CS 401 - Computer algorithms, Spring 2020, CS, UIC
Programming assignment 2
Instructor: Anastasios Sidiropoulos
Due date: May 1, 2020

Problem 1: Sokoban. In the videogame Sokoban you control a human who needs to push a box to a given destination. The human moves inside a room, which is encoded as 2-dimensional array. Here is an example of such an array:

```
A = [[4,0,3,0],
     [1,1,1,2]];
```

The above array encodes a room of dimensions 2×4. Each location in the room is either empty (indicated by 0), or contains an obstacle (indicated by 1), or contains the human (indicated by 2), or contains the box (indicated by 3), or the destination (indicated by 4).

The human can perform four possible moves: up, down, left, right. The human cannot move to a location containing an obstacle. If the human tries to move to a location that is empty, then she is successful. If the human tries to move to a location that is occupied by the box, then the human pushes the box towards the same direction; if the next location does not contain an obstacle, then the human and the box both move by one position to the same direction.

Design an algorithm that is given the array A as above, and outputs YES or NO depending on whether there is a sequence of moves that terminate with the box at the destination.

You may assume that the maximum dimensions of the room are 5×6.

Example 1:

Input:

```
A = [[4,0,0,0,0,0],
     [1,1,1,1,0,0],
     [0,0,0,2,0,0],
     [0,0,0,3,0,0],
     [0,0,0,0,0,0]];
```

Output:
`YES`

Example 2:

Input:

```
A = [[4,0,0,0,0,0],
     [1,1,1,1,1,0],
     [0,0,0,2,0,0],
     [0,0,0,3,0,0],
     [0,0,0,0,0,0]];
```

Output:
`NO`