Programming Assignment #2

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Wireless Sensor Network (WSN) Coverage (150 points)

Please implement a wireless sensor network (WSN) coverage and communication simulator program in C/C++ (for runtime speed) or Java. Each sensor has both a smaller coverage range and a bigger communication range. The command and options to run the program are:

    -h   for get this help page
    -s   for square area (default is round area)
    -d   for debugging (e.g., print coverage map)
    -a <num>   the size/diameter of a square/round area (default 64)
    -m <num>   the method to choose random locations (default 1) where 1
                for folding, 2 for lsb, 3 for scale, and 4 for msb
    -r <num>   the sensing range of each sensor (default 16)
    -c <num>   the communication range of each sensor (default 32)
    -n <num>   divide the are into regions per dimension (default 1)
    -p <num>   the percentage to cover by sensor (default 100%)
    -f <num>   the fixed seed for random number generator (default 0)
    –k <num>   for k-coverage

Example Input:
-a 1024 –r 32 –c 128 –p 95

Example Output (when the second message is corrupted):
Need 409 sensors to cover 95% of the circle area with diameter 1024.
Need 409 sensors to connect all nodes under the circle area with diameter 1024.
The sensor locations are:
  (950, 270), (847, 161), …, (895, 46)