アルゴリズムとデータ構造入門 第七回課題

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1 有理数システム

```
 1 (define make-rat (lambda (n d)
 2         (define g (gcd n d))
 3         (cons (/ n g) (/ d g))
 4 ))
 5
 6 (define numer (lambda (x) (car x)))
 7 (define denom (lambda (x) (cdr x)))
 8
 9 (define print-rat (lambda (x)
10         (newline)
11         (display (numer x))
12         (display "/")
13         (display (denom x))
14 ))
15
16 (define add-rat (lambda (x y)
17         (make-rat
18                 (+
19                         (* (numer x) (denom y))
20                         (* (numer y) (denom x))
21                 )
22                 (* (denom x) (denom y))
23         )
24 ))
25
26 (define sub-rat (lambda (x y)
27         (make-rat
28                 (-
29                         (* (numer x) (denom y))
```

```
30                              (* (numer y) (denom x))
31                      )
32                      (* (denom x) (denom y))
33              )
34  ))
35
36  (define mul-rat (lambda (x y)
37              (make-rat
38                      (* (numer x) (numer y))
39                      (* (denom x) (denom y))
40              )
41  ))
42
43  (define div-rat (lambda (x y)
44              (make-rat
45                      (* (numer x) (denom y))
46                      (* (denom x) (numer y))
47              )
48  ))
49
50
51  (define equal-rat? (lambda (x y)
52              (=
53                      (* (numer x) (denom y))
54                      (* (denom x) (numer y))
55              )
56  ))
57
58  (define to-inexact (lambda (x)
59              (/ (numer x) (denom x))
60  ))
```

2　有理数システムの実行例

(print-rat (add-rat (make-rat 1 6) (make-rat 1 3))) => 1/2
(print-rat (sub-rat (make-rat 1 2) (make-rat 1 3))) => 1/6
(print-rat (mul-rat (make-rat 3 5) (make-rat 5 6))) => 1/2
(print-rat (div-rat (make-rat 3 5) (make-rat 6 5))) => 1/2
(display (equal-rat? (make-rat 3 6) (make-rat 2 4))) => t
(display (to-inexact (make-rat 2 7))) => 0.2857142857142857