This is the bonus homework assignment. Students should tick in TUWEL problems they have solved and upload their detailed solutions by 20:00 on Monday January 22, 2024. These two examples will be checked and not presented in the exercises.

1. **New born babies in two city hospitals**
   There are two hospitals in a particular city. Every day 55 babies are born in the larger hospital and 18 babies are born in the smaller hospital. Over a year, each hospital recorded the days when more than 65% of babies born were boys.

   (a) Let L be the number of days that more than 65% of babies born in the larger hospital were boys. Compute the variance of L. Use the CLT to approximate the 0.74-quantile of L.

   (b) Let S be the number of days that more than 65% of babies born in the smaller hospital were boys. compute the expectation of S. Compute the correlation between L and S.

2. **Gender and marital status**
   A sample of 4000 persons aged 18 years and older produced the following table.

	Men	Women	Diverse
Single	431	257	200
Married	1305	1179	70
Widowed	70	160	10
Divorced	128	148	42

   Test at the 10% significance level whether gender and marital status are independent for all persons aged 18 years and older.