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12th Nov 2013

## Get Adjacent Squares on a Grid

I'm writing a game!

That's right, I'm writing a (*puzzle?*) game in JavaScript at the moment. I've come across a few features that seem difficult to implement but actually have very simple solutions, so I thought I'd share the first one.

### A list of adjacent squares

#### The grid

Let's say we have a grid of size x by y, the best way to represent this grid is as an array of x and y co-ordinates (starting from the top left first, as that's how my brain works these days - thank HTML).

1	[1,1]	[2,1]	[3,1]	[4,1]	[5,1]	..
2	[1,2]	[2,2]	[3,2]	[4,2]	[5,2]	..
3	[1,3]	[2,3]	[3,3]	[4,3]	[5,3]	..
4	[1,4]	[2,4]	[3,4]	[4,4]	[5,4]	..
5	[1,5]	[2,5]	[3,5]	[4,5]	[5,5]	..
6	..	..	..	..	..	..

This is actually a two dimensional array, which in reality is just an array of arrays. It's crucial to represent the grid like this, it allows for simpler calculations. Don't attempt to use a one dimensional array of size x \* y, as it'll just overcomplicate things.

#### Get adjacent squares

Using the above logic, we represent a square as an array containing one x and one y co-ordinate (for example [2,2]). To get a square adjacent to another, it's pretty simple with this system:

- Take one from the x co-ordinate [x-1,y]
- Add one to the x co-ordinate [x+1,y]
- Add one to the y co-ordinate [x,y+1]
- Take one from the y co-ordinate [x,y-1]

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## Get Adjacent Squares on a Grid | iLee

```
1 | var adjacents = [[x-1,y],[x+1,y],[x,y+1],[x,y-1]];
```

There is a maximum possibility of 4 adjacent squares to any other square.

## Off the grid!

Squares that are on the edge of the grid might only have 2 or 3 adjacent squares, so we need to check that a possible adjacent is valid:

- Check the x co-ordinate is greater than or equal to 1, but is also less than or equal to the width of the grid
- Check the y co-ordinate is greater than or equal to 1, but is also less than or equal to the height of the grid

```
1 | x >= 1 && x <= width && y >= 1 && y <= height
```

## The solution

```

1 |
2 |
3 |   var width = 5,
4 |       height = 5;
5 |   function isSquareOnGrid (square) {
6 |       var x = square[0],
7 |           y = square[1];
8 |       return x >= 1 && x <= width && y >= 1 && y <= height;
9 |   }
10 |   function getAdjacents (square) {
11 |       var x = square[0],
12 |           y = square[1],
13 |           adjacents = [[x-1,y],[x+1,y],[x,y+1],[x,y-1]];
14 |       return adjacents.filter(isSquareOnGrid);
15 |   }
16 |

```

I've set the height and width of the grid to 5, but they can be anything. To get an array of adjacent squares, you pass the `getAdjacents()` function a square:

```

1 | getAdjacents([ 2,2]); // [1,2],[3,2],[2,3],[2,1]
2 | getAdjacents([ 5,3]); // [4,3],[5,4],[5,2]

```

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Fine! I ain't gonna tell you what MY GAME is about either! =D  
Just kidding, it's an online tag. Hope yours isn't! =P

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