

# Mercedes-Benz Greener Manufacturing

## DESCRIPTION

### Reduce the time a Mercedes-Benz spends on the test bench.

Problem Statement Scenario: Since the first automobile, the Benz Patent Motor Car in 1886, Mercedes-Benz has stood for important automotive innovations. These include the passenger safety cell with a crumple zone, the airbag, and intelligent assistance systems. Mercedes-Benz applies for nearly 2000 patents per year, making the brand the European leader among premium carmakers. Mercedes-Benz is the leader in the premium car industry. With a huge selection of features and options, customers can choose the customized Mercedes-Benz of their dreams.

To ensure the safety and reliability of every unique car configuration before they hit the road, the company's engineers have developed a robust testing system. As one of the world's biggest manufacturers of premium cars, safety and efficiency are paramount on Mercedes-Benz's production lines. However, optimizing the speed of their testing system for many possible feature combinations is complex and time-consuming without a powerful algorithmic approach.

You are required to reduce the time that cars spend on the test bench. Others will work with a dataset representing different permutations of features in a Mercedes-Benz car to predict the time it takes to pass testing. Optimal algorithms will contribute to faster testing, resulting in lower carbon dioxide emissions without reducing Mercedes-Benz's standards.

Following actions should be performed:

If for any column(s), the variance is equal to zero, then you need to remove those variable(s).

Check for null and unique values for test and train sets.

Apply label encoder.

Perform dimensionality reduction.

Predict your test\_df values using XGBoost.

```
In [1]: #before we start with our analysis and prediscion let's import required libraries  
#we will include more libraries when needed,  
#for now based on problem statement I can say we would need pandas, numpy, sklearn  
import pandas as pd  
import numpy as np  
from sklearn.model_selection import train_test_split  
import xgboost as xgb  
import warnings  
warnings.filterwarnings('ignore')
```

```
In [2]: #import dataset for training data
#i have renamed the dataset with benz prefix and it is in my jupyter folder names c
train_data = pd.read_csv('dataset_files/benz_train.csv')
train_data.head()
```

Out[2]:

	ID	y	X0	X1	X2	X3	X4	X5	X6	X8	...	X375	X376	X377	X378	X379	X380	X381
0	0	130.81	k	v	at	a	d	u	j	o	...	0	0	1	0	0	0	0
1	6	88.53	k	t	av	e	d	y	l	o	...	1	0	0	0	0	0	0
2	7	76.26	az	w	n	c	d	x	j	x	...	0	0	0	0	0	0	0
3	9	80.62	az	t	n	f	d	x	l	e	...	0	0	0	0	0	0	0
4	13	78.02	az	v	n	f	d	h	d	n	...	0	0	0	0	0	0	0

5 rows × 378 columns

in the above output for head() we can see that IDV starts from x0 and goes till X385, no of columns is 378 let's use shape attribute to find our rows and columns

```
In [3]: train_data.shape
```

Out[3]: (4209, 378)

By Default python is showing only few columns which is not enough for our analysis, lets change the display option to see max rows and columns

```
In [4]: pd.set_option('display.max_columns', 378)
pd.set_option('display.max_rows', 4209)
train_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4209 entries, 0 to 4208
Columns: 378 entries, ID to X385
dtypes: float64(1), int64(369), object(8)
memory usage: 12.1+ MB
```

```
In [5]: train_data.describe() # Lets find staticstical info for dataset numerical columns
```

Out[5]:

	ID	y	X10	X11	X12	X13	X14	X15
count	4209.000000	4209.000000	4209.000000	4209.0	4209.000000	4209.000000	4209.000000	4209.000000
mean	4205.960798	100.669318	0.013305	0.0	0.075077	0.057971	0.428130	0.000000
std	2437.608688	12.679381	0.114590	0.0	0.263547	0.233716	0.494867	0.000000
min	0.000000	72.110000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000
25%	2095.000000	90.820000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000
50%	4220.000000	99.150000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000
75%	6314.000000	109.010000	0.000000	0.0	0.000000	0.000000	1.000000	0.000000
max	8417.000000	265.320000	1.000000	0.0	1.000000	1.000000	1.000000	1.000000

```
In [6]: train_data['ID'].value_counts()
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Out[6]: 0      1
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2227	1
2228	1
2229	1
2231	1
2232	1
2238	1
2239	1
2242	1
2243	1
2244	1
2245	1
2246	1
2251	1
2284	1
2255	1
2257	1
2260	1
2261	1
2263	1
2264	1
2267	1
2268	1
2270	1
2272	1
2276	1
2278	1
2281	1
2595	1
2601	1
3157	1
2946	1
2948	1
2949	1
2952	1
2957	1
2958	1
2959	1
2961	1
2965	1
2970	1
2973	1
2976	1
2978	1
2979	1
2982	1
2988	1
2993	1
2994	1
2997	1
2998	1

2999	1
3000	1
3001	1
3003	1
3007	1
3008	1
3009	1
3012	1
3013	1
3019	1
2947	1
2944	1
3022	1
2940	1
2875	1
2876	1
2879	1
2881	1
2886	1
2894	1
2895	1
2896	1
2897	1
2902	1
2903	1
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2912	1
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2916	1
2917	1
2924	1
2928	1
2930	1
2931	1
2932	1
2935	1
2937	1
2938	1
2939	1
3020	1
3023	1
2605	1
3080	1
3083	1
3086	1
3087	1
3089	1
3090	1
3095	1
3099	1
3100	1
3101	1
3103	1
3104	1
3105	1
3107	1
3108	1
3110	1
3114	1
3118	1

3119	1
3120	1
3128	1
3131	1
3133	1
3136	1
3139	1
3141	1
3142	1
3143	1
3153	1
3154	1
3081	1
3079	1
3025	1
3078	1
3026	1
3027	1
3029	1
3031	1
3033	1
3034	1
3035	1
3036	1
3037	1
3038	1
3042	1
3045	1
3047	1
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3051	1
3052	1
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3054	1
3057	1
3060	1
3062	1
3064	1
3065	1
3070	1
3071	1
3075	1
3076	1
2874	1
2873	1
2872	1
2669	1
2674	1
2676	1
2678	1
2680	1
2681	1
2682	1
2686	1
2687	1
2691	1
2692	1
2695	1
2696	1
2698	1
2700	1
2701	1

2702	1
2704	1
2706	1
2707	1
2708	1
2716	1
2719	1
2722	1
2723	1
2724	1
2725	1
2727	1
2729	1
2730	1
2673	1
2668	1
2871	1
2667	1
2609	1
2610	1
2611	1
2612	1
2616	1
2618	1
2619	1
2621	1
2622	1
2625	1
2626	1
2628	1
2631	1
2633	1
2634	1
2635	1
2637	1
2638	1
2641	1
2643	1
2645	1
2648	1
2651	1
2654	1
2656	1
2658	1
2660	1
2661	1
2666	1
2733	1
2735	1
2740	1
2741	1
2803	1
2805	1
2806	1
2810	1
2813	1
2815	1
2819	1
2825	1
2827	1
2828	1
2830	1
2831	1
2832	1

```
2833 1
2836 1
2837 1
2843 1
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2845 1
2847 1
2852 1
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2857 1
2859 1
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2772 1
2773 1
2775 1
2780 1
2781 1
2783 1
2785 1
2786 1
2788 1
2790 1
2791 1
2793 1
8417 1
Name: ID, dtype: int64
```

```
In [7]: df_cat = train_data.select_dtypes(include = np.object)
df_num = train_data.select_dtypes(exclude=np.object)
print("Categorical variables:-\n",df_cat.columns)
print("-----")
print("Numerical variables:-\n",df_num.columns)
```

Categorical variables:-

```
Index(['X0', 'X1', 'X2', 'X3', 'X4', 'X5', 'X6', 'X8'], dtype='object')
```

Numerical variables:-

```
Index(['ID', 'y', 'X10', 'X11', 'X12', 'X13', 'X14', 'X15', 'X16', 'X17',
      ...,
      'X375', 'X376', 'X377', 'X378', 'X379', 'X380', 'X382', 'X383', 'X384',
      'X385'],
      dtype='object', length=370)
```

Now that we have categorical and numerical rows separated, lets plot some bar graph to see the test time consumed for each categorical columns for individual test cases

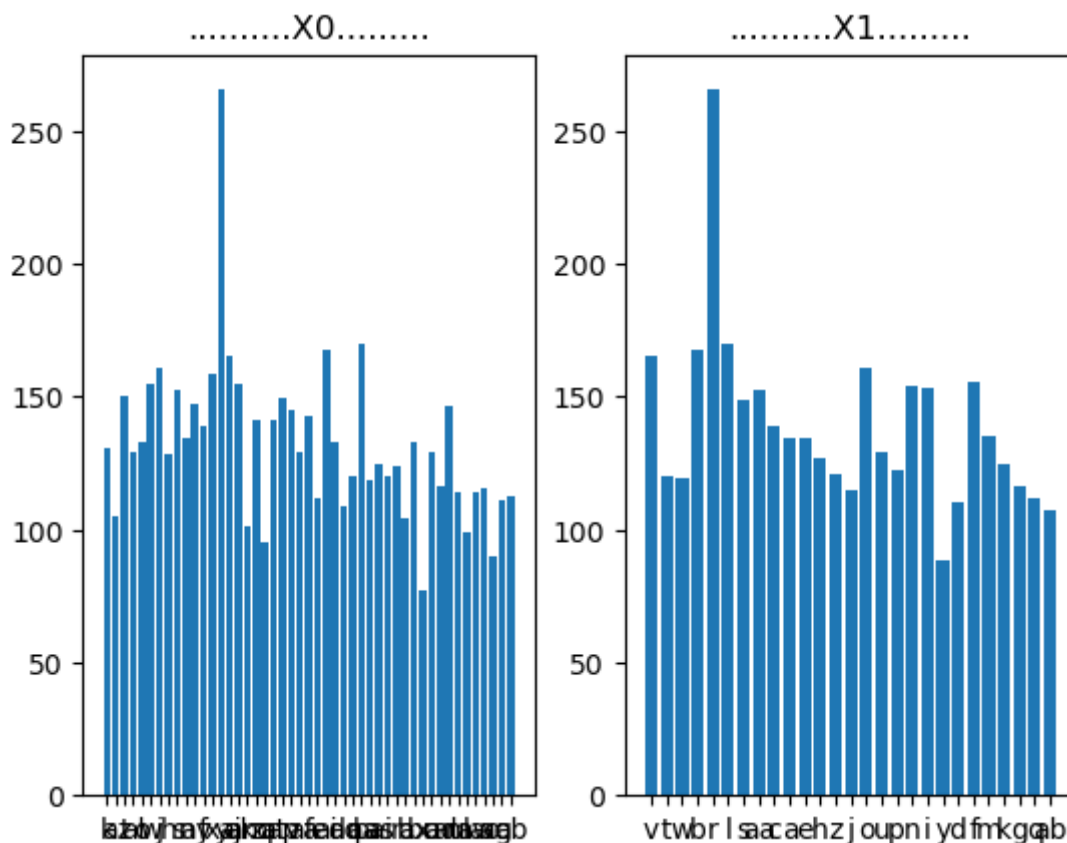
```
In [8]: import matplotlib.pyplot as plt
```

```
Y = train_data['y']
x0 = train_data['X0']
x1 = train_data['X1']
x2 = train_data['X2']
x3 = train_data['X3']
x4 = train_data['X4']
x5 = train_data['X5']
x6 = train_data['X6']
x8 = train_data['X8']
```

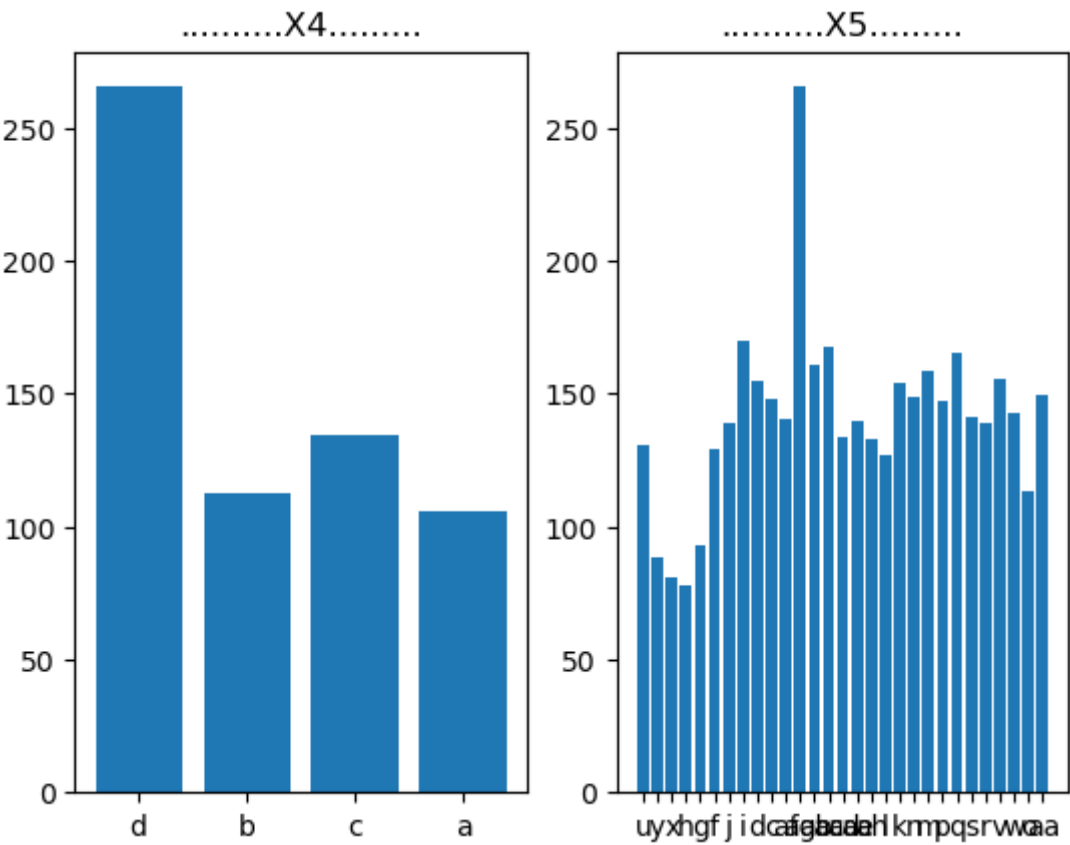
```
In [9]: plt.subplot(1, 2, 1)
plt.bar(x0,Y)
plt.title(".....X0.....")

plt.subplot(1, 2, 2)
plt.bar(x1,Y)
plt.title(".....X1.....")
```

```
Out[9]: Text(0.5, 1.0, '.....X1.....')
```





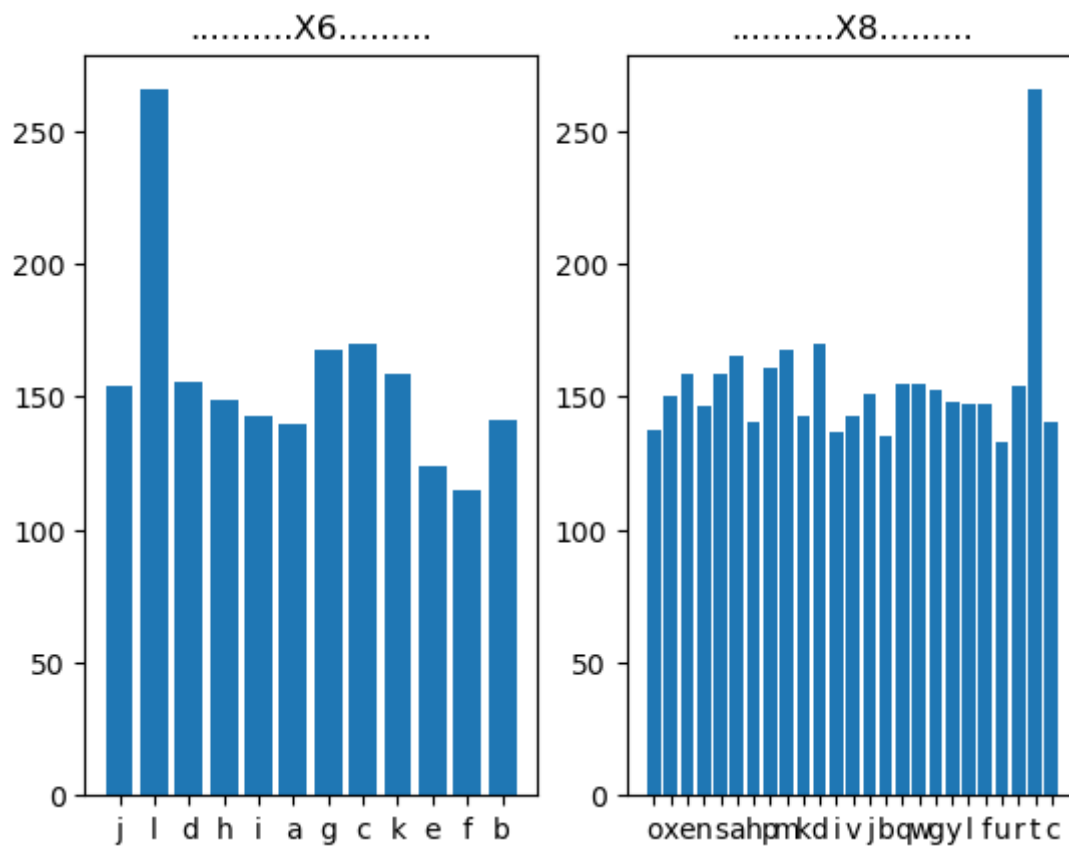


```
In [12]: plt.subplot(1, 2, 1)
plt.bar(x6,Y)
plt.title(".....X6.....")

plt.subplot(1, 2, 2)
plt.bar(x8,Y)
plt.title(".....X8.....")
```

Out[12]: Text(0.5, 1.0, '.....X8.....')





Lets find the variance for all the columns, we need to drop the columns which has variance as 0 by using var() method in pandas And display the variance with 3 decimal points, lets also add meaningful column names to this dataframe

```
In [13]: pd.options.display.float_format = '{:,.3f}'.format
variance_col = train_data.var()
variance_col = variance_col.reset_index()
variance_col.columns = ['Id', 'variance']
variance_col
```

Out[13]:

	Id	variance
0	ID	5,941,936.118
1	y	160.767
2	X10	0.013
3	X11	0.000
4	X12	0.069
5	X13	0.055
6	X14	0.245
7	X15	0.000
8	X16	0.003
9	X17	0.008
10	X18	0.008
11	X19	0.090
12	X20	0.122
13	X21	0.003
14	X22	0.079
15	X23	0.020
16	X24	0.002
17	X26	0.005
18	X27	0.217
19	X28	0.031
20	X29	0.041
21	X30	0.004
22	X31	0.178
23	X32	0.011
24	X33	0.000
25	X34	0.005
26	X35	0.178
27	X36	0.004
28	X37	0.178
29	X38	0.032
30	X39	0.000
31	X40	0.001
32	X41	0.011
33	X42	0.000
34	X43	0.067
35	X44	0.011

	Id	variance
36	X45	0.189
37	X46	0.241
38	X47	0.013
39	X48	0.022
40	X49	0.107
41	X50	0.168
42	X51	0.201
43	X52	0.041
44	X53	0.007
45	X54	0.042
46	X55	0.005
47	X56	0.021
48	X57	0.013
49	X58	0.244
50	X59	0.001
51	X60	0.001
52	X61	0.044
53	X62	0.006
54	X63	0.011
55	X64	0.234
56	X65	0.002
57	X66	0.026
58	X67	0.002
59	X68	0.068
60	X69	0.029
61	X70	0.074
62	X71	0.093
63	X73	0.020
64	X74	0.001
65	X75	0.035
66	X76	0.042
67	X77	0.012
68	X78	0.006
69	X79	0.025
70	X80	0.050
71	X81	0.177

	Id	variance
72	X82	0.017
73	X83	0.001
74	X84	0.093
75	X85	0.242
76	X86	0.001
77	X87	0.001
78	X88	0.007
79	X89	0.001
80	X90	0.007
81	X91	0.002
82	X92	0.001
83	X93	0.000
84	X94	0.007
85	X95	0.000
86	X96	0.183
87	X97	0.004
88	X98	0.054
89	X99	0.008
90	X100	0.214
91	X101	0.060
92	X102	0.007
93	X103	0.169
94	X104	0.002
95	X105	0.002
96	X106	0.013
97	X107	0.000
98	X108	0.015
99	X109	0.039
100	X110	0.001
101	X111	0.025
102	X112	0.003
103	X113	0.022
104	X114	0.125
105	X115	0.204
106	X116	0.158
107	X117	0.047

	Id	variance
108	X118	0.235
109	X119	0.235
110	X120	0.041
111	X122	0.007
112	X123	0.003
113	X124	0.000
114	X125	0.003
115	X126	0.037
116	X127	0.250
117	X128	0.040
118	X129	0.108
119	X130	0.040
120	X131	0.026
121	X132	0.215
122	X133	0.109
123	X134	0.022
124	X135	0.026
125	X136	0.042
126	X137	0.243
127	X138	0.039
128	X139	0.082
129	X140	0.039
130	X141	0.014
131	X142	0.177
132	X143	0.037
133	X144	0.155
134	X145	0.001
135	X146	0.039
136	X147	0.022
137	X148	0.043
138	X150	0.165
139	X151	0.078
140	X152	0.031
141	X153	0.001
142	X154	0.165
143	X155	0.071

	Id	variance
144	X156	0.203
145	X157	0.203
146	X158	0.177
147	X159	0.013
148	X160	0.001
149	X161	0.159
150	X162	0.039
151	X163	0.211
152	X164	0.059
153	X165	0.004
154	X166	0.032
155	X167	0.001
156	X168	0.198
157	X169	0.007
158	X170	0.024
159	X171	0.225
160	X172	0.006
161	X173	0.010
162	X174	0.017
163	X175	0.022
164	X176	0.017
165	X177	0.048
166	X178	0.247
167	X179	0.046
168	X180	0.133
169	X181	0.085
170	X182	0.095
171	X183	0.004
172	X184	0.001
173	X185	0.018
174	X186	0.249
175	X187	0.244
176	X189	0.077
177	X190	0.000
178	X191	0.249
179	X192	0.002

	Id	variance
180	X194	0.249
181	X195	0.012
182	X196	0.010
183	X197	0.031
184	X198	0.023
185	X199	0.003
186	X200	0.007
187	X201	0.146
188	X202	0.183
189	X203	0.017
190	X204	0.000
191	X205	0.000
192	X206	0.019
193	X207	0.000
194	X208	0.059
195	X209	0.091
196	X210	0.000
197	X211	0.015
198	X212	0.005
199	X213	0.002
200	X214	0.007
201	X215	0.089
202	X216	0.006
203	X217	0.007
204	X218	0.215
205	X219	0.063
206	X220	0.246
207	X221	0.008
208	X222	0.022
209	X223	0.247
210	X224	0.217
211	X225	0.088
212	X226	0.031
213	X227	0.003
214	X228	0.037
215	X229	0.038

	Id	variance
216	X230	0.005
217	X231	0.016
218	X232	0.041
219	X233	0.000
220	X234	0.161
221	X235	0.000
222	X236	0.000
223	X237	0.007
224	X238	0.077
225	X239	0.007
226	X240	0.003
227	X241	0.088
228	X242	0.007
229	X243	0.007
230	X244	0.093
231	X245	0.001
232	X246	0.242
233	X247	0.183
234	X248	0.001
235	X249	0.008
236	X250	0.247
237	X251	0.239
238	X252	0.001
239	X253	0.001
240	X254	0.005
241	X255	0.019
242	X256	0.068
243	X257	0.000
244	X258	0.002
245	X259	0.000
246	X260	0.000
247	X261	0.244
248	X262	0.001
249	X263	0.041
250	X264	0.038
251	X265	0.086



	Id	variance
252	X266	0.001
253	X267	0.009
254	X268	0.000
255	X269	0.000
256	X270	0.000
257	X271	0.002
258	X272	0.036
259	X273	0.202
260	X274	0.010
261	X275	0.199
262	X276	0.037
263	X277	0.001
264	X278	0.000
265	X279	0.041
266	X280	0.000
267	X281	0.003
268	X282	0.004
269	X283	0.121
270	X284	0.039
271	X285	0.163
272	X286	0.052
273	X287	0.016
274	X288	0.000
275	X289	0.000
276	X290	0.000
277	X291	0.010
278	X292	0.009
279	X293	0.000
280	X294	0.109
281	X295	0.000
282	X296	0.000
283	X297	0.000
284	X298	0.004
285	X299	0.004
286	X300	0.164
287	X301	0.045

	Id	variance
288	X302	0.011
289	X304	0.070
290	X305	0.013
291	X306	0.042
292	X307	0.002
293	X308	0.009
294	X309	0.007
295	X310	0.003
296	X311	0.240
297	X312	0.004
298	X313	0.210
299	X314	0.245
300	X315	0.028
301	X316	0.157
302	X317	0.008
303	X318	0.001
304	X319	0.000
305	X320	0.007
306	X321	0.182
307	X322	0.021
308	X323	0.009
309	X324	0.244
310	X325	0.006
311	X326	0.031
312	X327	0.112
313	X328	0.039
314	X329	0.246
315	X330	0.000
316	X331	0.053
317	X332	0.001
318	X333	0.023
319	X334	0.249
320	X335	0.004
321	X336	0.111
322	X337	0.250
323	X338	0.007

	Id	variance
324	X339	0.000
325	X340	0.022
326	X341	0.008
327	X342	0.022
328	X343	0.072
329	X344	0.008
330	X345	0.022
331	X346	0.045
332	X347	0.000
333	X348	0.050
334	X349	0.043
335	X350	0.224
336	X351	0.209
337	X352	0.051
338	X353	0.002
339	X354	0.162
340	X355	0.236
341	X356	0.148
342	X357	0.001
343	X358	0.245
344	X359	0.031
345	X360	0.071
346	X361	0.033
347	X362	0.250
348	X363	0.186
349	X364	0.003
350	X365	0.003
351	X366	0.001
352	X367	0.049
353	X368	0.059
354	X369	0.000
355	X370	0.007
356	X371	0.014
357	X372	0.000
358	X373	0.019
359	X374	0.176

	Id	variance
360	X375	0.217
361	X376	0.054
362	X377	0.216
363	X378	0.020
364	X379	0.009
365	X380	0.008
366	X382	0.008
367	X383	0.002
368	X384	0.000
369	X385	0.001

First note worthy observation here is - Variance is automatically calculated for numerical columns only, that is what we expected. From Above outcome we can see that first row 'ID' has largest variance, but this is not useful for our observation We see there are several rows e.g. X11, X15 have 0 variance, so these will not be impacted at all by IDV and row "ID" is vastly impacted by IDV, so lets drop them from our analysis

```
In [14]: variance_col1 = variance_col.drop(0)
variance_col1
```

Out[14]:

	Id	variance
1	y	160.767
2	X10	0.013
3	X11	0.000
4	X12	0.069
5	X13	0.055
6	X14	0.245
7	X15	0.000
8	X16	0.003
9	X17	0.008
10	X18	0.008
11	X19	0.090
12	X20	0.122
13	X21	0.003
14	X22	0.079
15	X23	0.020
16	X24	0.002
17	X26	0.005
18	X27	0.217
19	X28	0.031
20	X29	0.041
21	X30	0.004
22	X31	0.178
23	X32	0.011
24	X33	0.000
25	X34	0.005
26	X35	0.178
27	X36	0.004
28	X37	0.178
29	X38	0.032
30	X39	0.000
31	X40	0.001
32	X41	0.011
33	X42	0.000
34	X43	0.067
35	X44	0.011
36	X45	0.189

	Id	variance
37	X46	0.241
38	X47	0.013
39	X48	0.022
40	X49	0.107
41	X50	0.168
42	X51	0.201
43	X52	0.041
44	X53	0.007
45	X54	0.042
46	X55	0.005
47	X56	0.021
48	X57	0.013
49	X58	0.244
50	X59	0.001
51	X60	0.001
52	X61	0.044
53	X62	0.006
54	X63	0.011
55	X64	0.234
56	X65	0.002
57	X66	0.026
58	X67	0.002
59	X68	0.068
60	X69	0.029
61	X70	0.074
62	X71	0.093
63	X73	0.020
64	X74	0.001
65	X75	0.035
66	X76	0.042
67	X77	0.012
68	X78	0.006
69	X79	0.025
70	X80	0.050
71	X81	0.177
72	X82	0.017

	Id	variance
73	X83	0.001
74	X84	0.093
75	X85	0.242
76	X86	0.001
77	X87	0.001
78	X88	0.007
79	X89	0.001
80	X90	0.007
81	X91	0.002
82	X92	0.001
83	X93	0.000
84	X94	0.007
85	X95	0.000
86	X96	0.183
87	X97	0.004
88	X98	0.054
89	X99	0.008
90	X100	0.214
91	X101	0.060
92	X102	0.007
93	X103	0.169
94	X104	0.002
95	X105	0.002
96	X106	0.013
97	X107	0.000
98	X108	0.015
99	X109	0.039
100	X110	0.001
101	X111	0.025
102	X112	0.003
103	X113	0.022
104	X114	0.125
105	X115	0.204
106	X116	0.158
107	X117	0.047
108	X118	0.235

Id variance		
109	X119	0.235
110	X120	0.041
111	X122	0.007
112	X123	0.003
113	X124	0.000
114	X125	0.003
115	X126	0.037
116	X127	0.250
117	X128	0.040
118	X129	0.108
119	X130	0.040
120	X131	0.026
121	X132	0.215
122	X133	0.109
123	X134	0.022
124	X135	0.026
125	X136	0.042
126	X137	0.243
127	X138	0.039
128	X139	0.082
129	X140	0.039
130	X141	0.014
131	X142	0.177
132	X143	0.037
133	X144	0.155
134	X145	0.001
135	X146	0.039
136	X147	0.022
137	X148	0.043
138	X150	0.165
139	X151	0.078
140	X152	0.031
141	X153	0.001
142	X154	0.165
143	X155	0.071
144	X156	0.203



Id variance		
145	X157	0.203
146	X158	0.177
147	X159	0.013
148	X160	0.001
149	X161	0.159
150	X162	0.039
151	X163	0.211
152	X164	0.059
153	X165	0.004
154	X166	0.032
155	X167	0.001
156	X168	0.198
157	X169	0.007
158	X170	0.024
159	X171	0.225
160	X172	0.006
161	X173	0.010
162	X174	0.017
163	X175	0.022
164	X176	0.017
165	X177	0.048
166	X178	0.247
167	X179	0.046
168	X180	0.133
169	X181	0.085
170	X182	0.095
171	X183	0.004
172	X184	0.001
173	X185	0.018
174	X186	0.249
175	X187	0.244
176	X189	0.077
177	X190	0.000
178	X191	0.249
179	X192	0.002
180	X194	0.249

Id variance		
181	X195	0.012
182	X196	0.010
183	X197	0.031
184	X198	0.023
185	X199	0.003
186	X200	0.007
187	X201	0.146
188	X202	0.183
189	X203	0.017
190	X204	0.000
191	X205	0.000
192	X206	0.019
193	X207	0.000
194	X208	0.059
195	X209	0.091
196	X210	0.000
197	X211	0.015
198	X212	0.005
199	X213	0.002
200	X214	0.007
201	X215	0.089
202	X216	0.006
203	X217	0.007
204	X218	0.215
205	X219	0.063
206	X220	0.246
207	X221	0.008
208	X222	0.022
209	X223	0.247
210	X224	0.217
211	X225	0.088
212	X226	0.031
213	X227	0.003
214	X228	0.037
215	X229	0.038
216	X230	0.005

	Id	variance
217	X231	0.016
218	X232	0.041
219	X233	0.000
220	X234	0.161
221	X235	0.000
222	X236	0.000
223	X237	0.007
224	X238	0.077
225	X239	0.007
226	X240	0.003
227	X241	0.088
228	X242	0.007
229	X243	0.007
230	X244	0.093
231	X245	0.001
232	X246	0.242
233	X247	0.183
234	X248	0.001
235	X249	0.008
236	X250	0.247
237	X251	0.239
238	X252	0.001
239	X253	0.001
240	X254	0.005
241	X255	0.019
242	X256	0.068
243	X257	0.000
244	X258	0.002
245	X259	0.000
246	X260	0.000
247	X261	0.244
248	X262	0.001
249	X263	0.041
250	X264	0.038
251	X265	0.086
252	X266	0.001

Id variance		
253	X267	0.009
254	X268	0.000
255	X269	0.000
256	X270	0.000
257	X271	0.002
258	X272	0.036
259	X273	0.202
260	X274	0.010
261	X275	0.199
262	X276	0.037
263	X277	0.001
264	X278	0.000
265	X279	0.041
266	X280	0.000
267	X281	0.003
268	X282	0.004
269	X283	0.121
270	X284	0.039
271	X285	0.163
272	X286	0.052
273	X287	0.016
274	X288	0.000
275	X289	0.000
276	X290	0.000
277	X291	0.010
278	X292	0.009
279	X293	0.000
280	X294	0.109
281	X295	0.000
282	X296	0.000
283	X297	0.000
284	X298	0.004
285	X299	0.004
286	X300	0.164
287	X301	0.045
288	X302	0.011

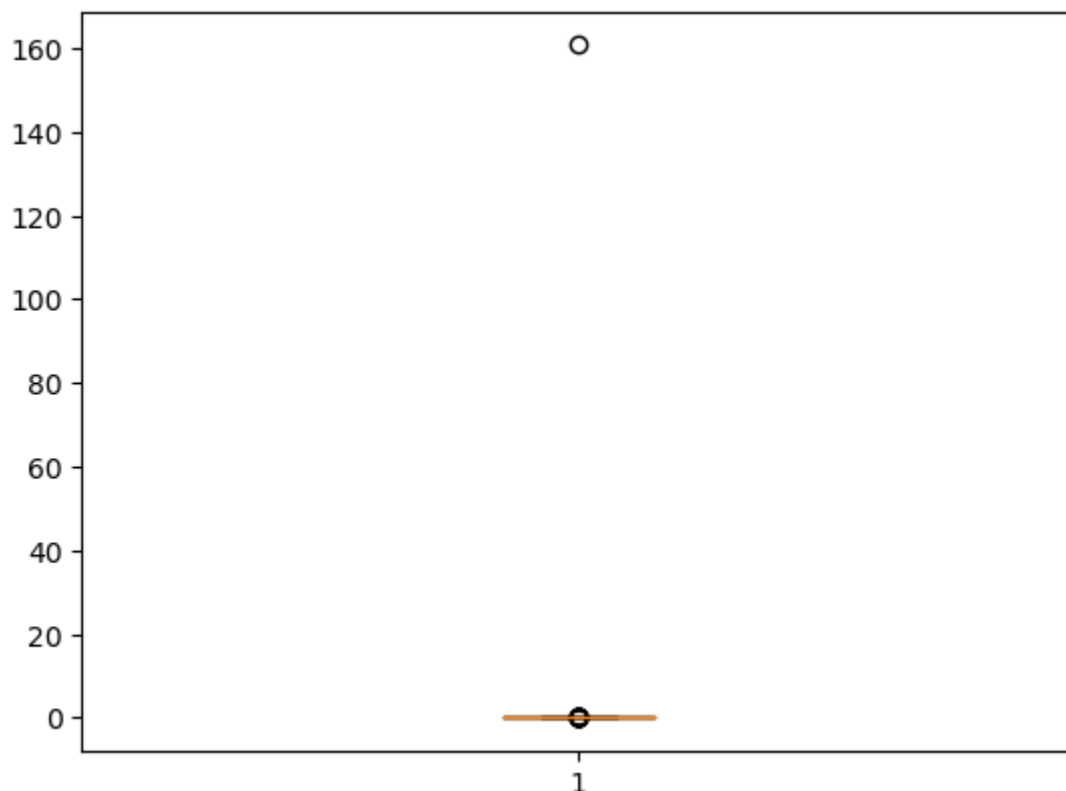
Id variance		
289	X304	0.070
290	X305	0.013
291	X306	0.042
292	X307	0.002
293	X308	0.009
294	X309	0.007
295	X310	0.003
296	X311	0.240
297	X312	0.004
298	X313	0.210
299	X314	0.245
300	X315	0.028
301	X316	0.157
302	X317	0.008
303	X318	0.001
304	X319	0.000
305	X320	0.007
306	X321	0.182
307	X322	0.021
308	X323	0.009
309	X324	0.244
310	X325	0.006
311	X326	0.031
312	X327	0.112
313	X328	0.039
314	X329	0.246
315	X330	0.000
316	X331	0.053
317	X332	0.001
318	X333	0.023
319	X334	0.249
320	X335	0.004
321	X336	0.111
322	X337	0.250
323	X338	0.007
324	X339	0.000

Id variance		
325	X340	0.022
326	X341	0.008
327	X342	0.022
328	X343	0.072
329	X344	0.008
330	X345	0.022
331	X346	0.045
332	X347	0.000
333	X348	0.050
334	X349	0.043
335	X350	0.224
336	X351	0.209
337	X352	0.051
338	X353	0.002
339	X354	0.162
340	X355	0.236
341	X356	0.148
342	X357	0.001
343	X358	0.245
344	X359	0.031
345	X360	0.071
346	X361	0.033
347	X362	0.250
348	X363	0.186
349	X364	0.003
350	X365	0.003
351	X366	0.001
352	X367	0.049
353	X368	0.059
354	X369	0.000
355	X370	0.007
356	X371	0.014
357	X372	0.000
358	X373	0.019
359	X374	0.176
360	X375	0.217

	Id	variance
361	X376	0.054
362	X377	0.216
363	X378	0.020
364	X379	0.009
365	X380	0.008
366	X382	0.008
367	X383	0.002
368	X384	0.000
369	X385	0.001

In [15]: `plt.boxplot(variance_col1['variance'])`

Out[15]: `{'whiskers': [<matplotlib.lines.Line2D at 0x1add2864e50>, <matplotlib.lines.Line2D at 0x1add25f2160>], 'caps': [<matplotlib.lines.Line2D at 0x1add25f2430>, <matplotlib.lines.Line2D at 0x1add25f2700>], 'boxes': [<matplotlib.lines.Line2D at 0x1add2864b80>], 'medians': [<matplotlib.lines.Line2D at 0x1add25f2a00>], 'fliers': [<matplotlib.lines.Line2D at 0x1add25f2cd0>], 'means': []}`



We can see that the outlier is 160 now which is variance for y

Now lets remove the columns with variance 0 and also highest variance for ID from our main dataset

In [16]: `drop_var = variance_col.loc[variance_col['variance']==0, 'Id']`  
`drop_var`

```
Out[16]: 3      X11
          83     X93
          97    X107
          219   X233
          221   X235
          254   X268
          275   X289
          276   X290
          279   X293
          283   X297
          315   X330
          332   X347
          Name: Id, dtype: object
```

```
In [17]: train_data_updated = train_data.drop(drop_var, axis=1)
          #train_data_updated.drop("ID", axis = 1, inplace=True)
          train_data_updated.head()
```

```
Out[17]:
```

	ID	y	X0	X1	X2	X3	X4	X5	X6	X8	X10	X12	X13	X14	X15	X16	X17	X18	X
0	0	130.810	k	v	at	a	d	u	j	o	0	0	1	0	0	0	0	1	
1	6	88.530	k	t	av	e	d	y	l	o	0	0	0	0	0	0	0	1	
2	7	76.260	az	w	n	c	d	x	j	x	0	0	0	0	0	0	1	0	
3	9	80.620	az	t	n	f	d	x	l	e	0	0	0	0	0	0	0	0	
4	13	78.020	az	v	n	f	d	h	d	n	0	0	0	0	0	0	0	0	

In above output we noticed that X11, X93, X107 .... are all columns with variance zero, after dropping those in dataset "train\_data\_updated" we can see that those columns are removed. That accomplishes our first goal.

Our next goal is to "Check for null and unique values for test and train sets." Lets start finding all the null values now

```
In [18]: train_data_updated.isnull().any(axis=1)
```



```
Out[18]: 0      False
          1      False
          2      False
          3      False
          4      False
          5      False
          6      False
          7      False
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dtype: bool
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From the output we can say that - there are no null values in our train data and test data both

```
In [19]: unique_train = train_data_updated['ID'].unique() #create another variable with unique IDs
unique_train
```

```
Out[19]: array([ 0,  6,  7, ..., 8412, 8415, 8417], dtype=int64)
```

```
In [20]: unique_train.shape
```

```
Out[20]: (4209,)
```

```
In [21]: train_data_updated['ID'].shape
```

```
Out[21]: (4209,)
```

```
In [22]: test_data = pd.read_csv('dataset_files/benz_test.csv') #create dataset from test d  
test_data.isnull().any(axis=1)
```

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Out[22]: 0      False
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dtype: bool
```

Based on the shape of ID column in training data unique elements in training data as per column "ID" we can say there are no Duplicates

```
In [23]: unique_test = test_data['ID'].unique()
         unique_test.shape
```

```
Out[23]: (4209,)
```

```
In [24]: test_data['ID'].shape
```

```
Out[24]: (4209,)
```

Based on the shape of ID column in test data unique elements in test data as per column "ID" we can say there are no Duplicate Let also confirm the same using "duplicated" method for test and train data

```
In [25]: test_data['ID'].duplicated().sum()
```

```
Out[25]: 0
```

```
In [26]: train_data_updated['ID'].duplicated().sum()
```

```
Out[26]: 0
```

Lets check the time taken for testing for each test case(ID)

```
In [27]: plot_df = train_data_updated[['ID' , 'y']].copy()  
print(plot_df)
```

	ID	y
0	0	130.810
1	6	88.530
2	7	76.260
3	9	80.620
4	13	78.020
5	18	92.930
6	24	128.760
7	25	91.910
8	27	108.670
9	30	126.990
10	31	102.090
11	32	98.120
12	34	82.620
13	36	94.120
14	37	99.150
15	38	93.640
16	39	106.100
17	40	114.130
18	44	89.810
19	47	90.810
20	48	90.560
21	49	94.570
22	50	108.140
23	52	120.770
24	54	84.840
25	60	93.590
26	61	104.070
27	62	89.370
28	66	90.080
29	67	128.190
30	68	76.010
31	70	107.860
32	74	106.870
33	75	104.850
34	79	114.780
35	80	91.560
36	81	98.160
37	86	117.310
38	90	79.000
39	92	110.760
40	100	101.440
41	102	91.980
42	106	98.080
43	107	139.200
44	108	85.440
45	109	110.520
46	112	91.440
47	116	91.520
48	118	91.590
49	119	108.000
50	124	116.590
51	125	93.810
52	127	119.440
53	128	91.570
54	129	97.240
55	130	90.110
56	131	94.830
57	133	108.420
58	134	95.570
59	136	88.820
60	139	104.780
61	141	87.750
62	143	93.270

63	145	111.740
64	146	109.760
65	147	84.150
66	150	93.670
67	151	107.720
68	152	90.870
69	153	118.240
70	154	89.910
71	158	113.400
72	159	118.530
73	160	79.030
74	161	92.470
75	164	100.980
76	165	114.760
77	166	111.150
78	168	108.570
79	169	93.030
80	170	93.120
81	171	113.310
82	173	94.270
83	174	102.310
84	175	101.590
85	176	110.370
86	177	98.840
87	178	101.980
88	184	96.960
89	186	90.800
90	190	110.980
91	197	73.700
92	200	111.420
93	202	98.910
94	203	106.460
95	207	115.430
96	208	91.940
97	209	108.370
98	212	127.660
99	213	93.620
100	214	106.670
101	215	96.060
102	217	92.500
103	218	92.350
104	222	102.970
105	223	109.430
106	224	106.310
107	225	87.150
108	229	107.830
109	232	112.750
110	233	89.490
111	234	126.170
112	237	100.380
113	239	95.420
114	240	112.390
115	241	92.700
116	246	88.780
117	252	105.150
118	255	118.740
119	260	116.610
120	261	90.990
121	263	113.280
122	264	101.430
123	265	113.690
124	268	87.090
125	269	116.730
126	270	89.020



127	271	102.520
128	274	98.680
129	277	91.240
130	278	96.880
131	281	90.540
132	282	110.960
133	284	88.920
134	286	92.360
135	287	102.460
136	294	89.230
137	295	110.020
138	300	96.780
139	301	101.660
140	302	87.260
141	303	111.550
142	308	88.100
143	309	101.070
144	310	96.410
145	312	92.740
146	315	112.440
147	317	105.740
148	318	89.100
149	319	108.970
150	320	87.650
151	321	116.080
152	322	108.840
153	323	94.750
154	325	94.920
155	326	106.440
156	328	108.870
157	331	90.680
158	332	104.080
159	333	109.690
160	334	90.270
161	335	105.770
162	336	94.170
163	341	97.330
164	342	90.330
165	344	105.870
166	348	98.250
167	351	106.140
168	355	90.170
169	356	110.910
170	359	108.250
171	360	98.160
172	361	113.170
173	363	90.030
174	369	100.850
175	371	89.480
176	372	116.650
177	374	99.060
178	375	94.020
179	376	110.550
180	379	94.800
181	380	105.470
182	381	91.500
183	383	87.440
184	385	79.090
185	386	89.670
186	387	121.150
187	388	97.810
188	389	99.080
189	391	87.790
190	394	119.760

191	397	90.010
192	398	98.960
193	400	90.540
194	401	108.280
195	402	88.100
196	403	116.200
197	404	90.880
198	405	87.650
199	407	94.610
200	411	96.160
201	414	117.030
202	415	91.230
203	416	136.410
204	417	91.020
205	418	102.890
206	422	110.530
207	423	102.600
208	424	77.360
209	425	113.110
210	426	88.390
211	427	108.850
212	428	90.790
213	429	98.280
214	431	109.110
215	432	88.820
216	433	146.830
217	435	102.580
218	441	115.670
219	442	90.540
220	444	87.660
221	445	115.250
222	447	106.870
223	449	128.780
224	450	89.860
225	451	132.100
226	454	90.730
227	455	134.430
228	456	104.160
229	461	97.420
230	463	99.050
231	466	91.160
232	468	103.980
233	469	100.290
234	470	99.350
235	474	106.190
236	476	109.300
237	477	108.460
238	478	118.450
239	479	101.260
240	481	116.500
241	482	88.210
242	483	114.460
243	484	96.970
244	485	97.910
245	486	108.430
246	487	90.380
247	489	90.190
248	494	122.690
249	495	90.470
250	496	110.560
251	503	91.010
252	504	122.240
253	505	150.430
254	507	90.820

255	508	100.980
256	509	89.850
257	513	107.900
258	514	90.920
259	515	109.100
260	517	112.380
261	520	88.420
262	523	87.580
263	524	106.400
264	525	89.810
265	527	91.220
266	528	76.640
267	530	111.750
268	531	95.040
269	534	111.310
270	535	92.230
271	538	111.770
272	542	121.190
273	544	99.560
274	545	89.400
275	549	90.930
276	550	112.540
277	553	99.050
278	554	108.750
279	555	104.560
280	561	92.940
281	563	89.940
282	564	102.060
283	565	108.310
284	567	110.210
285	568	88.450
286	569	87.050
287	574	89.590
288	578	109.940
289	582	95.990
290	583	119.510
291	584	105.230
292	585	104.320
293	586	91.260
294	587	76.590
295	588	87.250
296	590	90.520
297	592	92.620
298	596	114.340
299	597	108.430
300	599	117.520
301	600	94.950
302	601	90.670
303	603	90.390
304	605	89.030
305	607	107.670
306	611	91.820
307	612	111.080
308	613	89.440
309	614	99.480
310	615	94.850
311	619	99.820
312	621	91.650
313	625	89.410
314	627	89.170
315	631	88.590
316	632	107.450
317	633	85.760
318	634	113.980

319	635	87.810
320	636	113.360
321	639	74.000
322	640	92.920
323	641	106.060
324	642	91.960
325	644	102.700
326	647	90.270
327	649	100.560
328	650	89.050
329	651	120.180
330	655	86.980
331	658	110.490
332	661	93.080
333	662	112.490
334	665	94.120
335	667	88.690
336	670	104.380
337	672	115.070
338	673	92.030
339	674	106.970
340	676	116.040
341	680	91.630
342	681	169.910
343	683	103.670
344	684	98.520
345	686	109.480
346	689	96.030
347	690	107.160
348	691	94.090
349	692	87.270
350	694	105.350
351	695	97.750
352	697	104.740
353	699	91.620
354	700	115.500
355	702	102.660
356	703	92.480
357	706	99.050
358	707	102.000
359	708	100.320
360	713	74.280
361	718	112.350
362	719	92.580
363	722	116.590
364	723	100.640
365	727	95.380
366	729	84.650
367	730	112.670
368	732	73.340
369	733	94.110
370	735	95.130
371	736	108.430
372	737	89.230
373	739	112.190
374	740	91.020
375	741	108.270
376	742	87.900
377	743	109.160
378	744	99.480
379	747	110.350
380	748	91.530
381	749	106.630
382	750	88.790

383	752	98.240
384	753	109.990
385	755	107.740
386	757	109.730
387	760	91.040
388	762	95.100
389	763	105.210
390	764	87.510
391	765	99.700
392	775	91.440
393	778	122.470
394	779	97.760
395	781	88.070
396	783	105.850
397	784	117.490
398	785	97.690
399	786	92.910
400	789	77.140
401	790	91.210
402	791	107.760
403	794	93.980
404	795	97.360
405	796	102.490
406	797	112.460
407	799	114.610
408	801	108.930
409	802	88.580
410	803	111.920
411	804	94.510
412	805	100.390
413	807	90.870
414	808	93.210
415	810	116.160
416	813	108.080
417	815	98.010
418	819	90.840
419	821	93.670
420	822	136.470
421	824	77.310
422	825	103.460
423	826	107.370
424	827	88.990
425	828	128.050
426	832	112.660
427	833	90.160
428	835	92.200
429	836	154.870
430	837	94.140
431	838	111.700
432	840	89.990
433	842	98.450
434	843	88.720
435	846	99.980
436	847	103.980
437	849	108.190
438	853	110.100
439	857	93.140
440	858	100.210
441	860	88.910
442	862	85.970
443	863	122.450
444	868	112.200
445	870	106.160
446	873	89.660

447	874	90.410
448	875	101.420
449	876	89.520
450	877	111.740
451	878	91.450
452	879	77.690
453	880	117.810
454	881	87.970
455	884	99.170
456	886	93.590
457	887	104.070
458	889	98.570
459	890	101.190
460	891	108.240
461	892	90.060
462	894	92.790
463	895	100.950
464	896	90.760
465	897	119.990
466	898	78.250
467	899	110.630
468	900	87.280
469	902	89.100
470	906	95.600
471	907	108.850
472	908	88.470
473	909	110.330
474	912	87.650
475	913	89.750
476	915	113.870
477	916	108.530
478	917	96.480
479	919	94.880
480	920	111.470
481	922	116.600
482	923	103.540
483	924	107.860
484	925	118.830
485	926	87.280
486	927	129.000
487	930	92.380
488	931	107.350
489	936	94.650
490	938	118.180
491	945	116.340
492	946	99.940
493	948	101.020
494	950	91.990
495	955	97.470
496	956	112.420
497	958	110.200
498	961	93.410
499	962	113.880
500	964	92.880
501	966	107.680
502	968	88.570
503	969	90.030
504	970	112.590
505	976	101.110
506	977	93.020
507	979	88.060
508	982	99.510
509	983	90.770
510	985	89.790

511	987	79.990
512	991	93.400
513	993	113.680
514	994	94.350
515	995	116.870
516	997	112.940
517	998	92.400
518	1005	107.120
519	1006	100.420
520	1007	87.630
521	1011	91.020
522	1017	87.530
523	1018	134.260
524	1023	106.590
525	1026	121.640
526	1031	104.730
527	1032	90.460
528	1034	88.980
529	1035	116.030
530	1039	90.340
531	1040	101.970
532	1041	104.250
533	1046	93.740
534	1048	94.440
535	1049	102.330
536	1052	100.070
537	1053	101.660
538	1055	99.550
539	1058	113.400
540	1060	97.170
541	1061	109.670
542	1065	109.160
543	1067	106.500
544	1068	111.150
545	1069	92.830
546	1071	97.570
547	1072	111.520
548	1073	89.600
549	1074	105.090
550	1075	90.790
551	1079	90.540
552	1081	95.920
553	1084	111.410
554	1085	97.300
555	1086	106.810
556	1087	92.220
557	1088	111.040
558	1090	96.350
559	1092	98.930
560	1094	114.940
561	1095	89.020
562	1096	113.070
563	1098	107.610
564	1100	104.730
565	1102	80.010
566	1105	88.600
567	1107	88.200
568	1108	115.920
569	1113	91.200
570	1115	109.910
571	1118	94.000
572	1119	108.230
573	1121	75.860
574	1122	95.690

575	1123	91.160
576	1127	95.560
577	1128	107.540
578	1129	89.600
579	1130	101.000
580	1131	90.280
581	1132	108.320
582	1133	92.290
583	1135	95.030
584	1136	114.390
585	1139	104.520
586	1140	126.680
587	1141	94.560
588	1142	111.410
589	1143	93.810
590	1147	107.480
591	1149	73.400
592	1151	113.930
593	1156	111.880
594	1158	91.560
595	1159	103.750
596	1160	90.760
597	1161	113.330
598	1163	97.900
599	1164	108.920
600	1170	90.860
601	1175	113.750
602	1179	105.430
603	1180	92.010
604	1181	111.210
605	1183	93.650
606	1184	110.440
607	1185	119.710
608	1190	104.290
609	1193	111.450
610	1194	88.300
611	1195	108.530
612	1196	91.960
613	1199	104.670
614	1202	109.360
615	1204	98.780
616	1205	114.850
617	1206	113.120
618	1207	93.900
619	1208	86.560
620	1210	90.230
621	1211	105.760
622	1212	96.600
623	1213	128.250
624	1215	118.310
625	1216	110.110
626	1217	123.890
627	1219	100.970
628	1220	89.440
629	1221	109.040
630	1223	116.870
631	1224	91.820
632	1225	102.490
633	1227	99.460
634	1229	112.710
635	1231	111.540
636	1234	113.080
637	1235	89.970
638	1237	101.110



639	1239	90.050
640	1240	108.410
641	1242	87.100
642	1243	101.470
643	1245	107.510
644	1248	97.030
645	1249	88.260
646	1252	112.610
647	1253	124.370
648	1261	131.560
649	1262	95.490
650	1264	95.750
651	1265	106.720
652	1266	117.850
653	1269	113.640
654	1270	103.880
655	1273	94.290
656	1278	107.940
657	1280	113.680
658	1284	88.780
659	1287	129.190
660	1288	91.300
661	1290	90.520
662	1291	93.620
663	1292	105.870
664	1293	90.950
665	1294	112.500
666	1295	89.890
667	1297	97.330
668	1298	130.970
669	1300	74.530
670	1302	113.620
671	1303	94.950
672	1304	108.210
673	1305	90.390
674	1309	118.170
675	1310	90.380
676	1311	122.400
677	1312	89.830
678	1318	111.660
679	1320	114.280
680	1321	93.380
681	1322	147.720
682	1326	76.810
683	1327	115.730
684	1333	96.000
685	1334	100.490
686	1335	93.120
687	1336	94.710
688	1341	88.380
689	1342	74.200
690	1344	103.900
691	1345	109.530
692	1346	101.390
693	1350	119.570
694	1351	108.470
695	1353	107.220
696	1355	77.420
697	1356	87.070
698	1357	132.590
699	1358	90.660
700	1361	110.710
701	1362	91.350
702	1367	108.680

703	1368	90.730
704	1369	105.310
705	1370	91.440
706	1371	110.540
707	1373	79.810
708	1374	110.240
709	1377	85.820
710	1382	124.170
711	1383	100.770
712	1385	91.610
713	1386	114.370
714	1389	89.730
715	1390	110.490
716	1391	97.990
717	1393	87.610
718	1397	94.600
719	1402	111.440
720	1405	91.620
721	1409	99.220
722	1411	87.070
723	1414	101.440
724	1416	87.710
725	1417	111.540
726	1418	112.780
727	1419	92.590
728	1421	87.650
729	1428	109.930
730	1433	92.650
731	1435	89.740
732	1436	117.080
733	1439	89.560
734	1443	78.190
735	1447	105.960
736	1449	94.360
737	1450	108.900
738	1451	88.550
739	1452	107.750
740	1457	88.900
741	1460	118.270
742	1462	113.150
743	1463	82.200
744	1464	111.500
745	1467	90.460
746	1468	108.560
747	1470	99.150
748	1471	113.350
749	1473	110.530
750	1475	119.240
751	1476	93.260
752	1478	115.620
753	1480	97.290
754	1481	111.480
755	1484	110.480
756	1485	89.500
757	1486	99.520
758	1489	91.520
759	1491	88.810
760	1493	88.930
761	1495	97.990
762	1498	112.950
763	1500	101.060
764	1501	98.970
765	1503	117.070
766	1504	88.030

767	1505	107.450
768	1506	90.900
769	1510	91.390
770	1515	88.490
771	1516	101.700
772	1517	89.910
773	1520	121.230
774	1521	93.110
775	1523	105.350
776	1525	101.490
777	1526	108.540
778	1528	111.480
779	1530	109.920
780	1531	103.590
781	1533	93.430
782	1534	116.020
783	1535	100.250
784	1538	98.040
785	1540	93.470
786	1541	97.950
787	1546	90.650
788	1547	107.710
789	1548	85.980
790	1549	111.020
791	1552	87.870
792	1553	95.710
793	1555	96.510
794	1557	91.680
795	1558	111.020
796	1561	114.260
797	1563	113.930
798	1564	98.280
799	1565	115.420
800	1568	95.220
801	1572	102.130
802	1573	111.250
803	1575	109.190
804	1576	93.720
805	1577	107.620
806	1579	76.270
807	1581	118.900
808	1582	90.620
809	1589	110.230
810	1591	97.020
811	1593	90.390
812	1594	105.660
813	1595	95.710
814	1597	93.820
815	1600	109.190
816	1601	95.000
817	1602	100.590
818	1603	89.600
819	1605	109.640
820	1610	110.640
821	1612	104.620
822	1614	92.530
823	1615	121.790
824	1617	123.680
825	1618	94.110
826	1623	110.580
827	1624	93.800
828	1626	100.830
829	1628	121.180
830	1630	94.670

831	1631	87.470
832	1632	105.300
833	1633	89.650
834	1635	78.400
835	1637	105.030
836	1640	113.410
837	1642	99.510
838	1649	122.200
839	1650	90.780
840	1651	113.020
841	1654	94.410
842	1655	82.240
843	1657	110.640
844	1660	97.320
845	1662	101.430
846	1671	140.490
847	1673	89.410
848	1675	114.910
849	1676	112.540
850	1681	76.990
851	1682	88.260
852	1684	109.580
853	1685	104.530
854	1688	91.210
855	1694	111.100
856	1698	88.120
857	1699	101.460
858	1705	88.880
859	1709	101.760
860	1712	87.710
861	1714	98.130
862	1715	98.930
863	1716	92.120
864	1718	108.150
865	1721	104.200
866	1723	126.520
867	1724	91.110
868	1728	95.100
869	1732	91.580
870	1736	116.020
871	1737	97.570
872	1739	107.360
873	1740	109.770
874	1741	114.250
875	1743	104.420
876	1744	91.160
877	1746	119.020
878	1748	100.420
879	1750	109.390
880	1757	91.190
881	1765	107.240
882	1767	114.320
883	1770	265.320
884	1776	93.020
885	1778	90.220
886	1781	105.450
887	1782	112.380
888	1783	94.870
889	1784	158.530
890	1785	114.510
891	1786	127.910
892	1789	99.480
893	1791	129.320
894	1792	83.420

895	1793	118.440
896	1794	111.900
897	1795	91.370
898	1797	86.930
899	1798	112.510
900	1799	141.310
901	1800	102.870
902	1802	106.790
903	1804	99.180
904	1805	92.400
905	1806	108.570
906	1808	95.640
907	1810	89.600
908	1811	98.950
909	1817	108.650
910	1819	110.870
911	1823	108.360
912	1824	78.500
913	1827	101.980
914	1829	106.560
915	1830	88.380
916	1832	89.960
917	1833	113.560
918	1834	112.090
919	1835	92.320
920	1838	99.780
921	1839	92.380
922	1840	104.190
923	1842	98.010
924	1843	78.470
925	1845	91.780
926	1846	108.380
927	1847	105.400
928	1849	99.000
929	1850	87.130
930	1855	107.480
931	1857	100.770
932	1858	92.950
933	1862	87.210
934	1864	100.350
935	1869	106.190
936	1870	90.040
937	1871	123.310
938	1873	117.890
939	1874	88.640
940	1875	110.540
941	1876	93.760
942	1877	117.300
943	1878	101.200
944	1881	98.170
945	1883	99.910
946	1884	94.290
947	1886	91.630
948	1889	107.590
949	1891	90.710
950	1892	107.360
951	1893	91.210
952	1898	90.400
953	1899	91.270
954	1903	90.320
955	1904	108.820
956	1907	93.750
957	1908	108.490
958	1909	88.340

959	1910	120.170
960	1911	87.210
961	1913	93.420
962	1914	108.340
963	1919	90.350
964	1921	88.710
965	1922	110.700
966	1926	115.730
967	1927	88.240
968	1928	110.120
969	1929	89.970
970	1931	100.280
971	1936	114.350
972	1937	92.550
973	1938	115.220
974	1939	93.830
975	1946	94.390
976	1947	96.830
977	1950	90.960
978	1951	111.890
979	1953	113.390
980	1956	107.130
981	1957	125.030
982	1961	90.430
983	1962	101.580
984	1964	103.570
985	1966	107.990
986	1967	102.390
987	1970	113.740
988	1974	106.570
989	1976	107.480
990	1980	106.520
991	1983	100.620
992	1984	101.330
993	1985	108.680
994	1986	90.040
995	1989	140.150
996	1990	94.640
997	1991	114.530
998	1992	137.440
999	1994	110.240
1000	1995	91.490
1001	1996	106.000
1002	1998	104.970
1003	2000	107.130
1004	2005	95.620
1005	2008	95.040
1006	2011	88.960
1007	2012	101.660
1008	2014	104.370
1009	2015	99.720
1010	2016	105.430
1011	2017	125.060
1012	2019	89.430
1013	2020	108.370
1014	2021	89.000
1015	2023	99.060
1016	2027	89.290
1017	2028	115.130
1018	2029	92.730
1019	2034	108.880
1020	2038	98.560
1021	2039	108.640
1022	2041	99.510

1023	2042	89.830
1024	2045	92.630
1025	2047	105.530
1026	2048	108.990
1027	2049	90.100
1028	2050	117.980
1029	2051	89.650
1030	2052	88.100
1031	2053	99.560
1032	2057	85.480
1033	2058	140.410
1034	2061	115.810
1035	2064	89.750
1036	2065	144.360
1037	2068	93.780
1038	2069	89.060
1039	2070	88.260
1040	2071	105.530
1041	2077	116.210
1042	2078	90.590
1043	2079	115.150
1044	2081	108.360
1045	2083	109.450
1046	2084	93.920
1047	2086	91.070
1048	2088	93.960
1049	2089	76.220
1050	2090	93.600
1051	2094	97.000
1052	2095	102.760
1053	2096	94.110
1054	2097	99.200
1055	2099	100.550
1056	2100	90.690
1057	2104	89.940
1058	2108	93.340
1059	2109	122.090
1060	2111	154.430
1061	2112	88.260
1062	2113	106.390
1063	2116	89.390
1064	2121	106.230
1065	2124	87.540
1066	2125	99.580
1067	2130	99.030
1068	2131	97.220
1069	2133	108.740
1070	2134	93.410
1071	2136	90.700
1072	2137	104.930
1073	2140	97.940
1074	2143	98.110
1075	2144	95.770
1076	2145	128.780
1077	2147	128.140
1078	2148	90.090
1079	2149	87.310
1080	2150	97.430
1081	2152	93.380
1082	2153	102.630
1083	2154	96.080
1084	2155	105.650
1085	2156	91.390
1086	2158	93.110

1087	2160	87.060
1088	2161	99.520
1089	2163	106.080
1090	2165	89.020
1091	2166	106.670
1092	2169	89.000
1093	2170	111.850
1094	2172	117.360
1095	2176	106.810
1096	2177	128.360
1097	2179	101.970
1098	2181	119.080
1099	2182	90.180
1100	2183	128.100
1101	2184	92.330
1102	2186	119.010
1103	2187	94.810
1104	2188	79.220
1105	2191	103.410
1106	2193	89.740
1107	2195	90.640
1108	2196	111.860
1109	2197	112.510
1110	2198	109.780
1111	2199	94.550
1112	2202	93.950
1113	2206	97.410
1114	2207	115.820
1115	2208	96.230
1116	2210	98.590
1117	2211	97.460
1118	2212	90.490
1119	2217	74.540
1120	2221	106.820
1121	2224	115.950
1122	2227	121.030
1123	2228	87.980
1124	2229	113.880
1125	2231	118.180
1126	2232	100.900
1127	2238	108.390
1128	2239	87.530
1129	2242	111.020
1130	2243	91.380
1131	2244	118.420
1132	2245	93.390
1133	2246	111.110
1134	2247	88.800
1135	2251	103.030
1136	2255	90.570
1137	2257	109.630
1138	2260	94.810
1139	2261	101.230
1140	2263	93.480
1141	2264	149.630
1142	2267	88.620
1143	2268	99.680
1144	2270	118.230
1145	2272	116.300
1146	2276	104.920
1147	2278	122.720
1148	2281	107.280
1149	2284	88.410
1150	2285	97.890



1151	2286	88.950
1152	2287	109.680
1153	2290	100.160
1154	2293	96.410
1155	2294	99.660
1156	2295	88.510
1157	2296	101.000
1158	2302	73.590
1159	2303	100.120
1160	2307	103.010
1161	2310	111.740
1162	2313	97.720
1163	2314	111.310
1164	2315	89.510
1165	2317	91.330
1166	2318	106.310
1167	2319	89.190
1168	2320	92.040
1169	2323	114.880
1170	2324	89.700
1171	2327	108.880
1172	2328	91.790
1173	2336	93.650
1174	2339	100.810
1175	2341	106.190
1176	2343	122.650
1177	2344	99.980
1178	2346	110.030
1179	2347	88.980
1180	2348	106.180
1181	2350	88.570
1182	2353	108.120
1183	2356	100.370
1184	2359	110.580
1185	2362	88.920
1186	2363	116.000
1187	2365	83.980
1188	2367	114.120
1189	2368	88.290
1190	2372	92.960
1191	2375	122.400
1192	2377	93.620
1193	2379	101.710
1194	2380	90.890
1195	2381	108.520
1196	2384	114.260
1197	2385	91.210
1198	2388	121.270
1199	2391	121.280
1200	2393	90.370
1201	2394	98.580
1202	2395	88.690
1203	2396	160.870
1204	2397	94.160
1205	2403	150.890
1206	2405	111.500
1207	2406	100.750
1208	2410	92.700
1209	2411	113.390
1210	2414	99.160
1211	2416	104.180
1212	2417	97.700
1213	2418	101.180
1214	2419	90.490

1215	2421	108.480
1216	2424	93.290
1217	2425	100.500
1218	2427	108.760
1219	2428	93.970
1220	2429	110.210
1221	2430	88.340
1222	2431	123.240
1223	2433	107.350
1224	2437	90.250
1225	2439	88.920
1226	2441	95.240
1227	2442	115.220
1228	2445	105.650
1229	2446	90.860
1230	2448	112.970
1231	2449	114.800
1232	2451	102.910
1233	2452	98.330
1234	2453	87.950
1235	2456	91.850
1236	2457	101.640
1237	2458	133.360
1238	2461	87.820
1239	2462	114.560
1240	2464	108.520
1241	2466	109.030
1242	2467	88.160
1243	2470	103.910
1244	2471	88.010
1245	2472	109.910
1246	2473	108.060
1247	2475	110.170
1248	2476	88.150
1249	2477	118.140
1250	2479	122.510
1251	2482	96.140
1252	2483	100.920
1253	2484	106.030
1254	2485	106.350
1255	2486	89.410
1256	2487	92.130
1257	2488	99.830
1258	2491	96.050
1259	2493	105.970
1260	2494	87.160
1261	2495	110.470
1262	2498	90.130
1263	2499	99.240
1264	2501	86.600
1265	2502	106.050
1266	2503	105.030
1267	2504	98.950
1268	2506	112.570
1269	2511	152.320
1270	2512	106.090
1271	2514	111.310
1272	2516	134.210
1273	2517	88.610
1274	2522	92.800
1275	2524	78.450
1276	2526	115.820
1277	2527	87.370
1278	2528	87.050

1279	2531	139.080
1280	2532	93.930
1281	2534	88.180
1282	2536	76.860
1283	2537	89.850
1284	2539	90.440
1285	2540	111.580
1286	2541	109.260
1287	2542	106.310
1288	2543	92.210
1289	2545	91.380
1290	2546	113.430
1291	2547	91.350
1292	2548	112.480
1293	2549	97.990
1294	2550	105.180
1295	2551	76.640
1296	2552	108.190
1297	2554	100.100
1298	2555	113.340
1299	2557	104.370
1300	2566	94.090
1301	2568	76.180
1302	2569	98.390
1303	2570	84.850
1304	2571	111.030
1305	2573	109.870
1306	2574	114.890
1307	2581	112.800
1308	2584	134.040
1309	2585	96.690
1310	2586	105.510
1311	2588	129.160
1312	2592	95.940
1313	2593	111.550
1314	2595	113.030
1315	2596	91.100
1316	2601	94.390
1317	2605	99.260
1318	2609	111.470
1319	2610	103.720
1320	2611	87.810
1321	2612	93.770
1322	2616	88.630
1323	2618	95.330
1324	2619	107.470
1325	2621	105.800
1326	2622	85.230
1327	2625	106.270
1328	2626	94.830
1329	2628	88.360
1330	2631	110.160
1331	2633	101.740
1332	2634	92.640
1333	2635	107.820
1334	2637	108.730
1335	2638	101.960
1336	2641	91.670
1337	2643	92.300
1338	2645	90.050
1339	2648	108.030
1340	2651	88.570
1341	2654	88.140
1342	2656	88.600

1343	2658	85.920
1344	2660	96.850
1345	2661	106.130
1346	2666	111.490
1347	2667	110.760
1348	2668	92.220
1349	2669	142.710
1350	2673	108.510
1351	2674	92.090
1352	2676	113.820
1353	2678	96.820
1354	2680	100.970
1355	2681	102.040
1356	2682	89.380
1357	2686	77.420
1358	2687	90.670
1359	2691	95.590
1360	2692	110.230
1361	2695	91.240
1362	2696	110.070
1363	2698	91.550
1364	2700	103.820
1365	2701	103.320
1366	2702	113.860
1367	2704	107.650
1368	2706	93.550
1369	2707	109.690
1370	2708	88.020
1371	2716	118.060
1372	2719	90.960
1373	2722	98.570
1374	2723	91.620
1375	2724	94.800
1376	2725	75.260
1377	2727	107.500
1378	2729	97.860
1379	2730	90.600
1380	2733	111.410
1381	2735	89.690
1382	2740	89.110
1383	2741	75.790
1384	2742	87.580
1385	2743	103.310
1386	2744	92.820
1387	2745	104.340
1388	2747	109.250
1389	2748	88.790
1390	2750	94.020
1391	2754	98.320
1392	2755	90.130
1393	2756	105.950
1394	2761	88.170
1395	2763	89.380
1396	2766	90.680
1397	2767	98.440
1398	2768	99.600
1399	2770	94.570
1400	2772	87.240
1401	2773	123.170
1402	2775	110.240
1403	2780	97.260
1404	2781	105.960
1405	2783	78.010
1406	2785	108.330

1407	2786	100.870
1408	2788	108.570
1409	2790	88.550
1410	2791	114.830
1411	2793	99.930
1412	2794	93.570
1413	2795	109.120
1414	2796	94.840
1415	2797	100.750
1416	2803	106.840
1417	2805	117.350
1418	2806	92.980
1419	2810	90.000
1420	2813	106.580
1421	2815	115.390
1422	2819	106.320
1423	2825	107.610
1424	2827	88.690
1425	2828	107.150
1426	2830	107.660
1427	2831	135.290
1428	2832	95.760
1429	2833	108.300
1430	2836	101.250
1431	2837	91.030
1432	2843	114.100
1433	2844	93.870
1434	2845	89.550
1435	2847	100.320
1436	2852	110.320
1437	2855	88.870
1438	2856	118.610
1439	2857	87.250
1440	2859	91.320
1441	2860	115.750
1442	2862	97.270
1443	2863	80.530
1444	2869	87.000
1445	2871	90.000
1446	2872	110.290
1447	2873	91.900
1448	2874	106.650
1449	2875	94.260
1450	2876	97.470
1451	2879	89.260
1452	2881	100.570
1453	2886	100.630
1454	2894	111.100
1455	2895	91.980
1456	2896	115.220
1457	2897	112.880
1458	2902	73.150
1459	2903	167.450
1460	2904	109.700
1461	2905	90.880
1462	2906	108.350
1463	2907	90.410
1464	2908	96.610
1465	2912	87.990
1466	2915	74.100
1467	2916	92.910
1468	2917	111.090
1469	2924	93.030
1470	2928	87.630

1471	2930	87.560
1472	2931	76.960
1473	2932	108.060
1474	2935	98.510
1475	2937	92.340
1476	2938	114.920
1477	2939	89.670
1478	2940	115.640
1479	2944	90.690
1480	2946	91.350
1481	2947	91.000
1482	2948	96.870
1483	2949	110.440
1484	2952	91.070
1485	2957	115.600
1486	2958	91.530
1487	2959	101.790
1488	2961	111.850
1489	2965	88.930
1490	2970	128.350
1491	2973	98.810
1492	2976	90.320
1493	2978	119.870
1494	2979	104.510
1495	2982	112.000
1496	2988	100.070
1497	2993	93.000
1498	2994	108.310
1499	2997	94.180
1500	2998	119.030
1501	2999	93.400
1502	3000	101.130
1503	3001	93.320
1504	3003	92.210
1505	3007	102.300
1506	3008	92.630
1507	3009	75.820
1508	3012	96.980
1509	3013	106.330
1510	3019	107.980
1511	3020	91.320
1512	3022	73.450
1513	3023	94.600
1514	3025	91.110
1515	3026	90.410
1516	3027	116.570
1517	3029	108.960
1518	3031	127.060
1519	3033	95.740
1520	3034	96.280
1521	3035	105.530
1522	3036	76.800
1523	3037	86.830
1524	3038	127.190
1525	3042	127.270
1526	3045	87.850
1527	3047	91.070
1528	3048	109.610
1529	3049	90.820
1530	3050	125.260
1531	3051	86.150
1532	3052	81.080
1533	3053	86.720
1534	3054	110.150

1535	3057	101.000
1536	3060	92.810
1537	3062	93.580
1538	3064	103.450
1539	3065	111.450
1540	3070	108.130
1541	3071	106.620
1542	3075	108.420
1543	3076	96.170
1544	3078	111.420
1545	3079	89.590
1546	3080	89.970
1547	3081	110.470
1548	3083	75.890
1549	3086	90.720
1550	3087	94.080
1551	3089	132.600
1552	3090	114.530
1553	3095	96.450
1554	3099	110.900
1555	3100	108.940
1556	3101	93.600
1557	3103	111.150
1558	3104	90.660
1559	3105	106.540
1560	3107	125.910
1561	3108	114.650
1562	3110	109.750
1563	3114	120.910
1564	3118	110.430
1565	3119	113.140
1566	3120	89.900
1567	3128	90.350
1568	3131	89.610
1569	3133	91.150
1570	3136	110.570
1571	3139	119.300
1572	3141	102.420
1573	3142	113.710
1574	3143	92.390
1575	3153	106.280
1576	3154	77.860
1577	3157	90.440
1578	3158	111.310
1579	3160	110.330
1580	3164	103.470
1581	3166	112.060
1582	3167	75.510
1583	3168	90.400
1584	3169	108.020
1585	3170	88.810
1586	3171	117.600
1587	3174	92.660
1588	3175	107.700
1589	3178	93.620
1590	3180	93.860
1591	3181	98.740
1592	3182	113.750
1593	3184	106.830
1594	3185	72.110
1595	3188	87.300
1596	3191	103.200
1597	3195	88.380
1598	3196	99.200

1599	3199	118.780
1600	3203	102.140
1601	3207	92.530
1602	3209	95.670
1603	3215	91.010
1604	3217	87.830
1605	3218	111.640
1606	3222	102.500
1607	3223	93.750
1608	3224	110.420
1609	3225	87.410
1610	3230	117.060
1611	3231	92.980
1612	3235	125.760
1613	3237	100.560
1614	3241	111.050
1615	3242	87.950
1616	3243	121.500
1617	3244	88.770
1618	3245	105.850
1619	3246	103.700
1620	3248	114.600
1621	3250	89.620
1622	3251	109.370
1623	3258	95.800
1624	3259	104.730
1625	3260	113.870
1626	3261	99.000
1627	3265	133.500
1628	3268	102.000
1629	3270	111.340
1630	3271	91.380
1631	3273	104.490
1632	3276	88.290
1633	3278	106.790
1634	3281	109.710
1635	3282	112.270
1636	3284	98.980
1637	3286	119.750
1638	3289	112.990
1639	3292	117.710
1640	3293	91.610
1641	3294	82.210
1642	3295	89.300
1643	3296	114.500
1644	3297	104.920
1645	3300	98.700
1646	3301	93.930
1647	3305	93.760
1648	3306	98.020
1649	3308	109.740
1650	3310	108.510
1651	3311	88.670
1652	3312	117.350
1653	3313	102.770
1654	3315	87.860
1655	3318	119.390
1656	3323	105.890
1657	3325	88.470
1658	3327	104.450
1659	3328	125.720
1660	3332	89.410
1661	3333	105.490
1662	3334	87.720



1663	3336	100.530
1664	3342	125.460
1665	3344	78.220
1666	3345	101.260
1667	3347	132.860
1668	3349	110.640
1669	3350	97.860
1670	3353	93.710
1671	3354	111.440
1672	3357	89.030
1673	3361	89.570
1674	3362	98.070
1675	3363	117.290
1676	3364	92.590
1677	3365	111.680
1678	3366	92.350
1679	3367	107.540
1680	3368	91.760
1681	3369	81.960
1682	3370	95.590
1683	3373	101.640
1684	3375	107.690
1685	3376	94.030
1686	3379	88.620
1687	3381	116.820
1688	3383	106.660
1689	3384	110.880
1690	3385	88.880
1691	3387	99.940
1692	3388	90.860
1693	3390	94.310
1694	3392	100.500
1695	3396	101.940
1696	3401	97.670
1697	3402	91.620
1698	3403	102.780
1699	3405	89.390
1700	3406	93.960
1701	3408	88.830
1702	3410	91.660
1703	3411	107.040
1704	3412	92.580
1705	3413	108.470
1706	3414	95.980
1707	3415	94.760
1708	3416	104.770
1709	3417	89.610
1710	3418	99.670
1711	3420	117.400
1712	3422	133.550
1713	3423	105.170
1714	3424	96.590
1715	3426	96.810
1716	3430	106.180
1717	3432	107.710
1718	3433	91.140
1719	3434	109.550
1720	3437	93.290
1721	3438	108.330
1722	3440	77.620
1723	3447	95.640
1724	3448	90.270
1725	3450	90.260
1726	3451	108.030

1727	3452	100.000
1728	3454	114.520
1729	3455	92.450
1730	3456	139.610
1731	3458	104.600
1732	3459	89.940
1733	3463	120.950
1734	3471	101.470
1735	3474	106.520
1736	3477	91.780
1737	3480	88.270
1738	3481	92.940
1739	3482	105.790
1740	3486	117.320
1741	3489	95.870
1742	3490	122.120
1743	3491	119.500
1744	3492	100.460
1745	3493	86.960
1746	3494	114.180
1747	3495	101.070
1748	3498	110.940
1749	3502	107.100
1750	3503	92.600
1751	3505	112.170
1752	3506	89.750
1753	3507	99.230
1754	3509	115.050
1755	3510	89.840
1756	3513	101.450
1757	3514	110.940
1758	3516	114.570
1759	3519	89.950
1760	3520	80.340
1761	3521	98.700
1762	3522	87.740
1763	3523	120.170
1764	3524	117.280
1765	3525	98.100
1766	3527	92.460
1767	3541	97.320
1768	3542	114.350
1769	3543	115.240
1770	3544	106.600
1771	3547	99.840
1772	3548	109.250
1773	3549	119.310
1774	3552	108.260
1775	3555	89.930
1776	3556	105.560
1777	3560	78.950
1778	3566	109.610
1779	3568	95.710
1780	3569	125.720
1781	3570	90.680
1782	3573	106.730
1783	3575	77.450
1784	3580	122.010
1785	3581	89.790
1786	3582	116.510
1787	3584	99.640
1788	3588	74.350
1789	3589	114.510
1790	3590	107.990

1791	3591	108.970
1792	3592	110.010
1793	3596	89.280
1794	3597	99.100
1795	3598	90.760
1796	3603	106.550
1797	3605	109.900
1798	3606	94.210
1799	3607	108.060
1800	3608	93.940
1801	3611	93.150
1802	3613	114.660
1803	3616	72.940
1804	3622	102.480
1805	3623	92.470
1806	3624	100.270
1807	3627	89.770
1808	3628	111.220
1809	3629	91.890
1810	3635	88.220
1811	3636	108.350
1812	3638	107.790
1813	3642	108.990
1814	3643	95.150
1815	3649	107.970
1816	3650	86.340
1817	3651	99.990
1818	3652	92.820
1819	3656	88.310
1820	3657	112.540
1821	3658	88.770
1822	3661	115.100
1823	3663	92.990
1824	3664	101.650
1825	3665	90.760
1826	3667	111.400
1827	3669	88.360
1828	3670	110.070
1829	3672	119.590
1830	3676	109.790
1831	3677	92.590
1832	3678	111.920
1833	3679	89.070
1834	3680	110.220
1835	3683	90.110
1836	3684	98.810
1837	3685	94.500
1838	3688	91.320
1839	3689	122.310
1840	3690	89.900
1841	3691	111.830
1842	3693	125.440
1843	3694	88.230
1844	3697	109.440
1845	3698	89.190
1846	3700	89.380
1847	3701	102.300
1848	3702	85.830
1849	3703	105.290
1850	3704	87.490
1851	3706	89.140
1852	3711	115.530
1853	3713	109.960
1854	3714	88.660

1855	3717	107.010
1856	3718	94.900
1857	3719	93.910
1858	3721	93.780
1859	3723	99.400
1860	3724	89.010
1861	3725	98.190
1862	3727	109.240
1863	3730	100.710
1864	3732	91.430
1865	3733	97.780
1866	3734	88.440
1867	3737	109.590
1868	3738	105.640
1869	3740	90.520
1870	3742	93.640
1871	3747	72.500
1872	3748	90.830
1873	3749	106.220
1874	3750	111.010
1875	3752	107.400
1876	3754	107.300
1877	3755	87.330
1878	3756	115.720
1879	3757	95.310
1880	3758	128.020
1881	3759	90.260
1882	3764	107.850
1883	3766	119.780
1884	3767	87.400
1885	3771	92.970
1886	3772	74.860
1887	3775	106.790
1888	3777	108.070
1889	3785	115.830
1890	3787	78.470
1891	3788	87.730
1892	3791	101.710
1893	3792	100.350
1894	3794	87.570
1895	3796	89.750
1896	3799	88.870
1897	3801	92.190
1898	3802	74.770
1899	3803	104.550
1900	3805	107.120
1901	3806	87.710
1902	3807	119.650
1903	3808	102.910
1904	3809	102.310
1905	3811	113.620
1906	3812	92.320
1907	3813	107.900
1908	3814	132.610
1909	3817	89.890
1910	3819	91.440
1911	3820	101.030
1912	3821	97.860
1913	3822	104.910
1914	3823	91.460
1915	3825	90.970
1916	3826	106.590
1917	3827	91.460
1918	3829	98.310

1919	3833	116.180
1920	3837	87.170
1921	3841	88.140
1922	3842	132.290
1923	3843	88.080
1924	3844	111.010
1925	3848	106.900
1926	3850	97.770
1927	3851	107.770
1928	3852	90.830
1929	3854	89.090
1930	3857	97.640
1931	3858	98.590
1932	3859	104.870
1933	3860	90.800
1934	3861	98.160
1935	3862	89.640
1936	3863	99.030
1937	3870	105.360
1938	3872	113.010
1939	3873	89.900
1940	3874	97.870
1941	3877	115.190
1942	3880	89.260
1943	3882	92.430
1944	3885	91.120
1945	3887	86.670
1946	3888	118.270
1947	3889	91.880
1948	3891	109.020
1949	3892	108.640
1950	3894	94.560
1951	3895	109.980
1952	3896	92.130
1953	3898	88.180
1954	3899	91.080
1955	3900	109.210
1956	3903	73.890
1957	3904	93.570
1958	3905	100.710
1959	3906	93.450
1960	3907	101.600
1961	3908	87.670
1962	3909	114.800
1963	3910	88.730
1964	3911	100.100
1965	3912	91.600
1966	3915	110.020
1967	3918	97.960
1968	3919	74.200
1969	3920	99.580
1970	3921	95.340
1971	3922	109.490
1972	3923	95.700
1973	3926	92.380
1974	3927	102.780
1975	3930	87.720
1976	3931	100.850
1977	3940	88.830
1978	3941	89.690
1979	3942	108.990
1980	3954	90.390
1981	3955	103.850
1982	3956	90.490

1983	3957	103.030
1984	3958	98.970
1985	3959	91.130
1986	3960	100.400
1987	3963	115.390
1988	3964	88.920
1989	3965	109.050
1990	3972	77.640
1991	3976	94.350
1992	3978	110.940
1993	3980	92.100
1994	3981	110.070
1995	3982	109.630
1996	3983	88.280
1997	3984	81.070
1998	3987	90.440
1999	3989	89.650
2000	3990	114.650
2001	3996	88.120
2002	3997	106.910
2003	3998	100.110
2004	3999	108.880
2005	4000	93.550
2006	4001	116.230
2007	4002	85.750
2008	4003	111.070
2009	4004	95.330
2010	4006	114.290
2011	4014	91.230
2012	4017	89.630
2013	4019	90.690
2014	4020	95.350
2015	4021	95.210
2016	4022	98.830
2017	4023	91.590
2018	4024	112.530
2019	4027	92.600
2020	4030	114.630
2021	4035	95.480
2022	4036	123.470
2023	4040	107.610
2024	4050	80.200
2025	4053	90.410
2026	4054	109.470
2027	4055	93.800
2028	4056	109.130
2029	4057	92.910
2030	4059	89.860
2031	4060	106.130
2032	4061	88.950
2033	4063	91.060
2034	4065	92.080
2035	4066	119.890
2036	4069	112.310
2037	4071	114.400
2038	4073	88.700
2039	4079	124.640
2040	4081	96.410
2041	4083	88.970
2042	4084	99.590
2043	4087	96.470
2044	4090	101.270
2045	4091	88.450
2046	4093	108.490

2047	4098	91.880
2048	4099	106.400
2049	4100	90.000
2050	4101	112.070
2051	4103	109.690
2052	4104	102.930
2053	4106	92.180
2054	4108	93.290
2055	4109	107.810
2056	4110	77.160
2057	4121	122.400
2058	4123	90.570
2059	4124	109.290
2060	4127	95.670
2061	4128	126.970
2062	4130	100.090
2063	4131	105.940
2064	4132	111.320
2065	4133	91.520
2066	4135	89.650
2067	4136	125.840
2068	4138	111.080
2069	4139	87.060
2070	4140	108.800
2071	4143	113.280
2072	4147	101.890
2073	4148	98.250
2074	4149	113.090
2075	4152	92.270
2076	4153	119.380
2077	4155	110.330
2078	4158	95.960
2079	4162	93.560
2080	4163	105.590
2081	4164	110.390
2082	4165	98.940
2083	4166	94.380
2084	4167	110.530
2085	4169	75.420
2086	4170	106.100
2087	4174	109.340
2088	4180	88.990
2089	4182	91.630
2090	4187	94.020
2091	4189	88.440
2092	4191	99.410
2093	4197	89.890
2094	4198	109.390
2095	4199	90.440
2096	4200	104.650
2097	4201	110.970
2098	4204	113.520
2099	4205	89.610
2100	4206	100.680
2101	4207	88.750
2102	4213	88.770
2103	4218	114.870
2104	4220	112.940
2105	4221	89.220
2106	4223	108.310
2107	4225	89.910
2108	4226	92.790
2109	4227	100.040
2110	4228	101.350

2111	4229	107.110
2112	4230	88.060
2113	4233	107.420
2114	4235	109.650
2115	4238	97.550
2116	4239	76.780
2117	4241	89.380
2118	4244	106.370
2119	4245	91.880
2120	4246	116.670
2121	4250	111.140
2122	4251	103.630
2123	4252	96.210
2124	4253	89.370
2125	4255	98.320
2126	4256	119.880
2127	4257	93.910
2128	4258	75.730
2129	4259	91.600
2130	4260	103.100
2131	4261	96.930
2132	4262	97.580
2133	4264	83.490
2134	4266	93.330
2135	4269	101.450
2136	4270	75.050
2137	4275	111.210
2138	4277	95.890
2139	4279	100.250
2140	4282	115.210
2141	4291	88.830
2142	4292	113.700
2143	4294	109.400
2144	4295	91.410
2145	4298	110.200
2146	4300	109.100
2147	4301	113.950
2148	4302	91.880
2149	4304	108.800
2150	4305	87.530
2151	4306	113.750
2152	4307	89.190
2153	4308	84.200
2154	4309	92.310
2155	4311	110.920
2156	4313	100.680
2157	4314	109.050
2158	4315	95.010
2159	4316	105.360
2160	4317	99.540
2161	4319	92.400
2162	4321	118.020
2163	4324	91.710
2164	4327	109.020
2165	4329	93.360
2166	4331	88.390
2167	4334	73.790
2168	4337	102.300
2169	4339	92.460
2170	4340	101.300
2171	4343	92.830
2172	4345	103.390
2173	4346	110.750
2174	4349	89.170



2175	4350	93.950
2176	4354	87.990
2177	4357	113.430
2178	4358	102.650
2179	4362	90.040
2180	4363	98.920
2181	4366	86.900
2182	4367	97.160
2183	4369	117.490
2184	4370	92.540
2185	4371	104.210
2186	4373	107.260
2187	4375	78.880
2188	4378	89.130
2189	4379	100.710
2190	4381	109.280
2191	4382	88.120
2192	4386	90.430
2193	4387	99.670
2194	4388	91.030
2195	4390	121.600
2196	4394	80.440
2197	4397	88.910
2198	4400	108.940
2199	4402	114.550
2200	4403	96.690
2201	4404	98.120
2202	4405	98.360
2203	4407	98.960
2204	4409	99.030
2205	4410	100.670
2206	4411	88.250
2207	4413	102.040
2208	4414	109.010
2209	4416	100.770
2210	4417	94.500
2211	4421	97.720
2212	4424	106.050
2213	4426	114.300
2214	4427	97.680
2215	4429	87.150
2216	4430	86.950
2217	4432	92.520
2218	4433	113.550
2219	4435	78.910
2220	4438	88.070
2221	4442	94.240
2222	4443	102.910
2223	4448	93.870
2224	4449	112.220
2225	4450	89.730
2226	4451	90.620
2227	4453	93.100
2228	4454	109.650
2229	4455	91.430
2230	4459	121.060
2231	4463	119.220
2232	4464	89.440
2233	4467	86.190
2234	4470	91.880
2235	4471	108.960
2236	4473	89.990
2237	4474	109.070
2238	4476	108.710

2239	4477	91.850
2240	4481	154.160
2241	4482	91.310
2242	4487	115.180
2243	4496	97.220
2244	4497	89.960
2245	4501	98.510
2246	4502	96.770
2247	4504	93.000
2248	4509	112.310
2249	4512	107.450
2250	4514	112.820
2251	4515	95.970
2252	4517	99.150
2253	4518	106.510
2254	4520	118.530
2255	4522	102.170
2256	4523	121.100
2257	4524	91.550
2258	4525	107.900
2259	4526	121.280
2260	4527	108.760
2261	4528	113.980
2262	4529	90.360
2263	4530	136.960
2264	4535	92.210
2265	4538	99.530
2266	4540	99.460
2267	4541	92.260
2268	4543	91.830
2269	4544	113.990
2270	4546	108.470
2271	4547	105.890
2272	4548	108.370
2273	4550	108.720
2274	4552	104.000
2275	4553	112.410
2276	4555	104.100
2277	4557	87.220
2278	4558	93.180
2279	4560	96.510
2280	4563	134.080
2281	4564	113.340
2282	4565	90.360
2283	4567	94.690
2284	4568	110.630
2285	4571	89.510
2286	4572	104.650
2287	4576	101.570
2288	4579	90.870
2289	4581	88.750
2290	4584	92.560
2291	4586	76.100
2292	4588	93.050
2293	4589	97.070
2294	4590	105.240
2295	4591	98.540
2296	4592	88.400
2297	4593	119.200
2298	4594	87.800
2299	4597	91.990
2300	4598	111.160
2301	4599	90.710
2302	4600	125.750

2303	4604	97.210
2304	4609	100.950
2305	4611	121.790
2306	4612	93.250
2307	4614	89.070
2308	4615	76.330
2309	4616	128.580
2310	4621	109.010
2311	4623	85.960
2312	4624	107.360
2313	4628	85.940
2314	4630	111.010
2315	4632	110.600
2316	4636	101.870
2317	4637	91.930
2318	4638	108.710
2319	4641	92.790
2320	4643	90.360
2321	4645	95.100
2322	4651	103.530
2323	4652	107.400
2324	4653	92.540
2325	4654	108.050
2326	4656	87.490
2327	4657	109.720
2328	4658	91.040
2329	4659	115.720
2330	4664	101.290
2331	4669	106.160
2332	4674	90.780
2333	4678	92.760
2334	4679	97.790
2335	4681	81.180
2336	4684	93.110
2337	4687	84.560
2338	4689	114.270
2339	4691	90.570
2340	4694	106.400
2341	4695	95.460
2342	4696	80.290
2343	4698	112.250
2344	4699	92.830
2345	4701	87.330
2346	4703	85.610
2347	4704	90.140
2348	4705	140.250
2349	4706	87.800
2350	4709	108.370
2351	4711	90.280
2352	4712	90.690
2353	4713	107.110
2354	4714	88.180
2355	4715	112.560
2356	4719	99.280
2357	4722	142.710
2358	4724	122.650
2359	4725	92.840
2360	4728	113.860
2361	4730	119.280
2362	4733	87.130
2363	4734	74.430
2364	4740	100.580
2365	4741	110.830
2366	4742	112.300

2367	4743	88.530
2368	4745	89.810
2369	4746	99.820
2370	4748	88.140
2371	4751	99.950
2372	4753	88.200
2373	4754	96.850
2374	4760	118.850
2375	4761	134.810
2376	4762	148.940
2377	4768	90.580
2378	4773	92.380
2379	4775	97.690
2380	4779	105.830
2381	4781	110.070
2382	4782	108.580
2383	4783	111.040
2384	4785	114.580
2385	4790	92.020
2386	4793	106.000
2387	4794	96.990
2388	4797	89.720
2389	4798	112.430
2390	4799	90.770
2391	4800	86.730
2392	4801	74.870
2393	4802	118.730
2394	4804	111.560
2395	4806	112.090
2396	4808	121.920
2397	4810	109.620
2398	4811	90.310
2399	4812	108.760
2400	4813	97.040
2401	4814	118.380
2402	4815	126.110
2403	4819	119.700
2404	4822	92.980
2405	4826	96.360
2406	4827	105.310
2407	4828	89.910
2408	4832	90.750
2409	4834	103.770
2410	4835	105.130
2411	4839	107.300
2412	4845	108.280
2413	4846	109.280
2414	4847	136.560
2415	4848	117.080
2416	4850	98.560
2417	4853	111.570
2418	4854	97.960
2419	4855	110.660
2420	4856	90.720
2421	4857	76.840
2422	4859	128.800
2423	4861	117.140
2424	4862	91.130
2425	4866	126.950
2426	4870	89.200
2427	4871	86.800
2428	4872	107.500
2429	4874	107.030
2430	4879	90.160

2431	4881	100.860
2432	4882	122.360
2433	4883	98.690
2434	4884	90.160
2435	4885	121.410
2436	4887	88.050
2437	4891	92.030
2438	4892	117.460
2439	4894	100.050
2440	4897	113.670
2441	4898	112.880
2442	4900	91.740
2443	4905	115.600
2444	4906	97.960
2445	4907	93.530
2446	4908	89.790
2447	4909	135.530
2448	4911	107.610
2449	4913	119.940
2450	4914	108.970
2451	4918	97.990
2452	4919	105.500
2453	4921	91.330
2454	4922	105.810
2455	4923	92.170
2456	4924	92.600
2457	4925	111.740
2458	4926	88.660
2459	4929	112.280
2460	4930	100.680
2461	4932	90.170
2462	4933	110.860
2463	4935	108.980
2464	4937	116.420
2465	4938	93.330
2466	4940	77.060
2467	4941	87.970
2468	4946	98.160
2469	4949	94.320
2470	4950	137.490
2471	4954	76.160
2472	4955	94.280
2473	4959	108.030
2474	4961	100.240
2475	4962	131.690
2476	4963	105.910
2477	4964	85.490
2478	4965	99.110
2479	4966	99.840
2480	4967	102.250
2481	4970	128.870
2482	4972	89.420
2483	4974	91.600
2484	4977	107.290
2485	4980	87.470
2486	4981	123.110
2487	4989	83.230
2488	4990	106.780
2489	4991	90.820
2490	4992	93.710
2491	4993	105.110
2492	4996	110.380
2493	4997	115.250
2494	4998	117.010

2495	4999	85.720
2496	5000	137.090
2497	5001	90.350
2498	5003	103.900
2499	5008	88.080
2500	5010	91.960
2501	5012	113.500
2502	5013	111.170
2503	5016	120.940
2504	5017	88.000
2505	5024	116.610
2506	5026	109.970
2507	5027	94.290
2508	5028	106.410
2509	5029	87.160
2510	5030	113.670
2511	5031	74.660
2512	5033	116.410
2513	5035	111.640
2514	5037	111.420
2515	5040	103.360
2516	5041	99.270
2517	5042	95.370
2518	5043	90.470
2519	5044	99.560
2520	5045	88.800
2521	5047	98.790
2522	5048	93.400
2523	5050	76.380
2524	5056	104.510
2525	5058	110.060
2526	5060	90.140
2527	5061	97.190
2528	5064	85.130
2529	5066	93.060
2530	5067	135.140
2531	5068	94.790
2532	5070	132.650
2533	5072	106.060
2534	5073	93.700
2535	5078	102.390
2536	5082	93.620
2537	5084	105.980
2538	5085	112.550
2539	5086	93.000
2540	5087	91.590
2541	5090	74.760
2542	5091	93.090
2543	5092	105.350
2544	5096	97.200
2545	5097	115.750
2546	5098	89.340
2547	5100	93.200
2548	5102	105.890
2549	5106	112.190
2550	5110	108.620
2551	5116	106.470
2552	5117	99.740
2553	5119	110.000
2554	5120	92.220
2555	5121	133.090
2556	5124	109.020
2557	5126	94.210
2558	5130	90.530

2559	5131	99.130
2560	5133	106.950
2561	5136	86.330
2562	5138	98.330
2563	5139	103.140
2564	5140	89.250
2565	5141	101.230
2566	5145	108.590
2567	5146	91.840
2568	5147	117.670
2569	5151	87.780
2570	5152	115.270
2571	5153	87.300
2572	5156	108.690
2573	5157	97.280
2574	5158	109.970
2575	5160	89.190
2576	5161	106.350
2577	5162	97.370
2578	5163	109.120
2579	5168	100.740
2580	5170	110.100
2581	5173	88.790
2582	5174	97.550
2583	5175	99.490
2584	5177	109.750
2585	5178	102.180
2586	5179	95.580
2587	5180	108.690
2588	5181	88.530
2589	5182	78.710
2590	5183	92.000
2591	5187	91.990
2592	5192	88.510
2593	5194	94.700
2594	5195	108.120
2595	5197	124.310
2596	5198	98.140
2597	5201	89.440
2598	5202	110.950
2599	5206	110.120
2600	5209	91.680
2601	5210	117.270
2602	5211	102.090
2603	5213	103.230
2604	5215	78.710
2605	5216	104.410
2606	5217	116.610
2607	5219	113.940
2608	5221	112.040
2609	5223	107.660
2610	5226	89.140
2611	5228	89.370
2612	5230	87.980
2613	5231	110.580
2614	5235	79.970
2615	5236	116.020
2616	5238	94.620
2617	5242	93.420
2618	5243	127.420
2619	5245	90.570
2620	5246	111.190
2621	5247	91.910
2622	5249	93.020

2623	5250	75.880
2624	5252	117.260
2625	5254	106.470
2626	5258	103.960
2627	5261	94.050
2628	5262	118.170
2629	5263	128.370
2630	5264	89.480
2631	5265	84.270
2632	5267	109.490
2633	5269	115.440
2634	5270	96.380
2635	5271	108.610
2636	5272	95.470
2637	5273	123.860
2638	5274	94.520
2639	5278	105.250
2640	5282	103.200
2641	5288	108.340
2642	5291	90.980
2643	5295	91.470
2644	5296	109.970
2645	5298	88.420
2646	5300	88.120
2647	5301	121.840
2648	5303	117.830
2649	5304	118.620
2650	5307	99.850
2651	5311	84.530
2652	5313	89.860
2653	5314	108.860
2654	5315	107.780
2655	5318	95.870
2656	5321	89.000
2657	5322	106.890
2658	5324	106.980
2659	5325	88.060
2660	5326	90.350
2661	5327	130.000
2662	5328	90.380
2663	5330	92.080
2664	5332	91.480
2665	5333	93.050
2666	5335	90.580
2667	5337	102.880
2668	5339	102.080
2669	5340	112.120
2670	5342	110.030
2671	5343	93.480
2672	5344	119.720
2673	5346	95.230
2674	5347	123.690
2675	5350	88.640
2676	5351	104.280
2677	5352	87.890
2678	5353	115.660
2679	5354	88.820
2680	5357	114.220
2681	5358	90.600
2682	5359	87.910
2683	5361	86.610
2684	5363	105.050
2685	5365	93.600
2686	5369	106.910



2687	5372	92.110
2688	5374	89.240
2689	5377	103.420
2690	5380	100.710
2691	5381	112.950
2692	5382	104.660
2693	5385	94.850
2694	5386	93.830
2695	5387	112.800
2696	5388	116.070
2697	5390	130.600
2698	5392	88.160
2699	5394	88.050
2700	5396	86.570
2701	5400	93.220
2702	5405	108.360
2703	5406	91.790
2704	5409	102.770
2705	5410	110.930
2706	5411	109.000
2707	5412	95.150
2708	5415	110.360
2709	5416	109.310
2710	5419	88.830
2711	5422	100.360
2712	5423	99.140
2713	5427	113.950
2714	5428	97.360
2715	5430	92.060
2716	5432	99.020
2717	5433	73.710
2718	5434	99.840
2719	5435	105.890
2720	5436	98.840
2721	5438	89.720
2722	5439	108.540
2723	5441	105.960
2724	5442	112.080
2725	5443	108.090
2726	5445	90.790
2727	5448	86.160
2728	5449	106.440
2729	5450	107.680
2730	5453	92.070
2731	5454	88.630
2732	5457	110.100
2733	5461	128.580
2734	5470	128.940
2735	5471	158.230
2736	5473	153.510
2737	5477	101.680
2738	5478	103.420
2739	5481	85.690
2740	5483	118.770
2741	5484	88.880
2742	5487	88.820
2743	5489	90.760
2744	5490	83.670
2745	5491	111.560
2746	5492	98.440
2747	5493	102.150
2748	5494	100.540
2749	5498	92.560
2750	5500	88.880

2751	5501	98.420
2752	5502	113.310
2753	5505	105.820
2754	5506	120.810
2755	5508	114.830
2756	5510	114.910
2757	5513	97.800
2758	5514	77.470
2759	5515	91.510
2760	5519	108.010
2761	5520	107.730
2762	5523	97.270
2763	5524	98.760
2764	5525	100.000
2765	5526	108.130
2766	5530	115.160
2767	5531	105.660
2768	5534	94.600
2769	5537	114.110
2770	5538	94.950
2771	5539	125.380
2772	5541	103.680
2773	5542	100.250
2774	5543	89.060
2775	5544	110.840
2776	5545	88.690
2777	5546	125.250
2778	5549	94.740
2779	5552	112.120
2780	5553	89.340
2781	5556	118.540
2782	5557	88.530
2783	5558	103.770
2784	5564	93.620
2785	5569	100.130
2786	5570	95.440
2787	5571	106.320
2788	5573	100.020
2789	5575	112.690
2790	5577	107.970
2791	5578	95.810
2792	5582	123.090
2793	5585	90.140
2794	5588	91.030
2795	5590	90.830
2796	5600	111.480
2797	5601	90.460
2798	5604	108.250
2799	5606	109.370
2800	5611	75.410
2801	5615	106.850
2802	5617	97.950
2803	5618	95.590
2804	5619	89.010
2805	5620	105.970
2806	5622	101.030
2807	5624	108.620
2808	5625	88.220
2809	5626	75.650
2810	5627	89.470
2811	5630	100.050
2812	5632	98.900
2813	5634	104.280
2814	5635	93.770

2815	5636	97.070
2816	5637	94.830
2817	5641	88.230
2818	5642	101.920
2819	5643	90.850
2820	5644	99.400
2821	5647	88.140
2822	5648	109.210
2823	5650	110.960
2824	5651	95.710
2825	5652	87.280
2826	5654	85.180
2827	5657	99.550
2828	5659	124.750
2829	5660	90.400
2830	5661	106.020
2831	5664	112.800
2832	5665	90.520
2833	5666	76.220
2834	5668	114.070
2835	5669	116.460
2836	5677	96.530
2837	5678	117.240
2838	5680	90.130
2839	5681	96.910
2840	5682	128.930
2841	5684	101.900
2842	5685	101.740
2843	5686	85.630
2844	5689	97.510
2845	5695	96.210
2846	5696	97.910
2847	5700	96.380
2848	5701	100.110
2849	5702	88.030
2850	5703	116.550
2851	5705	99.660
2852	5706	141.390
2853	5708	95.570
2854	5711	98.140
2855	5712	116.870
2856	5713	120.800
2857	5715	109.820
2858	5716	110.800
2859	5717	109.080
2860	5719	92.730
2861	5720	119.480
2862	5722	122.660
2863	5727	86.310
2864	5728	113.990
2865	5732	114.880
2866	5734	112.620
2867	5735	108.280
2868	5737	97.260
2869	5738	94.390
2870	5739	105.670
2871	5740	95.470
2872	5742	100.740
2873	5743	99.490
2874	5744	96.620
2875	5746	87.350
2876	5749	122.220
2877	5753	101.960
2878	5756	109.420

2879	5759	97.840
2880	5761	115.070
2881	5763	87.840
2882	5764	108.720
2883	5765	98.740
2884	5767	96.270
2885	5775	108.750
2886	5779	116.370
2887	5781	144.560
2888	5785	138.190
2889	5787	104.610
2890	5792	103.820
2891	5795	109.380
2892	5798	113.750
2893	5799	111.500
2894	5800	112.670
2895	5802	103.580
2896	5807	88.740
2897	5809	112.860
2898	5810	98.320
2899	5811	95.270
2900	5812	119.710
2901	5814	99.160
2902	5817	92.660
2903	5818	94.510
2904	5819	89.170
2905	5820	147.220
2906	5821	74.500
2907	5824	91.620
2908	5826	101.390
2909	5828	88.690
2910	5834	90.880
2911	5835	121.910
2912	5836	89.380
2913	5840	105.340
2914	5841	91.620
2915	5843	89.430
2916	5847	89.210
2917	5849	97.140
2918	5852	109.110
2919	5855	105.420
2920	5856	116.390
2921	5857	108.240
2922	5859	88.390
2923	5861	89.370
2924	5862	108.340
2925	5863	99.080
2926	5865	73.020
2927	5872	100.570
2928	5873	89.220
2929	5875	90.440
2930	5881	107.990
2931	5882	98.680
2932	5883	77.380
2933	5885	104.670
2934	5887	96.800
2935	5888	88.610
2936	5889	98.940
2937	5891	107.090
2938	5892	90.380
2939	5893	121.850
2940	5894	87.170
2941	5895	109.900
2942	5899	74.990

2943	5900	87.860
2944	5902	99.260
2945	5904	90.800
2946	5905	107.530
2947	5907	93.970
2948	5913	92.050
2949	5915	91.680
2950	5916	96.480
2951	5917	75.100
2952	5918	93.190
2953	5920	88.520
2954	5921	99.010
2955	5922	92.750
2956	5923	111.220
2957	5925	120.380
2958	5927	105.550
2959	5928	94.540
2960	5931	100.550
2961	5940	94.520
2962	5941	110.540
2963	5945	91.220
2964	5947	88.910
2965	5948	74.790
2966	5949	87.710
2967	5950	119.560
2968	5952	114.210
2969	5955	110.810
2970	5956	87.280
2971	5958	96.830
2972	5959	89.400
2973	5960	110.660
2974	5963	97.360
2975	5966	101.340
2976	5967	91.190
2977	5970	93.520
2978	5971	107.350
2979	5972	88.360
2980	5973	108.420
2981	5976	91.570
2982	5977	93.740
2983	5979	139.160
2984	5980	91.740
2985	5984	92.900
2986	5985	108.190
2987	5986	95.860
2988	5987	99.630
2989	5988	99.370
2990	5990	98.280
2991	5993	90.250
2992	5994	105.290
2993	6000	90.550
2994	6005	88.540
2995	6008	106.610
2996	6009	92.660
2997	6010	111.040
2998	6013	99.640
2999	6019	97.760
3000	6020	99.680
3001	6021	97.420
3002	6022	88.480
3003	6023	99.640
3004	6027	104.330
3005	6031	106.410
3006	6032	112.720

3007	6033	108.820
3008	6034	98.590
3009	6035	94.510
3010	6037	91.840
3011	6038	105.530
3012	6039	112.750
3013	6043	105.700
3014	6046	100.050
3015	6050	90.220
3016	6055	90.620
3017	6056	104.660
3018	6057	86.910
3019	6060	108.010
3020	6061	83.090
3021	6066	108.020
3022	6069	91.860
3023	6073	98.590
3024	6074	108.900
3025	6075	94.270
3026	6076	119.350
3027	6077	113.500
3028	6078	140.310
3029	6079	102.930
3030	6082	97.450
3031	6083	89.870
3032	6085	92.630
3033	6086	106.040
3034	6088	116.130
3035	6090	96.920
3036	6091	91.930
3037	6093	81.060
3038	6096	95.650
3039	6098	105.730
3040	6099	108.140
3041	6101	120.780
3042	6102	99.690
3043	6103	103.710
3044	6111	107.960
3045	6112	98.570
3046	6113	89.110
3047	6115	85.990
3048	6119	111.050
3049	6120	88.110
3050	6121	109.020
3051	6122	113.580
3052	6124	88.730
3053	6126	111.670
3054	6127	91.340
3055	6129	89.600
3056	6131	96.210
3057	6133	89.510
3058	6134	102.140
3059	6135	87.220
3060	6136	118.710
3061	6138	109.040
3062	6143	99.470
3063	6147	105.000
3064	6148	90.800
3065	6150	106.020
3066	6151	86.810
3067	6152	111.910
3068	6153	78.630
3069	6154	95.490
3070	6155	106.960

3071	6157	94.850
3072	6158	89.220
3073	6161	87.380
3074	6163	89.160
3075	6166	115.390
3076	6167	107.750
3077	6174	90.320
3078	6175	97.960
3079	6179	95.730
3080	6183	84.390
3081	6184	110.590
3082	6187	94.830
3083	6190	107.900
3084	6191	90.170
3085	6198	75.900
3086	6199	95.890
3087	6200	90.540
3088	6205	107.300
3089	6206	85.370
3090	6208	146.300
3091	6212	98.220
3092	6214	92.180
3093	6215	132.700
3094	6218	122.870
3095	6220	116.340
3096	6221	91.410
3097	6224	111.490
3098	6225	99.870
3099	6226	101.280
3100	6227	98.310
3101	6228	101.140
3102	6229	88.460
3103	6230	98.380
3104	6231	95.510
3105	6232	110.000
3106	6233	93.970
3107	6234	108.860
3108	6236	108.930
3109	6237	73.520
3110	6238	92.450
3111	6239	109.180
3112	6241	126.410
3113	6243	89.390
3114	6244	111.910
3115	6245	93.830
3116	6246	98.670
3117	6248	102.830
3118	6249	93.450
3119	6250	108.330
3120	6252	92.130
3121	6253	99.490
3122	6256	114.630
3123	6257	97.750
3124	6258	117.480
3125	6259	94.820
3126	6263	89.510
3127	6265	85.550
3128	6266	73.530
3129	6267	103.320
3130	6268	94.620
3131	6270	88.730
3132	6272	95.430
3133	6273	165.520
3134	6274	96.520

3135	6277	106.970
3136	6280	90.960
3137	6282	94.870
3138	6283	111.220
3139	6285	110.650
3140	6289	91.430
3141	6290	90.380
3142	6291	111.380
3143	6294	99.780
3144	6296	101.370
3145	6297	90.480
3146	6299	114.800
3147	6301	94.320
3148	6302	107.700
3149	6303	77.250
3150	6305	89.490
3151	6306	133.860
3152	6307	83.250
3153	6309	102.760
3154	6311	117.090
3155	6313	96.740
3156	6314	91.070
3157	6315	108.730
3158	6316	94.070
3159	6317	99.680
3160	6318	75.590
3161	6319	99.430
3162	6321	112.900
3163	6322	128.670
3164	6323	112.340
3165	6326	135.130
3166	6327	109.330
3167	6328	111.120
3168	6329	97.030
3169	6331	120.860
3170	6332	98.350
3171	6333	95.660
3172	6334	101.520
3173	6335	90.760
3174	6337	91.970
3175	6338	107.900
3176	6339	92.100
3177	6343	137.320
3178	6346	88.780
3179	6350	90.390
3180	6352	89.620
3181	6355	112.470
3182	6356	88.400
3183	6359	92.080
3184	6361	95.010
3185	6362	106.180
3186	6365	80.820
3187	6366	102.320
3188	6367	89.030
3189	6369	110.070
3190	6372	110.740
3191	6373	95.650
3192	6374	112.780
3193	6375	92.650
3194	6376	109.220
3195	6378	104.360
3196	6380	119.460
3197	6384	91.790
3198	6385	112.550



3199	6386	99.840
3200	6387	101.480
3201	6389	99.140
3202	6391	96.450
3203	6394	105.520
3204	6396	98.500
3205	6397	93.040
3206	6399	116.360
3207	6400	97.840
3208	6404	88.340
3209	6408	93.240
3210	6410	92.360
3211	6412	107.440
3212	6414	105.040
3213	6415	88.040
3214	6421	90.080
3215	6422	141.090
3216	6423	100.440
3217	6424	125.980
3218	6425	91.940
3219	6427	88.100
3220	6428	106.230
3221	6433	105.710
3222	6435	110.320
3223	6436	103.630
3224	6444	107.130
3225	6446	112.690
3226	6447	94.700
3227	6449	88.780
3228	6451	95.280
3229	6452	98.370
3230	6454	109.330
3231	6456	74.220
3232	6459	111.460
3233	6460	116.650
3234	6462	109.400
3235	6463	88.890
3236	6465	95.650
3237	6466	108.730
3238	6468	101.590
3239	6472	88.280
3240	6475	104.790
3241	6476	107.460
3242	6477	87.510
3243	6478	98.450
3244	6480	114.330
3245	6482	112.080
3246	6483	89.330
3247	6485	96.120
3248	6486	111.240
3249	6487	87.830
3250	6488	114.920
3251	6489	86.860
3252	6490	108.120
3253	6491	90.890
3254	6492	106.200
3255	6493	98.050
3256	6494	75.710
3257	6497	86.030
3258	6498	113.240
3259	6499	89.460
3260	6500	114.430
3261	6501	89.350
3262	6502	108.240

3263	6503	100.110
3264	6504	104.730
3265	6507	99.950
3266	6511	91.080
3267	6516	103.430
3268	6517	90.690
3269	6518	100.220
3270	6520	107.050
3271	6522	102.910
3272	6524	93.280
3273	6527	96.790
3274	6530	89.310
3275	6532	88.100
3276	6538	90.280
3277	6539	74.270
3278	6542	91.850
3279	6543	97.960
3280	6544	86.610
3281	6545	90.010
3282	6546	121.110
3283	6549	88.840
3284	6550	106.640
3285	6552	108.940
3286	6554	93.520
3287	6557	105.080
3288	6558	90.790
3289	6559	129.450
3290	6560	88.050
3291	6562	90.510
3292	6563	106.410
3293	6566	119.470
3294	6567	100.460
3295	6570	91.290
3296	6571	106.880
3297	6572	90.700
3298	6575	79.810
3299	6576	90.640
3300	6578	87.050
3301	6580	89.890
3302	6583	86.070
3303	6584	109.090
3304	6587	110.890
3305	6588	90.100
3306	6591	101.820
3307	6592	110.850
3308	6596	92.840
3309	6597	89.470
3310	6598	107.870
3311	6605	77.680
3312	6606	92.970
3313	6610	101.760
3314	6612	94.120
3315	6615	116.930
3316	6620	88.230
3317	6622	93.220
3318	6623	107.050
3319	6624	88.680
3320	6625	115.940
3321	6626	88.610
3322	6628	90.750
3323	6630	92.630
3324	6632	113.720
3325	6633	116.930
3326	6635	98.670

3327	6637	103.340
3328	6640	94.450
3329	6643	100.090
3330	6644	89.350
3331	6645	108.860
3332	6646	87.460
3333	6647	110.840
3334	6648	90.700
3335	6649	112.890
3336	6650	95.970
3337	6652	89.190
3338	6653	111.210
3339	6655	98.970
3340	6656	109.990
3341	6658	111.650
3342	6659	89.540
3343	6660	100.350
3344	6661	88.970
3345	6662	113.030
3346	6664	102.650
3347	6667	110.140
3348	6672	99.540
3349	6674	110.580
3350	6678	111.330
3351	6682	100.270
3352	6683	101.620
3353	6684	92.160
3354	6686	90.600
3355	6687	101.760
3356	6691	98.330
3357	6695	91.300
3358	6696	135.480
3359	6697	90.850
3360	6703	111.550
3361	6705	107.860
3362	6706	87.850
3363	6708	96.100
3364	6709	91.460
3365	6710	108.760
3366	6711	118.930
3367	6714	108.210
3368	6716	105.820
3369	6717	108.190
3370	6718	94.620
3371	6719	110.460
3372	6720	88.980
3373	6726	108.840
3374	6727	109.930
3375	6728	104.890
3376	6729	99.650
3377	6730	103.190
3378	6732	110.430
3379	6733	107.740
3380	6734	111.590
3381	6740	91.380
3382	6742	91.170
3383	6744	109.600
3384	6746	107.530
3385	6748	74.990
3386	6754	86.250
3387	6758	91.160
3388	6760	88.590
3389	6762	117.520
3390	6767	85.550

3391	6769	89.880
3392	6770	117.360
3393	6772	113.800
3394	6775	92.420
3395	6776	106.500
3396	6777	105.490
3397	6780	118.270
3398	6782	112.050
3399	6783	92.730
3400	6785	108.830
3401	6788	98.910
3402	6789	95.500
3403	6791	104.820
3404	6792	88.280
3405	6794	91.990
3406	6796	73.740
3407	6797	85.440
3408	6799	89.940
3409	6800	109.670
3410	6801	89.060
3411	6802	98.130
3412	6803	92.550
3413	6804	118.310
3414	6805	114.230
3415	6808	94.100
3416	6809	100.590
3417	6811	108.970
3418	6812	75.850
3419	6813	89.080
3420	6814	89.340
3421	6821	108.680
3422	6826	109.640
3423	6827	88.050
3424	6830	86.610
3425	6835	112.800
3426	6839	107.430
3427	6841	89.280
3428	6842	112.830
3429	6844	107.380
3430	6848	92.050
3431	6849	96.490
3432	6850	87.120
3433	6854	89.200
3434	6855	107.140
3435	6856	88.080
3436	6857	109.700
3437	6859	101.990
3438	6860	96.980
3439	6862	90.840
3440	6871	103.110
3441	6872	110.160
3442	6873	139.070
3443	6876	92.440
3444	6879	109.420
3445	6881	96.820
3446	6882	98.810
3447	6885	104.180
3448	6887	109.660
3449	6888	89.800
3450	6889	107.930
3451	6891	96.410
3452	6892	87.000
3453	6895	109.310
3454	6896	89.690

3455	6897	100.110
3456	6898	97.280
3457	6901	107.480
3458	6902	88.050
3459	6903	77.230
3460	6907	106.720
3461	6908	86.810
3462	6909	109.340
3463	6911	111.510
3464	6914	93.810
3465	6915	100.800
3466	6916	96.260
3467	6917	97.140
3468	6918	98.030
3469	6919	76.560
3470	6921	129.650
3471	6924	89.150
3472	6925	97.930
3473	6929	106.100
3474	6930	86.730
3475	6932	97.630
3476	6934	107.850
3477	6935	88.980
3478	6938	95.980
3479	6940	92.070
3480	6948	89.190
3481	6950	89.990
3482	6952	87.440
3483	6956	88.990
3484	6957	107.940
3485	6958	84.760
3486	6959	75.190
3487	6960	89.940
3488	6961	104.550
3489	6962	96.560
3490	6965	108.740
3491	6967	106.450
3492	6969	114.230
3493	6971	89.220
3494	6973	85.890
3495	6974	113.770
3496	6975	92.410
3497	6977	89.490
3498	6979	109.130
3499	6980	74.870
3500	6982	90.200
3501	6983	98.740
3502	6984	88.700
3503	6988	89.980
3504	6990	99.550
3505	6992	90.220
3506	6999	90.940
3507	7000	116.750
3508	7002	91.330
3509	7004	96.650
3510	7005	100.050
3511	7007	100.010
3512	7009	121.570
3513	7015	105.030
3514	7016	89.620
3515	7020	111.490
3516	7021	90.860
3517	7022	100.590
3518	7029	88.380

3519	7032	118.870
3520	7034	89.080
3521	7035	73.240
3522	7038	110.660
3523	7040	106.930
3524	7041	96.790
3525	7042	101.170
3526	7043	110.590
3527	7047	124.600
3528	7048	92.040
3529	7052	91.570
3530	7053	88.460
3531	7056	108.800
3532	7058	112.260
3533	7059	96.600
3534	7062	109.810
3535	7065	97.740
3536	7066	100.100
3537	7068	112.190
3538	7069	89.590
3539	7070	109.850
3540	7072	101.900
3541	7073	92.190
3542	7076	112.120
3543	7077	98.250
3544	7084	76.320
3545	7086	107.680
3546	7087	100.100
3547	7088	113.830
3548	7089	105.280
3549	7090	98.040
3550	7091	93.170
3551	7093	115.320
3552	7095	100.780
3553	7096	94.840
3554	7097	98.750
3555	7098	90.850
3556	7099	103.990
3557	7103	87.400
3558	7111	97.120
3559	7115	90.760
3560	7119	118.720
3561	7122	100.290
3562	7125	110.360
3563	7126	91.520
3564	7128	93.170
3565	7129	114.710
3566	7130	90.590
3567	7138	109.330
3568	7139	93.250
3569	7140	94.470
3570	7142	104.250
3571	7143	90.140
3572	7145	93.710
3573	7146	99.480
3574	7149	109.540
3575	7153	73.830
3576	7155	108.230
3577	7158	94.590
3578	7160	98.100
3579	7162	107.500
3580	7165	91.390
3581	7166	120.760
3582	7168	93.960

3583	7171	107.930
3584	7172	105.650
3585	7175	89.790
3586	7176	116.790
3587	7183	111.170
3588	7190	90.800
3589	7192	85.740
3590	7194	93.510
3591	7195	106.880
3592	7196	74.170
3593	7198	108.830
3594	7202	114.120
3595	7203	95.730
3596	7205	105.640
3597	7206	89.230
3598	7208	91.700
3599	7212	75.540
3600	7215	100.520
3601	7218	107.980
3602	7219	89.830
3603	7221	104.310
3604	7222	110.840
3605	7223	115.040
3606	7228	100.980
3607	7229	90.410
3608	7230	98.120
3609	7231	101.650
3610	7232	105.570
3611	7233	90.650
3612	7235	91.010
3613	7237	93.200
3614	7238	94.770
3615	7241	98.160
3616	7243	90.280
3617	7246	92.490
3618	7254	91.820
3619	7255	117.590
3620	7257	87.060
3621	7258	99.480
3622	7259	90.270
3623	7262	88.590
3624	7263	106.970
3625	7265	96.190
3626	7266	121.310
3627	7267	92.830
3628	7268	97.070
3629	7271	108.610
3630	7272	106.770
3631	7274	88.860
3632	7275	107.440
3633	7276	91.630
3634	7277	116.130
3635	7278	88.340
3636	7280	87.220
3637	7282	89.060
3638	7283	128.300
3639	7288	105.060
3640	7290	91.400
3641	7291	106.820
3642	7294	88.930
3643	7295	111.020
3644	7300	87.240
3645	7302	131.670
3646	7303	89.180

3647	7305	91.490
3648	7307	119.380
3649	7310	110.500
3650	7311	107.470
3651	7315	109.660
3652	7317	112.340
3653	7318	89.120
3654	7320	93.390
3655	7322	116.280
3656	7326	101.520
3657	7327	90.020
3658	7329	91.410
3659	7331	103.320
3660	7332	115.000
3661	7333	107.630
3662	7335	128.800
3663	7336	90.510
3664	7340	106.960
3665	7343	92.590
3666	7346	87.580
3667	7348	103.700
3668	7351	75.860
3669	7352	87.900
3670	7354	88.000
3671	7359	104.850
3672	7361	112.890
3673	7362	110.320
3674	7365	111.160
3675	7367	96.960
3676	7371	93.710
3677	7372	108.580
3678	7376	109.510
3679	7378	104.690
3680	7381	90.580
3681	7384	106.470
3682	7387	89.060
3683	7388	104.870
3684	7389	91.130
3685	7390	100.210
3686	7392	100.390
3687	7393	93.830
3688	7395	86.660
3689	7398	111.640
3690	7401	86.270
3691	7402	96.530
3692	7404	92.580
3693	7406	116.130
3694	7407	90.210
3695	7409	94.680
3696	7410	103.930
3697	7411	84.480
3698	7412	108.150
3699	7413	91.160
3700	7415	114.160
3701	7418	102.510
3702	7424	91.560
3703	7426	107.050
3704	7427	105.730
3705	7428	116.680
3706	7429	104.570
3707	7431	100.330
3708	7435	84.800
3709	7439	89.350
3710	7443	91.880



3711	7444	88.770
3712	7447	91.650
3713	7449	109.170
3714	7452	111.850
3715	7453	94.410
3716	7456	97.340
3717	7458	94.530
3718	7460	90.030
3719	7461	105.460
3720	7463	105.650
3721	7468	89.050
3722	7470	87.490
3723	7471	84.860
3724	7474	91.400
3725	7475	97.020
3726	7476	92.980
3727	7477	92.510
3728	7478	97.870
3729	7481	89.790
3730	7482	98.640
3731	7483	94.100
3732	7485	90.050
3733	7486	105.910
3734	7487	90.980
3735	7488	100.210
3736	7489	88.150
3737	7490	118.440
3738	7492	126.170
3739	7493	77.500
3740	7496	101.560
3741	7497	91.170
3742	7498	92.640
3743	7499	109.670
3744	7500	155.620
3745	7502	108.160
3746	7506	99.800
3747	7507	87.800
3748	7512	114.080
3749	7513	87.520
3750	7514	98.850
3751	7520	102.710
3752	7523	102.450
3753	7525	89.050
3754	7530	95.720
3755	7531	91.770
3756	7532	111.910
3757	7533	85.860
3758	7535	88.190
3759	7536	75.380
3760	7539	109.210
3761	7542	117.710
3762	7543	107.340
3763	7544	89.120
3764	7546	98.440
3765	7547	108.200
3766	7548	84.220
3767	7549	110.880
3768	7550	90.200
3769	7552	97.160
3770	7556	75.410
3771	7557	114.730
3772	7558	91.920
3773	7559	136.750
3774	7560	90.460

3775	7563	106.740
3776	7568	90.990
3777	7573	90.180
3778	7575	90.240
3779	7576	102.390
3780	7577	86.940
3781	7580	108.580
3782	7581	86.470
3783	7582	105.410
3784	7583	110.050
3785	7584	92.570
3786	7585	109.110
3787	7588	90.110
3788	7589	100.610
3789	7591	114.440
3790	7592	93.670
3791	7596	109.180
3792	7597	92.590
3793	7598	97.970
3794	7599	90.780
3795	7605	107.370
3796	7607	108.060
3797	7609	87.140
3798	7610	105.180
3799	7611	98.560
3800	7612	108.410
3801	7614	94.400
3802	7620	88.630
3803	7621	114.460
3804	7629	104.220
3805	7630	99.860
3806	7638	88.130
3807	7641	103.910
3808	7642	98.610
3809	7643	99.350
3810	7646	120.900
3811	7647	89.340
3812	7651	99.060
3813	7654	105.400
3814	7656	114.010
3815	7657	101.120
3816	7658	94.860
3817	7660	91.880
3818	7661	116.360
3819	7663	111.220
3820	7665	104.950
3821	7667	101.320
3822	7671	103.900
3823	7674	90.010
3824	7675	108.400
3825	7676	96.930
3826	7677	90.220
3827	7681	92.250
3828	7682	105.540
3829	7684	114.470
3830	7686	89.460
3831	7687	120.120
3832	7689	95.750
3833	7691	110.740
3834	7694	78.100
3835	7697	106.820
3836	7700	92.340
3837	7701	115.310
3838	7705	97.320

3839	7706	87.250
3840	7708	92.310
3841	7709	115.180
3842	7710	89.260
3843	7711	112.760
3844	7712	90.910
3845	7714	100.680
3846	7716	88.830
3847	7720	92.200
3848	7723	115.330
3849	7724	88.860
3850	7726	89.280
3851	7728	90.180
3852	7729	99.120
3853	7731	92.810
3854	7732	112.530
3855	7734	88.580
3856	7736	90.420
3857	7737	115.880
3858	7738	87.990
3859	7739	85.200
3860	7743	88.320
3861	7745	88.700
3862	7746	112.320
3863	7748	104.180
3864	7749	87.750
3865	7751	92.380
3866	7753	88.720
3867	7755	92.410
3868	7759	105.280
3869	7762	118.860
3870	7764	100.030
3871	7766	97.980
3872	7769	99.860
3873	7770	77.410
3874	7772	107.160
3875	7775	90.450
3876	7777	108.430
3877	7778	94.270
3878	7780	100.490
3879	7781	111.340
3880	7782	110.100
3881	7784	103.500
3882	7785	75.390
3883	7788	106.190
3884	7790	105.290
3885	7792	93.860
3886	7796	109.990
3887	7797	88.960
3888	7798	97.090
3889	7801	100.370
3890	7803	104.890
3891	7804	94.410
3892	7806	89.370
3893	7809	104.930
3894	7810	90.530
3895	7812	73.360
3896	7813	89.040
3897	7814	95.740
3898	7815	104.420
3899	7816	126.520
3900	7820	85.590
3901	7821	113.910
3902	7824	87.140

3903	7826	83.960
3904	7827	113.650
3905	7829	103.310
3906	7830	84.720
3907	7831	108.700
3908	7836	100.930
3909	7838	112.880
3910	7839	105.760
3911	7841	121.220
3912	7845	100.680
3913	7847	125.450
3914	7848	88.280
3915	7849	109.620
3916	7851	77.110
3917	7852	89.140
3918	7854	92.020
3919	7856	86.930
3920	7857	105.430
3921	7859	98.010
3922	7860	102.290
3923	7861	108.080
3924	7862	91.320
3925	7864	122.280
3926	7867	108.710
3927	7870	92.020
3928	7873	87.910
3929	7875	90.490
3930	7876	113.830
3931	7880	85.820
3932	7882	106.160
3933	7884	102.560
3934	7887	112.360
3935	7888	97.850
3936	7892	106.020
3937	7895	92.800
3938	7897	87.760
3939	7899	84.900
3940	7900	108.900
3941	7903	92.430
3942	7907	93.770
3943	7908	110.740
3944	7911	112.490
3945	7912	103.860
3946	7914	110.570
3947	7915	92.110
3948	7916	109.380
3949	7917	88.600
3950	7920	73.760
3951	7921	110.930
3952	7922	105.720
3953	7924	104.090
3954	7926	113.670
3955	7928	107.650
3956	7929	92.970
3957	7931	96.440
3958	7934	75.860
3959	7936	86.100
3960	7937	103.320
3961	7938	100.120
3962	7940	87.710
3963	7941	102.910
3964	7944	86.380
3965	7947	101.180
3966	7952	115.150

3967	7953	88.750
3968	7954	96.870
3969	7956	87.220
3970	7957	84.120
3971	7958	99.740
3972	7963	87.200
3973	7969	74.620
3974	7970	89.960
3975	7972	88.850
3976	7973	110.440
3977	7975	110.710
3978	7977	94.880
3979	7979	87.840
3980	7980	142.460
3981	7981	93.310
3982	7985	106.360
3983	7987	74.080
3984	7988	90.440
3985	7990	86.410
3986	7996	117.400
3987	8000	86.770
3988	8001	121.840
3989	8003	109.320
3990	8004	101.810
3991	8005	103.080
3992	8006	76.640
3993	8008	103.620
3994	8010	107.440
3995	8012	107.130
3996	8014	108.820
3997	8016	92.900
3998	8018	87.680
3999	8020	100.900
4000	8021	97.710
4001	8022	103.060
4002	8025	94.010
4003	8028	115.410
4004	8032	77.770
4005	8034	108.430
4006	8037	93.590
4007	8038	88.380
4008	8040	89.250
4009	8041	108.690
4010	8043	109.580
4011	8045	111.580
4012	8047	88.530
4013	8051	90.180
4014	8052	96.760
4015	8055	105.360
4016	8056	89.380
4017	8057	106.580
4018	8058	89.460
4019	8060	74.750
4020	8063	92.220
4021	8065	92.480
4022	8069	106.400
4023	8073	82.440
4024	8074	91.810
4025	8075	115.450
4026	8077	109.090
4027	8078	86.180
4028	8079	110.220
4029	8082	91.300
4030	8083	103.850

4031	8085	99.380
4032	8086	89.710
4033	8088	108.570
4034	8092	111.860
4035	8093	111.680
4036	8095	94.990
4037	8096	86.400
4038	8097	105.780
4039	8098	89.060
4040	8099	115.140
4041	8102	106.620
4042	8103	99.660
4043	8104	125.100
4044	8105	95.500
4045	8106	101.690
4046	8107	87.940
4047	8108	89.680
4048	8109	97.930
4049	8113	100.870
4050	8114	93.500
4051	8117	114.580
4052	8119	87.330
4053	8120	118.410
4054	8122	98.370
4055	8123	106.000
4056	8124	89.580
4057	8126	88.510
4058	8130	109.500
4059	8132	97.990
4060	8133	75.900
4061	8134	111.100
4062	8135	112.120
4063	8136	115.880
4064	8137	104.720
4065	8144	91.940
4066	8147	114.800
4067	8149	87.130
4068	8150	98.860
4069	8151	121.650
4070	8152	86.040
4071	8156	85.680
4072	8157	91.380
4073	8158	103.930
4074	8159	88.710
4075	8160	103.070
4076	8164	105.680
4077	8165	110.580
4078	8167	86.960
4079	8169	92.260
4080	8171	112.970
4081	8174	104.880
4082	8175	88.510
4083	8177	89.600
4084	8178	97.430
4085	8180	99.680
4086	8183	95.100
4087	8185	89.930
4088	8186	100.890
4089	8187	101.340
4090	8188	111.830
4091	8189	90.840
4092	8192	100.040
4093	8193	86.510
4094	8195	85.090

4095	8197	88.650
4096	8200	89.060
4097	8203	88.030
4098	8204	103.890
4099	8205	92.220
4100	8206	106.050
4101	8209	73.250
4102	8210	90.130
4103	8212	90.110
4104	8213	107.290
4105	8215	92.720
4106	8216	113.100
4107	8219	100.080
4108	8220	85.170
4109	8221	114.580
4110	8223	118.410
4111	8224	85.140
4112	8225	112.320
4113	8226	97.740
4114	8227	88.250
4115	8228	85.910
4116	8230	105.290
4117	8232	106.380
4118	8234	112.030
4119	8235	108.720
4120	8237	88.660
4121	8239	91.110
4122	8241	89.380
4123	8242	85.910
4124	8244	117.850
4125	8245	90.820
4126	8247	87.780
4127	8248	108.050
4128	8249	93.800
4129	8251	118.540
4130	8252	84.420
4131	8253	106.790
4132	8255	108.660
4133	8259	105.040
4134	8262	93.500
4135	8265	95.580
4136	8266	96.110
4137	8269	102.860
4138	8270	107.290
4139	8273	104.260
4140	8274	86.480
4141	8283	88.630
4142	8284	106.300
4143	8285	85.840
4144	8286	94.910
4145	8290	88.440
4146	8291	99.910
4147	8292	77.380
4148	8293	106.530
4149	8295	111.150
4150	8297	105.610
4151	8298	89.040
4152	8300	103.620
4153	8301	94.710
4154	8303	88.510
4155	8304	106.340
4156	8305	89.530
4157	8306	82.790
4158	8307	87.430

4159	8309	88.540
4160	8310	108.750
4161	8311	96.450
4162	8312	99.740
4163	8313	104.420
4164	8318	88.770
4165	8322	105.100
4166	8324	99.520
4167	8327	91.760
4168	8329	91.960
4169	8333	93.830
4170	8335	96.850
4171	8336	118.810
4172	8337	76.440
4173	8340	101.860
4174	8342	104.290
4175	8343	87.230
4176	8344	149.520
4177	8348	106.610
4178	8350	99.680
4179	8354	85.930
4180	8356	90.450
4181	8357	90.060
4182	8362	90.380
4183	8367	95.560
4184	8368	109.000
4185	8369	109.640
4186	8371	131.980
4187	8373	98.150
4188	8374	102.330
4189	8375	102.420
4190	8378	89.110
4191	8382	88.930
4192	8383	103.030
4193	8384	107.240
4194	8385	91.130
4195	8387	86.230
4196	8390	99.930
4197	8392	89.250
4198	8393	97.090
4199	8395	88.240
4200	8397	108.590
4201	8399	107.390
4202	8402	123.340
4203	8403	85.710
4204	8405	107.390
4205	8406	108.770
4206	8412	109.220
4207	8415	87.480
4208	8417	110.850

## next Step we want to apply label encoder

```
In [28]: from sklearn.preprocessing import LabelEncoder # Import LabelEncoder from sklearn preprocessing module
category_cols = [col for col in train_data.columns if train_data[col].dtype == 'object']
le = LabelEncoder() #Let us use le instead of LabelEncoder for ease of writing code
for col in category_cols:
    le.fit(train_data[col].unique().tolist() + test_data[col].unique().tolist())
    train_data[col] = le.transform(train_data[col])
    test_data[col] = le.transform(test_data[col])
```



```
In [29]: print("Categorical variables array: ", category_cols)
```

```
Categorical variables array: ['X0', 'X1', 'X2', 'X3', 'X4', 'X5', 'X6', 'X8']
```

```
In [30]: print("Label encoded Train Data:\n", train_data.head())
```

Label encoded Train Data:

	ID	y	X0	X1	X2	X3	X4	X5	X6	X8	X10	X11	X12	X13	X14	X15	\
0	0	130.810	37	23	20	0	3	27	9	14	0	0	0	1	0	0	
1	6	88.530	37	21	22	4	3	31	11	14	0	0	0	0	0	0	
2	7	76.260	24	24	38	2	3	30	9	23	0	0	0	0	0	0	
3	9	80.620	24	21	38	5	3	30	11	4	0	0	0	0	0	0	
4	13	78.020	24	23	38	5	3	14	3	13	0	0	0	0	0	0	
	X16	X17	X18	X19	X20	X21	X22	X23	X24	X26	X27	X28	X29	X30	X31	\	
0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1		
1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1		
2	0	1	0	0	0	0	0	0	0	0	1	1	1	0	1		
3	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1		
4	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1		
	X32	X33	X34	X35	X36	X37	X38	X39	X40	X41	X42	X43	X44	X45	X46	\	
0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1		
1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0		
2	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1		
3	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1		
4	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1		
	X47	X48	X49	X50	X51	X52	X53	X54	X55	X56	X57	X58	X59	X60	X61	\	
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0		
1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1		
2	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1		
3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1		
4	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1		
	X62	X63	X64	X65	X66	X67	X68	X69	X70	X71	X73	X74	X75	X76	X77	\	
0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0		
1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0		
2	0	0	0	0	0	0	1	0	1	1	0	1	1	1	0		
3	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0		
4	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0		
	X78	X79	X80	X81	X82	X83	X84	X85	X86	X87	X88	X89	X90	X91	X92	\	
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0		
1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0		
2	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0		
3	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0		
4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0		
	X93	X94	X95	X96	X97	X98	X99	X100	X101	X102	X103	X104	X105	\			
0	0	0	0	0	0	0	0	0	0	0	0	0	0				
1	0	0	0	1	0	1	0	1	1	0	0	0	0				
2	0	0	0	1	0	1	0	0	1	0	0	0	0				
3	0	0	0	1	0	1	0	0	1	0	0	0	0				
4	0	0	0	1	0	1	0	0	1	0	0	0	0				
	X106	X107	X108	X109	X110	X111	X112	X113	X114	X115	X116	X117	\				
0	0	0	0	0	0	1	0	0	1	0	1	0					
1	0	0	0	0	0	1	0	0	0	0	0	0					
2	0	0	0	0	0	1	0	0	0	0	0	0					
3	0	0	1	0	0	1	0	0	1	0	0	0					
4	0	0	1	0	0	1	0	0	1	0	0	0					
	X118	X119	X120	X122	X123	X124	X125	X126	X127	X128	X129	X130	\				
0	1	1	1	0	0	0	0	0	0	1	0	0					
1	1	1	1	0	0	0	0	0	1	1	0	0					
2	0	0	1	0	0	0	0	0	0	1	0	0					
3	0	0	1	0	0	0	0	0	0	1	0	0					
4	0	0	1	0	0	0	0	0	0	1	0	0					

	X131	X132	X133	X134	X135	X136	X137	X138	X139	X140	X141	X142	\
0	1	0	0	0	0	1	1	0	0	0	0	1	
1	0	1	0	0	0	1	0	0	0	0	0	1	
2	0	1	0	0	0	0	1	0	0	0	0	0	
3	0	1	0	0	0	0	0	0	0	0	0	1	
4	0	1	0	0	0	0	0	0	0	0	0	0	

	X143	X144	X145	X146	X147	X148	X150	X151	X152	X153	X154	X155	\
0	0	1	0	0	0	0	1	0	0	0	0	0	
1	0	1	0	0	0	0	1	0	0	0	0	0	
2	0	1	0	0	0	1	1	0	0	0	0	0	
3	0	1	0	0	0	1	1	0	0	0	0	0	
4	0	1	0	0	0	1	1	0	0	0	0	0	

	X156	X157	X158	X159	X160	X161	X162	X163	X164	X165	X166	X167	\
0	1	0	0	0	0	0	0	0	0	0	0	0	
1	1	0	0	0	0	0	0	0	0	1	0	0	
2	0	1	1	0	0	0	1	1	0	0	0	0	
3	0	1	0	0	0	0	1	0	0	0	1	0	
4	0	1	1	0	0	0	1	0	0	0	1	0	

	X168	X169	X170	X171	X172	X173	X174	X175	X176	X177	X178	X179	\
0	0	0	1	0	0	0	0	0	0	0	0	1	
1	0	0	0	0	0	0	0	0	0	0	1	0	
2	0	1	0	0	0	0	0	0	0	0	0	1	
3	0	0	0	0	0	0	1	0	0	0	0	1	
4	0	0	0	0	0	0	0	0	0	0	0	1	

	X180	X181	X182	X183	X184	X185	X186	X187	X189	X190	X191	X192	\
0	0	0	0	0	1	0	0	1	1	0	0	0	
1	0	0	0	0	0	0	0	1	1	0	0	0	
2	0	0	0	0	0	0	0	0	0	0	0	0	
3	0	0	0	0	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	0	0	0	0	

	X194	X195	X196	X197	X198	X199	X200	X201	X202	X203	X204	X205	\
0	1	0	0	0	0	0	0	0	0	0	1	0	
1	1	0	0	0	0	0	0	0	0	0	0	1	
2	1	0	0	0	0	0	0	0	0	0	0	1	
3	1	0	0	0	0	0	0	0	0	0	0	1	
4	1	0	0	0	0	0	0	0	0	0	0	1	

	X206	X207	X208	X209	X210	X211	X212	X213	X214	X215	X216	X217	\
0	0	0	0	1	0	0	0	0	0	0	0	0	
1	0	0	0	1	0	0	0	0	0	0	0	0	
2	1	0	0	1	0	0	0	0	0	0	0	0	
3	0	0	0	1	0	0	0	0	0	0	0	0	
4	0	0	0	1	0	0	0	0	0	0	0	0	

	X218	X219	X220	X221	X222	X223	X224	X225	X226	X227	X228	X229	\
0	0	0	1	0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	0	0	0	1	
2	1	1	1	0	0	1	1	0	0	0	1	0	
3	1	0	1	0	0	1	0	0	0	0	0	1	
4	1	0	1	0	0	1	0	0	0	0	0	1	

	X230	X231	X232	X233	X234	X235	X236	X237	X238	X239	X240	X241	\
0	0	0	0	0	1	0	0	1	0	0	0	0	
1	0	0	0	0	0	0	0	0	1	0	0	0	
2	0	0	1	0	0	0	0	0	0	0	0	1	
3	0	0	1	0	0	0	0	0	0	0	0	1	
4	0	0	1	0	0	0	0	0	0	0	0	0	

	X242	X243	X244	X245	X246	X247	X248	X249	X250	X251	X252	X253	\
--	------	------	------	------	------	------	------	------	------	------	------	------	---

c													
0	0	0	0	0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	1	0	0	0	
2	0	0	1	0	1	0	0	0	1	0	1	0	
3	0	0	1	0	1	0	0	0	1	0	1	0	
4	0	0	0	0	1	0	0	0	1	0	1	0	
	X254	X255	X256	X257	X258	X259	X260	X261	X262	X263	X264	X265	\
0	0	0	0	0	0	0	0	0	1	1	0	0	
1	0	0	0	0	0	0	0	0	0	1	0	1	
2	0	0	1	0	0	0	0	0	0	0	0	0	
3	0	0	1	0	0	0	0	0	0	0	0	0	
4	0	0	1	0	0	0	0	0	0	0	0	0	
	X266	X267	X268	X269	X270	X271	X272	X273	X274	X275	X276	X277	\
0	1	0	0	0	0	0	0	1	0	1	0	0	
1	0	0	0	0	0	0	0	1	0	1	0	0	
2	0	0	0	0	0	0	1	1	1	0	1	0	
3	0	0	0	0	0	0	1	1	0	0	1	0	
4	0	0	0	0	0	0	1	1	0	0	1	0	
	X278	X279	X280	X281	X282	X283	X284	X285	X286	X287	X288	X289	\
0	0	0	0	0	0	0	0	1	0	0	0	0	
1	0	0	0	0	0	0	0	1	0	0	0	0	
2	0	1	0	0	0	0	0	0	1	0	0	0	
3	0	1	0	0	0	0	0	0	1	0	0	0	
4	0	1	0	0	0	0	0	0	1	0	0	0	
	X290	X291	X292	X293	X294	X295	X296	X297	X298	X299	X300	X301	\
0	0	0	0	0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	0	0	0	0	0	
3	0	1	0	0	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	0	0	0	0	
	X302	X304	X305	X306	X307	X308	X309	X310	X311	X312	X313	X314	\
0	0	0	0	1	0	0	0	0	0	0	0	0	
1	0	1	0	0	0	0	0	0	1	0	0	0	
2	0	1	0	0	0	0	0	0	0	0	0	0	
3	0	1	0	0	0	0	0	0	0	0	0	0	
4	0	1	0	0	0	0	0	0	0	0	0	0	
	X315	X316	X317	X318	X319	X320	X321	X322	X323	X324	X325	X326	\
0	0	1	0	0	0	0	0	0	0	1	0	0	
1	0	1	0	0	0	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	0	0	1	0	0	
3	0	0	0	0	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	0	0	0	0	
	X327	X328	X329	X330	X331	X332	X333	X334	X335	X336	X337	X338	\
0	1	0	1	0	0	0	0	1	0	0	0	0	
1	0	0	1	0	0	0	0	0	0	1	1	0	
2	0	1	0	0	0	0	0	1	0	0	0	0	
3	0	1	0	0	0	0	0	0	0	0	0	0	
4	0	1	0	0	0	0	0	1	0	0	0	0	
	X339	X340	X341	X342	X343	X344	X345	X346	X347	X348	X349	X350	\
0	0	0	0	0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	0	1	0	0	
2	0	0	0	0	0	0	0	0	0	1	0	1	
3	0	0	0	0	0	0	0	0	0	1	0	1	
4	0	0	0	0	0	0	0	0	0	1	0	1	
	X351	X352	X353	X354	X355	X356	X357	X358	X359	X360	X361	X362	\
0	0	0	0	1	0	0	0	0	0	0	1	0	

	c											
1	0	0	0	0	0	0	0	0	0	0	1	0
2	0	0	0	1	0	0	0	1	0	0	1	0
3	0	0	0	0	0	0	0	1	0	0	1	0
4	0	0	0	0	0	0	0	1	0	0	1	0

	X363	X364	X365	X366	X367	X368	X369	X370	X371	X372	X373	X374	\
0	0	0	0	0	0	0	0	0	0	0	0	0	
1	1	0	0	0	0	0	0	0	0	0	0	0	
2	1	0	0	0	0	0	0	0	0	0	0	0	
3	1	0	0	0	0	0	0	0	0	1	0	0	
4	1	0	0	0	0	0	0	0	1	0	0	0	

	X375	X376	X377	X378	X379	X380	X382	X383	X384	X385
0	0	0	1	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	1	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0

let us apply Principal component analysis on our dataset to perform dimensionality reduction

```
In [31]: from sklearn.decomposition import PCA #import PCA from sklearn
pca = PCA(n_components=10)
```

Let us apply fit and transform on training data , and understand its explained variance ratio

```
In [32]: pca.fit(train_data.drop('y', axis=1))
train_data_pca = pd.DataFrame(pca.transform(train_data.drop('y', axis=1)))
train_data_pca['y'] = train_data['y']
print("PCA variance ratios: ", pca.explained_variance_ratio_)
```

```
PCA variance ratios: [9.99904441e-01 4.13130289e-05 2.19765863e-05 1.10193653e-05
 8.26702521e-06 7.62663194e-06 1.42480683e-06 6.67174103e-07
 3.88754081e-07 2.62818901e-07]
```

```
In [33]: print("Training data after principal component analysis :\n", train_data_pca.head())
```

```
Training data after principal component analysis :
      0      1      2      3      4      5      6      7      8      9  \
0 -4,205.918  0.004 -0.040 13.237 -4.335 -21.255 -2.752  4.106  1.643 -0.499
1 -4,199.910 -0.053  1.780 11.423 -5.088 -25.188 -4.507 -0.477  0.931 -0.627
2 -4,198.912 16.474 13.806 11.679 -15.074 -23.057 -2.233  1.172  1.701 -0.437
3 -4,196.913 16.430 14.794  7.389   3.470 -25.485 -4.362 -1.888  2.219  0.212
4 -4,192.949 16.845 14.089 10.237 -3.085  -8.548  3.717 -1.742  2.175  1.282

      y
0 130.810
1  88.530
2  76.260
3  80.620
4  78.020
```

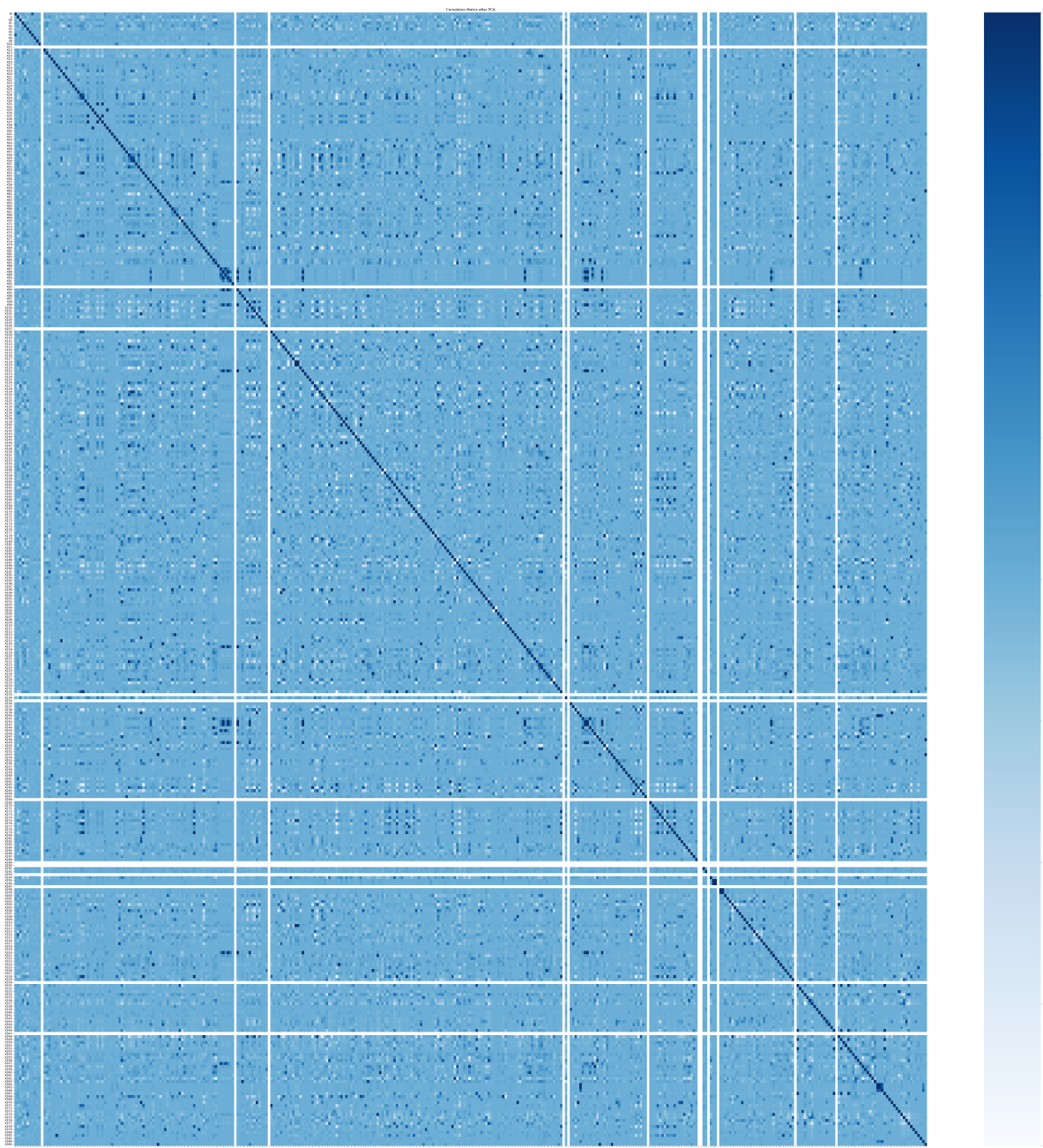
```
In [34]: test_data_pca = pd.DataFrame(pca.transform(test_data))
print("Training data after principal component analysis :\n", test_data_pca.head())
```

Training data after principal component analysis :

	0	1	2	3	4	5	6	7	8	9
0	-4,204.921	16.408	13.628	10.991	-13.496	-19.326	6.719	-1.625	2.410	1.398
1	-4,203.965	-15.476	-9.296	-3.283	-12.162	-1.901	0.913	4.026	1.997	-0.421
2	-4,202.980	12.747	-4.126	10.583	3.734	4.662	-2.592	-0.995	0.483	0.386
3	-4,201.911	14.439	14.341	0.311	-6.198	-26.215	-3.991	-2.535	2.167	-0.022
4	-4,200.910	-12.152	1.710	12.954	-2.548	-25.366	-1.504	1.224	-2.954	-1.280

## Lets Plot the correlation matrix after PCA

```
In [90]: import seaborn as sns
corr = train_data.corr()
fig, ax = plt.subplots(figsize=(70,70))
sns.heatmap(corr, xticklabels=corr.columns, yticklabels=corr.columns, cmap='Blues')
plt.title('Correlation Matrix after PCA')
plt.show()
```



Let's segregate and split our data

```
In [36]: X = train_data.drop("y",axis=1)
y = train_data.loc[:, "y"]
from sklearn.model_selection import train_test_split
train_X, test_X, train_y, test_y = train_test_split(X, y, test_size = 0.3, random_s
```

## Let us apply xgboosts Algorithm now and conclude our predictions

```
In [37]: # Train an XGBoost model and make predictions
from xgboost import XGBRegressor
param_grid = {
    'learning_rate': [0.05, 0.1, 0.15],
    'max_depth': [3, 4, 5],
    'min_child_weight': [1, 3, 5],
    'gamma': [0, 0.1, 0.2]
}
xgb = XGBRegressor(n_estimators=1000, objective='reg:squarederror', seed = 123)
xgb.fit(train_X, train_y)

prediction_y = xgb.predict(test_X)
print("Predictions:\n", prediction_y)
```

```
Predictions:
[110.59595  91.98747  98.93885  ...  96.68242  109.02192  106.353455]
```

```
In [38]: d = pd.DataFrame()
d["test_y"] = test_y
d["prediction_y"] = prediction_y
```

```
In [39]: #lets calculate MAPE by using formula ((test-prediction)/test)*100
d["mp"] = abs((d["test_y"] - d["prediction_y"])/d["test_y"])
(d.mp.mean())*100
```

```
Out[39]: 6.123251411538857
```

We are getting a mean absolute percentage error of 6.123251411538857% which is a good prediction. So our model is acceptable

```
In [70]: from sklearn.metrics import r2_score
# Evaluating the model on the validation set
r2 = r2_score(test_y, prediction_y)
print("R^2 score:", r2)
```

```
R^2 score: 0.4697389770989081
```

```
In [ ]:
```

```
In [ ]:
```

```
In [ ]:
```