Essay Question for CS -- 15 points -- Mandatory

We started the Computer Science part of this course by comparing analog and digital information, and we studied the way in which digital information, and algorithms that manipulate it, CAN do many wonderful things that are useful to human beings, but have limitations both practical and absolute. One of the key questions when considering how to "approximate" the world of our senses into digital form (audio files, pictures, videos) is when the approximation is "good enough"? How much resolution is necessary before it doesn't matter to our eyes or ears?

Then we studied artificial intelligence and understood that there are many things that computer CAN do to be intelligent and seem human, and we at least considered, without definitive answers, whether there are limitations to computer intelligence. The Turing Test was proposed as a test of machine intelligence. We concluded with the Chinese Room Thought Experiment, pro and con.

I also asked you to read an article on the thinking of Mr. Bostrom, who worries that because of the nature of digital information, computers are getting more and more intelligent in an exponential trend, and may soon exceed our ability to understand or control them, with possible disastrous consequences for the human race.

Here is my question, which I would like you to answer in two short paragraphs on the next blank page**.**

First, explain how the issues we raised at the beginning and at the end are really the same, namely, "when is a simulation of reality indistinguishable from reality?" When is it "good enough?" Be sure to discuss how the Turing Test and the Chinese Room relate to this question.

Second, I would like you to relate this to Bostrom's worries about the future: Suppose that simulations of intelligence may be "good enough" to pass the Turing Test, but like the Chinese Room, without really having "minds" like living creatures or being conscious. Would this make Bostrom less worried about our ability to control artificial intelligence?

I will give you this chart on the exam.

Powers of Two

- $2^0 = 1$
- $2^1 = 2$
- $2^2 = 4$
- $2^3 = 8$
- $2^4 = 16$
- $2^5 = 32$
- $2^6 = 64$
- $2^7 = 128$

- $2^8 = 256$
- $2^9 = 512$
- $2^{10} = 1024$
- $2^{11} = 2048$
- $2^{12} = 4096$
- $2^{13} = 8192$
- $2^{14} = 16384$
- $2^{15} = 32768$