

Nanyang Technological University

```
int BFS (Graph G, int v, int w);
```

```
int CC (Graph g);
```

1	2	3
1	5	
2	4	
6		

```
void sumToC(LinkedList* ll, int C, ArrayList* al);
```

```
typedef struct _arraynode
{
    int *itemArray;
    int sizeArray; //the size of a possible sequence
    struct _arraynode *next;
} ArrayNode;

typedef struct _arraylist{
    int size; //the number of possible sequences
    ArrayNode *head;
} ArrayList;

typedef struct _listnode
{
    int item;
    struct _listnode *next;
} ListNode;

typedef struct _linkedlist{
    int sum;
    int size;
    ListNode *head;
} LinkedList;
```

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```
int insertNode(LinkedList *ll, int index, int coin);
int removeNode(LinkedList *ll, int index);
ListNode *findNode(LinkedList ll, int index);
void removeAllItems(LinkedList *ll);
```

Hint: Using backtracking algorithm for finding all possible sequences.

Q4 In CX4321, each student will be assigned to a project and a mentor. Students has their own preferences but each project or mentor can only be assigned to one of the students. The course coordinator needs an algorithm to maximize the matching between students and projects and between students and mentors.

Only This Question: You are strongly encouraged not to use the given template.

Input: First line is number of students, **S**, number of projects, **P** and number of mentors, **M**. The following **S** lines indicate the corresponding students' The number of preference projects, the number of preference mentors, the IDs of preference projects [1,P] and the IDs of preference mentors, [1,M].

Output: The maximum number of matches

Sample Case:

Input:

```
4 3 3
2 2 1 3 2 1
2 2 2 3 1 2
2 2 1 3 1 2
2 1 1 3 3
```

Output:

```
3
```

In the given input, we have 4 students, 3 projects and 3 mentors (first line). Student 1 likes project 1 and project 3. Student 1 prefers to mentor 2 and mentor 1 (second line). The corresponding bipartite graph is as follow:

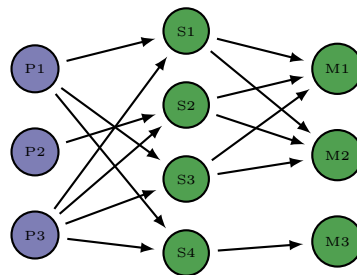


Figure 7.1: The graph of the given sample case: The Project indicates as P_i , the Student indicates as S_j , and the Mentor indicates as M_k .

Hint: You may not be able to use this graph to solve the problem directly. Think about some extreme cases like all students selected the same project and the same mentor.