Студент: Пивницкий Д.С.
Группа: М8о-206Б-19
Номер по списку: 19

«СИСТЕМЫ ПРОГРАММИРОВАНИЯ»
Курсовая работа 2021.
Часть 1.

Перечень документов в отчете.
Вариант грамматики:n19

Контрольная задача №1 – zeller.

Полный скриншот трансляции без трассировки (крупный белый шрифт на ярком черном фоне).
>
Распечатка файла zeller.cpp .
>
Скриншот запуска задачи на C++.
>

Контрольная задача №2 – golden21.

Полный скриншот трансляции без трассировки (крупный белый шрифт на ярком черном фоне).
>
Распечатка файла golden21.cpp .
>
Скриншот запуска задачи на C++.
>

Контрольная задача №3 – coin21.

Полный скриншот трансляции   без трассировки (крупный белый шрифт на ярком черном фоне).

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Распечатка файла coin21.cpp .

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Скриншот запуска задачи на C++.

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Распечатка файла code-gen.cpp.

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```
/* $n19 */
#include "code-gen.h"
using namespace std;
void tCG::init(){declarations.clear();
 Authentication = "DSP";
//                  ^
// replace with your initials!!!
}
int tCG::p01(){ // S -> PROG
  string header ="/*  " + Authentication +"   */\n";
  header += "#include \"mlisp.h\"\n";
  header += declarations;
  header += "//________________ \n";
  S1->obj = header + S1->obj;
     return 0;}
int tCG::p02(){ //PROG -> CALCS
                    S1->obj = "int main(){\n" + S1->obj
    + "std::cin.get();\n return 0;\n}\n";
     return 0;}
int tCG::p03(){ //PROG -> DEFS
                    S1->obj += "int main(){\n"
    " display(\"No calculations!\");newline();\n"
    "std::cin.get();\nreturn 0;\n}\n";
     return 0;}
int tCG::p04(){ //PROG -> DEFS CALCS
                    S1->obj += "int main(){\n" + S2->obj
    + "std::cin.get();\n return 0;\n}\n";
     return 0;}
int tCG::p05(){ //E -> $id
                    S1->obj = decor(S1->name);
     return 0;}
int tCG::p06(){ //E -> $int
                    S1->obj = decor(S1->name);
     return 0;}
int tCG::p07(){ //E -> $dec
               S1->obj = decor(S1->name);
     return 0;}
int tCG::p08(){ //E -> AREX
                         return 0;}
```

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int tCG::p09(){ //E -> COND
                    return 0;}
int tCG::p10(){ //E -> EASYLET
                    return 0;}
int tCG::p11(){ //E -> CPROC
          return 0;}
int tCG::p12(){ //AREX -> HAREX E )
                         if (S1->count == 0 && S1->name == "/")
          S1->obj = "(1. " + S1->obj + " " + S2->obj + ")";
     else
          S1->obj = "(" + S1->obj + " " + S2->obj + ")";
     return 0;}
int tCG::p13(){ //HAREX -> ( AROP
                         S1->obj = S2->obj;
     S1->name = S2->name;
     return 0;}
int tCG::p14(){ //HAREX -> HAREX E
                         if (S1->count == 0)
          S1->obj = S2->obj + " " + S1->name;
     else
          S1->obj = S1->obj + " " + S2->obj + " " + S1->name;
     ++(S1->count);
     return 0;}
int tCG::p15(){ //AROP -> +
                         S1->obj = S1->name;
     return 0;}
int tCG::p16(){ //AROP -> -
                         S1->obj = S1->name;
     return 0;}
int tCG::p17(){ //AROP -> *
                         S1->obj = S1->name;
     return 0;}
int tCG::p18(){ //AROP -> /
                         S1->obj = S1->name;
     return 0;}
int tCG::p19(){ //EASYLET -> HEASYL E )
                    if(S1->count != 0) S1->obj += S2->obj + ";\n";
     S1->obj += S2->obj;
     ++(S1->count);
     return 0;}
int tCG::p20(){ //HEASYL -> ( let ( )
                    return 0;}
int tCG::p21(){ //HEASYL -> HEASYL INTER
                    S1->obj += S2->obj + ", ";
     return 0;}
int tCG::p22(){ //COND -> ( cond BRANCHES )
                         S1->obj = "(" + S3->obj + "_infinity)";
     return 0;}
int tCG::p23(){ //BRANCHES -> CLAUS
                    return 0;}
int tCG::p24(){ //BRANCHES -> CLAUS BRANCHES
                         S1->obj = S1->obj + S2->obj;
     return 0;}
```

```
int tCG::p25(){ //CLAUS -> ( BOOL E )
                    S1->count = 0;
    S1->obj = "(" + S2->obj + ") ? (" + S3->obj + ") : ";
     return 0;}
int tCG::p26(){ //STR -> $str
                    S1->obj = decor(S1->name);
     return 0;}
int tCG::p27(){ //STR -> SIF
                    return 0;}
int tCG::p28(){ //SIF -> ( if BOOL STR STR )
                    S1->obj = " (" + S3->obj + ") " + " ? " + S4->obj
+ " : " + S5->obj;
     return 0;}
int tCG::p29(){ //CPROC -> HCPROC )
                    S1->obj = S1->obj + ")";
     return 0;}
int tCG::p30(){ //HCPROC -> ( $id
                    S1->count = 0;
    S1->obj = decor(S2->name) + "(";
     return 0;}
int tCG::p31(){ //HCPROC -> HCPROC E
                    if (S1->count != 0) {
        S1->obj += ", ";
    }
    S1->obj += S2->obj;
    S1->count++;
     return 0;}
int tCG::p32(){ //BOOL -> $bool
                    if (S1->name == "#t") {
        S1->obj = "true";
    } else if (S1->name == "#f") {
        S1->obj = "false";
    }
     return 0;}
int tCG::p33(){ //BOOL -> $idq
                    S1->obj = decor(S1->name);
     return 0;}
int tCG::p34(){ //BOOL -> REL
                    S1->obj = "(" + S1->obj + ")";
     return 0;}
int tCG::p35(){ //BOOL -> OR
                    return 0;}
int tCG::p36(){ //BOOL -> CPRED
                    S1->obj = S1->obj;
     return 0;}
int tCG::p37(){ //CPRED -> HCPRED )
                    S1->obj = S1->obj + ")";
     return 0;}
int tCG::p38(){ //HCPRED -> ( $idq
                    S1->count = 0;
    S1->obj = decor(S2->name) + "(";
     return 0;}
int tCG::p39(){ //HCPRED -> HCPRED ARG
```

```
                    if (S1->count != 0) {
        S1->obj += ", ";
    }
    S1->obj += S2->obj;
    S1->count++;
     return 0;}
int tCG::p40(){ //ARG -> E
                    return 0;}
int tCG::p41(){ //ARG -> BOOL
                    return 0;}
int tCG::p42(){ //REL -> ( = E E )
                    S1->obj = S3->obj + " == " + S4->obj;
     return 0;}
int tCG::p43(){ //REL -> ( <= E E )
                    return 0;}
int tCG::p44(){ //OR -> HOR BOOL )
                    return 0;}
int tCG::p45(){ //HOR -> ( or
                    return 0;}
int tCG::p46(){ //HOR -> HOR BOOL
                    return 0;}
int tCG::p47(){ //SET -> HSET E )
                    S1->obj += S2->obj;
     return 0;}
int tCG::p48(){ //HSET -> ( set! $id
                    S1->obj = S3->name + " = ";
    S1->name = S3->name;
     return 0;}
int tCG::p49(){ //DISPSET -> ( display E )
                    S1->obj = "display(" + S3->obj + ")";
     return 0;}
int tCG::p50(){ //DISPSET -> ( display BOOL )
                    S1->obj = "display(" + S3->obj + ")";
     return 0;}
int tCG::p51(){ //DISPSET -> ( display STR )
                    S1->obj = "display(" + S3->obj + ")";
     return 0;}
int tCG::p52(){ //DISPSET -> ( newline )
                    S1->obj = "newline()";
     return 0;}
int tCG::p53(){ //DISPSET -> SET
                    return 0;}
int tCG::p54(){ //INTER -> DISPSET
                    return 0;}
int tCG::p55(){ //INTER -> E
                    return 0;}
int tCG::p56(){ //CALCS -> CALC
          return 0;}
int tCG::p57(){ //CALCS -> CALCS CALC
                    S1->obj += S2->obj;
     return 0;}
int tCG::p58(){ //CALC -> E
```

```
                    S1->obj = " display(" + S1->obj + ");
newline();\n";
     return 0;}
int tCG::p59(){ //CALC -> BOOL
                    S1->obj = " display(" + S1->obj + ");
newline();\n";
     return 0;}
int tCG::p60(){ //CALC -> STR
                    S1->obj = " display(" + S1->obj + ");
newline();\n";
     return 0;}
int tCG::p61(){ //CALC -> DISPSET
                    S1->obj +=";\n";
     return 0;}
int tCG::p62(){ //DEFS -> DEF
          return 0;}
int tCG::p63(){ //DEFS -> DEFS DEF
                    S1->obj += S2->obj;
     return 0;}
int tCG::p64(){ //DEF -> PRED
                    return 0;}
int tCG::p65(){ //DEF -> VAR
                    return 0;}
int tCG::p66(){ //DEF -> PROC
          return 0;}
int tCG::p67(){ //PRED -> HPRED BOOL )
                    S1->obj += "return " + S2->obj +";\n}\n";
    return 0;}
int tCG::p68(){ //HPRED -> PDPAR )
                    S1->obj += ")";
     declarations += S1->obj + ";\n";
     S1->obj += "{\n";
     return 0;}
int tCG::p69(){ //PDPAR -> ( define ( $idq
                    S1->obj = "bool " + decor(S4->name) + "(";
     S1->count = 0;
     return 0;}
int tCG::p70(){ //PDPAR -> PDPAR $idq
                    if (S1->count != 0) {
        S1->obj += ", ";
    }
    S1->obj += "bool " + decor(S2->name);
    S1->count++;
     return 0;}
int tCG::p71(){ //PDPAR -> PDPAR $id
                    if(S1->count) S1->obj += ", ";
     S1->obj += "double " + decor(S2->name);
     ++(S1->count);
     return 0;}
int tCG::p72(){ //VAR -> VARDCL E )
                    S1->obj += " = " + S2->obj + ";\n";
    declarations += S1->obj;
    S1->obj = "";
```

```
     return 0;}
int tCG::p73(){ //VARDCL -> ( define $id
                    S1->obj = "double " + decor(S3->name);
     return 0;}
int tCG::p74(){ //PROC -> HPROC BLOCK )
                    if (S1->count == 0) {
        S1->obj += "{\n";
    }
     S1->obj = S1->obj + S2->obj + "\n}\n";
     return 0;}
int tCG::p75(){ //PROC -> HPROC E )
                    if (S1->count == 0) {
        S1->obj += "{\n";
    }
    S1->obj += "return " + S2->obj + ";\n}\n";
     return 0;}
int tCG::p76(){ //HPROC -> PCPAR )
                    S1->obj += ")";
    S1->count = 0;
    declarations += S1->obj + ";\n";
     return 0;}
int tCG::p77(){ //HPROC -> HPROC INTER
                    if (S1->count == 0) {
        S1->obj += "{\n";
    }
    S1->obj += S2->obj + ";\n";
    S1->count++;
     return 0;}
int tCG::p78(){ //PCPAR -> ( define ( $id
                    S1->obj = "double " + decor(S4->name) + "(";
     S1->count = 0;
     return 0;}
int tCG::p79(){ //PCPAR -> PCPAR $id
                    if(S1->count)S1->obj += ", ";
     S1->obj += "double " + decor(S2->name);
     ++(S1->count);
     return 0;}
int tCG::p80(){ //BLOCK -> HBLOCK E )
                    S1->obj = "{\n" + S1->obj + "return " + S2->obj +
";\n}\n";
     return 0;}
int tCG::p81(){ //HBLOCK -> BLVAR )
                         S1->obj = S1->obj + ";\n\t ";
     return 0;}
int tCG::p82(){ //HBLOCK -> HBLOCK INTER
                    S1->obj += S2->obj + ";\n";
     return 0;}
int tCG::p83(){ //BLVAR -> ( let ( LOCDEF
                    S1->obj = S4->obj;
     return 0;}
int tCG::p84(){ //BLVAR -> BLVAR LOCDEF
                    S1->obj+=S2->obj + "\n";
     return 0;}
```

```
int tCG::p85(){ //LOCDEF -> ( $id E )
                    S1->obj = "double " + decor(S2->name) + " = " +
S3->obj + ";\n";
     return 0;}
//_____________________
int tCG::p86(){return 0;} int tCG::p87(){return 0;}
int tCG::p88(){return 0;} int tCG::p89(){return 0;}
int tCG::p90(){return 0;} int tCG::p91(){return 0;}
int tCG::p92(){return 0;} int tCG::p93(){return 0;}
int tCG::p94(){return 0;} int tCG::p95(){return 0;}
int tCG::p96(){return 0;} int tCG::p97(){return 0;}
int tCG::p98(){return 0;} int tCG::p99(){return 0;}
int tCG::p100(){return 0;} int tCG::p101(){return 0;}
int tCG::p102(){return 0;} int tCG::p103(){return 0;}
int tCG::p104(){return 0;} int tCG::p105(){return 0;}
int tCG::p106(){return 0;} int tCG::p107(){return 0;}
int tCG::p108(){return 0;} int tCG::p109(){return 0;}
int tCG::p110(){return 0;}
```