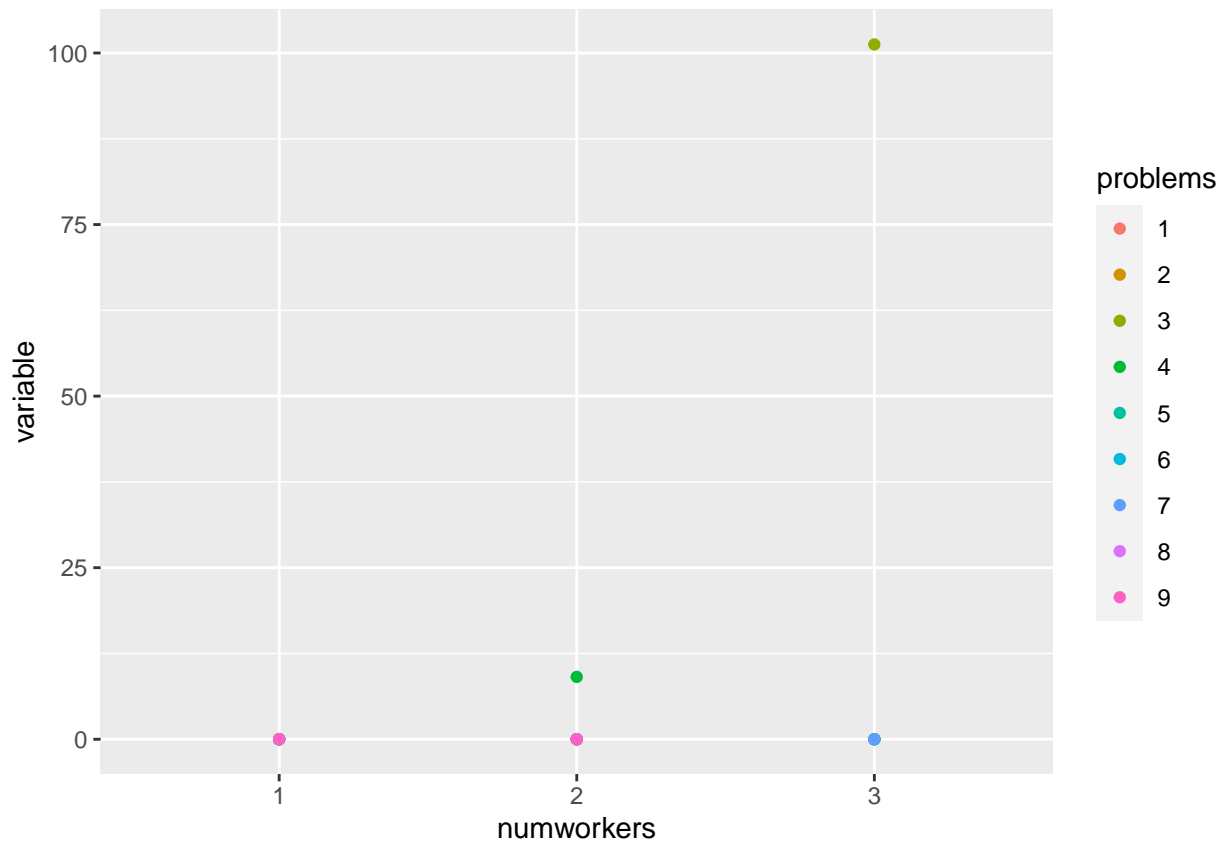


```
mydata = read.table("temp_1.txt", header = TRUE)
y = c(t(as.matrix(mydata)))
f = c("1", "2", "3")
a = 3
b = 9
workers = gl(a,1,a*b, factor(f))
questions = gl(b,a,a*b)
```

```
mydata_struc = data.frame(variable=y, numworkers=workers, problems=questions)
```

```
cleandata <- na.omit(mydata_struc)
```

```
library(ggplot2)
ggplot(cleandata, aes(x=numworkers, y=variable, color=problems))+geom_point()
```



```
analysis = aov(variable~numworkers+problems, data = cleandata)
summary(analysis)
```

```
##          Df Sum Sq Mean Sq F value Pr(>F)
## numworkers  2  1210    604.9    1.346  0.294
## problems    8  2772    346.5    0.771  0.635
## Residuals  13  5843    449.5
```

# TukeyHSD(analysis)

```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = variable ~ numworkers + problems, data = cleandata)
##
## $numworkers
##      diff      lwr      upr      p adj
## 2-1  1.004463 -25.38392 27.39285 0.9944486
## 3-1 16.867567 -12.63555 46.37068 0.3185715
## 3-2 15.863103 -13.64001 45.36621 0.3598852
##
## $problems
##      diff      lwr      upr      p adj
## 2-1 -5.454640e+00 -76.50694 65.59766 0.9999976
## 3-1  2.830396e+01 -42.74834 99.35626 0.8538773
## 4-1 -2.425769e+00 -73.47807 68.62653 1.0000000
## 5-1 -5.455903e+00 -76.50820 65.59640 0.9999976
## 6-1 -5.454840e+00 -76.50714 65.59746 0.9999976
## 7-1 -5.456088e+00 -76.50839 65.59621 0.9999976
## 8-1 -1.066281e-03 -77.83496 77.83283 1.0000000
## 9-1  7.995896e-03 -77.82590 77.84189 1.0000000
## 3-2  3.375860e+01 -29.79251 97.30971 0.5961402
## 4-2  3.028871e+00 -60.52224 66.57998 0.9999999
## 5-2 -1.262654e-03 -63.55237 63.54985 1.0000000
## 6-2 -1.999570e-04 -63.55131 63.55091 1.0000000
## 7-2 -1.448304e-03 -63.55256 63.54966 1.0000000
## 8-2  5.453574e+00 -65.59873 76.50587 0.9999976
## 9-2  5.462636e+00 -65.58966 76.51494 0.9999975
## 4-3 -3.072973e+01 -94.28084 32.82138 0.6960947
## 5-3 -3.375986e+01 -97.31097 29.79125 0.5960982
## 6-3 -3.375880e+01 -97.30991 29.79231 0.5961335
## 7-3 -3.376005e+01 -97.31116 29.79106 0.5960921
## 8-3 -2.830503e+01 -99.35733 42.74727 0.8538538
## 9-3 -2.829596e+01 -99.34826 42.75634 0.8540536
## 5-4 -3.030133e+00 -66.58124 60.52098 0.9999999
## 6-4 -3.029071e+00 -66.58018 60.52204 0.9999999
## 7-4 -3.030319e+00 -66.58143 60.52079 0.9999999
## 8-4  2.424703e+00 -68.62760 73.47700 1.0000000
## 9-4  2.433765e+00 -68.61854 73.48607 1.0000000
## 6-5  1.062697e-03 -63.55005 63.55217 1.0000000
## 7-5 -1.856493e-04 -63.55130 63.55092 1.0000000
## 8-5  5.454836e+00 -65.59746 76.50714 0.9999976
## 9-5  5.463899e+00 -65.58840 76.51620 0.9999975
## 7-6 -1.248347e-03 -63.55236 63.54986 1.0000000
## 8-6  5.453774e+00 -65.59853 76.50607 0.9999976
## 9-6  5.462836e+00 -65.58946 76.51514 0.9999975
## 8-7  5.455022e+00 -65.59728 76.50732 0.9999976
## 9-7  5.464084e+00 -65.58822 76.51638 0.9999975
## 9-8  9.062177e-03 -77.82483 77.84296 1.0000000
```