\[
m\text{Ah} \quad \frac{\text{mAs} \times V}{60^2} \quad \rightarrow \quad \text{M Watts per s} \\

\text{MJ/w/s} \\

\text{HW 1 due tomorrow}
\]

email to valliappan@asu.edu

\text{Professor}
Constructing Spanning tree

Flooding based protocol for tree construction

1) Prove that the protocol would construct a tree
   - proving that no cycles are formed
   - all nodes will be covered.

2) We need to specify the protocol
   - Message Types
   - Local Data Structure
   - Events and actions

neighbors: set of process ids
children: your own id.
1. Initially
   i : my own id
   r : root node id
   neighbors : are set of neighbors i) i in the network
   parent : nil
   children : empty set (Ø)
   others : Ø

2. Upon start
   if i = r and parent = nil then
     1. send M to all neighbors
     2. parent = i

3. Upon recv M from neighbor Pj
   1. If parent is nil then
      a. send <parent> to Pj; b. parent = Pj
      2. Else send <reject> to Pj
4. Upon recv of \(<\text{parent}>\) from \(p_j\)
   a. add \(p_j\) to children set union operator
   b. if children \(U\) others \(\cap\) contains all neighbors except parent then terminate.

5. Upon recv of \(<\text{reject}>\) from \(p_j\)
   a. add \(p_j\) to others
   b.

Q: Does it work for Asynchronous Model?
   -

Q: Complexity?
   Message Complexity: \(2 \times E\times\text{msg}\times(E\text{ is number of types of edge in the network})\)
   \(\Rightarrow 0(E)\) for both for Sync & async model
Time Complexity:

- Synch. Model: $O(D)$
  - $D$: diameter of the network
  - max of shortest distance between any two nodes in the network

- Async Model: $O(N)$
  - since in the worst case the async protocol may construct a "chain"