Theory Exercise 10

Group 21
Chen Zhen, Li Kecen, Liu Shule, Feng Letian, Zhang Xin

Task1

a) The voting sets provided don't comply with Maekawa's algorithm's requirements:
- process 8 is not in the 8th voting set, V8
- V1 and V4 doesn't overlap at all

b) V1: (1 2 5 7)
V2: (2 4 5 7)
V3: (1 3 5 7 8)
V4: (3 4 5 6 8) -- adding 5
V5: (1 3 5 7)
V6: (1 2 4 6 8)
V7: (2 4 6 7 8)
V8: (1 2 3 6 8) -- adding 8

This will make the voting sets valid for algorithm execution.

c) Fairness condition 1: all voting sets should have the same size.
Fairness condition 2: each process should belong to the same number of voting sets, M.
The above voting sets don't satisfy the fairness conditions:
- |V1| != |V6| for example.
- p3 is involved in 4 voting sets while p2 is involved in 5 voting sets for example.

d) V1: (1 2 3 5 7) — adding 3
V2: (2 4 5 6 7) — adding 6
V3: (1 3 5 7 8)
V4: (3 4 5 6 8) — adding 5
V5: (1 3 4 5 7) — adding 4
V6: (1 2 4 6 8)
V7: (2 4 6 7 8)
V8: (1 2 3 6 8) — adding 8

The above voting sets satisfy both fairness condition.

e) No, it doesn't avoid deadlocks. Extending Maekawa's algorithm to use a logic clock such that queued requests with a happened-before order can be processed with priority instead of being choked in the queue while the process wait for all other process to reply.