宣言型プログラム論

200911434 青木大祐

平成 24 年 9 月 18 日

問題 3.1

```
(* 図形のデータ型 *)
type figure =
  | Circle of float
  | Square of float
  | Rectangle of float * float;;

(* 面積を求める関数 *)
let area (x:figure) =
  match x with
    | Circle x -> x *. x *. 3.14
    | Square x -> x *. x
    | Rectangle ( x, y ) -> x *. y;;

print_float (area (Circle 2.));;
print_float (area (Square 2.));;
print_float (area (Rectangle(2.0, 3.0)));;
```

```
 type figure = Circle of float | Square of float | Rectangle of float * float
 #             val area : figure -> float = <fun>
 #   12.56- : unit = ()
 # 4.- : unit = ()
 # 6.- : unit = ()
 #
```

正しく計算できている。

問題 3.2

```
(* 木の定義 *)
type 'a tree =
  | Lf
  | Br of 'a * 'a tree * 'a tree;;

(* 木の深さを求める関数 *)
let rec depth (t:'a tree) =
  match t with
    | Lf -> 0
    | Br (v, t1, t2) -> 1 + max (depth t1) (depth t2);;ラベル

(*の完全二分木を返す関数X *)
let rec comptree (n:int) x =
    if n = 0 then Lf else Br (x, (comptree (n - 1) x), (comptree (n - 1) x));;

let sample = Br(2, Br(4, Br(5, Lf, Lf), Lf), Br(1, Lf, Lf));;
depth sample;;
comptree 5 "a";;
```

```
type 'a tree = Lf | Br of 'a * 'a tree * 'a tree
#           val depth : 'a tree -> int = <fun>
#       val comptree : int -> 'a -> 'a tree = <fun>
#   val sample : int tree = Br (2, Br (4, Br (5, Lf, Lf), Lf), Br (1, Lf, Lf))
# - : int = 3
# - : string tree =
Br ("a",
 Br ("a",
  Br ("a", Br ("a", Br ("a", Lf, Lf), Br ("a", Lf, Lf)),
   Br ("a", Br ("a", Lf, Lf), Br ("a", Lf, Lf))),
  Br ("a", Br ("a", Br ("a", Lf, Lf), Br ("a", Lf, Lf)),
   Br ("a", Br ("a", Lf, Lf), Br ("a", Lf, Lf)))),
 Br ("a",
  Br ("a", Br ("a", Br ("a", Lf, Lf), Br ("a", Lf, Lf)),
   Br ("a", Br ("a", Lf, Lf), Br ("a", Lf, Lf))),
  Br ("a", Br ("a", Br ("a", Lf, Lf), Br ("a", Lf, Lf)),
   Br ("a", Br ("a", Lf, Lf), Br ("a", Lf, Lf)))))
```