COIT11224 – Computer Systems – Tutorial – Week 7

Chapter 4  Summarising Data: Measures of Variation

Question 1

Consider the following assignment marks from 0 to a maximum of 10 as used in the tutorial for week 6:

4  6  9  4  8  7  6  9  7  2  6  7
1  3  3  9  4  7  5  8  6  7  7  5

What is the range of the above set of data?

Question 2

If the data in Question 1 is the total data from all students (total population), what is the population variance \( \sigma^2 \) and standard distribution \( \sigma \) of the assignment marks? Calculate your answer manually.

Question 3

If we consider just the top line of data shown in question 1, we can call this a sample of the total set of marks. Calculate manually the sample standard distribution \( s \) of the sample assignment marks?

Question 4

Using the formula

\[
S_s = \sqrt{\frac{S_{xx}}{n-1}} \quad \text{where} \quad S_{xx} = \sum x^2 - \frac{(\sum x)^2}{n}
\]

calculate manually the sample deviation using the data in Question 3. Now compare your answer with using a calculator and the standard deviation function.

Question 5

Using the sample standard deviation calculated in Question 4, how many of the total number of assignment marks (population) lie within 2 standard deviations from the mean and what is the range of these marks?

Chapter 5  Possibilities and Probabilities

Question 1

You need a new mouse for your notebook computer. You go into a computer shop to buy a new mouse, but when you get there, you find that there are four different brands
of mouse. Also, in each brand, the colours that are available are blue, red, green, black, and white. Just to make choosing a mouse more difficult, the salesman tells you that you can buy a mouse with either a USB, wireless, or Bluetooth connection. Just when you thought it was going to be a simple task to buy a new mouse, you are confronted with many choices. How many choices do you have?

Question 2

After you have calculated the number of different mouse you can buy, you decide that you now want to buy two mouse, one for home and one for work. Firstly, you choose the mouse for home and then the mouse for work in that order. Calculate the number of ways you can choose in order two mouse from the total number of distinct mouse available. This is a permutation calculation.

Question 3

Following on from Question 2, you decide that it doesn’t matter if you have a particular mouse for home or for work. You are not concerned with any order at all and you don’t care which of the two mouse you purchase is used for home or for work. Calculate the number of ways you can choose two mouse when order doesn’t matter. This is a combinations calculation.

Question 4

Suppose all the choices of mouse as mentioned in Question 1 are all placed in a big box. If you then put your hand in the box and pick a mouse without looking, what is the chance that you will pick a wireless mouse?

Question 5

Following on from question 4, if you then put your hand in the box and pick a mouse without looking, what is the chance that you will pick a red USB mouse?

Chapter 6  Some Rules of Probabilities

Question 1

Using the situation of buying a mouse as mentioned in Questions 4 and 5 of Chapter 5 questions above, if you pick a mouse without looking, what is the probability that the mouse you pick will be either a white Bluetooth mouse or a green USB mouse? Draw a Venn diagram to illustrate your answer.

Question 2

What are the odds from Question 1 above that you will pick a either a white Bluetooth mouse or a green USB mouse?
Question 3

What are the odds from Question 1 above that you will pick a either a blue mouse or a wireless mouse? Draw a Venn diagram to illustrate your answer.

Question 4

Suppose there were two people about to pick a mouse without looking from the box and you were going to have the second pick. What is the probability that you will pick a Bluetooth mouse of any colour if the first person picked a green mouse?

Question 5

Suppose you pick two mouse from the box without looking. What is the probability that neither mouse is red?