For each schedule, we have to choose a *stopping port*: the port in which the ship will spend the rest of the month. Implicitly, these stopping ports will define truncations of the schedules. We will say that an assignment of ships to stopping ports is *acceptable* if the resulting truncations satisfy the conditions of the problem — specifically, condition (†). (Note that because of condition (†), each ship must have a distinct stopping port in any acceptable assignment.)

We set up a stable marriage problem involving ships and ports. Each ship ranks each port in chronological order of its visits to them. Each port ranks each ship in reverse chronological order of their visits to it. Now we simply have to show:

(1) *A stable matching between ships and ports defines an acceptable assignment of stopping ports.*

Proof. If the assignment is not acceptable, then it violates condition (†). That is, some ship S_i passes through port P_k after ship S_j has already stopped there. But in this case, under our preference relation above, ship S_i "prefers" P_k to its actual stopping port, and port P_k "prefers" ship S_i to ship S_j. This contradicts the assumption that we chose a stable matching between ships and ports. ■

[1] ex873.532.244