Quiz 1 from Fall 2020 (Practice)

STUDENT NAME

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Q1 OCaml Typing

15 Points

The following function, `foo`, has a type error and does not match its expected type of `'a list -> float`. You should not change the behavior of the function.

```
let foo lst =
  1 +. match lst with [] -> -1.0 | h :: t -> 3
```

Re-type the function below, making the small changes necessary to resolve the type error.

Enter your answer here

Save Answer

Q2 Expressions

40 Points

Q2.1

20 Points

Fill in the blanks such that `f` is of type `(int list -> int) -> int -> int`. Enter the code for each blank in the corresponding field.

```
let f a b = ____________________ in b + ______
```

Enter the code for the first blank here:

Enter your answer here

Enter the code for the second blank here:

Enter your answer here

Save Answer

Q2.2
10 Points

Write a function of type `'a -> ('a -> 'b) -> 'b -> 'b list`.

Enter your answer here

Save Answer

Q2.3
10 Points

Write an expression of type `('a -> int) * ('b -> float)`.

Enter your answer here

Save Answer

Q3 Programming - Non-recursive
45 Points

For the next two questions, you **may not** define any recursive functions, or use any functions from the `List` module. You may write non-recursive helper functions. You can also use the following three provided functions:

```
let rec map f l =
  match l with
  | [] -> []
  | h :: t -> (f h) :: (map f t)

let rec fold_left f ac l =
  match l with
  | [] -> ac
  | h :: t -> fold_left f (f ac h) t

let rec fold_right f l ac =
  match l with
  | [] -> ac
  | h :: t -> f h (fold_right f t ac)
```

Q3.1 rtl

25 Points

Write a non-recursive function called `rtl` of type `('a -> 'a) list -> 'a -> 'a` which takes in a list of functions and an initial value, and applies each function in succession to the value in **right-to-left** order. For example, the following call would return `10`:

```
rtl [(fun x -> x - 10); (fun x -> x * 5); (fun x -> x + 2)] 2
```

Firstly, the initial value `2` is passed to the last function, which returns `4`. Then, `4` is passed to the middle function which returns `20`. Finally, `20` is passed to the first function which returns `10`.

Note that if the list of functions is empty, the initial value should simply be returned.

Write your code in the space below:

Enter your answer here

Save Answer

Q3.2 count_mem

20 Points

Write a non-recursive function called `count_mem` of type `('a * 'a) list -> 'a -> int` which takes a list of 2-tuples and a search value, and returns the number of times the search value appears in the list. For example, the following call would return `4`:

```
count_mem [("dog", "cat"); ("bat", "ant"); ("dog", "dog"); ("emu", "dog")] "dog"
```

The value "dog" appears once in the first tuple, twice in the third, and once in the fourth, for a total of 4 times.

As another example, the following call would return `0`:

```
count_mem [(1, 3); (0, 7); (8, 2)] 9
```

`9` does not appear in the list of tuples, so `0` is returned.

Write your code in the space below:

Enter your answer here

Save Answer

Save All Answers

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