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Группа: М8О-208Б-19
Номер по списку: 11

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

Лабораторная работа N2

Распечатка файла golden21.cpp
>

```
#include "mlisp.h"
extern double a;
extern double b;
extern double mphi;
extern double tolerance;
extern double total__iterations;
extern double xmin;
double fun(double x);
double golden__section__search (double a, double b);
double golden__start (double a, double b);
double __ilv__try (double a, double b, double xa, double ya,
double xb, double yb);
bool close__enough_Q (double x, double y);

double a = 2;
double b = 3;

double fun(double x){
    x = x - 11./12.;
    return (x - expt(x - 2., 3.) - atan(x) - 1.);
}
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 __ilv__try(a, b, xa, fun(xa), xb, fun (xb));
    }
}

double mphi = (3. - sqrt(5.)) * (1./2.);

double __ilv__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 = total__iterations + 1.,
            (
                (ya < yb) ?
                (
                    b = xb,
                    xb = xa,
                    yb = ya,
                    xa = a + mphi * (b - a),
                    __ilv__try (a, b, xa, fun(xa), xb, yb)
                ) :
                (
                    a = xa,
                    xa = xb,
                    ya = yb,
                    xb = b - mphi * (b - a),
                    __ilv__try (a, b, xa, ya, xb, fun(xb))
                )
            )
        );
}
bool close__enough_Q(double x, double y){
    return abs(x - y) < tolerance;
}

double tolerance = 0.001;
double total__iterations = 0;
double xmin = 0;
```

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

Распечатка файла golden21.ss

>

```
;golden21
(define a 2)(define b 3)
(define (fun x)
 (set! x (- x (/ 11 12)))
 (- x (expt(- x 2)3)(atan x) 1)
)
(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 C++
>

```
parsifal@DESKTOP-3G70RV4:~/SP/Lab2$ g++ golden21.cpp -o golden21
parsifal@DESKTOP-3G70RV4:~/SP/Lab2$ ./golden21
+++++++++++++++
Interval=       [2 , 3]
Total number of iteranions=15
xmin=           2.434675016371661
f(xmin)=        -0.3583063254111947
```

Скриншот запуска в DrRacket.
>