CS135 Tutorial 11

More HOF

A08 Q2

Write a function or-pred that consumes a predicate (that consumes one argument) and a list and produces true if the application of the consumed predicate on any element of the consumed list produces true, otherwise the function produces false. If the consumed list is empty the function should produce false. For example:

```
(or-pred even? empty) =>  false
(or-pred odd? (list 6 10 4)) =>  false
(or-pred string? (list 5 "wow")) => true
```

We want to solve this question in 2 ways. One using filter and one using foldl

Archery Score

You've been asked to automate the scoring process for an upcoming archery competition. In the competition, each archer will shoot multiple rounds of arrows at a target. Each round consists of multiple shots. Each time the archer shoots, their arrow may hit the target or miss.
If the arrow hits, it may hit dead center (bullseye) or hit somewhere else on the target (hit).

Archery Score Cont.

Write a function `(archery-scores rounds)` which consumes a list of rounds for one archer in the competition. Each round is a list of symbols, where each symbol represents one of three possible outcomes of one arrow shot by the archer:

- ‘bullseye, which receives a score of 2
- ‘hit, which receives a score of 1
- ‘miss, which receives a score of 0

The function should produce a single value: the sum of all points received by the given
archer.

Note: You must only use `cond`, `lambda`, and either `foldr` or `foldl` in your solution.

Web Search

Web search algorithms use a rich set of features to decide which links are relevant to a given search query (such as “how do I pass CS 135?”). In this problem, you will simulate a web search algorithm. Thankfully, you only must deal with queries that are one word long.

Your search algorithm may encounter two types of documents, either a `WebPage` or a `Video`. For this exercise, a `WebPage` is described by a list of symbols representing the words in the page and a `Video` by a description (list of symbols) and the number of seconds the video is long.

Web Search Data Defn.

You may use the following data definitions when writing your solution:

```
;; A Document is a WebPage or a Video.
(define-struct webpage (words))

;; A WebPage is a (make-webpage ne-(listof Sym))
(define-struct video (desc seconds))

;; A Video is a (make-video ne-(listof Sym) Num)
;; Requires: Num > 0.
```

Web Search Purpose

Write a function `(web-search query docs)` which takes a one-word query (represented by a single symbol) and a list of documents (`docs`) and produces a list of relevant docs. For each document, the function should include it only if the document is relevant to the query.

- A `WebPage` is relevant to the query if the exact query symbol is in the list of words on the webpage.
- A `Video` is relevant to the query if it is at least 5 seconds long and the query symbol is in the list of words in its description.

Note: Your solution must use `foldl/foldr`, `cond`, and `lambda` for all helper functions.