

# Class 08 Mini Project

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It is important to consider scaling your data before analysis such as PCA

For example:

```
head(mtcars)
```

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Mazda RX4	21.0	6	160	110	3.90	2.620	16.46	0	1	4	4
Mazda RX4 Wag	21.0	6	160	110	3.90	2.875	17.02	0	1	4	4
Datsun 710	22.8	4	108	93	3.85	2.320	18.61	1	1	4	1
Hornet 4 Drive	21.4	6	258	110	3.08	3.215	19.44	1	0	3	1
Hornet Sportabout	18.7	8	360	175	3.15	3.440	17.02	0	0	3	2
Valiant	18.1	6	225	105	2.76	3.460	20.22	1	0	3	1

```
colMeans(mtcars)
```

mpg	cyl	disp	hp	drat	wt	qsec
20.090625	6.187500	230.721875	146.687500	3.596563	3.217250	17.848750
vs	am	gear	carb			
0.437500	0.406250	3.687500	2.812500			

```
apply(mtcars, 2, sd)
```

mpg	cyl	disp	hp	drat	wt
6.0269481	1.7859216	123.9386938	68.5628685	0.5346787	0.9784574
qsec	vs	am	gear	carb	
1.7869432	0.5040161	0.4989909	0.7378041	1.6152000	

```
x <- scale(mtcars)
head(x)
```

	mpg	cyl	disp	hp	drat
Mazda RX4	0.1508848	-0.1049878	-0.57061982	-0.5350928	0.5675137
Mazda RX4 Wag	0.1508848	-0.1049878	-0.57061982	-0.5350928	0.5675137
Datsun 710	0.4495434	-1.2248578	-0.99018209	-0.7830405	0.4739996
Hornet 4 Drive	0.2172534	-0.1049878	0.22009369	-0.5350928	-0.9661175
Hornet Sportabout	-0.2307345	1.0148821	1.04308123	0.4129422	-0.8351978
Valiant	-0.3302874	-0.1049878	-0.04616698	-0.6080186	-1.5646078

	wt	qsec	vs	am	gear
Mazda RX4	-0.610399567	-0.7771651	-0.8680278	1.1899014	0.4235542
Mazda RX4 Wag	-0.349785269	-0.4637808	-0.8680278	1.1899014	0.4235542
Datsun 710	-0.917004624	0.4260068	1.1160357	1.1899014	0.4235542
Hornet 4 Drive	-0.002299538	0.8904872	1.1160357	-0.8141431	-0.9318192
Hornet Sportabout	0.227654255	-0.4637808	-0.8680278	-0.8141431	-0.9318192
Valiant	0.248094592	1.3269868	1.1160357	-0.8141431	-0.9318192

	carb
Mazda RX4	0.7352031
Mazda RX4 Wag	0.7352031
Datsun 710	-1.1221521
Hornet 4 Drive	-1.1221521
Hornet Sportabout	-0.5030337
Valiant	-1.1221521

```
round(colMeans(x),2)
```

mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
0	0	0	0	0	0	0	0	0	0	0

## Breast Cancer Biopsy Analysis

```
# Save your input data file into your Project directory
fna.data <- "WisconsinCancer (6).csv"

# Complete the following code to input the data and store as wisc.df
wisc.df <- read.csv(fna.data, row.names=1)
```

```
# We can use -1 here to remove the first column
wisc.data <- wisc.df[,-1]
```

```
diagnosis <- wisc.df[,1]
table(diagnosis)
```

```
diagnosis
  B   M
357 212
```

Remove this first `diagnosis` column from the dataset as I don't want to pass this to PCA etc. It is essentially the expert "answer" that we will compare our analysis results to.

```
# We can use -1 here to remove the first column
wisc.data <- wisc.df[,-1]
head(wisc.data)
```

	radius_mean	texture_mean	perimeter_mean	area_mean	smoothness_mean
842302	17.99	10.38	122.80	1001.0	0.11840
842517	20.57	17.77	132.90	1326.0	0.08474
84300903	19.69	21.25	130.00	1203.0	0.10960
84348301	11.42	20.38	77.58	386.1	0.14250
84358402	20.29	14.34	135.10	1297.0	0.10030
843786	12.45	15.70	82.57	477.1	0.12780

	compactness_mean	concavity_mean	concave.points_mean	symmetry_mean
842302	0.27760	0.3001	0.14710	0.2419
842517	0.07864	0.0869	0.07017	0.1812
84300903	0.15990	0.1974	0.12790	0.2069
84348301	0.28390	0.2414	0.10520	0.2597
84358402	0.13280	0.1980	0.10430	0.1809
843786	0.17000	0.1578	0.08089	0.2087

	fractal_dimension_mean	radius_se	texture_se	perimeter_se	area_se
842302	0.07871	1.0950	0.9053	8.589	153.40
842517	0.05667	0.5435	0.7339	3.398	74.08
84300903	0.05999	0.7456	0.7869	4.585	94.03
84348301	0.09744	0.4956	1.1560	3.445	27.23
84358402	0.05883	0.7572	0.7813	5.438	94.44
843786	0.07613	0.3345	0.8902	2.217	27.19

	smoothness_se	compactness_se	concavity_se	concave.points_se
842302	0.006399	0.04904	0.05373	0.01587
842517	0.005225	0.01308	0.01860	0.01340

84300903	0.006150	0.04006	0.03832	0.02058
84348301	0.009110	0.07458	0.05661	0.01867
84358402	0.011490	0.02461	0.05688	0.01885
843786	0.007510	0.03345	0.03672	0.01137
	symmetry_se	fractal_dimension_se	radius_worst	texture_worst
842302	0.03003	0.006193	25.38	17.33
842517	0.01389	0.003532	24.99	23.41
84300903	0.02250	0.004571	23.57	25.53
84348301	0.05963	0.009208	14.91	26.50
84358402	0.01756	0.005115	22.54	16.67
843786	0.02165	0.005082	15.47	23.75
	perimeter_worst	area_worst	smoothness_worst	compactness_worst
842302	184.60	2019.0	0.1622	0.6656
842517	158.80	1956.0	0.1238	0.1866
84300903	152.50	1709.0	0.1444	0.4245
84348301	98.87	567.7	0.2098	0.8663
84358402	152.20	1575.0	0.1374	0.2050
843786	103.40	741.6	0.1791	0.5249
	concavity_worst	concave.points_worst	symmetry_worst	
842302	0.7119	0.2654	0.4601	
842517	0.2416	0.1860	0.2750	
84300903	0.4504	0.2430	0.3613	
84348301	0.6869	0.2575	0.6638	
84358402	0.4000	0.1625	0.2364	
843786	0.5355	0.1741	0.3985	
	fractal_dimension_worst			
842302	0.11890			
842517	0.08902			
84300903	0.08758			
84348301	0.17300			
84358402	0.07678			
843786	0.12440			

Q1. How many observations are in this dataset?

```
ncol(wisc.df)
```

```
[1] 31
```

Q2. How many of the observations have a malignant diagnosis?

```
table(diagnosis)
```

```
diagnosis
  B    M
357 212
```

Q3. How many variables/features in the data are suffixed with `_mean`?

```
length(grep("_mean", colnames(wisc.data), value=T))
```

```
[1] 10
```

##Principal Component Analysis

```
# Check column means and standard deviations
```

```
colMeans(wisc.data)
```

radius_mean	texture_mean	perimeter_mean
1.412729e+01	1.928965e+01	9.196903e+01
area_mean	smoothness_mean	compactness_mean
6.548891e+02	9.636028e-02	1.043410e-01
concavity_mean	concave.points_mean	symmetry_mean
8.879932e-02	4.891915e-02	1.811619e-01
fractal_dimension_mean	radius_se	texture_se
6.279761e-02	4.051721e-01	1.216853e+00
perimeter_se	area_se	smoothness_se
2.866059e+00	4.033708e+01	7.040979e-03
compactness_se	concavity_se	concave.points_se
2.547814e-02	3.189372e-02	1.179614e-02
symmetry_se	fractal_dimension_se	radius_worst
2.054230e-02	3.794904e-03	1.626919e+01
texture_worst	perimeter_worst	area_worst
2.567722e+01	1.072612e+02	8.805831e+02
smoothness_worst	compactness_worst	concavity_worst
1.323686e-01	2.542650e-01	2.721885e-01
concave.points_worst	symmetry_worst	fractal_dimension_worst
1.146062e-01	2.900756e-01	8.394582e-02

```
apply(wisc.data,2,sd)
```

radius_mean	texture_mean	perimeter_mean
3.524049e+00	4.301036e+00	2.429898e+01
area_mean	smoothness_mean	compactness_mean
3.519141e+02	1.406413e-02	5.281276e-02
concavity_mean	concave.points_mean	symmetry_mean
7.971981e-02	3.880284e-02	2.741428e-02
fractal_dimension_mean	radius_se	texture_se
7.060363e-03	2.773127e-01	5.516484e-01
perimeter_se	area_se	smoothness_se
2.021855e+00	4.549101e+01	3.002518e-03
compactness_se	concavity_se	concave.points_se
1.790818e-02	3.018606e-02	6.170285e-03
symmetry_se	fractal_dimension_se	radius_worst
8.266372e-03	2.646071e-03	4.833242e+00
texture_worst	perimeter_worst	area_worst
6.146258e+00	3.360254e+01	5.693570e+02
smoothness_worst	compactness_worst	concavity_worst
2.283243e-02	1.573365e-01	2.086243e-01
concave.points_worst	symmetry_worst	fractal_dimension_worst
6.573234e-02	6.186747e-02	1.806127e-02

```
# Perform PCA on wisc.data by completing the following code
wisc.pr <- prcomp(wisc.data, scale= TRUE)
```

```
# Look at summary of results
summary(wisc.pr)
```

Importance of components:

	PC1	PC2	PC3	PC4	PC5	PC6	PC7
Standard deviation	3.6444	2.3857	1.67867	1.40735	1.28403	1.09880	0.82172
Proportion of Variance	0.4427	0.1897	0.09393	0.06602	0.05496	0.04025	0.02251
Cumulative Proportion	0.4427	0.6324	0.72636	0.79239	0.84734	0.88759	0.91010
	PC8	PC9	PC10	PC11	PC12	PC13	PC14
Standard deviation	0.69037	0.6457	0.59219	0.5421	0.51104	0.49128	0.39624
Proportion of Variance	0.01589	0.0139	0.01169	0.0098	0.00871	0.00805	0.00523
Cumulative Proportion	0.92598	0.9399	0.95157	0.9614	0.97007	0.97812	0.98335
	PC15	PC16	PC17	PC18	PC19	PC20	PC21
Standard deviation	0.30681	0.28260	0.24372	0.22939	0.22244	0.17652	0.1731
Proportion of Variance	0.00314	0.00266	0.00198	0.00175	0.00165	0.00104	0.0010

Cumulative Proportion	0.98649	0.98915	0.99113	0.99288	0.99453	0.99557	0.9966
	PC22	PC23	PC24	PC25	PC26	PC27	PC28
Standard deviation	0.16565	0.15602	0.1344	0.12442	0.09043	0.08307	0.03987
Proportion of Variance	0.00091	0.00081	0.0006	0.00052	0.00027	0.00023	0.00005
Cumulative Proportion	0.99749	0.99830	0.9989	0.99942	0.99969	0.99992	0.99997
	PC29	PC30					
Standard deviation	0.02736	0.01153					
Proportion of Variance	0.00002	0.00000					
Cumulative Proportion	1.00000	1.00000					

Main “PC score plot”, “PC1 vs PC2 plot”

```
wisc.pr$x
```

	PC1	PC2	PC3	PC4	PC5
842302	-9.18475521	-1.946870030	-1.122178766	3.630536408	1.1940594778
842517	-2.38570263	3.764859063	-0.528827374	1.117280773	-0.6212283647
84300903	-5.72885549	1.074228589	-0.551262540	0.911280840	0.1769302185
84348301	-7.11669126	-10.266555635	-3.229947535	0.152412923	2.9582754313
84358402	-3.93184247	1.946358977	1.388544953	2.938054169	-0.5462667446
843786	-2.37815462	-3.946456430	-2.932296681	0.940209586	1.0551135428
844359	-2.23691506	2.687666414	-1.638471247	0.149208600	-0.0403240371
84458202	-2.14141428	-2.338186649	-0.871180715	-0.126931171	1.4261817833
844981	-3.17213315	-3.388831138	-3.117243065	-0.600768440	1.5209521144
84501001	-6.34616284	-7.720380945	-4.338098744	-3.372234369	-1.7087596141
845636	0.80970132	2.656937673	-0.488400053	-1.671096176	-0.2755690974
84610002	-2.64876984	-0.066509405	-1.525113359	0.051216497	-0.3316592904
846226	-8.17783882	-2.698602007	5.725193241	-1.111278747	-1.0425531111
846381	-0.34182514	0.967428026	1.715661982	-0.594479872	-0.4675990720
84667401	-4.33856172	-4.856809832	-2.813639832	-1.453278303	-1.2889287269
84799002	-4.07207318	-2.974443983	-3.122526655	-2.455909915	0.4079831402
848406	-0.22985277	1.563382114	-0.801813642	-0.650010973	0.4942761390
84862001	-4.41412695	-1.417423150	-2.268323145	-0.186108659	1.4226094459
849014	-4.94435304	4.110716528	-0.314472408	-0.088128974	0.0566653163
8510426	1.23597583	0.188049490	-0.592761930	1.594942716	0.4417655273
8510653	1.57677384	-0.572304625	-1.799863016	1.124286473	0.3949222435
8510824	3.55420904	-1.661487969	0.450790799	2.071941593	0.4903150736
8511133	-4.72904972	-3.302058265	-1.465247427	2.039355666	0.0261970715
851509	-4.20482441	5.123858059	-0.751740573	-0.861951843	0.4705538779
852552	-4.94528075	1.542395143	-1.711687827	0.046718059	1.7377012054
852631	-7.09232236	-2.016835734	-0.028984132	2.585675482	2.0375470912
852763	-3.50717666	-2.169715994	-3.891122637	-1.294620549	0.0681580703

852781	-3.06136021	1.874902631	2.579478032	0.128371462	0.1165625639
852973	-4.00374127	-0.536769860	-2.759197831	-1.896718595	0.5252107652
853201	-1.71380176	1.522365502	0.146058578	1.909706071	-0.5356519265
853401	-6.05411853	0.756511800	-0.348932376	-1.063281958	0.7454493340
853612	-2.89968469	-4.001774373	-2.998823809	-0.325030387	0.8546038749
85382601	-4.55077848	-0.337239419	-0.753637681	-0.699714306	1.5471839770
854002	-4.98621538	1.131593223	-2.575118337	-1.216191663	-0.6693259394
854039	-2.98271631	-0.757756497	-3.490690279	0.054212589	-0.1669530505
854253	-2.76393718	0.354044421	-1.895295337	-0.533786198	0.8832432812
854268	-1.29505925	-0.912393466	-1.574383382	-1.042249570	-0.4143571251
854941	3.74601730	1.412230504	1.730784885	-0.564945456	-0.0802687991
855133	0.99719148	3.348346731	4.301788720	-0.560716245	0.4639645611
855138	-0.76459136	-0.885464837	-2.702540362	-0.274538185	-0.8097169787
855167	2.14906252	1.922300194	-1.179446370	-1.112219391	-0.4480774771
855563	0.09324934	-2.258764532	-1.903051997	-1.441039161	1.7038647386
855625	-9.08001023	-2.016898441	2.139343894	-1.068304028	-0.7972299505
856106	-0.98958304	-0.984064148	-2.308702241	-0.276582144	0.6399478981
85638502	0.29328849	0.136978564	-3.299029123	-1.008898141	0.0224910920
857010	-5.37620991	0.134758404	-1.677366657	1.506369463	-0.1518645822
85713702	4.57790860	-1.482915508	0.042037623	0.295968708	0.7132249498
85715	-1.69851237	-2.350203862	-3.075383081	-0.065962912	1.0555376469
857155	2.13456708	-0.095745364	-1.491099878	1.120077655	0.0679774156
857156	1.56610099	1.207370855	-0.368834570	-1.474331566	-0.1725985690
857343	3.53979091	1.281368110	1.017315805	-0.607621596	0.2194428358
857373	3.15503795	1.687473796	-0.495857416	0.193841543	-1.4386516886
857374	3.44745515	0.497780720	-0.152383875	0.574980496	0.0522688899
857392	-3.29964761	1.129943574	0.825666100	0.981853085	1.1942122234
857438	0.67402621	2.114549137	-1.394992302	-1.042221635	-0.2416042153
85759902	2.85564577	-0.152588874	0.428557855	0.482635650	1.5092086632
857637	-4.64465207	2.308301508	-0.728168145	0.639379104	1.1573061797
857793	-2.17494916	-0.971261438	-1.942179421	-0.736670095	0.3954358798
857810	3.71818738	1.786070097	1.278807604	0.115464169	0.5258196576
858477	4.13232693	-2.401679261	-1.241865694	2.046545722	1.1646276518
858970	2.38373822	-2.755233814	1.213018303	1.792911568	3.3352233901
858981	2.57661610	-3.135912650	1.399049169	-0.763194998	2.7816479152
858986	-4.75492832	-3.009032875	-0.166094576	-0.605295233	-1.1406976712
859196	2.31209785	-3.265116721	2.793766025	0.565229094	0.3814984103
85922302	-1.69012080	-1.539322116	-1.798262954	-1.389367072	1.2116088977
859283	-1.81071217	-0.722104815	-1.464960560	-1.197676214	1.4267861675
859464	2.78347559	-2.308617372	0.472309720	-1.605747397	1.6114402596
859465	3.51555502	0.657730736	0.590855071	-0.010793189	-0.0205709988
859471	-4.32619605	-9.194435552	1.491650337	0.319666023	-4.7240139158
859487	3.25841241	0.937013647	0.204949679	1.089113223	0.4599452518



859575	-2.70221851	4.433240985	0.307075192	0.488263229	-0.3721675732
859711	0.30758513	-7.381317396	3.815728542	2.131680166	-2.7083196796
859717	-5.49886689	-0.937500513	-2.208188675	-1.522456429	-0.9240784393
859983	0.36139121	-0.119633821	-2.039161544	1.057953093	-0.7564437850
8610175	2.62766457	0.696696349	-0.583428281	0.337884296	-0.4671344130
8610404	-1.42691206	1.965372092	1.110961327	0.752248984	0.5394071070
8610629	0.83378424	-1.963876860	0.789737653	3.434609101	2.3524809639
8610637	-6.22541880	-0.919260690	0.089748341	2.536926544	-0.0620812262
8610862	-11.65845644	-4.744442593	2.004115633	0.318768543	3.3883795562
8610908	2.01980045	0.254675746	-0.647302452	0.059199217	0.0547996477
8611103	1.63694460	-1.714440587	0.433824539	-1.526622964	1.7678261507
8611161	-1.16643527	-2.512305286	-1.904043397	0.637750373	-0.2359734956
8611555	-10.75977535	2.255997858	0.038801648	-0.389043228	-1.1862447821
8611792	-5.03038488	-0.773728357	2.679979922	-1.665039071	0.3113456414
8612080	2.17255269	-0.496441169	-0.948257444	0.207037052	0.8845677371
8612399	-3.28534463	1.666770480	0.146802675	0.437108401	1.3673667927
86135501	-0.60707378	-0.162071919	1.635935419	-1.113531850	0.5403198078
86135502	-3.58041324	2.204721916	-1.703037100	-0.800589442	-0.3650009185
861597	0.93333687	-0.926885919	-0.040128345	-1.352209082	-0.0648850467
861598	-1.25849730	-1.014684255	-0.080521995	2.049531496	-0.1373994614
861648	1.58686770	1.618232954	0.309726682	-1.091038889	-0.0537268234
861799	-0.25227559	0.530884425	0.588809736	-0.110441165	-0.4283042881
861853	2.84492835	2.891103732	0.527524677	0.598290300	-1.4344348070
862009	1.96322268	0.964308498	-0.081136715	-0.093998029	0.5495403920
862028	-2.77342525	-0.557509977	-0.605238702	0.499390598	-0.4994662006
86208	-4.39236314	2.121640892	0.579000549	-0.776729960	0.3035669597
86211	2.58980407	-0.213446120	1.034701089	0.661423462	0.5402889624
862261	3.90090576	-1.189020421	1.550616806	-0.934952821	0.7074978792
862485	2.81575365	-0.367560567	-1.350247556	1.736886645	-0.2840715251
862548	-0.61573908	-0.638349988	-0.199743121	-1.096533937	-0.1185853914
862717	0.43247968	1.390820523	-0.082646762	-1.933578565	0.0344302397
862722	4.55102442	-3.525683788	-0.215074716	1.090925794	2.7559240651
862965	3.44515217	1.423370040	-0.088646005	-1.709223842	0.1065229834
862980	2.11410008	-1.847747782	-0.556184595	-0.463948150	0.4744968363
862989	2.68898618	-1.418813334	0.968298772	-0.002857011	1.2554137475
863030	-3.21109134	-4.043198634	-2.712997305	1.327457319	0.2214783192
863031	0.74861266	-1.796058175	-0.567866143	-0.560006237	0.9322757208
863270	3.15622889	1.034838878	-1.489373670	-0.592646911	-0.5136339075
86355	-13.04464395	-0.980650357	0.598286247	1.471636087	0.5993856696
864018	2.22672053	-0.666823902	-1.090600727	-1.077353762	0.2988661489
864033	2.49063954	-2.596401708	1.668257671	0.632929090	1.1557305724
86408	0.10325957	-2.278139015	2.107708229	-0.351536677	-0.6219347413
86409	-3.58813694	-3.922881433	2.045207163	-0.231562584	-5.4604591892

864292	1.34776279	-3.553098748	1.730668471	-0.046949434	0.3449474850
864496	2.50791098	-3.248461200	-1.686140767	1.188915291	0.4551865326
864685	2.04423086	-0.304616836	-0.533369397	-0.489411120	0.0678524055
864726	2.09522559	-3.663872062	3.629007335	1.538433194	-2.2345636748
864729	-3.10779316	-1.568009873	-2.611638159	0.617924024	1.1807403791
864877	-4.95236801	-2.382749650	-1.933405900	-0.610304229	0.1480794337
865128	-0.85026612	2.304707468	0.566963050	-0.043586897	2.0922055990
865137	2.96339173	-0.371179883	-2.064716427	2.070684315	-0.1628943517
86517	-3.33120209	1.324392029	0.727373652	1.002316780	0.9328861016
865423	-12.88327621	-2.314585873	6.323133317	1.940496559	3.1574494112
865432	0.77006610	0.064052860	-1.133411514	2.508256103	-0.0202192366
865468	2.20057925	0.734958544	0.266845303	-0.037586447	-2.9314571580
86561	3.14064881	1.875758557	-0.669779705	0.303065257	-0.4077106627
866083	0.63831885	0.910564828	-2.140840449	-2.139033534	0.4287624850
866203	-1.91744627	3.534971966	1.253821297	0.335703696	-0.5885511025
866458	-1.40762980	-1.303782215	0.640864876	1.885297508	0.0362201276
866674	-4.63960895	1.480714297	-1.169651383	-1.217534223	-0.1779160105
866714	1.87581684	-1.421979452	-1.069870821	1.707830258	0.8837714798
8670	-1.43081046	1.048681220	-1.260901861	0.532720319	0.6261456617
86730502	-1.35143790	1.153126842	-1.208729712	-0.827378497	0.9859398192
867387	0.70849143	1.566853657	-0.669405084	1.685780647	-0.3390165106
867739	-2.16950708	2.823776101	-0.561613332	-0.660250673	0.4745525764
868202	1.97510247	0.419018755	-0.380240597	-1.737931013	0.3083668329
868223	2.59850310	0.481911436	1.870726668	-0.437633248	-0.0160686443
868682	3.25514318	0.417953651	-0.691197447	0.659273518	-0.1214593563
868826	-3.77870160	-0.859625218	3.667773435	2.046019895	2.1818702714
868871	1.99028348	-1.328186508	1.134246527	2.044634146	0.2519061287
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869104	-1.34383800	1.273650278	0.555354894	0.574366142	0.4704353120
869218	2.45380972	-0.897665441	0.352823033	-0.367668079	1.1033160270
869224	1.83566648	0.090946742	-1.444010288	0.671957291	0.1360791853
869254	4.34266862	0.892786708	0.638694049	0.425252734	-0.9556015217
869476	0.73216868	-3.698927716	0.657926113	2.234161633	0.3361716375
869691	-2.39788795	-4.833735642	-1.027253164	0.342615376	2.3897699977
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87106	3.74011364	-0.250281306	-0.097297641	1.930448497	1.0426741051
8711002	0.96832079	-0.944113582	-0.890028129	1.095568323	0.6129630899
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8711202	-4.09718264	0.378470806	1.445046044	0.701751100	-0.0006644087
8711216	0.75094226	3.067949187	1.447907672	-0.952587697	-0.8911446262
871122	3.65143365	0.674055644	-0.906188637	1.509832817	-0.2935538042
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8711561	0.59725624	-1.784081072	1.480433343	-0.177715866	1.5878294278
8711803	-3.38435289	2.908477953	3.004594027	2.825801426	-0.5078995524
871201	-6.14447970	2.015878994	-1.564766888	0.970791871	0.3360742118
8712064	1.32386648	-1.468002337	0.847675513	-1.141761837	0.0477797028
8712289	-5.48932277	4.162167037	-0.600732185	0.149568094	-0.6250164993
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8712729	-1.21256768	2.037246395	0.979834026	0.238756035	-0.0856932721
8712766	-5.06520424	1.783582969	1.172615291	-0.693122956	-0.6480853131
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87139402	2.51266554	-0.114151857	-0.496186180	2.352277364	0.6887689035
87163	0.94665494	1.683272444	-0.350877607	-0.576703303	0.3412418770
87164	-2.81688978	-1.263990953	-2.151251366	2.706077979	0.0400092558
871641	3.48092345	-1.618268077	2.673117328	1.252511728	0.5984548400
871642	4.65463399	0.222718846	1.557987797	0.510643007	1.8952731945
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872608	-1.16986842	-7.008319996	4.268106508	-0.332347396	-2.9068870248
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873357	4.97132782	3.383227983	0.439451738	-1.576183104	-1.0328868993
873586	4.06045289	1.245070643	0.573972801	1.703893823	-0.6153230400
873592	-9.50430706	5.598558052	-0.636679193	0.224024081	0.4061861282
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873843	2.65702172	-0.539461132	1.705514033	1.200694830	-2.3526717446
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874662	3.30737348	-0.155604280	0.541002917	-0.512033374	1.7863073596
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875093	1.71622508	0.542688019	3.295475582	-0.087253972	-0.0840995519
875099	5.56084294	0.477427493	4.123834207	-2.350422636	1.0515357688
875263	-1.77809695	-2.774146213	-0.941934046	-3.071649469	0.6945219915
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87930	0.78050321	-0.652275325	-0.643091145	0.214279700	0.4372951306
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8811523	0.38841453	-2.274796314	0.626780574	-0.429349217	-0.1192752256
8811779	2.75450931	-1.085879226	1.705737291	-0.516377016	-0.8063132292
8811842	-4.93923501	2.845820436	0.913075404	0.334889341	0.4829010175
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8812818	0.96634003	-0.438052741	-1.446423567	1.988611655	0.0938834761
8812844	2.97318270	-1.809381711	-0.223238842	0.391290904	1.5280262811
8812877	-1.80166175	-0.166314618	-2.626288708	-0.643175553	0.5214235661
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88143502	0.82531310	1.249148354	0.267725157	2.308595141	1.0139214702
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88199202	4.01560693	1.353056834	-0.360155815	-2.633480577	-0.7345986421
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882488	4.03305870	-1.161524089	0.189581014	0.939690169	0.5651016963
88249602	2.33218128	1.347793816	0.232482459	-1.211847619	-0.0515295475
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883539	4.47364832	1.739598699	-0.887426246	0.763980319	-0.6046080177

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884448	3.22593164	1.171043084	0.264431658	-1.002062865	-0.8936812738
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8910251	1.46338831	-1.685149061	1.168877382	0.325375950	0.4644646263
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8910748	3.15597737	-0.409941090	-1.107842420	1.969885542	0.0585356134
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8910996	3.63593673	-1.588189625	0.715650110	0.669795890	1.5759444757
8911163	-0.33704893	3.141609173	-0.115619749	-1.813699425	-0.0352621513
8911164	1.27546111	-0.848306563	3.067369195	1.165472001	2.6757698121
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8911670	-0.01741547	3.456302110	0.306650981	0.475151814	-0.4003842967
8911800	3.48935577	2.631766723	-0.072124181	-0.307707020	-0.5245541387
8911834	1.86490793	0.901271186	-0.870402828	1.027910020	0.2316732520
8912049	-4.95590744	1.339944038	-1.455772409	-1.466907423	0.6119216765
8912055	2.46855062	0.137904923	1.793307382	1.546266616	0.6967490495
89122	-3.78173258	1.900235409	-1.742708503	0.391939754	0.3389814297
8912280	-2.63493731	-0.576647607	-1.992946242	0.272309546	-1.1957159307
8912284	1.37147827	-0.005800358	1.547927203	0.583925361	-3.0022368265

8912521	4.13524399	1.375298123	0.877276691	-0.059803630	0.5970712749
8912909	0.68633639	-1.693519506	1.025310679	-0.874708540	-2.1727638053
8913	4.30833870	1.976746804	-0.251085558	1.573526614	-1.9816674884
8913049	-0.40295486	-3.720160654	4.582436940	0.215721385	-0.8070907499
89143601	3.00096526	-0.353848878	1.232930128	-0.716826045	1.3114083326
89143602	-3.13125303	-4.269702670	5.861122345	0.596058607	-4.1973346842
8915	0.41746954	0.807865734	-1.092330348	-0.089650892	-0.2568431865
891670	1.41897459	-1.392752638	-0.836251021	1.104473313	0.3640802623
891703	2.86806475	0.268408338	-0.468574962	-0.245287741	0.5574288140
891716	3.36288672	0.806890637	-0.806369895	1.662223414	-0.0505417655
891923	3.31208587	1.440908382	-0.583119519	1.783361666	0.0192555651
891936	4.76551701	0.542484530	0.893082182	1.729539559	-1.0008319932
892189	2.38378528	0.823391074	1.982219343	0.055206875	0.5052838506
892214	2.78464581	2.530807159	-0.883257225	-0.259446372	-1.6463839898
892399	3.39085817	-0.753301131	1.770235939	-0.276430081	1.0849483019
892438	-6.58444233	1.483557076	0.361022239	1.187401386	0.1208047145
892604	1.45405111	-0.591422478	1.145332613	0.078947827	-1.0867825344
89263202	-7.17661843	-0.055097580	2.011148288	0.082703332	0.6651964595
892657	3.57568917	-0.890799182	0.261257526	-0.253872371	0.5990662990
89296	3.05434514	0.179055836	0.621226832	0.261168580	-0.8959467593
893061	3.07173303	0.305789373	1.258146621	-2.206685025	0.6058786167
89344	3.85015201	1.523386003	-1.143503482	0.814334011	-0.4926180820
89346	5.38551771	-0.555766489	0.559577694	0.471440565	0.3994468273
893526	4.65358767	3.062692587	-0.075942289	1.507190163	-1.2716964644
893548	4.02400169	2.540671520	0.352906609	1.513056174	-0.6669118526
893783	3.34487880	0.068502773	-0.269955756	-0.627084568	1.1246979202
89382601	3.29694105	3.135950089	0.148761476	0.741837997	-0.3941040424
89382602	2.13452598	0.004388987	-0.055090483	1.786540911	-1.2993021931
893988	4.03446724	0.240486452	-1.326959165	2.438086999	-0.2771454326
894047	3.76210430	-4.394333943	3.946735131	-0.306998155	4.7854456445
894089	4.86695697	2.337158334	-0.168146877	0.694278950	-0.8202171408
894090	4.74307511	1.796820963	0.169570993	1.550246788	-0.5346670358
894326	-1.89365006	2.390134936	-1.675017462	0.711402276	-0.3830648490
894329	-1.57154834	-6.503377021	2.165253786	0.030049446	-1.0524851013
894335	4.02308037	1.400973753	3.183698584	0.019535088	-0.1794905224
894604	1.29372783	-3.467757378	1.108552569	0.766005357	-0.2103251163
894618	-1.83322742	4.317723823	0.316406925	0.996312898	-0.2544647520
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89511501	3.14288478	0.741873771	-0.861593396	0.754499772	-0.2998611546
89511502	2.88472980	0.464323069	-0.475325102	0.761631787	0.8524662824
89524	3.14688506	1.769691255	-0.035802185	1.505914596	-0.3529936101
895299	4.62431058	1.834004631	0.064174505	0.094110332	-0.7997554706

8953902	-2.24853190	0.348229535	-1.063814825	-0.231555660	1.0036176419
895633	-2.10594822	-1.120987593	1.773597643	0.262444379	0.9599662498
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896864	0.52723271	-1.264758769	-0.919631937	0.429094010	-0.5602900988
897132	3.21067592	-1.102473082	1.610564041	-0.486005834	3.4562087554
897137	4.38256677	0.760434627	-0.400245248	0.586341023	0.3762481427
897374	3.80666840	0.909118626	0.442778081	-0.949587668	0.3513268837
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89813	-0.29505357	-0.226735533	-1.088458865	0.946589841	-0.7284538257
898143	1.93726491	-2.542750760	-1.000543159	0.025717223	-1.2050388549
89827	2.07535283	-1.804931340	-1.166053416	1.141225718	0.4132078419
898431	-4.97078859	1.331400687	0.870211875	-1.290995242	0.9611232170
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898677	2.42941383	-3.444173357	3.453905770	0.493225969	1.0448376978
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89869	1.20553704	1.315886497	-0.929922572	1.703291193	-0.7180879050
898690	3.32315522	-0.474753848	-0.897496041	0.812772706	0.5848648524
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899187	4.03828183	1.355724562	0.537868401	0.833178809	-0.1785899127
899667	-6.17684877	-5.103514894	0.520682438	0.939912167	0.6059916654
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9010258	0.98178471	-0.796551513	2.367338148	0.156784682	-1.5450702314
9010259	-0.35757923	-2.125968004	0.707586438	0.184582384	0.1024797906
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9010333	2.99060189	-1.629958015	2.554470244	1.344703963	-0.0407045185
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9010598	2.39655663	0.250524355	-0.326850211	-0.277129058	0.3545026443
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9011495	2.22182078	0.356846723	-1.100713817	0.186058986	0.2390645934
9011971	-5.30247440	6.717504288	1.484358772	1.774948969	1.0726100091
9012000	-7.24162919	3.652255530	-0.155565119	1.225750236	-0.2973284171
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905189	1.14199209	1.960446508	-1.239628958	1.477776286	-0.4837568556
905190	1.34966974	-0.369249002	2.484489568	-1.139714833	-1.9041890533
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909231	2.61301823	1.830449830	0.763657618	-0.822442197	0.3005228170
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9111805	-2.50954497	2.526584455	0.797500590	-0.822950476	0.4288865709
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9113156	2.55786437	2.491852880	0.170162861	-2.107901855	-0.9783779753
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9113538	-5.92575082	-1.227216861	1.720074272	-0.473165926	-2.8810043579
911366	-0.64491119	-3.422999542	0.607750202	0.234280083	1.2086350824
9113778	2.68148698	-1.442286469	0.339105123	-0.244601788	0.7919949893
9113816	2.03986918	0.902461858	2.840741857	-2.883294431	1.0158156443
911384	1.39806620	1.770668244	-1.478260847	1.306959009	-1.8037276563
9113846	3.53330636	1.245758018	3.382434941	-4.661948944	1.8740788308
911391	1.98877953	-1.897792693	-2.029212586	0.911103793	-1.2304717877
911408	1.99642872	0.206189711	-1.639882150	1.038296903	-0.9034160493
911654	0.52020039	0.972512103	-0.323850426	-0.543521127	-1.4281800593
911673	3.16958159	2.087215768	-0.977945244	0.386756799	-1.4182276802
911685	2.20077374	-1.284908734	-0.886619084	0.700486694	-0.1796630638
911916	-3.82107090	-2.303209735	0.027521977	0.669669644	-1.2886313605
912193	2.98286009	0.672747298	-0.589970772	-0.593827781	-0.4615631694
91227	2.47887396	2.361880555	-0.432234246	-0.383132558	-1.0372087673
912519	1.27099312	-0.509385643	-2.237023334	1.670906156	0.1175030515
912558	2.23319191	1.297562775	-0.900644424	0.433712494	-0.1827652155
912600	0.05613371	0.227183495	-2.253532782	2.708217480	-0.8010805172
913063	-2.31535334	-4.385275755	1.776847691	0.968563355	-2.6430509823
913102	2.28232306	2.464672105	-0.820466562	-0.040767325	-1.0918206156
913505	-4.75043499	1.488114177	-1.252648906	-0.052540766	0.0965398306
913512	1.72479328	-0.997300316	-0.080167877	1.063711106	1.4343549437
913535	0.74112965	2.449879331	-1.995953713	-0.457537180	-0.2610613824
91376701	2.89176621	0.977084588	-0.804935982	-1.719266485	0.0289580691
91376702	1.65306732	4.551659142	0.751661685	1.646873743	-1.4018393993
914062	-3.10079133	1.235066483	1.286223339	0.608113830	1.1212732858
914101	4.06069761	0.560461075	2.174771231	1.374658804	-0.1992898120
914102	2.79087498	1.076940539	0.843799658	-1.109231547	-0.0048653882
914333	1.47362330	1.589695437	0.319710133	-0.798129881	-0.1579186103
914366	0.22919297	-1.514570755	-2.214334625	0.555081328	-0.2509810467
914580	2.55101378	0.763228924	-1.607988258	0.059875184	-0.5054003068
914769	-3.71243855	1.057755506	0.521494703	1.395773631	-0.3682903454
91485	-5.09036286	2.017432706	-0.708746074	-0.082722167	-0.3834794788

914862	0.60008810	0.837717560	-0.686437977	1.154318132	-0.9815689274
91504	-2.78794673	-3.382584454	-0.752414277	-1.332009710	1.5841377430
91505	1.40753273	-1.504446838	-0.353584900	1.120754558	1.8100776146
915143	-7.25279714	5.490904302	1.909245947	1.894050092	-0.3960294570
915186	-1.29772469	-7.723057325	-0.688309017	2.890184346	2.0135831354
915276	-1.07574673	-8.287483337	0.433810751	1.952471847	1.3946448821
91544001	1.24866183	-1.594281055	-1.355282076	0.126156474	-0.0233994859
91544002	1.25582341	-4.113567176	-0.412366931	1.053246923	1.1385251781
915452	1.16550969	1.664229389	-0.737229323	1.760617958	-0.7377031703
915460	-4.09054331	-2.800463137	-0.506987325	-1.975580106	-0.1327084112
91550	1.88597978	-1.670721680	0.119692299	1.217144238	-2.5658122684
915664	2.76500279	2.159148972	-0.021077623	1.608860107	-0.7157489170
915691	-2.22503669	-1.939927827	-2.283594176	-0.339561903	0.5363853531
915940	1.13058210	1.409761524	-0.564556376	1.993206904	-0.5280229629
91594602	0.73312738	1.941988438	-0.274994234	-0.337526159	-0.6604100570
916221	2.33161916	-0.789451973	-0.349735677	0.440471990	1.4212995780
916799	-2.69485257	1.942001189	-0.959719996	0.459104689	0.5839845732
916838	-3.37604410	2.331377578	-1.200875536	0.553126259	-0.5274167311
917062	0.19969487	-1.075413752	-0.672557052	0.627893020	0.8395117260
917080	1.17499204	-1.010481061	-0.711142576	1.065131254	1.4206509043
917092	1.29150016	-4.959860548	0.345622908	2.238565182	3.8371535988
91762702	-8.62316838	3.456410638	-0.178899380	1.176129200	0.0228851505
91789	4.42556234	0.785345015	-0.473002900	-0.696004578	-0.1037131678
917896	0.61929383	-0.635789842	-0.488421490	-0.015141135	0.1063131129
917897	3.24945659	-1.284794677	-0.218284421	0.307537632	0.0993416275
91805	3.34997942	-2.670950443	-1.777523046	1.388364375	0.3541295063
91813701	0.85904712	-0.096763381	-2.811570840	0.184161855	0.6295214724
91813702	3.15384692	0.870776432	-2.193784489	1.448593014	-0.4310565911
918192	-0.34622347	-1.539870352	2.843951628	1.908132516	0.5713316529
918465	2.45924278	-0.600319751	-1.170435277	2.209110148	0.6913036191
91858	1.52875558	-0.404861554	0.603933344	-0.346866279	0.7853562456
91903901	1.77202587	-0.803503014	-2.026135257	-0.686728928	0.6155504122
91903902	2.67808519	1.483403662	-1.740162222	1.022590841	-0.2972072410
91930402	-4.02489378	2.938844225	1.658026507	0.224969353	0.5131432277
919537	2.13447312	-1.517245623	0.178807901	-0.500336469	-0.6824469628
919555	-5.16086993	2.380108987	-0.421906048	0.882650977	0.2092240560
91979701	-0.53546080	-0.380380451	-0.442745212	-1.877719723	-0.2266699710
919812	-0.34282174	-3.531373815	0.069607554	-1.549307121	1.9552004887
921092	4.19339024	-2.365311059	1.325978010	-2.037710987	1.7603677988
921362	1.14182718	-5.594535868	1.299893249	-2.186325923	-0.7649016389
921385	1.66401100	-2.387517361	1.500928782	0.875181074	-0.4841195986
921386	-1.01082308	-1.091429307	-0.632142163	-1.756972472	-1.0459061568
921644	1.29978604	1.819814057	0.372979316	-1.846544182	-0.1994515741

922296	2.37134219	1.680097929	0.384190094	-3.014076570	0.0382130321
922297	1.66440651	0.213774641	-0.147942249	-0.196878516	-0.5559910407
922576	1.92598353	1.136739705	0.477781900	-1.156482818	0.2021640255
922577	4.23349159	-0.184110499	-0.326131445	0.587786142	0.7040073381
922840	2.67551655	-2.313756961	-0.053800867	0.340150357	-0.4502519824
923169	3.83312511	-0.495813665	0.922428047	-0.551386509	-0.0799652223
923465	2.54919727	-0.228129228	1.412934778	-1.969057256	1.4550448383
923748	4.69079604	0.766803238	1.542607509	-0.778334167	0.7842069600
923780	2.02325691	-1.260133116	0.504482203	-1.134529125	0.1141621816
924084	2.89340232	1.450359601	0.779859803	-2.967836815	0.3568359788
924342	3.49912218	-1.799249342	2.764024589	-0.865545694	0.6248149194
924632	2.15201013	0.829339088	0.564300199	-3.009108230	-0.5653278607
924934	2.05327740	-1.615038205	1.837342797	-3.110797801	-0.2108571316
924964	3.87388097	-1.083301553	1.858308794	-0.433358360	1.6859553304
925236	4.06028949	-0.122061034	3.235925374	-3.466133119	2.2399371646
925277	0.09858059	0.213372093	0.388587548	-1.011820230	-2.9864399976
925291	1.08841850	-1.291711328	1.428122289	-3.369171941	-0.9465087393
925292	0.48134743	0.177863190	1.031200235	-2.008512908	-0.3268156112
925311	4.86602793	2.129232607	3.411187296	-5.129474909	0.4884909563
925622	-5.91241029	-3.479575000	-3.259923297	-3.914141413	-1.7148732547
926125	-8.73365338	0.573350185	0.896301447	0.384811315	-0.6784463175
926424	-6.43365455	3.573672989	2.457324373	1.176279049	0.0747585153
926682	-3.79004753	3.580897052	2.086640366	-2.503824654	0.5102735378
926954	-1.25507494	1.900624364	0.562235817	-2.087390339	-1.8084001296
927241	-10.36567336	-1.670540206	-1.875379194	-2.353959892	0.0337122683
92751	5.47042990	0.670047220	1.489132801	-2.297135901	0.1845409324
	PC6	PC7	PC8	PC9	PC10
842302	1.410183639	2.1574715203	0.398056982	-0.156980233	-0.8766305374
842517	0.028631162	0.0133463502	-0.240776600	-0.711278966	1.1060217613
84300903	0.540976145	-0.6675790845	-0.097288135	0.024044486	0.4538760367
84348301	3.050737497	1.4286536346	-1.058633755	-1.404204115	-1.1159933184
84358402	-1.225416405	-0.9353895017	-0.635816609	-0.263573547	0.3773724202
843786	-0.450642134	0.4900139551	0.165298432	-0.133355760	-0.5299649041
844359	-0.128835073	-0.3013023315	-0.083624609	-0.079954220	0.2189506984
84458202	-1.255934103	0.9732434974	0.652763899	0.247965464	0.9997064885
844981	0.559052820	-0.2149145974	0.686736938	0.511473855	0.0291618051
84501001	-0.723272337	2.5176245802	-0.364827879	-0.716766009	-1.1646060593
845636	0.127219899	0.6244628561	-0.165603833	-0.301115608	0.3759046163
84610002	0.764194227	0.6655068738	-0.619000411	-0.400588340	-0.3307781202
846226	2.592290301	0.9406696600	3.318863750	-0.747130974	0.3955980681
846381	1.006774257	-1.7974995418	-1.105684467	0.267389882	0.4391951701
84667401	-0.349408795	0.7422274132	0.280679206	-0.674510305	-0.1155553104
84799002	0.495342130	0.9142524133	-0.302257713	0.456538430	0.4467643551

848406	-0.761520960	-0.0867706702	-0.029483040	0.502783775	-0.4992331367
84862001	-0.751827782	0.4415962916	0.413405991	0.018656683	0.3563165037
849014	-1.136688687	-0.2510619539	-0.741499503	0.410086322	-0.5708248435
8510426	-0.048594023	-1.2006310194	-0.403270875	0.404944121	0.0059203674
8510653	0.430462491	0.3381860916	0.861201670	-0.187036602	0.3606065559
8510824	-0.769391365	-0.1908707908	0.244247147	0.546415425	0.0076299444
8511133	3.020386239	-1.0062943167	-0.104544724	0.168363304	-0.2454047607
851509	-0.595316618	-0.0747626295	-0.180094245	-0.363806008	0.6909368005
852552	-0.812165001	0.7996017629	-0.419539913	0.810965561	0.0214595144
852631	1.183160422	0.6013244034	1.306262282	1.100042783	2.2842657360
852763	0.786665153	0.2896641020	0.495541562	0.113090873	0.2951812417
852781	-0.906797174	-0.6452669891	-0.340174492	-0.043873679	-0.3961957456
852973	0.192679233	0.1609885641	-0.378501497	0.356974453	-0.5691360315
853201	0.036227947	0.1838685926	0.218709799	-0.381333094	-0.0364970759
853401	0.241867529	0.4615706215	0.291813749	0.284492214	0.1182178679
853612	1.233593969	1.9763494638	-0.202453666	0.564148659	-0.2297663753
85382601	-0.190839648	-0.8888020606	0.243842164	0.442519010	0.1433737325
854002	0.267243832	1.0317090641	-1.141727259	-0.566293378	0.2446991603
854039	1.000905829	0.7700944229	-0.210139235	-0.585132155	-0.0747302216
854253	2.009267717	-0.7199616429	-1.411392236	0.196789071	-0.7431027433
854268	0.568095150	-0.1425954318	-0.488198042	0.390894097	-0.3824484486
854941	0.290013739	-0.8043318792	1.707341340	-0.891664549	-1.0876247249
855133	-1.493142577	1.2791292757	1.498249655	2.100532774	0.0114924931
855138	-1.036438899	-0.1775681622	-0.198083551	0.431153558	-0.4385877226
855167	0.928295680	0.0418357439	0.048599880	0.666574547	0.3902914311
855563	-2.120772389	-0.4965417472	0.484027443	0.912512891	-0.4303234931
855625	4.307303747	0.4337837927	-1.387017258	-0.352517752	-0.9339783433
856106	0.242568260	0.6132339088	0.067809257	0.282512565	0.1518262957
85638502	0.110049368	0.2333988676	-0.174872997	0.544441256	-0.2067359385
857010	0.423532149	-0.7874816331	-0.790091300	0.111457042	-1.0551322678
85713702	0.575420451	0.2230057137	-0.867569780	0.328258562	-0.1456716219
85715	-0.281861620	-0.1604792421	-0.018943396	0.591809797	-0.1053337966
857155	-0.692882067	0.1971605392	0.040044188	0.419441177	-0.6168907916
857156	0.544804546	-0.6838772921	0.555862941	0.605703404	0.1987895162
857343	0.266013819	0.4536379429	-0.123851495	0.259381187	-0.4343429520
857373	-0.256313209	0.4449438979	0.057879905	-0.492076521	-0.2410267010
857374	0.629337135	0.0607736151	-0.510873270	0.413623505	0.8230489282
857392	0.707227400	0.6479398411	1.537761700	-0.614290601	0.0886086788
857438	-0.656077776	-0.2152637743	-0.207515896	0.505338373	0.1085018162
85759902	1.277739611	-0.3925629141	-0.745416793	0.301153902	0.0751610030
857637	-0.178434830	-0.1853434904	-0.309233059	0.012534355	-0.1128753503
857793	0.461927636	0.5362098378	0.951178388	0.073379908	0.1941817154
857810	0.705119501	0.4873781448	-0.297723909	-0.127261763	0.7362638224

858477	-0.900267281	0.4064726785	-1.225062124	0.345609537	-0.4642608787
858970	2.538550035	0.7457813449	0.909941133	0.262199059	1.3178790775
858981	-0.815018482	-0.3959097935	-0.230734976	0.102956869	-0.9272860914
858986	-1.218994501	0.8193030850	-0.330742314	0.528189577	-0.4855301241
859196	2.955682829	0.2103798445	0.627427082	-0.232120660	0.0413657355
85922302	-1.242117920	-0.0057834579	-0.385706296	0.801372546	-0.1817471124
859283	-0.727422417	-0.5309593004	0.474393258	0.003939003	0.1728882560
859464	-1.188527693	0.1693780934	-0.029824460	-0.111145907	-0.2713131090
859465	-0.405353080	-0.5265287503	-1.082071976	0.427426065	-0.3912329742
859471	2.213816387	-2.5787909992	-1.298010892	3.780791875	-2.7357511959
859487	-0.433947228	-0.8493285940	-0.334869937	-0.004978691	-0.3104418547
859575	-0.291543973	0.2832433298	-0.086188560	0.326867199	0.0333168740
859711	-1.638316786	2.4262266414	-1.317108728	-1.883468421	3.1898325590
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859983	-0.919638446	0.6971724884	0.393036492	-0.357905538	-0.1474184494
8610175	0.034838302	0.1200189004	0.459971988	0.314694924	-0.0155400843
8610404	-0.994688029	-0.9081210535	-1.100360740	1.244777578	0.0926553152
8610629	-0.612562561	-0.7756714142	0.246838044	-0.772831741	1.5166900630
8610637	0.682870529	1.3985754634	-0.719241167	-0.096664805	0.5085691762
8610862	4.876508199	-1.1544779461	-0.483077495	-1.170391748	-1.3237161139
8610908	-0.072350138	0.0536554932	0.355866547	0.048832592	-0.1077491295
861103	-1.501869476	0.1435614258	0.486258862	-0.122378079	-0.0390292436
8611161	0.138012244	-0.3263920580	0.151919734	-0.226864771	-0.5036154424
8611555	-2.186236690	0.0355707110	0.547079286	-1.647859246	0.3961746350
8611792	-1.421297891	-0.0432176692	2.012767522	-2.966728252	0.0222412116
8612080	0.882263930	-0.2550878307	0.229994161	0.423649141	0.1477716874
8612399	0.967176566	-0.1536701262	0.192125163	-0.083450911	0.4426520533
86135501	0.567360307	-1.6613223577	0.349250281	0.571523884	-0.1210561314
86135502	1.560091353	-0.1983680707	-0.643025712	0.183841722	0.4623711739
861597	0.223702425	0.0769126070	0.148776905	0.262252261	0.4555666494
861598	0.842299884	-0.1736551116	0.614011283	0.283254129	0.3987023515
861648	0.325518164	0.2995505173	0.128752056	-0.246304891	0.5210683990
861799	-0.199459121	-1.7255946363	-0.786058401	0.116745956	0.1441268207
861853	-0.292110132	0.0957807360	0.413725996	0.390523505	-0.5899606072
862009	-0.321113861	-0.5677543179	0.395718555	0.058107568	-0.4912485698
862028	-1.066707998	-1.0421552988	-0.283564277	0.637899776	-0.2969722678
86208	1.783555798	0.0004244298	-0.292506839	-0.580370555	0.4991648297
86211	-0.096852967	-0.0225249946	1.596299697	0.179428829	0.4099629648
862261	-2.351934315	1.1157841763	0.148452301	-0.906614963	-0.3165086702
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862548	-0.853188272	-0.5060704070	0.634423963	-0.237141676	0.1392901935
862717	-0.595802895	0.0029648840	0.062601958	0.797723981	-0.2095356865
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862989	0.940750946	0.1577998775	0.592437419	0.477922672	0.6483605373
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864729	-0.767555623	-0.2067958374	0.209629326	0.284564474	-0.0334444954
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89143601	1.995111435	-0.4474969098	0.438993216	-0.154339792	-0.1535414595
89143602	0.870504292	1.4288153440	0.056604771	-1.772331697	1.6749304819
8915	0.245372994	-0.2532806962	0.131339272	0.013100900	0.5285901781
891670	0.089387450	-0.2632432645	-0.963857814	-0.475551131	-0.0781849151
891703	0.414086721	-0.6568800189	-0.389574742	0.447437433	0.1298348252
891716	-0.656055820	-0.1831651809	0.302520981	-0.106866323	0.0604470360
891923	0.629424293	-0.0059656014	0.134317338	-0.521742080	-0.2066610311
891936	0.962920440	0.2364685754	0.700921264	-0.667458810	-0.8409535457
892189	-0.988693412	0.5669876696	1.830877240	0.694029609	-0.5472157675
892214	0.942635213	0.7515115049	-0.175107129	-0.008041250	0.4998271246
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892438	-0.892012107	1.1708230247	0.240630468	0.401231594	-0.7912809587
892604	1.057049565	0.0641942198	-0.174584753	0.162311622	0.1211142829
89263202	0.424230119	0.8009641178	0.689452532	0.179814011	0.4398645110
892657	-1.764318755	-0.3089463278	0.389324396	-0.194847252	-0.4738750247
89296	-0.524107614	0.7087397770	-0.139625312	-0.164868485	-0.5004026881
893061	2.355994261	0.0138795016	-0.129463186	-0.085067064	0.2108086852
89344	0.287352467	1.0458411839	0.048345725	-0.373310733	0.5402341226
89346	1.475361121	0.9496661823	-0.136253368	-0.293049733	-0.0729297836
893526	0.555206557	0.5520636775	0.099323502	-0.477005324	-0.2717178095
893548	-0.096172883	0.8390301222	0.333065881	-0.012531062	-0.1732876433
893783	1.348798860	-0.3750342427	0.121358042	0.212737541	0.2187874168
89382601	0.640709233	-0.1712752620	-0.041463185	0.012850947	0.2322531073
89382602	-0.063062086	0.4144020234	-0.299714987	-0.072517447	-0.0724498885
893988	1.692163170	0.4138464332	-0.105494615	-0.011203650	0.0929704694
894047	0.965426537	0.0242816003	-1.745049356	-2.616377669	-0.2425580614
894089	-0.823767200	0.2426330221	-0.067426170	-0.339172721	-0.4694609147
894090	0.790884787	0.0580936404	-0.151511818	0.165573364	0.0738077799

894326	-0.392077864	-0.5981913512	-0.092751687	-0.095361501	0.3808674010
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894335	0.918487309	-0.2108079992	0.510943642	-1.009637831	-1.0435900733
894604	-0.839717979	0.2101197168	-0.007380881	-0.574251329	-0.0623371359
894618	1.653345461	-0.7582083636	-0.325742123	-0.083176746	0.7060239933
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89511501	-0.165391824	0.6992422401	-0.028307053	0.080348403	-0.0472513095
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895299	-0.169471369	0.8785198528	0.075574125	-0.237928202	-0.0648401994
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897137	0.535295153	0.7321018980	0.070591958	-0.001496864	0.3046607270
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89813	0.579500486	0.1083178964	0.256990853	0.255809327	-0.0397007789
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89869	0.637627242	0.1715272186	-0.605037603	-0.249194299	-0.4076237348
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911654	-0.049155752	0.2225068454	0.195224752	0.027736360	-0.4073010683
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911685	-0.024030956	0.2726963978	0.651189204	0.259076986	-0.5098708464
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912193	-0.544923618	0.6168567753	0.360787470	-0.185386117	-0.6053952951
91227	-0.020448924	0.5596010017	0.238972704	0.281984868	0.2297284929
912519	-0.015465239	0.0341998123	0.556776251	-0.410366430	-0.0001525405
912558	-0.163288967	-0.2363141916	1.110535207	0.404965671	0.0866869538
912600	-0.959725312	-1.0374933742	0.281339803	-0.273903950	-0.2516387236
913063	1.555748208	-0.0074068986	0.103548840	0.620787469	0.0066500562
913102	-0.100925216	-0.2480033888	0.236855524	-0.190191595	-0.7367867541
913505	-0.355060598	-0.6249667494	0.532054753	-0.572942001	-0.7416972638
913512	-0.865293960	-0.3426305869	0.107911866	0.387462633	-0.0895571414

913535	3.200742182	0.1681848622	-1.037468192	-0.233454240	0.5205880964
91376701	0.211717707	0.6719224926	-0.478277765	0.094544374	-0.0149590726
91376702	-0.552916738	0.1223216364	0.339129401	-0.965159125	-0.6851658328
914062	0.929231997	-0.1972060738	-0.161505829	0.030338925	0.5659987102
914101	0.564240369	0.2686459455	-0.516024743	-1.234008136	0.0270632156
914102	0.565106052	0.4685793512	-0.573882748	-0.356776050	0.2895432749
914333	-0.437681039	-1.0429086282	0.759487730	-0.479171345	-0.6395383847
914366	-0.602030766	0.4096827364	-0.141544270	-0.126704802	-0.5507565750
914580	0.213609008	0.0982391416	-0.007360691	0.100535897	-0.5819463924
914769	-1.103639415	0.6339022355	0.059087104	-0.286816236	0.3931897963
91485	-1.446663003	-0.5729903088	0.649548750	-0.535576844	0.2509909032
914862	-0.852480433	0.7049106403	1.345754994	-0.488514486	0.4163000633
91504	-0.507970681	0.2069805672	-0.080099530	-0.051659333	0.9747986067
91505	-0.241932508	-1.0452388229	-0.209946317	-0.039368061	-0.1874087571
915143	0.066333057	1.1529703725	-0.991695109	0.167376682	-0.5695827223
915186	-2.200919526	1.0250951989	2.028889513	-0.236610613	1.1453491173
915276	-3.508790828	0.6042606963	-1.278500206	-1.872556795	1.0201289746
91544001	-0.484723076	-0.1359505647	0.665044251	0.777877875	0.9392975863
91544002	-1.947329468	0.4881934312	-0.255064594	-0.906528375	1.2755281468
915452	-0.833977551	-1.4088879023	-0.297979389	-0.073731957	0.6470988652
915460	-1.602111794	-1.0533691956	0.356568603	-0.428904878	-0.7303104811
91550	0.253668588	0.5472551225	-0.542053825	-0.617650801	-0.0916288468
915664	0.032979942	-0.8752970956	-0.295663965	-0.033414237	0.3412769300
915691	-0.136700223	0.3929176231	0.614735076	0.714787485	0.1215931340
915940	0.072494321	-0.1758143289	0.255077079	0.311421297	-0.2139098582
91594602	-0.773624515	-0.1454686759	0.499925801	0.270529716	-0.4082811925
916221	0.046608047	-1.0005231004	-0.306962199	0.655600375	-0.0907347030
916799	-0.491293222	-0.5167539200	0.050028508	-0.131357405	0.2258787420
916838	-1.017677377	-0.0261084918	0.443355468	-0.658166813	0.5299438963
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917080	-0.265206232	0.1942744924	0.462310866	0.357702019	0.7940768989
917092	-0.548135411	-0.8140726857	-0.987108671	-0.070507407	-0.0537361968
91762702	-0.006685146	0.9611743974	0.397621795	-1.256638663	0.8486917334
91789	0.097095633	0.7218828231	0.508127340	0.060557805	0.3878654534
917896	-0.600188263	0.1391868086	0.295156517	-0.243768633	0.0023377369
917897	-1.401965911	0.9527774834	-0.299971512	-0.503892654	-0.7846233548
91805	-1.210209018	0.8160391133	-0.373064638	0.292981675	-0.3609872357
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91813702	0.325770470	-0.0944504391	0.149150397	0.318904984	-0.2288534014
918192	-1.686010994	-1.7109061685	2.408540813	0.332918111	-0.1176166151
918465	-0.851940525	-0.0288485824	-0.205098471	0.032406632	-0.3895059803
91858	-1.101161685	0.0869517853	1.295452125	0.161515938	-0.9103205148
91903901	-0.289073515	0.4730366470	-0.069618747	0.543463275	0.0572082633



91903902	-0.197903630	0.4337496082	0.168973422	0.024829540	0.3191275798
91930402	1.934520374	-0.7275859760	0.757319150	-0.175980334	0.2702433954
919537	-1.550311718	-0.7176961616	0.139629661	0.188290346	-0.3701820155
919555	0.578720770	-0.5430102167	0.951930849	-0.247809950	0.5286878926
91979701	-0.523378449	-1.1495594767	1.091132033	0.323915796	-0.1038818740
919812	-2.337461193	-0.4830815304	0.501982823	-0.069804388	1.2788258192
921092	0.042391707	2.1668488112	-1.479915189	-0.322804378	1.1801175946
921362	-1.158207647	0.1913668076	-1.796559226	0.876067543	0.9484780485
921385	-1.188472456	-0.6771595730	0.146514414	-0.291391323	0.1026424111
921386	0.425520296	0.3979358310	-0.835301076	-0.383809102	0.6190792834
921644	0.765081147	-0.4663049042	0.398228821	0.364670551	0.7941292239
922296	0.068753051	-0.4148574879	0.507946096	0.278027691	0.2875814970
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922576	0.114797260	-0.1161527345	-0.013618636	0.058006015	0.1323174915
922577	-0.145962831	0.2596286888	0.149437375	0.564356936	0.5746698535
922840	-0.677751360	0.0640445882	-0.970113001	-0.454875027	0.0952997770
923169	-0.112569772	0.4740694793	-0.169694808	0.410188208	-0.2194120652
923465	0.854769667	1.0210226174	-0.160349809	0.446749349	0.3987268089
923748	0.850625097	0.7520064103	-1.069484886	-0.588800008	0.0688498920
923780	1.783207929	0.3901520318	0.873654798	0.310967487	0.3653727356
924084	-0.582689902	-0.6178681677	-0.938396865	0.362221796	0.4485215927
924342	0.411907169	-0.3073955477	-0.357594218	-0.143055766	-0.4514830478
924632	-0.549918834	-0.4839795902	-0.892397382	0.435103530	0.2439245685
924934	-1.640362885	-1.0878956916	-0.349885533	0.514611257	-0.0049422107
924964	-0.814176294	-0.4706597676	-0.071321985	-0.701263764	-0.0705817127
925236	0.174755382	1.0763071056	-0.129380621	-0.426655069	-0.2770426795
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925291	-1.724352624	-0.3536636324	1.163315907	-0.207312716	-1.3904847631
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925311	-1.109815814	0.4879418774	1.288150901	-1.389256180	-1.7451271378
925622	1.012707855	0.2712037562	-0.091882489	0.372148526	-0.6298691742
926125	-0.300488375	0.0947410215	0.733436507	0.830362739	0.4502424273
926424	-2.373104852	-0.5956056075	0.035439747	0.987060511	0.2567626672
926682	-0.246493221	-0.7156966020	1.112380784	-0.105114917	-0.1085369986
926954	-0.533977345	-0.1925887705	-0.341586475	0.393570521	0.5204194692
927241	0.567437190	0.2228855560	0.279992246	-0.541558028	-0.0892176149
92751	1.616415088	1.6974579729	-1.045433644	0.373772231	-0.0476836145
	PC11	PC12	PC13	PC14	PC15
842302	-0.262724285	-0.8582592992	0.103296775	-0.6901967966	0.601264078
842517	-0.812404827	0.1577837523	-0.942699807	-0.6529008436	-0.008966977
84300903	0.605071514	0.1242777100	-0.410265611	0.0166650952	-0.482994760
84348301	1.150501182	1.0104267377	-0.932450704	-0.4869883986	0.168699395
84358402	-0.650787016	-0.1104182769	0.387606915	-0.5387065429	-0.310046684

843786	-0.109669824	0.0813699015	-0.026251351	0.0031339435	-0.178447576
844359	-0.393343607	0.2419761651	-0.351941936	-0.2216015267	0.060855369
84458202	0.196313828	-0.2777917914	-0.460630835	-0.0961356710	0.187478261
844981	0.560021577	0.0788169039	0.493001875	0.1120530076	-0.034237132
84501001	-0.548555069	-1.0841629631	-0.375475245	-0.0006033716	-1.206141020
845636	-0.294276512	0.6099198621	-0.692298563	-0.1301140961	0.091099184
84610002	0.150099383	-0.8725334105	-0.978852628	0.4132851288	-0.076575493
846226	1.119190867	0.0520074379	-1.983208918	-0.2667913889	0.492408131
846381	0.853628961	0.0628135272	0.194455743	-0.1212264306	-0.151174299
84667401	0.637371253	-0.5439530565	0.152152510	0.0208341513	-0.504094726
84799002	-0.089892055	-0.0929155801	0.272937688	0.4193736451	-0.531937246
848406	-0.283115330	0.3228336349	-0.873313571	-0.2068809463	0.026977460
84862001	-0.077022788	0.1450773283	-0.056826726	-0.5557727446	0.357788221
849014	-0.382631859	0.0680073259	-0.762829689	-0.1781151366	0.186075363
8510426	-0.087947737	-0.3232036086	-0.240304220	-0.1497219434	-0.277740235
8510653	0.252743308	0.1820993618	0.534747411	0.5364927035	0.630306593
8510824	0.295829357	-0.1193713638	-0.105109885	-0.5505241800	0.208888166
8511133	0.747761739	-0.7897394650	0.018967583	-0.3939657391	0.178368816
851509	-0.845138812	0.1995874763	-0.760017755	0.1495561475	0.585041105
852552	-0.600095326	0.2321645154	-0.719018102	0.0560160318	0.622570169
852631	0.196585356	-0.8095860291	-0.394727262	-0.9305675819	-0.282237083
852763	0.441362589	-0.9739851395	-0.516422067	-0.7074323955	-0.383724915
852781	-0.412668030	-0.3158058348	-0.298472337	-0.2950812415	-0.235804579
852973	0.370382886	-0.1246372082	0.129900549	0.1958202715	0.175956263
853201	0.246904961	-0.0031839923	-0.222279620	0.1283529520	0.091747519
853401	-0.496378073	-0.1044630774	0.885636344	0.0692396351	-0.376293016
853612	-0.756864461	-0.2657615457	-0.522186276	-0.3000453967	0.072356014
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854039	-0.326307877	-0.4066154950	-0.351748055	-0.0564880712	-0.224784255
854253	-0.328257659	0.2292843967	-0.619894462	0.2143138994	-0.067766013
854268	-0.217741168	-0.0195015091	0.032551005	0.1704452228	-0.479641248
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855133	1.047288688	-0.6130946673	-0.290379074	0.1249868104	-0.401912364
855138	0.591014507	-0.0004681369	-0.235544182	-0.4578511130	-0.668135575
855167	0.145009410	-0.0423201249	0.029903294	0.0054147710	0.005022251
855563	-0.115306889	0.3312318699	0.019742154	0.2321540822	-0.128765770
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856106	0.160272727	0.1311301054	-0.144226466	-0.1816995714	0.160135565
85638502	0.240085901	0.1091591008	-0.164573360	-0.0950096841	-0.193897144
857010	0.003089503	-0.1206287088	-0.149769253	0.3143049855	-0.268535008
85713702	0.090090936	-0.0249037139	0.378695789	-0.2394451655	0.277696370
85715	-0.289430944	-0.0732252281	-0.561084977	-0.2625113637	-0.646184357

857155	-0.324354020	0.0931121402	0.393569102	0.5995102295	-0.169047859
857156	0.237322628	-0.0116411885	-0.208908133	-0.1508619753	-0.058578846
857343	0.639460669	0.6058597387	0.224644982	-0.0446479438	-0.040260858
857373	0.079686662	0.0240053741	-0.377273811	-0.4453178247	0.108861412
857374	0.025165467	0.1593213356	0.246020193	-0.5093448931	-0.077987883
857392	-0.274018692	0.6533266173	0.601165133	0.6072878098	-0.501815152
857438	0.058487255	0.2677384961	-0.399395210	-0.0450747265	-0.036176457
85759902	0.197754405	0.5401834853	0.058602197	-0.1399689340	-0.349863814
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857810	-0.228334046	-0.1991733623	0.421272292	0.2167665417	-0.342304785
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858986	0.717323304	-1.1859167706	0.589385595	0.3030289831	0.129915286
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859471	-2.301916714	1.9478812125	1.103679434	0.2450717685	1.060326663
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859983	0.379838236	-0.1163449791	-0.053581681	-0.1557475752	-0.059940319
8610175	-0.007559389	-0.2732435321	0.012174976	0.2578796832	-0.032393640
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8610629	-0.408291577	-0.3217815151	0.814890878	0.8570418853	-0.590679517
8610637	0.845106205	-0.7038553721	-0.692840046	0.3237751499	-0.106235419
8610862	1.209082105	1.2860572446	1.339239602	-0.5384927467	0.904755029
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861103	-0.786967580	0.0345574874	0.033439840	0.1843125970	0.447952176
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8611555	0.253381955	-0.5690714729	0.753989687	-0.5460281371	0.432021867
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86135501	-0.552045457	-0.8029870413	-0.067392082	0.1127709163	-0.092173983
86135502	-0.433326769	0.5703689588	-0.119188327	-0.4170696748	-0.396379852
861597	0.016642280	-0.3158031850	-0.382598138	-0.4374455309	-0.208840242
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861648	0.724144967	0.5554322605	0.214432986	0.3277344219	-0.037958812

861799	0.937374393	0.4067146390	0.563287417	-0.7725393225	0.029255733
861853	0.049407605	-0.6890916537	-0.464225889	-0.4063362427	0.014895270
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862028	0.609344020	-0.7423625667	0.222233620	-0.2428698410	-0.129345613
86208	-0.644167720	-0.1613821271	-0.079839276	0.2971928632	-0.073910222
86211	0.585191831	0.4438091073	-0.230398088	-0.1827187582	-0.061170624
862261	-0.329894644	0.3323522602	-0.138254531	-0.1072538655	-0.178613587
862485	-0.146550183	0.0692879791	-0.002258044	-0.4559046799	0.100650887
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862717	0.237747713	0.4271403452	0.204387799	-0.0197655248	-0.095573905
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864726	1.325817930	-0.5164890912	0.796713304	-0.1042779720	1.230334163
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86517	-0.884232338	-0.0265148144	-0.611872230	-0.2217926975	-0.115027379
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8915	0.338431318	-0.4870938128	-0.441684474	-0.0578212808	-0.236739821
891670	-0.180312647	0.5953905235	-0.544430507	-0.2023067806	-0.371734841
891703	-0.340780810	-0.7285137341	-0.273589930	-0.0334471840	-0.009670032
891716	0.392085228	-0.1216187537	0.158672897	0.2577470054	0.355050450
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91227	-0.182316821	-0.0185594843	0.025351655	-0.0237769481	-0.107980895
912519	0.270190534	0.4252029656	-0.191220618	-0.1431104463	0.013293072
912558	0.200475839	0.4272385494	0.213721370	0.1529513498	0.147794029
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913063	0.430098593	0.0027740551	-0.486312026	0.2571649705	0.331462832
913102	-0.131537575	-0.0758429334	0.198911781	0.4966581680	0.038938641
913505	-0.910120607	0.1278456077	0.248345979	-0.0418222828	-0.109347069
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913535	-0.488433850	-0.0030835220	-0.416074175	0.2769279910	0.338978930
91376701	-0.118056633	0.3172047241	-0.253614426	0.0166237469	0.139340391
91376702	-0.236364830	-0.1156699908	-0.040531331	-0.0817350822	0.166193133
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914102	-0.295988005	-0.5455273504	0.123248220	-0.0816772472	0.208984125
914333	0.231234573	0.4316795917	-0.066079150	0.0232705761	0.037494299
914366	0.610689995	0.3742372700	-0.090040303	-0.0212508453	-0.054908668
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91485	-0.312833478	0.0177142577	0.524231545	-0.2019981327	-0.039947058
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91504	0.078581127	0.1589725855	-0.459371917	0.0886805410	-0.277104620
91505	0.144988459	0.4971942289	0.156019871	0.2908596514	0.291407020
915143	0.568692192	0.1591408726	-1.192610465	-0.0713913148	0.588139305
915186	1.080449875	1.2872881358	-0.495769149	0.6445579993	0.527081026
915276	-0.532755725	-0.2330164053	0.405118974	-1.1787557829	0.697074701
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915452	-0.019377981	0.1656588036	-0.236746460	-0.1878996254	-0.253631518
915460	0.315947790	-0.0633472245	-0.206100209	0.0753920244	-0.021392718
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915664	0.031575776	-0.2221749564	0.050687499	0.0407637532	-0.145970771
915691	0.135649014	0.2492132654	-0.050143738	-0.8348939124	-0.128536902
915940	-0.135202274	-0.0543952913	0.418043070	0.5273173190	-0.165610991
91594602	-0.064727834	-0.0224106269	0.244545028	0.1173740572	0.285898324
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916799	-0.378334890	0.4585978463	0.432548534	0.1643351329	-0.061591672
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921362	-0.391631186	-0.5494563493	0.953941633	0.0364970323	0.890138666
921385	-0.459932233	-0.8716409253	0.133864842	0.2918316525	0.533705303
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921644	0.344308231	0.2851593715	-0.174263087	-0.3021703935	-0.091722354
922296	0.754494648	0.4561970056	0.339310370	-0.0022268022	0.118843048
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922840	-0.043766957	-0.1056845291	-0.298157590	-0.3004703745	-0.194792207
923169	-0.048982818	0.3764808300	-0.195677690	-0.3816380198	-0.193683020
923465	-0.110930947	-0.4798931054	0.136682319	-0.0916403900	0.237267418
923748	0.128935162	-0.0436164575	1.049012602	-0.3209498675	-0.116741765
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924084	0.644600706	0.4766294202	0.237775205	-0.1124291332	-0.046746718
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925236	-0.372813857	-0.5775177218	0.713112793	-0.2595316849	-0.354395012
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926954	0.839772720	0.0963880851	0.157279563	0.2854397183	-0.090917772
927241	0.178471102	-0.6968480142	1.224117875	0.2185054033	-0.229389196
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842517	-0.6482383131	-0.0171970719	3.180176e-01	-0.2473469895	-0.1140327429
84300903	0.3248247158	0.1907506408	-8.789759e-02	-0.3922811953	-0.2043524231
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84358402	-0.1524716533	0.1330252645	-1.869779e-02	0.4610302383	0.0654378154
843786	-0.0127056581	0.1967133529	-2.972771e-01	-0.1297264835	-0.0711745335
844359	-0.0279433054	-0.3200829050	1.230170e-01	0.0035239593	-0.0444495512
84458202	-0.3365097518	0.1614215017	-4.908981e-02	0.2196830773	-0.0106331412
844981	0.5070582930	0.2854754597	-2.870772e-01	-0.1822709687	-0.0197682471
84501001	-1.1318257248	0.7584688292	-2.387387e-01	-0.1275685149	0.1779240553
845636	-0.0138706093	0.2849159741	-6.134944e-02	0.1720437193	0.0937289351
84610002	-0.0187810714	0.1611055355	-4.159689e-01	-0.1367793291	0.0566814179
846226	-0.2920952462	0.0531727295	9.339577e-01	0.9728881275	-0.3157956887
846381	-0.1992780260	0.0096995090	9.339247e-02	0.1010674465	0.1967267792
84667401	-0.1618282348	0.1754310229	2.238806e-01	-0.0531840832	0.3639545281
84799002	-0.6382781617	0.1798611136	-1.718454e-01	0.0906929739	-0.2822197817
848406	0.2443739278	-0.0458383708	-2.208124e-01	-0.0808510853	-0.1668401722
84862001	0.2215767406	-0.0781818510	5.021716e-02	0.3243354151	0.1355909907
849014	-0.1393548032	-0.6855739616	-2.705080e-01	-0.4576544799	-0.0261720852
8510426	0.1209221166	-0.1193080949	1.076572e-01	-0.0023196540	0.0627784940
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8510824	-0.2156163397	0.0416265799	-4.312105e-02	-0.2850057948	-0.0664739762
8511133	0.0779077052	0.0516753915	-1.351681e-01	-0.2505840594	0.2833238390
851509	-0.1695420732	-0.5795650326	-1.524509e-01	-0.4622425441	0.2441235537
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857155	0.0675974293	-0.1890272279	8.181192e-03	0.2854018034	0.0309365297
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861853	0.3440552885	-0.2273752521	-1.922491e-01	-0.0781472448	0.2033479975
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862028	0.3622171113	-0.3077571762	-1.249274e-01	-0.0092797913	-0.0162603868
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862485	0.2297949692	-0.1010915701	3.228795e-01	0.0795964606	-0.2354725917
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862717	0.2603574888	-0.0843126026	-3.760217e-01	-0.1282177279	0.1466945932
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862965	0.3166072907	0.1782153925	1.222033e-01	-0.1914123729	0.1774645649
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891703	0.4311772505	-0.0021485604	3.108104e-01	-0.0256739425	0.0147052733
891716	-0.0359002461	0.0420910103	1.576972e-01	0.1163353441	0.1094211617

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911320501	0.4093659972	0.1500933696	5.328932e-02	0.0508637577	-0.0908707847
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9113239	-0.5974218658	-0.1471347025	-1.849631e-01	0.0873280813	-0.3477157152
9113455	0.0291153507	-0.2534408859	4.252163e-02	0.1488658763	0.0808908761

9113514	0.3421853326	-0.0986465839	5.041461e-02	0.2709480873	-0.0442397637
9113538	0.1763564924	-0.0372038848	-2.845932e-02	-0.0736369742	-0.1005821487
911366	0.0172054420	-0.0308367920	4.471065e-02	0.2432901471	0.1623773566
9113778	0.0453408189	0.0054958394	-5.969832e-03	-0.0895727295	-0.1057466710
9113816	-0.0375389091	-0.0185752968	-3.814678e-01	0.2193251118	-0.1105674525
911384	-0.3061000700	-0.0456225836	-1.504954e-01	0.0183164709	0.0824946722
9113846	-0.3118583243	-0.1663433967	-6.947857e-02	0.1596341500	-0.1369845189
911391	-0.5691688283	-0.1311857188	8.801939e-02	-0.1537656514	-0.0164150330
911408	0.0117212288	-0.0724106602	5.570345e-02	0.0750153505	-0.0219888150
911654	-0.0680199510	-0.0159018154	-6.871319e-02	-0.0502469230	0.1534418424
911673	-0.1709974620	-0.0123870580	1.253255e-01	0.0402899453	0.0872854803
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913102	0.1344296202	0.0451822383	-1.368277e-01	0.0478395415	0.1626515967
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913512	-0.0886881633	-0.0843837467	-4.710080e-02	0.0779530510	0.1300871141
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846381	0.0536465611	0.2250613132	1.057031e-01	-0.0118578557	0.0109923447
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859465	0.0458313220	0.0615712021	2.847847e-02	0.0293938347	-0.0018518567
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859575	0.0571423282	-0.0830178567	-2.073762e-01	0.1006802771	0.0339903355
859711	-0.3361399692	-1.1424568904	2.420656e-01	-0.3463345316	-0.2252647249
859717	0.1239360454	0.4460762715	-1.913596e-02	0.0131668390	-0.1545557510
859983	0.0737021390	0.2859701894	-2.018351e-01	0.0772917781	0.1152392295
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8610637	0.4881849266	0.4593568598	-1.759304e-01	-0.1091187680	0.0415840412
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8611555	-0.0864821708	0.2665122626	-4.632589e-02	0.2608106914	-0.2015897382
8611792	-0.1196533997	-0.2956341346	2.224689e-01	0.5212444111	0.1096453749
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862261	-0.0102439849	-0.0916181734	-6.026311e-03	0.0642046278	0.0182723018
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88518501	-0.0827443999	-0.0025122862	-4.911417e-02	0.0098933299	-0.0512388223
885429	0.1939382313	0.0337559611	1.123423e-01	-0.5386655525	0.0988701448
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886776	0.0657075187	0.3547094070	-2.745383e-02	-0.1058042628	0.1097401753
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907915	0.0019578175	-0.1048584729	5.720205e-02	0.2539090880	0.1365988878
908194	0.0540536451	-0.0444643004	1.129768e-01	-0.0536100469	-0.0569430532
908445	0.1653342497	0.1274114679	-1.384038e-01	-0.4325870571	-0.1346793532
908469	0.1146329007	-0.0027134094	-8.200389e-02	-0.1730890191	-0.0144790390
908489	-0.2200985970	0.1006178156	-1.368833e-01	0.0531833989	0.1099756348
908916	-0.0304001780	-0.0572935134	-7.070516e-02	-0.0206441474	-0.0133543585
909220	-0.1368029275	0.0061230585	-5.591505e-02	-0.0478389719	-0.0403940458
909231	-0.0793001591	0.1044417028	-3.418081e-02	-0.0147955293	0.0745168721
909410	-0.0183452898	0.0548935007	-7.683394e-06	0.0347796156	0.0111744231
909411	-0.2417576781	-0.2788907229	-1.319303e-01	0.1618054403	-0.0426221634
909445	0.1580000777	-0.1834404534	2.574778e-03	-0.2487273459	-0.1217502618
90944601	-0.0033159852	0.0138414933	-3.660394e-02	-0.0753821955	0.0326697599
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9110720	-0.0472047714	-0.1698809252	-8.004756e-02	-0.0310899162	-0.0781274310
9110732	-0.2357417239	-0.3273223560	1.015880e-01	-0.0735782071	0.1269743445
9110944	0.0849379074	-0.2163203303	9.989555e-02	-0.0959688409	0.1189539833
911150	-0.1925398869	-0.2476888300	1.373175e-01	-0.0911925502	-0.0980712992
911157302	-0.3641253423	-0.1091531039	-3.505246e-01	-0.0347264802	-0.2398896114
9111596	0.0412613134	0.1024179683	2.475709e-02	-0.0993218275	0.0363300653
9111805	0.0393921606	-0.0600020038	6.233548e-02	-0.0872772974	-0.1328996352
9111843	-0.1256036884	0.0020564443	-1.380696e-02	0.0651525401	0.0281648503
911201	-0.0210571037	0.2003246196	3.443820e-03	0.1279633849	0.0160188982
911202	0.1437709369	-0.2026671856	2.112483e-03	0.0122183789	0.0910354686
9112085	-0.0993143795	0.1125780263	-7.237572e-02	-0.0188121874	0.0219217050

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9112367	-0.0445625200	0.0303823967	8.587958e-02	-0.0363677802	0.0095120561
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911320501	0.1696982514	-0.0091121369	9.413379e-02	0.0581625970	0.0813926896
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9113514	0.0419869330	0.0999656989	6.741788e-02	0.0033475535	-0.0870013668
9113538	0.0680035335	0.1272163054	-2.164847e-03	-0.4699301520	0.1415257001
911366	0.0684741059	-0.1754211846	-1.375369e-01	-0.0203658968	0.0835068775
9113778	-0.1432696762	0.1050453261	-7.255567e-02	0.0628878477	-0.0102102586
9113816	0.4132059354	-0.1253744570	-2.372379e-02	0.0689106194	0.0632012566
911384	0.0801477782	-0.0994904279	-7.551916e-02	0.0231996252	0.1031441886
9113846	0.3744615653	-0.2166879487	-2.056099e-01	0.0225950366	0.1145355103
911391	-0.0028374238	-0.0024283917	3.394618e-03	0.1226650174	-0.0657781843
911408	0.2074374506	-0.1946890651	8.574414e-02	0.0375255535	-0.0176623189
911654	0.0077541911	-0.1691781741	-2.393995e-01	0.0235301019	-0.0142543889
911673	-0.1274779565	0.1059211446	-1.420760e-02	0.1274986616	-0.0504357570
911685	-0.1752435869	0.0647906068	-1.963559e-02	0.0512455781	0.1507897689
911916	0.0741405793	-0.0683683718	3.014739e-01	0.1056563632	0.0291503627
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91227	-0.1718005261	0.0776043939	-1.207006e-01	-0.0681632290	0.1262100777
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912600	0.1618240979	-0.1260922761	-4.885764e-03	-0.0695939217	0.0167158472
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913505	-0.2558123584	0.0883016437	1.159603e-01	-0.1818387487	-0.0790781079
913512	-0.0136545293	-0.0515281909	-1.936755e-02	0.0442112419	0.1645016909
913535	0.2669916390	-0.2670016650	2.284507e-01	0.0042597084	-0.0555873751
91376701	-0.0535814976	0.0775740576	5.386731e-02	0.0309546385	-0.0198687085
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914101	-0.0687773666	-0.1016273418	3.828534e-02	-0.0499980530	-0.1182422028
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914769	-0.0481731383	0.1476443912	-2.255443e-01	-0.2411787219	-0.1401067009

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915186	-0.1123521419	-0.2210885176	4.119637e-01	-0.1621171978	-0.0747037425
915276	0.0311085932	-0.0043112438	-1.554371e-01	-0.1615159870	0.1462901120
91544001	0.0117125024	-0.3190203960	1.446060e-01	-0.2152535411	0.1095516050
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916799	0.1810812819	0.0867360333	1.384049e-01	-0.1324629140	-0.0090377647
916838	-0.0396300818	0.0422971304	1.048030e-02	0.0496241700	-0.0785177188
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91789	-0.0824384780	0.0250013489	1.149064e-01	0.0039590058	-0.0546444196
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91813702	-0.0007428400	-0.0794869253	-9.811836e-02	0.0489272789	-0.0264873014
918192	0.3705852161	-0.0223391489	5.075365e-01	0.0399525672	-0.1697663841
918465	0.1250829277	-0.0366604171	4.389193e-02	-0.0069134401	0.0520789685
91858	-0.2510653323	0.0340772274	-8.753856e-02	-0.0982485755	-0.1114855027
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91903902	0.1415752357	-0.1501413208	-1.183314e-01	0.0132847088	0.1539406806
91930402	0.1023467340	0.1517558697	-1.320795e-01	-0.2665377512	-0.1282250448
919537	-0.0025279486	0.1124682587	-1.477884e-01	0.0405273999	0.0306409909
919555	0.0791481775	-0.0502756205	-2.639892e-01	-0.0744509737	0.0008455486
91979701	-0.2740650665	-0.0002925086	1.707404e-01	0.1095625155	0.0994614805
919812	0.2606428739	-0.1601463771	-1.178442e-01	0.0390099169	0.0633318332
921092	-0.0413794118	-0.0604094030	-2.811241e-02	0.1403114024	-0.0330961759
921362	0.1154812600	0.2581934783	-7.793227e-02	-0.0711976819	0.0410671686
921385	0.1535435455	0.0239799396	-8.839128e-02	-0.1178975803	0.0735661058
921386	-0.0679373594	-0.1118336346	1.683499e-01	0.1715550493	0.0572524009



921644	0.0110374761	-0.1705246655	-5.717170e-02	-0.0128147660	0.1232452688
922296	-0.0656376005	0.0115407705	-1.397186e-01	-0.0441481701	-0.0402201549
922297	0.0641597728	-0.0257372276	-1.306238e-01	-0.0130286164	0.0536290674
922576	0.1105362335	0.0476875761	-8.635963e-02	-0.0603229788	0.0296765078
922577	-0.0262990959	0.0723866365	1.742109e-01	0.0600842055	-0.0903222486
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923169	0.0420616613	0.1434447978	2.151116e-01	0.0669104550	-0.0548411936
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923748	-0.0119356005	0.0136962943	-1.528663e-01	0.0443186800	0.0072493585
923780	-0.0388647303	-0.0294327168	-1.437595e-03	0.0211029594	-0.0051501501
924084	0.0994771923	-0.0523366815	-3.192496e-03	-0.0208073885	-0.0508996216
924342	0.1162426476	0.0972882879	7.659123e-02	0.1633788667	-0.1343697535
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925236	0.2548848500	-0.1344057649	-2.695888e-01	0.1253596547	0.1409818413
925277	0.0974032157	-0.0506046046	4.281686e-03	0.0074148594	0.1833745030
925291	0.0104818333	-0.0097405680	3.344908e-02	-0.0084439272	0.0371458564
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925311	0.6438555162	-0.1160958384	-1.348357e-01	0.0778267477	0.2155456879
925622	-0.3366411323	-0.5256708725	4.037840e-01	-0.2315981974	-0.0744296594
926125	-0.2819119524	-0.0637883885	3.027516e-01	0.3971743169	0.1344740836
926424	0.0068818177	0.0669407679	8.851262e-02	-0.1078034921	-0.2193267810
926682	-0.0097931016	-0.0195459671	-5.535634e-02	-0.0860588433	-0.0011958031
926954	-0.0365600992	-0.0632967943	-2.001358e-01	0.0447797442	-0.0024266219
927241	0.1405238587	0.0424409640	1.686715e-01	0.1957966922	-0.3774982893
92751	0.2744382324	0.2430237050	3.788121e-02	0.0750448656	0.0174926193
	PC26	PC27	PC28	PC29	PC30
842302	-0.2013263051	-2.523629e-01	-3.388464e-02	4.560759e-02	4.712774e-02
842517	-0.0410926274	1.811108e-01	3.259550e-02	-5.682424e-03	1.866234e-03
84300903	0.0047312486	4.952586e-02	4.698448e-02	3.143131e-03	-7.498749e-04
84348301	-0.2749828222	1.833008e-01	4.244698e-02	-6.923387e-02	1.991989e-02
84358402	0.0392197801	3.213957e-02	-3.475564e-02	5.033481e-03	-2.119512e-02
843786	-0.0302723330	-8.438081e-02	7.296587e-04	-1.970400e-02	-3.456433e-03
844359	-0.0267249755	2.074464e-02	-4.673321e-02	-1.296846e-02	-5.468279e-03
84458202	-0.0594137473	6.662113e-02	2.615274e-02	-2.859407e-03	-1.696347e-03
844981	-0.0549994685	3.829073e-02	3.712728e-02	1.169858e-02	-5.276735e-03
84501001	0.3108206873	-2.849340e-03	1.356126e-01	3.775496e-02	-3.823914e-03
845636	-0.0011132902	-1.675329e-02	-1.787033e-02	-8.472303e-04	8.589286e-03
84610002	-0.0988438257	-5.025511e-02	1.672603e-02	-8.893782e-03	-2.264877e-02
846226	0.1544995990	-1.601695e-01	2.189479e-01	-4.168578e-02	-3.128057e-02
846381	0.0185216253	-6.094451e-03	-2.104929e-02	1.333681e-02	-5.901062e-03
84667401	-0.1817110172	1.686671e-01	-1.248878e-02	5.471581e-02	2.767104e-03

84799002	-0.0132177128	-1.545333e-01	-8.311679e-02	3.490813e-02	-4.127870e-03
848406	-0.0741980103	1.496604e-02	1.660988e-03	-2.340097e-02	-1.378581e-02
84862001	0.0998664510	-7.732604e-02	6.074890e-02	-9.698796e-03	-1.266565e-02
849014	0.0289918326	-5.273101e-02	-1.596623e-03	4.840404e-02	5.987472e-03
8510426	0.0314450550	-5.423713e-02	9.789698e-03	7.673122e-03	1.840938e-03
8510653	0.0355362005	-9.840364e-02	-1.503860e-02	-1.881974e-02	-1.131431e-02
8510824	-0.0038246508	4.633703e-02	-1.209599e-02	-6.511882e-03	-8.590024e-03
8511133	-0.1164538409	-2.216492e-02	1.015524e-03	-1.634073e-02	1.872530e-02
851509	0.0916050281	1.468242e-01	6.867301e-02	1.786932e-02	1.386952e-02
852552	-0.0874379704	-1.431175e-01	3.447092e-03	-2.255543e-02	-3.999663e-03
852631	-0.0677237649	-4.147013e-02	-2.951161e-02	-1.657229e-02	-3.178130e-03
852763	-0.0357830509	6.090625e-02	-2.388746e-02	5.642173e-03	-1.339863e-02
852781	-0.0483807591	7.474866e-02	-1.755439e-02	2.208178e-02	-8.553100e-03
852973	-0.0463898691	-2.400501e-01	-1.852092e-01	-1.492340e-02	9.578804e-04
853201	0.0860853392	-1.294573e-01	1.125290e-02	3.714214e-02	2.014350e-03
853401	0.1964367931	-2.131927e-01	-9.860072e-02	2.126908e-02	1.608133e-02
853612	0.0582729648	-2.306134e-01	-1.768593e-01	-7.475334e-02	-1.128161e-03
85382601	-0.1339382974	-1.253022e-01	1.125350e-01	-4.434909e-03	1.886774e-03
854002	-0.0291953182	4.075234e-02	1.254330e-02	1.420997e-02	-1.165588e-02
854039	0.0209466264	-2.240063e-02	4.957060e-02	5.795811e-03	-3.132503e-02
854253	0.0848362899	1.615390e-01	-1.339550e-02	3.934955e-02	3.490852e-03
854268	-0.0342079425	-6.060832e-02	-1.122619e-01	6.738025e-02	1.370542e-02
854941	-0.0875148451	-1.650241e-01	-3.219827e-02	-1.617018e-02	5.144779e-04
855133	0.1758886282	1.604604e-01	5.386968e-02	1.842240e-01	1.989133e-02
855138	-0.1021726527	1.289034e-01	-7.427828e-02	2.945002e-02	2.146481e-03
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855563	0.1507064526	-3.820128e-03	-4.882003e-02	2.547541e-03	2.308071e-03
855625	-0.0097682136	-2.479041e-02	-7.096251e-02	-1.155836e-02	1.589353e-02
856106	0.0612412639	-1.019745e-01	-1.370845e-03	-7.961068e-02	-1.397809e-02
85638502	-0.0171718343	-4.877762e-02	1.425226e-02	-7.139958e-02	-1.085998e-02
857010	0.1332320422	1.573983e-02	5.422979e-02	-6.387622e-03	-7.213235e-03
85713702	0.1425991752	5.474195e-02	-1.825670e-02	-2.922901e-02	-2.649774e-03
85715	0.0028553147	1.498919e-02	1.783116e-02	3.335616e-02	-1.785149e-03
857155	0.1324480590	-2.199369e-03	3.816358e-03	-1.275649e-02	-8.411835e-04
857156	0.0241950429	3.299221e-02	-8.502787e-03	-1.188563e-02	-2.865884e-03
857343	-0.0209776680	6.139058e-02	-9.541691e-03	1.959516e-02	4.711585e-04
857373	-0.0739111736	3.792347e-02	-1.418360e-02	2.929794e-02	7.270380e-03
857374	-0.0893671777	-1.803353e-02	4.758468e-03	-2.715377e-04	1.642671e-03
857392	-0.0606178187	-2.190753e-02	-4.764801e-02	3.402123e-02	1.303268e-02
857438	-0.1075797759	1.268873e-01	2.923216e-03	1.113450e-02	-4.343678e-03
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857637	-0.0722065369	-8.119004e-02	7.271206e-02	1.327148e-02	4.135286e-03
857793	-0.1343191246	2.950093e-02	5.444365e-02	4.011741e-03	1.659040e-02

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858477	0.0400160356	-1.686265e-02	-1.071847e-02	1.590382e-02	-6.883016e-03
858970	0.0568714092	7.112930e-02	8.806180e-03	1.288489e-02	6.812673e-03
858981	0.0788845808	2.201995e-01	-2.946023e-02	-1.562093e-02	5.269029e-03
858986	-0.0098332379	-1.134152e-03	9.638361e-02	2.795349e-03	-1.901582e-02
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85922302	-0.0290360085	-1.228215e-01	9.356070e-03	-8.243027e-02	-4.849783e-03
859283	0.0465312637	-1.922755e-01	1.659535e-02	6.820462e-03	3.908128e-03
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859465	0.0761632336	-9.449785e-03	3.607516e-02	1.644550e-02	3.225830e-03
859471	0.2804283970	-2.445271e-02	6.842730e-03	7.394054e-03	-1.258908e-02
859487	0.0091579194	-5.251089e-02	1.240814e-02	1.391723e-02	6.642330e-03
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859717	-0.0797672858	1.517182e-02	8.814363e-02	-3.560637e-02	-2.146240e-02
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8610175	-0.0169312595	5.540068e-02	3.076006e-02	-2.228666e-02	-2.118429e-02
8610404	-0.0026046375	-9.489266e-02	2.564001e-02	-5.653385e-04	-5.060816e-04
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8610908	0.0603063922	7.898511e-02	1.797480e-02	7.861041e-03	-4.882806e-03
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8611161	0.1263341389	-1.278413e-01	7.181074e-02	-8.010741e-02	8.607098e-03
8611555	0.1532547175	2.065368e-01	-6.524724e-02	-2.149175e-02	6.506712e-03
8611792	0.0648110159	-2.543076e-01	1.221035e-01	1.212184e-04	-1.076054e-02
8612080	0.0007406985	4.610443e-02	-3.731944e-04	-1.674579e-02	-8.527853e-03
8612399	-0.0331782104	-7.289186e-02	-4.793390e-02	-1.125719e-02	-1.093361e-02
86135501	-0.0897923772	3.869966e-02	1.113252e-02	-1.599296e-02	9.423312e-03
86135502	0.0997869683	-2.630915e-02	5.753144e-02	-1.604379e-01	3.833652e-02
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862028	-0.0497851056	-4.559731e-02	4.608258e-02	-1.812182e-02	-1.283830e-02
86208	0.1201800560	4.208440e-02	3.674203e-03	-2.057035e-02	5.126475e-03
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862261	-0.0312503688	7.193844e-02	-9.341616e-03	2.552925e-03	-1.402809e-02
862485	0.0844032885	-1.349955e-01	9.281856e-03	4.750116e-03	-3.466455e-03
862548	-0.0257304933	-5.673535e-02	9.393122e-04	1.313570e-02	-7.638205e-03
862717	-0.0025631120	1.356357e-03	1.644737e-02	-3.823881e-02	-9.833806e-03

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862989	0.0211923117	5.879791e-02	-1.571216e-02	-1.570264e-02	-8.774836e-03
863030	-0.0232042053	4.932440e-02	1.155743e-02	-1.955738e-02	2.994340e-03
863031	0.0047096088	1.265146e-01	1.027214e-02	1.037018e-02	2.799425e-03
863270	0.0606735954	-1.540510e-02	2.302233e-02	2.966592e-02	2.369330e-03
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864726	0.0777033458	1.294349e-01	7.314377e-02	-2.121766e-02	-3.512427e-03
864729	-0.1234132759	-1.703396e-02	1.368415e-03	-4.179289e-03	6.831538e-03
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865128	0.1309244119	1.540883e-02	4.173716e-02	-6.394356e-03	3.945424e-02
865137	0.0508063449	-6.447124e-02	7.984368e-03	8.721731e-03	-1.275857e-02
86517	-0.1525315195	-6.004771e-02	3.475692e-02	9.488712e-03	2.183874e-02
865423	-0.2229870539	-2.472825e-02	-1.010000e-01	4.103202e-02	-2.125541e-04
865432	0.0418498033	-2.909973e-02	-1.592235e-02	1.748397e-02	5.563332e-03
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866203	0.0876668247	2.343153e-02	5.135429e-03	-2.716794e-02	-3.988293e-04
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86730502	-0.0528996064	4.515608e-02	-1.839276e-02	-7.431547e-03	-5.422633e-03
867387	-0.0282699050	-1.184145e-02	-2.195837e-02	-1.263740e-02	-4.758611e-03
867739	0.1191672859	-3.904577e-02	1.757057e-02	1.638597e-02	-1.846504e-03
868202	-0.0227364289	-4.455291e-02	6.116922e-03	1.501203e-02	-7.453719e-03
868223	0.0238785713	7.539973e-02	-1.181029e-03	-1.745342e-02	-3.718782e-03
868682	0.0453529768	3.918415e-02	-9.718923e-03	-6.407847e-04	-8.921861e-04
868826	-0.0046654928	1.410890e-01	-3.285330e-02	4.483727e-02	2.993330e-02
868871	0.1495819096	1.751436e-02	-4.783602e-02	-2.357881e-02	-2.338267e-04
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869104	0.0199857883	-9.378889e-02	5.731649e-03	-5.278943e-03	-5.891067e-03
869218	0.0049677942	5.801943e-02	-2.392725e-02	-1.320679e-02	-4.310563e-03
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869254	0.0495119056	4.722858e-02	-1.055344e-02	-1.275491e-02	2.378069e-03
869476	-0.0263294206	-6.201771e-02	2.591795e-02	1.040242e-02	-1.781949e-02
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86973702	-0.0490175920	-2.581647e-02	-3.235618e-02	1.251382e-02	4.893394e-03
869931	-0.0423402825	5.330201e-02	3.199615e-02	-1.397318e-02	-9.593652e-03
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8710441	-0.1390340354	-2.638579e-02	-3.366712e-02	1.779878e-02	-1.574621e-03
87106	-0.0365289819	-1.101000e-02	3.811133e-03	1.088321e-02	-7.351056e-03
8711002	-0.1315499734	2.241155e-02	-1.438139e-02	2.428473e-02	1.113668e-04
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8711202	0.0059292226	-7.990834e-02	1.053452e-01	1.097157e-02	-1.879966e-03
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871122	-0.0347925369	5.128014e-02	1.544007e-03	1.585498e-02	-3.662968e-03
871149	0.0320333494	9.611557e-02	1.100796e-02	9.278600e-03	3.250644e-03
8711561	0.1625166960	1.062510e-02	3.867946e-02	9.830449e-03	1.758741e-02
8711803	0.1833278621	-6.514273e-02	-4.949089e-02	-3.143983e-04	-1.024462e-02
871201	0.0466382547	4.488584e-02	9.110442e-02	1.485736e-03	-1.312096e-02
8712064	-0.0778884859	-1.494685e-02	1.326543e-02	4.271208e-03	-3.692513e-03
8712289	0.1648438853	3.025702e-01	-2.340033e-02	-8.324051e-03	1.848549e-03
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87127	-0.0022116006	-3.659396e-02	1.749325e-02	1.437802e-02	-3.555458e-03
8712729	0.0111851727	-5.483086e-02	9.163004e-03	-1.515471e-02	-1.308248e-02
8712766	-0.1128389699	4.360550e-02	-2.252514e-03	-4.939426e-03	7.403680e-03
8712853	0.0047133540	-4.722385e-02	9.407798e-03	3.756833e-03	5.469545e-03
87139402	0.0058479819	-5.422273e-02	1.519286e-02	-1.626943e-02	-1.424677e-03
87163	-0.0621792689	-4.679305e-02	-2.794307e-02	-8.322050e-02	-9.724531e-04
87164	-0.0204716584	-2.174815e-01	8.286055e-03	-1.945686e-02	-1.449219e-03
871641	-0.1283484525	-2.105483e-01	-1.812564e-02	-3.558919e-02	-1.771539e-04
871642	-0.0652630427	2.760698e-02	1.000593e-02	4.358827e-03	-7.483755e-03
872113	0.0316665578	7.087026e-02	5.732845e-03	6.943427e-03	-4.316588e-03
872608	-0.0130124597	9.505262e-03	2.489507e-02	-3.715104e-02	-1.768256e-03
87281702	0.0149367843	-3.373768e-02	-2.874672e-02	4.494640e-02	6.648435e-03
873357	-0.0565577633	-3.716741e-02	1.515057e-02	-5.631381e-03	7.259187e-03
873586	-0.1181480118	-4.202926e-02	-2.804052e-03	2.235523e-02	-3.575397e-03
873592	0.5075073909	3.875397e-01	-3.649879e-02	-4.817298e-02	-1.234021e-02
873593	0.1715237713	1.077659e-02	1.370693e-01	1.607476e-02	-4.130650e-03
873701	-0.0408188409	-1.855354e-02	5.026622e-02	-2.081737e-02	-6.144694e-03
873843	-0.0032329462	4.783222e-02	-5.100500e-02	-6.710928e-03	-1.311918e-02
873885	0.0566462354	-4.700916e-02	5.079073e-02	-1.107745e-03	-3.410878e-03
874158	0.0326076649	7.283462e-02	7.799828e-03	4.257019e-03	-6.436029e-03
874217	0.0970624158	4.300686e-02	2.557256e-02	3.511308e-03	4.228434e-03

874373	0.0030832009	2.037473e-02	-1.368604e-02	8.753567e-03	1.345992e-03
874662	0.0059062159	-1.096237e-02	-8.635239e-03	1.119167e-02	-4.636712e-03
874839	0.0290239084	2.453131e-02	1.775126e-02	-1.022940e-02	8.378152e-03
874858	0.0639676895	-4.746824e-02	4.534134e-02	1.788060e-02	3.942582e-02
875093	0.0691856368	-1.014548e-02	9.965295e-03	4.872696e-02	-1.213839e-03
875099	-0.1193609214	-5.010956e-02	-4.591822e-02	-1.193226e-02	-3.963558e-03
875263	-0.0723515248	1.223090e-02	7.793775e-03	-2.935833e-02	-1.693386e-02
87556202	0.0957203640	-1.086967e-01	-1.582959e-03	1.441066e-02	1.349096e-02
875878	-0.0043906404	-2.636426e-02	9.351632e-03	2.336560e-02	1.097957e-03
875938	-0.2012904786	9.005932e-02	1.657487e-02	2.824573e-02	-2.771209e-03
877159	-0.0125777667	-5.077927e-02	-6.943705e-03	2.010879e-03	7.766158e-03
877486	-0.0457090424	4.732110e-04	-1.101138e-01	5.298756e-03	-1.730179e-02
877500	-0.0387661993	2.856540e-02	8.960081e-02	-4.193797e-03	-1.195863e-02
877501	0.0406861821	-4.063331e-02	1.658042e-02	-2.740055e-02	-6.035120e-03
877989	0.0628321938	1.662944e-03	-5.740479e-02	-9.416140e-03	6.126064e-04
878796	0.0356893819	3.128748e-01	-1.007465e-01	-8.529045e-04	-3.819438e-02
87880	-0.0522821695	-1.586622e-01	2.118169e-02	-2.050653e-02	1.151177e-03
87930	-0.0093959004	3.989723e-02	9.128397e-03	-3.727004e-02	-1.006706e-02
879523	-0.0442994933	-1.772295e-02	-1.493651e-03	1.711604e-02	-1.574921e-02
879804	0.1136387746	1.087258e-01	1.246010e-02	1.874143e-02	1.204608e-03
879830	0.0194917676	-6.808987e-02	-4.364781e-03	-1.874407e-02	1.185807e-02
8810158	0.0266412052	-1.522403e-01	-4.513389e-02	3.041498e-02	-1.748377e-02
8810436	-0.0665932751	-3.875520e-02	-1.000271e-03	-1.976138e-02	2.741061e-04
881046502	0.0899645237	7.156408e-02	2.004215e-02	-1.900426e-02	4.412764e-02
8810528	-0.0129848991	3.220875e-02	6.694608e-03	-1.558529e-03	2.875884e-03
8810703	-0.0059839516	-1.940912e-02	1.123293e-01	-1.540261e-01	6.534187e-03
881094802	-0.1752161446	-8.473609e-02	-3.450049e-03	-2.207832e-02	-2.188679e-02
8810955	-0.0569743952	-6.261779e-02	-4.860221e-03	-5.786062e-03	1.020700e-02
8810987	0.1237499184	-8.195971e-02	1.529261e-02	6.937451e-03	2.619794e-03
8811523	0.1225618939	2.156147e-03	5.564389e-03	-3.560424e-03	-9.562893e-03
8811779	0.0207754683	5.065478e-02	-1.366777e-02	-2.066266e-02	-6.442102e-03
8811842	0.0647228635	-4.574542e-02	-1.722227e-02	-3.308224e-02	7.010155e-03
88119002	-0.0251689372	-3.974507e-02	1.042405e-01	1.826330e-02	-1.796512e-02
8812816	-0.0960222584	-4.425287e-02	-1.275666e-02	-1.388723e-02	-5.890132e-04
8812818	0.0376677232	-6.505149e-02	-8.533465e-03	4.279110e-03	6.539797e-03
8812844	0.0535466030	3.276009e-02	-2.756607e-02	-1.454529e-03	7.416389e-04
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88143502	0.0038497261	-3.295088e-02	1.592811e-02	-7.082278e-03	-2.641670e-03
88147101	0.0417846570	1.014432e-01	-1.676444e-02	-2.230372e-02	-1.486683e-03
88147102	0.0227429302	-3.082262e-02	-3.311199e-02	1.177004e-02	1.492911e-02
88147202	0.0421147176	4.962457e-02	2.486351e-02	2.865424e-02	-1.872174e-02
881861	-0.0425668315	4.688174e-02	-4.618497e-02	-6.874296e-03	2.119647e-02

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88199202	0.0056845921	-4.220301e-02	-1.412551e-02	5.629644e-03	5.025942e-03
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88206102	0.0042149614	1.146302e-01	-2.067239e-02	-6.311137e-03	6.009812e-03
882488	0.0118534104	-4.761135e-04	-1.400283e-02	1.197801e-02	-4.726901e-03
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88299702	0.2409967021	2.607101e-02	4.560323e-02	8.437318e-02	1.316171e-02
883263	0.0681708739	5.063556e-02	-5.389681e-02	-6.290592e-02	1.779366e-02
883270	-0.0523829446	-4.076603e-02	-6.505627e-03	-2.591461e-03	7.136696e-03
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88350402	0.0139953617	-1.884256e-02	2.886332e-02	1.645641e-02	1.335793e-03
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884626	0.1601457813	-6.855604e-02	-3.446241e-02	8.982938e-03	8.781242e-03
88466802	0.0713281560	3.797545e-02	-2.621500e-02	-8.606330e-03	-1.208039e-03
884689	0.0647306238	5.543553e-02	1.748686e-02	9.221382e-03	-1.937773e-03
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88649001	0.1694749187	-1.452418e-01	-4.223670e-02	1.760845e-02	-4.754179e-02
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8910721	-0.0985621595	-1.857856e-02	2.074257e-02	7.172121e-03	1.407351e-02
8910748	0.0375752134	3.203805e-02	8.858806e-03	-2.961281e-03	-1.207918e-03
8910988	0.1490111178	1.779051e-02	-4.740955e-02	1.222139e-02	-3.728448e-02

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8911163	0.0087349948	-2.586902e-02	-1.982127e-02	-2.952873e-02	1.231110e-02
8911164	0.1985841490	-1.657353e-01	2.135428e-03	4.348128e-02	-6.801149e-04
8911230	-0.0883232465	1.507252e-03	1.628523e-02	-1.568217e-03	-8.397414e-03
8911670	0.0367848322	6.676286e-02	1.394801e-02	-9.331447e-03	1.667624e-02
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8912049	0.0240789261	-2.159175e-02	-3.065026e-02	3.221432e-02	2.504987e-02
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8912909	0.0091710677	-1.396632e-02	2.508149e-02	3.763082e-03	3.377432e-03
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891716	-0.0032333996	-2.579634e-03	-1.410404e-02	1.057191e-02	5.048132e-03
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89263202	0.0373782196	-2.276784e-01	3.191511e-02	5.069162e-02	-1.893042e-02
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89296	-0.0216028124	7.907603e-02	1.869958e-02	5.518316e-03	2.679961e-04
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894326	0.1036850662	-4.122734e-02	3.720628e-02	-1.037487e-02	3.310589e-03
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894604	0.0274799350	4.641524e-02	-8.702956e-02	9.684250e-03	-1.445168e-02
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8953902	-0.0926684430	-7.409677e-02	-9.410580e-03	-1.893671e-02	8.456140e-03
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897137	-0.0749311508	-1.986689e-02	-1.359114e-02	-2.684112e-02	-6.402074e-03
897374	-0.0922219954	-3.415178e-02	3.056143e-03	4.059287e-03	1.703195e-03
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897604	-0.0506882579	-8.548810e-02	-1.602747e-02	2.834650e-02	-1.060789e-02
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9011494	0.2935362319	-1.723742e-01	2.185214e-02	-2.273933e-02	-4.674882e-03
9011495	-0.0137300647	1.185498e-02	1.654610e-03	-1.873353e-02	-1.314365e-03
9011971	0.0037341641	-7.167547e-02	6.130597e-02	8.910710e-02	2.779083e-02
9012000	0.0641405452	2.691763e-02	-1.225536e-01	-1.813708e-02	2.934112e-02
9012315	0.1319048106	-2.444827e-02	1.361289e-02	3.029308e-02	-3.002840e-02
9012568	-0.0461009301	-3.811042e-02	3.244915e-02	2.368301e-03	2.568715e-03
9012795	0.1433033538	4.139177e-02	-7.288579e-02	-3.284067e-02	6.495201e-03
901288	-0.0884394682	1.710730e-01	1.047917e-02	-2.433380e-02	6.307451e-03
9013005	-0.0560879416	-2.634266e-02	-3.094193e-02	8.598718e-03	2.494397e-03
901303	0.1136237725	-5.224795e-02	-3.221430e-02	1.619126e-02	2.121220e-03
901315	-0.1259683465	-2.860169e-02	9.738937e-02	-3.316582e-02	2.704225e-02
9013579	-0.1057722649	-3.507550e-02	-1.856191e-02	2.811173e-02	7.265963e-03
9013594	-0.0223237793	1.397750e-02	-3.238732e-02	5.081913e-02	-3.753929e-03
9013838	-0.0099416019	6.603702e-02	6.057311e-02	3.772853e-03	3.062385e-02
901549	0.0077057603	2.617681e-02	-2.526027e-02	-1.723553e-02	-1.680400e-03
901836	0.0063424578	-6.014370e-02	-1.129831e-02	-1.057942e-02	-1.162487e-03
90250	-0.0527633554	-7.925438e-03	-6.701908e-03	-6.020755e-03	7.877950e-03
90251	0.1661045786	-9.237282e-03	-1.297849e-02	-1.886778e-02	7.188850e-03
902727	0.1378075128	-6.536924e-02	-1.115757e-02	1.415867e-02	8.335717e-03
90291	0.0567342858	2.557998e-02	3.604941e-02	4.125581e-02	6.536262e-03
902975	0.0337345855	4.682555e-02	-5.419855e-03	2.974809e-02	-7.756777e-05
902976	-0.0828237991	-6.725593e-03	-7.795834e-04	-2.501989e-02	1.748559e-03
903011	0.0009152081	9.727720e-03	3.720713e-02	1.301738e-02	-4.154236e-03
90312	-0.0268672077	-2.832955e-02	-1.401436e-02	-5.597588e-02	7.570192e-03
90317302	0.0320847273	3.556353e-02	-4.999234e-04	-1.059188e-02	-1.114528e-02
903483	0.0980632762	1.692852e-01	1.915795e-02	6.137267e-03	-2.884652e-03
903507	-0.1894871657	-3.405032e-02	9.962819e-03	-6.173830e-02	3.222433e-03
903516	0.1309434894	-3.676168e-02	1.285375e-01	1.929117e-02	3.422224e-03
903554	0.1114635825	-9.747050e-02	-1.396312e-02	-1.702843e-02	5.498923e-03
903811	-0.0396983169	-1.339714e-01	7.040759e-03	1.959984e-04	4.346209e-03
90401601	0.1292686559	-3.416811e-02	2.106988e-03	3.190370e-03	-6.286585e-04
90401602	0.0827322987	-2.405680e-02	2.402192e-03	1.055410e-02	5.194828e-05
904302	-0.0077976749	8.733483e-03	7.107127e-03	-1.534061e-02	-1.211550e-02
904357	0.0355344738	4.029315e-02	1.077061e-02	1.143191e-02	-3.704758e-03
90439701	-0.0039833231	5.700786e-02	-9.503168e-02	1.394355e-02	-2.912923e-02
904647	0.0450212406	3.159255e-02	2.431547e-02	-1.456994e-02	-1.203609e-02

904689	-0.0289361278	-3.997476e-02	-8.045876e-03	-1.400343e-03	-1.048300e-02
9047	0.0519149269	3.613309e-02	-1.180289e-03	1.558827e-02	4.099201e-03
904969	-0.0346134932	-2.990139e-02	1.339587e-02	1.581804e-02	3.994893e-03
904971	-0.0728059821	2.510338e-02	-1.286446e-02	4.580992e-03	-3.618221e-03
905189	0.0397575699	-6.577997e-02	-1.047537e-02	-4.449056e-03	2.233120e-03
905190	-0.0514258563	4.647223e-02	-6.982733e-02	-9.503059e-05	-1.830162e-03
90524101	-0.0501724842	-4.628722e-02	3.999780e-02	-3.429226e-03	-3.077484e-03
905501	0.0276819728	5.915175e-02	1.304026e-02	-7.395440e-03	-9.302405e-03
905502	0.0931085075	1.502863e-02	-2.917256e-02	1.907808e-02	-5.034972e-03
905520	0.0361947758	7.667876e-02	-1.464209e-02	-1.024093e-02	-9.066808e-03
905539	0.0759067705	-1.487671e-02	-3.355674e-02	5.460849e-03	4.758629e-03
905557	0.0214399904	6.105112e-02	1.557195e-02	2.358897e-02	-9.245123e-03
905680	-0.0655598354	-5.033438e-02	8.129611e-03	2.045621e-03	1.321633e-03
905686	-0.0746638330	1.307785e-02	6.435182e-03	2.362431e-02	-4.456626e-03
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906564	-0.1267276154	-5.979588e-02	4.329068e-02	3.301665e-03	7.386138e-03
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907145	0.1074844809	1.021646e-01	9.004209e-03	3.485728e-02	5.458774e-04
907367	-0.0292477139	5.384906e-03	-1.920644e-02	-1.169381e-02	-5.006225e-03
907409	0.0259003372	5.924542e-02	-2.557271e-02	-1.590461e-02	1.477057e-04
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909411	0.0828997283	7.055109e-03	-5.337323e-02	2.224083e-02	4.878054e-03
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90944601	-0.0729310386	3.407189e-02	-2.967962e-03	-7.760464e-03	-3.493852e-03
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911201	0.0605699069	-1.478972e-01	1.379131e-03	1.947479e-03	1.131662e-02
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9112366	-0.0050881069	-2.604470e-02	-1.829845e-02	-1.097754e-02	4.368456e-03
9112367	0.0445463619	-5.794359e-02	1.048050e-02	7.872980e-03	7.710774e-03
9112594	-0.0215768139	-6.829240e-03	1.931505e-02	-2.563659e-03	6.043094e-03
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911296202	-0.1128547170	-1.591164e-01	-7.982505e-02	1.200865e-02	-1.593339e-02
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911320502	-0.0846326223	-1.595831e-02	2.824337e-02	-9.513276e-03	9.314585e-05
9113239	0.0915955060	-8.619147e-02	-9.496820e-02	-7.123957e-04	1.251121e-02
9113455	-0.0349996388	1.225956e-02	-2.365618e-02	1.362756e-02	9.798245e-04
9113514	0.0542473407	1.309476e-02	8.900566e-04	-2.664801e-04	2.499374e-03
9113538	-0.1457441362	7.226593e-02	-5.951642e-02	1.311257e-02	-3.413340e-02
911366	0.0957538784	-3.485376e-02	2.750362e-02	-1.043926e-02	-6.172565e-06
9113778	0.0909946383	1.398598e-01	8.858450e-03	7.244742e-04	-1.250954e-02
9113816	0.0730814567	6.023963e-02	1.322804e-02	5.220342e-03	-9.310005e-04
911384	0.0226017652	-1.609558e-02	2.644659e-02	-2.709195e-02	-6.915033e-03
9113846	-0.1242840374	-5.698309e-02	3.319390e-03	5.876624e-03	6.378471e-03
911391	0.0182447696	4.114275e-02	-1.661732e-02	-7.879829e-03	4.976152e-04
911408	0.1375631124	-1.253250e-01	6.518456e-04	-1.097810e-03	-4.923167e-03
911654	-0.0829225760	7.105777e-02	-4.770183e-02	-6.996362e-03	-9.172107e-04
911673	-0.0827292480	-3.235318e-02	-1.469619e-02	7.414257e-03	5.606623e-03
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912519	0.0403505601	-2.930731e-02	4.188617e-02	1.191858e-02	3.348884e-03
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912600	-0.0136577142	-6.945356e-02	7.542745e-03	-1.162578e-02	1.376873e-02
913063	-0.0107779990	3.093484e-03	1.413849e-01	-6.100949e-03	1.202071e-03
913102	0.0095431487	-7.376165e-03	2.000637e-02	-2.068873e-02	-5.432457e-03
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91376702	0.0364243509	2.194271e-02	6.585056e-03	-5.260954e-03	1.175358e-02
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914366	0.0965211814	-5.682683e-02	6.498587e-03	1.456788e-02	2.151391e-03
914580	-0.0422754385	2.085169e-02	-1.607462e-03	3.798926e-03	-1.110263e-02
914769	-0.0967977019	-1.485310e-01	1.576602e-02	3.329348e-03	-9.341349e-03
91485	-0.0641045051	1.841422e-01	-7.024287e-02	1.970595e-02	-1.498247e-02
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915143	-0.1180678238	2.658401e-01	-7.894180e-02	-2.561913e-02	7.697159e-03
915186	0.1148367203	2.121193e-01	-3.514142e-02	-5.061458e-02	3.668640e-02
915276	0.2752439895	-3.019773e-01	9.673065e-03	-1.996698e-02	4.151417e-02
91544001	-0.0485533966	5.416690e-02	-1.649414e-02	-1.490646e-02	-2.155321e-03
91544002	-0.0036376007	-1.802591e-01	-1.011343e-02	2.070820e-02	6.669538e-03
915452	-0.0647665350	4.842798e-03	1.594580e-02	9.613952e-03	-3.100001e-04
915460	-0.1754187549	1.359165e-01	4.067320e-02	5.041105e-02	2.144200e-04
91550	-0.0556837067	6.632740e-02	-6.746846e-03	1.531456e-02	-1.218153e-02
915664	-0.0984427406	1.808916e-02	1.255164e-02	9.930751e-03	9.221713e-03
915691	0.0036057142	-8.355934e-02	-3.592810e-02	2.235170e-02	3.151072e-03
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91594602	-0.0091762716	-7.293476e-02	2.792662e-02	-3.556928e-03	-1.164186e-03
916221	0.0038142602	3.300541e-02	8.325671e-03	-4.509973e-03	-1.285385e-03
916799	0.0189855035	-9.752934e-02	-6.505096e-03	-2.312757e-03	-1.589520e-02
916838	0.0550042618	-1.724436e-01	-9.894992e-02	-7.051032e-02	7.208234e-03
917062	0.1580673727	-6.410352e-02	-8.250866e-03	-1.932592e-02	1.086353e-02
917080	0.0544002611	1.580256e-02	-1.613705e-03	8.423291e-04	9.014139e-04
917092	0.0074556575	9.663785e-02	-2.665164e-02	-3.072198e-02	-5.603826e-03
91762702	0.2131860543	1.741659e-01	-1.264691e-01	1.220225e-02	-8.726745e-03
91789	-0.0681589606	-9.361363e-03	-8.419239e-03	1.344440e-02	2.051314e-03
917896	-0.1061345671	4.966193e-03	-6.582652e-03	4.193781e-02	7.898565e-03
917897	0.0664531179	-2.655619e-02	-2.136312e-02	-9.637608e-03	2.497448e-03
91805	0.0886147194	1.155966e-01	-5.229288e-02	1.076846e-02	1.449954e-03
91813701	0.0330021360	8.336065e-02	-5.061548e-03	3.298927e-02	5.387830e-04
91813702	0.0181336410	4.282084e-02	3.040698e-02	1.508284e-02	-7.330015e-03
918192	-0.0934720894	-5.020254e-02	4.171083e-02	-7.809330e-03	-9.193665e-05
918465	0.0288790490	-5.652693e-02	-1.947227e-03	1.611639e-03	-4.255828e-03
91858	0.0424242869	9.025177e-03	-1.623234e-02	6.269355e-03	-8.871060e-04

91903901	0.0931826121	-3.654002e-02	4.324270e-03	4.165806e-03	-1.106227e-03
91903902	-0.0830740552	1.658681e-02	1.150422e-02	-1.563064e-02	-6.663151e-03
91930402	0.1480707171	8.699232e-03	-5.961362e-02	-1.044751e-02	-6.141284e-03
919537	0.0728753384	1.259825e-02	-9.518713e-03	9.373100e-03	-3.095154e-03
919555	0.1536070303	-3.265112e-02	2.996697e-02	8.171708e-03	-3.458037e-02
91979701	-0.0487762627	5.821042e-02	1.015633e-02	2.035367e-02	9.738559e-03
919812	0.0329233687	-1.804282e-02	-2.169062e-02	-2.378939e-02	8.893677e-03
921092	0.1468627182	7.253893e-02	-8.746899e-03	-1.161071e-02	9.286171e-03
921362	0.1812441331	7.132198e-03	1.665571e-03	-5.739799e-02	3.679201e-02
921385	-0.0295036155	-8.523727e-03	-8.796157e-03	-2.463757e-03	9.112497e-05
921386	-0.0987152511	2.575798e-03	-1.994940e-02	8.161193e-03	-1.262046e-02
921644	-0.0565374950	1.610918e-02	-1.295072e-02	-2.390649e-02	4.092165e-03
922296	0.0568923371	-7.840121e-02	-1.162042e-02	3.505356e-03	-6.121733e-03
922297	-0.0542291424	-8.247547e-02	-8.960736e-03	1.302883e-02	4.772981e-03
922576	-0.0678745818	-1.961314e-02	-6.487119e-03	-4.750888e-03	-3.114620e-03
922577	0.0125381679	4.498783e-02	5.470187e-03	-7.783998e-03	-4.507372e-03
922840	0.0313546289	-4.161718e-02	-2.705643e-03	9.706143e-03	3.657914e-03
923169	0.1006525985	5.511332e-02	-8.274135e-04	-2.590615e-02	8.789459e-04
923465	-0.0007909619	3.418774e-02	6.937288e-05	-2.145122e-02	-4.134624e-03
923748	-0.0163685109	-1.107701e-02	2.770954e-02	1.795767e-02	8.260042e-03
923780	-0.0014215153	5.637368e-02	-3.381745e-03	3.849594e-03	-1.779362e-03
924084	-0.1022492547	-9.323360e-03	5.913651e-04	1.263059e-02	-7.162542e-03
924342	0.0044220903	4.297202e-03	-9.650436e-03	-1.615592e-02	-1.435061e-03
924632	0.0024994349	-7.130661e-02	4.473723e-02	1.560585e-02	1.385123e-03
924934	0.0938320141	3.896512e-02	-1.164274e-02	-1.431460e-03	6.878081e-03
924964	0.0152530115	-3.226473e-03	2.268760e-03	-1.799952e-02	-4.947889e-05
925236	0.1510723322	1.702667e-01	3.413466e-02	3.102528e-02	8.728220e-03
925277	0.0407493494	3.978350e-02	-1.130892e-02	4.068695e-03	-6.920526e-03
925291	0.0599659983	-3.787753e-02	2.037519e-02	-3.413149e-04	1.269775e-02
925292	0.0968312180	-1.392626e-02	2.900866e-02	1.731854e-03	4.328273e-03
925311	0.0041827618	2.209661e-02	7.486086e-03	-3.107530e-04	5.831723e-03
925622	0.2037854413	-1.474368e-01	-1.245986e-01	9.015380e-03	-7.118296e-03
926125	-0.0729289516	1.450989e-01	-3.945551e-02	7.014761e-02	7.638391e-03
926424	-0.1227922446	1.590577e-01	9.843968e-03	7.112909e-03	1.413613e-03
926682	0.0658312978	-6.845211e-02	-2.355466e-02	-2.746212e-02	1.041027e-02
926954	0.0070890278	-2.367063e-02	-2.575490e-03	6.700316e-03	-3.767102e-03
927241	-0.1980178555	-2.738532e-02	-6.802653e-02	-8.408929e-02	2.376191e-02
92751	0.3468098821	1.272691e-01	-9.507513e-03	-6.085956e-02	1.945846e-02

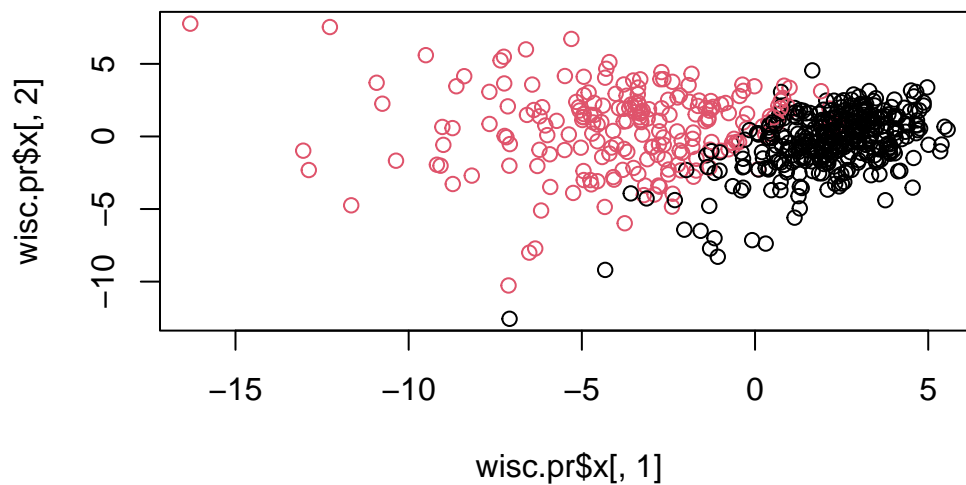
```
#plot(wisc.pr$x)
```

See whats in our PCA result object:

```
attributes(wisc.pr)
```

```
$names  
[1] "sdev"      "rotation" "center"    "scale"     "x"  
  
$class  
[1] "prcomp"
```

```
plot(wisc.pr$x[,1],wisc.pr$x[,2],  
     col=as.factor(diagnosis))
```



Q4. From your results, what proportion of the original variance is captured by the first principal components (PC1)?

```
pca_summary <- summary(wisc.pr)  
prop_var <- pca_summary$importance[2,]
```

```
print( prop_var[1])
```

```
PC1  
0.44272
```

Q5. How many principal components (PCs) are required to describe at least 70% of the original variance in the data?

```
cum_var <- pca_summary$importance[3,]
pc_70 <- which(cum_var >= 0.70)[1]
print(pc_70)
```

PC3  
3

Q6. How many principal components (PCs) are required to describe at least 90% of the original variance in the data?

```
which(cum_var >= 0.90)[1]
```

PC3  
3

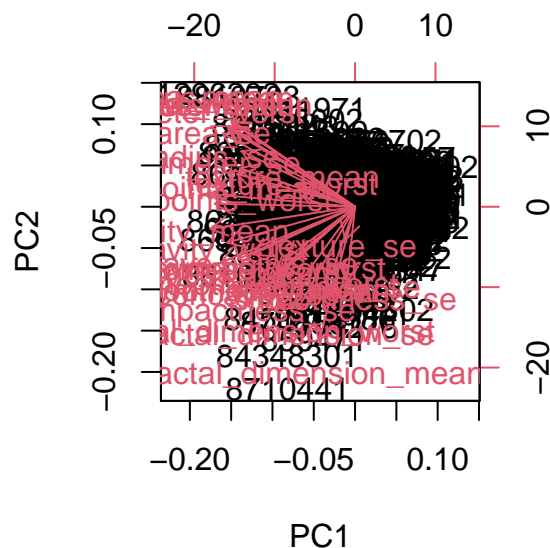
```
which(cum_var >=0.90)[1]
```

PC7  
7

Q7. What stands out to you about this plot? Is it easy or difficult to understand? Why?

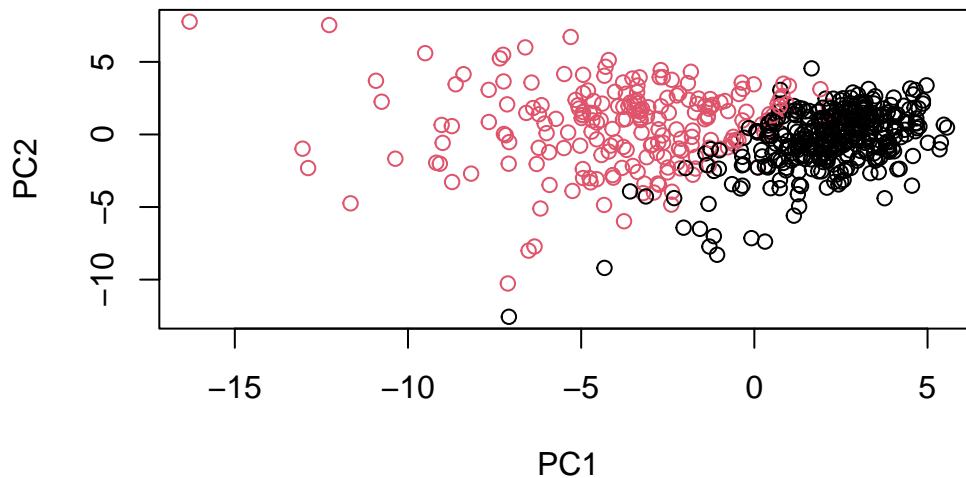
This plot is really hard to see the trends being represented – its difficult to understand not only the axis, but it also is hard to read what each point is representing.

```
biplot(wisc.pr)
```





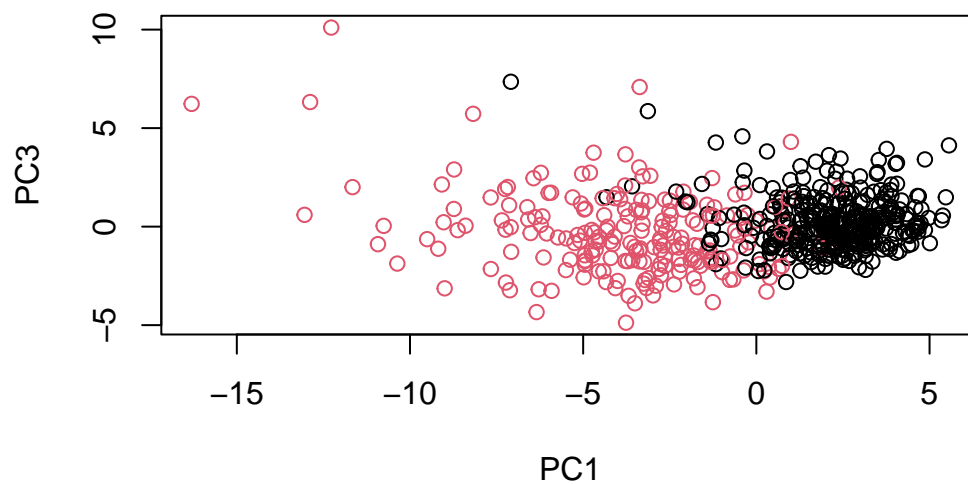
```
# Scatter plot observations by components 1 and 2
wisc.pr <- prcomp(wisc.data, scale=T)
plot( wisc.pr$x [,1], wisc.pr$x[,2],
      col = as.factor(diagnosis),
      xlab = "PC1", ylab = "PC2")
```



Q8. Generate a similar plot for principal components 1 and 3. What do you notice about these plots?

When comparing the plots, there is a more obvious separation of the two subgroups in comparison to the plot below – which could be caused due to more variance from component 2 than in component 3. It looks cleaner and it is easier to read

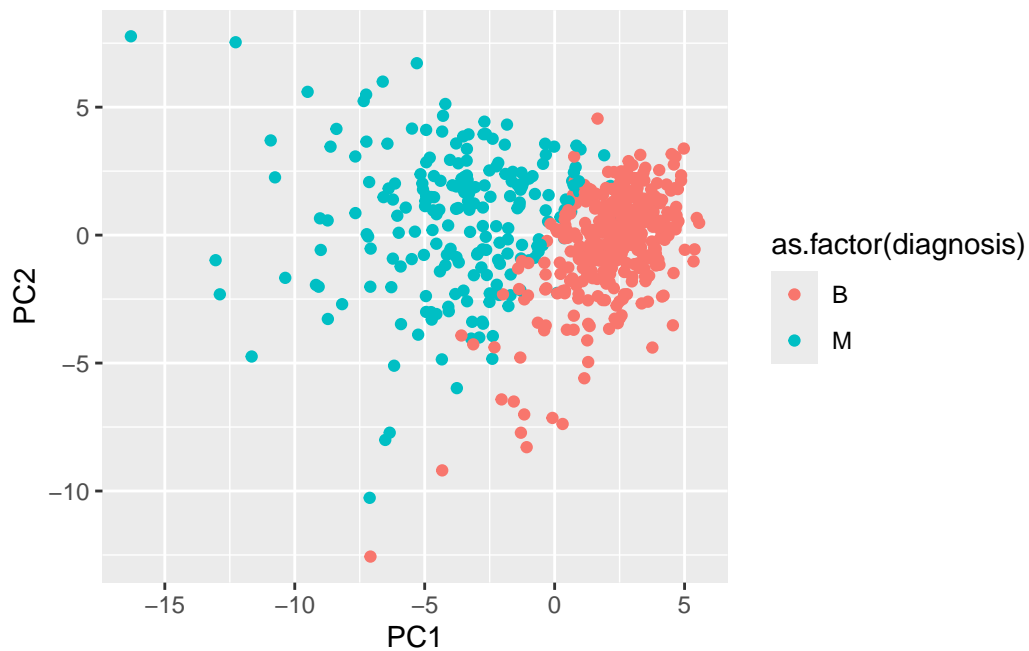
```
# Repeat for components 1 and 3
plot(wisc.pr$x [,1], wisc.pr$x[,3], col = as.factor(diagnosis),
      xlab = "PC1", ylab = "PC3")
```



```
# Create a data.frame for ggplot
df <- as.data.frame(wisc.pr$x)
df$diagnosis <- diagnosis

# Load the ggplot2 package
library(ggplot2)

# Make a scatter plot colored by diagnosis
ggplot(df) +
  aes(PC1, PC2, col= as.factor(diagnosis)) +
  geom_point()
```

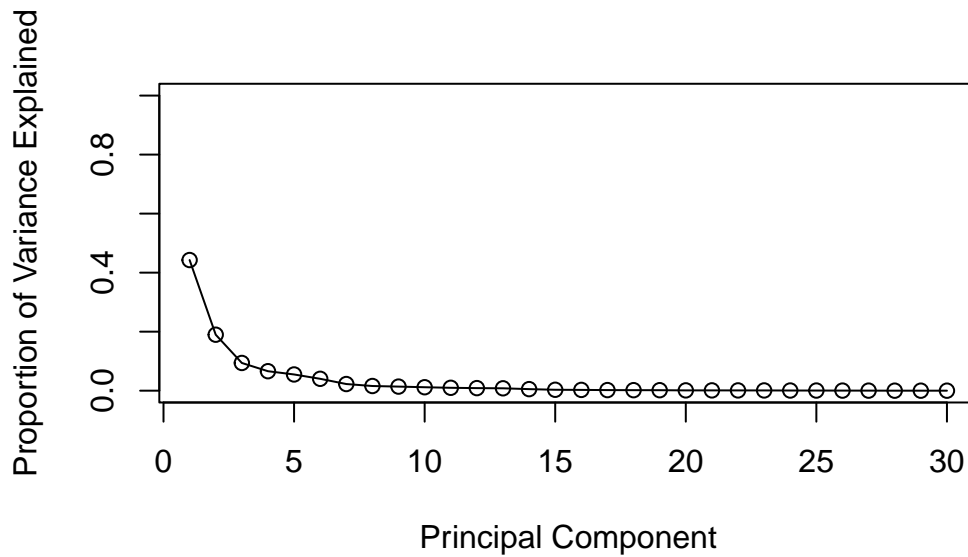


```
wisc.pr <- prcomp(wisc.data, scale=T)
# Calculate variance of each component
pr.var <- wisc.pr$sdev^2
head(pr.var)
```

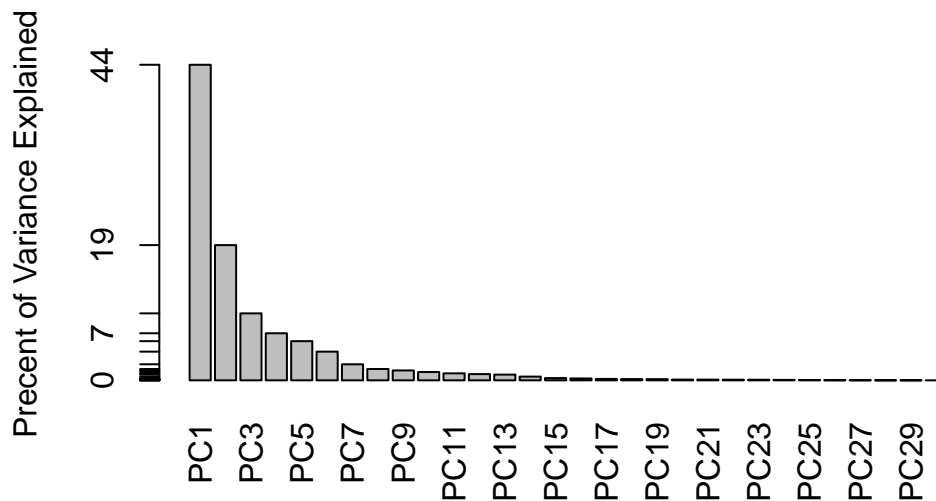
```
[1] 13.281608  5.691355  2.817949  1.980640  1.648731  1.207357
```

```
# Variance explained by each principal component: pve
pve <- pr.var / sum(pr.var)

# Plot variance explained for each principal component
plot(pve, xlab = "Principal Component",
     ylab = "Proportion of Variance Explained",
     ylim = c(0, 1), type = "o")
```



```
# Alternative scree plot of the same data, note data driven y-axis
barplot(pve, ylab = "Precent of Variance Explained",
        names.arg=paste0("PC",1:length(pve)), las=2, axes = FALSE)
axis(2, at=pve, labels=round(pve,2)*100 )
```



Q9. For the first principal component, what is the component of the loading vector (i.e. `wisc.pr$rotation[,1]`) for the feature `concave.points_mean`?

```
concave_points_loading <- wisc.pr$rotation ["concave.points_mean", 1]
print(concave_points_loading)
```

```
[1] -0.2608538
```

Q10. What is the minimum number of principal components required to explain 80% of the variance of the data?

```
pr.var <- wisc.pr$sdev^2
pve <- pr.var / sum(pr.var)
cumulative_pve <- cumsum(pve)
```

```
pc_80 <- which(cumulative_pve >= 0.80) [1]
print(pc_80)
```

```
[1] 5
```

##Hierarchial clustering

```
# Scale the wisc.data data using the "scale()" function
data.scaled <- scale(wisc.data)
```

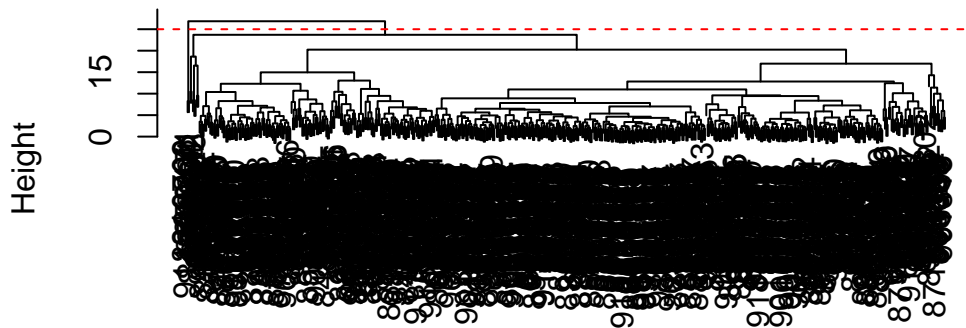
```
data.dist <- dist(data.scaled)
```

```
wisc.hclust <- hclust(data.dist, method = "complete")
```

Q11. Using the plot() and abline() functions, what is the height at which the clustering model has 4 clusters?

```
plot(wisc.hclust)
abline(h=25, col="red", lty=2)
```

## Cluster Dendrogram



```
data.dist
hclust (*, "complete")
```

```
wisc.hclust.clusters <- cutree(wisc.hclust, k=4)
```

```
table(wisc.hclust.clusters, diagnosis)
```

	diagnosis	
wisc.hclust.clusters	B	M
1	12	165
2	2	5
3	343	40
4	0	2

Q12. Can you find a better cluster vs diagnoses match by cutting into a different number of clusters between 2 and 10?

No, I can't find a better match due to how the clusters are seen to be a lot larger, as well as the data set being larger too – making it hard to find better matches.

```
wisc.hclust.clusters <- cutree(wisc.hclust, k=2:10)
print(wisc.hclust.clusters)
```

	2	3	4	5	6	7	8	9	10
842302	1	1	1	1	1	1	1	1	1
842517	1	1	1	1	1	1	2	2	2
84300903	1	1	1	1	1	1	2	2	2

84348301	1	2	2	2	2	2	3	3	3
84358402	1	1	1	1	1	1	2	2	2
843786	1	1	1	1	1	1	1	1	1
844359	1	1	1	1	1	1	1	1	1
84458202	1	1	1	1	1	1	1	1	1
844981	1	1	1	1	1	1	1	1	1
84501001	1	2	2	2	2	2	3	3	3
845636	1	1	3	3	3	3	4	4	4
84610002	1	1	1	1	1	1	1	1	1
846226	1	1	1	1	1	1	2	2	5
846381	1	1	3	3	3	3	4	4	4
84667401	1	1	1	1	1	1	1	1	1
84799002	1	1	1	1	1	1	1	1	1
848406	1	1	3	3	3	3	4	4	4
84862001	1	1	1	1	1	1	1	1	1
849014	1	1	1	1	1	1	2	2	2
8510426	1	1	3	3	3	3	4	4	4
8510653	1	1	3	3	3	3	4	4	4
8510824	1	1	3	3	3	3	4	4	4
8511133	1	1	1	1	1	1	1	1	1
851509	1	1	1	1	1	1	2	2	2
852552	1	1	1	1	1	1	2	2	2
852631	1	1	1	1	1	1	1	1	1
852763	1	1	1	1	1	1	1	1	1
852781	1	1	1	1	1	1	2	2	2
852973	1	1	1	1	1	1	1	1	1
853201	1	1	3	3	3	3	4	4	4
853401	1	1	1	1	1	1	1	1	1
853612	1	1	1	1	1	1	1	1	1
85382601	1	1	1	1	1	1	1	1	1
854002	1	1	1	1	1	1	1	1	1
854039	1	1	1	1	1	1	1	1	1
854253	1	1	1	1	1	1	1	1	1
854268	1	1	1	1	1	1	1	1	1
854941	1	1	3	3	3	3	4	4	4
855133	1	1	3	3	3	3	4	4	4
855138	1	1	1	1	1	1	1	1	1
855167	1	1	3	3	3	3	4	4	4
855563	1	1	1	1	1	1	1	1	1
855625	1	1	1	1	1	1	2	2	5
856106	1	1	1	1	1	1	1	1	1
85638502	1	1	1	1	1	1	1	1	1
857010	1	1	1	1	1	1	2	2	2

85713702	1	1	3	3	3	3	4	4	4
85715	1	1	1	1	1	1	1	1	1
857155	1	1	3	3	3	3	4	4	4
857156	1	1	3	3	3	3	4	4	4
857343	1	1	3	3	3	3	4	4	4
857373	1	1	3	3	3	3	4	4	4
857374	1	1	3	3	3	3	4	4	4
857392	1	1	1	1	1	1	2	2	2
857438	1	1	3	3	3	3	4	4	4
85759902	1	1	3	3	3	3	4	4	4
857637	1	1	1	1	1	1	2	2	2
857793	1	1	1	1	1	1	1	1	1
857810	1	1	3	3	3	3	4	4	4
858477	1	1	3	3	3	3	4	4	4
858970	1	1	3	3	3	3	4	4	4
858981	1	1	3	3	3	3	4	4	4
858986	1	1	1	1	1	1	1	1	1
859196	1	1	3	3	3	3	4	4	4
85922302	1	1	1	1	1	1	1	1	1
859283	1	1	1	1	1	1	1	1	1
859464	1	1	3	3	3	3	4	4	4
859465	1	1	3	3	3	3	4	4	4
859471	1	2	2	4	4	4	5	5	6
859487	1	1	3	3	3	3	4	4	4
859575	1	1	1	1	1	1	2	2	2
859711	1	1	3	3	5	5	6	6	7
859717	1	1	1	1	1	1	1	1	1
859983	1	1	1	1	1	1	1	1	1
8610175	1	1	3	3	3	3	4	4	4
8610404	1	1	3	3	3	3	4	4	4
8610629	1	1	3	3	3	3	4	4	4
8610637	1	1	1	1	1	1	2	2	5
8610862	1	2	2	2	2	6	7	7	8
8610908	1	1	3	3	3	3	4	4	4
861103	1	1	3	3	3	3	4	4	4
8611161	1	1	1	1	1	1	1	1	1
8611555	1	1	1	1	1	1	2	2	5
8611792	1	1	1	1	1	1	2	2	5
8612080	1	1	3	3	3	3	4	4	4
8612399	1	1	1	1	1	1	2	2	2
86135501	1	1	3	3	3	3	4	4	4
86135502	1	1	1	1	1	1	2	2	2
861597	1	1	3	3	3	3	4	4	4



861598	1	1	1	1	1	1	1	1
861648	1	1	3	3	3	3	4	4
861799	1	1	3	3	3	3	4	4
861853	1	1	3	3	3	3	4	4
862009	1	1	3	3	3	3	4	4
862028	1	1	1	1	1	1	1	1
86208	1	1	1	1	1	1	2	2
86211	1	1	3	3	3	3	4	4
862261	1	1	3	3	3	3	4	4
862485	1	1	3	3	3	3	4	4
862548	1	1	3	3	3	3	4	4
862717	1	1	3	3	3	3	4	4
862722	1	1	3	3	3	3	4	4
862965	1	1	3	3	3	3	4	4
862980	1	1	3	3	3	3	4	4
862989	1	1	3	3	3	3	4	4
863030	1	1	1	1	1	1	1	1
863031	1	1	1	1	1	1	1	1
863270	1	1	3	3	3	3	4	4
86355	1	1	1	1	1	1	2	2
864018	1	1	3	3	3	3	4	4
864033	1	1	3	3	3	3	4	4
86408	1	1	3	3	3	3	4	4
86409	1	1	3	3	5	5	6	6
864292	1	1	3	3	3	3	4	4
864496	1	1	3	3	3	3	4	4
864685	1	1	3	3	3	3	4	4
864726	1	1	3	3	3	3	4	4
864729	1	1	1	1	1	1	1	1
864877	1	1	1	1	1	1	1	1
865128	1	1	3	3	3	3	4	4
865137	1	1	3	3	3	3	4	4
86517	1	1	1	1	1	1	2	2
865423	1	2	2	2	2	6	7	7
865432	1	1	3	3	3	3	4	4
865468	1	1	3	3	3	3	4	4
86561	1	1	3	3	3	3	4	4
866083	1	1	1	1	1	1	1	1
866203	1	1	3	3	3	3	4	4
866458	1	1	1	1	1	1	1	1
866674	1	1	1	1	1	1	1	1
866714	1	1	3	3	3	3	4	4
8670	1	1	1	1	1	1	1	1

86730502	1	1	1	1	1	1	1	1
867387	1	1	3	3	3	3	4	4
867739	1	1	1	1	1	1	1	1
868202	1	1	3	3	3	3	4	4
868223	1	1	3	3	3	3	4	4
868682	1	1	3	3	3	3	4	4
868826	1	1	1	1	1	1	1	1
868871	1	1	3	3	3	3	4	4
868999	1	1	3	3	3	3	4	4
869104	1	1	3	3	3	3	4	4
869218	1	1	3	3	3	3	4	4
869224	1	1	3	3	3	3	4	4
869254	1	1	3	3	3	3	4	4
869476	1	1	3	3	3	3	4	4
869691	1	1	1	1	1	1	1	1
86973701	1	1	3	3	3	3	4	4
86973702	1	1	3	3	3	3	4	4
869931	1	1	3	3	3	3	4	4
871001501	1	1	3	3	3	3	4	4
871001502	1	1	3	3	5	5	6	6
8710441	1	2	2	4	4	4	5	5
87106	1	1	3	3	3	3	4	4
8711002	1	1	3	3	3	3	4	4
8711003	1	1	3	3	3	3	4	4
8711202	1	1	1	1	1	1	2	2
8711216	1	1	3	3	3	3	4	4
871122	1	1	3	3	3	3	4	4
871149	1	1	3	3	3	3	4	4
8711561	1	1	3	3	3	3	4	4
8711803	1	1	1	1	1	1	2	2
871201	1	1	1	1	1	1	1	1
8712064	1	1	3	3	3	3	4	4
8712289	1	1	1	1	1	1	2	2
8712291	1	1	3	3	3	3	4	4
87127	1	1	3	3	3	3	4	4
8712729	1	1	3	3	3	3	4	4
8712766	1	1	1	1	1	1	2	2
8712853	1	1	3	3	3	3	4	4
87139402	1	1	3	3	3	3	4	4
87163	1	1	3	3	3	3	4	4
87164	1	1	1	1	1	1	1	1
871641	1	1	3	3	3	3	4	4
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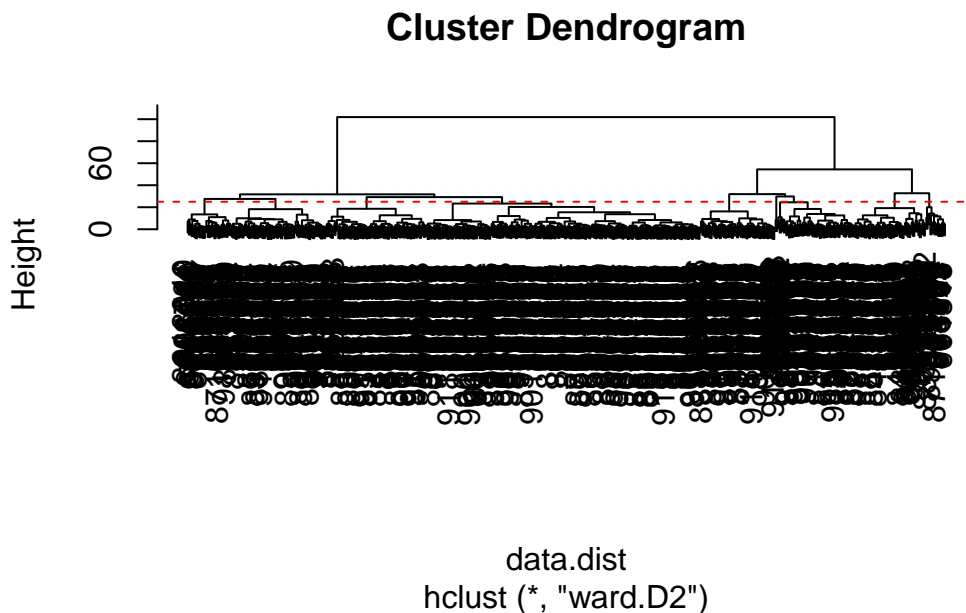
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91813702	1	1	3	3	3	3	4	4	4
918192	1	1	3	3	3	3	4	4	4
918465	1	1	3	3	3	3	4	4	4
91858	1	1	3	3	3	3	4	4	4
91903901	1	1	3	3	3	3	4	4	4
91903902	1	1	3	3	3	3	4	4	4
91930402	1	1	1	1	1	1	2	2	2
919537	1	1	3	3	3	3	4	4	4
919555	1	1	1	1	1	1	2	2	2
91979701	1	1	3	3	3	3	4	4	4
919812	1	1	1	1	1	1	1	1	1
921092	1	1	3	3	3	3	4	4	4
921362	1	1	3	3	5	5	6	6	7
921385	1	1	3	3	3	3	4	4	4
921386	1	1	1	1	1	1	1	1	1
921644	1	1	3	3	3	3	4	4	4
922296	1	1	3	3	3	3	4	4	4
922297	1	1	3	3	3	3	4	4	4
922576	1	1	3	3	3	3	4	4	4
922577	1	1	3	3	3	3	4	4	4
922840	1	1	3	3	3	3	4	4	4
923169	1	1	3	3	3	3	4	4	4
923465	1	1	3	3	3	3	4	4	4
923748	1	1	3	3	3	3	4	4	4
923780	1	1	3	3	3	3	4	4	4
924084	1	1	3	3	3	3	4	4	4
924342	1	1	3	3	3	3	4	4	4
924632	1	1	3	3	3	3	4	4	4
924934	1	1	3	3	3	3	4	4	4
924964	1	1	3	3	3	3	4	4	4
925236	1	1	3	3	3	3	4	4	4
925277	1	1	3	3	3	3	4	4	4
925291	1	1	3	3	3	3	4	4	4
925292	1	1	3	3	3	3	4	4	4
925311	1	1	3	3	3	3	4	4	4

925622	1	1	1	1	1	1	1	1
926125	1	1	1	1	1	2	2	5
926424	1	1	1	1	1	2	2	2
926682	1	1	1	1	1	2	2	2
926954	1	1	3	3	3	3	4	4
927241	1	1	1	1	1	2	2	5
92751	1	1	3	3	3	3	4	4

Q13. Which method gives your favorite results for the same data.dist dataset?  
Explain your reasoning.

Below is the “ward.D2” method is better due to how to minimizes variance in the plot, making it more compact and clusters are evenly sized. There is also more obvious structure to the data which is more effectively shown in a “ward.D2” in comparison to the other methods. There is a clear distinction between the clusters.

```
wisc.hclust <- hclust(data.dist, method = "ward.D2")
plot(wisc.hclust)
abline(h=25, col="red", lty=2)
```



##K-means clustering

```
scaled_data <- scale(wisc.data)
wisc.km <- kmeans(scaled_data, centers=2, nstart=20)
```

```
table(wisc.km$cluster, diagnosis)
```

```
diagnosis
  B    M
1 343  37
2  14 175
```

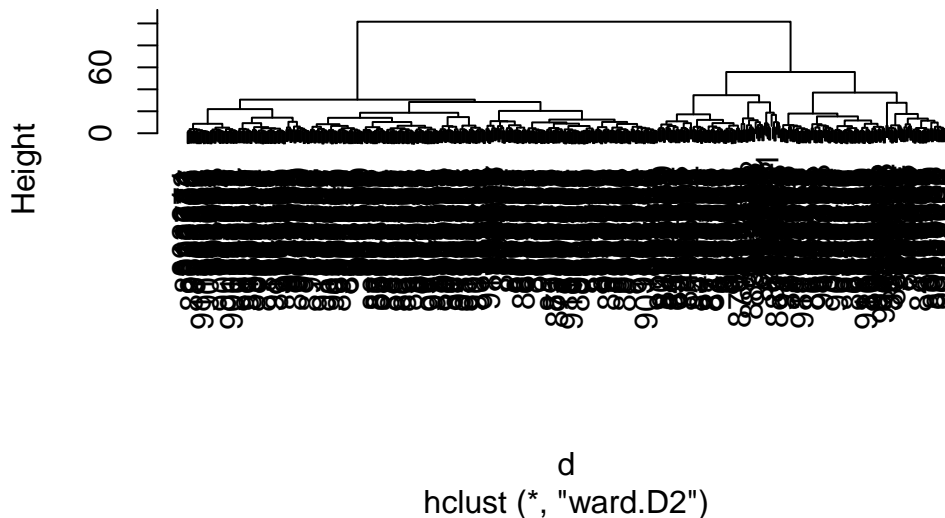
Q14. How well does k-means separate the two diagnoses? How does it compare to your hclust results?

The k-means is not the best tactic to compare the two separate diagnoses due to how the output given resulted in a long, unorganized list which was extremely hard to interpret.

##COMBINE PCA AND CLUSTERING

```
d <- dist(wisc.pr$x[,1:7])
wisc.pr.hclust <- hclust(d, method = "ward.D2")
plot(wisc.pr.hclust)
```

## Cluster Dendrogram



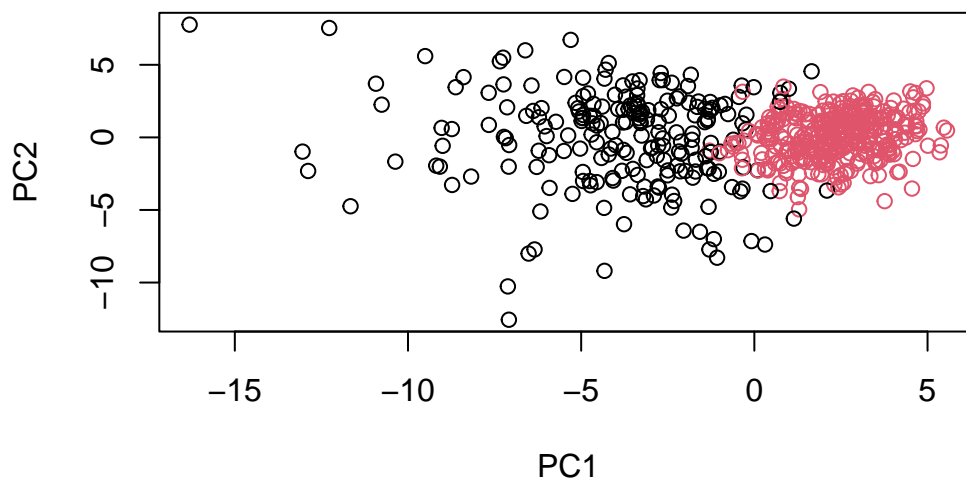
```
grps <- cutree(wisc.pr.hclust, k=2)
table(grps)
```

```
grps
 1    2
216 353
```

```
table(grps, diagnosis)
```

```
      diagnosis  
grps   B     M  
  1   28  188  
  2  329   24
```

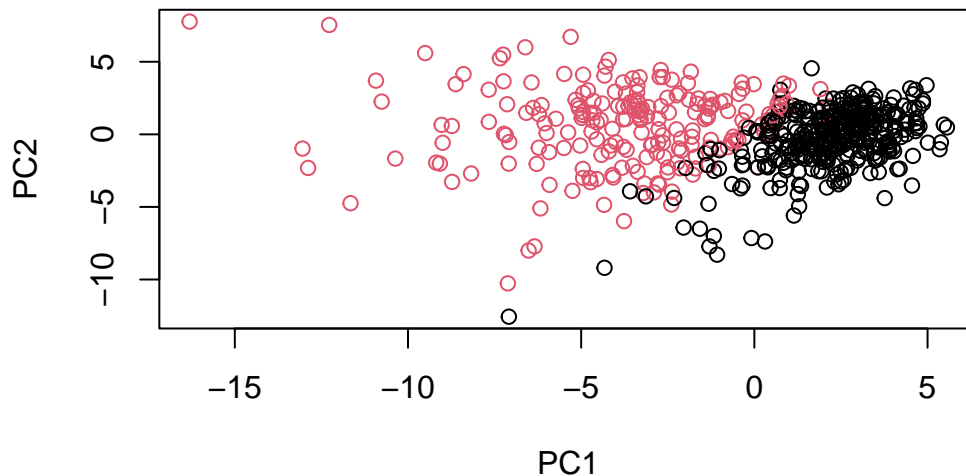
```
plot(wisc.pr$x[,1:2], col=grps)
```



```
table(grps, diagnosis)
```

```
      diagnosis  
grps   B     M  
  1   28  188  
  2  329   24
```

```
plot(wisc.pr$x[,1:2], col= as.factor(diagnosis))
```



```
wisc.pr.hclust <- hclust (d, method = "ward.D2")
wisc.pr.hclust.clusters <- cutree (wisc.pr.hclust, k=2)
```

Q15. How well does the newly created model with four clusters separate out the two diagnoses?

```
table(wisc.pr.hclust.clusters, diagnosis)
```

	diagnosis	
wisc.pr.hclust.clusters	B	M
1	28	188
2	329	24

This new model separates the four clusters similar to that of k means. The first cluster shows malignant cells and the second shows benign cells. The separation is pretty decent in comparison to the other ways we tried to cluster. There is a distinct separation between the two different diagnosis and no noteworthy overlaps are seen.

Q16. How well do the k-means and hierarchical clustering models you created in previous sections (i.e. before PCA) do in terms of separating the diagnoses? Again, use the table() function to compare the output of each model (wisc.km\$cluster and wisc.hclust.clusters) with the vector containing the actual diagnoses.

```
table(wisc.km$cluster, diagnosis)
```

		B	M
1	343	37	
2	14	175	

```
scaled_data <- scale(wisc.data)
data.dist <- dist(scaled_data)
hclust_model <- hclust(data.dist, method = "complete" )
wisc.hclust.clusters <- cutree(hclust_model, k=4)
comparision_table <- table(wisc.hclust.clusters, diagnosis)
print(comparision_table)
```

		diagnosis	
wisc.hclust.clusters		B	M
1	12	165	
2	2	5	
3	343	40	
4	0	2	

The kmeans and hierarchical cluster models both separated the two diagnosis in an effective manner. The k-mean model shows that cluster 1 has the malignant cases and cluster 2 is composed of benign cases. In hierarchical cluster, all the clusters have mixed diagnosis showing the two separated diagnosis in one model.

Q17. Which of your analysis procedures resulted in a clustering model with the best specificity? How about sensitivity?

Sensitivity = TP/ (TP+FN) Specificity = TN/ (TN+FP)

k-means specificity =  $175/(175+37) = 175/212 = 0.825$  k-means sensitivity =  $343/(343+14) = 343/357 = 0.961$

hierarchical specificity =  $165/(165+47) = 165/212 = 0.778$  hierarchical sensitivity =  $343/(343+14) = 343/357 = 0.961$

Both the hierarchical and k-means clustering models have the best specificity. K-means has the best sensitivity.

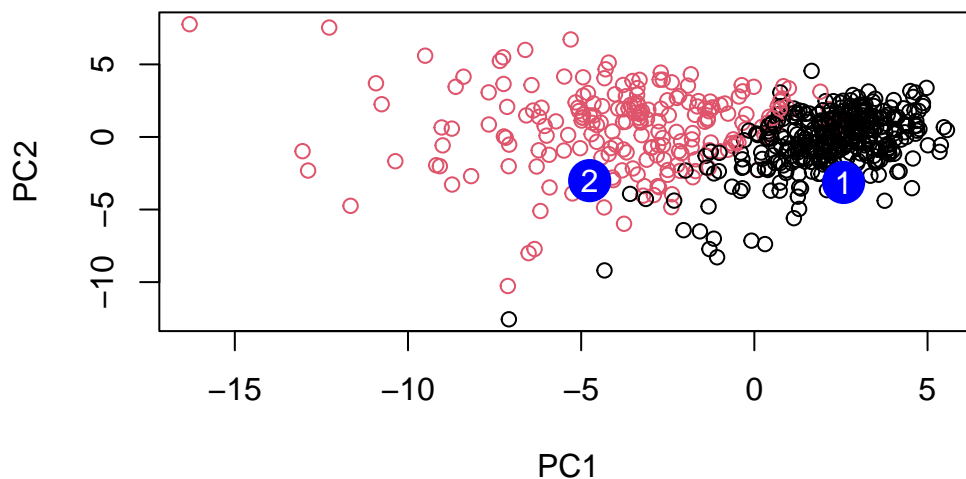
##PREDICTION

```
#url <- "new_samples.csv"
url <- "https://tinyurl.com/new-samples-CSV"
new <- read.csv(url)
npc <- predict(wisc.pr, newdata=new)
npc
```



	PC1	PC2	PC3	PC4	PC5	PC6	PC7
[1,]	2.576616	-3.135913	1.3990492	-0.7631950	2.781648	-0.8150185	-0.3959098
[2,]	-4.754928	-3.009033	-0.1660946	-0.6052952	-1.140698	-1.2189945	0.8193031
	PC8	PC9	PC10	PC11	PC12	PC13	PC14
[1,]	-0.2307350	0.1029569	-0.9272861	0.3411457	0.375921	0.1610764	1.187882
[2,]	-0.3307423	0.5281896	-0.4855301	0.7173233	-1.185917	0.5893856	0.303029
	PC15	PC16	PC17	PC18	PC19	PC20	
[1,]	0.3216974	-0.1743616	-0.07875393	-0.11207028	-0.08802955	-0.2495216	
[2,]	0.1299153	0.1448061	-0.40509706	0.06565549	0.25591230	-0.4289500	
	PC21	PC22	PC23	PC24	PC25	PC26	
[1,]	0.1228233	0.09358453	0.08347651	0.1223396	0.02124121	0.078884581	
[2,]	-0.1224776	0.01732146	0.06316631	-0.2338618	-0.20755948	-0.009833238	
	PC27	PC28	PC29	PC30			
[1,]	0.220199544	-0.02946023	-0.015620933	0.005269029			
[2,]	-0.001134152	0.09638361	0.002795349	-0.019015820			

```
plot(wisc.pr$x[,1:2], col=as.factor(diagnosis))
points(npc[,1], npc[,2], col="blue", pch=16, cex=3)
text(npc[,1], npc[,2], c(1,2), col="white")
```



Q18. Which of these new patients should we prioritize for follow up based on your results?

Patient 2