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Группа: М8О-2086-19
Номер по списку: 2

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

Лабораторная работа N3

Распечатка файла coin21.ss (ЖИРНЫЙ ШРИФТ, 14
пунктов, Verdana).

```
>
(define VARIANT 2)
(define LAST-DIGIT-OF-GROUP-NUMBER 8)
(define KINDS-OF-COINS 5)

(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) 25)
    ((= kinds-of-coins 5) 50)
    (else 0)
  )
)

(define (count-change amount)
  (display"_____\n amount: ")
  (display amount)
  (newline)
  (display"KINDS-OF-COINS: ")
  (display KINDS-OF-COINS)
  (newline)
  (let(
    (largest-coin (first-denomination KINDS-OF-COINS))
  )
    (display"largest-coin: ")
    (display largest-coin)
    (newline)
    (cond
```

```

    ((and (> amount 0) (> KINDS-OF-COINS 0) (>
largest-coin 0))
      (display "List of coin denominators: ")
      (denomination-list KINDS-OF-COINS)
      (display "count-change= ")
      (cc amount KINDS-OF-COINS)
    )
  )
  (
    else (display "Improper parameter
value!\ncount-change= ")-1
  )
)
)
)

(define (pier? x? y?)
  (not (or x? y?))
)

(define (cc amount kinds-of-coins)
  (cond
    ((= amount 0) 1)
    ((pier? (< amount 0) (= kinds-of-coins 0))
      (+ (cc amount (- kinds-of-coins 1)) (cc (- amount
(first-denomination kinds-of-coins)) kinds-of-coins)))
    (else 0)
  )
)

(define (denomination-list kinds-of-coins)
  (cond
    ((= kinds-of-coins 0) (newline) 0)
    (else (display (first-denomination kinds-of-coins))
      (display " ")
      (denomination-list (- kinds-of-coins 1))
      -1)
  )
)

(define (GR-AMOUNT)
  (remainder (+ (* 100 LAST-DIGIT-OF-GROUP-NUMBER)
VARIANT) 231)
)

```

```
(display "Variant ") VARIANT (newline)
(count-change 100) (newline)
(count-change (GR-AMOUNT)) (newline)
(set! KINDS-OF-COINS 13)
(count-change 100) (newline)
(display "(c) Arapov S.A. 2021\n")
```

Распечатка файла coin21. cpp (ЖИРНЫЙ ШРИФТ, 14 пунктов, Verdana).

```
>
//coin21.cpp
#include "mlisp.h"

extern double VARIANT;
extern double LAST__DIGIT__OF__GROUP__NUMBER;
extern double KINDS__OF__COINS;
double first__denomination(double kinds__of__coins);
double count__change(double amount);
bool pier_Q(bool x_Q, bool y_Q);
double cc(double amount, double kinds__of__coins);
double denomination__list(double kinds__of__coins);
double GR__AMOUNT();

// вариант - номер в писке группы
double VARIANT=2.;
// последняя цифра номера группы
double LAST__DIGIT__OF__GROUP__NUMBER=8.;
// количество имеющихся номиналов монет
double KINDS__OF__COINS=5.;

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. ? 25.
        : kinds__of__coins == 5. ? 50.
        : 0.
        );
}

double count__change(double amount){
    display( "_____ \n amount: ");
    display( amount);
```

```

        newline();
        display( "KINDS-OF-COINS: ");
        display( KINDS__OF__COINS);
        newline();
    {
        double largest__coin (first__denomination(
KINDS__OF__COINS));
        display( "largest-coin: ");
        display( largest__coin);
        newline();
        return
            ( amount > 0. &&
              KINDS__OF__COINS > 0. &&
              largest__coin > 0. ?
                ( display( "List of coin denominations: "),
                  denomination__list( KINDS__OF__COINS),
                  display( "count-change= "),
                  cc(amount, KINDS__OF__COINS)
                )
              : (display("Improper parameter
value!\ncount-change= "), -1.)
            );
    }
}

bool pier_Q(bool x_Q, bool y_Q){
// стрелка Пирса
    return !(x_Q || y_Q);
}

double cc(double amount, double kinds__of__coins){
    return
        ( amount == 0. ? 1.
          : pier_Q(amount < 0., kinds__of__coins == 0.) ?
            cc(amount, kinds__of__coins - 1.) +
            cc(amount - first__denomination(kinds__of__coins),
              kinds__of__coins)
          : 0.
        );
}

double denomination__list(double kinds__of__coins){
    return ( kinds__of__coins== 0 ? (newline() , 0.)

```

```

        :
        (display(first__denomination(kinds__of__coins)),
          display(" "),
          denomination__list(kinds__of__coins - 1.)
        )
      );
}

double GR__AMOUNT(){
  return
    remainder(100. * LAST__DIGIT__OF__GROUP__NUMBER
+ VARIANT,
    231);
}

int main(){
  display ("Variant ");
  display (VARIANT);
  newline();
  newline();
  display (count__change(100.) ); newline();
  display (count__change(GR__AMOUNT()) ); newline();
  KINDS__OF__COINS=13.;
  display (count__change(100.) ); newline();
  display ("(c) Arapov S.A. 2021\n");

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

```

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

>

```
Выбрать "C:\Users\rocket\Desktop\СшёЄхь√ яЁюЁрььшЁютрэш \lab03\coin21.exe"
Variant 2

amount: 100
KINDS-OF-COINS: 5
largest-coin: 50
List of coin denominations: 50 25 3 2 1
count-change= 1992

amount: 109
KINDS-OF-COINS: 5
largest-coin: 50
List of coin denominations: 50 25 3 2 1
count-change= 2580

amount: 100
KINDS-OF-COINS: 13
largest-coin: 0
Improper parameter value!
count-change= -1
(c) Arapov S.A. 2021

Process returned 0 (0x0)   execution time : 264.898 s
Press any key to continue.
```

Скриншот запуска в DrRacket.

>

Welcome to [DrRacket](#), version 8.0 [cs].
Language: **Pretty Big**; memory limit: **128 MB**.
Variant 2

amount: 100
KINDS-OF-COINS: 5
largest-coin: 50
List of coin denominators: 50 25 3 2 1
count-change= 1992

amount: 109
KINDS-OF-COINS: 5
largest-coin: 50
List of coin denominators: 50 25 3 2 1
count-change= 2580

amount: 100
KINDS-OF-COINS: 13
largest-coin: 0
Improper parameter value!
count-change= -1

(c) Arapov S.A. 2021
>
