NAME

cf-demo − demonstration of continued fraction library

SYNOPSIS

```
cf-demo e          # calculate decimal expansion of e
cf-demo x          # calculate expansion of real
cf-demo n d          # calculate expansion of n/d
cf-demo a b c d x # calculate expansion of (ax+b)/(cd+x)
cf-demo a b c d e f h x y # calculate expansion of (axy+bx+cy+d)/(exy+fx+gy+h)
cf-demo x + y   # calculate expansion of x + y
cf-demo x - y   # calculate expansion of x - y
cf-demo x * y   # calculate expansion of x * y
cf-demo x / y   # calculate expansion of x / y
cf-demo '->d' x        # calculate decimal expansion of x
```

DESCRIPTION

cf-demo is a demonstration program for the continued-fraction calculation library. **demo** can be invoked in several ways to exercise the various features of **cf**.

demo *n d*

calculates and prints the continued-fraction expansion of the rational number *n*/*d* where *n* and *d* are integers. The **cf** function *new_rat*() is used to manufacture the continued-fraction object, and then *print_cf*() is used to print the terms of the continued fraction.

demo *x*

uses *new_rat_from_float*() to build a continued fraction with the value of *x*, which is a floating-point number in the usual format. The terms of the continued fraction are then printed.

demo *a b c d x*

first uses *new_rat_from_float*() to convert *x* to a continued fraction, and then *new_holo*() to calculate a continued-fraction expansion for the value *ax+b* / *cx+d*. The terms of this latter continued fraction are then printed. *x* should be in floating-point format; *a*, *b*, *c*, and *d* should be integers.

demo *a b c d e f g h x y*

uses *new_rat_from_float*() to convert *x*and*y* to continued fractions, and then *new_arith*() to calculate a continued-fraction expansion for the value *axy+bx+cy+d* / *exy+fx+gy+h*. The terms of this latter continued fraction are then printed. *x* and *y* should be in floating-point format; *a*, *b*, *c*, *d*, *e*, *f*, *g*, and *h* should be integers.

demo *x* + *y*

demo *x* - *y*

demo *x* * *y*

demo *x* / *y*

x and *y* are real numbers in floating-point format. *new_rat_from_float*() is called to convert them to continued-fraction representation, and then *new_arith*() is used to perform the indicated operation (addition, subtraction, multiplication, or division) is performed on the two values. The terms of the result then printed.

Note that '*' is special in the shell and will need to be quoted. The program will accept the letter "x" as a synonym.

demo e

This calculates and prints the decimal value of *e* (2.71818...) from the continued fraction representation. Specifically, the continued fraction [2; 1, 2, 1, 1, 4, 1, 1, 6, 1, 1, 8, 1, ...] is contstructed, and then *new_dec*() is used to convert it to a decimal.

demo '->d' *x*

x is a real number as above. The real number is converted to a continued fraction, using *new_rat_from_float*(). The continued fraction is then converted back to a sequence of decimal digits, using *new_dec*(), and the decimal digits are displayed.

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