```
function [X,Y,grid_pt,bound_pt]=line_grid(numcellX,numcellY,mapstore)
boundaryX =[-2,2];
boundaryY =[-1,1];
len = length(mapstore);
grid_pt = cell(2,16);
idx = 1;
num_div = max(numcellX,numcellY);
for i=1:len
   for j=1:4
      now = j;
      next = j+1;
      if(j+1 >4)
         next=1;
      end
      %%%%calculate the line points
      if(mapstore{i}(now,1)==mapstore{i}(next,1))
         x_pt = mapstore{i}(now,1)*ones(1,num_div);
         y_pt = linspace(mapstore{i}(now,2),mapstore{i}(next,2),num_div);
      elseif(mapstore{i}(now,2)==mapstore{i}(next,2))
         y_pt = mapstore{i}(now,2)*ones(1,num_div);
         x_pt = linspace(mapstore{i}(now,1),mapstore{i}(next,1),num_div);
      else
         x_pt = linspace(mapstore{i}(now,1),mapstore{i}(next,1),num_div);
         y_pt = linspace(mapstore{i}(now,2),mapstore{i}(next,2),num_div);
      end
         grid_pt{1,idx}=x_pt;
         grid_pt{2,idx}=y_pt;
         idx = idx + 1;
   end
end
%%grid points
grid_x = linspace(boundaryX(1),boundaryX(2),numcellX+1);
grid_y = linspace(boundaryY(1),boundaryY(2),numcellY+1);
[X,Y] = meshgrid(grid_x,grid_y);
%%find the index of the grid
X_rol=X(1,:);
Y_col=Y(:,1)';
bound_pt=zeros(numcellY,numcellX);
num_b = length(grid_pt);
for k=1:num_b
   for j=1:num_div
      for i=1:numcellX
         if(grid_pt{1,k}(j) >= X_rol(i) && grid_pt{1,k}(j) <= X_rol(i+1))
            idx_x = i;
```

```
        end
      end
      for i=1:numcellY
        if(grid_pt{2,k}(j) >= Y_col(i) && grid_pt{2,k}(j) <= Y_col(i+1))
          idx_y = i;
        end
      end
      bound_pt(idx_y,idx_x) = bound_pt(idx_y,idx_x)+1;
   end
end

for i=1:numcellX*numcellY
  if(bound_pt(i) >0)
     bound_pt(i) = 1;
  end
end
bound_pt = flip(bound_pt, 1);
end
```