Programming Assignment #2

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Tuesday & Thursday 9:00-9:30pm

Due date: October 20, 2013

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)

Student Name:

SSN/ID:

Score:

Correctness and boundary condition (62%):

Whitespace and free format compliance (4%):

Error Handling (4%):

Compiling without warning/error (2%):

Modular design, file/directory organizing, showing input, documentation, coding standards, sympathy/typing point with README (24%):

Automation (4%):

Extra Bonus:

Derive mathematic model based on constant distribution (20%)

Subtotal:

Late penalty (20% per day):

Special service penalty (4%):

Total score: