

Assignment#7 - Gold Mine Problem Implementation using Dynamic Programming in any of your preferred Programming Language (C/C++/Java)

Code :

```
#include<bits/stdc++.h>

using namespace std;

int getMax(int num1, int num2)
{
    if(num1<num2)
    {
        return num2;
    }
    else
    {
        return num1;
    }
}

int Max(int num1,int num2,int num3)
{
    if(num1>num2 && num1>num3)
```

```

{
    return num1;
}

else if(num2>num1 && num2>num3)
{
    return num2;
}

else if(num3>num2 && num3>num1)
{
    return num3;
}
}

int maximum_value_sell(int c, int r, int matrix[50][50])
{
    int mat[r][c];

    for(int i=0;i<r;i++)
    {
        for(int j=0;j<c;j++)
        {
            mat[i][j]=matrix[i][j];
        }
    }

    int j=0;

    while(j<c)
    {

```

```

for(int i=0;i<r;i++)
{
    if(i==0 && j==0)
    {
        continue;
    }
    else if(i!=0 && j==0)
    {
        continue;
    }
    else if(i==0 && j!=0)
    {
        mat[i][j] = mat[i][j] + getMax(mat[i][j-1],mat[i+1][j-1]);
    }
    else if(i==(r-1) && j!=0)
    {
        mat[i][j] = mat[i][j]+getMax(mat[i-1][j-1],mat[i][j-1]);
    }
    else
    {
        mat[i][j]=mat[i][j]+Max(mat[i-1][j-1],mat[i][j-1],mat[i+1][j-1]);
    }
}
j++;
}

```

```

    int maximum=0;
}

int Gold_mine(int c, int r, int matrix[50][50])
{
    int mat[r][c];
    for(int i=0;i<r;i++)
    {
        for(int j=0;j<c;j++)
        {
            mat[i][j]=matrix[i][j];
        }
    }
    int j=0;
    while(j<c)
    {
        for(int i=0;i<r;i++)
        {
            if(i==0 && j==0)
            {
                continue;
            }
            else if(i!=0 && j==0)
            {
                continue;
            }

```

```

else if(i==0 && j!=0)
{
    mat[i][j] = mat[i][j] + getMax(mat[i][j-1],mat[i+1][j-1]);
}
else if(i==(r-1) && j!=0)
{
    mat[i][j] = mat[i][j]+getMax(mat[i-1][j-1],mat[i][j-1]);
}
else
{
    mat[i][j]=mat[i][j]+Max(mat[i-1][j-1],mat[i][j-1],mat[i+1][j-1]);
}
}
j++;
}

cout<<"Gold mine table : "<<endl;

for(int i=0;i<r;i++)
{
    for(int j=0;j<c;j++)
    {
        cout<<mat[i][j]<<" ";
    }

    cout<<endl;
}

cout<<endl;

```

```

int maximum=0;

int f=c-1;

for(int i=0;i<r;i++)
{
    if(maximum<=mat[i][f])
    {
        maximum = mat[i][f];
    }
}

return maximum;
}

int main()
{
    int row,col;

    cout<<"Enter Row and Column of the matrix\n";

    cout<<"enter Row= ";

    cin>>row;

    cout<<"enter column= ";

    cin>>col;

    int matrix[50][50];

    cout<<"enter matrix: "<<endl;

    for(int i=0;i<row;i++)
    {
        for(int j=0;j<col;j++)
        {

```

```

        cout<<"inputArray["<<i<<"]["<<j<<"] = ";

        cin>>matrix[i][j];

    }

    cout<<endl;

}

cout<<"maximum gold found is = "<<Gold_mine(col, row, matrix)<<endl;

cout<<"one of the sell that we return in main faction is = ("<<maximum_value_sell(col,

row, matrix)<<","<<row-1<<")"<<endl;

return 0;

}

```

Output:

The screenshot shows a C++ IDE with the following code in the editor:

```

1 #include<bits/stdc++.h>
2 using namespace std;
3 int getMax(int num1, int num2)
4 {
5     if(num1<num2)
6     {
7         return num2;
8     }
9     else
10    {
11        return num1;
12    }
13 }
14
15 int Max(int num1,int num2,int num3)
16 {
17     if(num1>num2 && num1>num3)
18     {
19         return num1;
20     }
21     else if(num2>num1 && num2>num3)
22     {
23         return num2;
24     }
25     else if(num3>num2 && num3>num1)
26     {
27         return num3;
28     }

```

The output window shows the following text:

```

"H:\Southeast University\Adv Algo (MSRS) 2021\Lab\Lab 7\Goldmine Problem.exe"
Enter Row and Column of the matrix
enter Row= 3
enter column= 5
enter matrix:
inputArray[0][0] = 1
inputArray[0][1] = 2
inputArray[0][2] = 3
inputArray[0][3] = 4
inputArray[0][4] = 5

inputArray[1][0] = 1
inputArray[1][1] = 2
inputArray[1][2] = 3
inputArray[1][3] = 4
inputArray[1][4] = 5

inputArray[2][0] = 0
inputArray[2][1] = 0
inputArray[2][2] = 0
inputArray[2][3] = 0
inputArray[2][4] = 0

Gold mine table :
1 3 6 10 15
1 2 6 6 15
0 1 2 6 6

maximum gold found is = 15
one of the sell that we return in main faction is = (5,2)

```