Philosophy 240, Kenny Easwaran
Midterm Sample 1

October 4, 2017

I've given two example answers for each "make up an argument" questions, because a lot of variety is possible.

I've used "~" for the negation sign in the translations.

Name: _____

1. Validity. Make up an argument with the described premises and conclusion, or say why such an argument is impossible. (10 pts each)

   (a) Valid, with two true premises, and a false conclusion.

This is impossible, because it is impossible for a valid argument to have true premises and a false conclusion.

   (b) Invalid, with one true premise, and a false conclusion.

One example: Grass is green. Therefore, Austin is the largest city in the world.

Another example: The Statue of Liberty is taller than my house. Therefore my house is tiny.

   (c) Invalid, with one false premise and a false conclusion.

One example: The moon is made out of green cheese. Therefore the moon is larger than the sun.

Another example: I am six feet tall. Therefore I weigh 300 pounds.

2. Translations (10 pts each)

   (a) Translate the following sentences from English into the formal language of Tarski's World.

      i. d is smaller than c, but is not smaller than e.

Smaller(d,c) ^ ~Smaller(d,e)

      ii. b is either a large cube or a medium one.

(Large(b)^Cube(b)) v (Medium(b)^Cube(b))

      iii. Either b is a cube, or both a and c are.

Cube(b) v (Cube(a)^Cube(c))

(b) Give ordinary English translations of the following sentences in the formal language of Tarski's World.

i. ((Large(c)∧Cube(c))∨(Large(a)∧Tet(a)))

Either c is a large cube, or a is a large tet.

ii. ¬(SameSize(a,b)∧SameShape(a,b))

a and b are not both the same size and shape.

iii. Cube(a)∧(Larger(a,b)∨Larger(a,c))

a is a cube that is larger than either b or c.

3. Say whether each of the following arguments is valid. If it is valid, show this using a truth table. If it is invalid, show this by describing a situation that would be a counterexample. (20 pts each)

(a) Cube(a)∨Cube(b). ¬Cube(b)∨¬Small(c). Therefore, Cube(a)∨¬ Small(c).

Cube(a)	Cube(b)	Small(c)	Cube(a)vCube(b)	~Cube(b)v~Small(c)	Cube(a)v~Small(c)
T	T	T	T	F F	T F
T	T	F	T	F T	T T
T	F	T	T	T F	T F
T	F	F	T	T T	T T
F	T	T	T	F F	F F
F	T	F	T	F T	T T
F	F	T	F	T F	F F
F	F	F	F	T T	T T

The argument is valid because there is no row where the premises are both true and the conclusion is false

(b) Cube(a)∨Cube(b). ¬(Cube(b)∨Small(c)). Therefore, ¬Cube(a).

Consider a situation where a is a cube, b is a tet, and c is large.
The first premise is true because a is a cube.
The second premise is true because b is not a cube and c is not small.
The conclusion is false, because a is a cube.
Thus, it is possible for the premises to be true and the conclusion false, so the argument is not valid.

4. Consider the following table. What is the probability of C? What is the probability of C given $A \vee B$? Is the argument, "$A \vee B$, therefore C" a good one? How good? (20 pts)

A	B	C	probability
T	T	T	.1
T	T	F	.1
T	F	T	.2
T	F	F	.1
F	T	T	.2
F	T	F	.1
F	F	T	.1
F	F	F	.1

The probability of C is .1+.2+.2+.1=.6
AvB is true in all but the last two rows, and has probability .8. Out of these rows, C is true in the 1st, 3rd, and 5th, for a total of .5 out of .8. Thus, the probability of C given AvB is .5/.8=.625
Thus, the premise AvB does give some support to C, but only a very small amount. .625 is still fairly far from 1. So this argument is only a little bit good.