

Coding Challenge 2020Q1 Solution Set

Handling data transformations using map, filter, reduce
and functional programming techniques

Part 1: Map, filter, reduce on iterable data structures

1. (1 pt.) Using `map`, finish the return statement in the given function which should take in a list of numbers and **return a list of numbers where each element in the list is multiplied by 10.**

Accepted Solution

```
function q1(nums) : number[] {  
    return nums.map(x => x * 10)  
}
```

2. (1 pt.) Using `reduce`, write a function returns the average `rating` of the movies in the catalog.

Accepted Solution

```
function q2(movies: Movie[]) : number {  
    return movies.reduce((a, b) => a + b.rating, 0.0) / movies.length  
}
```

Accepted Solution (reduce initial value integer 0 is okay)

```
function q2(movies: Movie[]) : number {  
    return movies.reduce((a, b) => a + b.rating, 0) / movies.length  
}
```

NOT Accepted (Not the same, arithmetically)

```
function q2(movies: Movie[]) : number {  
    return movies.reduce((a, b) => (a + b.rating)/2.0, 0.0)  
}
```

3. (1 pt.) Using a chain of maps, filters, or reduces. Write a function that returns a list of movies that:
1. (1/3 pt.) starts with 'The' (account for case insensitivity)
 2. (1/3 pt.) has a rating > 3
 3. (1/3 pt.) append property `imageFileName` which is the base file name coming from the `boxart` property, i.e. `{..., boxart: http://cdn-0.nflximg.com/images/2891/DieHard.jpg}` => `{..., imageFileName: DieHard.jpg}`.
- *Note that the `imageFileName` comes from the string after the last slash (/) in the `boxart` property. Please refer to the movie data used in problem 2.

***Each Condition is Worth 1/3 of a Point**
Accepted Solution

```
function q3(movies: Movie[]) : number {  
  return movies  
    .filter(x => x.title.substring(0,3).toUpperCase() === ("THE"))  
    .filter(x => x.rating > 3) //or x.rating >= 4  
    .map(x => ({...x, imageFilename: x.boxart.split("/").pop()}));  
}
```

*For condition 1, alternate solution(s) include but are not limited to:

```
.filter(x => x.title.substring(0,3).toLowerCase() === ("the"))
```

*For condition 3, alternate solution(s) include but are not limited to:

```
.map(x => ({...x, imageFilename:  
x.boxart.split("/") [x.boxart.split("/").length - 1] //alternative to pop  
}));  
  
or  
  
.map(x => (<any>Object).assign(x,  
{imageFilename: x.boxart.split('/').pop()}));  
  
or  
  
.map(x => {  
  x['imageFileName'] = x.boxart.split("/").pop();  
  return x;  
})
```

Part 2: Function Composition and Currying

4. (1 pt.) What is the output to the console when the following code is executed?

***Note:** pipe, map, and filter have been re-written to be used for function composition.

```
const pipe = (...fns) => args => fns.reduce((arg, f) => f(arg), args)
const map = fn => arr => arr.map(fn)
const filter = fn => arr => arr.filter(fn)
const classmates = [{ name: "Charlie",
  age: 20,
  sex: "male",
  likabilityScore: 95,
  isKind: true
}, {
  name: "Riley",
  age: 23,
  sex: "female",
  likabilityScore: 78,
  isKind: false
}, {
  name: "Alex",
  age: 25,
  sex: "female",
  likabilityScore: 77,
  isKind: true
}, {
  name: "Skyler",
  age: 21,
  sex: "male",
  likabilityScore: 86,
  isKind: false}]
const mysteryFunction1 = arr => map(x => x.isKind ?
{...x, likabilityScore: x.likabilityScore + 4} : x)(arr)
const mysteryFunction2 = arr => filter(x => x.likabilityScore >= 80)(arr)
var closeFriends = pipe(
  filter(x => x.age >= 21),
  mysteryFunction1,
  mysteryFunction2,
  map(x => (x.name)))
)(classmates)
console.log(closeFriends)
```

Accepted Solution: ['Alex', 'Skyler']

5. (1 pt.) What is the output to the console when the following code is executed? ¹

```
export const pipe = (...fns) => x => fns.reduce((y, f) => f(y), x);
export const flip = fn => a => b => fn(b)(a);
export const trace = value => label => {
  console.log(`${ label }: ${ value }`);
  return value;
};

const flippedTrace = flip(trace);
const g = n => n + 1;
const f = n => n * 2;

const h = pipe(
  g,
  flippedTrace('after g'),
  f,
  flippedTrace('after f')
);

h(20);
```

Accepted Solution

```
after g: 21
after f: 42
```

¹<https://medium.com/javascript-scene/curry-and-function-composition-2c208d774983>

Tiebreaker

Please ignore this problem unless further instruction to do so is given.

6. (1 pt.) What is the output to the console when the following code is executed?
*Note: Array.pop() removes the last element from an array and returns that value to the caller.

```
var sequence = [1, 7, 12, 8, 2, 0, 3, 9, 6, 10, 5, 11, 4]
var wordScramble = [
  ['A', 'Z', 'Y', 'M', 'C', 'X', 'N', 'D', 'O', 'P', 'T', 'G', 'Q'],
  ['M', 'D', 'T', 'R', 'V', 'S', 'L', 'P', 'I', 'C', 'X', 'O', 'N'],
  ['N', 'E', 'R', 'X', 'N', 'D', 'P', 'R', 'J', 'T', 'C', 'V', 'U'],
  ['H', 'X', 'M', 'B', 'E', 'I', 'N', 'P', 'J', 'X', 'E', 'V', 'O'],
  ['N', 'X', 'J', 'T', 'O', 'P', 'C', 'G', 'H', 'L', 'S', 'A', 'K'],
  ['O', 'F', 'L', 'D', 'V', 'B', 'R', 'W', 'R', 'O', 'H', 'F', 'B'],
  ['K', 'J', 'U', 'M', 'E', 'T', 'Y', 'E', 'B', 'M', 'C', 'V', 'I'],
  ['M', 'X', 'R', 'A', 'Z', 'I', 'T', 'F', 'K', 'V', 'U', 'M', 'X'],
  ['U', 'S', 'U', 'J', 'V', 'P', 'U', 'B', 'Q', 'X', 'I', 'N', 'I'],
  ['R', 'L', 'I', 'H', 'C', 'Y', 'D', 'J', 'N', 'G', 'T', 'R', 'E'],
  ['F', 'K', 'C', 'R', 'M', 'U', 'I', 'X', 'Z', 'E', 'R', 'L', 'I'],
  ['W', 'M', 'O', 'S', 'D', 'F', 'Y', 'T', 'P', 'U', 'L', 'C', 'B'],
  ['N', 'Y', 'J', 'K', 'I', 'R', 'P', 'L', 'F', 'O', 'X', 'B', 'U']
]

var result: any = wordScramble.reduce((accum, curr) =>
  accum + curr[sequence.pop()],
  '')

console.log(result)
```

Accepted Solution: 'CODECOMMUNITY'

Accepted Solution (without single quotes okay): CODECOMMUNITY