101C_final_project

```
train<-read.csv("/Users/lingjuexie/Downloads/lafdtraining.csv")
load("/Users/lingjuexie/Downloads/Training_adj.rda")
```

```
summary(factor(Training_adj$First.in.District))
```

```
##       9     64     66     57     11     46     33     89     94
##   73180  70356  60576  56191  52725  48475  47664  45996  45436
##      39     61     27     98     60     37     51     15      4
##   45154  39568  39492  37531  36826  35879  35279  33714  33570
##      35     10     26     91     65     13     58      3     68
##   32921  32784  32719  32381  32204  31737  31521  31295  30664
##       2     63     93      7     29      6     34     90     73
##   30012  29673  29292  29264  29167  28873  28773  27928  27656
##      88     81     41    105     72     52     14     20     82
##   27287  25079  24770  24021  23964  23537  23172  22264  22230
##      87    102      1     59     21     75     38     85     77
##   21526  21060  21013  20976  20789  20692  20449  19118  18937
##      12     84     74     78     96    104     92     83     43
##   18859  18514  18488  17989  17701  17535  17493  16813  16751
##      62     19      5     70     86     48    106    100     25
##   16460  16382  16211  16039  15637  15425  14135  14101  13698
##     103     56     67     79     47     50     95     36    107
##   13085  12615  12413  11637  11554  11347  10313  10040   9840
##     112     42     55     17     16     18     44     71     69
##    9736   9702   9418   9393   8776   8527   8371   7661   7340
##      76    101     24      8     23    109     97     28     99
##    6814   6530   6037   5284   4215   4205   3645   3639   2641
## (Other)
##    4691
```

```
elapsed_mean<-c()
elapsed_var<-c()
diff<-c()
diff[1]<-0
for(i in 1:112){
  elapsed_mean[i]<-mean(Training_adj[which(Training_adj$First.in.District==i),]$elapsed_time)
  elapsed_var[i]<-var(Training_adj[which(Training_adj$First.in.District==i),]$elapsed_time)
  if(i>1) diff[i]<-elapsed_mean[i]-elapsed_mean[i-1]
}
diff
```

```
##  [1]    0.000000  -63.993574   65.672919  -21.222211   35.673518
##  [6]  -74.507942   37.951539   91.630415 -126.904087   19.133341
## [11]  -65.840948  108.250127  -72.344964   -5.878943   49.103651
## [16]  245.016947  103.557353 -295.657407   86.008765 -159.548264
## [21]  -29.837086         NaN         NaN  -31.971236 -314.835919
## [26]  -88.785911   78.462887  111.885570 -180.455543         NaN
## [31]        NaN         NaN         NaN    8.102342  -27.842501
## [36]  116.907893  -24.385200  -19.932868   -2.174338  248.239365
## [41] -214.274226   25.063657 -111.931262  246.936457         NaN
## [46]        NaN   87.054137  -46.115365  328.857989 -146.722941
## [51] -159.001833  -49.977090         NaN         NaN         NaN
```

```
## [56]  199.115899 -222.936177    2.936038   21.426846  -31.248103
## [61]   -1.168407   31.079009  115.074033 -151.760436   43.758038
## [66]  -28.869214  109.422877  -76.536279  114.732312 -140.086291
## [71]  117.000704 -115.747900  -61.868127   77.364485  -40.006769
## [76]  160.649545   85.388658 -224.992463  278.831482         NaN
## [81]         NaN   39.250947   -1.328525   25.541899  -46.297145
## [86]  -23.463123  -38.330487   64.249631   -9.341304   21.299728
## [91]   93.816528 -114.450781  -18.211645  -10.351106   24.099486
## [96]   39.064662   66.633141  -75.239826  259.011375 -278.640885
## [101] 136.311693 -170.112067   10.877355  -38.778550   84.410156
## [106] -36.284903  -29.897171  315.780636  -25.701636         NaN
## [111]         NaN         NaN
```
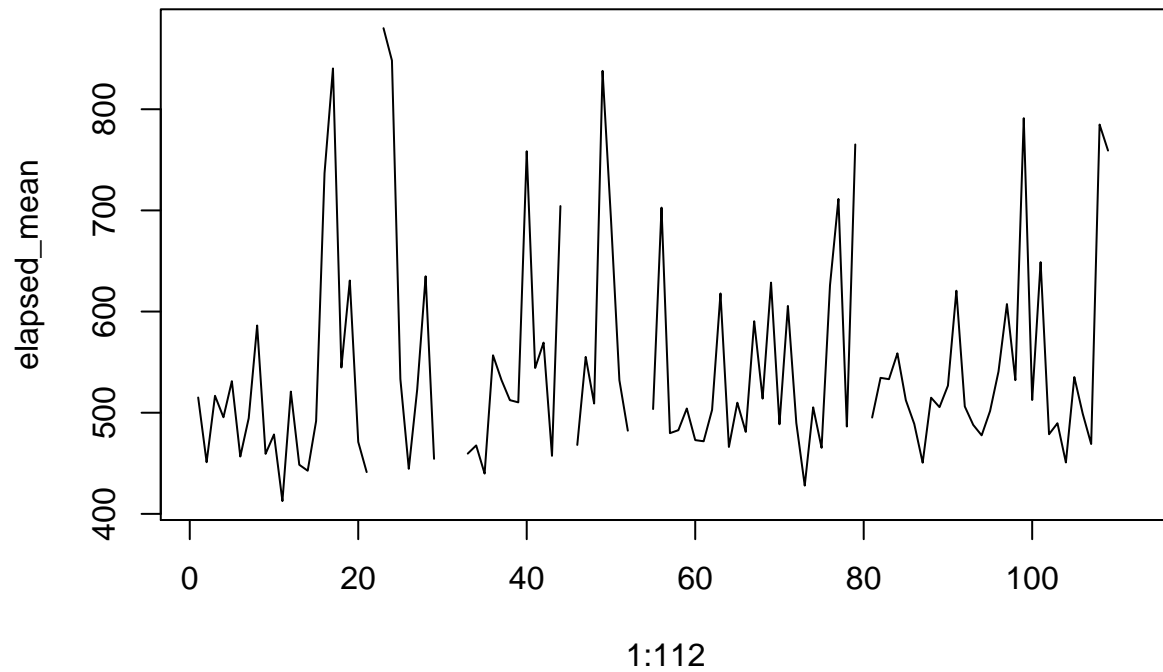
elapsed_mean

```
##   [1] 515.0427 451.0491 516.7220 495.4998 531.1733 456.6654 494.6169
##   [8] 586.2474 459.3433 478.4766 412.6357 520.8858 448.5408 442.6619
##  [15] 491.7655 736.7825 840.3398 544.6824 630.6912 471.1429 441.3058
##  [22]      NaN 880.1144 848.1431 533.3072 444.5213 522.9842 634.8697
##  [29] 454.4142      NaN      NaN      NaN 459.5780 467.6803 439.8378
##  [36] 556.7457 532.3605 512.4276 510.2533 758.4927 544.2184 569.2821
##  [43] 457.3508 704.2873      NaN 468.1408 555.1949 509.0795 837.9375
##  [50] 691.2146 532.2128 482.2357      NaN      NaN 503.6174 702.7333
##  [57] 479.7972 482.7332 504.1600 472.9119 471.7435 502.8225 617.8966
##  [64] 466.1361 509.8942 481.0250 590.4478 513.9116 628.6439 488.5576
##  [71] 605.5583 489.8104 427.9423 505.3067 465.3000 625.9495 711.3382
##  [78] 486.3457 765.1772      NaN 495.2241 534.4751 533.1466 558.6885
##  [85] 512.3913 488.9282 450.5977 514.8473 505.5060 526.8058 620.6223
##  [92] 506.1715 487.9599 477.6087 501.7082 540.7729 607.4060 532.1662
##  [99] 791.1776 512.5367 648.8484 478.7363 489.6137 450.8351 535.2453
## [106] 498.9604 469.0632 784.8438 759.1422      NaN      NaN 488.8398
```

elapsed_var

```
##   [1]   173840.8   360585.1  2467301.9  1641661.6   158818.0  1295374.3
##   [7]  1512870.3   411924.0  3663045.1  2747666.7   824365.0  2269405.2
##  [13]   841950.1  1414703.5  5014328.3  5377145.0 17219597.2   614253.9
##  [19]  3298947.3  1614465.9   211310.4         NA  6017434.0 10493980.6
##  [25]   386040.3   944196.4  5207350.7  2284325.9  1544765.0         NA
##  [31]         NA         NA  1345161.4   181055.1   998688.5  2927402.6
##  [37]  2843343.5  2247567.3  3465516.4   953410.9  2404700.3  2407447.8
##  [43]    96958.8  5039693.8         NA  1331296.1  2001842.7  2063261.5
##  [49]  2831065.3  6654123.1   664169.6  1127612.5         NA         NA
##  [55]  1622441.8  4417431.7  1940714.5   340610.0  1144009.2  1969135.3
##  [61]   780658.5   113237.3  5103602.9  1380676.0  1257096.0  1291403.0
##  [67]  1948532.8  2888476.6  3400963.8   693598.6   765417.4  1130443.8
##  [73]   372812.8   931947.0   830853.9   241381.7  6009746.1  1070738.2
##  [79]  6550508.0         NA  1113473.9  2753445.7   983695.9  1139513.8
##  [85]   855409.1  1177715.7   765592.1  1225897.3  1507642.4  1744784.8
##  [91]  3248486.2  1146688.1   325158.2   810398.1   839052.8   672451.3
##  [97]   373628.9  2579386.7  6100330.6  3079567.5  6734897.5   217579.2
## [103]  1147447.5   139084.1  2077668.2   736574.2  1530706.3   276249.7
## [109]   564859.4         NA         NA   798517.4
```

```
plot(1:112,elapsed_mean,type="l")
```



```
district_time<-data.frame(district=1:112,time=elapsed_mean,variance=elapsed_var)
district_time<-district_time[order(district_time$time),]
par(mfrow=c(1,2))
plot(district_time$time)
plot(district_time$variance)
```