

Distributed Event Modelling with MPI Your naval fleet patrols an area comprising 1000 distinct locations.

Each vessel can occupy any one of these locations randomly² at the end of sampling interval³. For a vessel to be able to launch a strike, other vessels must accompany it. The rules for launching a strike are summarised as follows:

1. At least one odd numbered and two even numbered vessels share the same location, at a given point in time, for a strike to be counted. MPI rank 1 to n may be used to number each vessel in the fleet
2. The fleet may generate more than one strike at an instant of time (it will however depend on the number of locations meeting the strike criterion, item 1 above, at that instant of time).
3. There is no limit on the number of vessels in the fleet. The objective is to achieve the highest possible strike rate. It may however be pointed out that increases in fleet size will increase the probability of satisfying Rule no. 1 (above), but doing so will also slow the program owing to higher inter-process communication overheads.

Assume that a set of MPI processes represents the fleet and each MPI process represents a naval vessel.