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Computer Networks CPSC 441 Winter 2018
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ASSIGNMENT#[4]

Adaptive Tree Protocol

To run the program:

```
g++ -o TS TreeSimulation.cpp
./TS
```

The program prompts for 2 inputs: the first, it asks the use to enter the number of ready stations, between 1 - 1024 and second prompt is for the level, which is between 0 and 10.

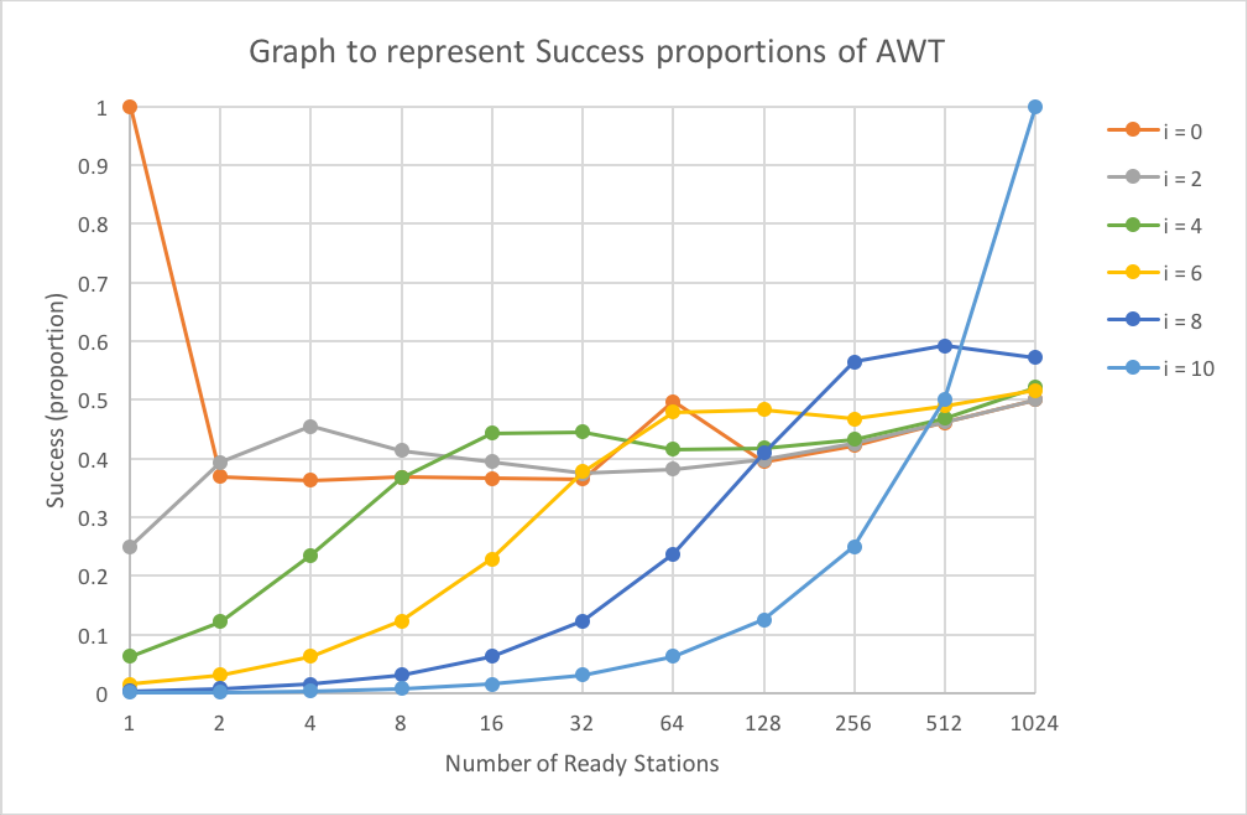
For my testing, I use a random number generation to populate my arrays, and do this process 100 times for get a good average estimate of the AWTs success rate, idle rate and collision rates at each level.

From the data, we can say that as the number of stations increases in the, the number of collisions seem to converge around 0.5. This is however, false for the case, when each each firing is represented by a station. The general trend is upwards in the success and in idle as the number of stations increases and while number of failure decrease.

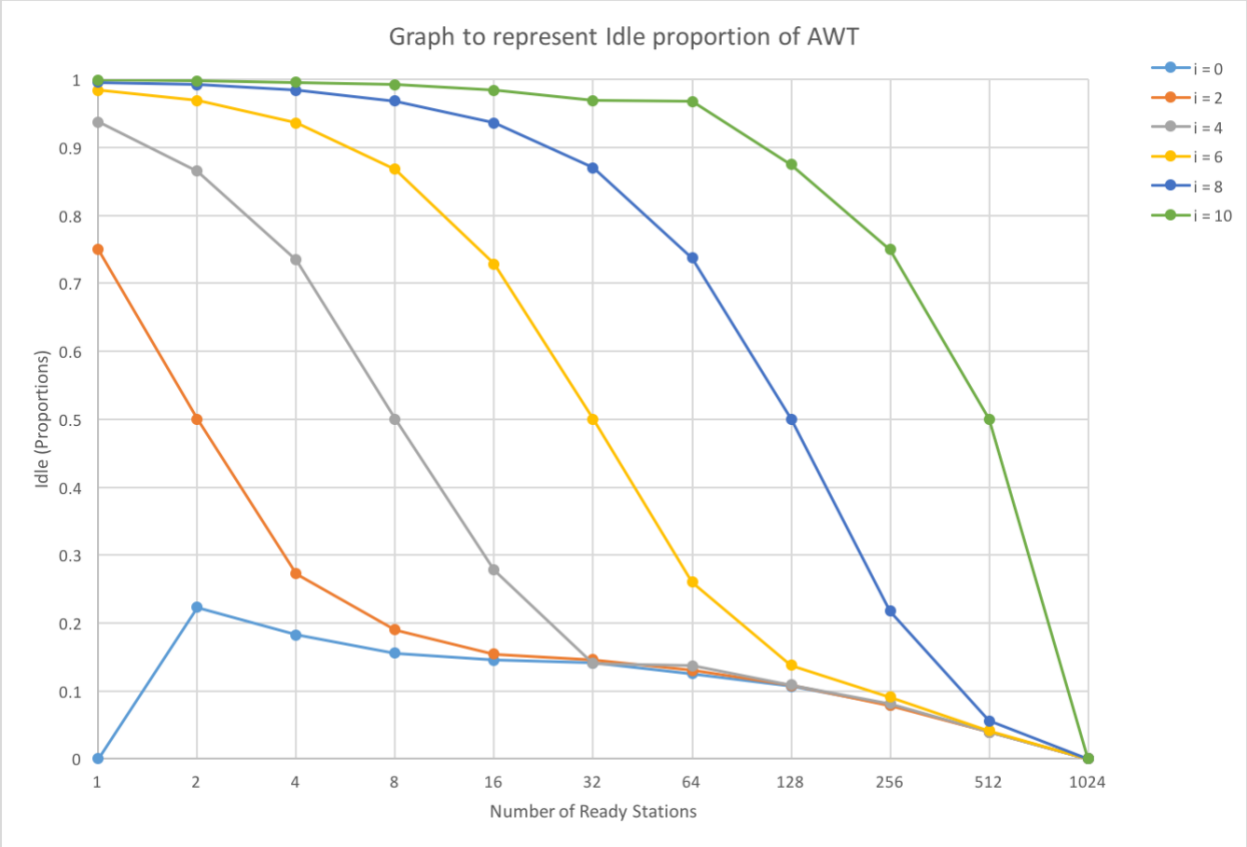
If we are able to provide this algorithm with the number of firing stations, it would allow to for the algorithm to execute at a higher reliability by calculating the nearest power of 2 and finding its log base to find level where the reliability would be more optimal. Graphs and tables are in the following pages.

Submitted by Simran Bhattaraii on April 6, 2018.

		SUCCESS TABLE				
k	i = 0	i = 2	i = 4	i = 6	i = 8	i = 10
1	100%	25%	6.25%	1.56%	0.39%	0.10%
2	36.90%	39.37%	12.16%	3.13%	0.78%	0.20%
4	36.30%	45.45%	23.45%	6.23%	1.56%	0.39%
8	36.76%	41.37%	36.73%	12.27%	3.12%	0.78%
16	36.63%	39.49%	44.35%	22.86%	6.23%	1.56%
32	36.46%	37.46%	44.48%	37.74%	12.33%	3.13%
64	49.71%	38.21%	41.50%	47.85%	23.74%	6.25%
128	39.46%	39.79%	41.76%	48.31%	40.93%	12.50%
256	42.15%	42.46%	43.23%	46.77%	56.46%	25%
512	46.13%	46.24%	46.79%	48.92%	59.21%	50%
1024	50.00%	50%	52.09%	51.61%	57.14%	100%



			IDLE TABLE			
k	i = 0	i = 2	i = 4	i = 6	i = 8	i = 10
1	0	75%	93.75%	98.44%	99.61%	99.90%
2	22.32%	50%	86.50%	96.88%	99.22%	99.80%
4	18.24%	27.27%	73.45%	93.61%	98.43%	99.61%
8	15.53%	18.98%	50%	86.82%	96.83%	99.22%
16	14.51%	15.45%	27.83%	72.86%	93.58%	98.44%
32	14.11%	14.59%	14.01%	49.98%	86.99%	96.88%
64	12.54%	12.98%	13.68%	26.01%	73.74%	96.75%
128	10.69%	10.83%	10.85%	13.77%	50%	87.50%
256	7.94%	7.88%	8.12%	9.07%	21.77%	75%
512	3.91%	3.94%	3.94%	4.14%	5.59%	50%
1024	0%	0%	0%	0%	0%	0%



		COLLISION TABLE				
K	i=0	i=2	i=4	i=6	i=8	10
1	0	0	0	0	0	0
2	40.77%	11%	1.34%	0	0	0
4	45.46%	27.27%	3.11%	0.16%	0.00%	0
8	47.70%	39.66%	9.60%	0.91%	0.04%	0.00%
16	48.89%	45.06%	27.83%	4.27%	0%	0.00%
32	49.43%	47.37%	38.88%	12.24%	0.68%	0.00%
64	49.71%	48.81%	44.81%	26.07%	2.61%	0.00%
128	49.85%	49.38%	47.39%	37.92%	9.07%	0%
256	49.92%	49.67%	48.65%	44.15%	21.77%	0.00%
512	49.95%	49.82%	49.27%	46.94%	35.20%	0.00%
1024	50.00%	50%	47.91%	48.39%	42.86%	0%