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Группа: М8О-208Б-19
Номер по списку: 15

Тема: Знакомство с языком МИКРОЛИСП.
Отображение программ из МИКРОЛИСПа в C++.

Лабораторная работа N2

> Распечатка файла golden21.cpp:

```
// golden21.cpp

#include "mlisp.h"

extern double a;
extern double b;
extern double total__iterations;
extern double mphi;
extern double tolerance;
extern double xmin;

double fun(double x);
double golden__section__search(double a, double b);
double golden__start(double a, double b);
double __klv__try(double a, double b, double xa, double ya,
double xb, double yb);
bool close__enough_Q(double x, double y);

double a = 7.;
double b = 9.;
double total__iterations = 0;
double mphi = (3. - sqrt(5.)) * (1. / 2.);
double tolerance = 0.001;
double xmin = 0;

double fun(double x) {
   x = x - 15. / 16.;
   return -x + sin(x) + expt(x - 7., 4.) + 0.3;
}

double golden__section__search(double a, double b) {
   {
        double xmin(
            a < b ? golden__start(a, b) : golden__start(b, a));
        newline();
        return xmin;
    }
}

double golden__start(double a, double b) {
    total__iterations = 0;
    {
        double xa(
            a + mphi * (b - a));
        double xb(
            b + (-mphi * (b - a)));
        return __klv__try(a, b, xa, fun(xa), xb, fun(xb));
    }
}

double __klv__try(double a, double b, double xa, double ya,
double xb, double yb) {
    return (
        close__enough_Q(a, b) ?
            ((a + b) * 0.5) :
            (display("+"), total__iterations++, (ya < yb ?
                                                    (b = xb, xb = xa, yb = ya, xa
= a + mphi * (b - a), __klv__try(a, b, xa, fun(xa), xb, yb)) :
                                                    (a = xa, xa = xb, ya = yb, xb
= b - mphi * (b - a), __klv__try(a, b, xa, ya, xb, fun(xb)))))
        );
}

bool close__enough_Q(double x, double y) {
    return abs(x - y) < tolerance;
}

int main() {
    xmin = golden__section__search(a, b);
    display("Interval=\t[");
    display(a);
    display(" , ");
    display(b);
    display("]\n");
    display("Total number of iterations=");
    display(total__iterations);
    newline();
    display("xmin=\t\t");
    display(xmin);
    newline();
    display("f(xmin)=\t");
    display(fun(xmin));
    newline();
}
```

> Распечатка файла golden21.ss:

```
;golden21

(define a 7)(define b 9)

(define (fun x)

 (set! x (- x (/ 15 16)))
 (+ (- x) (sin x) (expt(- x 7)4) (/ 3 10))
)

(define (golden-section-search a b)

 (let(

      (xmin(if(< a b)(golden-start a b)(golden-start b a )))

     )

     (newline)

     xmin

 )

)

(define (golden-start a b)
 (set! total-iterations 0)
 (let(
    (xa (+ a (* mphi(- b a))))
    (xb (+ b (-(* mphi(- b a)))))
   )
   (try a b xa (fun xa) xb (fun xb))
 )
)
(define mphi (* (- 3(sqrt 5))(/ 2.0)))
(define (try a b xa ya xb yb)
 (if(close-enough? a b)
    (* (+ a b)0.5)
    (let() (display "+")
        (set! total-iterations (+ total-iterations 1))
        (cond((< ya yb)(set! b xb)
                (set! xb xa)
                (set! yb ya)
                (set! xa (+ a (* mphi(- b a))))
                (try a b xa (fun xa) xb yb)
            )
            (else   (set! a xa)
                (set! xa xb)

                (set! ya yb)

                (set! xb (- b (* mphi(- b a))))

                (try a b xa ya xb (fun xb))

            )

        );cond...

    );let...

 );if...

)

(define (close-enough? x y)

  (<(abs (- x y))tolerance))

(define tolerance 0.001)

(define total-iterations 0)

(define xmin 0)

(set! xmin(golden-section-search a b))

  (display"Interval=\t[")

  (display a)

  (display" , ")

  (display b)

  (display"]\n")

  (display"Total number of iteranions=")
```

total-iterations

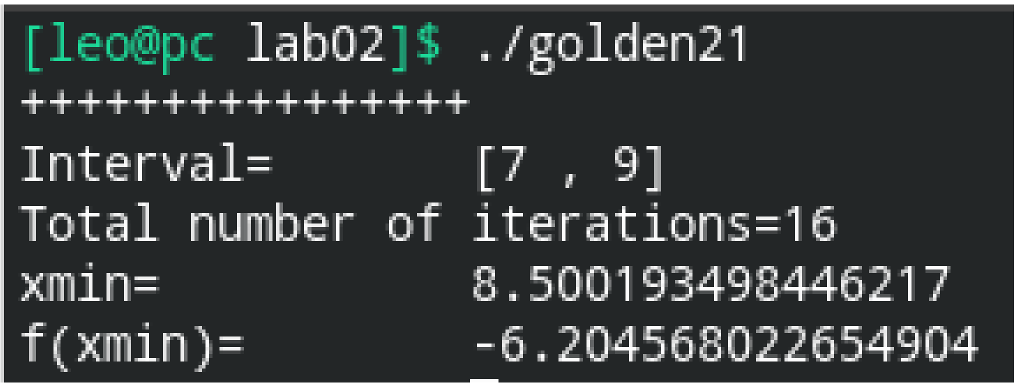
(display"xmin=\t\t")

xmin

(display"f(xmin)=\t")

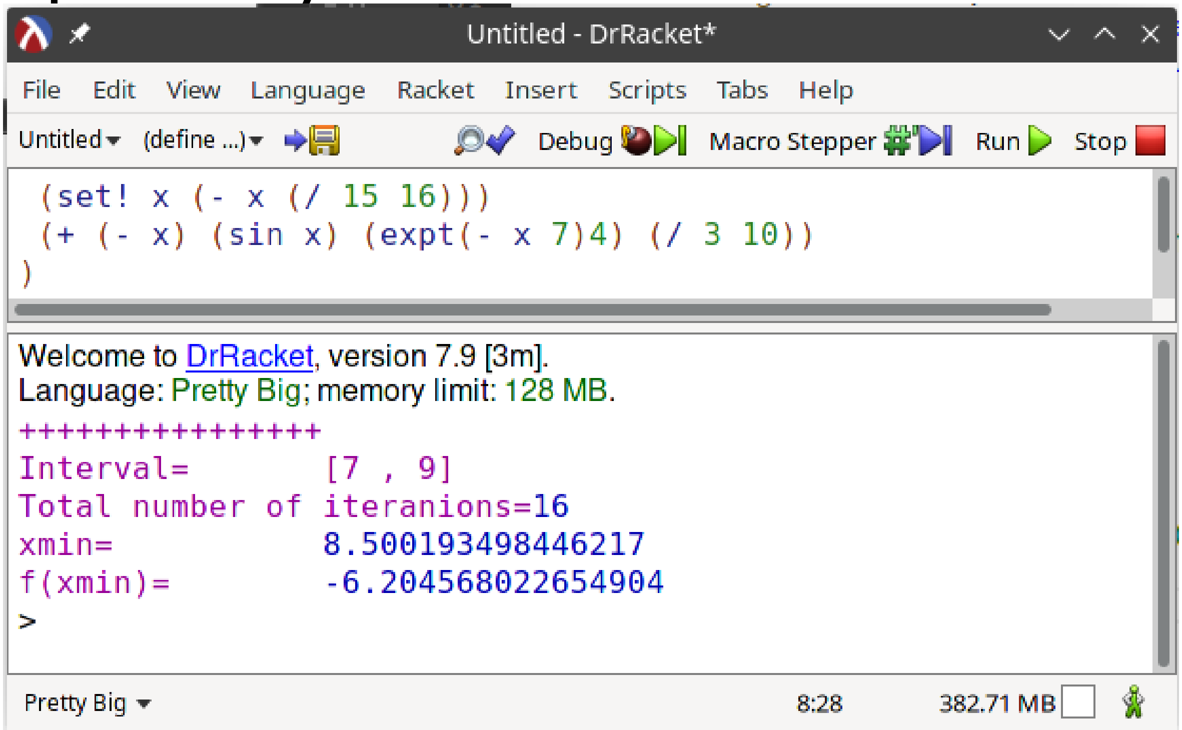
(fun xmin)

> Скриншот запуска в С++:



```
[leo@pc lab02]$ ./golden21
++++++++++++++++
Interval=       [7 , 9]
Total number of iterations=16
xmin=           8.500193498446217
f(xmin)=        -6.204568022654904
```

> Скриншот запуска в DrRacket:



```
 (set! x (- x (/ 15 16)))
 (+ (- x) (sin x) (expt(- x 7)4) (/ 3 10))
)
```

```
Welcome to DrRacket, version 7.9 [3m].
Language: Pretty Big; memory limit: 128 MB.
++++++++++++++++
Interval=       [7 , 9]
Total number of iteranions=16
xmin=           8.500193498446217
f(xmin)=        -6.204568022654904
>
```