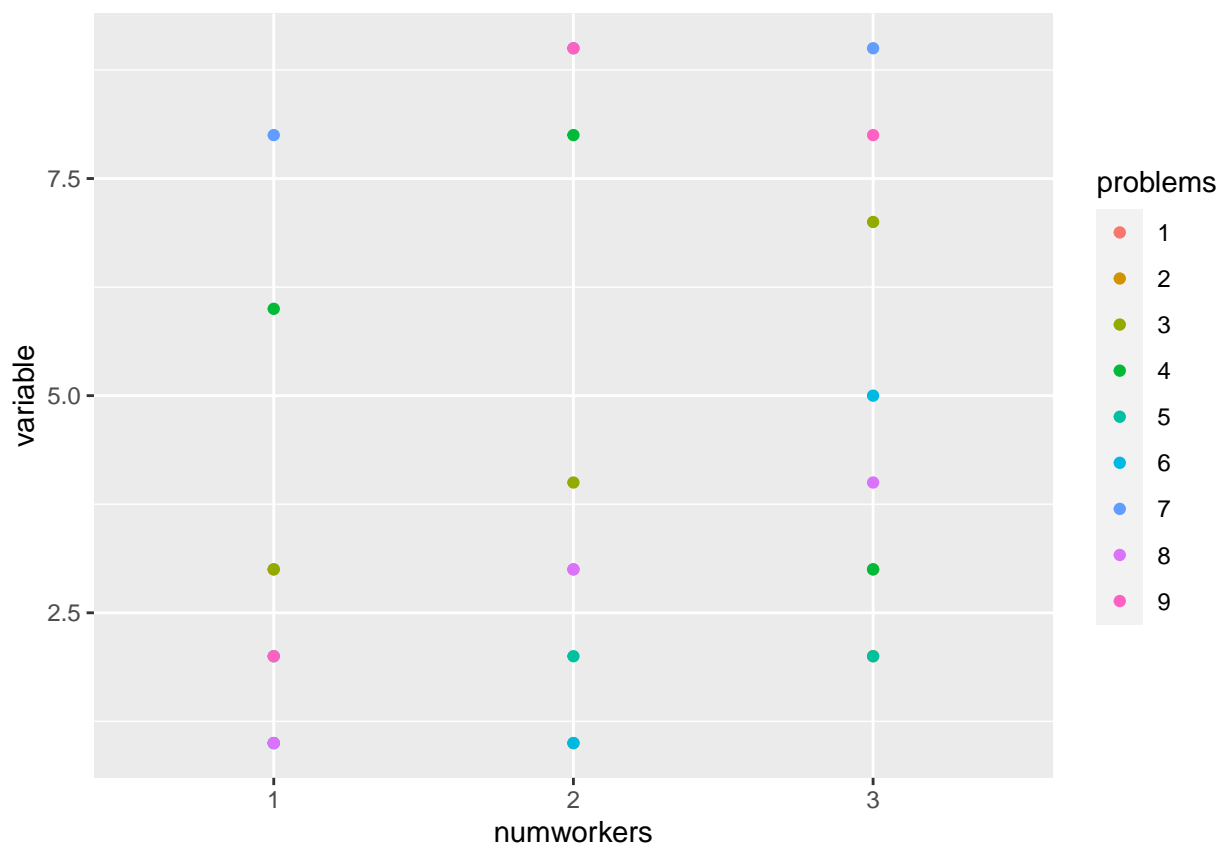```
mydata = read.table("temp_1.txt", header = TRUE)
y = c(t(as.matrix(mydata)))
f = c("1", "2", "3")
a = 3
b = 9
workers = gl(a,1,a*b, factor(f))
questions = gl(b,a,a*b)

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

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  16.07   8.037   2.542 0.11001
## problems      8 141.19  17.648   5.581 0.00174 **
## Residuals    16  50.59   3.162
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
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 1.4444444 -0.7185361 3.607425 0.2272491
## 3-1 1.7777778 -0.3852028 3.940758 0.1170234
## 3-2 0.3333333 -1.8296472 2.496314 0.9169743
##
## $problems
##             diff        lwr       upr      p adj
## 2-1 -1.6666667  -6.8317557  3.498422 0.9567797
## 3-1  1.6666667  -3.4984224  6.831756 0.9567797
## 4-1  2.6666667  -2.4984224  7.831756 0.6604883
## 5-1 -1.0000000  -6.1650890  4.165089 0.9982654
## 6-1 -0.6666667  -5.8317557  4.498422 0.9999086
## 7-1  5.6666667   0.5015776 10.831756 0.0260396
## 8-1 -0.3333333  -5.4984224  4.831756 0.9999996
## 9-1  3.3333333  -1.8317557  8.498422 0.3976335
## 3-2  3.3333333  -1.8317557  8.498422 0.3976335
## 4-2  4.3333333  -0.8317557  9.498422 0.1394183
## 5-2  0.6666667  -4.4984224  5.831756 0.9999086
## 6-2  1.0000000  -4.1650890  6.165089 0.9982654
## 7-2  7.3333333   2.1682443 12.498422 0.0028461
## 8-2  1.3333333  -3.8317557  6.498422 0.9883508
## 9-2  5.0000000  -0.1650890 10.165089 0.0617083
## 4-3  1.0000000  -4.1650890  6.165089 0.9982654
## 5-3 -2.6666667  -7.8317557  2.498422 0.6604883
## 6-3 -2.3333333  -7.4984224  2.831756 0.7883976
## 7-3  4.0000000  -1.1650890  9.165089 0.2035549
## 8-3 -2.0000000  -7.1650890  3.165089 0.8908132
## 9-3  1.6666667  -3.4984224  6.831756 0.9567797
## 5-4 -3.6666667  -8.8317557  1.498422 0.2893060
## 6-4 -3.3333333  -8.4984224  1.831756 0.3976335
## 7-4  3.0000000  -2.1650890  8.165089 0.5247904
## 8-4 -3.0000000  -8.1650890  2.165089 0.5247904
## 9-4  0.6666667  -4.4984224  5.831756 0.9999086
## 6-5  0.3333333  -4.8317557  5.498422 0.9999996
## 7-5  6.6666667   1.5015776 11.831756 0.0068961
## 8-5  0.6666667  -4.4984224  5.831756 0.9999086
## 9-5  4.3333333  -0.8317557  9.498422 0.1394183
## 7-6  6.3333333   1.1682443 11.498422 0.0107545
## 8-6  0.3333333  -4.8317557  5.498422 0.9999996
## 9-6  4.0000000  -1.1650890  9.165089 0.2035549
## 8-7 -6.0000000 -11.1650890 -0.834911 0.0167580
## 9-7 -2.3333333  -7.4984224  2.831756 0.7883976
## 9-8  3.6666667  -1.4984224  8.831756 0.2893060
```