Class Gathering 07 Higher-Order Functions and Classes

Instructions

1. Please make a copy of this worksheet and provide your answers as a team of 3-4 in the designated areas below. If you are a group of only 3 people then have 1 person in your group take two roles. Please enter your name and email next to the POGIL role below before starting this activity.

Name	Email	Role
		Manager
		Speaker
		Reflector
		Recorder

2. Complete each of the sections below. Each section begins with a **`Model`** that you must use to answer the associated questions. Stop at the end of each section for a short discussion with the instructor.
3. At the end of class download a PDF version of this document and submit the PDF to the correct assignment in Gradescope. Please see Submitting an Assignment and Adding Group Members to ensure that you are submitting properly.

Rubric

Your submission will be scored out of 4 points:

Exceeding = 4	Meeting = 3	Approaching = 2	Beginning = 1	No Submission = 0
All answers have been provided, answers are excellent, answers are clear and concise, team roles have been recorded	All answers have been provided, answers are good, answers are mostly clear and concise, team roles have been recorded	Most answers have been provided, answers are ok, answers are not entirely clear and concise, team roles have been recorded	Several answers are missing, answers are not what is expected, answers are not entirely clear and concise	Nothing submitted

Model 1: Abstraction and Repetition (~15 min)

“There are two ways of constructing a software design: One way is to make it so simple that there are obviously no deficiencies, and the other way is to make it so complicated that there are no obvious deficiencies.” - C.A.R. Hoare, 1980 ACM Turing Award Lecture.

```
for (let i = 0; i < 10; i++) {
  console.log(i);
}
```

Code Listing #1

```
const repeat = (n, callback) => {
  for (let i = 0; i < n; i++) callback(i);
};
repeat(5, console.log);
```

Code Listing #2

Critical Thinking Questions

1.	What does the code in Code Listing #1 do?
	Put your answer here!
2.	What is a callback function and what does the code in Code Listing #2 do?
	Put your answer here!
3.	How does the two code listings relate to the idea of abstraction? Which of the code listings provide a better abstraction?
	Put your answer here!
4.	How does the quote from C.A.R. Hoare relate to the two code listings? Which of these code listings do you think C.A.R. Hoare would prefer more?
	Put your answer here!

Model 2: Higher-Order Functions (~40 min)

JavaScript Array Higher-Order Functions

1. Filtering Arrays / Array.filter()
2. Transforming with Map / Array.map()
3. Summarizing with Reduce / Array.reduce()

Critical Thinking Questions

5.	Write JavaScript code that uses the **`filter`** function to filter out odd numbers from a given array. Thus, given the array **`[1,2,3,4,5,6,7,8]`**, the result would be **`[2,4,6,8]`**. You may not use any other functions.

	`Put your answer here!`
6.	Write JavaScript code that uses the **`map`** function to map an array of objects containing first and last names to an array of strings where the strings are the concatenation of the first and last names. Thus, given the array **`[{first: 'Mia', last: 'Gold'}, {first: 'Chris', last: 'Brown'}]`**, the result would be **`['Mia Gold', 'Chris Brown']`**. You may not use any other functions.
	`Put your answer here!`
7.	Write JavaScript code that uses the **`reduce`** and unshift functions to reverse the items in an array. Thus, given the array **`[1,2,3,4]`**, the result would be **`[4,3,2,1]`**. This one is tricky and may take a little more time. Make sure you understand the order of arguments of the callback function provided to **`reduce`**. You may not use any other functions.
	`Put your answer here!`
8.	Write JavaScript code that uses your solution to 7. and the split and reduce functions to reverse the characters in a string. Thus, given the string **`'this is text'`**, the result would be **`'txet si siht'`**. You may not use any other functions.
	`Put your answer here!`
9.	Write a JavaScript function called **`some`** that works like the built-in some function provided by JavaScript arrays. Use a loop to implement this function.
	`Put your answer here!`
10.	Write a JavaScript function called **`some`** that works like the built-in some function provided by JavaScript arrays. Use the **`reduce`** function to implement **`some`**.
	`Put your answer here!`

Model 3: Classes (~15 min)

JavaScript provides a notation for writing classes. This has only been around since 2015. Although there are other ways of expressing classes in JavaScript, we will stick to the more conventional notation. It is assumed that you have had prior exposure to classes in other languages so we will give this shorter treatment than higher-order functions.

Critical Thinking Questions

11.	Write a JavaScript class called **`Post`** that represents a post to your favorite social media platform. Then, create another class called **`Feed`** that maintains a list of posts. In your classes use a constructor and implement at least one method in each class.
	`Put your answer here!`

Submission

The recorder must download a PDF of this activity and submit to Gradescope. Make sure you **submit to the correct activity** and that you **add all group members** who you worked with you today.

Note: All in class and lab activities for this course must be submitted through Gradescope. You must **submit your work as groups** and depending on the assignment you may need to submit either a PDF or code. Group members can be easily added through the Gradescope interface after the submission has been uploaded. You should spend some time reviewing the Student Workflow on the Gradescope website to better understand the submission process. There is also a video tutorial on how to submit a PDF-based assignment that might be helpful.