDARD BURNISHED NICKEL	43	WRAP BOX	911.01	ng gr
12	cornflower wheat orange maroon ghost	Manufacturer#3	Brand#33	MEDIUM ANODIZED STEEL	25	JUMBO CASE	912.01	quickly
13	ghost olive orange rosy thistle	Manufacturer#5	Brand#55	MEDIUM BURNISHED NICKEL	1	JUMBO PACK	913.01	osits,
14	khaki seashell rose cornsilk navajo	Manufacturer#1	Brand#13	SMALL POLISHED STEEL	28	JUMBO BOX	914.01	kages c
15	blanched honeydew sky turquoise medium	Manufacturer#1	Brand#15	LARGE ANODIZED BRASS	45	LG CASE	915.01	usual ac

4. Supplier: this table includes information about suppliers around the world.  
s\_accbal: supplier account balance.

schema:

```

CREATE TABLE SUPPLIER (
S_SUPPKEY INTEGER NOT NULL,
S_NAME CHAR(25) NOT NULL,
S_ADDRESS VARCHAR(40) NOT NULL,
S_NATIONKEY INTEGER NOT NULL,
S_PHONE CHAR(15) NOT NULL,
S_ACCTBAL DECIMAL(15,2) NOT NULL,
S_COMMENT VARCHAR(101) NOT NULL);

```

Example:

s_suppkey	s_name	s_address	s_nationkey	s_phone	s_accbal	s_comment
1	Supplier#000000001	N kD4on9OM Ipw3,gf0jBoQDd7tgrzrdDZ	17	27-918-335-1736	5755.94	each slyly above the careful
2	Supplier#000000002	89eJ5ksX3InxJQbvxObc,	5	15-679-861-2259	4032.68	slyly bold instructions, idle dependen
3	Supplier#000000003	q1,G3PJ00J1uUyFU0H18BFTKPSaU9bEV3	1	11-383-510-1199	4192.40	blithely silent requests after the express dependencies are sl
4	Supplier#000000004	Bk7ah4CK8S3VQ7epEzWmKkgHwg	15	25-843-787-7479	4641.88	riously even requests above the exp
5	Supplier#000000005	Gcdn2rJ8zL5qLTVzc	11	21-151-696-3663	283.84	slyly regular pinto bea
6	Supplier#000000006	lTQuvN757CNk	14	24-696-997-4969	1365.79	final accounts, regular dolphins use against the furiously ironic decoys,
7	Supplier#000000007	s,4TlCNCB4u06PaSqNBUq	23	33-990-965-2201	6820.35	s unwind silently furiously regular courts, final requests are deposits,
8	Supplier#000000008	9Sqb4BH2fQEnaP0ocY45sRTxobdyuoG	17	27-498-742-3868	7627.85	al pinto beans, asymptotes haggl
9	Supplier#000000009	lKHuJZegwH0ua7d5YnekY8sk	10	20-483-998-8662	5362.37	s, unusual, even requests along the furiously regular pac
10	Supplier#000000010	Saygah3gYwMp72L PY	24	34-852-489-8585	3891.91	lmg waters, regular requests ar
11	Supplier#000000011	JfWtS,LZrV, N,9C	18	28-613-996-1505	3393.08	y ironic packages, slyly ironic accounts affix furiously; ironically unusu
12	Supplier#000000012	aLIW qbHYd	8	18-179-925-7181	1432.69	al packages nag alongside of the bold instructions, express, daring accoun
13	Supplier#000000013	lHK7H0yXodwX8Gf FpgAtfW,2P0H	3	13-727-626-7813	9107.22	requests engage regularly instructions, furiously special requests ar
14	Supplier#000000014	EXsnoSpTj34lZm	15	25-656-247-5858	9189.82	l accounts boost, fluffily bold warhorses wake
15	Supplier#000000015	oLXVbN8FvZRqgokr1T,Ie	8	18-453-357-6394	308.56	across the furiously regular platelets wake even deposits, quickly expre
16	Supplier#000000016	VJP5C552HXL7LaLk2Z7fQnweJdpLn4AMpvh	22	32-822-502-4215	2972.26	ously express ideas haggle quickly dugouts? fu

5. Partsupp: this table includes information about parts, their suppliers, available quantity, supply cost, and comments on that part supply.

schema:

```

CREATE TABLE PARTSUPP (
PS_PARTKEY INTEGER NOT NULL,

```

ps_partkey	ps_suppley	ps_avallqty	ps_supplycost	ps_comment
1	2	8076	771.64	even theodolites, regular, final theodolites eat after the carefully pending foxes, furiously regular deposits sleep slyly, carefully bold re
1	25002	8076	993.49	ven ideas, quickly even packages print, pending multipliers must have to are fluff
1	50002	3956	337.09	after the fluffily ironic deposits? blithely special dependencies integrate furiously even excuses, blithely silent theodolites could have to ha
1	75002	4069	357.84	al, regular dependencies serve carefully after the quickly final pinto beans, furiously even deposits sleep quickly final, silent pinto beans. f
2	3	8895	378.49	ntic accounts, final accounts sleep furiously about the ironic, bold packages, regular, regular accounts
2	25003	4969	915.27	ptotes, quickly pending dependencies integrate furiously, fluffily ironic ideas impress blithely above the express accounts, furiously even epit
2	50003	8539	438.37	blithely bold ideas, furiously stealthy packages sleep fluffily, slyly special deposits snooze furiously carefully regular accounts, regular dep
2	75003	3025	306.39	olites, deposits wake carefully, even, express requests cajole, carefully regular ex
3	4	4651	920.92	lent foxes affix furiously quickly unusual requests, even packages across the carefully even theodolites nag above the sp
3	25004	4093	498.13	ending dependencies haggle fluffily, regular deposits boost quickly carefully regular requests, deposits affix furiously around the pinto beans,
3	50004	3917	645.40	of the blithely regular theodolites, final theodolites haggle blithely carefully unusual ideas, blithely even f
3	75004	9942	191.92	unusual, ironic foxes according to the ideas detect furiously alongside of the even, express requests, blithely regular the
4	5	1339	113.97	carefully unusual ideas, packages use slyly, blithely final pinto beans cajole along the furiously express requests, regular orbits haggle care

```

PS_SUPPKEY    INTEGER NOT NULL,
PS_AVAILQTY   INTEGER NOT NULL,
PS_SUPPLYCOST DECIMAL(15,2) NOT NULL,
PS_COMMENT    VARCHAR(199) NOT NULL );

```

Example:

6. Customer: this table includes information about customers.

schema:

```

CREATE TABLE CUSTOMER ( C_CUSTKEY    INTEGER NOT NULL,
                          C_NAME       VARCHAR(25) NOT NULL,
                          C_ADDRESS    VARCHAR(40) NOT NULL,
                          C_NATIONKEY  INTEGER NOT NULL,
                          C_PHONE      CHAR(15) NOT NULL,
                          C_ACCTBAL    DECIMAL(15,2) NOT NULL,
                          C_MKTSEGMENT CHAR(10) NOT NULL,
                          C_COMMENT     VARCHAR(117) NOT NULL);

```

Example:

c_custkey	c_name	c_address	c_nationkey	c_phone	c_acctbal	c_mktsegment	c_comment
1	Customer#000000001	IVhzIApeRb ot,c,E	15	25-989-741-2988	711.56	BUILDING	to the even, regular platelets, regular, ironic epitaphs nag e
2	Customer#000000002	XSTf4,NCwDvAmNe6tEgVwfnRchLxak	13	23-768-087-3665	121.65	AUTOMOBILE	l accounts, blithely ironic theodolites integrate boldly: caref
3	Customer#000000003	AG0k1D0ZBhwHc	1	11-710-740-3364	498.12	AUTOMOBILE	deposits eat slyly ironic, even instructions, express foxes detect
4	Customer#000000004	XXV5JslAGtn	4	14-128-100-5944	2866.83	MACHINERY	requests, final, regular ideas sleep final accou
5	Customer#000000005	KvpyuHCplRB8MgAtGV6sYpZq7Tj	3	13-750-942-6364	794.47	HOUSEHOLD	n accounts will have to unwind, foxes cajole accor
6	Customer#000000006	sKZz0CsnMD7np4Xd0YrBvx, LREYKUWAH yVn	20	30-114-968-4951	7638.57	AUTOMOBILE	tions, even deposits boost according to the slyly bold packages, fir
7	Customer#000000007	ICGeSpaZNgvePXU3kRrvX8FkasDlea	18	28-190-982-9759	9561.95	AUTOMOBILE	ainst the ironic, express theodolites, express, even pinto beans and
8	Customer#000000008	IO8i0008yMmc, 8PR8V8CFlyC3BcbCPmnh15	17	27-147-574-9335	6819.74	BUILDING	among the slyly regular theodolites kindle blithely courts, careful
9	Customer#000000009	sKLAFTJUsCuxFeLeNgefumTrJ5	8	18-338-900-3675	8324.07	FURNITURE	r theodolites according to the requests wake thinly excuses: pending
10	Customer#000000010	6LrEaV6KR6PLVcgL2ArL Q3rqzLzcT1 v2	5	15-741-346-9870	2753.54	HOUSEHOLD	es regular deposits haggle, fur
11	Customer#000000011	PKMS 3HLXqWtuzrKg6338Et	23	33-464-151-3439	-272.60	BUILDING	ckages, requests sleep slyly, quickly even pinto beans promise above
12	Customer#000000012	9PMKh1z4Zr1Q	13	23-791-276-1263	3396.49	HOUSEHOLD	to the carefully final braids: blithely regular requests nag, iron
13	Customer#000000013	nsXQU0oVjD7PM659uC3SRSp	3	13-761-547-5974	3857.34	BUILDING	ounts sleep carefully after the close frays, carefully bold notornit
14	Customer#000000014	KXKletML2JQEa	1	11-845-129-3851	5266.30	FURNITURE	, ironic packages across the unus

7. Orders: contains information about all orders. O\_orderstatus: 'F' means failed to meet the committed delivery date.

schema:

```

CREATE TABLE ORDERS ( O_ORDERKEY    INTEGER NOT NULL,
                        O_CUSTKEY     INTEGER NOT NULL,
                        O_ORDERSTATUS  CHAR(1) NOT NULL,
                        O_TOTALPRICE   DECIMAL(15,2) NOT NULL,
                        O_ORDERDATE    DATE NOT NULL,
                        O_ORDERPRIORITY CHAR(15) NOT NULL,
                        O_CLERK        CHAR(15) NOT NULL,
                        O_SHIPPRIORITY INTEGER NOT NULL,
                        O_COMMENT       VARCHAR(79) NOT NULL);

```

Example:

ps_partkey	ps_suppkey	ps_avallqty	ps_supplycost	ps_comment			
1	2	3325	771.64	even theodolites. regular. final theodolites eat after the carefully pending foxes. furiously regular deposits sleep slyly. carefully bold regular			
1	25002	8076	993.49	ven ideas. quickly even packages print. pending multipliers must have to are fluff			
1	50002	3956	337.09	after the fluffily ironic deposits? blithely special dependencies integrate furiously even excuses. blithely silent theodolites could have to had			
1	75002	4069	357.84	al, regular dependencies serve carefully after the quickly final pinto beans. furiously even deposits sleep quickly final, silent pinto beans. f			
2	3	8895	378.49	ntic accounts. final accounts sleep furiously about the ironic, bold packages. regular, regular accounts			
2	25003	4969	915.27	pnotes. quickly pending dependencies integrate furiously. fluffily ironic ideas inpress blithely above the express accounts. furiously even epit			
2	50003	8539	438.37	blithely bold ideas. furiously stealthy packages sleep fluffily. slyly special deposits snooze furiously carefully regular accounts. regular dep			
2	75003	3025	306.39	olites. deposits wake carefully. even, express requests cajole. carefully regular ex			
3	4	4651	920.92	lent foxes affix furiously quickly unusual requests. even packages across the carefully even theodolites nag above the sp			
3	25004	4093	498.13	ending dependencies haggle fluffily. regular deposits boost quickly carefully regular requests. deposits affix furiously around the pinto beans.			
3	50004	3917	645.40	of the blithely regular theodolites. final theodolites haggle blithely carefully unusual ideas. blithely even f			
3	75004	9942	191.92	unusual, ironic foxes according to the ideas detect furiously alongside of the even, express requests. blithely regular the			
4	5	1339	113.97	carefully unusual ideas. packages use slyly. blithely final pinto beans cajole along the furiously express requests. regular orbits haggle care			

o_orderkey	o_custkey	o_orderstatus	o_totalprice	o_orderdate	o_orderpriority	o_clerk	o_shippriority	o_comment
1	369001	O	186600.18	1996-01-02	5-LOW	Clerk#000009506	0	nstructions sleep furiously among
2	780017	O	66219.63	1996-12-01	1-URGENT	Clerk#000008792	0	foxes. pending accounts at the pending, silent asymptot
3	1233140	F	270741.97	1993-10-14	5-LOW	Clerk#000009543	0	sly final accounts boost. carefully regular ideas cajole carefully. depos
4	1367761	O	41714.38	1995-10-11	5-LOW	Clerk#000001234	0	sits. slyly regular warthogs cajole. regular, regular theodolites acro
5	444840	F	122444.33	1994-07-30	5-LOW	Clerk#000000240	0	quickly. bold deposits sleep slyly. packages use slyly
6	550222	F	50883.96	1992-02-21	4-NOT SPECIFIED	Clerk#000000580	0	ggle. special, final requests are against the furiously specia
7	391343	O	287534.80	1996-01-10	2-HIGH	Clerk#000004697	0	ly special requests
32	1300570	O	129634.85	1995-07-16	2-HIGH	Clerk#000006157	0	ise blithely bold, regular requests. quickly unusual dep
33	609580	F	126998.88	1993-10-27	3-MEDIUM	Clerk#000004080	0	urlously. furiously final request
34	610001	O	55314.82	1998-07-21	3-MEDIUM	Clerk#000002220	0	ly final packages. fluffily final deposits wake blithely ideas. spe
35	1275877	O	219853.63	1995-10-23	4-NOT SPECIFIED	Clerk#000002584	0	zzle. carefully enticing deposits nag furio
36	1152518	O	67366.95	1995-11-03	1-URGENT	Clerk#000003571	0	quick packages are blithely. slyly silent accounts wake qu
37	861145	F	159656.83	1992-06-03	3-MEDIUM	Clerk#000004556	0	kly regular pinto beans. carefully unusual waters cajole never
38	1248280	O	62350.62	1996-08-21	4-NOT SPECIFIED	Clerk#000006037	0	haggle blithely. furiously express ideas haggle blithely furiously regular
39	017025	O	320710.77	1996-09-20	3-MEDIUM	Clerk#000006580	0	ole express, ironic requests. ir

8. Lineitem: contains information about all line items(in transportation). L\_ORDERKEY: unique key of an order.

schema:

```
CREATE TABLE LINEITEM ( L_ORDERKEY INTEGER NOT NULL,
                        L_PARTKEY INTEGER NOT NULL,
                        L_SUPPKEY INTEGER NOT NULL,
                        L_LINENUMBER INTEGER NOT NULL,
                        L_QUANTITY DECIMAL(15,2) NOT NULL,
                        L_EXTENDEDPRICE DECIMAL(15,2) NOT NULL,
                        L_DISCOUNT DECIMAL(15,2) NOT NULL,
                        L_TAX DECIMAL(15,2) NOT NULL,
                        L_RETURNFLAG CHAR(1) NOT NULL,
                        L_LINESTATUS CHAR(1) NOT NULL,
                        L_SHIPDATE DATE NOT NULL,
                        L_COMMITDATE DATE NOT NULL,
                        L_RECEIPTDATE DATE NOT NULL,
                        L_SHIPINSTRUCT CHAR(25) NOT NULL,
                        L_SHIPMODE CHAR(10) NOT NULL,
                        L_COMMENT VARCHAR(44) NOT NULL);
```

Example:

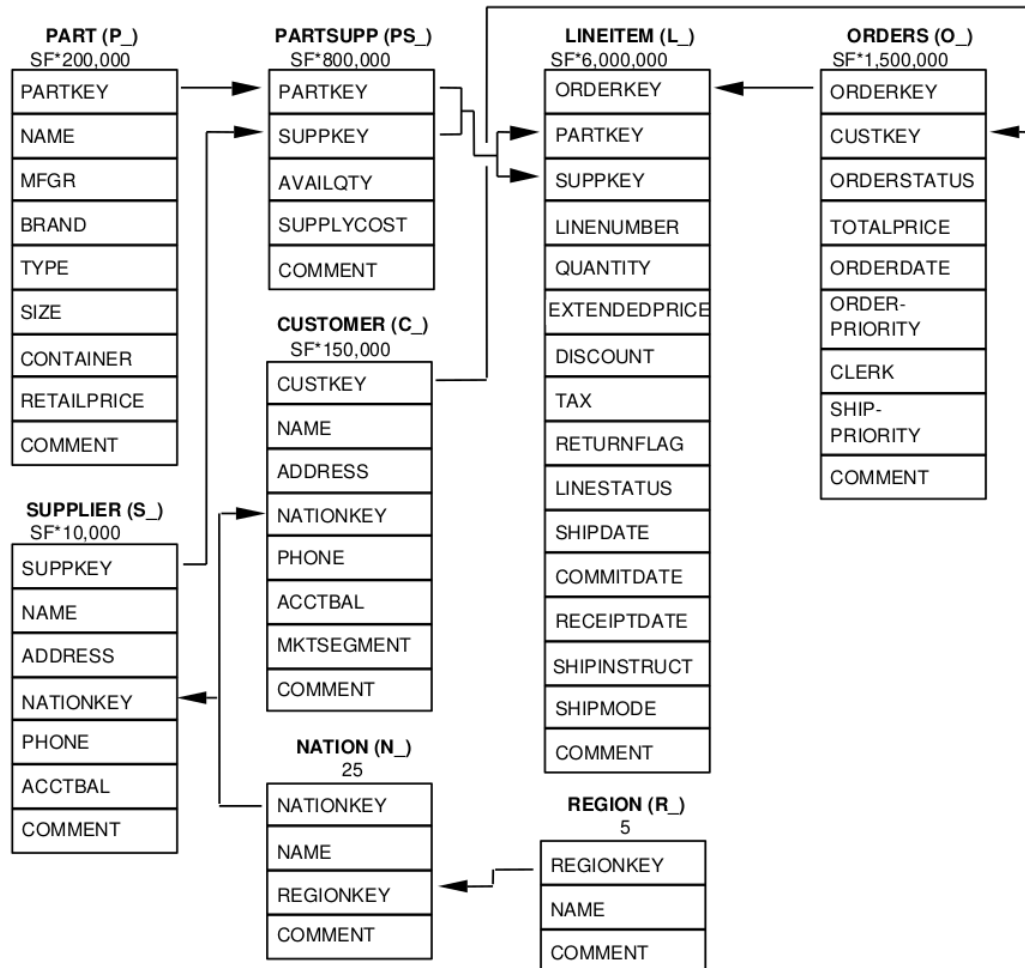
l_orderkey	l_partkey	l_suppkey	l_linenumber	l_quantity	l_extendedprice	l_discount	l_tax	l_returnflag	l_linestatus	l_shipdate	l_commitdate	l_receiptdate
1	1551894	76910	1	17.00	33078.94	0.04	0.02	N	O	1996-03-13	1996-02-12	1996-03-22
1	673091	73092	2	36.00	38306.16	0.09	0.06	N	O	1996-04-12	1996-02-28	1996-04-20
1	636998	36999	3	8.00	15479.68	0.10	0.02	N	O	1996-01-29	1996-03-05	1996-01-31
1	21315	46316	4	28.00	34616.68	0.09	0.06	N	O	1996-04-21	1996-03-30	1996-05-16
1	240267	15274	5	24.00	28974.00	0.10	0.04	N	O	1996-03-30	1996-03-14	1996-04-01
1	150345	6348	6	32.00	44842.88	0.07	0.02	N	O	1996-01-30	1996-02-07	1996-02-03
2	1061698	11719	1	38.00	63066.32	0.00	0.05	N	O	1997-01-28	1997-01-14	1997-02-02
3	42970	17971	1	45.00	86083.65	0.06	0.00	R	F	1994-02-02	1994-01-04	1994-02-23
3	190355	65359	2	49.00	70822.15	0.10	0.00	R	F	1993-11-09	1993-12-28	1993-11-24
3	1284483	34508	3	27.00	39620.34	0.06	0.07	A	F	1994-01-16	1993-11-22	1994-01-23

l_receiptdate	l_shipinstruct	l_shipmode	l_comment
1996-03-22	DELIVER IN PERSON	TRUCK	egular courts above the
1996-04-20	TAKE BACK RETURN	MAIL	ly final dependencies: slyly bold
1996-01-31	TAKE BACK RETURN	REG AIR	riously. regular, express dep
1996-05-16	NONE	AIR	lites. fluffily even de
1996-04-01	NONE	FOB	pending foxes. slyly re
1996-02-03	DELIVER IN PERSON	MAIL	arefully slyly ex
1997-02-02	TAKE BACK RETURN	RAIL	ven requests. deposits breach a
1994-02-23	NONE	AIR	ongside of the furiously brave acco
1993-11-24	TAKE BACK RETURN	RAIL	unusual accounts. eve
1994-01-23	DELIVER IN PERSON	SHIP	nal foxes wake.

ps_partkey	ps_suppkey	ps_avallqty	ps_supplycost	ps_comment
1	2	3325	771.64	, even theodolites, regular, final theodolites eat after the carefully pending foxes, furiously regular deposits sleep slyly, carefully bold rea
1	25002	8076	993.49	ven ideas, quickly even packages print, pending multipliers must have to are fluff
1	50002	3956	337.09	after the fluffily ironic deposits? blithely special dependencies integrate furiously even excuses, blithely silent theodolites could have to ha
1	75002	4069	357.84	al, regular dependencies serve carefully after the quickly final pinto beans, furiously even deposits sleep quickly final, silent pinto beans. f
2	3	8895	378.49	ntic accounts, final accounts sleep furiously about the ironic, bold packages, regular, regular accounts
2	25003	4969	915.27	ptotes, quickly pending dependencies integrate furiously, fluffily ironic ideas impress blithely above the express accounts, furiously even epit
2	50003	8539	438.37	blithely bold ideas, furiously stealthy packages sleep fluffily, slyly special deposits snooze furiously carefully regular accounts, regular dep
2	75003	3025	306.39	olites, deposits wake carefully, even, express requests cajole, carefully regular ex
3	4	4651	920.92	lent foxes affix furiously quickly unusual requests, even packages across the carefully even theodolites nag above the sp
3	25004	4093	498.13	ending dependencies haggle fluffily, regular deposits boost quickly carefully regular requests, deposits affix furiously around the pinto beans,
3	50004	3917	645.40	of the blithely regular theodolites, final theodolites haggle blithely carefully unusual ideas, blithely even r
3	75004	9942	191.92	unusual, ironic foxes according to the ideas detect furiously alongside of the even, express requests, blithely regular the
4	5	1339	113.97	carefully unusual ideas, packages use slyly, blithely final pinto beans cajole along the furiously express requests, regular orbits haggle care

## Overall Schema



### Problem 1.

#### Parts/Supplier Relationship Query (Example 16)

This query finds out how many suppliers can supply parts with given attributes.

Table used: **partsupp**, **part**

Query broad description:

The Parts/Supplier Relationship Query **counts the number of (distinct) suppliers** who can supply parts that satisfy a particular customer's requirements. The customer is interested in parts of **eight different sizes** as long as **they are not of a given type**[Brand#45], **not of a given brand**[MEDIUM POLISHED], and **not from a supplier who has bad complaints**.

Results must be presented in

First, **descending count** (of the number of suppliers)



ps_partkey	ps_suppkey	ps_avallqty	ps_supplycost	ps_comment
1	2	3325	771.64	, even theodolites, regular, final theodolites eat after the carefully pending foxes, furiously regular deposits sleep slyly, carefully bold rea
1	25002	8076	993.49	ven ideas, quickly even packages print, pending multipliers must have to are fluff
1	50002	3956	337.09	after the fluffily ironic deposits? blithely special dependencies integrate furiously even excuses, blithely silent theodolites could have to ha
1	75002	4069	357.84	al, regular dependencies serve carefully after the quickly final pinto beans, furiously even deposits sleep quickly final, silent pinto beans. f
2	3	8895	378.49	ntic accounts, final accounts sleep furiously about the ironic, bold packages, regular, regular accounts
2	25003	4969	915.27	ptotes, quickly pending dependencies integrate furiously, fluffily ironic ideas impress blithely above the express accounts, furiously even epit
2	50003	8539	438.37	blithely bold ideas, furiously stealthy packages sleep fluffily, slyly special deposits snooze furiously carefully regular accounts, regular dep
2	75003	3025	306.39	olites, deposits wake carefully, even, express requests cajole, carefully regular ex
3	4	4651	920.92	ilent foxes affix furiously quickly unusual requests, even packages across the carefully even theodolites nag above the sp
3	25004	4093	498.13	ending dependencies haggle fluffily, regular deposits boost quickly carefully regular requests, deposits affix furiously around the pinto beans,
3	50004	3917	645.40	of the blithely regular theodolites, final theodolites haggle blithely carefully unusual ideas, blithely even f
3	75004	9942	191.92	unusual, ironic foxes according to the ideas detect furiously alongside of the even, express requests, blithely regular the
4	5	1339	113.97	carefully unusual ideas, packages use slyly, blithely final pinto beans cajole along the furiously express requests, regular orbits haggle care

Second, ascending brand

Third, ascending type

Fourth, ascending size.

Specific Requirements:

1. BRAND is **not** Brand#45.
2. TYPE does **not** start with **MEDIUM POLISHED**.
3. Size must be one of {49, 14, 23, 45, 19, 3, 36, 9}
4. comment of supplier must not contain "Customer Complaints"

In other words, s\_comment should not match '%Customer%Complaints%'

Example of output table:

p_brand	p_type	p_size	supplier_cnt
Brand#44	STANDARD PLATED TIN	9	120
Brand#12	STANDARD POLISHED COPPER	14	100
Brand#11	LARGE BRUSHED STEEL	36	96
Brand#23	PROMO BURNISHED STEEL	14	96
Brand#34	MEDIUM BRUSHED STEEL	23	96
Brand#53	PROMO BURNISHED BRASS	36	96
Brand#54	STANDARD BRUSHED COPPER	19	96
Brand#32	LARGE POLISHED COPPER	14	95
Brand#43	LARGE PLATED COPPER	19	95
Brand#11	SMALL BRUSHED STEEL	9	92
Brand#11	STANDARD BRUSHED TIN	23	92
Brand#23	STANDARD POLISHED BRASS	9	92
Brand#34	ECONOMY POLISHED BRASS	19	92
Brand#35	PROMO BURNISHED TIN	9	92
Brand#43	MEDIUM BRUSHED COPPER	9	92
Brand#43	PROMO BURNISHED STEEL	3	92
Brand#11	LARGE ANODIZED COPPER	36	88
Brand#11	STANDARD BURNISHED COPPER	14	88
Brand#14	ECONOMY BRUSHED COPPER	19	88

## Problem 2.

### Forecasting Revenue Change Query (Example 6)

This query quantifies the amount of revenue increase that would have resulted from eliminating certain company-wide discounts in a given percentage range in a given year. Asking this type of "what if" query can be used to look for ways to increase revenues.

Table used: **lineitem**

Query broad description:

ps_partkey	ps_suppkey	ps_avallqty	ps_supplycost	ps_comment
1	2	3325	771.64	, even theodolites, regular, final theodolites eat after the carefully pending foxes, furiously regular deposits sleep slyly, carefully bold rea
1	25002	8076	993.49	ven ideas, quickly even packages print, pending multipliers must have to are fluff
1	50002	3956	337.09	after the fluffily ironic deposits? blithely special dependencies integrate furiously even excuses, blithely silent theodolites could have to ha
1	75002	4069	357.84	al, regular dependencies serve carefully after the quickly final pinto beans, furiously even deposits sleep quickly final, silent pinto beans. f
2	3	8895	378.49	ntic accounts, final accounts sleep furiously about the ironic, bold packages, regular, regular accounts
2	25003	4969	915.27	ptotes, quickly pending dependencies integrate furiously, fluffily ironic ideas impress blithely above the express accounts, furiously even epit
2	50003	8539	438.37	blithely bold ideas, furiously stealthy packages sleep fluffily, slyly special deposits snooze furiously carefully regular accounts, regular dep
2	75003	3025	306.39	olites, deposits wake carefully, even, express requests cajole, carefully regular ex
3	4	4651	920.92	ilent foxes affix furiously quickly unusual requests, even packages across the carefully even theodolites nag above the sp
3	25004	4093	498.13	ending dependencies haggle fluffily, regular deposits boost quickly carefully regular requests, deposits affix furiously around the pinto beans.
3	50004	3917	645.40	of the blithely regular theodolites, final theodolites haggle blithely carefully unusual ideas, blithely even r
3	75004	9942	191.92	unusual, ironic foxes according to the ideas detect furiously alongside of the even, express requests, blithely regular the
4	5	1339	113.97	carefully unusual ideas, packages use slyly, blithely final pinto beans cajole along the furiously express requests, regular orbits haggle care

The Forecasting Revenue Change Query considers all the lineitems shipped **in a given year “1994-01-01” - “1995-01-01”** with **discounts between 0.05 and 0.07**. The query lists the amount by which the total revenue would have increased if these discounts had been eliminated for lineitems **with l\_quantity less than 24**. Note that the potential revenue increase is equal to **the sum of [l\_extendedprice \* l\_discount]** for all lineitems with discounts and quantities in the qualifying range.

Sample output:

revenue

```
-----
1230113636.0101
3677125983.5401
```

### Problem 3.

#### Order Priority Checking Query (Example 4)

This query determines how well the order priority system is working and gives an assessment of customer satisfaction.

Table used: orders, lineitem

Query broad description:

The Order Priority Checking Query counts the number of orders ordered in a given quarter of a given year (“1993-07-01” to “1993-10-01”) in which **at least one lineitem was received by the customer later than its committed date**. The query lists the count of such orders for each order priority sorted in ascending priority order.

Sample output:

```
o_orderpriority | order_count
-----+-----
1-URGENT        | 105214
2-HIGH          | 104821
3-MEDIUM       | 105227
4-NOT SPECIFIED | 105422
5-LOW           | 105356
```

ps_partkey	ps_supkey	ps_avallqty	ps_supplycost	ps_comment
1	2	3325	771.64	, even theodolites. regular. final theodolites eat after the carefully pending foxes. furiously regular deposits sleep slyly. carefully bold rea
1	25002	8076	993.49	ven ideas. quickly even packages print. pending multipliers must have to are fluff
1	50002	3956	337.09	after the fluffily ironic deposits? blithely special dependencies integrate furiously even excuses. blithely silent theodolites could have to ha
1	75002	4069	357.84	al, regular dependencies serve carefully after the quickly final pinto beans. furiously even deposits sleep quickly final, silent pinto beans. f
2	3	8895	378.49	ntic accounts. final accounts sleep furiously about the ironic, bold packages. regular, regular accounts
2	25003	4969	915.27	ptotes. quickly pending dependencies integrate furiously. fluffily ironic ideas impress blithely above the express accounts. furiously even epit
2	50003	8539	438.37	blithely bold ideas. furiously stealthy packages sleep fluffily. slyly special deposits snooze furiously carefully regular accounts. regular dep
2	75003	3025	306.39	olites. deposits wake carefully. even, express requests cajole. carefully regular ex
3	4	4651	920.92	lilent foxes affix furiously quickly unusual requests. even packages across the carefully even theodolites nag above the sp
3	25004	4093	498.13	ending dependencies haggle fluffily. regular deposits boost quickly carefully regular requests. deposits affix furiously around the pinto beans.
3	50004	3917	645.40	of the blithely regular theodolites. final theodolites haggle blithely carefully unusual ideas. blithely even f
3	75004	9942	191.92	unusual, ironic foxes according to the ideas detect furiously alongside of the even, express requests. blithely regular the
4	5	1339	113.97	carefully unusual ideas. packages use slyly. blithely final pinto beans cajole along the furiously express requests. regular orbits haggle care

For benchmark 16(first 1)

## Understanding 1:

Groundtruth is:

```
select
p_brand,
p_type,
p_size,
count(distinct ps_supkey) as supplier_cnt
from
partsupp,
part
where
p_partkey = ps_partkey
and p_brand <> 'Brand#45'
and p_type not like 'MEDIUM POLISHED%'
and p_size in (49, 14, 23, 45, 19, 3, 36, 9)
and ps_supkey not in (
select
s_supkey
from
supplier
where
s_comment like '%Customer%Complaints%'
)
group by
p_brand,
p_type,
p_size
order by
supplier_cnt desc,
p_brand,
p_type,
p_size;
```

Running time & Query plan for ground truth is:

```

QUERY PLAN
-----
Sort (cost=379739.94..380123.78 rows=153537 width=44) (actual time=2239.933..2266.070 rows=27840 loops=1)
  Sort Key: (count(DISTINCT partsupp.ps_supkey)) DESC, part_p_brand, part_p_type, part_p_size
  Sort Method: quicksort  Memory: 2968kB
-> GroupAggregate (cost=285383.54..361789.08 rows=153537 width=44) (actual time=1692.061..2219.225 rows=27840 loops=1)
  Group Key: part_p_brand, part_p_type, part_p_size
  -> Gather Merge (cost=285383.54..354333.55 rows=592016 width=40) (actual time=1692.018..2029.149 rows=1186602 loops=1)
    Workers Planned: 2
    Workers Launched: 2
    -> Sort (cost=284383.51..285000.19 rows=246673 width=40) (actual time=1671.124..1791.961 rows=395534 loops=3)
      Sort Key: part_p_brand, part_p_type, part_p_size
      Sort Method: external merge  Disk: 20144kB
      Worker 0: Sort Method: external merge  Disk: 20256kB
      Worker 1: Sort Method: external merge  Disk: 20200kB
    -> Parallel Hash Join (cost=67767.50..255543.18 rows=246673 width=40) (actual time=824.326..1034.508 rows=395534 loops=3)
      Hash Cond: (partsupp.ps_partkey = part_p_partkey)
      -> Parallel Index Only Scan using partsupp_pkey on partsupp (cost=3466.46..172881.12 rows=1666667 width=8) (actual time=23.633..439.421 rows=2665173 loops=3)
        Filter: (NOT (hashed SubPlan 1))
        Rows Removed by Filter: 1493
        Heap Fetches: 0
        SubPlan 1
        -> Seq Scan on supplier (cost=0.00..3466.00 rows=10 width=4) (actual time=2.586..23.174 rows=56 loops=3)
          Filter: ((s_comment)::text ~~ '%Customer%Complaints%':text)
          Rows Removed by Filter: 99944
      -> Parallel Hash (cost=61795.33..61795.33 rows=123337 width=40) (actual time=128.485..128.486 rows=98941 loops=3)
        Buckets: 65536  Batches: 8  Memory Usage: 3328kB
        -> Parallel Seq Scan on part (cost=0.00..61795.33 rows=123337 width=40) (actual time=8.477..111.524 rows=98941 loops=3)
          Filter: ((p_brand <> 'Brand#45')::bpchar) AND ((p_type)::text !~ 'MEDIUM POLISHED%':text) AND (p_size = ANY ({49,14,23,45,19,3,36,9}::integer[]))
          Rows Removed by Filter: 567725
Planning Time: 1.075 ms
JIT:
  Functions: 84
  Options: Inlining false, Optimization false, Expressions true, Deforming true
  Timing: Generation 8.631 ms, Inlining 0.000 ms, Optimization 1.614 ms, Emission 30.807 ms, Total 41.052 ms
Execution Time: 2273.876 ms
(34 rows)
```

Handwritten solution is:



ps_partkey	ps_suppkey	ps_avallqty	ps_supplycost	ps_comment
1	2	3325	771.64	, even theodolites. regular. final theodolites eat after the carefully pending foxes. furiously regular deposits sleep slyly. carefully bold rea
1	25002	8076	993.49	ven ideas. quickly even packages print. pending multipliers must have to are fluff
1	50002	3956	337.09	after the fluffily ironic deposits? blithely special dependencies integrate furiously even excuses. blithely silent theodolites could have to ha
1	75002	4069	357.84	al, regular dependencies serve carefully after the quickly final pinto beans. furiously even deposits sleep quickly final, silent pinto beans. f
2	3	8895	378.49	ntic accounts. final accounts sleep furiously about the ironic, bold packages. regular, regular accounts
2	25003	4969	915.27	ptotes. quickly pending dependencies integrate furiously. fluffily ironic ideas impress blithely above the express accounts. furiously even epit
2	50003	8539	438.37	blithely bold ideas. furiously stealthy packages sleep fluffily. slyly special deposits snooze furiously carefully regular accounts. regular dep
2	75003	3025	306.39	olites. depositts wake carefully. even, express requests cajole. carefully regular ex
3	4	4651	920.92	lilent foxes affix furiously quickly unusual requests. even packages across the carefully even theodolites nag above the sp
3	25004	4093	498.13	ending dependencies haggle fluffily. regular deposits boost quickly carefully regular requests. deposits affix furiously around the pinto beans.
3	50004	3917	645.40	of the blithely regular theodolites. final theodolites haggle blithely carefully unusual ideas. blithely even r
3	75004	9942	191.92	unusual, ironic foxes according to the ideas detect furiously alongside of the even, express requests. blithely regular the
4	5	1339	113.97	carefully unusual ideas. packages use slyly. blithely final pinto beans cajole along the furiously express requests. regular orbits haggle care

```
SELECT
p_brand,
p_type,
p_size,
count(distinct ps_suppkey) AS SUPPLIERCNT
FROM
(SELECT p_brand, p_type, p_size, p_partkey, ps_comment, ps_suppkey
FROM PART RIGHT OUTER JOIN PARTSUPP
ON part.p_partkey = partsupp.ps_partkey) as a
WHERE
p_brand <> 'Brand#45'
AND p_type NOT LIKE 'MEDIUM POLISHED%'
AND (p_size = 49 OR p_size = 14 OR p_size = 23 OR p_size = 45
OR p_size = 19 OR p_size = 3 OR p_size = 36 OR p_size = 9)
AND ps_suppkey not in (
select
s_suppkey
from
supplier
where
s_comment like '%Customer%Complaints%'
)
GROUP BY p_brand, p_type, p_size
ORDER BY SUPPLIERCNT DESC, p_brand, p_type, p_size;
```

Running time & Query plan for Handwritten solution is:

QUERY PLAN

Sort (cost=380210.97..380583.71 rows=149095 width=44) (actual time=2303.700..2329.026 rows=27840 loops=1)  
Sort Key: (count(DISTINCT partsupp.ps\_suppkey)) DESC, part.p\_brand, part.p\_type, part.p\_size  
Sort Method: quicksort Memory: 2968kB  
-> GroupAggregate (cost=291445.64..362810.83 rows=149095 width=44) (actual time=1728.399..2278.697 rows=27840 loops=1)  
Group Key: part.p\_brand, part.p\_type, part.p\_size  
-> Gather Merge (cost=291445.64..355794.76 rows=552512 width=40) (actual time=1728.361..2081.984 rows=1186602 loops=1)  
Workers Planned: 2  
Workers Launched: 2  
-> Sort (cost=290445.61..291021.14 rows=230213 width=40) (actual time=1714.437..1843.689 rows=395534 loops=3)  
Sort Key: part.p\_brand, part.p\_type, part.p\_size  
Sort Method: external merge Disk: 20424kB  
Worker 0: Sort Method: external merge Disk: 20080kB  
Worker 1: Sort Method: external merge Disk: 20096kB  
-> Parallel Hash Join (cost=75933.96..263645.64 rows=230213 width=40) (actual time=844.255..1058.498 rows=395534 loops=3)  
Hash Cond: (partsupp.ps\_partkey = part.p\_partkey)  
-> Parallel Index Only Scan using partsupp\_pkey on partsupp (cost=3466.46..172881.12 rows=1666667 width=8) (actual time=17.824..449.094 rows=2665173 loops=3)  
Filter: (NOT (hashed SubPlan 1))  
Rows Removed by Filter: 1493  
Heap Fetches: 0  
SubPlan 1  
-> Seq Scan on supplier (cost=0.00..3466.00 rows=10 width=4) (actual time=2.522..17.396 rows=56 loops=3)  
Filter: ((s\_comment)::text ~ '%Customer%Complaints%':text)  
Rows Removed by Filter: 99944  
-> Parallel Hash (cost=70128.67..70128.67 rows=115107 width=40) (actual time=128.577..128.577 rows=98941 loops=3)  
Buckets: 65536 Batches: 8 Memory Usage: 3360kB  
-> Parallel Seq Scan on part (cost=0.00..70128.67 rows=115107 width=40) (actual time=9.390..111.653 rows=98941 loops=3)  
Filter: ((p\_brand <> 'Brand#45')::bpchar) AND ((p\_type)::text !~ 'MEDIUM POLISHED%':text) AND ((p\_size = 49) OR (p\_size = 14) OR (p\_size = 23) OR (p\_size = 45) OR (p\_size = 19) OR (p\_size = 3) OR (p\_size = 36) OR (p\_size = 9)))  
Rows Removed by Filter: 567725  
Planning Time: 1.123 ms  
JIT:  
Functions: 84  
Options: Inlining false, Optimization false, Expressions true, Deforming true  
Timing: Generation 8.629 ms, Inlining 0.000 ms, Optimization 1.810 ms, Emission 33.220 ms, Total 43.659 ms  
Execution Time: 2336.719 ms  
(34 rows)

Understanding 2:  
Groundtruth is:

```
select
p_brand,
p_type,
p_size,
count(distinct ps_suppkey) as supplier_cnt
from
partsupp,
part
where
p_partkey = ps_partkey
and p_brand <> 'Brand#45'
and p_type not like 'MEDIUM POLISHED%'
and p_size in (49, 14, 23, 45, 19, 3, 36, 9)
and ps_comment not like '%Customer%Complaints%'

group by
p_brand,
```

ps_partkey	ps_suppkey	ps_avallqty	ps_supplycost	ps_comment
1	2	3325	771.64	, even theodolites, regular, final theodolites eat after the carefully pending foxes, furiously regular deposits sleep slyly, carefully bold re
1	25002	8076	993.49	ven ideas, quickly even packages print, pending multipliers must have to are fluff
1	50002	3956	337.09	after the fluffily ironic deposits? blithely special dependencies integrate furiously even excuses, blithely silent theodolites could have to ha
1	75002	4069	357.84	al, regular dependencies serve carefully after the quickly final pinto beans, furiously even deposits sleep quickly final, silent pinto beans. f
2	3	8895	378.49	ntic accounts, final accounts sleep furiously about the ironic, bold packages, regular, regular accounts
2	25003	4969	915.27	ptotes, quickly pending dependencies integrate furiously, fluffily ironic ideas impress blithely above the express accounts, furiously even epit
2	50003	8539	438.37	blithely bold ideas, furiously stealthy packages sleep fluffily, slyly special deposits snooze furiously carefully regular accounts, regular dep
2	75003	3025	306.39	olites, deposits wake carefully, even, express requests cajole, carefully regular ex
3	4	4651	920.92	lent foxes affix furiously quickly unusual requests, even packages across the carefully even theodolites nag above the sp
3	25004	4093	498.13	ending dependencies haggle fluffily, regular deposits boost quickly carefully regular requests, deposits affix furiously around the pinto beans,
3	50004	3917	645.40	of the blithely regular theodolites, final theodolites haggle blithely carefully unusual ideas, blithely even r
3	75004	9942	191.92	unusual, ironic foxes according to the ideas detect furiously alongside of the even, express requests, blithely regular the
4	5	1339	113.97	carefully unusual ideas, packages use slyly, blithely final pinto beans cajole along the furiously express requests, regular orbits haggle care

```
p_type,
p_size
order by
supplier_cnt desc,
p_brand,
p_type,
p_size;
```

## Running time & Query plan for Groundtruth is:

### QUERY PLAN

```
Sort (cost=546454.05..546837.89 rows=153537 width=44) (actual time=2640.381..2667.860 rows=27840 loops=1)
Sort Key: (count(DISTINCT partsupp.ps_suppkey)) DESC, part.p_brand, part.p_type, part.p_size
Sort Method: quicksort Memory: 2968kB
-> GroupAggregate (cost=377242.39..528503.20 rows=153537 width=44) (actual time=2084.004..2617.965 rows=27840 loops=1)
Group Key: part.p_brand, part.p_type, part.p_size
-> Gather Merge (cost=377242.39..515128.69 rows=1183914 width=40) (actual time=2083.953..2436.535 rows=1187296 loops=1)
Workers Planned: 2
Workers Launched: 2
-> Sort (cost=376242.37..377475.61 rows=493298 width=40) (actual time=2062.641..2189.700 rows=395765 loops=3)
Sort Key: part.p_brand, part.p_type, part.p_size
Sort Method: external merge Disk: 20264kB
Worker 0: Sort Method: external merge Disk: 20104kB
Worker 1: Sort Method: external merge Disk: 20272kB
-> Parallel Hash Join (cost=64301.05..316106.86 rows=493298 width=40) (actual time=1147.348..1364.936 rows=395765 loops=3)
Hash Cond: (partsupp.ps_partkey = part.p_partkey)
-> Parallel Seq Scan on partsupp (cost=0.00..216052.67 rows=3333000 width=8) (actual time=0.018..670.743 rows=2666667 loops=3)
Filter: ((ps_comment)::text !~ '%Customer%Complaints%':text)
-> Parallel Hash (cost=61795.33..61795.33 rows=123337 width=40) (actual time=205.911..205.911 rows=98941 loops=3)
Buckets: 65536 Batches: 8 Memory Usage: 3328kB
-> Parallel Seq Scan on part (cost=0.00..61795.33 rows=123337 width=40) (actual time=92.040..188.547 rows=98941 loops=3)
Filter: ((p_brand <> 'Brand#45':bpchar) AND ((p_type)::text !~ 'MEDIUM POLISHED%':text) AND (p_size = ANY ('{49,14,23,45,19,3,36,9}':integer[])))
Rows Removed by Filter: 567725

Planning Time: 0.911 ms
JIT:
Functions: 45
Options: Inlining true, Optimization true, Expressions true, Deforming true
Timing: Generation 6.459 ms, Inlining 61.440 ms, Optimization 130.582 ms, Emission 83.621 ms, Total 282.102 ms
Execution Time: 2674.829 ms
(28 rows)
```

## Handwritten solution is:

```
SELECT
p_brand,
p_type,
p_size,
count(distinct ps_suppkey) AS SUPPLIERCNT
FROM

(SELECT p_brand, p_type, p_size, p_partkey, ps_comment, ps_suppkey
FROM PART RIGHT OUTER JOIN PARTSUPP
ON part.p_partkey = partsupp.ps_partkey) as a

WHERE
p_brand <> 'Brand#45'
AND p_type NOT LIKE 'MEDIUM POLISHED%'
AND (p_size = 49 OR p_size = 14 OR p_size = 23 OR p_size = 45
OR p_size = 19 OR p_size = 3 OR p_size = 36 OR p_size = 9)
AND ps_comment NOT LIKE '%Customer%Complaints%'

GROUP BY p_brand, p_type, p_size
ORDER BY SUPPLIERCNT DESC, p_brand , p_type , p_size ;
```

## Running time & Query plan for Handwritten solution is:

### QUERY PLAN

```
Sort (cost=539728.80..540101.54 rows=149095 width=44) (actual time=2612.695..2640.125 rows=27840 loops=1)
Sort Key: (count(DISTINCT partsupp.ps_suppkey)) DESC, part.p_brand, part.p_type, part.p_size
```

ps_partkey	ps_suppkey	ps_avallqty	ps_supplycost	ps_comment
1	2	3325	771.64	, even theodolites, regular, final theodolites eat after the carefully pending foxes, furiously regular deposits sleep slyly, carefully bold rea
1	25002	8076	993.49	ven ideas, quickly even packages print, pending multipliers must have to are fluff
1	50002	3956	337.09	after the fluffily ironic deposits? blithely special dependencies integrate furiously even excuses, blithely silent theodolites could have to ha
1	75002	4069	357.84	al, regular dependencies serve carefully after the quickly final pinto beans, furiously even deposits sleep quickly final, silent pinto beans. f
2	3	8895	378.49	ntic accounts, final accounts sleep furiously about the ironic, bold packages, regular, regular accounts
2	25003	4969	915.27	ptotes, quickly pending dependencies integrate furiously, fluffily ironic ideas impress blithely above the express accounts, furiously even epit
2	50003	8539	438.37	blithely bold ideas, furiously stealthy packages sleep fluffily, slyly special deposits snooze furiously carefully regular accounts, regular dep
2	75003	3025	306.39	olites, deposits wake carefully, even, express requests cajole, carefully regular ex
3	4	4651	920.92	lilent foxes affix furiously quickly unusual requests, even packages across the carefully even theodolites nag above the sp
3	25004	4093	498.13	ending dependencies haggle fluffily, regular deposits boost quickly carefully regular requests, deposits affix furiously around the pinto beans.
3	50004	3917	645.40	of the blithely regular theodolites, final theodolites haggle blithely carefully unusual ideas, blithely even r
3	75004	9942	191.92	unusual, ironic foxes according to the ideas detect furiously alongside of the even, express requests, blithely regular the
4	5	1339	113.97	carefully unusual ideas, packages use slyly, blithely final pinto beans cajole along the furiously express requests, regular orbits haggle care

Sort Method: quicksort Memory: 2968kB

-> GroupAggregate (cost=381103.26..522328.66 rows=149095 width=44) (actual time=2052.271..2589.690 rows=27840 loops=1)

Group Key: part\_p\_brand, part\_p\_type, part\_p\_size

-> Gather Merge (cost=381103.26..509788.58 rows=1104913 width=40) (actual time=2052.237..2408.973 rows=1187296 loops=1)

Workers Planned: 2

Workers Launched: 2

-> Sort (cost=380103.23..381254.18 rows=460380 width=40) (actual time=2027.657..2154.565 rows=395765 loops=3)

Sort Key: part\_p\_brand, part\_p\_type, part\_p\_size

Sort Method: external merge Disk: 20376kB

Worker 0: Sort Method: external merge Disk: 20272kB

Worker 1: Sort Method: external merge Disk: 19984kB

-> Parallel Hash Join (cost=72467.50..324209.32 rows=460380 width=40) (actual time=1130.760..1342.282 rows=395765 loops=3)

Hash Cond: (partsupp.ps\_partkey = part\_p\_partkey)

-> Parallel Seq Scan on partsupp (cost=0.00..216052.67 rows=3333000 width=8) (actual time=0.020..663.662 rows=2666667 loops=3)

Filter: ((ps\_comment)::text !~ '%Customer%Complaints%')::text)

-> Parallel Hash (cost=70128.67..70128.67 rows=115107 width=40) (actual time=197.905..197.906 rows=98941 loops=3)

Buckets: 65536 Batches: 8 Memory Usage: 3296kB

-> Parallel Seq Scan on part (cost=0.00..70128.67 rows=115107 width=40) (actual time=101.863..180.627 rows=98941 loops=3)

Filter: ((p\_brand <> 'Brand#45')::bpchar) AND ((p\_type)::text !~ 'MEDIUM POLISHED')::text) AND ((p\_size = 49) OR (p\_size = 14) OR (p\_size = 23)

OR (p\_size = 45) OR (p\_size = 19) OR (p\_size = 3) OR (p\_size = 36) OR (p\_size = 9))

Rows Removed by Filter: 567725

Planning Time: 0.219 ms

JIT:

Functions: 45

Options: Inlining true, Optimization true, Expressions true, Deforming true

Timing: Generation 3.095 ms, Inlining 61.253 ms, Optimization 144.282 ms, Emission 99.417 ms, Total 308.046 ms

Execution Time: 2644.084 ms