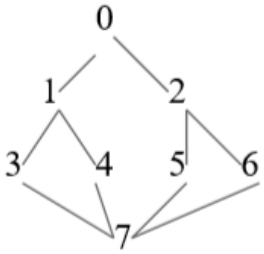
Hw6 Graph Search (Depth First Search: DFS) **due: 6/3 일 09 시 까지**

- 노드 선언 (참고)

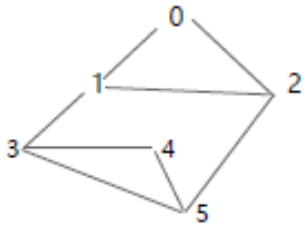
```
class Node {
private: int data;
         Node *link;
          friend class Tree;
}
```

```
class Tree{
  private: Node *root;
  public:  Tree();
           void print_node(); //그래프 전체출력
           void build_tree();
           Void dfs(v0);
```

- Data for DFS (다음 2 개의 그래프로 테스트 할 것)



(Graph 1)



(Graph 2)

- 입력 데이터 (**Adjacency list** 로 표현할 것)

v0: v1 -> v2 v0: v1 -> v2

v1: v0 -> v3-> v4 v1: v0->v2->v3

……

- Algorithm

```
void main()    {
  initialize VISITED[i]= false;      // Visited 배열을 0 으로 초기화
  buffer[] = get INPUT data;         // get data from data file, buffer size as 80;
  while (buffer !=empty){
      build_AdJlist(buffer, line)    // graph[line] => head nodes, 데이터파일의 첫 line 부터
      line++;}
  print_graph()                      // print Adjacency List

  dfs(v0);       // starting vertex v0
} //end of main
```

```
void build_AdJlist(buffer, line) {
    - temp = buffer[i++];            // 각 라인별 데이터로 인접리스트 생성
    - head =  new node (temp);       // 각 리스트의 첫번째 head node 생성
    - graph[i] = head                 // head 노드 저장
    - while (buffer !=0) {
          temp = buffer[i++]'
          create next node & make singly linked list
      }
}

void print_graph(){
   for (i=0 ;   i <last node; i++){
      get head node = graph[] & link to second node //
      for (start; start!=0;start=start->link)     print nodes;
}
```

```
void dfs(v) { // 강의노트 알고리즘 참조
  visited[v]= true;          print v;
  for (next= graph[v]; next!=NULL; next=next->link)
       if (!visited[next->data]) dfs(next->data);
}
```

Ex) (Data 출력 및 DFS 결과)

1) Graph data 1:

Graph[0] -> 1 2
Graph[1] -> 0 3 4
Graph[2] -> 0 5 6
Graph[3] -> 1 7
Graph[4] -> 1 7
Graph[5] -> 2 7
Graph[6] -> 2 7
Graph[7] -> 3 4 5 6

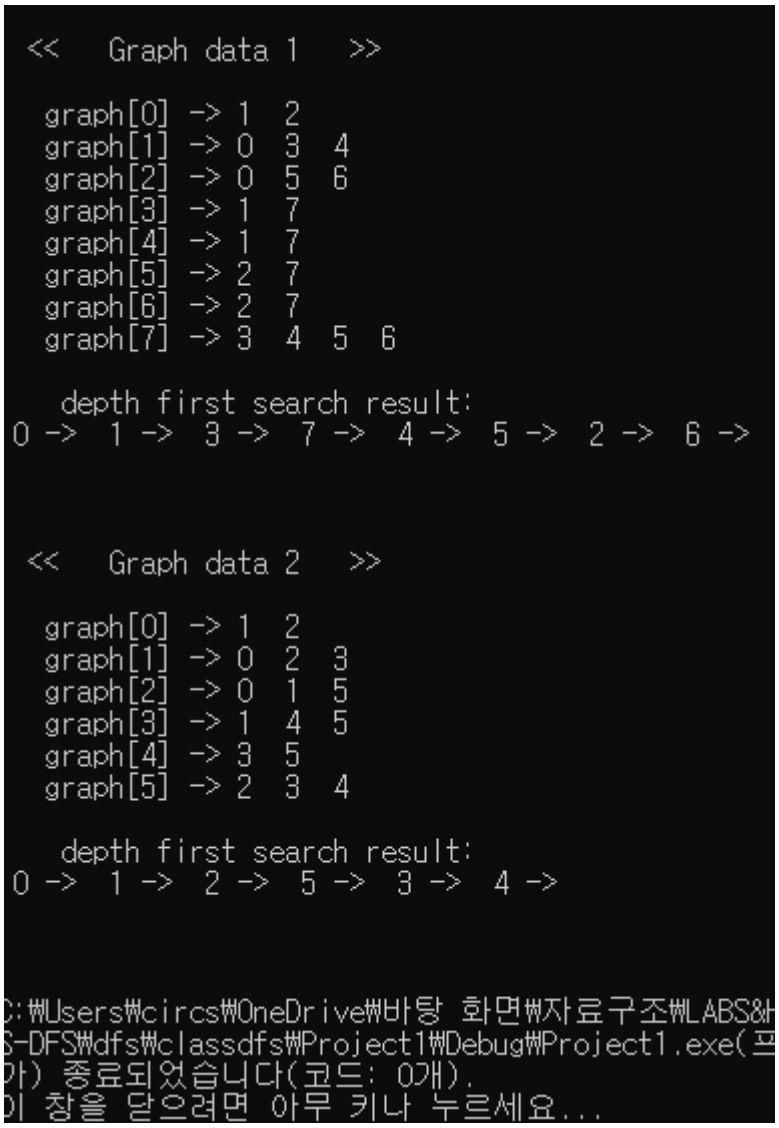
Output:
V0 -> V1-> V3-> V7 -> V4 ->V5->V2->V6

Graph Data 2:

Graph[0]-> 1 2
Graph[1]-> 0 2 3
Graph[2]-> 0 1 5
Graph[3]-> 1 4 5
Graph[4] -> 3 5
Graph[5] -> 2 3 4

Output:
V0 -> V1 -> V2 -> V5 -> V3 ->V4

(DFS 출력 화면)


<< Graph data 1 >>
graph[0] -> 1 2
graph[1] -> 0 3 4
graph[2] -> 0 5 6
graph[3] -> 1 7
graph[4] -> 1 7
graph[5] -> 2 7
graph[6] -> 2 7
graph[7] -> 3 4 5 6
depth first search result:
0 -> 1 -> 3 -> 7 -> 4 -> 5 -> 2 -> 6 ->
<< Graph data 2 >>
graph[0] -> 1 2
graph[1] -> 0 2 3
graph[2] -> 0 1 5
graph[3] -> 1 4 5
graph[4] -> 3 5
graph[5] -> 2 3 4
depth first search result:
0 -> 1 -> 2 -> 5 -> 3 -> 4 ->
C:₩Users₩circs₩OneDrive₩바탕 화면₩자료구조₩LABS&H
S-DFS₩dfs₩classdfs₩Project1₩Debug₩Project1.exe(프
가) 종료되었습니다(코드: 0개).
이 창을 닫으려면 아무 키나 누르세요...