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High Performance Computing - Assignment 1.2

Screenshots

15th April 2021

1 Question 1

```
Device number: 0
i) GPU Name and Warp Size:
  Device name: Tesla T4
  Warp size: 32

ii) Computation Capabilities  and memory sizes:
  Compute capability: 7.5
  Clock Rate: 1590000 kHz
  Total SMs: 40
  Shared Memory Per SM: 65536 bytes
  Registers Per SM: 65536 32-bit
  Max threads per SM: 1024
  L2 Cache Size: 4194304 bytes
  Total Global Memory: 15843721216 bytes
  Memory Clock Rate: 5001000 kHz

iii) Max Block Dimensions and Grid Dimensions:
  Max threads per block: 1024
  Max threads in X-dimension of block: 1024
  Max threads in Y-dimension of block: 1024
  Max threads in Z-dimension of block: 64

  Max blocks in X-dimension of grid: 2147483647
  Max blocks in Y-dimension of grid: 65535
  Max blocks in Z-dimension of grid: 65535

  Shared Memory Per Block: 49152 bytes
  Registers Per Block: 65536 32-bit
  Warp size: 32
```

2 Question 2

Input:

```
char h_string[500000] = "Today, there were many people who wished me well.";
char h_pattern[100] = "well";
```

This should match at position 45.

Output:

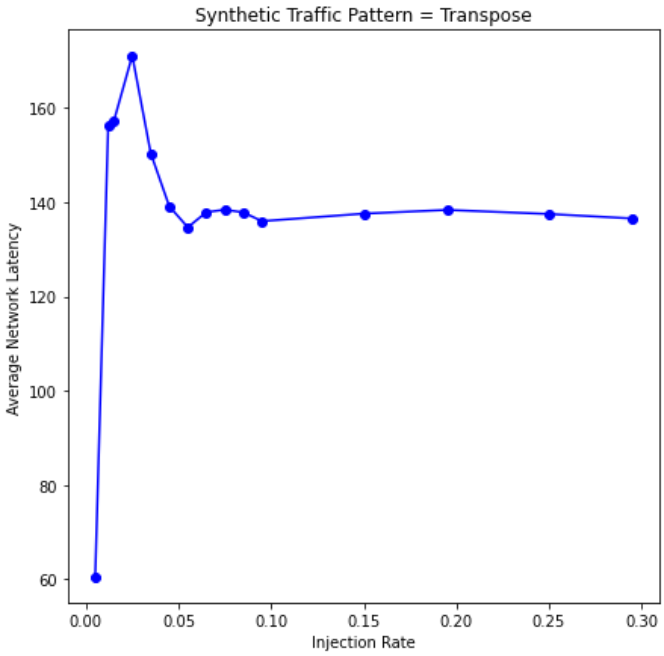
```
4 7 2 4

Pattern Found at position: 45
```

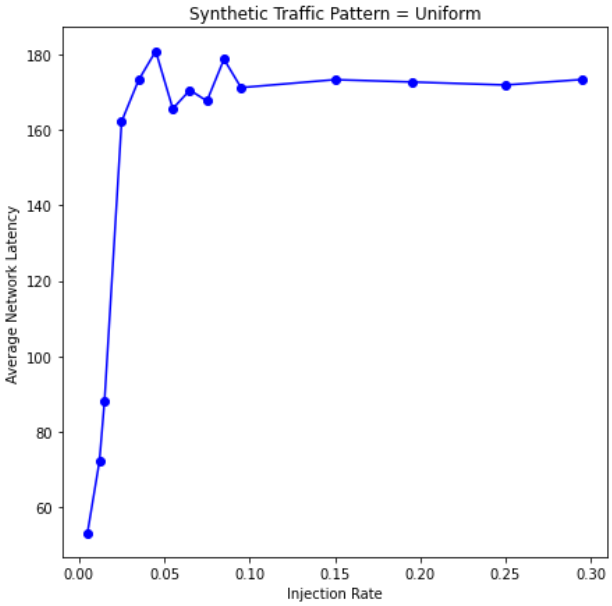
3 Question 3

Graphs:

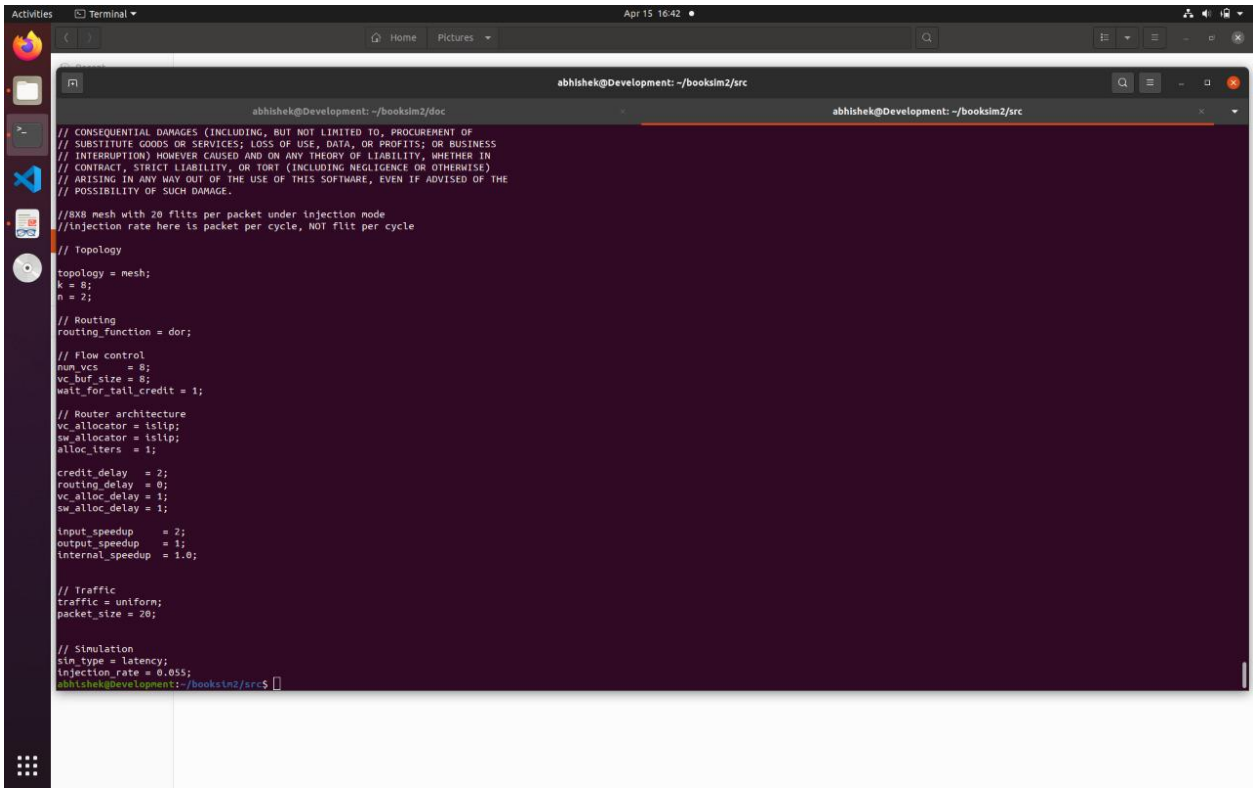
- **Synthetic Traffic Pattern : Transpose**

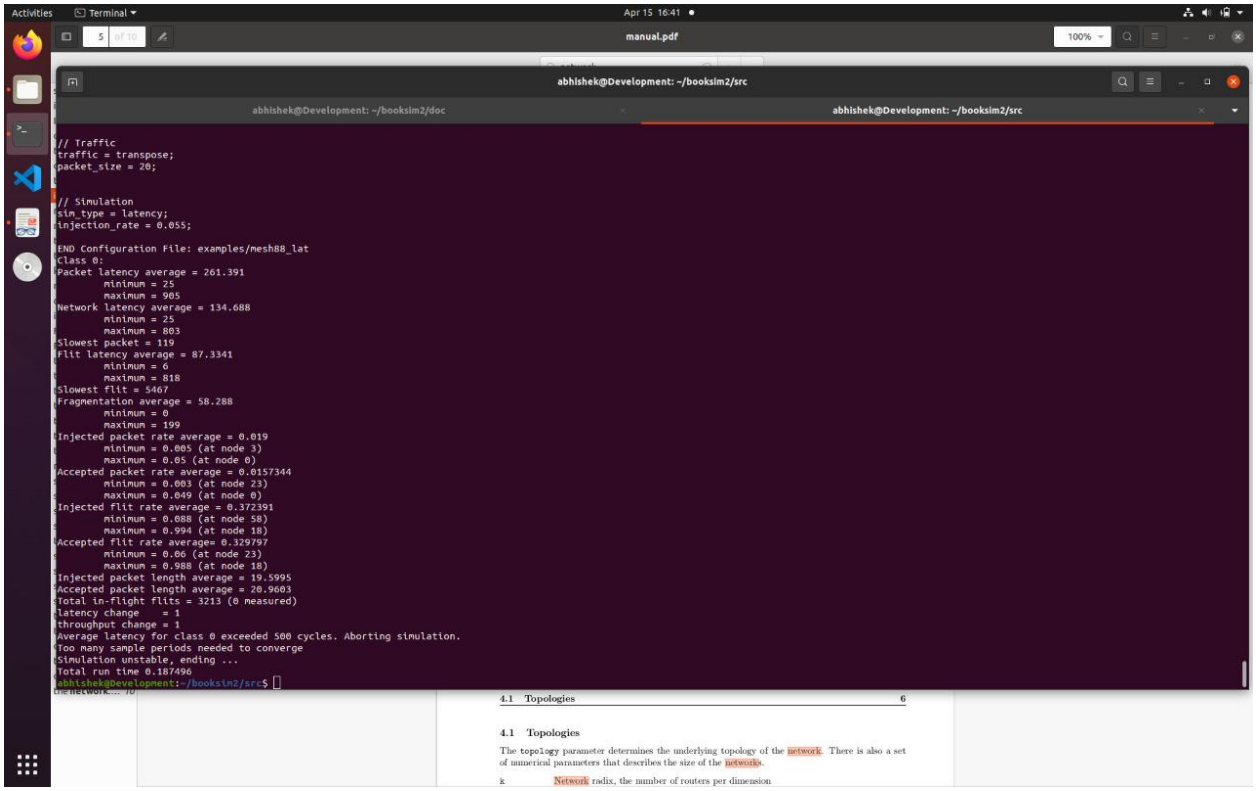


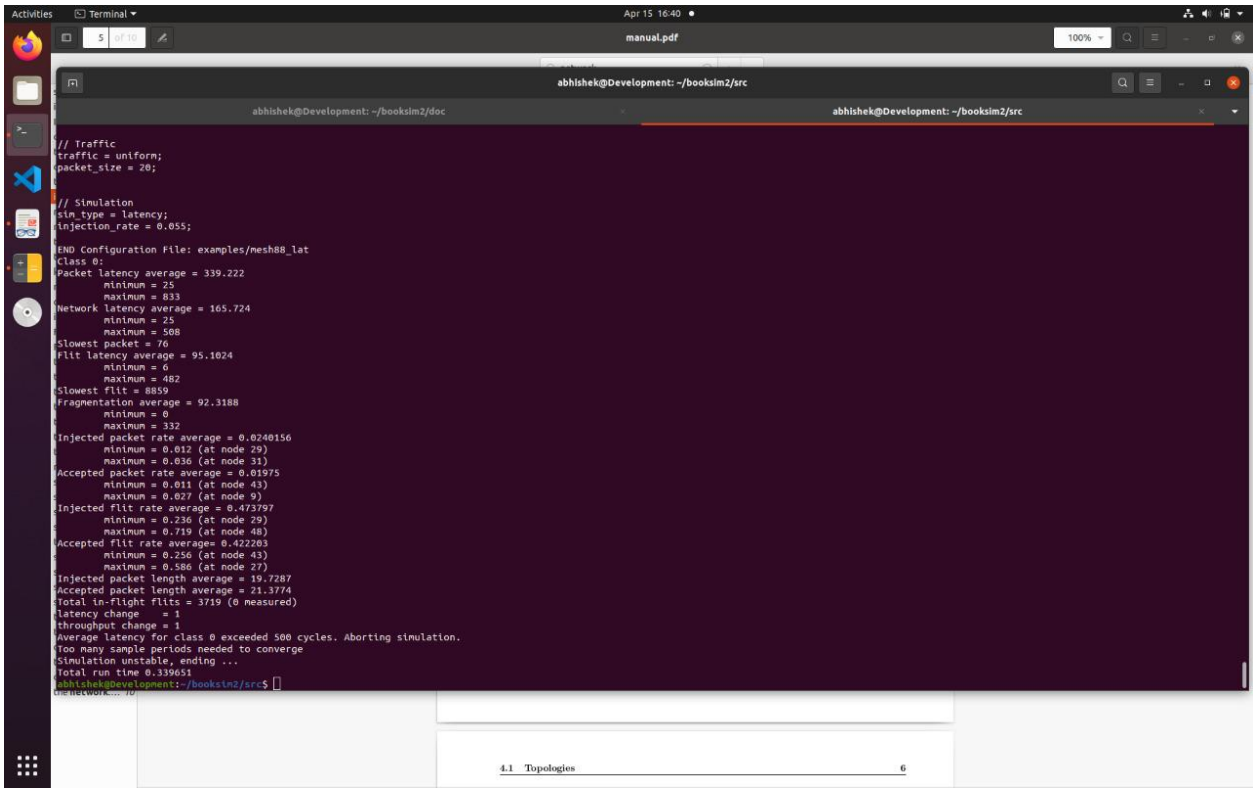
- **Synthetic Traffic Pattern : Uniform**



Some Screenshots of Question3:




Activities
Terminal
Apr 15 16:41
manual.pdf
100%
abhishek@Development: ~/booksim2/src
abhishek@Development: ~/booksim2/doc
abhishek@Development: ~/booksim2/src
// Traffic
traffic = transpose;
packet_size = 20;
// Simulation
sim_type = latency;
injection_rate = 0.055;
END Configuration File: examples/mesh88_lat
Class 0:
Packet latency average = 261.391
minimum = 25
maximum = 905
Network latency average = 134.688
minimum = 25
maximum = 803
Slowest packet = 119
Flit latency average = 87.3341
minimum = 6
maximum = 818
Slowest flit = 5467
Fragmentation average = 58.288
minimum = 0
maximum = 199
Injected packet rate average = 0.019
minimum = 0.005 (at node 3)
maximum = 0.05 (at node 0)
Accepted packet rate average = 0.0157344
minimum = 0.003 (at node 23)
maximum = 0.049 (at node 0)
Injected flit rate average = 0.372391
minimum = 0.088 (at node 58)
maximum = 0.994 (at node 18)
Accepted flit rate average= 0.329797
minimum = 0.06 (at node 23)
maximum = 0.988 (at node 18)
Injected packet length average = 19.5995
Accepted packet length average = 20.9603
Total in-flight flits = 3213 (0 measured)
latency change = 1
throughput change = 1
Average latency for class 0 exceeded 500 cycles. Aborting simulation.
Too many sample periods needed to converge
Simulation unstable, ending ...
Total run time 0.187496
abhishek@Development:~/booksim2/src$
4.1 Topologies 6
4.1 Topologies
The topology parameter determines the underlying topology of the network. There is also a set of numerical parameters that describes the size of the networks.
k Network radix, the number of routers per dimension


Activities
Terminal
Apr 15 16:40
manual.pdf
100%
abhishek@Development: ~/booksim2/src
abhishek@Development: ~/booksim2/doc
abhishek@Development: ~/booksim2/src
// Traffic
traffic = uniform;
packet_size = 20;
// Simulation
sim_type = latency;
injection_rate = 0.055;
END Configuration File: examples/mesh88_lat
Class 0:
Packet latency average = 339.222
minimum = 25
maximum = 833
Network latency average = 165.724
minimum = 25
maximum = 508
Slowest packet = 76
Flit latency average = 95.1024
minimum = 6
maximum = 482
Slowest flit = 8859
Fragmentation average = 92.3188
minimum = 0
maximum = 332
Injected packet rate average = 0.0240156
minimum = 0.012 (at node 29)
maximum = 0.036 (at node 31)
Accepted packet rate average = 0.01975
minimum = 0.011 (at node 43)
maximum = 0.027 (at node 9)
Injected flit rate average = 0.473797
minimum = 0.236 (at node 29)
maximum = 0.719 (at node 48)
Accepted flit rate average= 0.422263
minimum = 0.256 (at node 43)
maximum = 0.586 (at node 27)
Injected packet length average = 19.7287
Accepted packet length average = 21.3774
Total in-flight flits = 3719 (0 measured)
latency change = 1
throughput change = 1
Average latency for class 0 exceeded 500 cycles. Aborting simulation.
Too many sample periods needed to converge
Simulation unstable, ending ...
Total run time 0.339651
abhishek@Development:~/booksim2/src$
4.1 Topologies 6