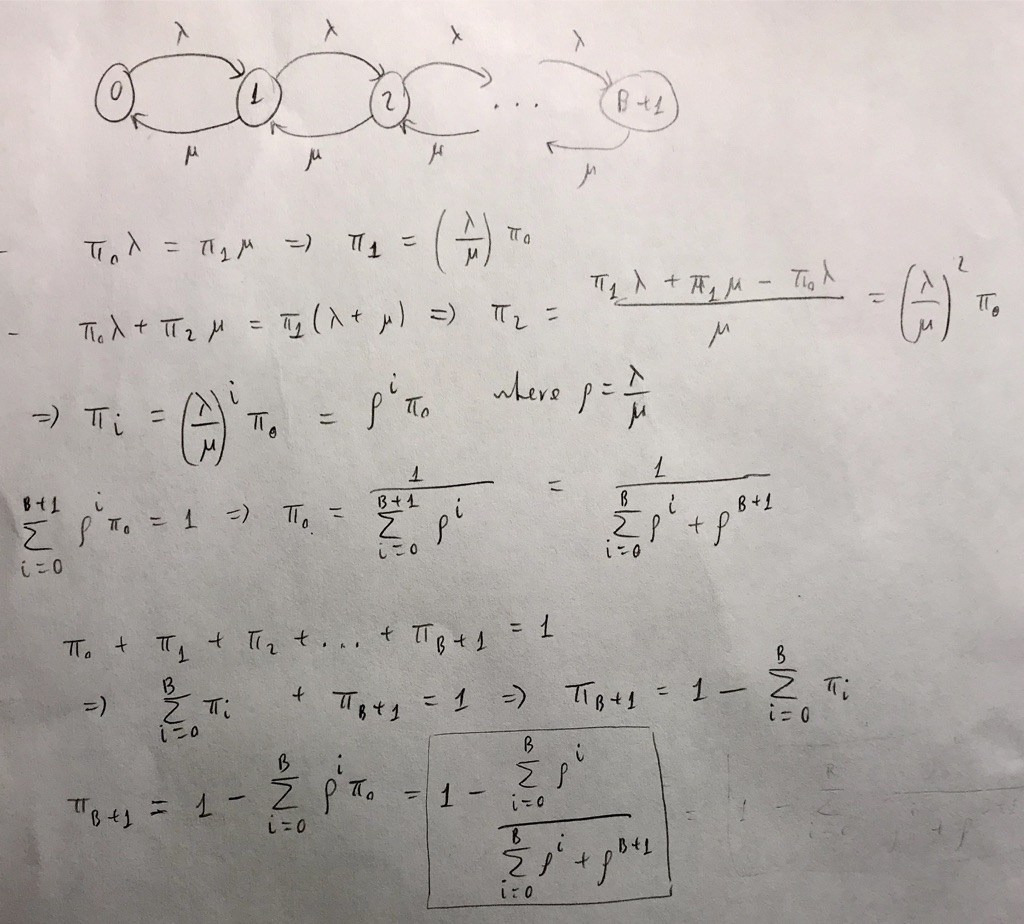
My Nguyen – 914 329 026 Project 2

Jasmin Adzic – 999 883 011

1. **Part 1:**
   1. Derivation of Packet Loss Probability:



* 1. Simulation vs. Theoretical:

|  |  |  |
| --- | --- | --- |
| Lamda | Simulated | Theoretical |
| 0.2 | 1.251 | 1.250 |
| 0.4 | 1.658 | 1.667 |
| 0.6 | 2.529 | 2.500 |
| 0.8 | 4.996 | 5.000 |
| 0.9 | 9.558 | 10.000 |
| 0.99 | 86.938 | 100.000 |

**CALCULATED VALUES THROUGH CODE SIMULATION**

Lambda Count Min Max Mean Median Sd Utilization

0.200 200377 0.000 15.023 1.251 0.867 1.254 0.200

0.400 400070 0.000 18.180 1.658 1.146 1.660 0.399

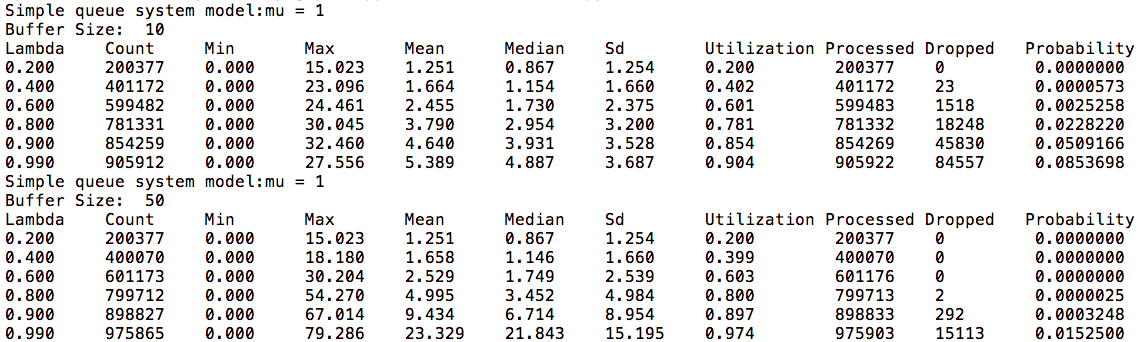
0.600 601173 0.000 30.204 2.529 1.749 2.539 0.603

0.800 799713 0.000 54.270 4.996 3.452 4.988 0.800

* 1. 898679 0.000 90.886 9.558 6.698 9.370 0.897
  2. 991142 0.000 419.359 86.938 64.409 76.626 0.990

Formula to calculate Mean Delay

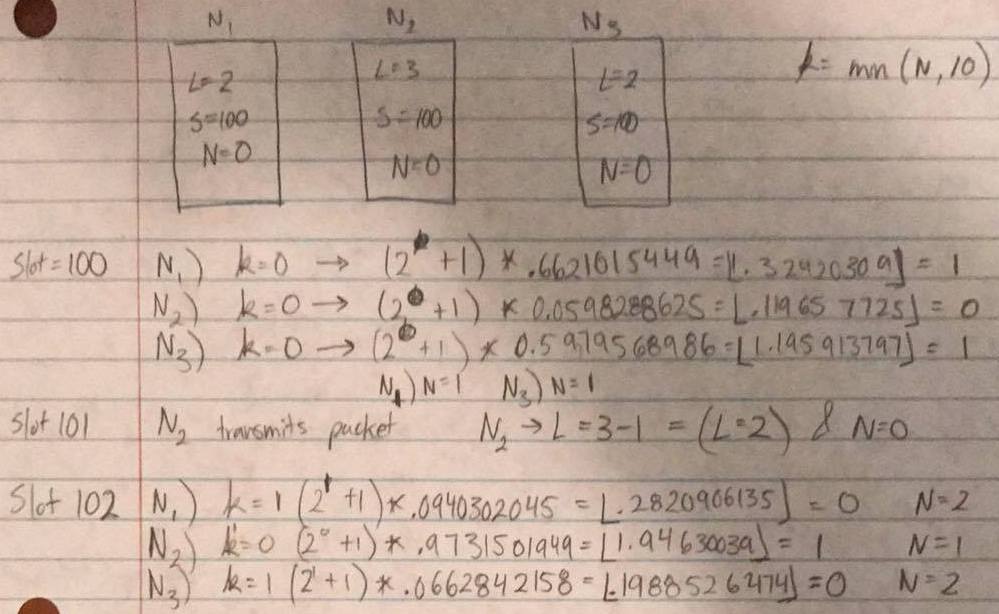
* 1. Simulation Result with finite buffer:

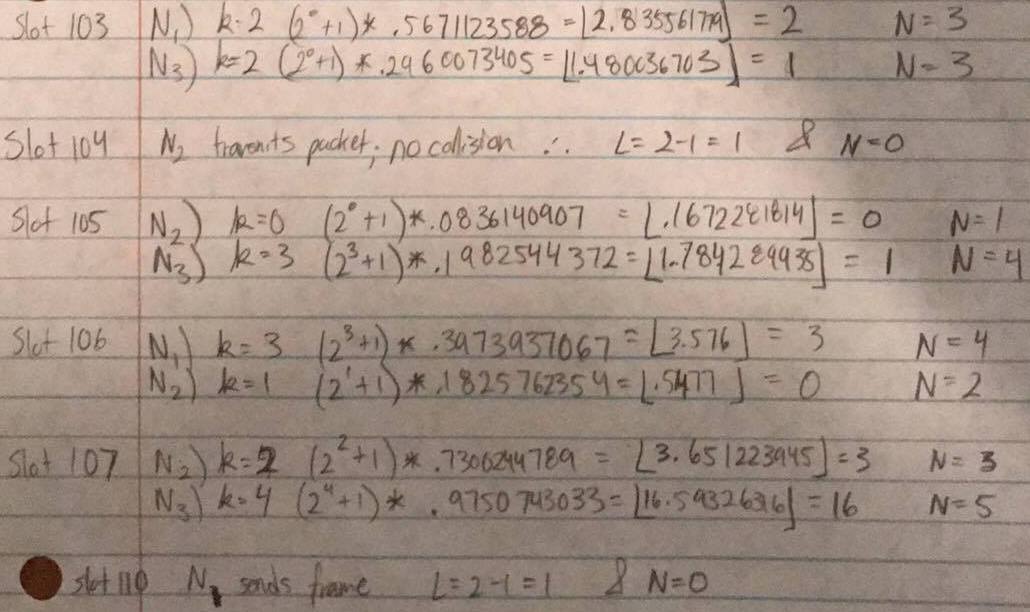


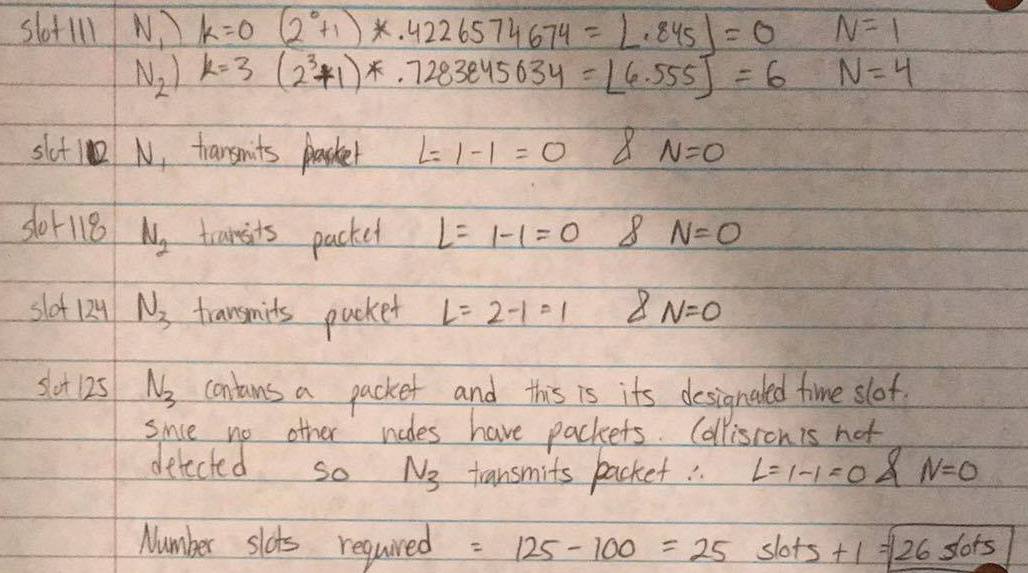
* 1. Packet Loss Probability:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lamda | B = 10 | | B = 50 | |
| Simulated | Theoretical | Simulated | Theoretical |
| 0.2 | 0.0000000 | 0.000000016 | 0.0000000 | 0.000000000 |
| 0.4 | 0.0000573 | 0.000025166 | 0.0000000 | 0.000000000 |
| 0.6 | 0.0025258 | 0.001454354 | 0.0000000 | 0.000000001 |
| 0.8 | 0.0228220 | 0.018447577 | 0.0000025 | 0.000002283 |
| 0.9 | 0.0509166 | 0.0437323736 | 0.0003248 | 0.000465784 |
| 0.99 | 0.0853698 | 0.0788044927 | 0.0152500 | 0.0147151507 |

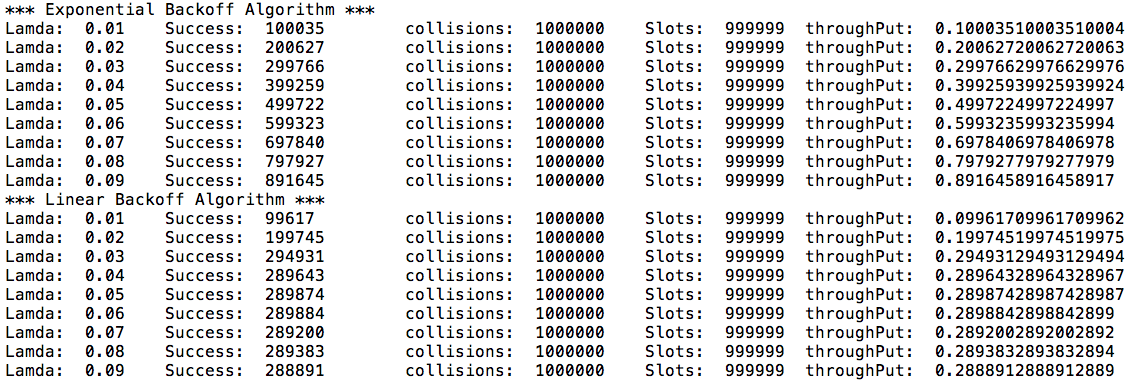
1. **Part 2:**
   1. Sample Execution:







* 1. Simulation Result:



* 1. Exponential and Linear Backoff Algorithm Results:

|  |  |  |
| --- | --- | --- |
| Lamda | Exponential | Linear |
| 0.01 | 0.10003510003510004 | 0.09961709961709962 |
| 0.02 | 0.20062720062720063 | 0.19974519974519975 |
| 0.03 | 0.29976629976629976 | 0.29493129493129494 |
| 0.04 | 0.39925939925939924 | 0.28964328964328967 |
| 0.05 | 0.4997224997224997 | 0.28987428987428987 |
| 0.06 | 0.5993235993235994 | 0.2898842898842899 |
| 0.07 | 0.6978406978406978 | 0.2892002892002892 |
| 0.08 | 0.7979277979277979 | 0.2893832893832894 |
| 0.09 | 0.8916458916458917 | 0.2888912888912889 |