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Section: I

Semester: 3rd

SRN: PES1UG20CS507

Date: 15/11/2021

File Name:PES1UG20CS507_F.c

```c
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include "header.h"


int main()
{
   st head;
   init(&head);
   FILE *fp=fopen("input.txt","r");
   int r[2];
   int c[2];
   read(r,2,fp);
   read(c,2,fp);
   create(&head,c[0]-r[0]+1,c[1]-r[1]+1,r[0],r[1],fp);
   del(&head,c[0]-r[0],c[1]-r[1]);
   path(&head,c[0]-r[0],c[1]-r[1]);
   return 0;
}
```

File Name:PES1UG20CS507_H.h

```
typedef struct node{
   int val;
   int row,col;
   struct node *r;
   struct node *d;
}no;//node definition

typedef struct start{
   no *head;
}st;//multilist definition

void init(st *p);
no *nod(int val);
void read(int *a,int n,FILE *fp);
void create(st *p,int row,int col,int rs,int cs,FILE *fp);
int rowdel(no *p,int up,int col);
void del(st *p,int row,int col);
int check(no *p,int row,int col);
void path(st *p,int row,int col);
```

File Name: PES1UG20CS507_C.c

```
#include <stdio.h>

#include <stdlib.h>

#include <string.h>

#include "header.h"


void init(st *p)//initialisation the starting of multilist

{

   p->head=NULL;

}


no *nod(int val)//creating of node

{

   no *temp=(no*)malloc(sizeof(no));

   temp->val=val;

   temp->r=NULL;

   temp->d=NULL;

   return temp;

}

void read(int *a,int n,FILE *fp)//reading a line of inputs that are seperated by space

{

   for(int i=0;i<n;i++)

   {

      fscanf(fp,"%d",a+i);

   }

}

void create(st *p,int row,int col,int rs,int cs,FILE *fp)//creating a multilist from starting point to
ending point

{

   int arr[col+cs];

   for(int i=0;i<=rs;i++)
```

```
    read(arr,col+cs,fp);
for(int i=0;i<col;i++)
{
    no *q=p->head;
    no *temp=nod(arr[i+cs]);
    temp->row=1+rs;
    temp->col=i+1+cs;
    if(q==NULL)
    {
        p->head=temp;
    }
    else
    {
        while(q->r!=NULL)
        {
            q=q->r;
        }
        q->r=temp;
    }
}
for(int i=0;i<(row-1);i++)
{
    no *q=p->head;
    for(int j=0;j<i;j++)
    {
        q=q->d;
    }
    no *m=NULL;
    int c=1;
    read(arr,col+cs,fp);
    while(q!=NULL)
```

```
        {
            no *temp=nod(arr[c-1+cs]);
            temp->row=i+2+rs;
            temp->col=c+cs;
            c++;
            q->d=temp;
            if(m!=NULL)
            {
                m->d->r=temp;
            }
            m=q;
            q=q->r;
        }
    }
}
int rowdel(no *p,int up,int col)//deleting nodes if they are usless or unreachable in row form
{
    no *q=NULL;
    for(int i=0;i<col;i++)
    {
        if(i<up)
        {
            q=p;
            p=p->r;
        }
        else
        {
            if(p->val==0)
            {
                up=i;
                q=p;
            p=p->r;
          }
          else
          {
            q->r=NULL;
            return up;
          }
        }
      }
      return up;
    }
    void del(st *p,int row,int col)//deleting all nodes that cannot be reached
    {
      int up=0;
      for(int i=0;i<row;i++)
      {
        no *q=p->head;
        for(int j=0;j<i;j++)
        {
          q=q->d;
        }
        up=rowdel(q,up,col);
      }
    }
    int check(no *p,int row,int col)//checks if by going to the next node they can reach the destination
    {
      int right=0;
      int down=0;
      if(p->r!=NULL && p->d!=NULL)
      {
        if(p->r->val==1 && p->d->val==1)
```

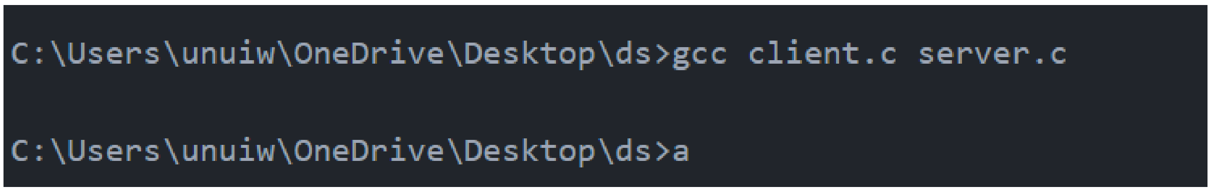
```
            return 0;
        }
        if(p->row==row && p->col==col)
            return 1;
        if(p->r!=NULL)
        {
            if(p->val==0)
            {
                if(p->r->val==0)
                    right=check(p->r,row,col);
            }
        }
        if(p->d!=NULL)
        {
            if(p->val==0)
            {
                if(p->d->val==0)
                    down=check(p->d,row,col);
            }
        }
        if(right==1 || down==1)
            return 1;
        return 0;
    }

    void path(st *p,int row,int col)//prints the output in the output file
    {
        FILE *fp=fopen("out.txt","w");
        no *q=p->head;
        while(1)
        {
```

```
        fprintf(fp,"%d,%d\n",q->row-1,q->col-1);
        int ctr=0;
        if(q->r!=NULL)
        {
            if(check(q->r,row,col))
            {
                q=q->r;
                ctr=1;
            }
        }
        if(q->d!=NULL && ctr==0)
        {
            if(check(q->d,row,col))
            {
                q=q->d;
                ctr=1;
            }
        }
        if(ctr==0)
            break;
    }
    if(q->row==row && q->col==col)
    {
        if(q->r->val==0)
        {
            fprintf(fp,"%d,%d\n%d,%d\n",q->r->row-1,q->r->col-1,row,col);
        }
        else if(q->d->val==0)
        {
            fprintf(fp,"%d,%d\n%d,%d\n",q->d->row-1,q->d->col-1,row,col);
        }
        else
          printf("No path to reach\n");
      }
      fclose(fp);
}
```

Output Screenshots:

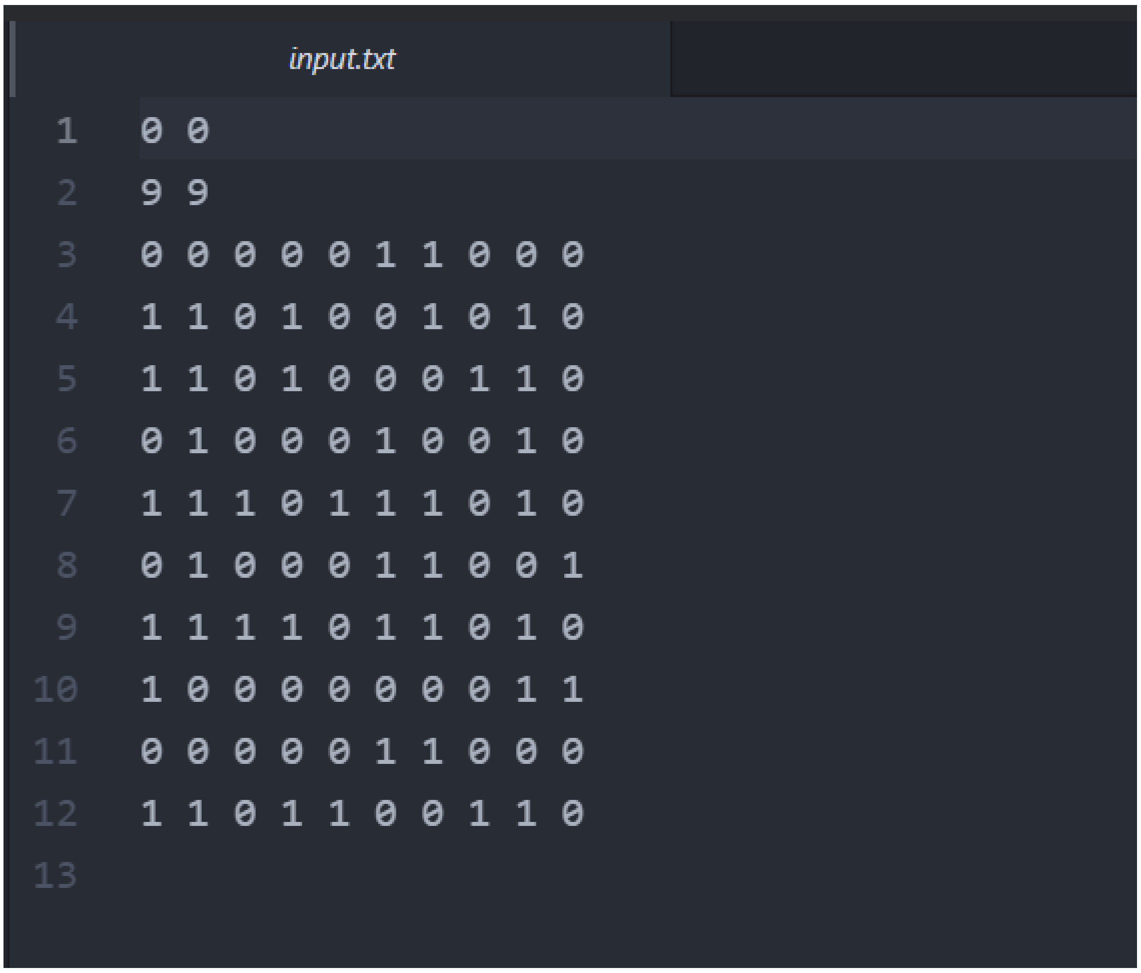
Command Promt:



```
C:\Users\unuiw\OneDrive\Desktop\ds>gcc client.c server.c

C:\Users\unuiw\OneDrive\Desktop\ds>a
```

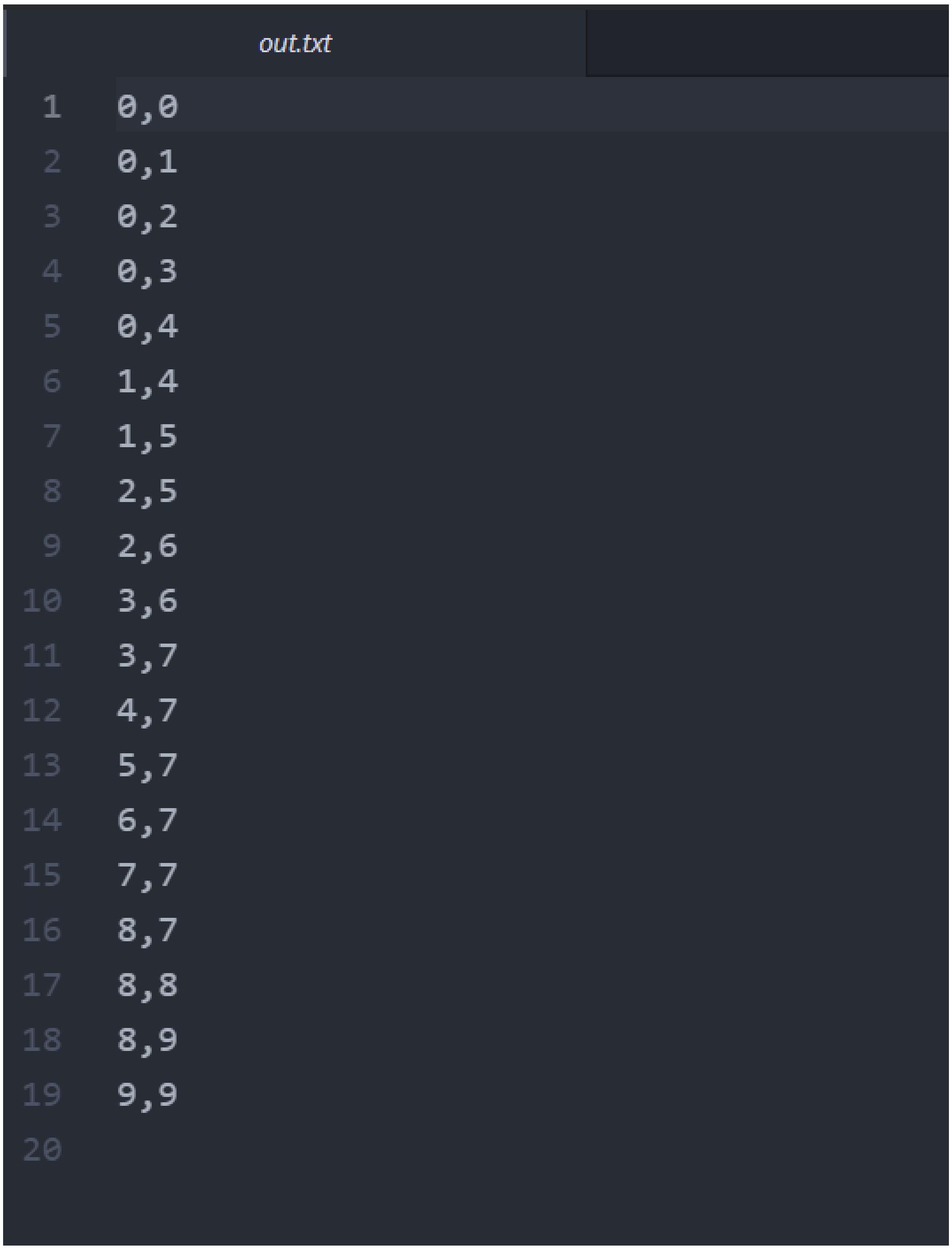
Input File:



input.txt

```
0 0
9 9
0 0 0 0 0 1 1 0 0 0
1 1 0 1 0 0 1 0 1 0
1 1 0 1 0 0 0 1 1 0
0 1 0 0 0 1 0 0 1 0
1 1 1 0 1 1 1 0 1 0
0 1 0 0 0 1 1 0 0 1
1 1 1 1 0 1 1 0 1 0
1 0 0 0 0 0 0 0 1 1
0 0 0 0 0 1 1 0 0 0
1 1 0 1 1 0 0 1 1 0
```

Output File:



```
0,0
0,1
0,2
0,3
0,4
1,4
1,5
2,5
2,6
3,6
3,7
4,7
5,7
6,7
7,7
8,7
8,8
8,9
9,9
```