**Diving Into the Bitstream**

**Chapter 8 Questions**

Exploring your opinions

1. Chapter 8 begins with an excerpt from The Hitchhiker’s Guide to the Galaxy (Douglas Adams, Pan Books, 1979). It can be interpreted in several ways, among which are: it reveals the pessimism of being doomed to never understand the way the world works; the answer is and always has been right in front of us but our minds are too feeble to grasp it; it’s futile to rely on computers for grappling with questions that only humans can understand and deal with, and maybe for many other things as well. What are your thoughts?
2. Artificial intelligence means a lot of different things to a lot of different people. What does it mean to you? Do you look forward to future developments eagerly or with trepidation?
3. The “artificial” part of the term implies non-organic computer-based mechanisms. Suppose we could develop organic life forms and use them as the building blocks of intelligent mechanisms. Would we still call it artificial? Would you feel differently about that kind of artificial intelligence?
4. Intelligence presupposes interpretation of sensory inputs. Thus, it is not absorbing streams of information that counts as intelligence, but what can be made of those streams.

If two artificially intelligent mechanisms come to different conclusions about the same information, does that mean there is some flaw in the thinking processes of one or both? What about if two humans come to different conclusions about the same information? Does it matter if the artificial or human conclusions match in any way?

1. There is some expectation that truly intelligent machines will always come up with the right answer. Is that rational? Setting aside situations where answers are well-defined and singular – for example, solving equations – is greater intelligence shown by offering alternatives, giving opinions, being unsure about how to proceed in particular situations, taking informed guesses, rather than concluding with certainty no matter what?
2. Just as people can, at times, behave irrationally, commit crimes, and in general act badly, would machines with human-like intelligence do likewise? In thinking about this, keep in mind that one person’s bold heroics is another’s maniacal insanity – suicide bombers being but one example.
3. To realize human-like or very high level intelligent machines, computing power will have to grow by several orders of magnitude while continuing to shrink in size and cost. Some say that progress on those fronts will continue apace as they have since the dawn of the digital age. Others say we will reach limits to that growth sooner than later. After investigating various professional opinions, form your own.
4. In the not too distant future, you may be interacting with various types of automatons and other artificially intelligent mechanisms – those that are clearly machines, those that are human-like, those that are cute and friendly looking, those that are physical manifestations, and those that exist only in virtual worlds. For each of these types, discuss how you would feel about those interactions.
5. Understanding how the human mind works has been a long sought grail. Do you believe that it is possible for the mind to understand itself?

Progress in the science of brain functioning is proceeding apace, largely focused on sensing and reading and understanding brain patterns as we think and act. If we reach a point where, with the aid of computer-based processors, we can, in effect, read minds, what controversies do you envision will arise? What do you think should be done about them, if anything?

1. The digital age has brought about such vast changes in information technology that in many ways the world has become a more complex place. Technological positives and negatives incorporate many extremes. Along with that are continuing controversies relating to drawing a line between what’s allowable and what isn’t, what areas of research and development should be supported and which should be halted. The potentials of artificial intelligence exacerbate the picture. How do you see this evolving? How would you like it to evolve?

Stimulating your thinking

Qualities like empathy, intuition, common sense, appreciation, relief, fear, delight, sense of humor, fantasy, ethics, morals, and so on, are considered by many to be differentiators contrasting human and machine intelligence.

The thought that even highly capable reasoning machines could incorporate such qualities is antithetical to their beliefs. Others believe that there is no compelling argument to limits of artificial intelligence capabilities; a full range of emotional responses and every other human characteristic, cannot, perforce, be excluded. Machine intelligence superior to that of humans is not out of the question either.

Support each side in turn. Then assuming the no-limits belief is valid, discuss whether or not development along those lines should be constrained.

One theme of this chapter, which parallels the same idea as it relates to the other chapters, is:

*“Machines that can access, manipulate, create, utilize, and dispense information can be viewed as boon or doom.”*

Expand on this theme.