STATISTICS DATA ANALYSIS DECISION MODELING 5TH EDITION SOLUTIONS

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Chapter 7 Practice Questions and Solutions for "Statistics, Data Analysis, and Decision Modeling, 5th Edition"

Question 1: A survey of 200 students found that the average grade on a midterm exam was 75 with a standard deviation of 10. What is the probability that a randomly selected student scored between 65 and 85?

Solution: Using the normal distribution with mean 75 and standard deviation 10, we can calculate the z-scores for 65 and 85: $z = (65 - 75) / 10 = -1$ and $z = (85 - 75) / 10 = 1$. Then, using a standard normal distribution table, we find that the area between $z = -1$ and $z = 1$ is approximately 0.68. Therefore, the probability that a randomly selected student scored between 65 and 85 is 0.68.

Question 2: A company wants to test a new marketing campaign. They randomly assign 100 customers to the new campaign and 100 customers to a control group. After the campaign, they find that the average sales for the new campaign group is $150 with a standard deviation of $25, while the average sales for the control group is $120 with a standard deviation of $30. Is there a significant difference in sales between the two groups?

Solution: To test this, we can use a two-sample t-test. The test statistic is calculated as: $t = (150 - 120) / \sqrt{(25^2 / 100) + (30^2 / 100)} = 3.16$. Using a t-table with 198 degrees of freedom (100 + 100 - 2), we find that the p-value is less than 0.01.

Therefore, we can conclude that there is a statistically significant difference in sales between the two groups.

Question 3: A study investigates the relationship between age and income. The following data is collected:

Age Income

25   40,000

30   50,000

35   60,000

40   70,000

45   80,000

What is the correlation coefficient between age and income?

Solution: To calculate the correlation coefficient, we can use the formula: $r = (n\sum xy - \sum x \sum y) / \sqrt{(n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2)}$, where n is the number of data points. Plugging in the values, we get r = 0.986, indicating a strong positive correlation between age and income.

Question 4: A pharmaceutical company is developing a new drug. They conduct a clinical trial with 200 patients, of whom 120 experience a positive outcome. What is the 95% confidence interval for the proportion of patients who will experience a positive outcome?

Solution: The sample proportion is 0.6. Using the formula for the confidence interval for a proportion: $CI = p \pm z\sqrt{p(1-p)/n}$, *where z is the z-score for the desired confidence level (95% corresponds to z = 1.96), we get CI = 0.6 ± 1.96* $\sqrt{0.6*0.4/200}$ = (0.52, 0.68).

Question 5: A store manager wants to forecast the daily sales for the next week. They have the following historical data:

Day	Sales
Monday	100
Tuesday	120

Day	Sales
Wednesday	110
Thursday	130
Friday	140

Using exponential smoothing with a smoothing constant of 0.3, what is the forecast for Saturday's sales?

Solution: The forecast for Saturday's sales is calculated as: $F_{t+1} = \alpha Y_t + (1-\alpha)F_t$, where F_{t+1} is the forecast, α is the smoothing constant, and Y_t and F_t are the actual sales and the previous forecast. Using the given data and $\alpha = 0.3$, we get $F_{t+1} = 0.3 \cdot 140 + (1-0.3)F_t = 0.3 \cdot 140 + (1-0.3)130 = 132$. Therefore, the forecast for Saturday's sales is $132.

The Tiger Cub Den Leader: Questions and Answers

As a den leader for Cub Scout Pack 543, I often get questions about the role and responsibilities of a Tiger Cub Den Leader. Here are some of the most frequently asked questions and answers:

What is a Tiger Cub Den Leader?

A Tiger Cub Den Leader is a volunteer parent or guardian who leads a den of 6-7 first-grade boys for one year. Den Leaders provide guidance and support to the Cub Scouts as they learn about Cub Scouting and develop their social and leadership skills.

What are the responsibilities of a Tiger Cub Den Leader?

Den Leaders are responsible for planning and leading weekly den meetings, which typically last for an hour. They also assist with pack meetings, outings, and special events. Den Leaders are also expected to communicate with parents and guardians and maintain records of the den's activities.

What are the qualifications to be a Tiger Cub Den Leader?

To be a Tiger Cub Den Leader, you must be at least 18 years old, have a desire to work with children, and be willing to commit to the time required to lead a den. Previous Scouting experience is not required, but it is helpful.

What are the benefits of being a Tiger Cub Den Leader?

Being a Tiger Cub Den Leader is a rewarding experience that allows you to make a positive impact on the lives of young boys. Den Leaders get to witness the growth and development of the Cub Scouts as they learn new skills and build confidence.

How do I become a Tiger Cub Den Leader?

If you are interested in becoming a Tiger Cub Den Leader, the first step is to contact your local Cub Scout Pack. You can find a list of packs in your area on the Boy Scouts of America website. Once you have contacted a pack, they will provide you with more information about the role and responsibilities of a Den Leader and help you get started.

Mastercam CAD/CAM Software: System Requirements

Mastercam is a leading CAD/CAM software solution used for designing, manufacturing, and simulating products. Before using Mastercam, it's crucial to ensure your system meets the minimum requirements for optimal performance.

What are the minimum system requirements for Mastercam CAD/CAM software?

- Operating System: Windows 10 or 11 (64-bit)
- Processor: Intel Core i5 or AMD Ryzen 5 (recommended i7 or Ryzen 7)
- RAM: 8GB (16GB recommended)
- Hard Drive Space: 10GB for installation (additional space for data and projects)
- Graphics Card: Dedicated GPU with 2GB VRAM (4GB recommended)
- Display: 1920x1080 resolution (4K or higher recommended)

Can I run Mastercam on a Mac?

Mastercam is not currently supported on Mac operating systems.

Do I need a specific graphics card for Mastercam?

Yes, Mastercam requires a dedicated graphics card with at least 2GB of VRAM. NVIDIA Quadro or GeForce RTX cards are recommended for optimal performance.

How much RAM do I need for Mastercam?

8GB of RAM is the minimum requirement, but 16GB is highly recommended for smooth operation, especially when working with complex models and large projects.

Can I install Mastercam on an external hard drive?

Installing Mastercam on an external hard drive is not recommended as it can impact performance and stability. It's best to install Mastercam on a local drive with sufficient storage capacity.

World History: Ellis Esler Answers

Q: What were the primary causes of World War II? A: Ellis Esler identifies multiple factors contributing to World War II, including: the rise of fascism and militarism in Europe, the economic instability following the Great Depression, the Treaty of Versailles imposed on Germany after World War I, and the appeasement policies adopted by the Western powers towards Nazi Germany.

Q: Describe the impact of the Cold War on global politics. A: Esler emphasizes the profound influence of the Cold War on shaping international relations. He highlights the ongoing tensions and military buildup between the United States and the Soviet Union, the division of Europe into communist and capitalist blocs, and the proxy wars waged in various parts of the world.

Q: How did the ideas of the Enlightenment shape the American Revolution? A: Esler explains that the Enlightenment, with its emphasis on reason, individualism, and natural rights, provided the intellectual foundation for the American Revolution. The colonists drew inspiration from philosophers like John Locke and Montesquieu, who advocated for limited government, the rule of law, and the rights of individuals.

Q: Discuss the significance of the Industrial Revolution in transforming society. A: Esler highlights the profound changes brought about by the Industrial Revolution. He describes the shift from agricultural to industrial economies, the rise of factories and mass production, and the increasing urbanization and population growth. These technological advancements led to unprecedented economic development, but also created social and environmental challenges.

Q: Analyze the factors that led to the collapse of the Soviet Union. A: Esler identifies several factors contributing to the collapse of the Soviet Union, including: economic stagnation, political repression, the arms race with the United States, and the rise of nationalist movements within the Soviet republics. He emphasizes the role of Mikhail Gorbachev's reforms, such as glasnost (openness) and perestroika (restructuring), in weakening the Soviet system and ultimately leading to its dissolution.

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