Algorithm – Uniform Broadcast

Algorithm 1 All-Ack Uniform Reliable Broadcast
Implements:
UniformReliableBroadcast, instance urb.
Uses:
BestEffortBroadcast, instance beb.
PerfectFailureDetector, instance P.

1: upon event ⟨ Init ⟩ do
2:    delivered := ∅
3:    pending := ∅
4:    correct := Π
5:    for all m do ▷ Where m is a meta variable for a message
6:        ack[m] := ∅
7: upon event ⟨ urb, Broadcast | m ⟩ do
8:    pending := pending ∪ {(self, m)}
9:    trigger ⟨ beb, Broadcast | [DATA, self, m] ⟩
10: upon event ⟨ beb, Deliver | p, [DATA, s, m] ⟩ do
11:    ack[m] := ack[m] ∪ {p}
12:    if (s, m) ∉ pending then
13:        pending := pending ∪ {(s, m)}
14:    trigger ⟨ beb, Broadcast | [DATA, s, m] ⟩
15: upon event ⟨ P, Crash | p ⟩ do
16:    correct := correct \ {p}
17: function SHOULD_DELIVER(m)
18:    return correct ⊆ ack[m] ∧ m ∉ delivered
19: upon event ⟨ ∃(s, m)∈pending SHOULD_DELIVER(m) ⟩ do
20:    delivered := delivered ∪ {m}
21:    trigger ⟨ urb, Deliver | s, m ⟩
Algorithm 2 Majority-Ack Uniform Reliable Broadcast

**Implements:**
UniformReliableBroadcast, instance urb.

**Uses:**
BestEffortBroadcast, instance beb.

1: **upon event** (Init) **do**
2: \( \text{delivered} := \emptyset \)
3: \( \text{pending} := \emptyset \)
4: \( \text{correct} := \Pi \)
5: \( N := |\Pi| \)
6: for all \( m \) do \( \triangleright \) Where \( m \) is a meta variable for a message
7: \( \text{ack}[m] := \emptyset \)
8: **upon event** (urb, Broadcast | \( m \)) **do**
9: \( \text{pending} := \text{pending} \cup \{(\text{self, } m)\} \)
10: **trigger** (beb, Broadcast | [DATA, self, \( m \)])
11: **upon event** (beb, Deliver | \( p, [\text{DATA}, s, m] \)) **do**
12: \( \text{ack}[m] := \text{ack}[m] \cup \{p\} \)
13: if \( (s, m) \notin \text{pending} \) then
14: \( \text{pending} := \text{pending} \cup \{(s, m)\} \)
15: **trigger** (beb, Broadcast | [DATA, s, \( m \)])
16: **function** SHOULDDELIVER(\( m \))
17: **return** \( |\text{ack}[m]| > \frac{N}{2} \land m \notin \text{delivered} \)
18: **upon event** (\( \exists (s, m) \in \text{pending}\text{SHOULDDELIVER}(m) \)) **do**
19: \( \text{delivered} := \text{delivered} \cup \{m\} \)
20: **trigger** (urb, Deliver | \( s, m \))