REMOVE ELEMENTS FROM DICTIONARIES (20/20 points)

The following code is the program explained during the video sequence except that we have modified the interface `DictSig` a little bit. Now, it is possible to `remove` a key from a dictionary.

1. Update the code to have it accepted by the type-checker.

THE GIVEN PRELUDE

```
module type DictSig = sig
  type ('key, 'value) t
  val empty : ('key, 'value) t
  val add : ('key, 'value) t -> 'key -> 'value -> ('key, 'value) t
  exception NotFound
  val lookup : ('key, 'value) t -> 'key -> 'value
  val remove : ('key, 'value) t -> 'key -> ('key, 'value) t
end ;;
```

YOUR OCAML ENVIRONMENT

```
module Dict : DictSig = struct
  type ('key, 'value) t =
    | Empty
    | Node of ('key, 'value) t * 'key * 'value * ('key, 'value) t

  let empty = Empty

  let rec add d k v =
    match d with
    | Empty -> Node (Empty, k, v, Empty)
    | Node (l, k', v', r) ->
        if k = k' then Node (l, k, v, r)
        else if k < k' then Node (add l k v, k', v', r)
        else Node (l, k', v', add r k v)

  exception NotFound

  let rec lookup d k =
    match d with
    | Empty ->
        raise NotFound
    | Node (l, k', v', r) ->
        if k = k' then v'
        else if k < k' then lookup l k
        else lookup r k

  let rec find_max = function
    | Empty -> assert false
    | Node (_, k, v, Empty) -> (k, v)
    | Node (_, k, v, r) -> find_max r;;

  let rec remove d k = match d with
    | Empty ->
```

Evaluate >

Switch >>

Typechecl

Reset Templ

Full-screen |

Check & Sa

Exercise complete (click for details) 20 pts

v Exercise 1: Dict Completed, 20 pts

Found Dict with compatible type.

Computing the following sequence:
```
let d = Dict.empty in
let d = Dict.add d "Eggplant" 5 in
let d = Dict.remove d "Eggplant" in
d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
let d = Dict.empty in
let d = Dict.add d "Eggplant" 5 in
let d = Dict.remove d "Zucchini" in
d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
let d = Dict.empty in
let d = Dict.add d "Eggplant" 5 in
let d = Dict.add d "Zucchini" 3 in
let d = Dict.remove d "Zucchini" in
d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:

```
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Eggplant" 5 in
  let d = Dict.add d "Zucchini" 3 in
  let d = Dict.add d "Banana" 1 in
  let d = Dict.remove d "Eggplant" in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Eggplant" 5 in
  let d = Dict.add d "Zucchini" 3 in
  let d = Dict.add d "Banana" 1 in
  let d = Dict.remove d "Apple" in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Radish" 2 in
  let d = Dict.add d "Orange" 4 in
  let d = Dict.add d "Zucchini" 5 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Banana" 4 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Apple" 7 in
  let d = Dict.add d "Salad" 2 in
  let d = Dict.remove d "Salad" in
  let d = Dict.add d "Tomato" 0 in
  let d = Dict.add d "Bean" 9 in
  let d = Dict.remove d "Apple" in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Carrot" 2 in
  let d = Dict.add d "Eggplant" 2 in
  let d = Dict.remove d "Carrot" in
  let d = Dict.remove d "Eggplant" in
  let d = Dict.add d "Orange" 8 in
  let d = Dict.add d "Bean" 3 in
  let d = Dict.remove d "Orange" in
  let d = Dict.add d "Eggplant" 4 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Salad" 8 in
  let d = Dict.remove d "Salad" in
  let d = Dict.add d "Tomato" 6 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Carrot" 10 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Apple" 4 in
  let d = Dict.add d "Banana" 7 in
  let d = Dict.remove d "Banana" in
  let d = Dict.add d "Zucchini" 7 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Radish" 0 in
  let d = Dict.add d "Tomato" 10 in
  let d = Dict.add d "Banana" 2 in
  let d = Dict.remove d "Radish" in
  let d = Dict.remove d "Tomato" in
  let d = Dict.remove d "Banana" in
  let d = Dict.add d "Salad" 7 in
  d
  let d = Dict.add d "Carrot" 1 in
  let d = Dict.remove d "Carrot" in
  let d = Dict.add d "Apple" 1 in
  let d = Dict.add d "Eggplant" 5 in
  let d = Dict.remove d "Eggplant" in
  let d = Dict.add d "Bean" 2 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Zucchini" 4 in
  let d = Dict.add d "Orange" 6 in
  let d = Dict.add d "Carrot" 3 in
  let d = Dict.remove d "Orange" in
  let d = Dict.add d "Bean" 9 in
  let d = Dict.add d "Apple" 6 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Orange" 10 in
  let d = Dict.add d "Banana" 0 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Eggplant" 2 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Salad" 1 in
  let d = Dict.remove d "Salad" in
  let d = Dict.add d "Zucchini" 9 in
  let d = Dict.add d "Tomato" 3 in
  let d = Dict.add d "Radish" 5 in
  let d = Dict.remove d "Radish" in
  let d = Dict.add d "Eggplant" 0 in
  let d = Dict.add d "Salad" 6 in
  d
```
Correct dictionnary returned. 1 pt

Computing the following sequence:
```
  let d = Dict.empty in
  let d = Dict.add d "Tomato" 8 in
  let d = Dict.remove d "Tomato" in
  let d = Dict.add d "Banana" 1 in
  let d = Dict.add d "Bean" 10 in
  let d = Dict.remove d "Banana" in
  let d = Dict.add d "Apple" 6 in
  let d = Dict.add d "Zucchini" 5 in
  let d = Dict.remove d "Zucchini" in
  d
```
Correct dictionnary returned. 1 pt