

Session 3 - Fun Logics

UCAS Program 2020

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1 What is Logic?

Logic isn't just a particular way of thinking, it is based on relating facts and introducing a result from the compilation of facts. Philosophical Logic, yet is very related to how we make sense of things, and Mathematical Logic, enhances our thinking to produce higher level proofs.

2 Now, Think With Logic

Now that you know what is Logic, we will be doing some Logical Puzzles, but in contrary to scribbles and just pure thinking that you usually do, you would need to lay out your thinking process, step by step, in written form.

You can lay out your steps on paper, your iPads, or on Google Docs.

Imagine this is an exam, so please keep your scribbles clear and make sure others would make sense of it.

You will be asked to talk about your thinking process at the end of the task, so **think** about it!

Ready? Let's delve into the wonders of Logic now!

2.1 CSAT 2019, Q2

Alice and Bob want to know Carol's birthday. Carol gives them a list of 10 possible dates: March 11, 12, 15; April 13, 14; May 10, 12 and June 10, 11, 13. Carol then tells Alice the month of her birthday, and Bob the day of her birthday. Alice and Bob say the following:

Alice: *I don't know Carol's birthday, but Bob doesn't know either.*

Bob: *Previously I didn't know Carol's birthday, but now I do.*

Alice: *I now also know Carol's birthday.*

When is Carol's birthday? Explain your reasoning.

Space for some scribbling:

2.2 MAT 2007, Q6

Three people called Alf, Beth, and Gemma, sit together in the same room.

One of them always tells the truth.

One of them always tells a lie.

The other one tells truth or lies at random.

In each of the following situations, your task is determine how each person acts.

(i) Suppose that Alf says "I always tell lies" and Beth says "Yes, that's true, Alf always tells lies".

Who always tells the truth? Who always lies? Briefly explain your answer.

(ii) Suppose instead that Gemma says "Beth always tells the truth" and Beth says "That's wrong."

Who always tells the truth? Who always lies? Briefly explain your answer.

(iii) Suppose instead that Alf says "Beth is the one who behaves randomly" and Gemma says "Alf always lies". Then Beth says "You have heard enough to determine who always tells the truth".

Who always tells the truth? Who always lies? Briefly explain your answer.

Space for some scribbling: