

# Homework 1

David Östling

dostl@kth.se

DA2210

September 27, 2021

## Science as falsification

a) I picked the following conclusion: “1. It is easy to obtain confirmations, or verifications, for nearly every theory — if we look for confirmations.”. Furthermore I believe that the following sentence can be used to strengthen the argument provided within the conclusion: “Once your eyes were thus opened you saw confirmed instances everywhere: the world was full of verifications of the theory.”. The statement clearly states that once a person is observant (“Once your eyes were thus opened”) the person will see confirmed instances everywhere. This aligns pretty well with what was said in the conclusion.

b) A great example of a non-falsifiable theory is the theological god [3]. There is simply no way of telling whether god is real or not. Some might argue that science has been able to tell us that god was not required to create the universe but it does not mean that god does not exist. God is also largely subjective, god can be considered as all things, even emotion. Thus there is no way to falsify the theory of god’s existence.

## What is truth?

### 1. The program statement `while (true) {}` gives an infinite loop.

This could be considered both as a type of coherence truth as if we run a while loop which will run forever it will most certainly return an infinite loop, it follows from the previous definition (`while(true) → runs forever`).

### 2. Mergesort has complexity $O(n \log n)$ .

This is a type of coherence truth as it is logically linked to other statements, it is also not an opinion or anything like that it’s simply a non-coherent fact. The statement is true because

the worst possible running time of Mergesort is  $O(n \log(n))$ . [5]

**3. Apple suffered losses in the consumer market last year.**

This is also a type of correspondence truth as it too responds to reality, it is (as above) not an opinion or anything like that, it's simply a fact. The statement is true because they actually did suffer some heavy losses in the consumer market last year. [2]

**4. Comments make it easier to modify programs.**

This is a type of merge between an intuitive- and pragmatic truth, however it can also be seen as false depending on the opinion of the one reading the statement. It can be considered an intuitive truth as it can be true for you (the reader) and you really enjoy comments when it comes to modifying programs. Moreover it can also be considered a pragmatic truth because believing in the statement results in a positive outcome.

**5. Agile development provides greater job satisfaction.**

This is also a type of merge between an intuitive- and pragmatic truth, however (as above) it can also be seen as false depending on the opinion of the reader. It can be considered an intuitive truth as it can be true for you (the reader) and you agree with the stated opinion. Furthermore, it can also be considered a pragmatic truth because believing in the statement results in a positive outcome (similarly to above).

**6. Two doses of the mRNA Covid-19 vaccine BNT162b2 give a 95% protection for adults.**

This is a type of coherence truth as it is simply logically linked to other statements The statement has been proven true in a data analysis. [1]

**7. P is a strict subset of NP.**

This could be considered a coherent truth due to the fact that it represents a coherent system of statements (P and NP are logically linked to each other). However note that this also could be considered a correspondence truth as the statement simply responds to reality. It is true because if a deterministic machine can solve a problem in polynomial time it can also be solved by a non-deterministic machine in polynomial time. [4]

**8. This statement is true.**

**9. This statement is false.**

Both of the above statements (8 and 9) do not really correspond to any truth as there are no indicators that would support the statements being true or false. However I believe both of

them could be considered as types of correspondence truth as they are defined as true/false (meaning they are in fact true or false with no subjective input). As the statements simply say true or false with no subjective pointers it is hard to classify them as an intuitive- or pragmatic truth.

## References

- [1] Barda, N., et al. (2021) “Safety of the BNT162b2 mRNA Covid-19 Vaccine in a Nationwide Setting.” New England Journal of Medicine. Available: [doi.org/10.1056/NEJMoa2110475](https://doi.org/10.1056/NEJMoa2110475).
- [2] C. Ballentine, J.Kearns (2020, October) “Apple Loses \$450 Billion in Value Since Record on iPhone Woes” Bloomberg [Online] Available:<https://www.bloomberg.com/news/articles/2020-10-30/apple-loses-450-billion-in-value-since-record-on-iphone-woes>
- [3] E. Feser (2016, April) “Do Theological Claims Need to be Falsifiable?” Strange Notions [Online] Available: <https://strangenotions.com/do-theological-claims-need-to-be-falsifiable/>
- [4] GeeksForGeeks (2021) “What are NP, P, NP-complete and NP-Hard problems?” [Online] Available: <https://www.geeksforgeeks.org/np-completeness-set-1/>
- [5] Studytonight (2021) “Merge Sort Algorithm” [Online] Available: <https://www.studytonight.com/data-structures/merge-sort>