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**Kiran B Chilakamarri\***, Kchilakamarri@yahoo.com. *Unit distance graphs, Variable distance graphs, and Graphs on integer lattice.*

If a simple graph  $G$  can be drawn on the plane so that every edge is a straight line segment of length  $d$ , then  $G$  is a unit distance graph (contracting the plane we can choose  $d=1$ ). Edges can cross in these drawings. If the length of every edge is in a closed interval  $[a, b]$ , then  $G$  is a variable distance graph. If we further demand that all coordinates of all vertices be integers then  $G$  is a variable distance graph on integer lattice. It is easy to see that  $K(4)$ , the complete graph on four vertices, is not a unit distance graph. Similarly  $K(3,3)$  is not a unit distance graph if we insist that all vertices be distinct. The Petersen graph is a unit-distance graph. Characterization of unit distance graphs is a challenging unsolved problem. On the other hand any graph is a variable distance graphs if the interval  $[a, b]$  is appropriately chosen. The unit distance graph problem is a famous unsolved problem and is equivalent to finding maximum of chromatic numbers of unit distance graphs. This number is known to be between 4 and 7, but the exact number is not known. I will present a number of interesting problems dealing with unit distance graphs, variable distance graphs and graphs on integer lattice graphs. (Received January 12, 2012)