

# 非手続き型言語10回目課題 解答例

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## 1 演習問題 5.6.1 を関数 map を使って行う

c)

```
val S=["a", "N", "f", "r"];  
map (fn c=> if c>= "a" andalso c<= "z" then chr(ord(c)-32) else c) S;
```

d)

```
val S2=["abcde", "Nonmonoton", "fa", "rest"];  
map (fn s=> if size(s) > 5 then substring(s,0,5) else s) S2;
```

## 2 演習問題 5.6.1

d) foldr もしくは foldr で

```
val D = foldr (fn (x,y) => x^y) "";
```

foldl でするなら

```
val D2 = foldl (fn (x,y) => y^x) "";
```

e) foldr でなければならない

```
val E = foldr (op -) 0;
```

以下の解答でも OK.

```
val E = foldr (fn (x,y) => x-y) 0;
```

f) foldr もしくは foldl で

```
val F = foldr (fn (x,y) => x andalso y) true;
```

g) foldr もしくは foldl で

```
val G = foldr (fn (x,y) => x orelse y) false;
```

h) foldr もしくは foldl で

```
val H = foldr (fn (x,y) => not(x=y)) false;
```

以下でもいい (意味は一緒).

```
val H2 = foldr (fn (x,y) => x<>y) false;
```

以下のようにしてもできる. これはまずリストの true/false を 1/0 に関数 map で置き換え, 関数 foldr でリスト内の 1 の数を数え, 最後にその数を 2 で割ったあまりが 1 かどうかを判定している. ここで o は関数の合成 (授業ではやっていない).

```
val H3 = (fn x => if (x mod 2) = 1 then true else false ) o  
(foldr (fn (x,y) => x+y) 0 ) o map (fn x=> if x then 1 else 0);
```

### 3 実行例

```
- use "ML10answer.ml";  
[opening ML10answer.ml]  
val S = ["a","N","f","r"] : char list  
val it = ["A","N","F","R"] : char list  
val S2 = ["abcde","Nonmonoton","fa","rest"] : string list  
val it = ["abcde","Nonmo","fa","rest"] : string list  
val D = fn : string list -> string  
val D2 = fn : string list -> string  
val E = fn : int list -> int  
val F = fn : bool list -> bool  
val G = fn : bool list -> bool  
val H = fn : bool list -> bool  
val H2 = fn : bool list -> bool  
val H3 = fn : bool list -> bool  
val it = () : unit  
- D ["abc", "def", "ghi"];  
val it = "abcdefghi" : string  
- D2 ["abc", "def", ""];  
val it = "abcdef" : string  
- E [5,4,3,2,1];  
val it = 3 : int  
- F [true, false, true];  
val it = false : bool  
- G [true, false, true];  
val it = true : bool  
- H [true, false, true];
```

```
val it = false : bool  
- H [true, true, true];  
val it = true : bool
```