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# Tutorial Probability & Regression #

Question 1- What is Sample spaces, dependent events & independent events?

Question 2- Explain Expected value for discrete random variables.

Question 3- What is Probability and its different types?

Question 4- What is different between Covariance and Correlation?

Question 5- What is different between Pearson Correlation & Spearman Rank Correlation and their use case?

Question 6- What is Significance of Measuring Correlation?

Question 7- What is Regression Analysis?

Question 8- Explain Simple Linear Regression & Multiple Linear Regression and their use case.

Question 9- Movie companies need to predict the gross receipts of individual movies once a movie has debuted. The data are the first-weekend gross, the U.S. gross, and the worldwide gross (in $ millions) of the eight Harry Potter movies:

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| --- | --- | --- | --- |
| **Title** | **First-Weekend** | **U.S. Gross** | **Worldwide Gross** |
| Sorcerer's Stone | 90.295 | 317.558 | 976.458 |
| Chamber of Secrets | 88.357 | 261.988 | 878.988 |
| Prisoner of Azkaban | 93.987 | 249.539 | 795.539 |
| Goblet of Fire | 102.335 | 290.013 | 896.013 |
| Order of the Phoenix | 77.108 | 292.005 | 938.469 |
| Half-Blood Prince | 77.836 | 301.460 | 934.601 |
| Deathly Hallows Part 1 | 125.017 | 295.001 | 955.417 |
| Deathly Hallows Part 2 | 169.189 | 381.011 | 1,328.111 |

a. Compute the covariance between first-weekend gross and U.S. gross, first-weekend gross and worldwide gross, and U.S. gross and worldwide gross.

b. Compute the coefficient of correlation between first-weekend gross and U.S. gross, first-weekend gross and worldwide gross, and U.S. gross and worldwide gross.

c. Which do you think is more valuable in expressing the relationship between first-weekend gross, U.S. gross, and worldwide gross-the covariance or the coefficient of correlation? Explain.

d. Based on (a) and (b), what conclusions can you reach about the relationship between first-weekend gross, U.S. gross, and worldwide gross?

Question 10-

Calculate the mean, variance, standard deviation on both income and consumption. Also, calculate the covariance and coefficient of correlation between income and consumption of the ten households. Interpret the results of covariance and coefficient of correlation.

|  |  |
| --- | --- |
| Monthly Income (in Dollars) | Consumption (in Dollars) |
| 4,000 | 3,500 |
| 4,300 | 3,900 |
| 3,900 | 3,300 |
| 2,900 | 2,700 |
| 3,400 | 3,200 |
| 3,800 | 3,500 |
| 4,800 | 4,400 |
| 5,200 | 4,870 |
| 5,600 | 5,420 |
| 5,400 | 5,280 |