宣言型プログラム論 課題5

200911434 青木大祐

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5-1

```
(* 5.1.1 *)
let array_sum2 a1 a2 =
  let len = min (Array.length a1) (Array.length a2) in
  Array.init len (fun idx -> a1.(idx) + a2.(idx));;

array_sum2 [|1; 2; 3|] [|4; 5|];;

(* 5.1.2 *)
let inner_prod a1 a2 =
  let len = Array.length a1 in
  let res = ref 0 in
  for i = 0 to len - 1 do
    res := !res + a1.(i) * a2.(i)
    done;
  !res;;

inner_prod [| 1; 2; 3 |] [| 2; 3; 4 |];;

(* 5.1.3 *)
let array_map f a =
  let len = Array.length a in
  Array.init len (fun idx -> f a.(idx))
;;

array_map (fun i -> i * i) [| 1; 2; 3 |];;

(*
    val array_sum2 : int array -> int array -> int array = <fun>
#   - : int array = [|5; 7|]
#                 val inner_prod : int array -> int array -> int = <fun>
#   - : int = 20
#           val array_map : ('a -> 'b) -> 'a array -> 'b array = <fun>
#   - : int array = [|1; 4; 9|]
#
*)
```

5-2

```
(* 5.2.1 *)

exception Zero;;

let preprod l =
  if l = [] then
    0
  else
    let rec preprod_loop l prd =
      match l with
          [] -> prd
        |   head::rest ->
            if head = 0 then
              raise Zero
            else
              preprod_loop rest (prd * head)
    in
    preprod_loop l 1;;

preprod [];;
preprod [2;3;4];;
preprod [2;0;4];;

(* 5.2.2 *)
let prod l =
  try
    preprod l
  with
      Zero -> 0;;

prod [];;
prod [2;3;4];;
prod [2;0;4];;


(*
# val preprod : int list -> int = <fun>
#  - : int = 0
# - : int = 24
```

```
# Exception: Zero.
# val prod : int list -> int = <fun>
# - : int = 0
# - : int = 24
# - : int = 0
#
 *)
```

5-3

```
(* 5.3.1 *)
let count_lines file =
  let inchan = open_in file in
  let lines = ref 0 in
  try
    while true do
      let _ = input_line inchan in
      lines := !lines + 1
    done;
    0
  with End_of_file -> close_in inchan;
    !lines;;

count_lines "test.txt";;

(*
   val count_lines : string -> int = <fun>
#  - : int = 8
 *)
```

test.txt

```
hoge
piyo
fuga
hogera
foo
bar
baz
qux
```