1. A case for the independent variable is that this essentially the Stroop Task and ultimately, whether the word was the same color as read or different. A case for the dependent variable is Time. Specifically, Time in the sense that we are measuring it on possibly a reactionary basis or an overall duration.
2. My (H not) would be that the Stroop effect showed no effect on one's ability to speak the color of the word presented. With this being the argument it seems fairly clear cut that we are looking to test whether or not the Stroop Effect has any affect at all. My (H alternative) would be that the Stroop effect did have an effect on the ability to speak the color of the word presented. I'm fairly confident that this alternative is the only considered alternative that can be presented. As such, there doesn't seem to be a case where one would think the Stroop Effect would enhance one's ability. With the aforementioned, I would expect to perform a one-tailed 2 samples paired dependent t-test.
3. Details:
    a. Congruent set
        i. Mean = 16.004
        ii. Median = 14.356
        iii. Mode = All
        iv. Size = 24
        v. Range(variability) = 8.63 to 22.328
        vi. IQR = 14.48 to 16.004
    b. Incongruent set
        i. Mean = 21.157
        ii. Median = 21.017
        iii. Mode = All
        iv. Size = 24
        v. Range(variability) = 15.687 to 35.255
        vi. IQR = 21.157 to 24.209
4. Graphs
    a. #1 is interesting in that it is a visually appealing graph and gives the general view that patterns are somewhat present.
    b. #2 Better extends on #1 and the overall premise of this test in that it shows a majority of the pairings tend to follow a certain line. It is easy to identify which values are outlier cases and you are able to make a solid prediction of future values.
5. Test:
    a. H not = the t statistic does not statistically differ at an alpha of .05
    b. H alt = the t statistic does statistically differ at an alpha of .05
    c. 2 samples, paired, dependent, t-test
    d. Critical Value ~ 1.714

e. Std Dev = $\frac{\sum_{x}^{24}(x_1 - x_2)^2}{24-1} = 4.864$

f. T statistic = $\frac{16.004 - 21.157}{\frac{4.864}{\sqrt{24}}} = -8.0207$

g. Result: reject the null as the t statistic is considerably outside the critical value. When looking at this from a p-value perspective it is considerably less .0001 and therefore we should expect that (<.01% of the time) to achieve a mean greater than the incongruent mean.

h. Overall these results did meet my expectations; however, I was surprised to how great of an effect the Stroop Effect has. It probably shouldn't shock me as so as this task involves contradicting how our brains have been programmed to function. It is possible that our brains capture and process information in different sections and the mediums between these sections aren't as strong as the immediate response.

6. As mentioned above I believe the one of the main reasons for the effect observed is based on how our brains are structured. Similar to a warehouse our brains stores information and modularizes certain tasks (sensory, short/long term memory, etc). Because of these "compartments" of tasks this test puts much focus on the brain's ability to communicate on these channels and not immediately respond. Another alternative or similar task may be testing the effect influence of alcohol on the brain.

References

https://graphpad.com/quickcalcs/pValue2/
www.ams.sunysb.edu/~zhu/ams57210/HW5.docx