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Assignment : Data Engineers Question (Mathematical statistics)

Q8 : Assume that you are a rector of a university and you want to show to the public a statistics report for examinees in your university entrance exam, what is the best graph to use. Please justify your decision.

Answer:

In my opinion, I would like to use Bar Chart/Histogram to show the number of student in each grade point in University entrance exam

Q9 We have three identical six-sided dice. We roll one dice first and the remaining two dice after that. What is the probability that the point obtained in the first roll is greater than the sum of the points obtained in the second roll.

Answer :

If we roll one dice first then the first dice must be 3,4,5 and 6 to greater than sum of the second roll which minimum is 2 (2nd dice = 1, 3rd dice = 1)

Then we have all of possible case is:

- $d_1 = 3$: (1, 1)
- $d_1 = 4$: (1, 1), (1, 2), (2, 1)
- $d_1 = 5$: (1, 1), (1, 2), (2, 1), (2, 2), (1, 3), (3, 1)
- $d_1 = 6$: (1, 1), (1, 2), (2, 1), (2, 2), (1, 3), (3, 1), (1, 4), (4, 1), (2, 3), (3, 2)

As we can see, Possible outcomes of 2nd dice equal $d_1 - 2$ and possible outcomes of 3rd dice equal to $d_1 - (d_2 + 1)$

The probability of each outcome of a dice is $\frac{1}{6}$ then probability that the point obtained in the first roll is greater than sum of the points obtained in the second roll is

$$\begin{aligned} prob &= \frac{1}{6} \sum_{d_1=3}^{6} \frac{1}{6} \sum_{d_2=1}^{d_1-2} \frac{1}{6}(d_1 - (d_2 + 1)) \\ prob &= \frac{1}{6^3} \sum_{d_1=3}^{6} \sum_{d_2=1}^{d_1-2} (d_1 - (d_2 + 1)) \\ prob &= 0.0925 \end{aligned} \tag{1}$$