

ECE 344 Knowledge Probe – Fall 2008

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ABET Outcome probed: A,B,C

Relevant pre-and co-requisite classes: ECE 238L, ECE 206L

1. Instrument

The knowledge probe (KP) consisted of five of the questions on the final exam. These questions were created to give information about how well the students could use their mathematical skills to analyze and interpret data. Also, the students would need analysis capabilities for problems presented and abilities to design – at the assembly language level – modules for handling different experimental situations. Outcome A is probed by Question A. Outcome B is probed by questions B and C. Outcome C is probed by questions D and E.

Question A (question 1 on the exam)

This question addresses the ability of the students to understand different number systems for information representation, how to convert between these number systems, and do simple mathematics in those number systems. For students involved in doing work in microprocessors, this is important and straightforward information. The process is fairly simple, and I expected approximately 85% of the students to provide correct answers.

Question B (question 3 on the exam)

This question addressed the ability of the students to interpret assembly language representations of a system, to determine the experimental results, and to analyze the resulting values. Students must know what the instructions do to the data, and be able to determine the correct results of the represented system. The question requires not only overview type of information, but also detailed knowledge the instructions and the work that they do. I expected 70% of the students to provide correct answers.

Question C (question 4 on the exam)

This question is paired with Question B, and extends the tested information to include memory references as well as register references. It also involves some simple mathematics. Once again, students must analyze the assembly language representations of a system, determine the experimental results, and to then determine the resulting values. The question requires both overview type of information and detailed knowledge the instructions and the data manipulations involved. I expected about 70% of the students to provide correct answers.

Question D (question 5 on the exam)

This question deals with the student's ability to design a system – represented with assembly language instructions – to handle a fairly complex system. The student must have knowledge of the interrupt mechanism involved, and how to design a module that will handle the initialization of that system. Students must know the requirements for the overall system, the module involved in the interrupt, and how to set up the system correctly. I expected 65% of the students to provide correct answers.

Question E (question 6 on the exam)

This question is paired with Question D and probes the student's ability to design a system – represented with assembly language instructions – to complete the system initiated in Question D. The student must understand the system requirements for steady state behavior and how to maintain it. This involves both knowledge of the interrupt mechanism, and how to design a module that will handle the steady state behavior of that system. Students must know the correct mechanism for interrupt behavior, and how to maintain that behavior in steady state. I expected 65% of the students to provide correct answers.

2. Results

Fifteen people took the final exam. Designing the questions to serve as knowledge probe provides a good vehicle to test this information transfer without additional class time required. However, the results could be better oriented toward the knowledge probes by designing better questions.

Question A (question 1 on exam)

Only three students lost points on this question, and in each case, only one point was lost. This question probably was not difficult enough, since students were not challenged by it.

Question B (question 3 on the exam)

Students demonstrated varied responses to this question. If they knew the correct answer, they did very well (only two at 100%, but many high point responses), but if they didn't know the correct approach, then their scores were not good (two students at 60%).

Question C (question 4 on exam)

Even though this question was paired with Question B on the exam, students did markedly better on this question. With 20 points possible, the average was 18, and six students scored the full 20 points.

Question D (question 5 on the exam)

The students responded quite well to this question. Three students received all possible points, and eight students lost only 4 points or less (out of 25 points) The lowest score was half of the available points.

Question E (question 6 on exam)

This question reflected the behavior of the previous question, but because the knowledge was so detailed, some points were lost due to the specific nature of the knowledge being probed. Almost all students, however, received more than 75 percent of the available points. Only one student fell below that point.

3. Analysis.

The questions asked for this knowledge probe were detailed to the point that perhaps the details clouded the issues. However, the details also allowed the instructor to identify those students that had assimilated the information and could use it for design and analysis tasks.