1. Out put for the Assignment 19.1

Problem Statement 1:

Is gender independent of education level? A random sample of 395 people were

surveyed and each person was asked to report the highest education level they

obtained. The data that resulted from the survey is summarized in the following table:

summarized in the following table:

|  | **High School** | **Bachelors** | **Masters** | **Ph.d.** | **Total** |
| --- | --- | --- | --- | --- | --- |
| **Female** | 60 | 54 | 46 | 41 | 201 |
| **Male** | 40 | 44 | 53 | 57 | 194 |
| **Total** | 100 | 98 | 99 | 98 | 395 |

Null Hypothesis=h0 = Gender independent of education level

Alternate Hyp =h1 = Gender dependent of Edu level

Degrees of freedom

DF = (r - 1) \* (c - 1) = (2 - 1) \* (4 - 1) = 3

Frequency:

Er,c = (nr \* nc) / n  
E1,1 = (201 \*100/ 395 = 50.88

E1,2 = (201\* 98) /395 = 49.86  
E1,3 = (201 \* 99) / 395 = 50.37  
E1.4 = (201 \* 98) /395 = 49.86  
E2.1 = (194 \* 100) /395 = 49.114  
 E2,2 = (194 \* 98 / 395 = 48.132

E2.3 = (194\* 99) /395 = 48.623  
E2.4 = (194 \* 98) / 395 = = 48.132

**Chi-Square Test Statistic**

Χ2 = Σ [ (Or,c - Er,c)2 / Er,c ]   
χ2=(60−50.886)2/50.886+(⋯+(57−48.132)2/48.132=8.006

The critical value of χ2χ2 with 3 degree of freedom is 7.815. Since 8.006 > 7.815, therefore we reject the null hypothesis and conclude that the education level depends on gender at a 5% level of significance.