Fastcampus

Web Programming & Frontend Dev SCHOOL

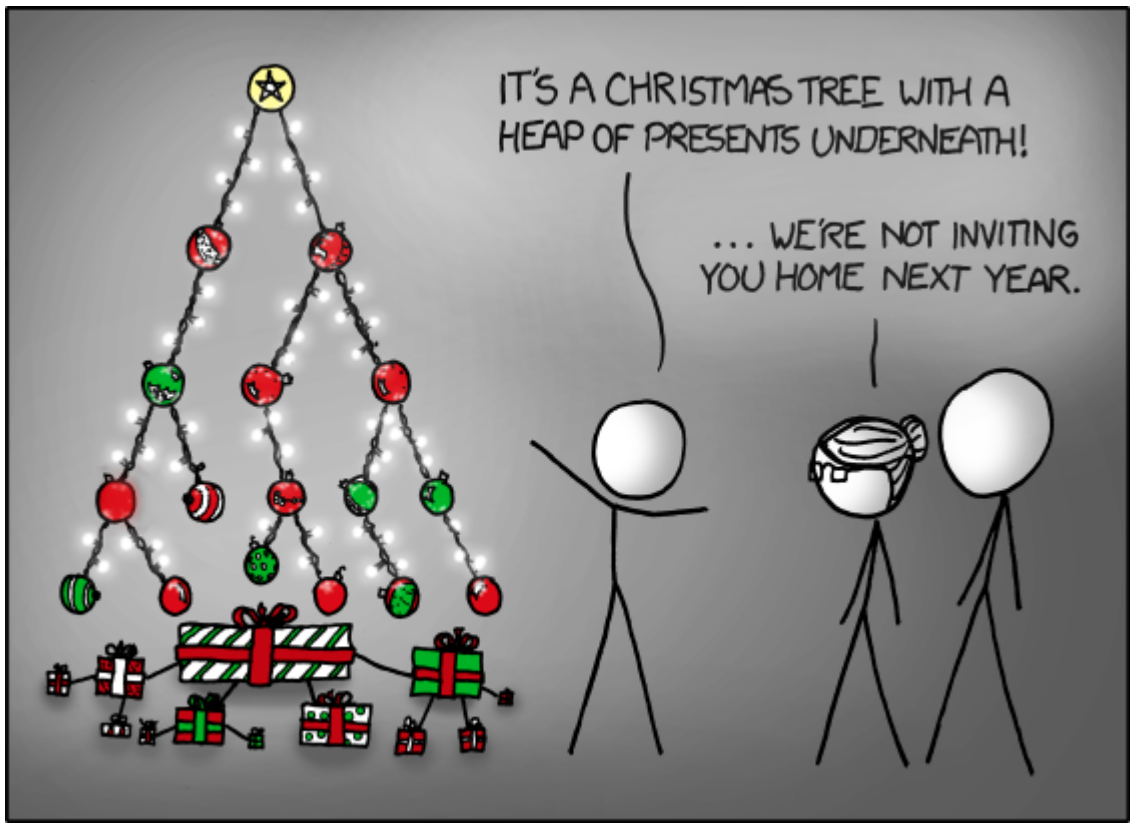
Data Structure(stack, queue), gulp(1)

Data Structure

Data Structure

> Data structure is a particular way of organizing data in a computer so that it can be used efficiently.

So, Data Structure is..



Data Structures in Web Development

Array & Hash(Dictionary) - indexing post

```
in RDB
[articleId, title, body, userId, view]
```

```
[{
        userId: 1,
        articleId: 1,
        view: 100,
        title: "sunt aut facere repellat provident occaecati exc
        body: "quia et suscipit suscipit recusandae consequuntur
},
...

]
```

Data Structures in Web Development

Tree - DOM rendering performance, reply

```
<html>
<head></head>
<body>
<h1></h1>
<p></p>
</body>
</html>
```

Data Structures in Web Development

- Binary Tree Search
  - Queue(BFS, Breadth First Search)
  - Stack(DFS, Depth First Search)

We'll Learn about..

- Stack
- Queue
- Linked-list
- Tree

Stack

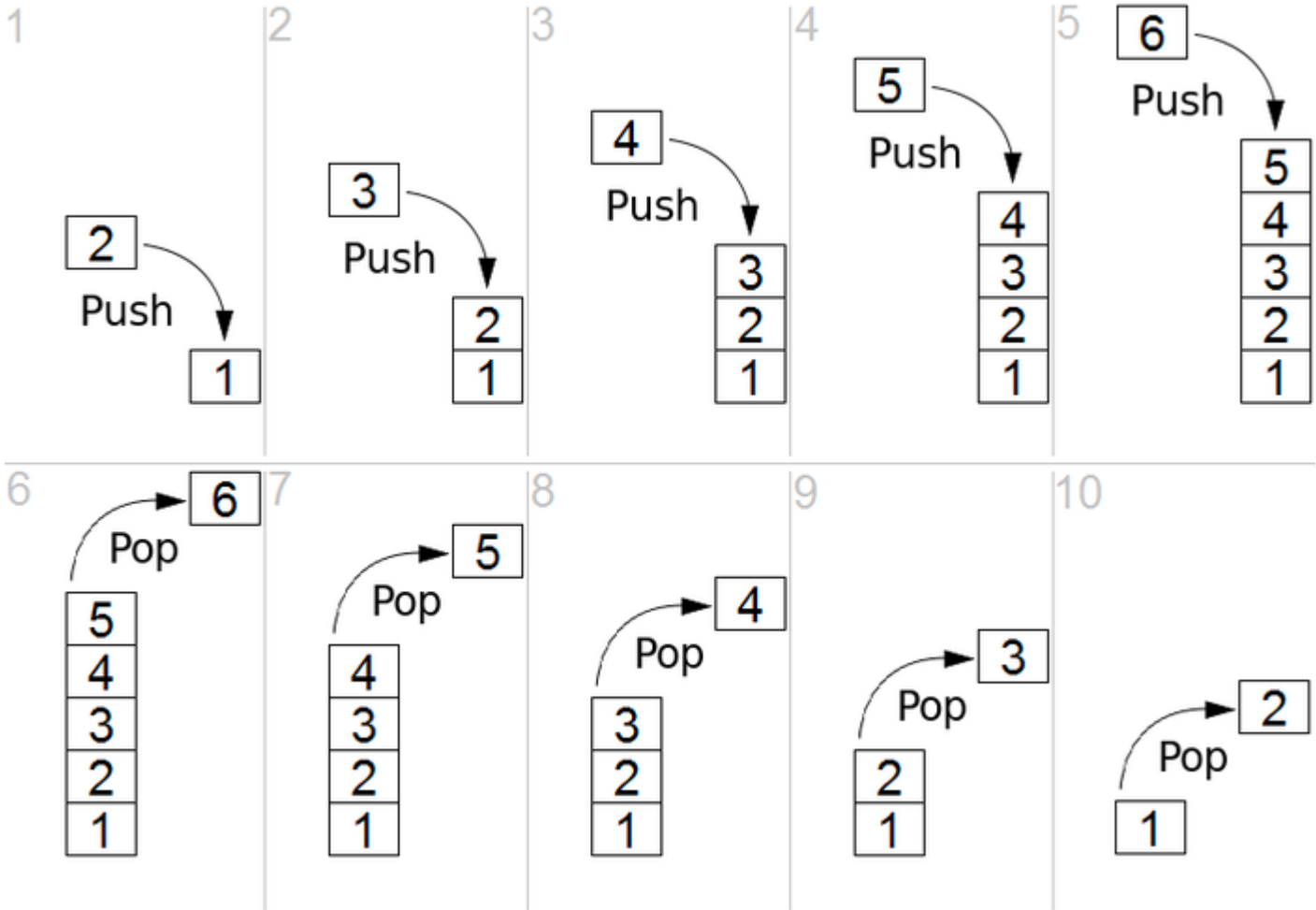
Stack

> A stack is an abstract data type that serves as a collection of elements, with two principal operations.

- push: which adds an element to the collection
- pop: which removes the most recently added element that was not yet removed

LIFO

> Last In, First Out


1
2
Push
1
2
3
Push
2
1
3
4
Push
3
2
1
4
5
Push
4
3
2
1
5
6
Push
5
4
3
2
1
6
Pop
6
5
4
3
2
1
7
Pop
5
4
3
2
1
8
Pop
4
3
2
1
9
Pop
3
2
1
10
Pop
2
1

Let's Create Stack class

```
function Stack() {
        //properties, methods
        var items = [];
}
```

push & pop

```
function Stack() {
        //properties, methods
        var items = [];

        this.push = function(element){
                return items.push(element);
        };


        this.pop = function(){
                return items.pop();
        };
}
```

peek & isEmpty

```
function Stack() {
        //underneath push & pop

...

        this.peek = function(){
                return items[items.length-1];
        };
        this.isEmpty = function(){
                return items.length == 0;
        };


}
```

size & clear & print

```
function Stack() {
        //underneath peek & isEmpty

...

        this.size = function(){
                return items.length;
        };

        this.clear = function(){
                items = [];
        };

        this.print = function(){
                console.log(items.toString());
        };

}
```

Let's push with Stack class

```
> var stack = new Stack();
> console.log(stack.isEmpty());

> stack.push(5);
> stack.push(2);
> stack.push(8);

> console.log(stack.peek());

> stack.push(11);

> console.log(stack.size());
> console.log(stack.isEmpty());
```

Let's pop with Stack class

```
> stack.pop();
> stack.pop();

> console.log(stack.size());
> stack.print();
```

Let's make binaryConverter with Stack

case: $10_{(10)}$ to `1010` $_{(2)}$

```
10 / 2 == 5 rem == 0
5 / 2 == 2 rem == 1
2 / 2 == 1 rem == 0
1 / 2 == 0 rem == 1
```

push remainders ==> `[0, 1, 0, 1]`

output = pop remainders

Let's make binaryConverter with Stack

```
function divideBy2 (decimal) {
        var remStack = new Stack(),
        rem,
        binaryString = '';
}
```

Let's make binaryConverter with Stack

```
function divideBy2 (decimal) {
        var remStack = new Stack(),
        rem,
        binaryString = '';

        while (decimal > 0) {
                rem = Math.floor(decimal % 2);
                remStack.push(rem);
                decimal = Math.floor(decimal / 2);
        }
}
```

Math.floor

Let's make binaryConverter with Stack

```
function divideBy2 (decimal) {
        var remStack = new Stack(),
        rem,
        binaryString = '';

        while (decimal > 0) {
                rem = Math.floor(decimal % 2);
                remStack.push(rem);
                decimal = Math.floor(decimal / 2);
        }

        while (!remStack.isEmpty()) {
                binaryString += remStack.pop().toString();
        }
}
```

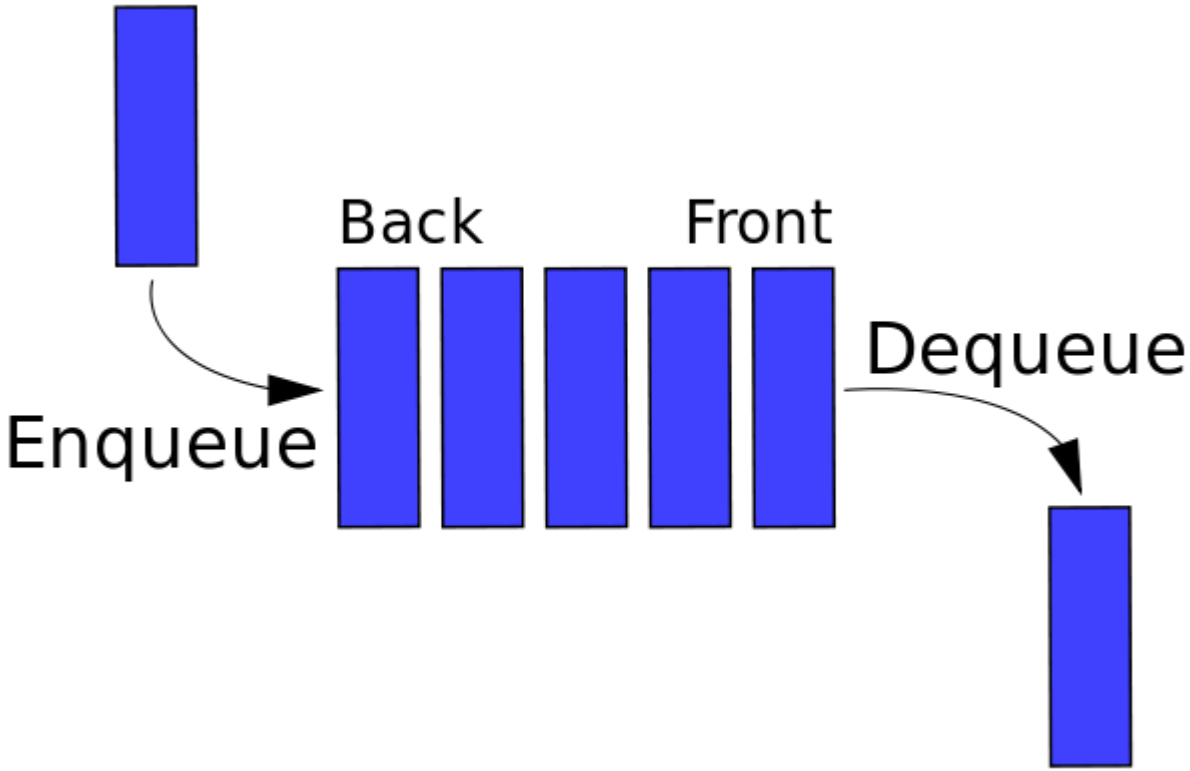
Queue

Queue

> a queue is a particular kind of abstract data type or collection in which the entities in the collection are kept in order.

Enqueue & Dequeue

- Enqueue: addition of entities to the rear terminal position
- Dequeue: removal of entities from the front terminal position


Back
Front
Enqueue
Dequeue

Let's Create Queue class

```
function Queue() {
        //properties, methods
        var items = [];
}
```

Enqueue & Dequeue

```
function Queue() {
        //properties, methods
        this.enqueue = function(element) {
                items.push(element);
        };
        this.dequeue = function() {
                return items.shift();
        };
}
```

front & isEmpty

```
function Queue() {
        //underneath Enqueue & Dequeue

...

        this.front = function() {
                return items[0];
        };
        this.isEmpty = function() {
                return items.length == 0;
        };
}
```

clear & size & print

```
function Queue() {
        //underneath front & isEmpty

...

        this.clear = function() {
                items = [];
        };
        this.size = function() {
                return items.length;
        };
        this.print = function() {
                console.log(items.toString());
        };

}
```

Let's Enqueue with Queue class

```
> var queue = new Queue();
> console.log(queue.isEmpty());

> queue.enqueue("Fast");
> queue.enqueue("Campus");
> queue.enqueue("School");

> queue.print();
> console.log(queue.size());
> console.log(queue.isEmpty());
```

Let's Dequeue with Queue class

```
> queue.dequeue();
> queue.dequeue();

> queue.print();
```

Create Queue with 2 Stacks

```
function Queue_with_stack() {
    var inBox = [];
    var outBox = [];

    this.enqueue = function(num) {
        inBox.push(num);
    };

    this.dequeue = function() {
        if (outBox.length > 0) {
            return outBox.pop();
        }

        while(inBox.length > 1) {
            outBox.push(inBox.pop());
        }

        return inBox.pop();
    };
}
```

Queue can make

- Priority Queue
- Circular Queue

Priority Queue

```
function PriorityQueue() {
    var items = [];

    ...
}
```

```
function QueueElement (element, priority){
    this.element = element;
    this.priority = priority;
}

this.enqueue = function(element, priority){
    var queueElement = new QueueElement(element, priority);

    if (this.isEmpty()) {
        items.push(queueElement);
    } else {
        var added = false;
        for (var i=0; i<items.length; i++) {
            if (queueElement.priority < items[i].priority) {
                items.splice(i,0,queueElement);
                added = true;
                break;
            }
        }
        if (!added) {
            items.push(queueElement);
        }
    }
};
```

splice

```
this.dequeue = function(){
        return items.shift();
};

this.front = function(){
        return items[0];
};

this.size = function(){
        return items.length;
};
```

Gulp

Gulp is..

Task runner

- 매우 귀찮은 루틴한 작업들을 자동화 할 수 있는 툴
- 현재 2735 + a 개의 패키지가 존재
    - 따라서 필요한 기능을 골라 설치할 필요가 있음!!

task flow

`코드작성 - JS test(jshint) - JS Minify - JS Merge(concat) - CSS Minify - CSS Merge - 결과물`

```
$ npm install gulp --global
$ npm install gulp --save-dev
```

```
$ touch gulpfile.js

var gulp = require("gulp");

//hello라는 gulp task를 등록
gulp.task("hello", function () {
        return console.log("hello gulpworld");
});

$ gulp hello
```

gulp 기본 문법

- `gulp.task` : gulp의 작업단위
- `gulp.src` : gulp 실행의 대상
- `gulp.dest` : gulp 실행 후 목적지
- `gulp.watch` : 변화 감지 후 자동 실행

기본값 설정하기

```
$ gulpfile.js

var gulp = require("gulp");

//hello라는 gulp task를 등록
gulp.task("hello", function () {
        return console.log("hello gulpworld");
});

gulp.task("default", ["hello"]);

$ gulp
```

우선순위 설정하기

```
$touch gulpfile.js

var gulp = require("gulp");

//hello라는 gulp task를 등록
gulp.task("hello", function () {
        return console.log("hello");
});

gulp.task("gulpworld", ["hello"], function () {
        return console.log("gulpworld");
});

gulp.task("default", ["gulpworld"]);

$ gulp
```

자주쓰는 목적지 설정하기

```
var publicPath = {
        src  : './public/src/',
        dest : './public/dist/'
};
```

uglify(gulp-uglify) : js uglify

```
gulp.task("uglify", function(){
        pump([
                gulp.src(publicPath.src + 'js/uglify.js'),
                uglify(),
                gulp.dest(publicPath.dest + 'js/')
        ]);
});
```

gulp-concat : js concatenate

```
gulp.task("concat", function(){
        pump([
                gulp.src([publicPath.src + 'js/concat1.js', publ
                concat('concatenated.js'),
                gulp.dest(publicPath.dest + 'js/')
        ]);
});
```

gulp-imagemin : image minify

```
gulp.task("imagemin", function(){
        pump([
                gulp.src(publicPath.src + 'img/*.jpg'),
                imagemin(),
                gulp.dest(publicPath.dest + 'img/')
        ]);
});
```