**Activity Sheet**

Please go through 'Central Tendency' slides of today's lecture and spend time in understanding the concepts, examples problems explained and then solve the problems given below.

1. You plan to hire a taxi to commute. When you access the app based on the pick-up and drop point, you get an estimated cost for the ride. Name the factors that the app must consider to arrive at an estimated cost and respective data types.

Few more examples that you come across daily:

1. Blood pressure reading
2. Number of stocks traded
3. Education background
4. Type of groceries purchased
5. Price of petrol
6. Rating a Restaurant
7. Buy a car or not
8. Lifetime of a battery
9. A company has 10 employees and their average salary is 1 lpa. Now they have recruited a CEO who salary is normally very high. Which of the following measure of central tendencies will be impacted
   1. Median
   2. Mode
   3. Mean
10. Here is the data of experience of individuals in a CPEE class. We have grouped individuals into 6 groups and here is the data. Compute the average and median values for each group and list your observations.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Group 6 |
| 0 | 3 | 14 | 9 | 16 | 13 |
| 0 | 12 | 9.5 | 4.5 | 12 | 10 |
| 0 | 3.5 | 4.5 | 9 | 6.5 | 10 |
| 0 | 14 | 7.5 | 8 | 1 | 1 |
| 0 | 3 | 5 | 4 | 11 | 3 |
| 0 | 2.8 | 2 | 6 | 5 | 4 |
| 1 | 5 | 4.8 | 5 | 3 | 6 |
| 1 | 9 | 3.6 | 3.5 | 8 | 3.8 |
| 1 | 5.5 | 6 | 2.8 | 3 | 4 |
| 16 | 9 | 8.5 | 12 | 4 | 8 |

1. What is the average in each group?
2. What is the median in each group?
3. What is the average experience across all groups?
4. You and your friends regularly order food online and prefer door delivery services. Each one believes that their respective service providers are very prompt. To understand it better, you have started collecting the time to deliver food in 20 different occasions for all. Here is the data of delivery times.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Time taken to deliver the order in minutes** | | | | |
| **EagleBoys** | **FoodPanda** | **Swiggy** | **PiazzaHut** | **Dominos** |
| **30** | **39** | **33** | **30** | **35** |
| **35** | **37** | **31** | **35** | **23** |
| **23** | **35** | **25** | **23** | **35** |
| **12** | **33** | **37** | **12** | **33** |
| **15** | **31** | **28** | **15** | **30** |
| **16** | **25** | **36** | **16** | **31** |
| **19** | **37** | **20** | **19** | **25** |
| **31** | **28** | **30** | **31** | **37** |
| **35** | **10** | **35** | **35** | **28** |
| **21** | **46** | **23** | **0** | **36** |
| **39** | **30** | **12** | **60** | **20** |
| **37** | **35** | **15** | **37** | **12** |
| **35** | **23** | **16** | **35** | **15** |
| **33** | **12** | **19** | **33** | **16** |
| **31** | **15** | **31** | **31** | **19** |
| **25** | **16** | **35** | **25** | **31** |
| **37** | **19** | **0** | **37** | **35** |
| **28** | **31** | **60** | **28** | **21** |
| **36** | **35** | **37** | **36** | **44** |
| **20** | **21** | **35** | **20** | **32** |

1. Now that you know central measures help you understand data better you go ahead with computing the central measures. (mean, median, mode, quartiles, range, inter-quartile range, standard deviation)
2. What do you observe?
3. Do you still believe that all the service providers are prompt in their services?

**Few more applications**

1. Performance of batsmen in a cricket team
2. Performance of stocks in market
3. Performance of machines in a manufacturing unit
4. Two people work in a factory making parts for cars. The table shows how many complete parts they make in one week.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Worker | Mon | Tue | Wed | Thu | Fri |
| Philip | 20 | 21 | 22 | 20 | 21 |
| Mathews | 30 | 15 | 12 | 36 | 28 |

(a) Find the mean, median and range for Philip and Mathews.

(b) Who is more consistent?

1. Find the mode for 8,6,2,4,6,8,10,8
2. Analyze the performance of your class in the first WUQ taken at INSOFE

Scores: 11, 7.5, 8.5, 10, 10, 10.5, 5.5, 10, 9, 9.5, 5.25, 8, 6.5, 10.5, 8.75, 0, 6, 6, 6.75,

8.75, 0, 9.5, 7.5, 8.5, 7

1. How is the spread of the scores? Compute range, variance & standard deviation
2. Find the 25th percentile, 50th percentile and 75 percentile for this data.
3. A large retailer store regularly orders cartons of Pineapples. The average weight of the cartons is supposed to be 22 kgs. Random samples of cartons from two suppliers were weighed. The weights in kgs of the cartons were

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Supplier – I | 17 | 22 | 22 | 22 | 27 |
| Supplier – II | 17 | 19 | 20 | 27 | 27 |

1. Compute the range of carton weights from each supplier
2. Compute the mean weight of cartons from each supplier.
3. Look at the two samples again. The samples have the same range and mean. How do they differ? The retailer store uses one carton of Pineapples in each Pineapples muffin recipe. It is important that the cartons be of consistent weight so that the muffins turn out right.
4. Temperatures in 5 cities measured on 12 days is given below. The weather department says that two cities have similar weather. Use central tendencies to identify those two cities.
5. What is the probability that we get a 5th Tuesday in a 30-day month?
6. Let us suppose, you tossed two two-sided fair coins:
   1. What are total # of events in the sample space?
   2. Compute the PMF for heads in this experiment
   3. Compute Expectation of heads

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| City 1 | 29 | 32 | 36 | 40 | 43 | 37 | 36 | 33 | 32 | 37 | 31 | 29 |
| City 2 | 20 | 24 | 31 | 37 | 40 | 38 | 37 | 34 | 34 | 33 | 28 | 23 |
| City 3 | 23 | 26 | 32 | 38 | 41 | 40 | 35 | 33 | 35 | 37 | 30 | 25 |
| City 4 | 20 | 24 | 29 | 34 | 37 | 36 | 32 | 30 | 33 | 32 | 27 | 23 |
| City 5 | 19 | 24 | 29 | 38 | 43 | 38 | 33 | 34 | 36 | 34 | 29 | 23 |

1. Let three fair coins be tossed. Let Event A = {all heads or all tails}, Event B = {at least two heads}, and Event C = {at most two tails}. Of the pairs of events, (A,B), (A,C), and (B,C), which are independent and which are dependent? Are there any mutually exlcusive events? (Justify).