Project 2

Question 1:

The independent variable is whether the ink color and the word is in congruence or not. The difference between the two conditions is that in the first case the word and ink are same color while in the second case it's different. The dependent variable is the time that it takes to name the ink colors in eually sized lists.

Question 2:

We have been given a data set. The results are recorded for the congruent words case. Then a internvention is performed where the participants are now supposed to read out the ink color that is different from the word (incongruent words condition). Lets say the mean of the recorded time for congruent words condition is time1 This would be the initial claim of the population mean that the researchers observed. We can also assume that time1 is the population mean. After intervention, for incongruent words condition, the mean of the sample is time2. Looking at the data set, it is clear that the recorded time increase for the incongruent words condition. Therefore, we can use only one tailed t-test in the positve direction (upper tailed test)

The null hypothesis would be:

time1=time 2, this implies that the intervention is not statiscally significant

The alternate hypothesis woud be:

Time1<time2
time1!=time2

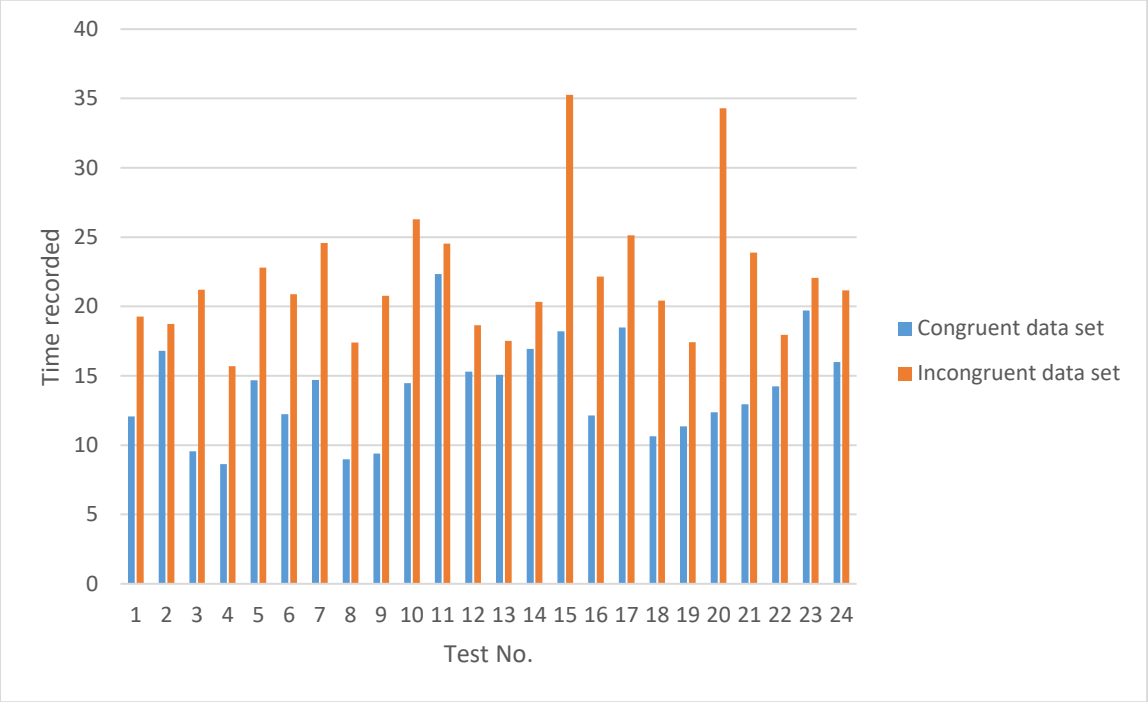
Since we do not know the popluation papameters t-tesing is selected. Since the same people are tested for both consditions for the same dependent variable, this would a **depedent t-test for paired samples**. Since the sample size is very small we cannot assume a normal distribution. Therefore, we assume a t distribution. Also, since we know the direction one-taled t-testing is performed.

Question 3

Data Set	**Mean**	**Variance**	**Standard Deviation**
Congruent Words	14.05	12.66	3.55
Incongruent Words	22.015	23.01	4.79

Question 4

A bar graph is plotted against the test number and the time recorded. The graph is mostly a random distribution but we can see that the time recorded for the incongruent case is higher than that of the congruent case.



Question 5:

I did the following calculations

Standard deviation of the difference	Sd	4.86
Standard error	SE	0.992
t-statistical		8.02
t-critical		1.714

Computing the 95% confidence interval for the mean difference:

margin of error	1.700
upper bound	9.66
lower bound	625

According to my calculation t-statistical is greater than the t-critical value. This means that the new mean lies in the critical region. Hence we reject the null hypothesis. The incongruent words method significantly impacts the mean of the time recorded. Yes, the results match up with my expectations as from the visualization it was clear that the recorded time is higher for the incongruent test methods. This could not be by chance.

Question 6

There are several theories that explain this effect. One is the increase in processing time. According to aresearch, there is a lag in the brain's ability to recognize the color of the word since the brain reads words faster than it recognizes color. Hence when the words are congruent with the ink color, the ink color does not affect the processing time because you are essentially just reading out the word. But when its not congruent, it takes longer to recognize the ink color.

Another such effect can be created with a number stroop effect. In this case, in the first scenario, participants are asked to read out the count of the times a word appear. For example, two for [dog dog]. In a second case, the participants are asked to read out the count shown. For example, one for [one one]. I expect that the time recorded would be lesser for the second scenario. This is also because of the same reason as our experiment.

Reference:

Referred to Wikipedia to read on stroop effect and Microsoft Excel for analysis.