Question sheet

Exercise 1

Run the simulator on the 'Very High' setting a few times, making a note of what the final population looked like each time.
E.G. jot down the number of cells with the '101' and '110' genotype.

1a.) Did you get the same results both times? Why do you think this is?

Exercise 2

Now we'll look at how different mutation rates effect the final population.

Run the simulator at a few different mutation rates and jot down how the final population differs.

2a.) How does varying the mutation rate affect the proportion of cells capable of taking up nutrients (Hint: add up the number of cells with the 010, 110,011,111 genotypes)?

2b.) How does varying the mutation rate affect the diversity of the final population (Hint how many different colors do you get)?

Exercise 3

Now let's have a look at how different patterns of mutation effect the final population.
Run the simulator a few times and have a look at what happens to cells that mutate early, and later on.

3a.) Do mutations that occur early in the simulation have more or less effect on the population structure than mutations that occur later (keep an eye on the first color you see, is this the most common color in the final population)?

3b.) Look at the populations that are capable of causing disease. What cells do they come from most often? Is this always the case?
3c.) Run the model at very high, 5 times. How many times did you get the disease causing phenotype

Exercise 4

Now let's think about how useful the simulator is for researching phase variation in real life bacteria.

4a.) How realistic do you think the simulator is?
4b.) What advantages do you think using a simulation can have over real experiments?