SIM Frequently asked Questions

1. What do OUTPUT BUFFER ARRIVAL STATS, OUTPUT BUFFER DEPARTURE STATS, OUTPUT BUFFER TIME AVERAGE OCCUPANCY STATS mean?

   Ans: OUTPUT BUFFER ARRIVAL STATS, OUTPUT BUFFER DEPARTURE STATS, OUTPUT TIME AVERAGE OCCUPANCY STATS, are all statistics for the output buffer. Each of the above give the size i.e. occupancy of the output buffer. The first one gives the size of the output buffer i.e. Q(t) as seen by arrivals to the OQ, the second one gives the statistics as seen by departures to the OQ, and the third one simply gives the average over all time. The histograms mean the same thing, except that they give a more detailed break up than the STATS.

2. What does OUTPUT BUFFER LATENCY STATS mean?

   Ans: This gives the delay faced by a cell in the queue i.e. the difference between the departure time and the arrival time of the packet.

3. I ran SIM with $sim -i 4 -o 4 -l 10000 and it gave me an error.

   Ans: The switch configuration information in SIM should be given in a configuration file. The -f option should be specified while giving the configuration. Versions of SIM greater than 2.30 no longer support command line specification of the switch information.

4. I downloaded SIM from the Web Page and it does not compile.

   Ans: Here is what you need to do to compile SIM. Do a $make depend followed by $createsim -sim to compile SIM for terminal mode operation. In case you want to run SIM with SimGraph (a graphical interface to visualise switch simulation data) use $createsim -simgraph.

5. I did a make depend and $createsim -sim, but sim still does not compile.

   Ans: We have heard of this problem from some users. In such a case the best thing to do is to open all the makefiles in the SIM directory and it's subdirectory and delete all the dependencies create by make depend. These are all the lines below the line in the Makefile which says ".... make depend depends on it". Now you will have clean makefiles. Then run $make depend followed by $createsim -sim.

6. The histogram's show only occupancies for bins 0, 2, 4, 8, 16.. Why is this? Is this fishy?

   A) No. This is not fishy. SIM reports histogram occupancies either in a linear fashion, or sometime in a logarithmic manner, if there are too many different values to be shown. The definition of bin's differ based on whether the bin's are reported in a linear manner or logarithmic manner. More information on the definition of bin's is given below.

7. Input Buffer (1, 6). Does the 6 refers to the virtual output queue 6 for output 6 for input 1?

   Ans. Yes. It does.

8. The "Occupancy seen by the Arrivals", for VOQ(1,6). Is that the occupancy of VOQ 6 seen by arrivals to VOQ 6? Or is it the combined queue length of all the VOQs seen by arrivals to VOQ 6.

   Ans. It is the former.

9. So what do these bins for histograms mean anyway?

   Ans. Say that we are looking at histograms of the queue occupancy. If SIM outputs histograms with bins as 0,1,2,3,.. etc. Then that means that SIM is reporting for how many instances, did it see a queue occupancy of 0,1,2,3. This

is the case when the bins are linear. Now, suppose SIM outputs bins as 0,2,4,8,16. That means SIM is outputting data in logarithmic mode. Then Bin "8" in the above example means that SIM saw between between 5 and 8 cells in the queue. Similarly, bin 16 means that it saw between 9 and 16 cells in the queue. SIM automatically does that when it has a lot of bins to report.

10. The SIM simulator does not give me the "Queue occupancy based on arrival" for the input queue. Instead it only gives me the "queue occupancy based on arrivals for each different VOQ". What should I do to get the "Queue occupancy based on arrival" for the whole input queue.

    A) Imagine that you are trying to find the expected value of a process P. Now, you know the expected values of P_1 and P_2, where P = P_1 + P_2. How can you calculate E(P)?

11. Do the stats under the heading "Histogram: Aggregated Time Avg Arrival Occupancy for Input Buffer 1" refer to the average seen by arrivals or the time occupancy averages?

    Ans: Hmm. This is a very confusing output from SIM. It stands for the Time Average occupancy and NOT the arrival occupancy. Again, note that histograms are NOT needed for solving the MIDTERM problem. So it should not affect you.

12. The following shows the table for "Input Buffer Latency Stats". a. What does "Pri" stand for in the table?

    Ans: "pri" stands for the number of priorities in the queues. SIM allows you to do things like create multiple levels of strict priorities in the queues. In the question given in class, all cells have the same priority.

13. What does the number in brackets (i.e. 4440) represent?

```
14.    INPUT BUFFER LATENCY STATS
15.    -------------------------
16.    I/P O/P   Pri  Avg   SD
17.    ----------------------
18.      1   0   0   1.73694 2.54503 (4440)
```

Ans: The number in the brackets are the number of instances, that the values have been calculated for. For example, depending on the statistics being seen it represents the number of time intervals, or the number of arrival instants etc.

19. Q2. The following shows the "Input Buffer Time Avg...". Once again: a. What does the number (49999) represent?

Ans: As stated above, in this case 49999 represents the fact that it took the average over 49,999 time intervals.

20. How in the world, did it get 49,999 time intervals? I usually input much nicer numbers :)

A) Well it looks like the simulation was run for 100,000 time slots. Sim will by default ignore half the time intervals so that the initial transients are ignored. Then it takes the statistics over the remaining half of the time intervals. SIM exits on the last time slot before keeping aggregate statistics, so that gives (100,000/2) -1 = 49,999 time slots.

21. Consider the output:-

```
22.
23.  INPUT BUFFER TIME AVG OCCUPANCY STATS
24.    ------------------------------------
25.    I/P O/P   Pri  Avg   SD
26.    ----------------------
27.      1   0   0   0.15422 0.36737 (49999)
28.
29.     c. The last line of the above table (not shown above) read as:
30.
31.     1   X 1.211 0.895 (50000)
32.
```

What does the "X" mean?

Ans: The last line of the output is the aggregated time average occupancy for the whole input queue. So SIM, maintains the value for the whole queue i.e. (1,*), so that you dont have to calculate it individually using the VOQ statistics.

33. For Qs 3a). The "time average occupancy of input queue 1"... is this for all the VOQs at input 1 combined, or is it for any tagged VOQ?

    Ans: The question in the midterm for both parts a, b, asks you to check that for the whole input i.e. (1,*).