Exercise Session 7
Consensus (part II)

Problem 1
Give the four properties of consensus. Give four executions, each of which violates exactly one of the consensus properties.

Problem 2
Algorithm 1 implements a consensus protocol using a perfect failure detector and best effort broadcast (beb). Assume you have to change this Algorithm 1 in order to obtain a uniform consensus protocol. Explain these changes and rewrite the algorithm accordingly.

Algorithm 1 Consensus Using a Perfect Failure Detector and Beb
Upon event < Init > do
1. suspected = Ø
2. round = 1
3. currentProposal = nil
4. broadcast = false
5. delivered[] = false
Upon event < Crash, pi > do
1. suspected = suspected ∪ {pi}
Upon event < Propose, v > do
1. if currentProposal == nil then
2. currentProposal = v
3. end if
Upon event < bebDeliver, pround, value > do
1. currentProposal = value
2. delivered[round] = true
Upon event delivered[round] == true or pround ∈ suspected do
1. round = round + 1
Upon event pround == self and broadcast == false and currentProposal ≠ nil
1. trigger < Decide, currentProposal >
2. trigger < bebBroadcast, currentProposal >
3. broadcast = true