AlgorithmicHomework: Introductory Statistics

What is AlgorithmicHomework?

AlgorithmicHomework is a collection of web-based, interactive homework exercises and additional practice questions that are customized for you by our specialist academic authors to complement your course and the way you teach it.

AlgorithmicHomework offers:

- hundreds of engaging questions that focus on deep analysis and real-world application of the content you teach
- a large variety of question types, at varying levels of difficulty, to help students target their study
- tailored step-by-step solutions and detailed stand-alone feedback that students describe as like having a 24/7 personal tutor.

Assessment

AlgorithmicHomework provide instructors with a centralized and automated assessment environment that offers:

- AntiCheat functionality to ensure students learn thoroughly, rather than mindlessly copying the work of their peers
- AutoGrade functionality to completely remove the workload of individually grading each student's work yourself
- Ongoing feedback to help students learn from their mistakes along the way.

Advantages of Perdisco AlgorithmicHomework

- Questions contain algorithmic variables so that each student receives unique numeric values and cannot easily cheat
- Detailed, stand-alone feedback provided means that students don't need to refer to other sources, such as a textbook
- Inter and intra-dependent questions are used to reflect real-world problem solving situations
- Content is learning focused and does not easily reveal the correct answer
- Content is continually updated in response to suggestions from instructors and changes in standards or approaches
- Our in-house academic team customizes the content for you (for free) to match your course
- Academic and technical support is provided for instructors and students via email and toll-free telephone
- No downloads or plug-ins are required. A large range of web browsers is supported

Case study – Ellen Gundlach, STAT301, Purdue University

My fellow lecturers and I decided to use the Perdisco system in STAT301 because, after assessing students in previous semesters using instructor-written homework problems on Blackboard, the biggest complaint we received from our students was the lack of feedback they were being provided. Students wanted better explanations for why they were getting things wrong. As lecturers, the complexity of the types of problems we wanted to ask made the Blackboard problems 'clunky' and students spent more time trying to figure out how to get Blackboard to tell them the right answers than actually solving the statistical problems!

We found the quality and detail of explanations on the Perdisco system to be excellent, with homework becoming much more of a teaching tool than in the past. Questions are written in a technologically graceful way, with each student's unique numeric values carrying through to their solution. The unique values also allow students to submit their homework again and learn from their earlier mistakes.

We tell our students that the Perdisco system is as much of an asset to their learning as their textbook is!

Ellen Gundlach is the course coordinator for two of the largest service based courses offered by the Department of Statistics at Purdue University. In 2007, Ellen was awarded The David S. Moore Service Teaching Award for her outstanding contributions to the quality of the Department of Statistics courses, especially those with a majority audience of students outside the statistics and actuarial science disciplines.

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Available content

Perdisco's AlgorithmicHomework resources are independently developed to cover a number of academic approaches. We can customize AlgorithmicHomework for you to mirror your course using any combination of the topics listed below:

Part 1: Collecting data

Collection and presentation of data

- Data collection and classification
- Presenting categorical data
- Presenting numerical data
- Contingency tables
- Scatter diagrams
- Time-series plots

Part 2: Developing tools

Numerical descriptive measures

- Measures of a population
- Measures of centre
- Measures of variation
- Data analysis
- Measures of linear relation

Probability

- Introductory probability
- Conditional probability
- Bayes' theorem
- Enumeration

Discrete probability distributions

- Discrete random variables
- An application to finance: portfolio theory
- The binomial distribution
- The Poisson distribution
- The hypergeometric distribution

Continuous probability distributions

- The uniform distribution
- The normal distribution
- Determination of normality
- Normal approximation to the binomial distribution
- The exponential distribution

Part 3: Analysis, inference and testing

Sampling distributions

- The distribution of sample means
- The distribution of sample proportions
- Sampling techniques
- Survey credibility

Confidence intervals

- Confidence interval for the mean
- Confidence interval for the proportion
- Required sample size
- An application to business: auditing

Hypothesis testing

- Concepts of hypothesis testing
- The power of a hypothesis test
- z test of hypotheses for the mean
- t test of hypotheses for the mean
- z test of hypotheses for the proportion
- One-tail tests

Comparing populations

- Comparing two means
- z test for the difference between two proportions
- F test for the difference between two variances
- One-way analysis of variance

Chi-square tests

- Comparing two proportions
- Comparing more than two proportions
- Chi-square test for independence
- Chi-square test for a population variance
- Chi-square goodness-of-fit tests

Part 4: Modeling

Simple linear regression

- Constructing the linear regression equation
- Measuring error in linear regression
- The assumptions of linear regression
- Testing the model
- Approximating the mean value
- Constructing a prediction interval

Multiple regression

- Constructing the multiple regression model
- The assumptions of multiple linear regression
- F test of a multiple regression model
- t test of the slope coefficients
- Partial F test of an independent variable

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