1. Consider a complex number system (ie. $x + iy$). For complex number data sets, create a user-friendly, menu-driven program that implements a **doubly linked list**, including the following operations. Please discuss the complexity for each operation.

   (a) Build a list by reading a sequence of complex numbers from input.

   (b) Determine if a list is empty.

   (c) Insert a complex number.

   (d) Search for a complex number.

   (e) Delete a complex number.

   (f) Print out a list.

   (g) Count the number of times a given complex number occurs in a list.

   (h) Find the middle element of a list. (If there are even nodes, then there would be two middle numbers.)