1. What is our independent variable? What is our dependent variable?

   Independent variable: The type of condition: Congruent or incongruent.
   Dependent variable: Time taken to name the ink colors.

2. What is an appropriate set of hypotheses for this task? What kind of statistical test do you expect to perform? Justify your choices.

   Null Hypothesis: The time taken to name the congruent and incongruent word condition are approximately the same.

   H_0 : μ congruent = : μ incongruent

   Alternate hypothesis: The time taken to name the incongruent word conditions is different than that of the congruent conditions.

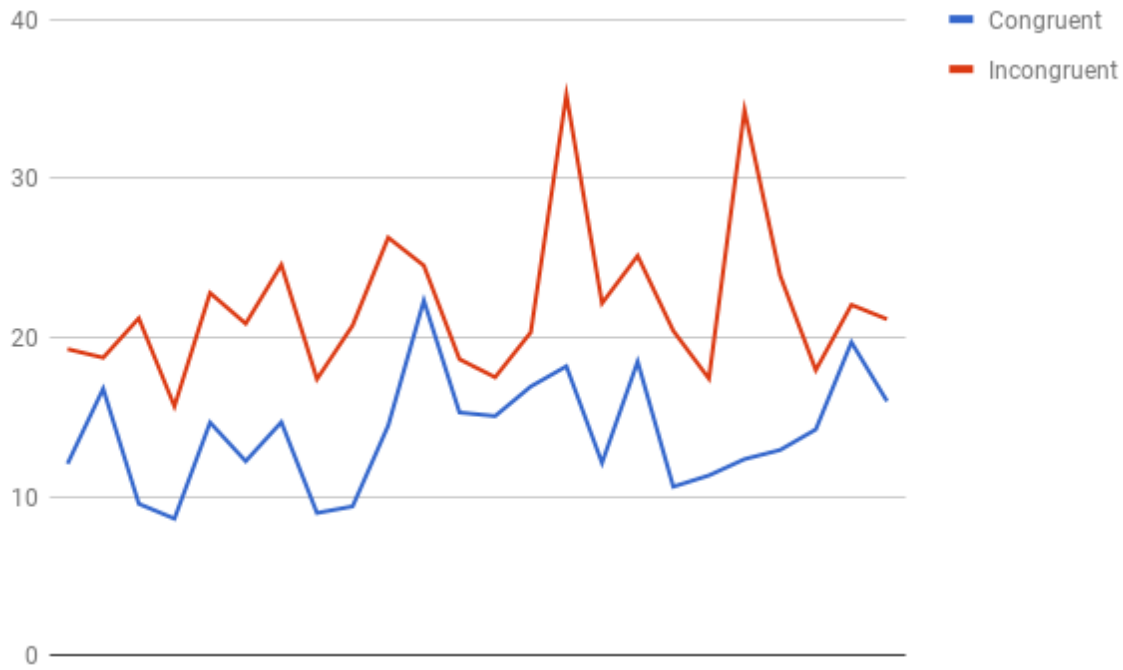
   H_{alt} : μ congruent = : μ incongruent, where μ refers to the population mean.

   Z test works best when we know the population parameters like mean and standard deviation, but in our case we have no idea about the population. We are just provided with 2 samples, and we are required to compare these two samples, therefore our standard error depends on the sample mean. When such a case happens, we use the t-distribution. It is through the samples that we are trying to infer some information about the population.
   In our case the same participants are tested on two different conditions, therefore the statistical test that we use is the dependent t-test for a paired sample.

3. Report some descriptive statistics regarding this dataset. Include at least one measure of central tendency and at least one measure of variability.

	Congruent Condition	Incongruent Condition
Mean	14.051125	22.01591667
Standard Deviation	3.559357958	4.797057122
Variation	12.66902907	23.01175704

4. Provide one or two visualizations that show the distribution of the sample data. Write one or two sentences noting what you observe about the plot or plots.



The observation which seems apparent is that the average time taken to name the ink color for incongruent conditions is more than the congruent conditions.

5. Now, perform the statistical test and report your results. What are your confidence level and your critical statistic value? Do you reject the null hypothesis or fail to reject it? Come to a conclusion in terms of the experiment task. Did the results match up with your expectations?

$\overline{x}$ = 14.051125 n = 24
$\overline{y}$ = 22.01591667

Point estimate for $\mu_x - \mu_y$ is -7.965
(Standard deviation of differences) = 4.86482691
T-statistic = -8.02
T-critical values for α = 0.05 is +/-2.069

The T statistic falls within the critical region.
Therefore we can reject the null hypothesis.

The results definitely match up to my expectation as can be noted that the time taken to name the ink colors for the incongruent conditions is always more than the time taken to name the congruent conditions.

6. What do you think is responsible for the effects observed? Can you think of an alternative or similar task that would result in a similar effect?

   According to the wiki, it is suggested that the brain is much faster at text recognition, than at color recognition, therefore we quickly recognize the word presented but if told to recognize the color, we require more time. If the task is to report the color, the word information arrives at the decision-making stage before the color information which presents processing confusion.

   Similar result will be observed if people are told to walk normally, and to walk in reverse. The ability to walk normally will usually be better than to walking in reverse.