

Lab3 Q2&Lab4 Q1

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Lab3 Question2

Given the following numbers:

| | | | | | | |
|---|---|---|---|---|---|---|
| 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| | | | 1 | 3 | 2 | |
| 7 | 6 | 4 | 1 | 8 | 9 | |
| 3 | 9 | 1 | 4 | 2 | | |
| 5 | 6 | 1 | 3 | 4 | 7 | |
| 3 | 1 | 2 | 7 | 9 | 6 | 8 |

LengthStatic[10]:Static the length of all numbers

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| 1 | 2 | 1 | 0 | 1 | 0 | 0 |

N = 5

Take the 764189 for example:
For each digit in 764189:

| Digit(i) | d | <i | calc a = calc b | >=i | calc a | calc b | No |
|----------|---|--------------|--------------------------------------|-----|---------------|---------------|----|
| 1 | 9 | 0 | | 5 | $5*9*10^1$ | $5*9*1^0$ | 0 |
| 10 | 8 | 0 | | 5 | $5*8*10^3$ | $5*8*10^2$ | 1 |
| 100 | 1 | 0 | | 5 | $5*1*10^5$ | $5*1*10^4$ | 2 |
| 1000 | 4 | 1<>3 | $2*1*4*10^{3+3}$ | 4 | $4*4*10^7$ | $4*4*10^6$ | 3 |
| 10000 | 6 | 1<>3 | $2*1*6*10^{4+3}$ | 4 | $4*6*10^9$ | $4*6*10^8$ | 4 |
| 100000 | 7 | 1<>3 1<>5 | $2*1*6*10^{5+3}$ $2*1*6*10^{5+5}$ | 3 | $3*7*10^{11}$ | $3*7*10^{10}$ | 5 |

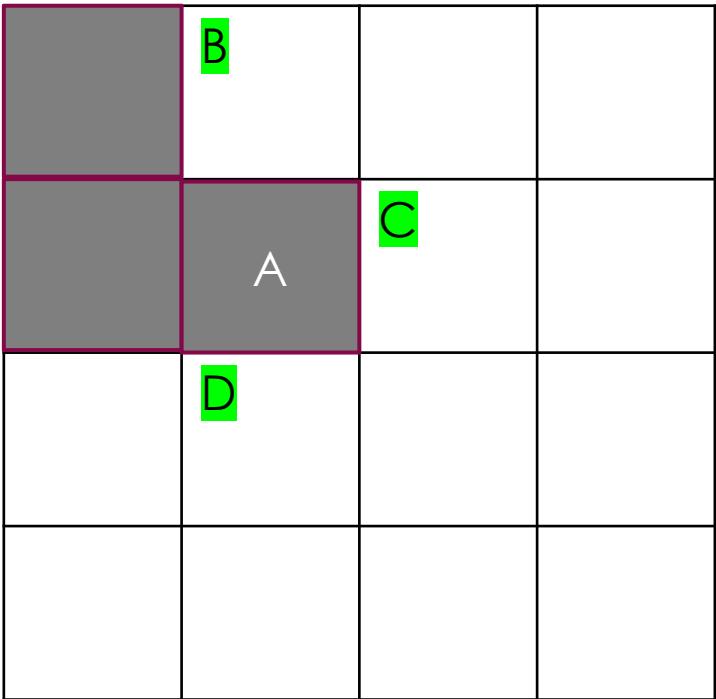
Lab3 Question2

```
sum<- 0
foreach e of n numbers{
    for i=0 to e.length-1{
        for j= 1 to i{
            sum ← sum + 2* LengthStatic[j]*d*pow(10, i+j))
        }
        count ← the count of elements whose length >= e.length
        sum ← sum + count*d*pow(10, 2*i)
        sum ← sum + count*d*pow(10, 2*i+1)
    }
}
```

Lab4 Question1

```
count = 0
DFS(start, target){
    if (start == target){
        if (isPathValid(path)){
            count ← count+1
        }
        return
    }
    foreach unvisited neighbor of start{
        bPrun ← check whether neighbor can be pruned
        if (!bPrun){
            add the neighbor to path
            DFS(neighbor, target)
        }
    }
    return
}
```

Lab4 Question1

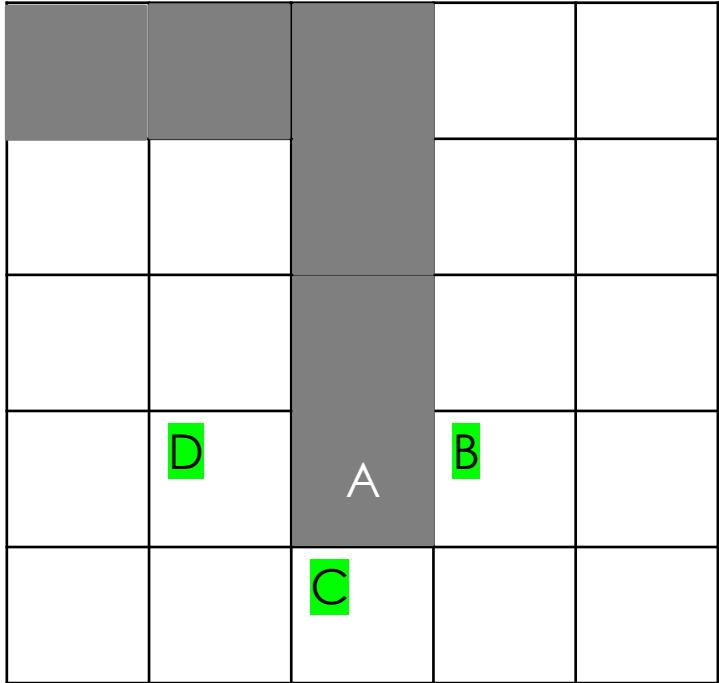


1. The only choice is A->B
2. If you choose A->C or A->D, you will finally find the only way to reach B is (1,3)->B, then B is a dead end.

Which neighbor can be picked first?

1. Only one neighbor has only one reachable grid except A

Lab4 Question1



1. A->C B and D will never be connected
2. Cut A->C

Which neighbor can be picked first?

1. Only one neighbor has only one reachable grid except A

Which neighbor can be given up first?

1. the neighbor will make the two other grid never be connected

When you can give up A?

1. More than one neighbor has only one reachable grid
2. No neighbor around A

Lab4 Question2 Hint

Prune hint: note the number of players is small then 10. Some information is repeatedly calculated, and we can recode it.

More detail: suppose there are 6 contestants and we have fixed first three players (they achieve their final points), and the rest contestants need 2, 3, 3 points, respectively. And in another search state we make first three contestants achieving their scores again. Then the number of possible types for the remaining three contestants (i.e., still 2, 3, 3) is same with the results of the previous search.