1. Using a timing diagram to track the sequence of sent messages and acknowledgements, show that if messages can be reordered (i.e., a packet might be delayed and received after a packet that is subsequently sent), the `rdt 3.0` state machine using alternating bits will not work as designed.

2. `rdt3.0` seems to have solved all of the key problems that result in unreliable data transfer (e.g., packet corruption, packet loss).

   (a) What is the main reason of introducing sliding windows on top of the stop-and-wait approach that `rdt3.0` uses?

   (b) Give a couple of special situations where stop-and-wait might perform similarly to a sliding-window approach.

3. For TCP, the lecture notes (slide 114) make the following statement: "receivers *can* buffer out of sequence packets".

   (a) Why might a receiver choose NOT to do this?

   (b) Does a sender need to know whether a receiver buffers out of sequence packets? Why? Why not?

4. Please refer to the computer networking handout for this year. `https://www.cl.cam.ac.uk/teaching/2324/CompNet/files/compnet-exercises-student.pdf`. Please do problems 15 and 16(b) and 16(c) (it's worth having a think about 16(a) but I don't think it's very relevant nor has it really been covered in the lectures).

5. When TCP implementations measure the RTT, what problem are they trying to solve? What does the value α in the exponential averaging function control?