

非手続き型言語3回目課題 解答例

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1 関数 mygcd (第3回のスライドの問題)

```
fun mygcd(a, 0) = a
| mygcd(a, b) = mygcd(b, a mod b);
```

2 演習問題 3.3.2

```
fun swapElement ([]) = []
| swapElement ([x]) = [x]
| swapElement (x::y::zs) = y::x::swapElement(zs);
```

3 演習問題 3.3.3

```
(* 先頭が1番目 *)
fun deleteIElement ([], i) = []
| deleteIElement (x::xs, 1) = xs
| deleteIElement (x::xs, i) = x::deleteIElement(xs, i-1);
```

4 演習問題 3.3.11

```
(* a *)
fun member(x, []) = false
| member(x, y::ys) = if x = y then true
                      else member(x, ys);

(*
Warning: calling polyEqual が出るが、これは無視してよい
*)

(* orelse を使ったこういうのもできる これも Warning: calling polyEqual が
出る*)
fun member2(x, []) = false
| member2(x, y::ys) =
    x=y orelse member(x, ys);
```

```

(* b *)
fun delete(x,[]) = nil
  | delete(x,y::ys) = if x = y then ys
                      else y::delete(x,ys);

(*
Warning: calling polyEqual が出るが、これは無視してよい
*)
(* c *)
fun insert(x,S) = if member(x, S) then S
                  else x::S;

(* member を使わない 以下のものでもよい*)
(* この解答例で as は別名をつけるというもの. S as y::ys は, S として
も y::ys としても同じリストを意味するという意味 *)

fun insert2(x,[]) = [x]
  | insert2(x,S as y::ys) =
    if x=y then S else y::insert2(x,ys);

```

5 実行結果

```

- use "ML3answer.ml";
[opening ML3answer.ml]
val mygcd = fn : int * int -> int
val swapElement = fn : 'a list -> 'a list
val deleteElement = fn : 'a list * int -> 'a list
ML3answer.ml:33.29 Warning: calling polyEqual
val member = fn : 'a * 'a list -> bool
ML3answer.ml:42.10 Warning: calling polyEqual
val member2 = fn : 'a * 'a list -> bool
ML3answer.ml:47.28 Warning: calling polyEqual
val delete = fn : 'a * 'a list -> 'a list
val insert = fn : 'a * 'a list -> 'a list
ML3answer.ml:62.13 Warning: calling polyEqual
val insert2 = fn : 'a * 'a list -> 'a list
val it = () : unit
- mygcd (100, 55);
val it = 5 : int
- swapElement([2,3,4,5,6]);
val it = [3,2,5,4,6] : int list
- deleteElement ([1,2,3,4,5], 3);
val it = [1,2,4,5] : int list
- member (3, [1,2,3,4,5]);

```

```
val it = true : bool
- delete (3, [1,2,3,4,5]);
val it = [1,2,4,5] : int list
- insert (7, [1,2,3,4,5]);
val it = [7,1,2,3,4,5] : int list
- insert2 (7, [1,2,3,4,5]);
val it = [1,2,3,4,5,7] : int list
```