

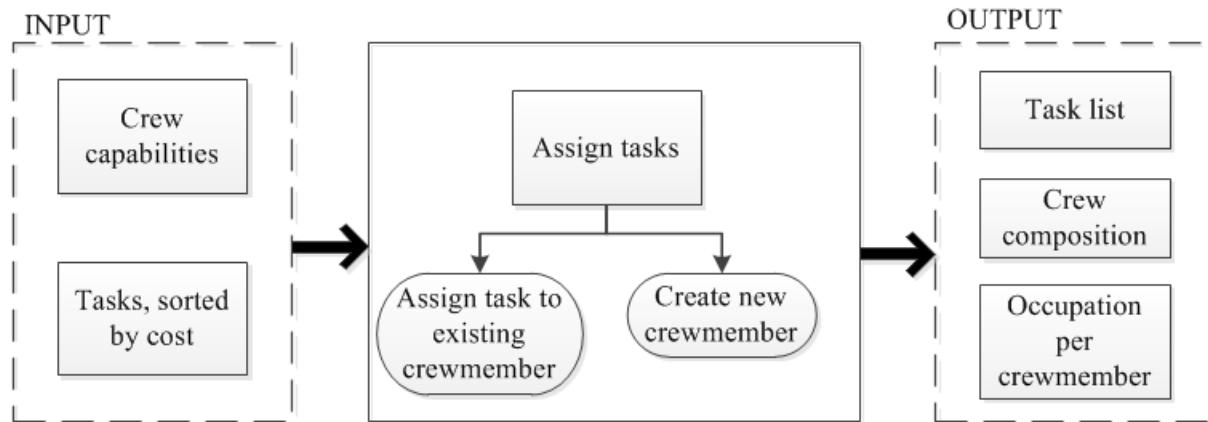
# Economisch haalbare laag bemande scheepsconcepten



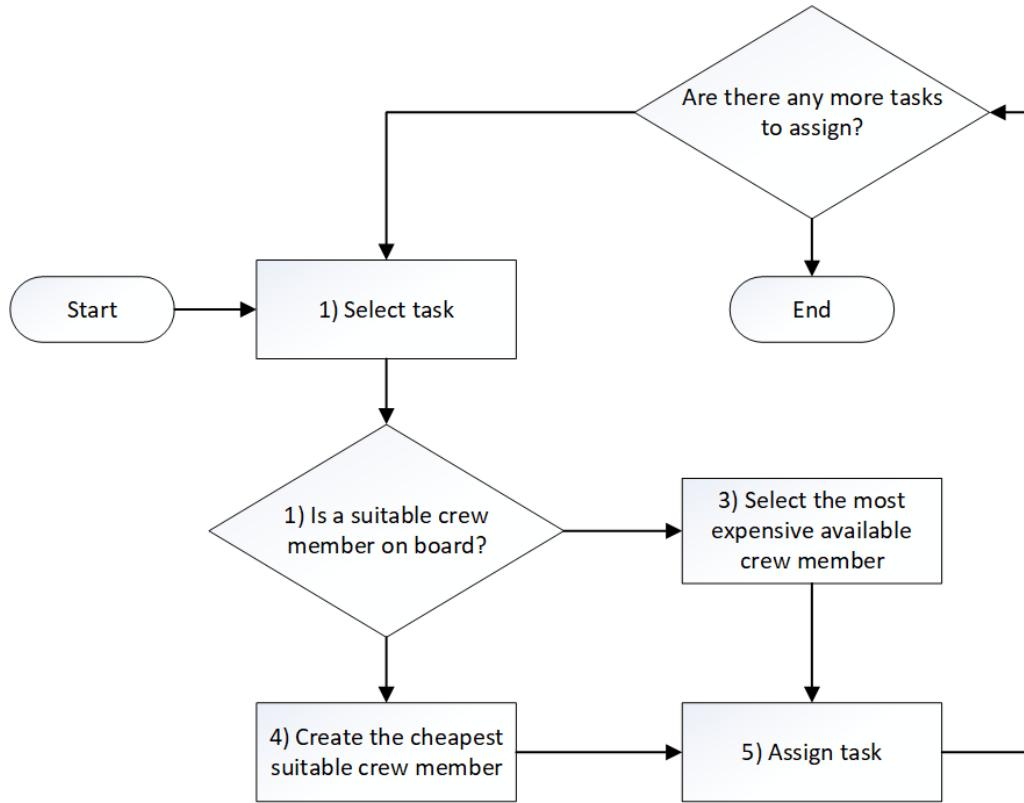
# Onderzoek naar onbemand varen



# Het effect van automatiseren

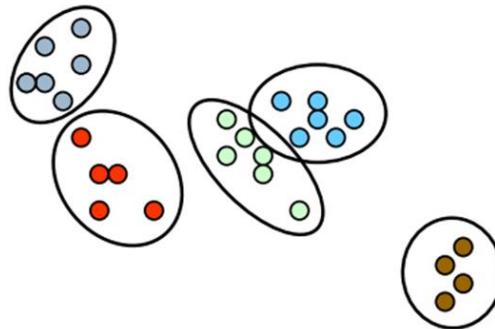


# Greedy Algorithm



# Clusters

- Maintenance on deck
- Maintenance in the engine room
- Bunkering
- Administration
- Crew support
- Port supervision
- Responsibility
- Mooring
- Navigation
- Cargo conditioning



# Technische oplossingen

- Maintenance in the engine room
- Mooring
- Navigation
- Cargo conditioning



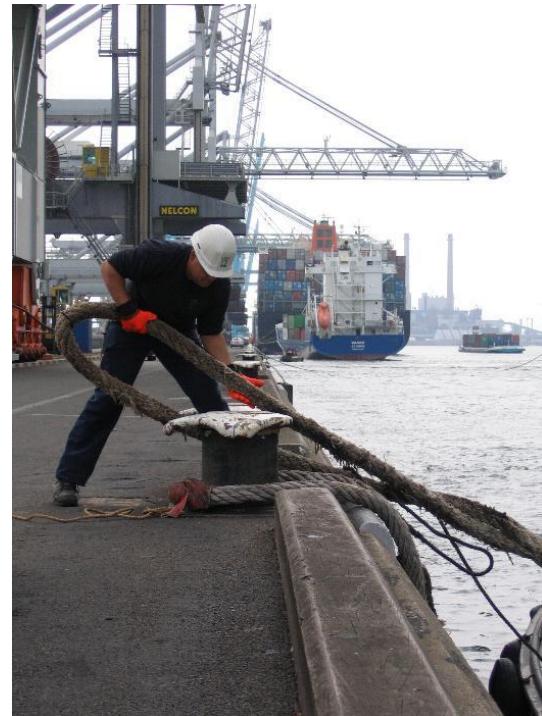
# Reorganiseren

- Maintenance on deck
- Maintenance in the engine room
- Administration
- Port supervision
- Responsibility



# Gebruik van diensten

- Port supervision
- Responsibility
- Mooring

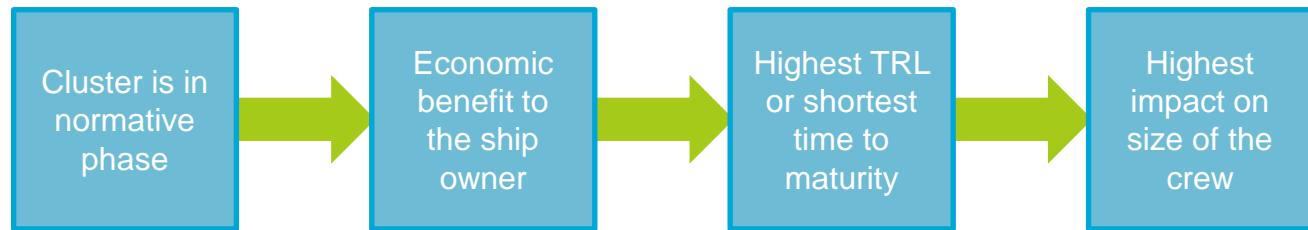


# Identificatie van logische concepten

Relaxed task assignment	Required crew											
	0	1	2	3	4	5	6	7	8	9	10	11
Automated clusters	0	0	0	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	0	4	2	4
2	0	0	0	0	0	0	0	0	5	26	8	6
3	0	0	0	0	0	0	0	3	40	61	12	4
4	0	0	0	0	0	0	4	27	103	67	8	1
5	0	0	0	0	0	5	24	68	116	37	2	0
6	0	0	0	0	4	22	40	71	63	10	0	0
7	0	0	0	2	13	31	22	34	17	1	0	0
8	0	0	3	5	13	10	4	0	2	0	0	0
9	0	0	5	1	3	0	0	0	0	0	0	0
10	1	0	0	0	0	0	0	0	0	0	0	0

# Identificatie van logische concepten

	Loading and unloading	Arrival and departure	Normal sailing	Cost reduction
Base case	9	9	11	0



# Concept 1: Automate open water sailing



9 crew members

# Concept 2: mooring, port supervision, cargo conditioning, administration, maintenance on deck



3 crew members

# Concept 3: Near shore navigation



2 crew members

# Concept 4: Maintenance in the engine room



0 crew members

# Economisch haalbare laag bemande scheepsconcepten

