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Номер по списку: 27

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

Лабораторная работа N2
Распечатка файла golden-section20.cpp

```
#include <iostream>
#include "mlisp.h"

double xmin= 0.;

double tolerance= 0.00001;
double mphi = (3. - sqrt(5.)) /2.;
double a = 3.;
double b = 5.;
double fun( double x ){
   x = x - 27./28.;
   return (x + sin(2*x - 0.25*pi) + log(x+1) - 0.5);
}


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

double golden__start(double a,double b){
      double xa;
      double xb;
      double ya;
      double yb;
   xa=a+mphi*(b-a);
   xb=b-mphi*(b-a);
   return _CHNA_try(a,b,xa,fun(xa),xb,fun(xb));
}

double golden__section__search(double a, double b){
```

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

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

double _CHNA_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),
         _CHNA_try(a,b,xa,fun(xa),xb,yb)
      ):
      (
         a=xa,
         xa=xb,
         ya=yb,
         xb=b-mphi*(b-a),
         _CHNA_try(a,b,xa,ya,xb,fun(xb))

      )
   );
}

int main(){
   xmin=golden__section__search(a,b);
   display("interval=\t[");
   display(a);
   display(" , ");
   display(b);
   display("]\n");
   display("xmin=\t\t");
   display(xmin);
```

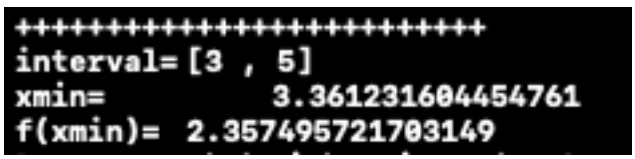
```
   newline();
   display("f(xmin)=\t");
   display(fun(xmin));
      newline();
}
```

Распечатка файла golden-section20.ss

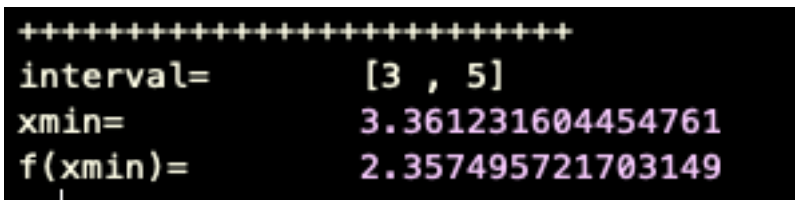
```
#lang racket
;golden-section20
(define a 3)(define b 5);3.47372
(define (fun x)
 (set! x (- x (/ 27 28)))
  (- (+ x (sin(- (* 2 x) (* 0.25 pi))) (log (+ x 1))) 0.5)
)
(define (golden-section-search a b)
 (let(
     (xmin(if(< a b)(golden-start a b)(golden-start b a )))
    )
    (newline)
    xmin
 )
) ; z+ sin(2z- 0.25 pi) + ln( z+1) - 0.5
(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)) ;вычисляется значение
функции в точках а б. ха и б локальные переменные
 )
)
(define mphi (* 0.5(- 3(sqrt 5)))); глобальная перем
(define (try a b xa ya xb yb);опр процедура трай
 (if(close-enough? a b);если а и б достаточно близки друг
к другу
     (* (+ a b)0.5)
     (let() (display "+");если не достаточно близки
          (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 C++(белый шрифт на ЯРКОМ ЧЕРНОМ фоне)



Скриншот запуска на Лиспе



Лабораторная работа N3
Распечатка файла coin20.cpp

```
#include "mlisp.h"

double VARIANT=27;
double LAST__DIGIT__OF__GROUP__NUMBER=7;
double KINDS__OF__COINS=4;
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)
```

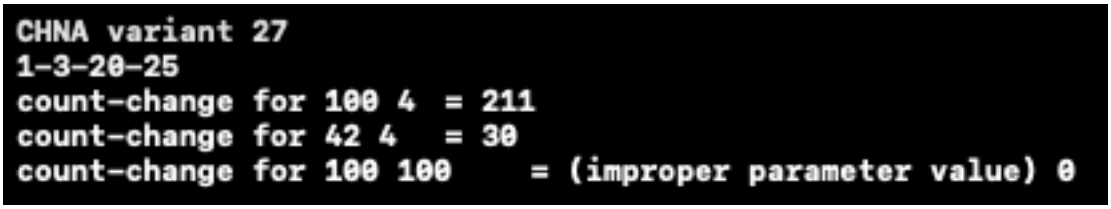
```
    : (display("(improper parameter value) "), 0)
    );
}

double first__denomination(double kinds__of__coins){
   return
   ( kinds__of__coins == 1 ? 1
    : kinds__of__coins == 2 ? 3
    : kinds__of__coins == 3 ? 20
    : kinds__of__coins == 4 ? 25
    : 0
    );
}

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

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

   std::cin.get();
   return 0;
}
```

Распечатка файла coin20.ss

```
#lang racket
(define VARIANT 27)
(define LAST__DIGIT__OF__GROUP__NUMBER 7)
(define KINDS__OF__COINS 4)
(define (implication? x? y?) (or (not x?) y?))
(define (cc amount kinds-of-coins)
   (cond ((= amount 0) 1)
      ((implication?
        (>= 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 (and (> amount 0) (> kinds-of-coins 0) (>(first-
denomination kinds-of-coins) 0))
      (cc amount kinds-of-coins)
      (let() (display "(improper parameter value) ") 0))
        )
(define (first-denomination kinds-of-coins) (cond ((= kinds-
of-coins 1) 1)
                                                  ((= kinds-of-coins 2) 3)
                                                  ((= kinds-of-coins 3) 20)
                                                  ((= kinds-of-coins 4) 25)

                                                  (else 0)
                                                  ))

(define (GR-AMOUNT) (remainder (+ (* 100
LAST__DIGIT__OF__GROUP__NUMBER) VARIANT) 137))

(display "CHNA variant ")
(display VARIANT)
(newline)
```

```
(display "1-3-20-25")
(newline)
(display (count-change 100 KINDS__OF__COINS))
(newline)
(display (count-change (GR-AMOUNT)
KINDS__OF__COINS))
(newline)
(display (count-change 100 100))
```

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



Скриншот запуска на Лиспе