

Flock Initialization:

- 16 bird songs
- Initialize variables to defaults
- At start, pick your initial song
- Volume, Timbre, and Tempo are part of song
- Also subject to global initialization

Flock State Machine

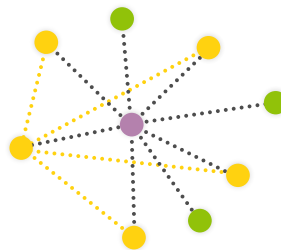
- **WAIT STATE** (silent, go to this state on command)
 - Wait to receive a packet of type AdjustGlobals
 - Turn tri-color LED off and turn on red LED on corner of sound board
 - Ignore SangSong packets from neighbors
 - IF (AdjustGlobals) set clock, go to clear state
 - IF (Command Packet) perform command, change LED, possibly sing song, stay in wait state
- **CLEAR STATE** (silent)
 - Clear correlation FIFO and receive queue data (all historical data)
 - Clear all counter variables
 - Wait for random amount of time (1000- 4000 milliseconds)
 - Go to sing state
- **SING STATE**
 - Choose a song (using provided algorithm) and send to Yamaha chip
 - Collect data from neighbors even while singing
 - After song is finished, send SangSong message
 - Go to listen state
- **LISTEN STATE** (silent, go to this state on reset)
 - Set listen time for random time [minListen, maxListen] msec
 - Listen and collect data from neighbors
 - When listen timer goes off go to sing state
- **STARTLED STATE**
 - Send "startled" song to Yamaha chip
 - Collect data from neighbors even while singing
 - Send startled message to neighbors (remember to decrement hop count)
 - Turn tri-color LED off and red LED on corner of sound board on
 - After finished singing, delay 10 secs, turn off red LED
 - Go to listen state

Active Message Types

- SangSong
 - Inform neighbors as to song that was just completed
- AdjustGlobals
 - Change parameters
- StopNWait
 - Go to wait state
- CommandPacket
 - Adjust LED and possible sing song
- Startled
 - From neighbor, indicated scared bird
- Selected
 - Send back to controller when selected

Flock Details: Listen

- Arriving packets need to be time-stamped
- Packets from Node 0 must be specially treated – they may contain global parameters
- Arriving packets are strength-stamped for RSSI value



Song Decision Algorithm

- Goals
 - Sing the same song for a little while
 - Songs start, then spread, then die out
 - Don't sing the same song too often
- Algorithm
 - Determine nearest songs
 - If our song = any of nearest n, then repeat song
 - If all same, switch to different song
 - If none same, switch to different song
 - If selected song on "black list" pick a different song
- How do we evaluate how effective this algorithm is?

Song Decision Algorithm (cont'd)

```
x = rand() % Probability
y = rand() % Silence
if (x == 0)
  SONG = song with the lowest point value
else if (y == 0)
  Silence, don't sing a song, go back to LISTEN STATE
else
  SONG = song with the highest point value
```

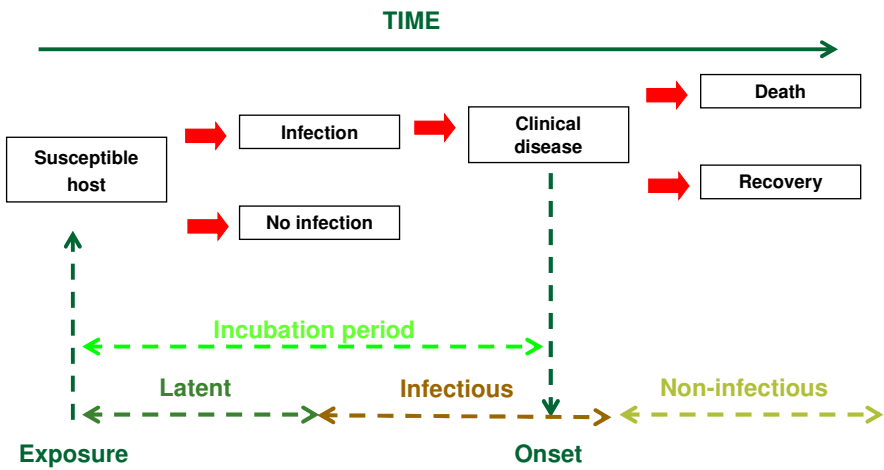
Selection

- Command packets include a range of node IDs (if min=max, then a specific node)
- All selected nodes execute command

The Bird Flu

- The birds can get the bird flu
- If they are exposed to an infected bird:
 - They may get the flu
 - They will die or recover
 - With recovery comes temporary immunity
- A bird's color indicates its health state
 - Green = healthy but susceptible
 - Red = infected
 - Blue = immune

A generic disease model

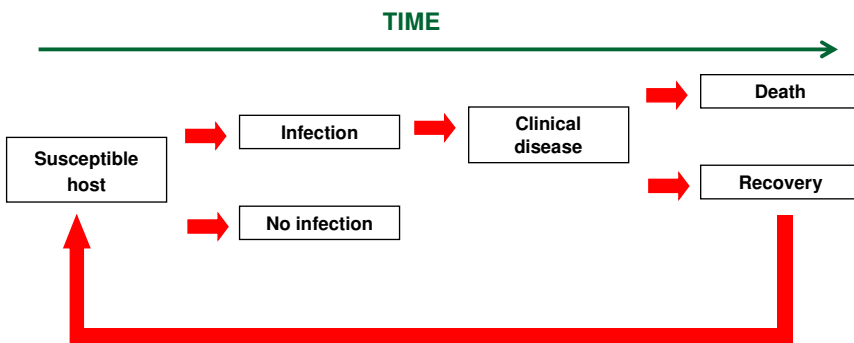


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A generic disease model



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Virus calculation

- When a bird becomes infected, the infection length should be computed by randomly picking a value between two limits.
- A timer should be set for the picked length. When the timer fires, a random number between 0 and 99 should be picked.
- If this number is below the chanceRecovery global, then the health state should be set to IMMUNE, and a timer should be set for a random length of time to set the state back to HEALTHY.
- Otherwise, the health state should be set to DEAD, and the bird should enter the DEAD state.

For Friday, 5/19

- Make three suggestions for improvement to any aspect of the flow or decision algorithm to improve chances of accomplishing this
- Do not consider trivial algorithms
- No Central Control!
- Turn in one page-- computer produced, not handwritten.