**ENTS 656 PROJECT REPORT**

**PYTHON APPLICATION WHICH WILL SIMULATE THE DOWNLINK BEHAVIOR OF A 3-SECTORED BASESTATION**

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**Pre Run:**

Welcome to Python application which will simulate the downlink behavior of a 3-sectored basestation

Statistics for 1 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 6)

('The number of call attempts ', 182)

('The number of successful calls', 176)

('The number of successful handoffs ', 113)

('The number of handoff failures into and out of each sector', 2)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 5)

('The number of call attempts ', 160)

('The number of successful calls', 155)

('The number of successful handoffs ', 112)

('The number of handoff failures into and out of each sector', 2)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

**Q1: Run your simulation for six hours with the parameters given. How many problems (e.g. drops, blocks, hand off failures) occur? What percentage of call attempts have a problem? Does this basestation perform well?**

***Less than 2% to of the call attempts have a problem to no probability of failure. This basestation performs well. As you can see that for in 160 call attempts, there are 153 successful calls.***

Welcome to Python application which will simulate the downlink behavior of a 3-sectored basestation

Statistics for 1 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 7)

('The number of call attempts ', 160)

('The number of successful calls', 153)

('The number of successful handoffs ', 76)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 5)

('The number of call attempts ', 137)

('The number of successful calls', 132)

('The number of successful handoffs ', 77)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

Statistics for 2 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 7)

('The number of call attempts ', 307)

('The number of successful calls', 300)

('The number of successful handoffs ', 176)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 2)

('The number of call attempts ', 312)

('The number of successful calls', 310)

('The number of successful handoffs ', 175)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

Statistics for 3 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 4)

('The number of call attempts ', 469)

('The number of successful calls', 465)

('The number of successful handoffs ', 266)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 5)

('The number of call attempts ', 486)

('The number of successful calls', 481)

('The number of successful handoffs ', 267)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

Statistics for 4 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 7)

('The number of call attempts ', 618)

('The number of successful calls', 611)

('The number of successful handoffs ', 350)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 3)

('The number of call attempts ', 647)

('The number of successful calls', 644)

('The number of successful handoffs ', 347)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

Statistics for 5 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 4)

('The number of call attempts ', 766)

('The number of successful calls', 762)

('The number of successful handoffs ', 439)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 4)

('The number of call attempts ', 799)

('The number of successful calls', 795)

('The number of successful handoffs ', 438)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

Statistics for 6 hour

**\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\***

**('The number of channels currently ', 3)**

**('The number of call attempts ', 931)**

**('The number of successful calls', 928)**

**('The number of successful handoffs ', 538)**

**('The number of handoff failures into and out of each sector', 0)**

**('The number of call drops due to capacity', 0)**

**('The number of call drops due to low signal strength ', 0)**

**\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\***

**('The number of channels currently ', 3)**

**('The number of call attempts ', 949)**

**('The number of successful calls', 946)**

**('The number of successful handoffs ', 539)**

**('The number of handoff failures into and out of each sector', 0)**

**('The number of call drops due to capacity', 0)**

**('The number of call drops due to low signal strength ', 0)**

Q2: Change the length of the road from 6 km to 8 km and move the basestation so it is still at the midway point (20m west and 4 km up from the bottom). Rerun your simulation for six hours. How many problems occur now, and what is the new percentage? Compared to Q1, what is the main cause of the additional problems? (e.g. drops from signal strength? Or blocks from capacity? Or Hand off failures? Etc.)

***Even after changing the road length, the amount of call problems is very low.***

Welcome to Python application which will simulate the downlink behavior of a 3-sectored basestation

Statistics for 1 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 2)

('The number of call attempts ', 162)

('The number of successful calls', 160)

('The number of successful handoffs ', 49)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 7)

('The number of call attempts ', 142)

('The number of successful calls', 135)

('The number of successful handoffs ', 49)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

Statistics for 2 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 3)

('The number of call attempts ', 333)

('The number of successful calls', 330)

('The number of successful handoffs ', 125)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 3)

('The number of call attempts ', 292)

('The number of successful calls', 289)

('The number of successful handoffs ', 124)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

Statistics for 3 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 3)

('The number of call attempts ', 531)

('The number of successful calls', 528)

('The number of successful handoffs ', 204)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 8)

('The number of call attempts ', 443)

('The number of successful calls', 435)

('The number of successful handoffs ', 204)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

Statistics for 4 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 1)

('The number of call attempts ', 692)

('The number of successful calls', 691)

('The number of successful handoffs ', 267)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 607)

('The number of successful calls', 598)

('The number of successful handoffs ', 268)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

Statistics for 5 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 1)

('The number of call attempts ', 848)

('The number of successful calls', 847)

('The number of successful handoffs ', 329)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 5)

('The number of call attempts ', 739)

('The number of successful calls', 734)

('The number of successful handoffs ', 330)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 0)

('The number of call drops due to low signal strength ', 0)

Statistics for 6 hour

**\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\***

**('The number of channels currently ', 1)**

**('The number of call attempts ', 1009)**

**('The number of successful calls', 1008)**

**('The number of successful handoffs ', 397)**

**('The number of handoff failures into and out of each sector', 0)**

**('The number of call drops due to capacity', 0)**

**('The number of call drops due to low signal strength ', 0)**

**\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\***

**('The number of channels currently ', 2)**

**('The number of call attempts ', 904)**

**('The number of successful calls', 902)**

**('The number of successful handoffs ', 397)**

**('The number of handoff failures into and out of each sector', 0)**

**('The number of call drops due to capacity', 0)**

**('The number of call drops due to low signal strength ', 0)**

Q3: Change the length of the road back to 6 km (and put the basestation back where it was). Double the number of users (from 160 to 320). Rerun your simulation for six hours. How many problems occur now, and what is the new percentage? Compared to Q1, what is the main cause of the additional problems (e.g. drops from signal strength? Or blocks from capacity? Or Hand off failures? Etc.)

***The problems are highlighted below,***

***Beta Sector: 25% to 44% of call attemps have a problem***

***Alpha Sector: 20% to 43% of call attempts have a problem***

***Due to the increase number of users these problems arise.***

Welcome to Python application which will simulate the downlink behavior of a 3-sectored basestation

Statistics for 1 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 303)

('The number of successful calls', 294)

('The number of successful handoffs ', 191)

('The number of handoff failures into and out of each sector', 50)

('The number of call drops due to capacity', 35)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 8)

('The number of call attempts ', 300)

('The number of successful calls', 292)

('The number of successful handoffs ', 191)

('The number of handoff failures into and out of each sector', 50)

('The number of call drops due to capacity', 15)

('The number of call drops due to low signal strength ', 0)

Statistics for 2 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 7)

('The number of call attempts ', 598)

('The number of successful calls', 591)

('The number of successful handoffs ', 387)

('The number of handoff failures into and out of each sector', 253)

('The number of call drops due to capacity', 95)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 575)

('The number of successful calls', 566)

('The number of successful handoffs ', 385)

('The number of handoff failures into and out of each sector', 253)

('The number of call drops due to capacity', 23)

('The number of call drops due to low signal strength ', 0)

Statistics for 3 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 15)

('The number of call attempts ', 894)

('The number of successful calls', 877)

('The number of successful handoffs ', 585)

('The number of handoff failures into and out of each sector', 340)

('The number of call drops due to capacity', 140)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 10)

('The number of call attempts ', 858)

('The number of successful calls', 848)

('The number of successful handoffs ', 584)

('The number of handoff failures into and out of each sector', 340)

('The number of call drops due to capacity', 56)

('The number of call drops due to low signal strength ', 0)

Statistics for 4 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 15)

('The number of call attempts ', 1184)

('The number of successful calls', 1168)

('The number of successful handoffs ', 766)

('The number of handoff failures into and out of each sector', 570)

('The number of call drops due to capacity', 173)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 13)

('The number of call attempts ', 1178)

('The number of successful calls', 1165)

('The number of successful handoffs ', 766)

('The number of handoff failures into and out of each sector', 570)

('The number of call drops due to capacity', 149)

('The number of call drops due to low signal strength ', 0)

Statistics for 5 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 1453)

('The number of successful calls', 1444)

('The number of successful handoffs ', 934)

('The number of handoff failures into and out of each sector', 628)

('The number of call drops due to capacity', 183)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 5)

('The number of call attempts ', 1466)

('The number of successful calls', 1461)

('The number of successful handoffs ', 934)

('The number of handoff failures into and out of each sector', 628)

('The number of call drops due to capacity', 171)

('The number of call drops due to low signal strength ', 0)

Statistics for 6 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 8)

('The number of call attempts ', 1737)

('The number of successful calls', 1729)

('The number of successful handoffs ', 1104)

('The number of handoff failures into and out of each sector', 649)

('The number of call drops due to capacity', 220)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 1736)

('The number of successful calls', 1727)

('The number of successful handoffs ', 1104)

('The number of handoff failures into and out of each sector', 649)

('The number of call drops due to capacity', 184)

('The number of call drops due to low signal strength ', 0)

**Q4: Add a call to the numpy.random.seed function at the beginning of your code so it generates the same “random” numbers every time. Change the handoff margin (HOm) to 5 db and rerun, then change the hand off margin to 0 db and rerun (keep the users at 320 as in Q3 along with the rest of the simulation). What is the effect on the number of hand offs?**

***The number of handoffs have been increased from the previous run when the seed function is added. More Handoff occurs when HOm 5dB compared to 0dB, please see stats below. And as per adding the numpy.random.seed function the values of the handoffs sum to approximately the same total.***

Welcome to Python application which will simulate the downlink behavior of a 3-sectored basestation

Statistics for 1 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 13)

('The number of call attempts ', 296)

('The number of successful calls', 283)

('The number of successful handoffs ', 176)

('The number of handoff failures into and out of each sector', 51)

('The number of call drops due to capacity', 10)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 272)

('The number of successful calls', 263)

('The number of successful handoffs ', 176)

('The number of handoff failures into and out of each sector', 51)

('The number of call drops due to capacity', 50)

('The number of call drops due to low signal strength ', 0)

Statistics for 2 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 10)

('The number of call attempts ', 579)

('The number of successful calls', 569)

('The number of successful handoffs ', 335)

('The number of handoff failures into and out of each sector', 101)

('The number of call drops due to capacity', 21)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 13)

('The number of call attempts ', 582)

('The number of successful calls', 569)

('The number of successful handoffs ', 337)

('The number of handoff failures into and out of each sector', 101)

('The number of call drops due to capacity', 73)

('The number of call drops due to low signal strength ', 0)

Statistics for 3 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 7)

('The number of call attempts ', 891)

('The number of successful calls', 883)

('The number of successful handoffs ', 513)

('The number of handoff failures into and out of each sector', 268)

('The number of call drops due to capacity', 43)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 8)

('The number of call attempts ', 893)

('The number of successful calls', 885)

('The number of successful handoffs ', 513)

('The number of handoff failures into and out of each sector', 268)

('The number of call drops due to capacity', 107)

('The number of call drops due to low signal strength ', 0)

Statistics for 4 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 4)

('The number of call attempts ', 1177)

('The number of successful calls', 1173)

('The number of successful handoffs ', 711)

('The number of handoff failures into and out of each sector', 382)

('The number of call drops due to capacity', 58)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 14)

('The number of call attempts ', 1238)

('The number of successful calls', 1224)

('The number of successful handoffs ', 713)

('The number of handoff failures into and out of each sector', 382)

('The number of call drops due to capacity', 162)

('The number of call drops due to low signal strength ', 0)

Statistics for 5 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 13)

('The number of call attempts ', 1516)

('The number of successful calls', 1503)

('The number of successful handoffs ', 911)

('The number of handoff failures into and out of each sector', 536)

('The number of call drops due to capacity', 121)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 12)

('The number of call attempts ', 1532)

('The number of successful calls', 1520)

('The number of successful handoffs ', 912)

('The number of handoff failures into and out of each sector', 536)

('The number of call drops due to capacity', 249)

('The number of call drops due to low signal strength ', 0)

Statistics for 6 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 1840)

('The number of successful calls', 1829)

('The number of successful handoffs ', 1108)

('The number of handoff failures into and out of each sector', 660)

('The number of call drops due to capacity', 169)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 10)

('The number of call attempts ', 1858)

('The number of successful calls', 1846)

('The number of successful handoffs ', 1104)

('The number of handoff failures into and out of each sector', 658)

('The number of call drops due to capacity', 273)

('The number of call drops due to low signal strength ', 0)

**AFTER CHANGING THE HANDOFF MARGIN TO 5DB**

Welcome to Python application which will simulate the downlink behavior of a 3-sectored basestation

Statistics for 1 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 12)

('The number of call attempts ', 296)

('The number of successful calls', 283)

('The number of successful handoffs ', 176)

('The number of handoff failures into and out of each sector', 51)

('The number of call drops due to capacity', 10)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 10)

('The number of call attempts ', 273)

('The number of successful calls', 263)

('The number of successful handoffs ', 176)

('The number of handoff failures into and out of each sector', 51)

('The number of call drops due to capacity', 50)

('The number of call drops due to low signal strength ', 0)

Statistics for 2 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 625)

('The number of successful calls', 616)

('The number of successful handoffs ', 351)

('The number of handoff failures into and out of each sector', 165)

('The number of call drops due to capacity', 57)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 6)

('The number of call attempts ', 564)

('The number of successful calls', 558)

('The number of successful handoffs ', 351)

('The number of handoff failures into and out of each sector', 165)

('The number of call drops due to capacity', 77)

('The number of call drops due to low signal strength ', 0)

Statistics for 3 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 10)

('The number of call attempts ', 902)

('The number of successful calls', 892)

('The number of successful handoffs ', 519)

('The number of handoff failures into and out of each sector', 261)

('The number of call drops due to capacity', 79)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 6)

('The number of call attempts ', 857)

('The number of successful calls', 851)

('The number of successful handoffs ', 522)

('The number of handoff failures into and out of each sector', 261)

('The number of call drops due to capacity', 107)

('The number of call drops due to low signal strength ', 0)

Statistics for 4 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 5)

('The number of call attempts ', 1197)

('The number of successful calls', 1192)

('The number of successful handoffs ', 703)

('The number of handoff failures into and out of each sector', 332)

('The number of call drops due to capacity', 106)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 11)

('The number of call attempts ', 1168)

('The number of successful calls', 1157)

('The number of successful handoffs ', 703)

('The number of handoff failures into and out of each sector', 332)

('The number of call drops due to capacity', 138)

('The number of call drops due to low signal strength ', 0)

Statistics for 5 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 8)

('The number of call attempts ', 1522)

('The number of successful calls', 1514)

('The number of successful handoffs ', 882)

('The number of handoff failures into and out of each sector', 388)

('The number of call drops due to capacity', 148)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 14)

('The number of call attempts ', 1492)

('The number of successful calls', 1478)

('The number of successful handoffs ', 883)

('The number of handoff failures into and out of each sector', 388)

('The number of call drops due to capacity', 168)

('The number of call drops due to low signal strength ', 0)

Statistics for 6 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 1816)

('The number of successful calls', 1807)

('The number of successful handoffs ', 1065)

('The number of handoff failures into and out of each sector', 480)

('The number of call drops due to capacity', 194)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 8)

('The number of call attempts ', 1773)

('The number of successful calls', 1765)

('The number of successful handoffs ', 1064)

('The number of handoff failures into and out of each sector', 480)

('The number of call drops due to capacity', 210)

('The number of call drops due to low signal strength ', 0)

**AFTER CHANGING THE HANDOFF MARGIN TO 0dB**

Welcome to Python application which will simulate the downlink behavior of a 3-sectored basestation

Statistics for 1 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 316)

('The number of successful calls', 307)

('The number of successful handoffs ', 202)

('The number of handoff failures into and out of each sector', 141)

('The number of call drops due to capacity', 45)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 11)

('The number of call attempts ', 297)

('The number of successful calls', 286)

('The number of successful handoffs ', 203)

('The number of handoff failures into and out of each sector', 141)

('The number of call drops due to capacity', 49)

('The number of call drops due to low signal strength ', 0)

Statistics for 2 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 8)

('The number of call attempts ', 653)

('The number of successful calls', 645)

('The number of successful handoffs ', 407)

('The number of handoff failures into and out of each sector', 235)

('The number of call drops due to capacity', 79)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 8)

('The number of call attempts ', 594)

('The number of successful calls', 586)

('The number of successful handoffs ', 407)

('The number of handoff failures into and out of each sector', 235)

('The number of call drops due to capacity', 119)

('The number of call drops due to low signal strength ', 0)

Statistics for 3 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 6)

('The number of call attempts ', 959)

('The number of successful calls', 953)

('The number of successful handoffs ', 586)

('The number of handoff failures into and out of each sector', 373)

('The number of call drops due to capacity', 112)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 7)

('The number of call attempts ', 903)

('The number of successful calls', 896)

('The number of successful handoffs ', 585)

('The number of handoff failures into and out of each sector', 373)

('The number of call drops due to capacity', 164)

('The number of call drops due to low signal strength ', 0)

Statistics for 4 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 1234)

('The number of successful calls', 1225)

('The number of successful handoffs ', 761)

('The number of handoff failures into and out of each sector', 421)

('The number of call drops due to capacity', 147)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 13)

('The number of call attempts ', 1228)

('The number of successful calls', 1215)

('The number of successful handoffs ', 761)

('The number of handoff failures into and out of each sector', 421)

('The number of call drops due to capacity', 207)

('The number of call drops due to low signal strength ', 0)

Statistics for 5 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 6)

('The number of call attempts ', 1550)

('The number of successful calls', 1544)

('The number of successful handoffs ', 945)

('The number of handoff failures into and out of each sector', 462)

('The number of call drops due to capacity', 173)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 11)

('The number of call attempts ', 1551)

('The number of successful calls', 1540)

('The number of successful handoffs ', 946)

('The number of handoff failures into and out of each sector', 462)

('The number of call drops due to capacity', 245)

('The number of call drops due to low signal strength ', 0)

Statistics for 6 hour

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 11)

('The number of call attempts ', 1871)

('The number of successful calls', 1860)

('The number of successful handoffs ', 1149)

('The number of handoff failures into and out of each sector', 778)

('The number of call drops due to capacity', 250)

('The number of call drops due to low signal strength ', 0)

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 9)

('The number of call attempts ', 1852)

('The number of successful calls', 1842)

('The number of successful handoffs ', 1149)

('The number of handoff failures into and out of each sector', 778)

('The number of call drops due to capacity', 286)

('The number of call drops due to low signal strength ', 0)

**TO TEST DROP CALLS**

\*\*\*\*\*\*\*\*\*\*\*\*\* beta \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 15)

('The number of call attempts ', 16)

('The number of successful calls', 5)

('The number of successful handoffs ', 2)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 599)

**('The number of call drops due to low signal strength ', 1)**

\*\*\*\*\*\*\*\*\*\*\*\*\* alpha \*\*\*\*\*\*\*\*\*\*\*\*\*\*

('The number of channels currently ', 15)

('The number of call attempts ', 24)

('The number of successful calls', 5)

('The number of successful handoffs ', 2)

('The number of handoff failures into and out of each sector', 0)

('The number of call drops due to capacity', 655)

**('The number of call drops due to low signal strength ', 1)**

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

Signature\_\_\_\_**RANJITHA RATCHAGAN\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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Signature\_\_\_\_**RANJITHA RATCHAGAN\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**