Syllabus of the three tutorials

The tutorial will be in Julia, we expect that students have a bit of familiarity with the language and have a working Julia environment in their laptops. Students should bring their own laptops to solve the tutorials

1. Tutorial 1:
   Playing with tensors, constructing, reshaping and permuting
   Tensor contractions, advantage of pairwise,
   Reshaping two tensors as matrices and their multiplications.
   Tensor decompositions eigenvalue singular value and QR
   Connection of SVD with Hilbert Schmidt norm and low rank approximation
   Entanglement, eigenvalues of reduced density matrices or SVD of states
   Contraction cost and libraries,
   Entanglement of ground states and random states via exact diagonalization
2. Tutorial 2:
   MPS (construct iteratively MPS with svds for small systems),
   Special states (W likes and GHZ)
   Gauge freedom
   Canonical form and orthogonality center
   Computing expectation values and correlation functions entropies
   MPOs
   Application, DMRG itensor phase diagram of the TFI
3. Tutorial 3:
   iTEBD ground state and time evolution entanglement in time,
   Itransverse and time evolution