Module1_Creation of WSN for given area and plotting.

```
close all;
clear;
clc;

%creation of WSN

% Field Dimensions in meters %
xm=100;
ym=100;
x=0; % added for better display results of the plot
y=0; % added for better display results of the plot
% Number of Nodes in the field %
n=100;
% Number of Dead Nodes in the beggining %
dead_nodes=0;
% Coordinates of the Sink (location is predetermined in this simulation) %
sinkx=50;
sinky=200;


% Initial Energy of a Node (in Joules) %
Eo=2; % units in Joules
% Energy required to run circuity (both for transmitter and receiver) %
Eelec=50*10^(-9); % units in Joules/bit
ETx=50*10^(-9); % units in Joules/bit
ERx=50*10^(-9); % units in Joules/bit
% Transmit Amplifier Types %
Eamp=100*10^(-12); % units in Joules/bit/m^2 (amount of energy spent by the amplifier t
% Data Aggregation Energy %
EDA=5*10^(-9); % units in Joules/bit
% Size of data package %
k=4000; % units in bits
% Suggested percentage of cluster head %
p=0.05; % a 5 percent of the total amount of nodes used in the network is proposed to g
% Number of Clusters %
No=p*n;
% Round of Operation %
rnd=0;
% Current Number of operating Nodes %
operating_nodes=n;
transmissions=0;
temp_val=0;
flag1stdead=0;
% Creation of the Wireless Sensor Network %
for i=1:n

    SN(i).id=i;    % sensor's ID number
    SN(i).x=rand(1,1)*xm;    % X-axis coordinates of sensor node
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    SN(i).y=rand(1,1)*ym;    % Y-axis coordinates of sensor node
    SN(i).E=Eo;     % nodes energy levels (initially set to be equal to "Eo"
    SN(i).role=0;   % node acts as normal if the value is '0', if elected as a cluster
    SN(i).cluster=0;    % the cluster which a node belongs to
    SN(i).cond=1;    % States the current condition of the node. when the node is opera
    SN(i).rop=0;    % number of rounds node was operational
    SN(i).rleft=0;  % rounds left for node to become available for Cluster Head electio
    SN(i).dtch=0;    % nodes distance from the cluster head of the cluster in which he
    SN(i).dts=0;    % nodes distance from the sink
    SN(i).tel=0;    % states how many times the node was elected as a Cluster Head
    SN(i).rn=0;     % round node got elected as cluster head
    SN(i).chid=0;   % node ID of the cluster head which the "i" normal node belongs to


    hold on;
    figure(1)
    plot(x,y,xm,ym,SN(i).x,SN(i).y,'ob',sinkx,sinky,'*r');
    title 'Wireless Sensor Network';
    xlabel '(m)';
    ylabel '(m)';
```

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end
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