EE Quals Questions 2012 - Mark Horowitz

The goal of this question was to get to a point where the student did not know the answer off the top of their head, and needed to figure it out. It did not matter much where the point occurred, the score really depended on how the student solved a new problem.

This question is going to look at the hardware needed to compress a video stream.

1. Video consists of a stream of picture. Often motion estimation is used to compress frames. Why is estimating motion useful in compression?

2. Show a picture of an image block (8x8 pixels) being compared against many different 8x8blocks of pixels. Ask about the trade-off in choosing the size of the comparison region.

3. The actually computation is a funny one. It is not a squared error metric $(a-b)^{\wedge 2}$, but rather the sum of absolute differences $|a-b|$. What practical reasons might have favored this metric

4. If you create an implementation on a simple processor, it runs to slowly, and takes too mch energy. What can you change, to either the hardware or the algorithm, to make this computation more efficient.

Mark