1. We will study some simple B-model boundary conditions for a target space X.
   (a) Dirichlet boundary conditions fix the boundary value of the sigma-model scalar fields. They are labelled by a point p in X. In the formulation in terms of maps into $T^*[1]X$ they are associated to the Lagrangian fiber above a point in $T^*[1]X$. Find the classical boundary local operators.
   (b) Neumann boundary conditions leave the boundary value of the sigma-model scalar fields free to fluctuate. In the formulation in terms of maps into $T^*[1]X$ they are associated to the zero section of $T^*[1]X$. Find the classical boundary local operators.
   (c) Find the classical local operators at a junction point between Neumann and Dirichlet boundary conditions.
   (d) What is the classical phase space of the theory on a segment, with Neumann boundary conditions? Compare the geometric quantization of that with the space of local operators at Neumann boundary conditions.
   (e) How do your answers compare with calculations in the derived category of coherent sheaves?

2. A BBB brane on $\mathbb{C}^2$ should be described by an instanton bundle, which in turns can be built from the ADHM data: two $N \times N$ matrices B_i, an $N \times K$ matrix I and an $K \times N$ matrix J, which satisfy the constraints for an $U(N)$ hyper-kahler quotient, where $U(N)$ acts by conjugation on B_i and multiplication from the left/right on I and J.
   (a) The ADHM complex
   $$\mathbb{C}^N \to \mathbb{C}^{2N+K} \to \mathbb{C}^N \tag{1}$$
   uses differentials
   $$(J \qquad B_2 + z_2 \qquad - B_1 - z_1) \tag{2}$$
   $$(I \qquad B_1 + z_1 \qquad B_2 + z_2) \tag{3}$$
   where z_i are coordinates on $\mathbb{C}^2$. Verify that the differential squares to 0.
   (b) The differential above can be interpreted as the supercharge in an $N = 4$ SQM. Can you use the ADHM data to write three more supercharges for the SQM?