Producer's and Consumer's Risk

These two errors have another importance in terms of risk.

Example: ALabs as a vendor has provided 1000 components to a customer. The UAT team chooses a sample of components and tests it. They set an acceptance plan, if there are more than 20 bugs per component at an average, they will reject the whole deliverable. If the number is less than 20, they will accept it.

Now H_0: bugs per component =20, against H1: bugs/component > 20.

So if the UAT team commits a type I error: they reject the true null hypothesis, which means even when the number of bugs is not greater than 20 in the population, they reject the whole delivery. Such a probability is known as Producer's risk.
On the other hand, if the team commits a type II error, it accepts the code, when actually the number of bugs is greater than 20 per component in the whole population. This probability is known as Consumer's risk.

One-Sample t-Test:

- 1-Sample t-Test is used to compare a sample mean to a specified value to conclude whether the population mean is equal to the specified value or not
- This value may be based on a performance standard, process targets, or historical data

Business Scenarios

- SLA compliance compared to a target value
- Customer Satisfaction Index against organizational targets
- Review Effectiveness versus target set
- Delivery/Quality Metrics versus respective targets

2-Sample t-Test (Assuming Equal Variances)

- 2-Sample t-Test is a statistical test used to detect differences between means of two populations
- This is simplified approach to the test when the variation within the two populations is assumed to be same and the only need to verify for the difference in the mean

Business Scenarios

- Comparison before and after process improvement
- Schedule slippage comparison between two units or delivery centers
- Defect density comparison between two technologies
- CR Schedule Slippage between Sev 2 and Sev 3 tickets

2-Sample t-Test (Assuming Unequal Variances):

- This test is used when the variations in the two populations are not known or there is substantial difference in the standard deviations

Business Scenarios

- Comparison before and after process improvement
- Schedule slippage comparison between two units or delivery centers
- Defect density comparison between two technologies
- CR Schedule Slippage between Sev 2 and Sev 3 tickets

Paired t test:

- A paired T-test is used to check whether there is any difference between two paired populations
- For paired t test, the samples should be collected pair-wise
- For example
  - We may choose the same elements from a population before and after an improvement
  - We find each sample in population(1) has a paired element in population(2)

Business Scenarios

- Comparison of associate productivity before and after training (sample remaining the same
- Web page load time using 2 different Web servers (sample of pages loaded being same on both servers)

One-way ANOVA:

- In general, the purpose of analysis of variance (ANOVA) is to test for significant differences between means.
- One-way ANOVA is used to test for differences in the means of more than two independent populations. Typically, one-way ANOVA is used to test for differences among at least three groups, since the two-group case can be covered by a t-test.
- In One-way ANOVA
  - Population from which samples are drawn should be normally distributed.
  - Variance between the groups should be approximately equal

Business Scenarios

- Comparison of Schedule Slippages across three or more delivery centers
- Comparison of defect density across different technologies
- Comparison of CSI across different operating units

Chi Square - Test of Independence:

- Aim of a Chi-Square test is to determine whether or not two classifications of a population of discrete data are statistically independent
- The test can be interpreted as the comparison of two or more populations
- The test distribution used is the Chi-Square distribution

Business Scenarios

Factor	Outcome to Predict

Technology, Component complexity High-Medium-Low, Peer Review conducted, Requirements Sign-off	Type of Defects
Application Type, Architecture Layers, Development Environment, Application Features	Skill Type Needed