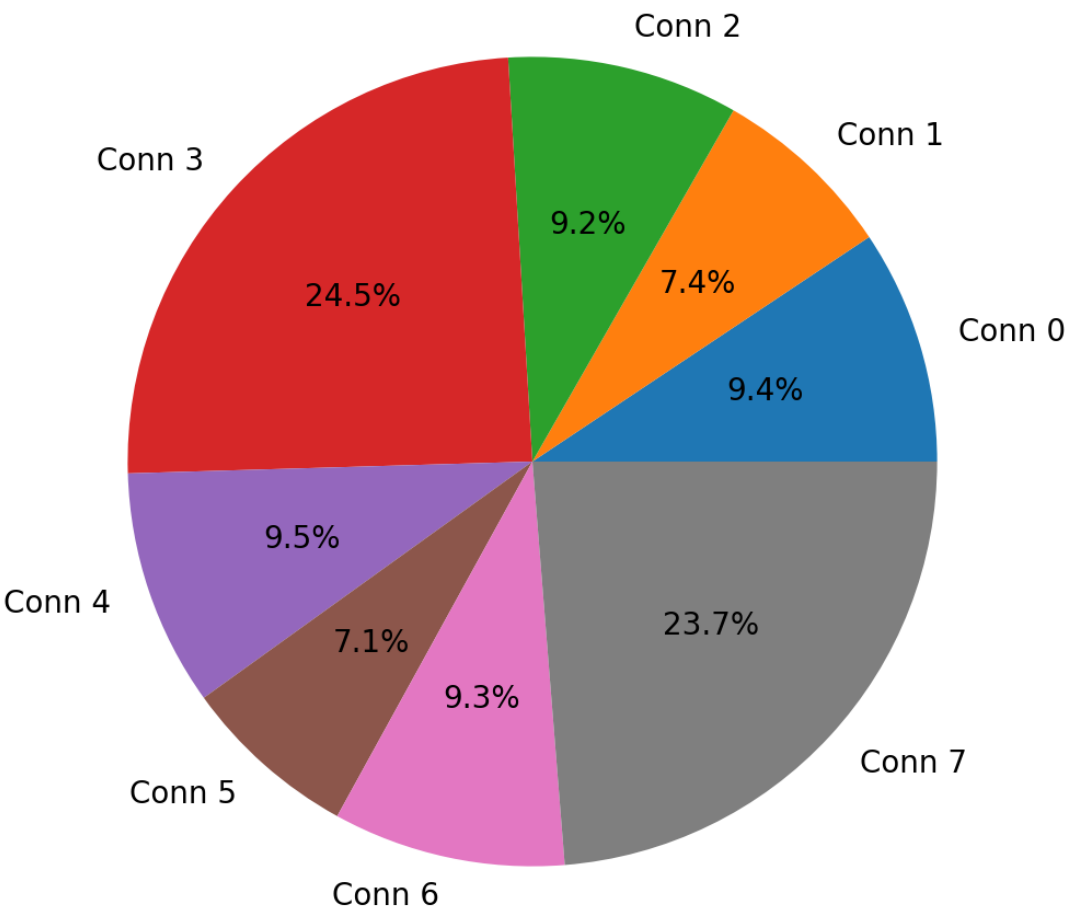
Assignment 4 - Report

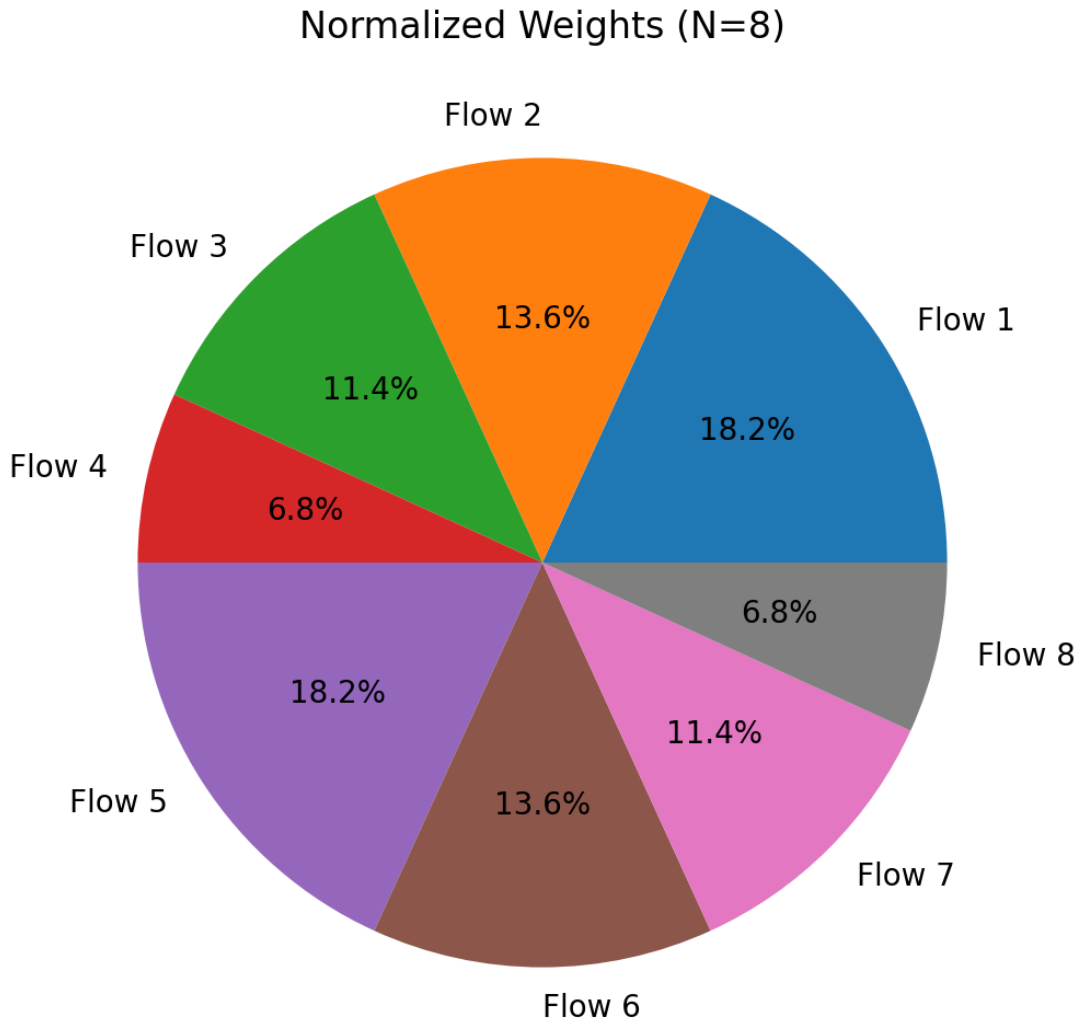
1. Observations for N = 8

```
N=8 T=100000 C=100000 B=100
10 1000 1500 4 0.03 0.8
20 500 1200 3 0.02 0.7
20 750 1500 2.5 0.05 0.9
100 1000 1800 1.5 0.01 0.9
10 1000 1500 4 0.03 0.8
20 500 1200 3 0.02 0.7
20 750 1500 2.5 0.05 0.9
100 1000 1800 1.5 0.01 0.9
```

connID	Bg	Bt	Bt/Bg	linkFraction	avg delay	avg dr proba
0	113576141	68342532	0.601733	683.425320	1.820467	0.2049
1	77077813	51983901	0.674434	519.839010	1.183591	0.1174
2	125677769	70389009	0.560075	703.890090	3.960397	0.2699
3	314537056	174972231	0.556285	1749.722310	4.115603	0.3443
4	113913335	69251950	0.607935	692.519500	1.827067	0.2032
5	76870259	52041308	0.677002	520.413080	1.287901	0.1179
6	124103712	69906473	0.563291	699.064730	4.093746	0.2658
7	311029361	173466481	0.557717	1734.664810	4.744083	0.3443

Link fraction graph


Normalized Link Fraction (N=8)
Conn 2
Conn 1
Conn 3
9.2%
7.4%
24.5%
Conn 0
9.4%
9.5%
Conn 4
7.1%
23.7%
9.3%
Conn 7
Conn 5
Conn 6

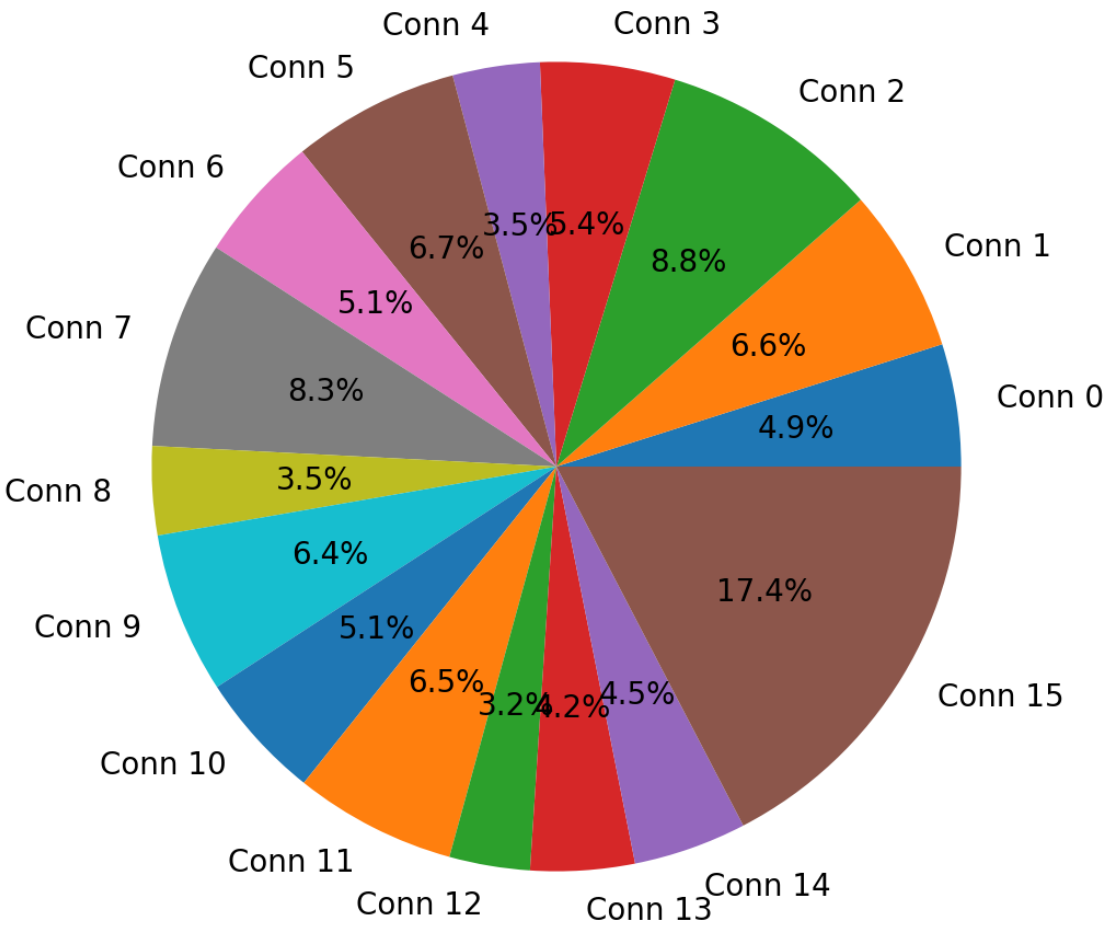


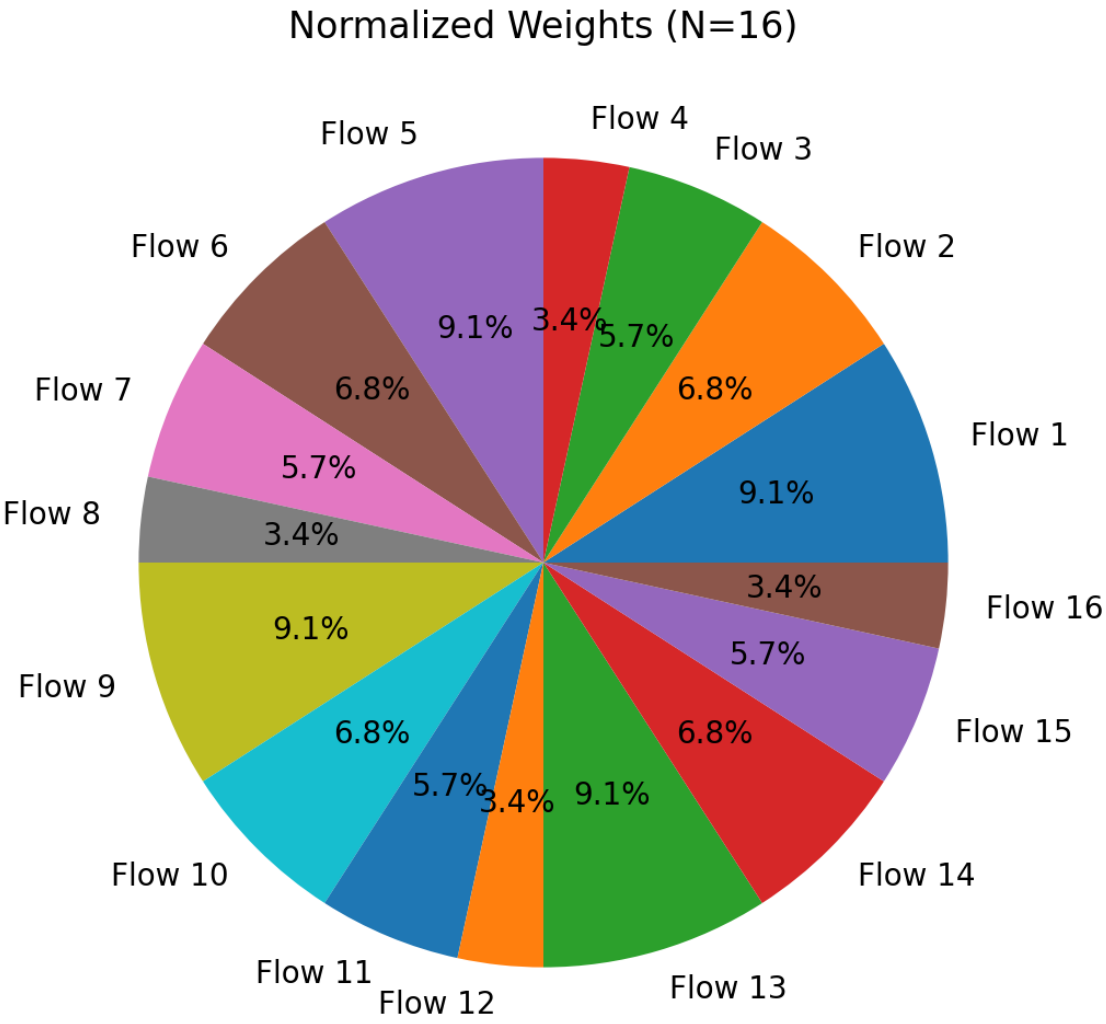
2. Observations for N = 16

```
N=16 T=100000 C=100000 B=100
10 1000 1500 4 0.03 0.8
20 500 1200 3 0.02 0.7
20 750 1500 2.5 0.05 0.9
100 1000 1800 1.5 0.01 0.9
10 1000 1500 4 0.03 0.8
20 500 1200 3 0.02 0.7
20 750 1500 2.5 0.05 0.9
100 1000 1800 1.5 0.01 0.9
10 1000 1500 4 0.03 0.8
20 500 1200 3 0.02 0.7
```

```
20 750 1500 2.5 0.05 0.9
100 1000 1800 1.5 0.01 0.9
10 1000 1500 4 0.03 0.8
20 500 1200 3 0.02 0.7
20 750 1500 2.5 0.05 0.9
100 1000 1800 1.5 0.01 0.9
```

connID	Bg	Bt	Bt/Bg	linkFraction	avg delay	avg drop probabil
0	98495120	4646106	0.047171	46.461060	5.153239	0.938495
1	74020614	2971522	0.040145	29.715220	4.016792	0.949313
2	109564947	7563310	0.069030	75.633100	5.325944	0.908979
3	275086890	6509555	0.023664	65.095550	4.386582	0.973601
4	98752308	5486310	0.055556	54.863100	4.141440	0.927282
5	64322492	5529296	0.085962	55.292960	5.207629	0.883937
6	110720811	8178961	0.073870	81.789610	5.631133	0.903319
7	281602239	6269018	0.022262	62.690180	4.486705	0.974776
8	98171233	5162028	0.052582	51.620280	4.535108	0.926049
9	75409102	2724683	0.036132	27.246830	4.692448	0.951924
10	110736577	4303787	0.038865	43.037870	5.474057	0.945827
11	285340048	4641318	0.016266	46.413180	2.950961	0.981561
12	97917700	4561198	0.046582	45.611980	4.560791	0.934689
13	74233849	2409207	0.032454	24.092070	4.154314	0.956234
14	115589917	4002059	0.034623	40.020590	4.531509	0.953094
15	288660344	4969941	0.017217	49.699410	3.809859	0.980491


Normalized Link Fraction (N=16)
Conn 0
4.9%
Conn 1
6.6%
Conn 2
8.8%
Conn 3
5.4%
Conn 4
3.5%
Conn 5
6.7%
Conn 6
5.1%
Conn 7
8.3%
Conn 8
3.5%
Conn 9
6.4%
Conn 10
5.1%
Conn 11
6.5%
Conn 12
3.2%
Conn 13
4.2%
Conn 14
4.5%
Conn 15
17.4%



Conclusions

- Jain's Fairness Index for this weighted system
  - `N = 8` : 0.801
  - `N = 16` : 0.835
- While the individual distributions are not very aligned to the weights, the fairness index comes out to be relatively reasonable
- Another aspect to be noticed is that similarly weighted flows have similar distributions, while their relative contributions might not be corresponding to their weight
- The other metrics such as `avgPacketDelay` and `avgPacketDropProbability` follow the same trend

- The `avgPacketDelay` is around the same as having to wait for the entire buffer (`B = 100`) to clear out and then get processed. This is including the exponential `interArrivalTime`, therefore it is also reasonable.
- The server utilisation *i.e.* the average of `Bt/Bg` is around `60%` for `N = 8` and is significantly lower for `N = 16`