Development of an Online Statics Homework System

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Since the late 1990’s, there has been an explosion of web based platforms for the submission and grading of homework. There are many advantages to online homework submission including (1) students obtain immediate feedback, (2) they can be used to randomize questions and eliminate blatant cheating, and (3) they can be used to provide just in time tutorials and information when needed. Many online homework systems such as WebAssign, CAPA, and Blackboard offer a wide range of question types such as multiple choice question formats, fill in the blank, and numerical answer evaluation. However, in the field of engineering, obtaining the correct answer is only part of the learning process. Students must learn to present their methodology in an appropriate manor, use clear and annotated diagrams, and they must learn to pay strict attention to notation and significant figures. Repeating this process over many homework problems encourages the development of a thorough and systematic thought process. Current systems are incapable of evaluating methodology or the presentation of a solution. As an alternative to the current systems, we will discuss the creation of a web based platform which allows for students to present the steps involved in their solution using correct notation, and obtain automatic and specific feedback at each step. The program is able to grade the homework in a systematic manner dependent on not only the correctness of the answer, but also on the presentation of the solution methodology. In addition, while learning to solve a problem, a student may enter intermediate steps for evaluation. The system is currently being tested at Merrimack College. The application of the online computer platform to a statics course will be demonstrated. Sample questions and student responses will also be presented.

Figure: A sample problem from the statics online homework system.

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