인공지능

Programming #1

C184036 이소연

제출일 : 10월 13일 (금)

▪ maze1

<DFS>

```
Maze:

??????????B??
?????????? ??
????????  ??
???????? ????
      ????
A???????????

Solving...
States Explored: 11
Solution:

??????????B??
??????????*??
????????**??
????????*????
*****????
A???????????
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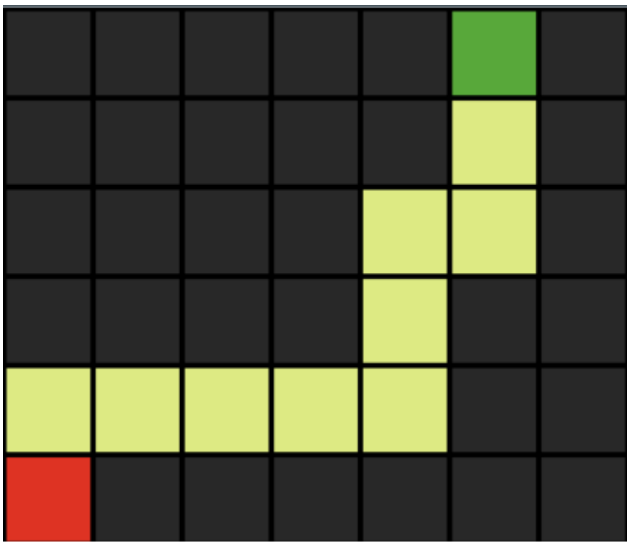


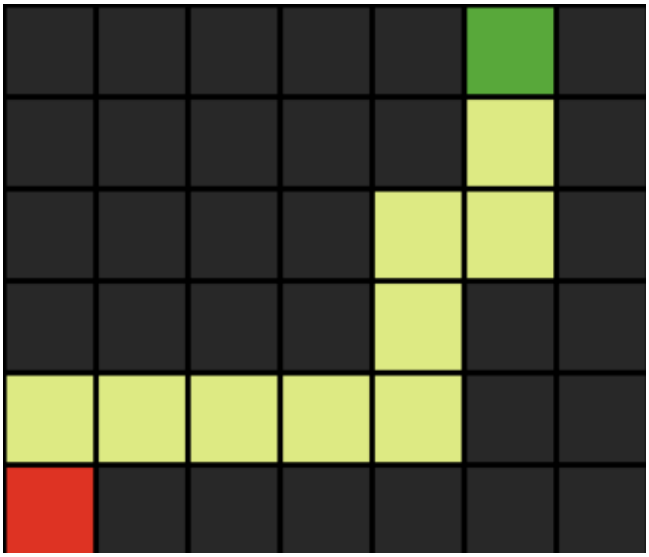
<BFS>

```
Maze:

??????????B??
?????????? ??
????????  ??
???????? ????
      ????
A???????????

Solving...
States Explored: 11
Solution:

??????????B??
??????????*??
????????**??
????????*????
*****????
A???????????
```



maze1 비교 결과 : DFS 알고리즘과 BFS 알고리즘의 차이가 없는 것을 확인할 수 있다.

▪ maze2

<DFS>

```
Maze:

??????                    ??????????????????
??    ??????????????????????????????????????????    ?? ??
?? ????????                  ?? ?? ?? ??
?? ????????????????????????????????????????????? ?? ?? ?? ??
??                        ?? ?? ?? ??
????????????????????????????????????????????????? ?? ?? ?? ??
??    ????                ?? ?? ?? ??
?? ?? ???? ?????? ???? ??????????????????? ?? ?? ??
?? ??     ??   ????B??          ?? ?? ??
?? ?? ???? ?????????????????????????????????? ?? ?? ??
?????? ????              ???????? ?? ?? ??
?????? ????????????????????????????????? ???? ?? ?? ?? ??
??????              ????    ?? ?? ?? ??
???????????? ???????????????????? ?????????????? ?? ?? ??
???????????? ????????              ??   ??
A      ??????????????????????????????????????????????????

Solving...
States Explored: 194
Solution:

??????                    ??????????????????
??    ??????????????????????????????????????????    ?? ??
?? ????????                  ?? ?? ?? ??
?? ????????????????????????????????????????????? ?? ?? ?? ??
??                        ?? ?? ?? ??
????????????????????????????????????????????????? ?? ?? ?? ??
??   ????********          ?? ?? ?? ??
?? ?? ????*?????? ????*??????????????????? ?? ?? ??
?? ??****??   ????B??          ?? ?? ??
?? ??*???? ?????????????????????????????????? ?? ?? ??
??????*????              ???????? ?? ?? ??
??????*????????????????????????????????? ???? ?? ?? ?? ??
??????****          ????    ?? ?? ?? ??
???????????*???????????????????? ?????????????? ?? ?? ??
???????????*????????              ??   ??
A******??????????????????????????????????????????????????
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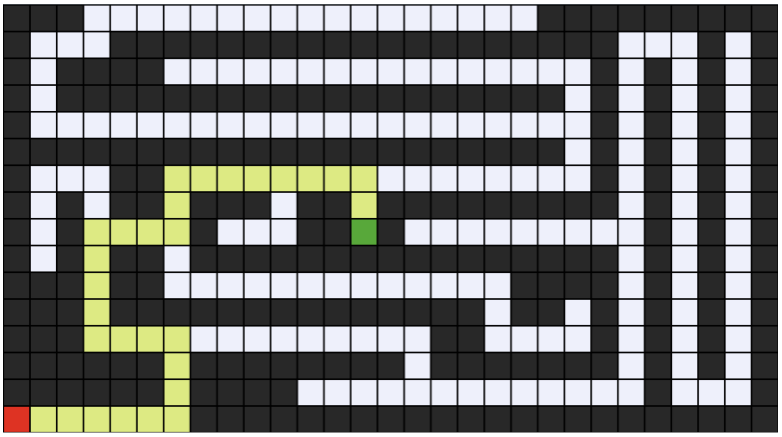


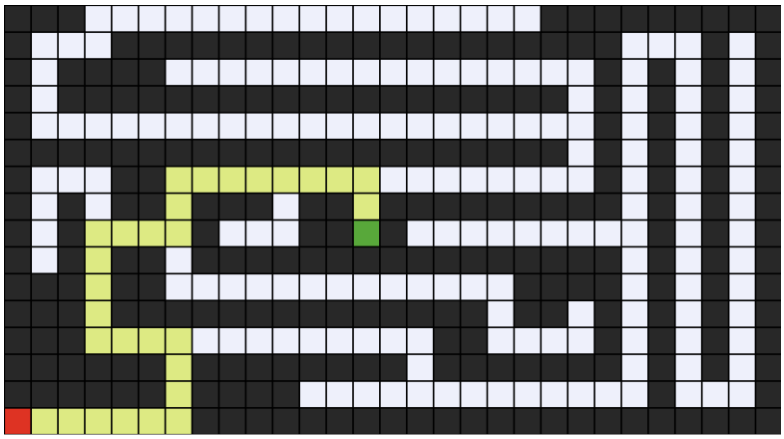
<BFS>

```
Maze:

??????                    ??????????????????
??    ??????????????????????????????????????????    ?? ??
?? ????????                  ?? ?? ?? ??
?? ????????????????????????????????????????????? ?? ?? ?? ??
??                        ?? ?? ?? ??
????????????????????????????????????????????????? ?? ?? ?? ??
??    ????                ?? ?? ?? ??
?? ?? ???? ?????? ???? ??????????????????? ?? ?? ??
?? ??     ??   ????B??          ?? ?? ??
?? ?? ???? ?????????????????????????????????? ?? ?? ??
?????? ????              ???????? ?? ?? ??
?????? ????????????????????????????????? ???? ?? ?? ?? ??
??????              ????    ?? ?? ?? ??
???????????? ???????????????????? ?????????????? ?? ?? ??
???????????? ????????              ??   ??
A      ??????????????????????????????????????????????????

Solving...
States Explored: 77
Solution:

??????                    ??????????????????
??    ??????????????????????????????????????????    ?? ??
?? ????????                  ?? ?? ?? ??
?? ????????????????????????????????????????????? ?? ?? ?? ??
??                        ?? ?? ?? ??
????????????????????????????????????????????????? ?? ?? ?? ??
??    ????********        ?? ?? ?? ??
?? ?? ????*?????? ????*??????????????????? ?? ?? ??
?? ??****??   ????B??          ?? ?? ??
?? ??*???? ?????????????????????????????????? ?? ?? ??
??????*????              ???????? ?? ?? ??
??????*????????????????????????????????? ???? ?? ?? ?? ??
??????****          ????    ?? ?? ?? ??
???????????*???????????????????? ?????????????? ?? ?? ??
???????????*????????              ??   ??
A******??????????????????????????????????????????????????
```



maze2 비교 결과 : DFS 알고리즘보다 BFS 알고리즘의 탐색 횟수가 더 적은 것을 알 수 있다. 탐색한 경로가 같다.

▪ maze3

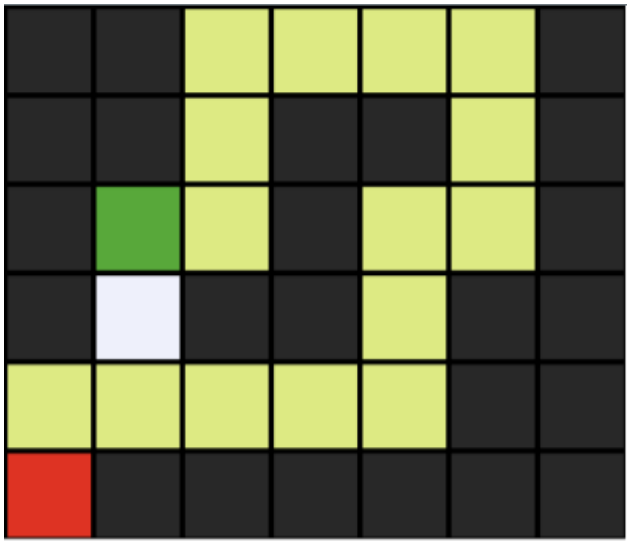
<DFS>

```
Maze:

????    ??
???? ???? ??
??B ??  ??
?? ???? ????
     ????
A???????????

Solving...
States Explored: 17
Solution:

????****??
????*????*??
??B*??**??
?? ????*????
*****????
A???????????
```



<BFS>

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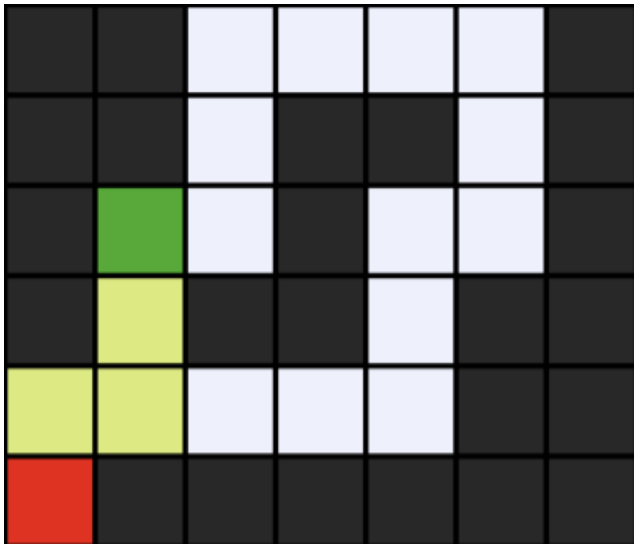
Maze:

????    ??
???? ???? ??
??B ??  ??
?? ???? ????
     ????
A???????????

Solving...
States Explored: 6
Solution:

????    ??
???? ???? ??
??B ??  ??
??*???? ????
**   ????
A???????????
```



maze3 비교 결과 : DFS 알고리즘보다 BFS 알고리즘의 탐색 횟수가 더 적은 것을 알 수 있다. 탐색한 경로가 서로 다르다.

▪ maze4

<DFS>

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Maze:

??
?? ??????????
??    ??
???? ??  ??
???? ?? ?? B
 ?? ??
 A ?? ????
??  ??

Solving...
States Explored: 22
Solution:

??
?? ??????????
?? ***??
????*??* ??
????*??*?? B
 ??*??****
 A*?? ????
??  ??
```

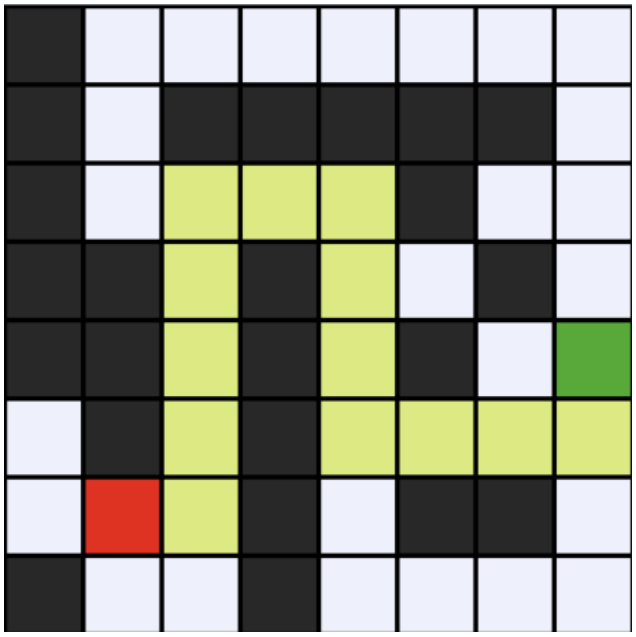

<BFS>

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Maze:

??
?? ??????????
??    ??
???? ??  ??
???? ?? ?? B
 ?? ??
 A ?? ????
??  ??

Solving...
States Explored: 34
Solution:

??
?? ??????????
?? ***??
????*??* ??
????*??*??*B
 ??*??***
 A*?? ????
??  ??
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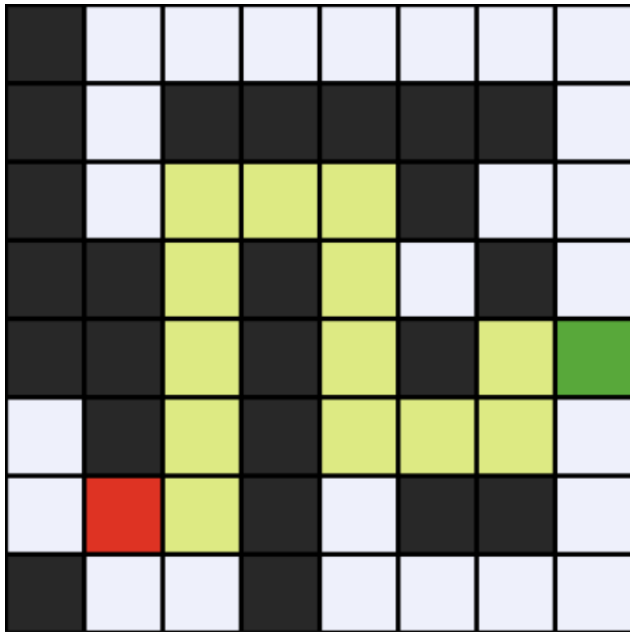

maze4 비교 결과 : DFS 알고리즘보다 BFS 알고리즘의 탐색 횟수가 더 많은 것을 알 수 있다. 탐색 결과가 살짝 다르다.

▪ maze5

<DFS>

```
Maze:

        ????     ??
 ?????? ??????B  ?????? ??
??    ??  ????  ???? ??
?? ???????? ??  ??
??    ?? ???? ???????? ??
 ?????? ??    ??
       ??     ??
A ??????   ????????

Solving...
States Explored: 37
Solution:

        ????     ??
 ?????? ??????B**?????? ??
??    ??  ????**???? ??
?? ???????? ??  ??****
??    ?? ???? ????????*??
 ?????? ??****??   **
 *******?? ****?? *
A*??????   ????????****
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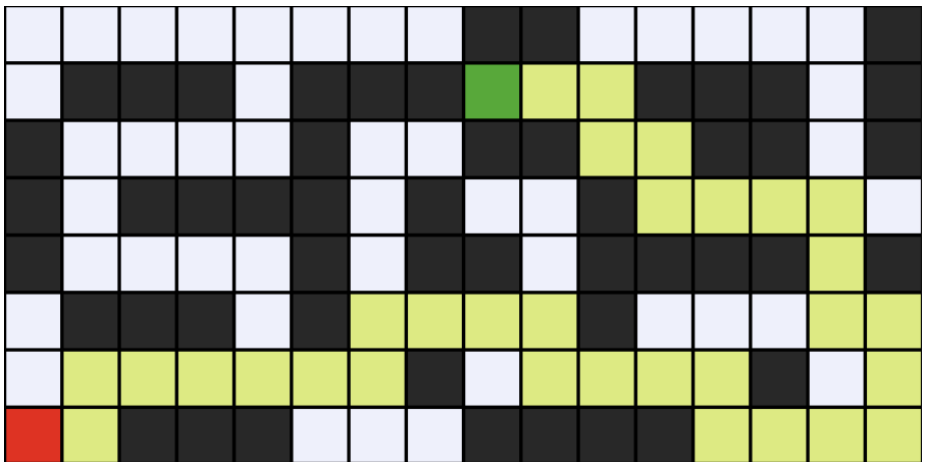

<BFS>

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Maze:

        ????     ??
 ?????? ??????B  ?????? ??
??    ??  ????  ???? ??
?? ???????? ??  ??
??    ?? ???? ???????? ??
 ?????? ??    ??
       ??     ??
A ??????   ????????

Solving...
States Explored: 78
Solution:

        ????     ??
 ?????? ??????B**?????? ??
??    ??  ????**???? ??
?? ???????? ??  ??****
??    ?? ???? ????????*??
 ?????? ??*** ??****
*******??**** ??
A ??????   ????????
```

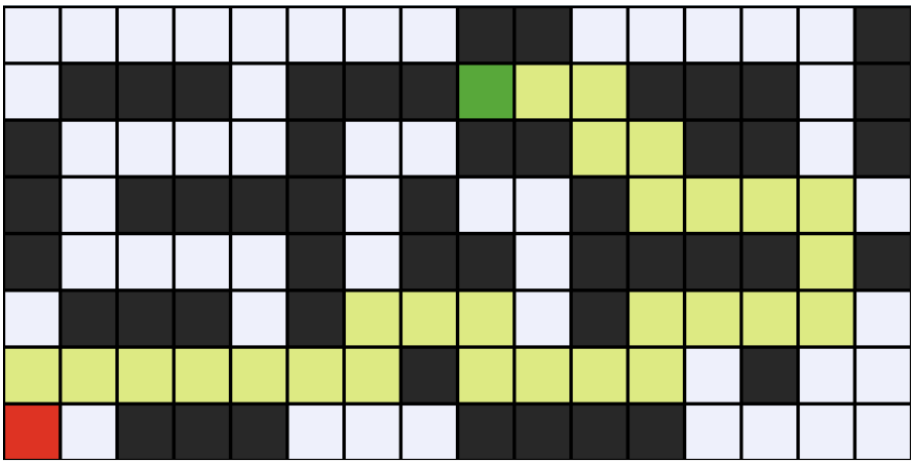

maze5 비교 결과 : DFS 알고리즘보다 BFS 알고리즘의 탐색 횟수가 더 많은 것을 알 수 있다. 탐색 결과가 살짝 다르다.

<총 결과>

▪ DFS : 목표 지점이 깊은 곳에 있을 경우에 빠를 수 있다. 하지만 최단 경로를 찾는다는 보장이 없으며, 목표 지점에서 멀리 떨어진 노드를 먼저 방문할 가능성이 있다.

▪ BFS : 최단 경로를 찾는 것이 보장되어 있다. 가까운 노드부터 차례대로 탐색하기 때문에 최초로 발견한 목표 지점이 최단 경로이다.

미로의 구조와 목표에 따라 어떤 탐색 알고리즘이 미로를 해결하는 데 더 효율적인 지는 다를 수 있다. 최단 경로를 찾을 때는 BFS를 사용하는 것이 일반적으로 더 좋다.