**Q1:**

*For 1000 users*

When the system is simulated without admission control, the statistics are as follows:

* *Number of call attempts not counting retries:  11393*
* *Number of call attempts including retries:  22638*
* *Number of dropped calls:  6528*
* *Number of blocked calls due to signal strength:  2215*
* *Number of blocked calls due to channel capacity:  0*
* *Number of successfully completed calls:  2621*
* *Number of calls in progress at any given time:  26*
* *Number of failed calls (blocks + drops):  8743*
* *Current cell radius (most distant connected user):  9.65399883631*
* *Ratio of the number of dropped calls to the number of completed calls: 2.4945509207065015*

**Analysis**:

As seen from the statistics, majority of the calls failed are due to them being dropped to admit new users into the system (can be noticed that fewer call attempts are being blocked). It means that as new users get added to the system (their calls get connected), the interference value goes up significantly thereby decreasing the respective SINR values. Hence, the on-call users SINR values fail to meet the 6dB criterion and are therefore dropped.

The blocking of attempting callers is solely due to their failure to meet the RSL criterion. There are no blocks due to channel capacity. This is justified for the fact that a substantial number of users are dropped before their call is completed.

**Q2:**

When the system is simulated with admission control (Cd = 20 & Ci = 15), the statistics are as follows:

* *Number of call attempts not counting retries:  11474*
* *Number of call attempts including retries:  39957*
* *Number of dropped calls:  79*
* *Number of blocked calls due to signal strength:  9104*
* *Number of blocked calls due to channel capacity:  0*
* *Number of successfully completed calls:  2272*
* *Number of calls in progress at any given time:  14*
* *Number of failed calls (blocks + drops):  9183*
* *Current cell radius (most distant connected user):  8.98936912069*
* *Ratio of the number of dropped calls to the number of completed calls:* 0.035868625756266204

**Analysis**:

As observed, the dropped calls are significantly reduced, meaning that the connected users have very little probability of their call being dropped, ensuring the call quality (reliability of being on-call). However, the number of users being blocked is substantial high with admission control. This is justified for the fact that the Pilot EIRP changes dynamically and more often resulting in failure to meet the RSL criterion. The cell radius is relatively lower than that without admission control.

**Q3.**

*For 10000 users*

When the system is simulated without admission control (Cd = 57 & Ci = 0), the statistics are as follows:

* *Number of call attempts not counting retries:  117874*
* *Number of call attempts including retries:  237148*
* *Number of dropped calls:  86860*
* *Number of blocked calls due to signal strength:  24500*
* *Number of blocked calls due to channel capacity:  468*
* *Number of successfully completed calls:  5981*
* *Number of calls in progress at any given time:  43*
* *Number of failed calls (blocks + drops):  111828*

When the system is simulated with admission control (Cd = 20 & Ci = 15), the statistics are as follows:

* *Number of call attempts not counting retries:  117516*
* *Number of call attempts including retries:  336309*
* *Number of dropped calls:  54800*
* *Number of blocked calls due to signal strength:  57690*
* *Number of blocked calls due to channel capacity:  68*
* *Number of successfully completed calls:  4888*
* *Number of calls in progress at any given time:  31*
* *Number of failed calls (blocks + drops):  112558*

**Analysis**:

As noticed, with admission control in place, the number of calls blocked due to channel capacity decreases drastically.

\*\*To run the simulation, please run the file “***main\_func.py*”**, with all other files in same folder.

HONOR PLEDGE: I pledge on my honor that I have not given or received any unauthorized assistance on this assignment.

Signature: ***Satya Sesha Sai Praneeth Yeleswarapu***