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**1. Scenario A**

0 / 1 point

(Answer the following 6 questions based on the information given below and the material in this course.)

The European Union brought an anti-trust case against Google, alleging that the search engine was intentionally manipulating search results. Among other problems, rather than return the most useful results, Google was allegedly quashing particular results in order to harm its competitors. The investigation was long and complicated. At the time, the German justice minister said that it would all be much simpler if Google were "transparent" about how it calculates which search results to show.

What are some of the challenges for transparency in this case?

- A) The audience for transparency (regulators) is not valid.
- B) It is already in Google's financial interest to be more transparent.
- C) It may not be possible to convey a meaningful explanation of why the system behaved the way that it did in a particular case.
- D) The government has no recourse -- it cannot act on anything found via transparency.
- E) All of the above

**Incorrect**

Correct answer: It may not be possible to convey a meaningful explanation of why the system behaved the way that it did in a particular case.

This is the correct answer for multiple reasons given in the Ananny & Crawford reading and in lecture. In this case even if the search results are "honest" and Google is innocent, it may be technically challenging to prove that -- it is not clear what metrics would be required. As the search engine is a complicated system, individual engineers at Google may not understand all of it and could be blind to consequences introduced via combinations of parts of the system they don't know about. At least, they may not be able to answer questions about a particular case. As an extreme example, even if Google disclosed every single piece of information available to them -- if they opened up the entire company to regulators -- how would the relevant data be found? What would the relevant data be?

The other answers are incorrect because regulators ARE a valid audience for transparency -- in fact they are a common audience. Given the expense of adding transparency and the chance it might uncover problems, it is NOT Google's financial interest to be more transparent. Finally, the government CAN act on wrongdoing uncovered via transparency. In fact in this case they did act.

**2. Hypothetically, let's imagine that Google responded to the justice minister by publicly releasing a statistical model that governed search results, inferences made in that model, and the degree of human and machine involvement in the process. What additional problem(s) of transparency would remain?**

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- A) It might not be possible to identify some problems in the model without access to the data.
- B) If people are not involved the system must be fair, but Google might reveal that people are involved.
- C) The need to identify the audience for the transparency.
- D) Weizenbaum's *ad populem* problem.

**Correct**

Correct answer: It might not be possible to identify some problems in the model without access to the data

You may not be able to diagnose some problems with an analysis (or conclusions from it) without access to the data used to produce it. Data are identified as an important candidate for transparency on the lecture slide about "What to Disclose?" In addition, the Ananny & Crawford reading notes that "code without data" is ineffective as a transparency effort.

The other answers are incorrect because the audience in this case would probably be the government, and it is NOT the case that a system is fair if no people are involved in it. This was identified in lecture as silly. Finally, although Weizenbaum is a famous computer scientist, Weizenbaum's *ad populem* problem is made up.

**3. Considering Johnny Cash's concept for the week, how would we analyze the release of information proposed in the previous question in terms of "power"? The release is \_\_\_\_\_.**

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- A) progressive because transparency is better than secrecy.
- B) progressive because transparency may identify crimes committed by Google.
- C) regressive because it would require substantial time and expertise to make sense of it, and thus be very expensive to interpret.
- D) regressive because it could be automated.
- E) none of the above.

 **Correct**

Correct answer: Regressive because it would require substantial time and expertise to make sense of it, and thus be very expensive to interpret by those hope to address the problem through release of the information.

Several readings and lectures in this course note that transparency can be quite expensive as an accountability strategy because of the need to analyze and understand any information that is released. This is a good example of why it is not realistic for each person to individually discover and raise problems with data science that affect them personally -- they don't have the time or expertise. This makes transparency a regressive strategy in terms of power, BUT it still might be a useful strategy. In this scenario, the government is mitigating this regressive power dynamic by providing the resources (via EU anti-trust enforcement) to interpret any information released by Google. This is an important role of government and NGOs -- we can act collectively to secure the resources necessary to do this kind of work.

Remember that a power analysis asks you to consider how power works in a given situation, how a solution affects different people differently (or requires different resources from them). Answers (A) and (B) are somewhat tricky because they seem to be considering "progressive" as a synonym for "good" or "preferable" rather than as a strategy to understand how power works in a situation. For (A), although transparency might be better than secrecy in general, in this case it is not clearly so. If all search engines released their algorithms publicly this would be a tremendous boon to spammers and those who want their misinformation to be our top-ranked search results. (This is discussed briefly in the Diakopoulos reading.) (B) may be true, but does not really relate to the question of regressive v. progressive. Answer (D) is simply a non sequitur.

4. What if Google were found innocent and the investigation ended, but you -- a rogue data scientist -- were convinced that Google was guilty. You set out to prove it on your own using independent algorithm audits (Sandvig et al.) and reverse engineering (Diakopoulos) from the outside. What would be the most significant problem with this approach?

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- A) In this "black box" scenario, only the output is observable.
- B) External audits cannot be attempted against Google.
- C) You will not be able to determine intent.
- D) All of the above
- E) None of the above

 **Incorrect**

Correct answer: You will not be able to determine intent.

Both the referenced readings and the lecture make the point that "outside" audits and reverse engineering can be very useful in finding problems with systems but that these methods poorly suited to determining WHY a system is doing something wrong (that is, intent). Because these methods only look at systems from the outside even in the best case they can only come up with an approximation of what happens inside Google. Many laws might require intent in order for a crime to have been committed. AFTER completing an outside audit, some other mechanism such as an official government investigation would be required to uncover intent. E.g., intent might be found in statements made in internal e-mail messages directing the design of the system. A court could compel these to be disclosed to government investigators.

Answer "A" is a reference to Diakopoulos's typology. It is false because at least some inputs ARE observable - the search queries provided to Google are observable. Answer "B" is not true; in fact Google was an example "target" given in the Diakopoulos reading.

5. Consider the lecture video about whose job it is to discover problems with systems. In the context of this scenario let's posit that Google IS filtering out its competitors from search results. Is this a scenario that data scientists should already be able to recognize as a potential ethical problem?

0 / 1 point

- A) Yes, absolutely.
- B) Maybe.
- C) No, absolutely not.
- D) There is not enough information to answer.

 **Incorrect**

Correct answer: Yes, absolutely

Even the average person without any data science training should be able to recognize this as an ethical problem. The scenario specifies that the system is "intentionally" not "return[ing] the most useful results." The fact that there are already laws on the books that cover this problem -- antitrust laws -- is another clue that it is not a bizarre new issue that has never occurred before.

6. Again considering the scenario as stated in the last question: Is this a scenario that **individual users** casually doing **one search** would be able to recognize as a potential ethical problem?

1 / 1 point

- A) Yes, absolutely.
- B) No, absolutely not.
- C) There is not enough information to answer.



Correct answer: No, absolutely not.

This is an interesting case for our discussions of transparency and auditing because users probably cannot notice missing search results. By definition, if search results are excluded then the user will not see them or know they are excluded. The key words in this question are "individual" and "one search."

However, you could argue that systematic auditing could diagnose this problem by comparing a larger pattern of results across many users. For instance if a Google competitor WAS returned in some Google search result but then disappeared (or changed order) in other results where they were directly competing with a Google product, an auditor might become very suspicious that something funny was going on. Indeed, this is similar to what actually happened in this case. This is a real scenario. Google was found guilty and fined €2.42 billion. For more information, see:

[https://ec.europa.eu/commission/presscorner/detail/en/IP\\_17\\_1784](https://ec.europa.eu/commission/presscorner/detail/en/IP_17_1784)

## 7. Scenario B

1 / 1 point

(Answer the next 4 questions based on the information given below)

You suspect that a travel website price discriminates against Mac users, inferring that they are more willing to pay for higher-priced hotel rooms. People suspect the website modifies the default order in which hotels are shown, with higher priced hotels ranking slightly higher for Mac users than for other PC users. (This example was briefly mentioned in week 2 and similar examples appear in the Diakopoulos reading.)

Considering all of the material for this week, what might be the major challenge(s) for you to conduct any outside review or audit of this website?

- A) Secrecy via contractual rules (non-disclosure agreements).
- B) Source code being too complex to interpret.
- C) Access to the data.
- D) All of the above.
- E) None of the above are likely to be a problem.



Correct answer: All of the above.

The list of answers for this question was taken for the three largest readings from this week and the lectures as major problems of transparency, auditing, and accountability reporting. All of these are likely to be a problem, especially when trying to provide accountability from the outside. However, it is worth noting that if you worked inside the organization you might be able to use auditing techniques and avoid some of these problems. For instance, a system might be unintentionally price discriminating and this could be revealed by an internal audit. (Presumably if the system were *intentionally* price discriminating, at least some of the people inside the company would already know that, as they must have designed the system to perform this way.)

8. Imagine that you are a data science journalist. From the things on this list, what would be the most useful thing to start your investigation if you want to "reverse engineer" the system as Diakopoulos suggests?

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- A) Its marketing strategies and images.
- B) Online reviews of the Web site (a collaborative audit).
- C) A list of competing travel websites.
- D) An available API to be sampled.
- E) None of these are useful.



**Incorrect**  
Correct answer: An available API to be sampled

For algorithmic accountability reporting from the outside, Diakopoulos emphasizes the importance of an interface to the system from the outside at many points in the article. In comparison, answers "A" and "C" don't seem useful. (Or we suppose they might be a little useful but the correct answer is much more useful.) Answer "B" might at first seem useful but there is no obvious way to determine if the reviews were left by a Mac, PC, or Linux user, so there is no way to connect a positive or negative pattern in the reviews to the variable of interest.

9. Considering the arguments in the Sandvig et al. reading, what approach is likely to be ineffective for your investigation?

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- A) Ask the company to disclose their source code.
- B) Conduct a "sock puppet" audit.
- C) Conduct a collaborative audit.
- D) Interview the designers and data scientists from the company.



**Incorrect**  
Correct answer: Ask the company to disclose their source code.

If the source code is not already public, it seems very unlikely that an outside journalist's request would cause a company to release the code, as this is usually kept secret. The Sandvig et al. reading raises a number of issues with reviews of source code and is generally pessimistic about them when comparing them to other kinds of audits such as "sock puppet" (answer B) or collaborative audits (answer C). Answer D (interview designers) does seem likely to be useful -- however, it wasn't an idea promoted in the Sandvig et al. reading. It also seems like the company's staff may not want to talk to the press about this, as price discrimination is typically unpopular.

10. As a computational journalist, if you have access to the following list of information, what information would be the best to disclose to better inform people about the operation of the system?

1 / 1 point

- A) Visualization of the model.
- B) Interview findings from the designers.
- C) Crowdsourced samples of inputs and outputs.
- D) The definitions or thresholds used in the algorithms.
- E) All of the above should be disclosed if you have them.



**Correct**  
Correct answer: All of the above

All of these are given in the Diakopoulos reading as things it is useful for an investigation of a system to disclose. Indeed, the COMPAS example from the previous week is a good example of a system where only some of these things were available. If the additional items on this list could be obtained (particularly D and perhaps more complete answers from B) the audit of the COMPAS system would have been able to more conclusively describe the operation of the algorithm.

As noted in the explanatory text, this scenario is based on real examples. For details of the real investigations, see the footnotes in the Diakopoulos reading where the case studies are described.