//Sprague Graundy

int spragueGraundy(int x, int y) // give the states

{

if(dp[x][y] != -1) return dp[x][y];

set<int>graundyValues;

set<int> :: iterator it;

visit[x][y] = 1;

bool pos = false;

for(int i=0;i<=3;i++) //All the possible states

{

int px = x + dx[i];

int py = y + dy[i];

bool ok = valid(px,py);

if(ok)

{

if(visit[px][py]==0)

{

pos = true;

int v = spragueGraundy(px,py);

graundyValues.insert(v);

}

else

{

if(dp[px][py] != -1)

{

pos = true;

graundyValues.insert(dp[px][py]);

}

}

}

}

if(pos)

{

int mini = 0; //find the minimum value which is not in the set

for(it = graundyValues.begin() ; it != graundyValues.end(); it++)

{

int v = \*it;

if(mini == v)

{

mini++;

}

}

dp[x][y] = mini;

return dp[x][y];

}

else

{

dp[x][y] = 0;

return 0;

}

}