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Team 12

18-748: Wireless Sensor Networks (Lab 2)

Our whack-a-mole implementation achieved all the bonus points and normal game functionality. For normal functionality, we implement a 10 game turn. When the slaves receive a command to become a mole, they confirm it with the master to ensure the master and slave are on the same page. When the master determines that the light value is accepted as a “whack”, it will send a command to the node to turn off its RED LED and the slave in turn will send back a response, confirming to the master that it was whacked. The score is kept throughout the game is calculated by the addition of the end mole time - beginning mole time + number of moles seen. This score is printed at the end of the game. For bonus points, we start out with a 15 second timeout for the first mole and every mole after that decreases the timeout by 1 second. If this timeout is reached, a penalty is added to the score. We account for global light change by using a cell-phone flashlight to indicate when the mole is “whacked”. This allows a wider range of light conditions to be accepted as the initial condition as being “not whacked”. Our game is also reconfigurable to account for dead nodes. When the master receives a receive timeout equal to or greater than 10 times, it will assume the device is dead and won’t select it to become a mole in the future.

Estimate on system latency: 0.5 seconds

Worst case time for mole to wake-up: ~0.1 seconds

Lifetime estimate:
(17.4 + 18.8mA) = 36.2 mA per TX/RX cycle

1 cycle per second
60 cycles per hour
60 cycles per hour * 36.2mA per cycle = 2172mAh

With the above numbers in mind and assuming 1800 mAh, that leaves $\frac{1800}{2172} = 0.8287292818$ hours, or 49.7238 minutes.