

```
clear all; clc; clear variables;
```

```
stp = 71:1:90;
stp_all = repmat(stp,1650600,1);
stp_all = stp_all(:);

layer = 1:1:100;
layer_all = repmat(layer,16506,1);
layer_all = layer_all(:);
layer_all = repmat(layer_all,20,1);

row = 1:1:126;
row_all = repmat(row,131,1);
row_all = row_all(:);
row_all = repmat(row_all,100,1);
row_all = repmat(row_all, 20,1);

col = 1:1:131;
col_all = [];
for i=1:length(row)
    col_all = [col_all col];
    %i = i+1;
end
col_all=col_all(:);
col_all =repmat(col_all,100,1);
col_all = repmat(col_all, 20,1);

layer = 1:1:100;
layer_all = repmat(layer, 16506, 1);
layer_all = layer_all(:);
layer_all = repmat(layer_all, 20,1);

all = [stp_all layer_all row_all col_all];
all1 = array2table(all);
% writetable(all1, 'C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\stp_all.csv');
```

```
% Make Layer, row, column
% Later to make it semi_join
all_cells1 = readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\Zone_6zones_edit_final.csv');
all_cells = table2array(all_cells1);
lay_row_col = all_cells(:,1:3);

% Export lay_row_col 16506*100*3
lay_row_col1 = array2table(lay_row_col);
writetable(lay_row_col1, 'C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\Layrowcol.csv');

% Collecting all
% Zone file
ibound =[];

% Layers 1-33
for i = 1:33
```

```

data1= readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\ibound_1_33.xlsx','Sheet1');
data2 = table2array(data1);
data3 = transpose(data2);
data4 = data3(:);
nana = isnan(data4);
data4(nana) = [];
ibound = [ibound data4];
i=i+1;
end
% Layers 34-67
for i = 1:34
    data1= readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\ibound_34_67.xlsx','Sheet1');
    data2 = table2array(data1);
    data3 = transpose(data2);
    data4 = data3(:);
    nana = isnan(data4);
    data4(nana) = [];
    ibound = [ibound data4];
    i=i+1;
end
% Layers 68-100
for i = 1:33
    data1= readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\ibound_68_100.xlsx','Sheet1');
    data2 = table2array(data1);
    data3 = transpose(data2);
    data4 = data3(:);
    nana = isnan(data4);
    data4(nana) = [];
    ibound = [ibound data4];
    i=i+1;
end

% Finding the top cells to assign the recharge
ibound1 = ibound;
ncells = 16506;
layers = 100;
for j = 1:ncells
    for i = 1:layers
        if i==1 & ibound1(j,i)==1
            ibound1(j,:)=0;
            ibound1(j,i)=1;
        elseif i>1 & ibound1(j,i)==1
            ibound1(j,:)=0;
            ibound1(j,i)=1;
        else
            ibound1(j,i)=0;
            %ibound1(j,i+1)=0;
        end
    end
end

% Checking if for any horizontal location there is only one top cells is
% found
% Total number of cells matched 423,394 cells

```

```
% In total top 9,241 horizontal cells
```

```
ibound_top = sum(ibound1,2);
```

```
% Pulling out only active cells to avoid large size matrices
```

```
ibound_onlyactive = ibound;
```

```
ibound_onlyactive(ibound_onlyactive==0) = NaN;
```

```
% All row columns for all layers
```

```
ibound_onlyactive = ibound_onlyactive(:);
```

```
ibound_onlyactive = repmat(ibound_onlyactive,1,20);
```

```
% Recharge
```

```
proj_rch1= readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\final\project_rch.csv',
```

```
proj_rch2 = table2array(proj_rch1);
```

```
% proj_rch2 = proj_rch2.*ibound_onlyactive;
```

```
proj_rch2 = proj_rch2(:);
```

```
% proj_rch2(isnan(proj_rch2)) =[];
```

```
% Simulated heads
```

```
proj_hds1= readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\final\project_heads.csv',
```

```
proj_hds2 = table2array(proj_hds1);
```

```
% proj_hds2 = proj_hds2.*ibound_onlyactive;
```

```
proj_hds2 = proj_hds2(:);
```

```
% proj_hds2(isnan(proj_hds2)) =[];
```

```
% Initial heads
```

```
proj_initial1= readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\final\project_initial
```

```
proj_initial2 = table2array(proj_initial1);
```

```
% proj_initial2 = proj_initial2.*ibound_onlyactive;
```

```
proj_initial2 = proj_initial2(:);
```

```
% proj_initial2(isnan(proj_initial2)) = [];
```

```
% Horizontal hydraulic conductivity
```

```
proj_hk1= readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\final\project_hk.csv', 'F
```

```
proj_hk2 = table2array(proj_hk1);
```

```
% proj_hk2 = proj_hk2.*ibound_onlyactive;
```

```
proj_hk2 = proj_hk2(:);
```

```
% proj_hk2(isnan(proj_hk2)) = [];
```

```
% Vertical anisotropy
```

```
proj_vka1= readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\final\project_vka.csv',
```

```
proj_vka2 = table2array(proj_vka1);
```

```
% proj_vka2 = proj_vka2.*ibound_onlyactive;
```

```
proj_vka2 = proj_vka2(:);
```

```
% proj_vka2(isnan(proj_vka2)) = [];
```

```
% Layer thickness
```

```
proj_thick1= readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\final\project_thick.cs
```

```
proj_thick2 = table2array(proj_thick1);
```

```
% proj_thick2 = proj_thick2.*ibound_onlyactive;
```

```
proj_thick2 = proj_thick2(:);
```

```
% proj_thick2(isnan(proj_thick2)) = [];
```

```
% Pumping rates
proj_pumping1 = readtable('C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\pumping_71_90.csv',
proj_pumping1 = proj_pumping1(:,2:6);
proj_pumping1 = table2array(proj_pumping1);
proj_pumping1 = proj_pumping1(5);
% proj_pumping2 = proj_pumping2.*ibound_onlyactive;
% proj_pumping2 = proj_pumping1(:);
% proj_pumping2(isnan(proj_pumping2)) = [];
```

```
% River cells
project_river = table2array(project_river);
proj_riv2 = project_river(:);

project_drain = table2array(project_drain);
proj_drn2 = project_drain(:);
```

```
input = [proj_hds2 proj_initial2 proj_pumping1 proj_rch2 proj_riv2 proj_drn2 proj_thick2 proj_h
```

```
active_cells = ibound_onlyactive(:);
input = input.*active_cells;
input_all = input(any(~isnan(input),2),:);

active_all = all.*active_cells;
active_all = active_all(any(~isnan(active_all),2),:);
```

```
input = [active_all input_all];
```

```
input_exp = array2table(input);
writetable(input_exp, 'C:\Users\nyamaa.mendsaikhan\CPTS575_project\Data\final\project_input.csv',
```