CSY1018
Web Development

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Topic 7

- While loops
- Arrays continued

Exercise 1

1) Create a web page with a single <button> element

- 2) Create an array that contains the names of 8 football/rugby/other sport's teams
- 3) Generate 4 random matches using the 8 teams and display them in a list on the page
  - Hint: You will need to use createElement and createTextNode to create the elements
  - E.g. England Vs France
  - France Vs Germany
  - Brazil vs England
- 4) **Optional** When the button is pressed, remove the last generated list from the page

```
function buttonClick() {
        var teams = [];
        teams[0] = 'England';
        teams[1] = 'Spain';
        teams[2] = 'Germany';
        teams[3] = 'Brazil';
        teams[4] = 'Argentina';
        teams[5] = 'Italy';
        teams[6] = 'Holland';
        teams[7] = 'France';

        var oldUl = document.getElementsByTagName('ul');
        if (oldUl.length > 0) {
                oldUl[0].parentNode.removeChild(oldUl[0]);
        }


        var ul = document.createElement('ul');
        var body = document.getElementsByTagName('body')[0];
        body.appendChild(ul);

        for (var i = 0; i < 4; i++) {
                var firstTeamNo = Math.floor(Math.random() * 8);
                var secondTeamNo = Math.floor(Math.random() * 8);

                var li = document.createElement('li');
                var textNode = document.createTextNode(teams[firstTeamNo]
                                        + ' vs ' + teams[secondTeamNo]);

                li.appendChild(textNode);
                ul.appendChild(li);
        }

}

function myLoadEvent() {
        var button = document.getElementsByTagName('button')[0];
        button.addEventListener('click', buttonClick);
}

document.addEventListener('DOMContentLoaded', myLoadEvent);
```

While loops

- A while loop is a second type of loop that you can use to keep looping *while* a condition is true
- This is useful when you don't know how many times you need to loop

While Loops

- For example, to keep looping until a 6 is picked on a dice:

```
var sixRolled = false;

while (sixRolled == false) {
        diceRoll = Math.ceil(Math.random() * 6);
        if (diceRoll == 6) {
          sixRolled = true;
        }
}
```

Exercise 2

- 15 minutes
- 1) Extend exercise 1 using a while loop create a loop that keeps looping until a specific one of your teams from Exercise 1 has been picked e.g. until England is picked
- 2) Inside each loop, add a list item to a list on the page that says
- [Team] Picked
  - Each time you click the button it should generate a different sized list

```
function buttonClick() {
        var teams = [];
        teams[0] = 'England';
        teams[1] = 'Spain';
        teams[2] = 'Germany';
        teams[3] = 'Brazil';
        teams[4] = 'Argentina';
        teams[5] = 'Italy';
        teams[6] = 'Holland';
        teams[7] = 'France';


        var oldUl = document.getElementsByTagName('ul');
        if (oldUl.length > 0) {
                oldUl[0].parentNode.removeChild(oldUl[0]);
        }

        var ul = document.createElement('ul');
        var body = document.getElementsByTagName('body')[0];
        body.appendChild(ul);

        var englandRolled = false;

        while (englandRolled == false) {
                var randomTeam = Math.floor(Math.random() * 8);
                var textNode = document.createTextNode(teams[randomTeam] + ' picked');
                var li = document.createElement('li');
                li.appendChild(textNode);
                ul.appendChild(li);

                if (teams[randomTeam] == 'England') {
                        englandRolled = true;
                }
        }
}

function myLoadEvent() {
        var button = document.getElementsByTagName('button')[0];
        button.addEventListener('click', buttonClick);
}

document.addEventListener('DOMContentLoaded', myLoadEvent);
```

Arrays

- You can fill an array by writing values to specific indexes, e.g.

```
teams[0] = 'England';
teams[1] = 'Spain';
teams[2] = 'Germany';
teams[3] = 'Brazil';
teams[4] = 'Argentina';
teams[5] = 'Italy';
teams[6] = 'Holland';
teams[7] = 'France';
```

- To do this you need to manually specify and keep track of each index
- You can also create an array by adding to the *next available index*

Array Push

- This is done using the array.push() function
- You can *push* an value to the end of the array
- The index will be automatically generated and use the next available number, starting from zero:

```
var teams = [];
teams[0] = 'England';
teams[1] = 'Spain';
teams[2] = 'Germany';
teams[3] = 'Brazil';
teams[4] = 'Argentina';
teams[5] = 'Italy';
teams[6] = 'Holland';
teams[7] = 'France';
```

These pieces of code will create identical arrays

```
var teams = [];
teams.push('England');
teams.push('Spain');
teams.push('Germany');
teams.push('Brazil');
teams.push('Argentina');
teams.push('Italy');
teams.push('Holland');
teams.push('France');
```

Array.push()

- Array.push() will always add values to the end of an array.
- This way you don't need to know the existing size of an array to add to it
- This is useful when you want to dynamically store values

Exercise 3

- 20 minutes
- 1) Extend exercise 1 so each team is only drawn once. Each team should be in one of the 4 matches.
- Hint:
  - Use a second array to keep track of which teams have already been drawn
  - When drawing a random team, loop through the list of teams that have been drawn already and check the team isn't there
  - Use a while loop to keep picking teams until a team that hasn't been picked yet is drawn

```
var teams = [];
teams[0] = 'England';
teams[1] = 'Spain';
teams[2] = 'Germany';
teams[3] = 'Brazil';
teams[4] = 'Argentina';
teams[5] = 'Italy';
teams[6] = 'Holland';
teams[7] = 'France';


var ul = document.createElement('ul');
var body = document.getElementsByTagName('body')[0];
body.appendChild(ul);

var pickedTeams = [];

for (var i = 0; i < 4; i++) {

        var newTeam = false;
        while (newTeam == false) {
                var firstTeamNo = Math.floor(Math.random() * 8);

                var alreadyPicked = false;

                for (var j = 0; j < pickedTeams.length; j++) {
                        if (pickedTeams[i] == teams[firstTeamNo]) {
                                alreadyPicked = true;
                        }
                }

                if (alreadyPicked == false) {
                        pickedTeams.push(teams[firstTeamNo]);
                        newTeam = true;
                }
        }


        var newTeam = false;
        while (newTeam == false) {
               // pick second team in the same way
        }


        var li = document.createElement('li');
        var textNode = document.createTextNode(teams[firstTeamNo] +
                                ' vs ' + teams[secondTeamNo]);

        li.appendChild(textNode);
        ul.appendChild(li);
}
```

Loop from 1 - 4 for each game

Keep looping until a new team is picked

Loop through the list of teams that have already been picked

If it's already in the array set alreadyPicked to true

If it's not already been Picked, add it to the list of Picked teams and exit the while loop

Exercise 4

- 1) Use a while loop and an array to solve the problem from Topic 6:
  - Prevent the same lottery numbers being picked twice
- Extend the game from Topic 3 to randomly create at least 6 characters and store them in an array. Generate a random head/body and have them walk around the screen
  - When generating the characters ensure the character is unique and doesn't have the same head/body combination as others.