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Номер по списку: 3

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

Лабораторная работа N2
Распечатка файла golden-section20.cpp
>

```
#include "mlisp.h"
```

```
double a = 6.;  
double b = 8.;  
double mphi = (0.5 * (3. - sqrt(5.)));  
double tolerance = 0.00001;  
double xmin = 0.;
```

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

```
double fun(double x) {  
    x = x - (103. / 104.);  
    return x - sin(x) - cos(x);  
}
```

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

```
double golden__start(double a, double b) {  
    {  
        double xa(a + (mphi * (b - a)));
```

```

        double xb(b - (mphi * (b - a)));
        return __xxx__try(a, b, xa, fun(xa), xb, fun(xb));
    }
}

double __xxx__try(double a, double b, double xa, double ya,
double xb, double yb) {
    return close__enough_Q(a, b) ? ((a + b) * 0.5) :
(display("+"), ya < yb ?
    (b = xb,
    xb = xa,
    yb = ya,
    xa = (a + (mphi * (b - a))),
    __xxx__try(a, b, xa, fun(xa), xb, yb)):
    (a = xa,
    xa = xb,
    ya = yb,
    xb = (b - (mphi * (b - a))),
    __xxx__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("xmin=\t\t");
    display(xmin);
    newline();
    display("f(xmin)=\t");
    display(fun(xmin));
    newline();
}

```

Распечатка файла golden-section20.ss

>

```

;golden-section20
(define a 6)(define b 8);7.27356
(define (fun x)
  (set! x (- x (/ 103 104)))
  (- (- x (sin x)) (cos x)))
(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)
  (let(
    (xa (+ a (* mphi(- b a))))
    (xb (- b (* mphi(- b a))))
    )
    (try a b xa (fun xa) xb (fun xb))
  )
)
(define mphi (* 0.5(- 3(sqrt 5))))
(define (try a b xa ya xb yb)
  (if(close-enough? a b)
    (* (+ a b)0.5)
    (let() (display "+")
      (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 0.00001)
(define xmin 0)
(set! xmin(golden-section-search a b))
  (display"interval=\t[")
  (display a)
  (display" , ")
  (display b)
  (display"]\n")
  (display"xmin=\t\t")
xmin
  (display"f(xmin)=\t")
(fun xmin)

```

Скриншот запуска на С++ (белый шрифт на ЯРКОМ ЧЕРНОМ фоне)

>

```

courage@courage-X550LC:~/SP/lab02$
+++++
interval=      [6 , 8]
xmin=          7.273569503731466
f(xmin)=       5.283185307179674

```

Скриншот запуска на Лиспе

>

```

Добро пожаловать в DrRacket, версия 6.11 [3m].
Язык: Pretty Big; memory limit: 128 MB.
+++++
interval=      [6 , 8]
xmin=          7.2735695037314665
f(xmin)=       5.283185307179674

```

Лабораторная работа N3
Распечатка файла coin20.cpp

>

```

//coin20.cpp
#include "mlisp.h"

double VARIANT = 3;
double LAST__DIGIT__OF__GROUP__NUMBER = 6;
double KINDS__OF__COINS = 6;

```

```

bool implication_Q(bool x_Q, bool y_Q);
double cc(double amount, double kinds_of_coins);
double count_change(double amount, double
kinds_of_coins);
double first_denomination(double kinds_of_coins);
double GR_AMOUNT();

```

```

bool implication_Q(bool x_Q, bool y_Q){
    return !(x_Q) || y_Q;
}

```

```

double cc(double amount, double kinds_of_coins){
    return
        ( amount == 0 ? 1
        : implication_Q(amount >= 0, kinds_of_coins == 0) ? 0
        : cc(amount, kinds_of_coins - 1) +
          cc(amount - first_denomination(kinds_of_coins),
            kinds_of_coins)
        );
}

```

```

double count_change(double amount, double
kinds_of_coins){
    display("count-change for ");
    display(amount);
    display(" ");
    display(kinds_of_coins);
    display(" \t= ");
    return
        ( amount > 0 &&
          kinds_of_coins > 0 &&
          first_denomination(kinds_of_coins) > 0 ?
            cc(amount, kinds_of_coins)
        : (display("(improper parameter value) "), 0)
        );
}

```

```

double first_denomination(double kinds_of_coins) {
    return
        ( kinds_of_coins == 1 ? 1
        : kinds_of_coins == 2 ? 2
        : kinds_of_coins == 3 ? 3
        : kinds_of_coins == 4 ? 20
        : kinds_of_coins == 5 ? 25

```

```

        : kinds__of__coins == 6 ? 50
        : 0
    );
}

```

```

double GR__AMOUNT(){
    return
        remainder(100. * LAST__DIGIT__OF__GROUP__NUMBER +
VARIANT,
                137.);
}

```

```

int main(){
    display ("VKO variant ");
    display (VARIANT);
    newline();
    display (" 1-2-3-20-25-50");
    newline();
    display (count__change(100, KINDS__OF__COINS) );
    newline();
    display (count__change(GR__AMOUNT(), KINDS__OF__COINS)
);
    newline();
    display (count__change(100, 100) );
    newline();

display(GR__AMOUNT());
std::cin.get();
return 0;
}

```

Распечатка файла coin20.ss

>

```

;(define (count-change amount)
; (cc amount 6))

```

```

(define variant 3)
(define last-digit-of-group-number 6)
(define kinds-of-coins 6)

```

```

(define (cc amount kinds-of-coins)

```

```
(cond ((= amount 0) 1)
      ((or (< amount 0) (= kinds-of-coins 0)) 0)
      (else (+ (cc amount
                    (- kinds-of-coins 1))
                (cc (- amount
                        (first-denomination kinds-of-coins))
                    kinds-of-coins))))))
```

```
(define (count-change amount kinds-of-coins)
  (display "count-change for ")
  (display amount)
  (display " ")
  (display kinds-of-coins)
  (display "\t= ")
  (if (let()(and (> amount 0) (> kinds-of-coins 0) (> (first-
denomination kinds-of-coins) 0)))
      (cc amount kinds-of-coins)
      (let()(display "(improper parametr value)" 0)))
```

```
(define (first-denomination kinds-of-coins)
  (cond ((= kinds-of-coins 1) 1)
        ((= kinds-of-coins 2) 2)
        ((= kinds-of-coins 3) 3)
        ((= kinds-of-coins 4) 20)
        ((= kinds-of-coins 5) 25)
        ((= kinds-of-coins 6) 50)
        (0)))
```

```
(define (gr-amount)
  (remainder (+(* 100 last-digit-of-group-number) variant)
137))
```

```
(display "VKO variant ")
(display variant)
(newline)
(display " 1-2-3-20-25-50")
(newline)
(display (count-change 100 kinds-of-coins))
(newline)
(display (count-change (gr-amount) kinds-of-coins))
(newline)
(display (count-change 100 100))
(newline)
```

(display (gr-amount))

**Скриншот запуска на C++(белый шрифт на
ЯРКОМ ЧЕРНОМ фоне)**

>

```
courage@courage-X550LC:~/SP/lab03$ ./a.out
VKO variant 3
1-2-3-20-25-50
count-change for 100 6 = 3743
count-change for 55 6 = 542
count-change for 100 100 = (improper parameter value) 0
55
```

Скриншот запуска на Лиспе

>

Язык: Pretty Big; memory limit: 128 MB.

```
VKO variant 3
1-2-3-20-25-50
count-change for 100 6 = 3743
count-change for 55 6 = 542
count-change for 100 100 = (improper parametr value)0
55
```
