Frequently Asked Questions

1. What do you mean by attributes?
   Answer:
   An attribute means a quality or characteristic. Theory of attributes deals with qualitative characteristics which are not amenable to quantitative measurements and hence need slightly different statistical treatment from that of the variables.

2. Which are the different points to be noted while classifying the data?
   Answer:
   1. **Classification is arbitrary and vague:** It should be clearly understood that when the universe is divided in, say, two classes, "blinds" and "not blinds" .there is no clear cut line of demarcation between them. It is very difficult to lay down such a definition of the word blindness which may give two clear-cut classes. In practice, the attribute of blindness gradually transforms into attribute of sight and there are many cases on the border line. The boundary in such cases is very vague and uncertain. In some cases, the line of demarcation may be arbitrary. For example when people are classified as tall and short, an arbitrary figure is the dividing line. People above a certain height (decided arbitrarily) are called tall and below it short. In all types of analysis relating to statistics of attributes this point should always be kept in mind

   2. **Classification by dichotomy:** If only one attribute is being studied the universe is divided into two parts – one in which the attribute is present and the other in which it is not present. These classes are mutually exclusive. Such classification where the universe is divided into two parts is called 'classification by dichotomy'. In actual analysis usually there are more than two classes in which the universe is divided and such classification is called manifold classification

3. What do you mean by class frequencies?
   Answer:
   The number of units in different classes is called "class frequencies". Thus if number of blind and deaf people is 20 the frequency of class AB is 20. Class frequencies are denoted by enclosing the class symbols brackets. Thus (AB) would represent the frequency of the class AB.

4. How to calculate number of classes when we have different number of attributes?
   Answer:
   - If there is one attribute represented by A the total number of classes is 3 (if total or N is also taken as a class); they would be A, α, and N. If the number of attributes is two, represented by A and B the total

number of classes (including N) would be 9. They would be N, A, B, α, β, AB, Aβ, αB and αβ.

- If number of attributes is three, the total number of classes (including N) would be 27. The total number of classes is always equal to 3^n where n stands for the number of attributes.

5. Write a note of 'order of classes'.
   Answer:
   The various classes and their frequencies are demarcated on the basis of an order. Thus,

   N — is a class of zero order

   A B, A β — are classes of the first order

   AB αβ, Aβ αB — are classes of second order

   Similarly the frequencies of these classes are also known as frequencies of the Zero, First or Second order. If there are only two attributes under study then the Second order classes and frequencies are called the classes or the frequencies of the ultimate order. Since these are the last set of classes ad frequencies. The number of classes of the ultimate order is equal to 2^n, where n stands for the number of attributes.

6. Name different types of classes.
   Answer:
   The different types of classes are
   i. Positive classes
   ii. Negative classes
   iii. Pairs of contrary

7. Explain different types of classes with an example?
   Answer:
   - **Positive classes:** The classes which represent the presence of an attribute or attributes. **e.g.** N, A, B and AB
   - **Negative classes:** The classes which represent the absence of an attribute or attributes. **e.g.** α and β
   - **Pairs of contraries:** The class in which one attribute is present and the other is absent. **e.g.** Aβ and αB

8. Explain the relationship between the classes of various order.
Answer:
- In classifying statistical data according to attributes, the following simple rule should be kept in mind
  - Any class frequency can always be expressed in terms of class frequencies of higher order
  - Frequencies of first order can be expressed in terms of the frequencies of the second order which in turn can be expressed in terms of frequencies of the third order and so on
- Based on this rule, We can set up various types of relationships between the frequencies of different orders
- In case of one attribute represented by A, the frequency of the universe N can be divided into classes (A) and (α)

  Thus $N=(A)+(\alpha)$
- If one more attribute B is taken into account the first order classes i.e., A and α can each be divided into two classes –
  - One in which attribute B is present
  - Other in which is not present

Thus, $(A)=(AB)+(A\beta)$

$(\alpha)=(\alpha B)+(\alpha\beta)$

Similarly, $(B)=(AB)+(\alpha B)$

$(\beta)=(A\beta)+(\alpha\beta)$

9. How will you check for the consistency of the data?
Answer:
It is obvious that in statistics of attributes when frequencies of various classes are counted, no class frequency can be negative. If any class frequency is negative the data are said to e inconsistent. Such inconsistency may be due to wrong counting or inaccurate additions or subtractions or may be the result of misprints. In order to test whether a set of figures is consistent, various class frequencies should be found and if no class frequency is negative apparently the data are consistent. It should be remembered that consistence of data is no proof of accurate counting or the correct calculation though the inconsistence of data proves that there is either a mistake or misprint in figures.

The easiest way to find out whether the data are consistent is to obtain ultimate class frequencies because if there is any inconsistence, one or more

ultimate class frequencies would be negative. It is also possible to lay down rules for testing consistence of data.

For example: The value of (A) cannot be more than N otherwise (α) would have negative value. Similarly (A) cannot be less than 0, otherwise (A) itself would have a negative value.

10. When you say that two attributes A and B are independent?
Answer:
Two attributes A and B are said to be independent if there exists no relationship of any kind between them. If A and B are independent we would expect
    i. The same proportion A's amongst B's as amongst β's and
    ii. The proportion of B's amongst A's is same as that amongst the α's.

For example: If insanity and deafness are independent, the proportion of the insane people among deaf and non-deaf must be same.

11. Give the fundamental rule for the independence of two attributes A and B.
Answer:
Following is the fundamental rule for the independence of two attributes A and B.

"*If the attributes A and B are independent, the proportion of AB's in the population is equal to the product of the proportions of A's and B's in the population.*"

12. What is meant by association of attributes?
Answer:
Association of attributes refers to such techniques by which we can measure the relationship between two such phenomena whose size cannot be measured and where we can only find out the presence or absence of an attribute.

13. Explain complete association and disassociation.
Answer:
There is **complete association** (or in other words perfect positive association) between two attributes A and B if all A's are B's and all B's are A's in which case (A)=(B). if (A) and (B) are not equal in number then there would be complete association between them if either all A's are B's or all B's are A's depending on whether the number of A's is less than the number of B's or vice versa. Thus if the number of A's is 40 and of B's is 60 then A and B would be completely associated if (AB)=40.

In the same way there would be **complete disassociation** or in other words perfect negative association between A and B if none of the A is B and none of the α is β. Thus if the number of A's is 40 and the number of B's is 60, A and B would be completely disassociated if (AB)=0. In such case (αβ) would also be zero.

14. When do you say there is partial association between the attributes?

Answer:

The association between A and B may not be direct association; it may be the result of their association with a third attribute C. Thus if A is positively associated with C and if B is also associated with C, A may be found to be positively associated with B. This association between A and B is not direct. It is the effect of their association with another attribute C. To find out whether the association between A and B is real, and not merely due to their association with a third attribute C, it would be necessary to study the association of A and B in the sub-population of C and γ. If A and B are associated in both the sub-population of C and γ it would indicate that A and B are really associated with each other. The associations of A and B in the sub-populations are called partial association to distinguish them from total association in the universe as a whole.

15. What do you mean by illusory association?

Answer

Sometimes misleading or illusory associations may be observed between two attributes which are not directly associated but which are both individually associated with third attribute. Thus if A and B are two independent attributes but both of them are positively associated with a third attribute C, it would appear as if A and B are directly associated. If A is positively associated with C, and B is negatively associated with C, the association between A and B would appear to be negative. Misleading conclusions may be arrived at if the partial associations are not studied.