**Part A: ANOVA Test**

- The research question we want to answer is: "Is the time to finish a check out less with VR training, compared to coach training or video training?  
**Q1. What is the H0 Hypothesis?**

Answer. H0 (Null Hypothesis): There is no significant difference in the time to finish a check-out between the VR training group, the coach training group, and the video training group. In other words, the average time to finish a check-out is the same for all three training methods.

**Q2. What is the H1 Hypothesis?**

Answer. H1 (Alternative Hypothesis): The time to finish a check-out is significantly less for the VR training group compared to the coach training group or the video training group. In other words, the average time to finish a check-out is lower for the VR training method than for the other two methods.

**Q3. Based on the check-out time data here, perform an ANOVA test. Show the results (F-value, P-value) of the test. Suppose we use a significance level of 0.05. What conclusion statement can be made with regard to H0?**

Answer. Refer Excel file “ Project.xls”/ANOVA for F-value and P-value.  
  
Given the p-value of 0.003627392 and using a significance level of 0.05, you can make the following conclusion statement:

Since the calculated p-value (0.003627392) is less than the significance level of 0.05, we reject the null hypothesis (H0). This means that there is a statistically significant difference in the check-out times among the groups who underwent VR training, coach training, or video training. In other words, the type of training has an effect on the check-out times of the employees.  
  
**Q4. We want to check if there is a statisically significant difference between the check out times of different training approaches. Perform a Scheffe Post Hoc test to compare each pair of training approaches (ie., VR-coach, VR-video, coach-video) and show the p-value for each pair. Suppose we use a significance level of 0.05. What conclusion statement can be made?**  
Answer. Refer Excel file “ Project.xls”/SCHEFFE for the P-value of each pair training.  
  
For the Scheffe test, when the p-value is 0.003995203 and the significance level is 0.05, we can reject the null hypothesis. This means that there is a statistically significant difference between VR Training Group and Video Training Group in terms of check-out times. Thus, we can conclude that the type of training has an effect on the check-out times, and not all training methods perform equally.  
  
**Q5. Other than the check-out time, suggest another metric for comparing VR training with other training approaches (e.g., something that the management may want to know to decide whether to adopt VR training). Briefly describe how such metric can be measured.**  
  
Answer. Another useful metric for comparing VR training with other training approaches is the employee's retention rate of the material or skills learned during training. Retention rate measures how well employees remember and apply the knowledge and skills they have acquired during the training process.

To measure the retention rate:

1. Design a follow-up assessment or test that covers the key concepts and skills learned during the training. This assessment can include a combination of theoretical questions (e.g., multiple-choice questions, fill-in-the-blank, or short answers) and practical tasks (e.g., simulated scenarios or on-the-job performance observations).
2. Schedule the follow-up assessment to take place at a predetermined time after the initial training, such as two weeks or one month later. This allows for a consistent measurement of retention across different training approaches.
3. Administer the follow-up assessment to all employees who participated in the training, regardless of the approach they took (VR, coach, or video).
4. Calculate the retention rate for each training approach by comparing the follow-up assessment scores with the initial post-training test scores. You can calculate the average score for each group and the percentage of improvement or decline in scores.

By comparing the retention rates of employees who underwent VR training with those who took coach or video training, the management can get an insight into the long-term effectiveness of each training approach. This information can help them decide whether investing in VR training is worthwhile in terms of enhancing employees' learning and skill application in the workplace.

**Part B: Chi-squared Test**

We would like to further investigate if there is any statistically significant difference in the choice of training approach by new employees of different ages. To investigate this, new employees of different age groups (20-35, 35-50, 50-60) are asked in a survey to select a training approach (out of VR training, coach, or video) they prefer. Note that each age group contains a different number of new employees.

**Q. What is the H0 Hypothesis?**  
Answer: The null hypothesis (H0) for this investigation would be that there is no statistically significant difference in the choice of training approach (VR training, coach, or video) by new employees of different age groups (20-35, 35-50, 50-60). In other words, the age group of the employees does not influence their preference for a particular training method.  
  
**Q. Perform a Chi-squared test on the data.**  
Answer. Refer Excel file “ Project.xls”/Chi-Square.  
  
**Q. Assume a significance threshold of 0.05. What conclusion can be drawn based on the results?**

Since the calculated p-value (0.0291) is less than the significance threshold of 0.05, we reject the null hypothesis. This means that there is a statistically significant difference in the choice of training approach among new employees of different ages. In other words, the age of the employees has an influence on their preference for VR training, coach training, or video training.