

AHRF14 Midterm

S Bringsjord

1013141600NY

Write your name on your answer booklets now.

As you proceed, label each answer in your answer booklets with the appropriate 'Qn'.

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1 Logic Focus

Q1 June is in Wales.

What follows deductively from this statement, if anything?

Prove that your answer is correct.

Q2 Sherlock has three perfectly trustworthy clues to work with in an attempt to place three people. The clues are:

(a) Jill is in Westchester or Chris is in Seattle, but not both.

(b) Chris is in Seattle or Kate is in Ireland, but not both.

(c) Chris isn't in Seattle.

Answer the following fill-ins for Sherlock, where what is supplied is either a place-name (where if X is a place-name, we also — rather charitably! — count 'not X ' as a place name) or 'UNKNOWN.'

Jill's location:

Kate's location:

Chris's location:

Justify each of these three answers with a proof that employs one or more rules of deductive inference from our list of them for the propositional calculus.

Q3 Either the first or second of the following two conditionals is true, but not both: If your opponents have the queen, they have the ace; if your opponents don't have the queen, they have the ace.

Additionally: If your opponents have the ace, you should lead with trump. And if they don't have the ace, you should lead with the king.

Given the above information, what is the rational thing for you to lead with?

Prove that you're right.

Q4 Consider the following syllogism:

All the Swedes in the room are skiers.

Some of the skiers in the room are athletic.

Therefore:

Some of the Swedes in the room are athletic.

Is this valid? Prove that your answer is correct.

Q5 Is the following argument valid? Prove that your answer is correct.

All As are Bs.

All Bs are Cs.

All Cs are Ds.

All Ds are Fs.

Some Gs are As.

Some Gs are Fs.

Q6 The following four statements are either all true or all false.

(a) If Alvin is happy, so is Betty.

(b) If Betty is happy, Charlie is too.

(c) If Charlie is happy, Darla is happy as well.

(d) Alvin is happy.

Does it follow deductively from the above information that Darla is happy? Prove that you're right.

Q7 Modified "St Pete": Instead of \$2 if tails come up on the first toss, the person taking the gamble will get \$10. From there, the sequence continues in an exact parallel to the \$2 game we considered in class. What is the expected payoff of the 5th flip, were tails to come up there? What is the expected payoff of the overall \$10-based game? (No proofs necessary.)

Q8 This problem is hard. Leave it for your last problem, to tackle only if you have time.

Let's define the **uncertainty** of a formula ϕ from the language of the propositional calculus as $1 - p(\phi)$. So for example if $p(\delta) = 1$, the uncertainty of δ , written $u(\delta)$, is 0.

Now consider the statement 'Snow is white, and if snow is white Frank is happy'. Is it true that the uncertainty of 'Frank is happy' must be less than or equal to the uncertainty of the first statement? Prove it.

2 Readings Focus

- Q9 What kind of data are the four axioms of probability from Kolmogorov, Big, or Big-But-Buried? Explain why, in no more than five sentences.
- Q10 According to E & S Bringsjord, what is the relevance of the The Paradox of the Arrow to the differential and integral calculus? (No more than three sentences.)
- Q11 According to Kahneman, what is the rational-actor definition of rationality? (No more than two sentences.)
Compare and contrast this definition of rationality with the overall picture of a rational agent drawn and defended by S Bringsjord. (No more than five sentences.)
- Q12 According to Kahneman, does the body of his work, as described in his *Thinking, Fast & Slow*, imply that humans are irrational? Do you agree with him? Justify your answers (in no more than one page).
- Q13 Following others, Kahneman distinguishes between two modes of thinking, both present within the human mind, _____ 1 and _____ 2. In no more than three sentences for each, characterize both.
A systematic examination of the differences between these two modes would most likely be an example of thinking in which mode? (No more than two sentences.)
- Q14 Suppose Jones decides to start bidding in the bi-pay auction solely because he believes that any money he loses will go to charity (because the auctioneer/bank is, Jones knows, deeply philanthropic), and because if by chance he wins money, he will himself donate these winnings to charity. Is this mind-set modeled by Johnson et al. in their work on the bi-pay auction? (One sentence.) Is Jones's mind-set modeled by prospect theory? Explain. (No more than three sentences.)

3 In-Class Content Focus

- Q15 Yes or No: Descartes would say that machines can never be human-level intelligent? _____. Yes or No: Descartes would say that sub-human animals can never be human-level intelligent? _____. Give two human capabilities that are central to _____.

Descartes' position on machines and mere animals, and explain the role that these two capabilities play in his position. (No more than half a page.)

Q16 We focused in class on two particular pieces of empirical evidence offered by Kahneman in support of the claim that most humans are overconfident. They were _____ and _____. S Bringsjord's objection to the claim that these empirical facts imply that the humans in these two domains are overconfident was:. (No more than five sentences.)

Q17 True or False: The argument of Good & Chalmers for the proposition that the Singularity will happen contains the premise that machines having human-level intelligence will arrive. Answer: _____.

Q18 What rule of deductive inference on our list of such rules for the propositional calculus does Camus' argument for the meaninglessness of human life employ?

Q19 Compare and contrast **Sing** with **MiniMax**. No more than half a page.