Assignment 1

AI1110: Probability and Random Variables

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06 April 2022

ICSE 2017 Grade 10

Question 3(c):

The marks of 10 students of a class in an examination arranged in ascending order is as follows:
13, 35, 43, 46, x, x+4, 55, 61, 71, 80.
If the median marks is 48, find the value of x. Hence find the mode of the given data.

Given: "data in ascending order"

(i) 13, 35, 43, 46, x, $x+4$, 55, 61, 71, 80.

(ii) median = 48

Required:

(i) value of x.

(ii) mode of the data.

Solution:

Median(definition): it is the middle number in a sorted ordered list of number.

i.e., if n be the number of entries in given data then median of the data is:

(i) if n = odd, Median = $(\frac{n}{2})^{th}$ element.

(ii) if (n = even), Median = average of $(\frac{n}{2})^{th}$ and $(\frac{n+1}{2})^{th}$ elements.

As, Here the value of n is <u>odd</u>.

therefore,

$$Median = \frac{(x)+(x+4)}{2}. \tag{1}$$

$$48 = \frac{(x)+(x+4)}{2}. \tag{2}$$

$$48 = x+2. \tag{3}$$

therefore, $\underline{x = 46.}$

Requirement (ii) : mode of the data.

mode(definition) : it is the most repeating number in the list of numbers.

Given Data =

13, 35, 43, <u>46</u>, <u>46</u>, 50, 55, 61, 71, 80.

(after updating x)

and hence, the <u>mode = 46.</u>

Verification:

(i) obtained value of x using median is verified in python code

(ii) calculated value of mode is verified using C code