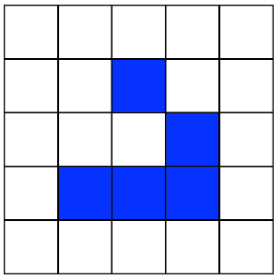
Comments on pre-reading 1 quiz

1. I talked about two uses of models: for theory testing, and for gaining insight. Which of the following describes the way in which models, theories, real-world data and predictions link together?

- ○ Carefully build a model that is nice and simple and that you can run on a computer, find a theory that matches your model, then check the real world data to see if it matches the model
- ○ Look at the real world data and develop your theory, generate its predictions and build these into a model
- ○ Once you have a theory, build a model which accurately captures the key elements. Run the model to see what you theory predicts, then check those predicitions against the real world.
- ✓ Once you have a theory, build a model which accurately captures the key elements. Run the model to see what you theory predicts, then check those predicitions against the real world. If they don't match, revise your theory.

The first two are clearly a bit muddled, the last two match the loop described in the reading from theory via model to predictions, then we test the predictions of our theory against our observations of the real world to evaluate how good our theory is. Then, importantly, if your theory is making the wrong predictions (i.e. ones that don't match the real world), you can and should revise your theory.

2. The reading presents Conway's game of life, a cellular automaton that has some really simple rules. Live cells that have two or three neighbours stay alive, otherwise they die. Dead cells that have exactly three live neighbours become alive. A computer can follow these rules really easily, and given a set of cells can work out what they will look like at the next time step, and the next time step, and so on forever. You can also work this out yourself, using paper and pencil, or you can use a Life simulator, like this one. If we start from the pattern below, which pattern will be next, after one round of updates?

✓ 

This is the correct option - it's a glider.

3. What kind of model do you think Life is?

- ○ A model for carefully testing predictions of theories.
- ✓ A model for playing with.

It looks to me like a model for playing with - it doesn't feel like it's a well-worked-out specification of any particular theory, although maybe one way of looking at it is that it's an instantiation of Conway's theory that self-replication is possible even with a very simple simulated world.

4. What do you think we can learn from models like Life?

- ( ) Nothing - it's too simple.
- ( ) A lot - it's called Life, it tells us about life.
- (✓) It shows how simple a model can be and still be interesting.
- ( ) It shows us how simple the world could be and still permit life.

Either of the latter two options is fine I think - I mainly took from it that even very simple models can provide useful insights.

5. I have already come across models as part of my degree.

- ( ) No
- ( ) Yes, all the time - they were explicitly called models
- ( ) Yes, I think so - although they weren't described as models, I think they did what models are described as doing in the reading

Please explain - if you said "No", what is your degree in. If you said "Yes", very quickly give an example of the kind of models you have seen

We can talk about this in class: I **think** you will all have seen models, either explicitly labelled as such or implicit in the theories you have come across.