

Homework assignment CS1420

Instructions: please, read the questions and provide an answer in no more than 150 words per subquestion (that is, $1.a + 1.b + 1.c < 450$ words).

Send your response to all **three** of the following email addresses. NB: if one or more of the lecturers do not receive your answer, your homework might not be graded in its entirety.

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Deadline: Thursday 22nd of June @ 23:59

Question 1

Come up with a problem or research question related to cyber security that you think could be solved or answered by relying on or bringing in:

- a. exclusively knowledge and methods from science, i.e. one or more of the natural sciences;
- b. exclusively knowledge and methods from one or more of the social sciences;
- c. exclusively knowledge and methods from mathematics and/or theoretical computer science (algorithmics, a.s.f.);

Briefly explain your answer in each of the three cases. If you think that no example can be given, then explain your reasons for believing this to be so.

Question 2

Social engineering

- a. Do you think that the term ‘social engineering’ as used by hackers is correct in that these techniques can rightly be seen as a form of engineering?
- b. Do you think that the use of ‘engineering’ by Popper in ‘piecemeal social engineering’ rightly chosen to organize society and to modify and adapt the organization of society are, basically, engineering problems?

Question 3

Consider the three paradigms of computer science

- a. What makes all three paradigms fundamentally different? Choose to answer this from the perspective of the methodology or the epistemology.
- b. What objection would a partisan of the technocratic paradigm present to an advocate of the rationalist paradigm,

- c. What response would the latter have to justify his/her own paradigm?

Question 4

Consider issues in the ethics and epistemology of algorithms

- d. What chief implication for scientific and engineering research follows from the kind of inconclusive evidence characteristic of algorithms? Why?
- e. Briefly describe the relation between reliable results, black-boxes, and unfair outcomes. Offer an example.
- f. Which transformative effects do algorithms have in our personal, professional, or academic life? Why?
- g. How could the accountability gap (i.e., ‘causality’, ‘justice’ and ‘compensation’) be reduced or fully eliminated? Focus on one of the three and elaborate.