(i) how distance vector routing works,

Distance Vector Routing works by each node having a Distance Vector containing the cost to reach every other node in the network. The distances and the next hop to take on the route are calculated by the Bellman-Ford algorithm. This works by taking the minimum, Dx(Y), of the link cost between nodes X and V plus the value in our Distance Vector for V to Y, for each node Y in the network. $Dx(Y) = \min_v\{c(x,v)+Dv(Y)\}$ for each Y in N.

(ii) how you tested the algorithms

We applied our distance vector code on each of the different topologies given. Then we tested with and without poison reverse and link changes to see what the different outputs were.

(iii) some cases in which poisoned reverse may fail

Loops involving more than 3 nodes,and networks where there exists 1) a loop of arbitrarily many nodes, and 2) a single isolated node will not be detected by the poisoned reverse technique.

(iv) a solution to this problem

A solution to the link break problem is split horizon. This prevents loops by not sending a route back to the router from which it was learned. The split horizon solution is implemented in the Routing Information Protocol (RIP) along with poison reverse to solve the count-to-infinity in some, but not all, cases.

An alternative solution to the problem is to use a newer DV protocol like DSDV or Babel, which avoid loop formation in all cases at the cost of increased complexity.