Universal College of Engineering, Kaman
Department of Computer Engineering
Subject: Mobile Computing

Experiment No: 2

Aim: Implement Frequency User Cell Clusters

Theory:

Frequency Reuse is the scheme in which allocation and reuse of channels throughout a coverage region is done. Each cellular base station is allocated a group of radio channels or Frequency sub-bands to be used within a small geographic area known as a cell. The shape of the cell is Hexagonal. The process of selecting and allocating the frequency sub-bands for all of the cellular base stations within a system is called Frequency reuse or Frequency Planning.

Salient features of using Frequency Reuse:

- Frequency reuse improve the spectral efficiency and signal Quality (QoS).
- Frequency reuse classical scheme proposed for GSM systems offers a protection against interference.
- The number of times a frequency can be reused is depend on the tolerance capacity of the radio channel from the nearby transmitter that is using the same frequencies.
- In Frequency Reuse scheme, total bandwidth is divided into different sub-bands that are used by cells.
- Frequency reuse scheme allow WiMax system operators to reuse the same frequencies at different cell sites

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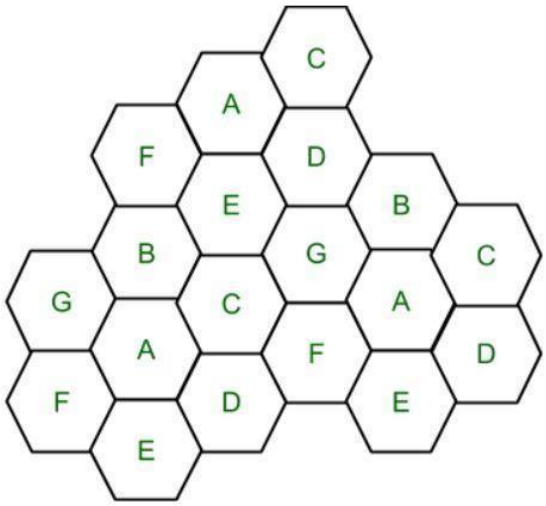

Cell with the same letter uses the same set of channels group or frequencies sub-band. To find the total number of channel allocated to a cell: S = Total number of duplex channels available to use k = Channels allocated to each cell (k<S) N = Total number of cells or Cluster Size Then Total number of channels (S) will be,

$S = kN$

Frequency Reuse Factor = 1/N

In the above diagram cluster size is 7 (A,B,C,D,E,F,G) thus frequency reuse factor is 1/7. N is the number of cells which collectively use the complete set of available frequencies is called a Cluster. The value of N is calculated by the following formula:

$N = I2 + I*J + J2$ Where I,J = 0,1,2,3…

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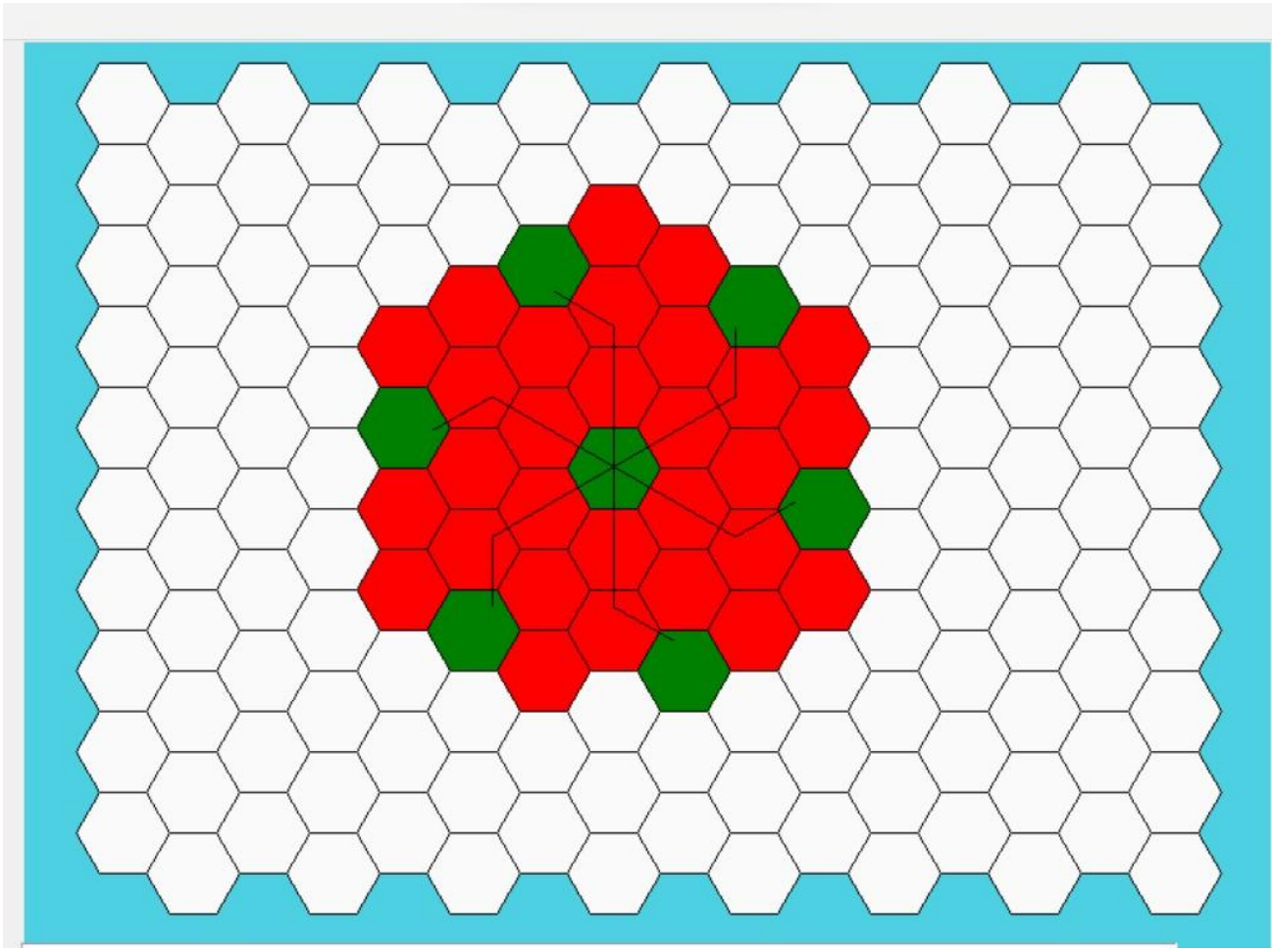
Github Link :

https://github.com/sachinskill/MC-EXPERIMENTS/tree/main/EXP2%20Frequency%20Reuse

Screenshots of the Output:



Conclusion: Hence, we have successfully implemented and learned about the frequency reuse of cell clusters by using the python platform.