

CSC 416

Question Set 1

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A set of questions based on chapter 1 of Coppin's Artificial Intelligence Illuminated. This chapter deals with the history of AI and provides definitions for some terms widely used in the field.

$$\text{GRADE} = (X + N + LF + A + R) = (64 + 13 + 5 + 4 + 5) = 91$$

1. The chapter opens up with a quote by Henri Poincare that I like a lot. I hope that you do too! Regardless, write a 3-5 sentence biographical sketch of Poincare which suggests why AI researchers might be interested in at least some of his ideas. Be sure to cite your resources. (5)

- Poincare was a French mathematician and made fundamentally important contributions to the field of mathematic philosophy. Interested greatly in the questions that the mathematics of his day could not answer, he conjectured about and provided the groundwork for the theory of manifolds. Philosophically, he was intensely interested in psychologism, or a focus on what the mind understands over mental formalisms. He stressed that certain ideas and concepts that the human mind takes for granted, such as our understanding of the natural numbers, was innate, and therefore not a construct of the mind but a sort of base understanding.

(source: <http://www.britannica.com/EBchecked/topic/466250/Henri-Poincare>)

2. Search online for someone's definition of intelligence that you believe has merit. Strive to find one that is both insightful and interesting – and somewhat distinctive! Write down the definition along with the name of the individual with whom it is associated. (2)

- Susan Sontag, an American author and political activist, defined intelligence in the following manner:

Intelligence is really a kind of taste: taste in ideas.

3. Of the definitions of AI presented in class, which do you like best? Why? (2)

- Of the definitions presented in class, I prefer the definition provided by Elaine Rich, as it allows for the concept of AI to constantly evolve. I tend to like dynamic ideas and concepts, and for a field that is constantly making further progress into what could be considered the “final frontier” of sorts, I feel that a static definition wouldn't be at all appropriate.

4. Characterize **strong AI**. (1)

- Strong AI is the concept that a computer, given enough time, power, and intelligence, can be made to think and have its own consciousness, in the literal sense.

5. Characterize **weak AI**. (1)

- Weak AI is the concept that a computer can model intelligent behavior and solve increasingly difficult and complex problems.

6. What is a **strong method** in the context of AI research and practice? (1)

- Strong methods in AI are methods which require significant intelligence about the environment in which the system is operating in order to solve problems posed to it.

7. What is a **weak method** in the context of AI research and practice? (1)

- Weak methods in AI are methods which do not necessarily require any outside intelligence to operate and determine a solution to a problem.

8. Write a *one paragraph (50-100 words, not including references)* historical survey of “logic and reason” which features just three individuals: Aristotle, Leibniz, and J. Alan Robinson. Chronologically, introduce each individual and as you do say something about

their main contribution to the development of logic and its application to thinking and problem solving. Be sure to cite your sources. (6)

- Several important figures have been prominent in developing the field of logic and reason. These figures include Aristotle, Leibniz, and J. Alan Robinson. Aristotle, an ancient Greek philosopher, came up with the concept of a syllogism, which is the idea of a predicate, where in by defining something as truth, certain other truths may be deduced naturally. Leibniz, a German mathematician (and co-discoverer of calculus) conceptualized a universal mathematical language for logic and reasoning, in an effort to create an all-encompassing knowledge system. J. Alan Robinson, a professor at Syracuse University, contributed to the field of automated theorem proving, and catalyzed an efficient implementation of the PROLOG language.

(sources: Coppin: *Artificial Intelligence Illuminated*;
http://en.wikipedia.org/wiki/John_Alان_Robinson)

9. Write a 3-5 sentence biographical sketch of Alan Turing which suggests why AI researchers might be interested in at least some of his ideas. Be sure to cite your sources. (5)

- Alan Turing was a British mathematician who made grand contributions to several fields of study. Perhaps most well known for his set of rules defining a programmable computational machine called a “Turing machine”, he also led to the term “Turing complete” in reference to programming languages and generative structures. Turing’s contribution to the field of AI, however, took the form of the well known “Turing test”, in which a participant quizzed two confederates indirectly, one a computer and one a real live human. If the computer successfully tricked the participant into believing it was human, it passed the “Turing test” and was considered, for Turing’s purposes, intelligent. This test still remains un-passable, and large monetary prizes are offered for the first program to pass it.

(sources: Coppin: *Artificial Intelligence Illuminated*;
<http://www.britannica.com/EBchecked/topic/609739/Alan-M-Turing>)

10. What is **Cartesian Dualism**? (1)

- Cartesian Dualism is the idea that the universe consists of mind and matter, and these two components are completely separate and unconstrained by each other.

11. How does Chomsky’s “Syntactic Structures” relate to artificial intelligence? (2)

- Chomsky’s “Syntactic Structures” theory provided a theory for the structure of language, but also a theory for the representation of knowledge. This theory for knowledge representation became the basis for Artificial Intelligence.

12. Characterize **cognitive psychology**. Characterize **behaviorism**. Explicitly state the principle distinction between cognitive psychology and behaviorism. (3)

- Cognitive psychology is the idea the the mind uses information that it can make sense of to solve problems and rationalize. Behaviorism is the idea that humans react strictly to stimuli, without any cognitive interaction of intelligence involved in the process.

13. This three part question appears as Review Question 1.7 in your text. (6)

- What do you think led mankind to embark upon the study of Artificial Intelligence?
 - I believe that we started looking into AI simply because we are always looking to improve production and increase efficiency. Also, in the process, we've already discovered a lot about how the mind works, and formed theories that are constantly being tested. Simply, mankind is curious, productivity minded, and willing to learn.
- Which fields of study particularly fed into it?
 - Mathematics, philosophy, psychology, computer science, cognitive science, and linguistics.
- What human desires did the study of Artificial Intelligence seek to satisfy?
 - The study of AI, in my personal opinion, seeks to satisfy the desire for understanding at a transcendental level. Humanity is concerned with "knowing" as much as is possible, and I do believe that the study of AI, if applied correctly, will help us as a species discover great unknowns that have been entrancing us for millennia.