These questions allow you to check your understanding of how to properly perform a Chi-squared Test of Independence in R.

Asia has become a major competitor with the U.S and Western Europe in education. The following table presents the counts of university degrees awarded to students in engineering and science (natural and social sciences) for the three regions.

		Region	
Field	United States	Western Europe	Asia
Engineering	61941	158931	280772
Natural Science	111158	140126	242879
Social Science	182166	116353	236018

The following code gets this data into R.

```
> education <- cbind( `United States` = c(Engineering = 61941, `Natural Science` = 111158, `Social Science` = 182166), `Western Europe` = c(Engineering = 158931, `Natural Science` = 140126, `Social Science` = 116353), Asia = c(280772, 242879, 236018))
> education
```

Are there any differences in the numbers of degrees awarded to each field for the different regions? In other words, are field and region associated? Or can we assume that all three countries are similar in their patterns of degrees being awarded?

The null and alternative hypotheses for this study are:

2 H_a 1 H_0

1. Field and Region are independent.
2. Field and Region are associated.

It is appropriate to consider the results of this chi-squared test because all expected counts are greater than five.

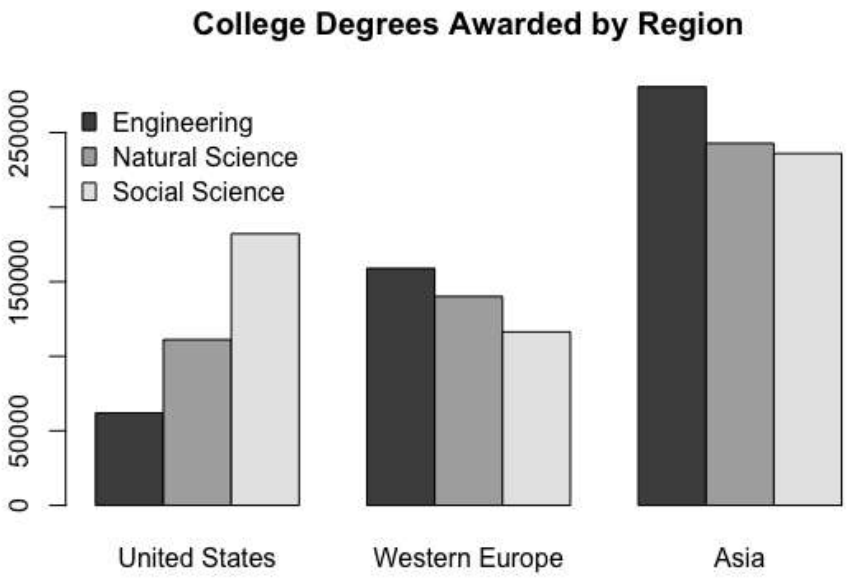
$\chi^2 =$ 69890

degrees of freedom = 4

p-value < 2.2e-16

This shows sufficient evidence to conclude that field and region are associated.

Create an appropriate graphic in R for this analysis. It should look like this.



Were you able to reproduce this graphic in R?

Yes, I got it to look exactly as shown!

Obtain the Pearson Residuals for this analysis. To check that you obtained them correctly, enter the residual for Engineering in Western Europe: 61.67899 .

Which region differs the most from expected when it comes to the number of Engineering degrees awarded?

- (●) United States
- ( ) Western Europe
- ( ) Asia

Which region differs the most from expected when it comes to the number of Social Science degrees awarded?

- (●) United States
- ( ) Western Europe
- ( ) Asia