

# Problem Set 1

Logic 2024-2025

1. Identify premisses and conclusions for the following arguments. Are they logically valid? [2 pts/item]

- (a) If people can freely choose their actions, then they have free will. People can freely choose their actions. Therefore, people have free will.
- (b) Minnie is a cow, and she likes to watch the sunset. Therefore, some cows like to watch the sunset.
- (c) Roger has a tan because he just came back from holiday in Spain.
- (d) Every act of murder is a crime. Some crimes are morally wrong. Therefore, some acts of murder are morally wrong.
- (e) The woman in blue is the murderer. For the murderer is either the man with the hat or the woman in blue. But the man with the hat is definitely not the murderer.
- (f) There are salmon here, so there are fish here.
- (g) Everyone who likes music either likes Taylor Swift or Kendrick Lamar. I don't like Taylor Swift, and I don't like Kendrick Lamar either. But I like the Beatles, and everyone who likes the Beatles likes music. Therefore, fairies are real.

2. Identify the premisses and the conclusion in the following argument [3 pts]:

If today is a Sunday and not a holiday, Einar is either sleeping in or playing football with his friends. It's not a holiday today. Einar only plays football when the weather's nice. Today it's raining, and if it is raining today it also rained yesterday. But Einar only sleeps in if he went out the previous day. Therefore, today is not a Sunday. For if it rained yesterday, then Einar surely didn't go out yesterday.

3. Identify premisses and conclusions for the following arguments. Are they logically valid? If not, supply a missing premiss to make the argument valid. [3 pts/item]

- (a) The temperature of the water is 100 °C. Therefore, the water is boiling.
  - (b) If Tamal is not an only child, she has a brother. Tamal is not an only child. Therefore, she either has a brother or she is an only child.
  - (c) Since I don't hate romantic comedies, I like romantic comedies.
  - (d) The state should respect international law. Therefore, international law should be respected by the state.
4. (a) Write down the negation of the conclusion of 3(a). [1 pt]
- (b) Write down the set of sentences that contains the premiss(es) of 3(a) and the negation of the conclusion of 3(a). Is this set consistent or inconsistent? [2 pts]
- (c) Repeat this question for 3(b)-(d). What do you notice? [3 pts]
5. Consider the following sentence:
- (S) Not every dish that contains pasta is Italian; but if a dish contains salsa then it definitely isn't Italian.
- (a) What are the subject-specific terms in (S)? What are the logical terms? [1 pt]
  - (b) Assign a meaning to the subject-specific terms such that (S) becomes false. [2 pts]
  - (c) Is (S) logically true? Explain your answer with reference to Characterisation 1.9. [2 pt]
6. Consider the following sentence:
- (C) Some pink elephants are not pink.
- What kind of sentence is (C)? Write down a sentence that is logically equivalent to (C). Hint: use characterisation 1.11. [3 pts]

Total = 43 pts