KTH CSC, Johan Karlander

Personnummer: **Name:** **Group:**

DA2210, Philosophy of Science and Research Methodology for Computer Scientists
December 14, 2015, 13–15

14 E-question points correct ⇒ E.
17 E question points ⇒ D.
17 E question points and 7 C question points ⇒ C.
Your result will be in Rapp tomorrow evening.
You may bring one self-written notesheet with your name on it. Hand it in afterwards.

No extra answer sheets will be accepted — all answers should be written on this questionnaire.

E questions

Each correctly answered question gives 2 points.

1. *All ravens are black.* State the reformulation used in the raven paradox.

All are .

2. Newton, Copernicus, Galileo, Brahe, Kepler created the modern view of the solar system. Who did what?

discovered Jupiter's moons using a telescope.

found that planet orbits are ellipses.

stated that Earth circles the sun.

collected observation data for all planets.

explained the orbits by gravitational force.

3. A universal Turing machine can emulate any computer. Fine, but such a machine will never exist. Why?

4. Popper, Descartes, Kant, Euclid, Aristotle are famous. Why?

stressed the importance of falisfiability.

invented formal logic and syllogisms.

meant that duty ethics has a categorical imperative.

invented the coordinate system.

constructed geometry from axioms.

5. What observation by Lavoisier falsified the phlogiston theory (about burning).

6. In spite of gravitation, birds seem to be able fly. Here are some hypotheses about that. Which can be called *ad hoc*, *null hypothesis*, *anti-realist*?

Observational errors, birds can't fly.

We observe this, whether they really fly doesn't matter.

Birds are an exception, gravitation does not affect them.

7. Statements may be *proved*, *unproved*, *undecidable*, *independent axiom* and *paradoxical*. Choose the right category (only one) for each of these statements .

Exactly one line through point P parallel to line L.

P=NP

For any property, there is a set of all things with that property.

A given program will stop after finite time.

8. What is the difference between science and pseudoscience? Give three features.

1:

2:

3:

9. Not everybody thinks that computer science is real science. Why? Give three reasons.

1:

2:

3:

10. The famous Turing test concerns three of the following. Which three?

Undecidability, polynomial complexity, artificial intelligence, formal systems, imitation, correlation, consciousness.

1:

2:

3:

Personnummer: **Name:**

C questions

Each correctly solved question gives 3 points.

1. State H and D in these famous applications of the HD-method. Also note if H was strengthened or falsified.

Semmelweis, the maternity ward with autopsy room next door and high mortality until S prescribed handwash.

H:

D:

Strengthened/falsified?

Galileo and the two balls dropped from the tower to test Aristotle's law that heavy objects fall faster.

H:

D:

Strengthened/falsified?

Einstein's conjecture that light rays bend near great masses and the total solar eclipse that made it possible to see stars close to the sun.

H:

D:

Strengthened/falsified?

2. The elements of a paradox are the premise P, the argument A and the (seeingly unreasonable) conclusion C. State P, A and C in the following three famous examples. Also note which element is deceptive.

Achilles and the Tortoise

P:

A:

C:

Deception:

The statistics say that men have more children than women.

P:

A:

C:

Deception:

The twin paradox in relativity

P:

A:

C:

Deception:

3. The NSA pays me a lot of money to hack into the prime minister's mail box. Give an argument for accepting the offer if I use

consequential ethics:

duty ethics:

contract ethics