Листинг окончательного варианта программы и тесты к ней.

---<main.c>---

//Лабораторная работа №9. Вариант 29. Бучкин Тимур Артемович. М8О-101Б-22.

//Здесь содержатся тесты, реализация программы находится в модуле Calc.c

#include <stdio.h>

#include "Calc.c"

int main(){

    //Тест из варианта

    printf("First test from guide(Variant 29) i0 = %d, j0 = %d, l0 = %d\n Result =  ",-7, -19, 4);

    Calc(-7, -19, 4);//

    //Далее идут 125 тестов для i0, j0, l0 = {1,...,5}

    int k = 1;

    for(int i0 = 1; i0 <= 5; i0++){

        for(int j0 = 1; j0 <= 5; j0++){

            for(int l0 = 1; l0 <= 5; l0++){

                printf("Test N %d: i0 = %d, j0 = %d, l0 = %d\n Result = ", k, i0, j0, l0);

                Calc(i0, j0, l0);

                k++;

            }

        }

    }

    return 0;

}

---<Calc.c>---

#include <stdio.h>

//Данный модуль содержит всю логику и математику программы.

//Определяем основные функции(математические). Макс, мин, проверить на попадание, знак, модуль

int max(int a, int b){

    return (a>b) ? a : b;

}

int min(int a, int b){

    return (a>b) ? b : a;

}

int chek(int i, int j, int Ci, int Cj, int A, int B){

    if (abs(Cj - j)>A){

        return 0;

    }

    //Xo2mCi - максимальный разлёт значений х от Ci, если у считать параметром.(i ~ x, j ~ y в дальнейшем).

    int Xo2mCi = A\*A\*(1-(j-Cj)\*(j-Cj)/B/B);

    if(Xo2mCi >= (i-Ci)\*(i-Ci)){

        return 1;

    }

    return 0;

}

int sign(int n){

    if (n > 0) return 1;

    if (n == 0) return 0;

    return -1;

}

int abs(int x){

    if (x >= 0) return x;

    return -x;

}

//Главная вычислительная функция, для данного теста вычисляет попадание.

int Calc(const int i0, const int j0, const int l0){

    //Объявление начальных констант

    const int Ci = 20;

    const int Cj = 0;

    const int A = 10;

    const int B = 5;

    //Объявление начальных переменных

    int ik = i0;

    int jk = j0;

    int lk = l0;

    //Проверка на попадание при k = 0, затем при k = 1,2,...,50

    if(chek(i0, j0, Ci, Cj, A, B)){

        printf("Yes. k = 0, i = %d, j = %d, l = %d\n", i0, j0, l0);

        return 0;

    }

    for(int k = 1; k <= 50; k++){

        int copyik = ik, copyjk = jk, copylk = lk;//Создание копий ik, jk, lk

        //Обновляем ik, jk, lk

        ik = max(max(copyik\*copyjk, copyik\*copylk), copyjk\*copylk)%30 + k;

        jk = abs(copyjk-copylk)\*sign(copyik) - abs(copyik-copylk)\*sign(copyjk);

        lk = min(copyik, max(copyjk, min(copylk, max(copyik-copylk, copyjk-copylk))));

        //Проверка на попадание

        if(chek(ik, jk, Ci, Cj, A, B)){

            printf("Yes. k = %d, i = %d, j = %d, l = %d\n", k, ik, jk, lk);

            return 0;

        }

    }

    //Если вышли из цикла, значит промах.

    printf("No. k = 50, i = %d, j = %d, l = %d\n", ik, jk, lk);

    return 0;

}

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Тесты:

Всего 126 тестов, для набора данных из методички к варианту 29 и для i, j, l от 1 до 5 включительно.

Формат теста

Test N <Номер теста>: i0 = <Нач. знач. i0>, j0 = <Нач. знач. j0>, l0 = <Нач. знач. l0>

Result = <Да/Нет>. k = <Кон. знач. k>, i = <Кон. знач. i>, j = <Кон. знач. j>, l = <Кон. знач. l>

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First test from guide(Variant 29) i0 = -7, j0 = -19, l0 = 4

Result = Yes. k = 11, i = 11, j = 1, l = 9

Test N 1: i0 = 1, j0 = 1, l0 = 1

Result = Yes. k = 5, i = 25, j = -1, l = 10

Test N 2: i0 = 1, j0 = 1, l0 = 2

Result = Yes. k = 5, i = 29, j = 0, l = 12

Test N 3: i0 = 1, j0 = 1, l0 = 3

Result = Yes. k = 7, i = 19, j = -1, l = 6

Test N 4: i0 = 1, j0 = 1, l0 = 4

Result = Yes. k = 5, i = 19, j = 2, l = 14

Test N 5: i0 = 1, j0 = 1, l0 = 5

Result = Yes. k = 6, i = 21, j = 2, l = 3

Test N 6: i0 = 1, j0 = 2, l0 = 1

Result = Yes. k = 4, i = 30, j = -1, l = 7

Test N 7: i0 = 1, j0 = 2, l0 = 2

Result = Yes. k = 3, i = 15, j = -1, l = 6

Test N 8: i0 = 1, j0 = 2, l0 = 3

Result = Yes. k = 3, i = 15, j = -1, l = 8

Test N 9: i0 = 1, j0 = 2, l0 = 4

Result = Yes. k = 3, i = 23, j = -1, l = 10

Test N 10: i0 = 1, j0 = 2, l0 = 5

Result = Yes. k = 1, i = 11, j = -1, l = 1

Test N 11: i0 = 1, j0 = 3, l0 = 1

Result = Yes. k = 2, i = 10, j = -2, l = 2

Test N 12: i0 = 1, j0 = 3, l0 = 2

Result = Yes. k = 5, i = 25, j = 4, l = 16

Test N 13: i0 = 1, j0 = 3, l0 = 3

Result = Yes. k = 1, i = 10, j = -2, l = 1

Test N 14: i0 = 1, j0 = 3, l0 = 4

Result = Yes. k = 1, i = 13, j = -2, l = 1

Test N 15: i0 = 1, j0 = 3, l0 = 5

Result = Yes. k = 1, i = 16, j = -2, l = 1

Test N 16: i0 = 1, j0 = 4, l0 = 1

Result = Yes. k = 2, i = 17, j = -2, l = 3

Test N 17: i0 = 1, j0 = 4, l0 = 2

Result = Yes. k = 26, i = 26, j = -3, l = 24

Test N 18: i0 = 1, j0 = 4, l0 = 3

Result = Yes. k = 1, i = 13, j = -1, l = 1

Test N 19: i0 = 1, j0 = 4, l0 = 4

Result = Yes. k = 1, i = 17, j = -3, l = 1

Test N 20: i0 = 1, j0 = 4, l0 = 5

Result = Yes. k = 1, i = 21, j = -3, l = 1

Test N 21: i0 = 1, j0 = 5, l0 = 1

Result = Yes. k = 2, i = 26, j = -2, l = 4

Test N 22: i0 = 1, j0 = 5, l0 = 2

Result = Yes. k = 1, i = 11, j = 2, l = 1

Test N 23: i0 = 1, j0 = 5, l0 = 3

Result = Yes. k = 1, i = 16, j = 0, l = 1

Test N 24: i0 = 1, j0 = 5, l0 = 4

Result = Yes. k = 1, i = 21, j = -2, l = 1

Test N 25: i0 = 1, j0 = 5, l0 = 5

Result = Yes. k = 1, i = 26, j = -4, l = 1

Test N 26: i0 = 2, j0 = 1, l0 = 1

Result = Yes. k = 3, i = 23, j = -1, l = 4

Test N 27: i0 = 2, j0 = 1, l0 = 2

Result = Yes. k = 4, i = 24, j = 1, l = 10

Test N 28: i0 = 2, j0 = 1, l0 = 3

Result = Yes. k = 5, i = 23, j = 1, l = 3

Test N 29: i0 = 2, j0 = 1, l0 = 4

Result = Yes. k = 26, i = 26, j = -3, l = 24

Test N 30: i0 = 2, j0 = 1, l0 = 5

Result = Yes. k = 1, i = 11, j = 1, l = 1

Test N 31: i0 = 2, j0 = 2, l0 = 1

Result = Yes. k = 2, i = 12, j = 2, l = 2

Test N 32: i0 = 2, j0 = 2, l0 = 2

Result = Yes. k = 2, i = 12, j = 2, l = 2

Test N 33: i0 = 2, j0 = 2, l0 = 3

Result = Yes. k = 2, i = 16, j = 2, l = 2

Test N 34: i0 = 2, j0 = 2, l0 = 4

Result = Yes. k = 2, i = 20, j = 2, l = 2

Test N 35: i0 = 2, j0 = 2, l0 = 5

Result = Yes. k = 1, i = 11, j = 0, l = 2

Test N 36: i0 = 2, j0 = 3, l0 = 1

Result = Yes. k = 2, i = 16, j = -4, l = 2

Test N 37: i0 = 2, j0 = 3, l0 = 2

Result = Yes. k = 2, i = 16, j = -4, l = 2

Test N 38: i0 = 2, j0 = 3, l0 = 3

Result = Yes. k = 1, i = 10, j = -1, l = 2

Test N 39: i0 = 2, j0 = 3, l0 = 4

Result = Yes. k = 1, i = 13, j = -1, l = 2

Test N 40: i0 = 2, j0 = 3, l0 = 5

Result = Yes. k = 1, i = 16, j = -1, l = 2

Test N 41: i0 = 2, j0 = 4, l0 = 1

Result = Yes. k = 2, i = 20, j = -7, l = 2

Test N 42: i0 = 2, j0 = 4, l0 = 2

Result = Yes. k = 2, i = 20, j = -7, l = 2

Test N 43: i0 = 2, j0 = 4, l0 = 3

Result = Yes. k = 1, i = 13, j = 0, l = 2

Test N 44: i0 = 2, j0 = 4, l0 = 4

Result = Yes. k = 1, i = 17, j = -2, l = 2

Test N 45: i0 = 2, j0 = 4, l0 = 5

Result = Yes. k = 1, i = 21, j = -2, l = 2

Test N 46: i0 = 2, j0 = 5, l0 = 1

Result = Yes. k = 1, i = 11, j = 3, l = 2

Test N 47: i0 = 2, j0 = 5, l0 = 2

Result = Yes. k = 1, i = 11, j = 3, l = 2

Test N 48: i0 = 2, j0 = 5, l0 = 3

Result = Yes. k = 1, i = 16, j = 1, l = 2

Test N 49: i0 = 2, j0 = 5, l0 = 4

Result = Yes. k = 1, i = 21, j = -1, l = 2

Test N 50: i0 = 2, j0 = 5, l0 = 5

Result = Yes. k = 1, i = 26, j = -3, l = 2

Test N 51: i0 = 3, j0 = 1, l0 = 1

Result = Yes. k = 24, i = 24, j = 2, l = 21

Test N 52: i0 = 3, j0 = 1, l0 = 2

Result = Yes. k = 5, i = 25, j = 4, l = 16

Test N 53: i0 = 3, j0 = 1, l0 = 3

Result = Yes. k = 1, i = 10, j = 2, l = 1

Test N 54: i0 = 3, j0 = 1, l0 = 4

Result = Yes. k = 1, i = 13, j = 2, l = 1

Test N 55: i0 = 3, j0 = 1, l0 = 5

Result = Yes. k = 1, i = 16, j = 2, l = 1

Test N 56: i0 = 3, j0 = 2, l0 = 1

Result = Yes. k = 8, i = 23, j = 4, l = 21

Test N 57: i0 = 3, j0 = 2, l0 = 2

Result = Yes. k = 8, i = 23, j = 4, l = 21

Test N 58: i0 = 3, j0 = 2, l0 = 3

Result = Yes. k = 1, i = 10, j = 1, l = 2

Test N 59: i0 = 3, j0 = 2, l0 = 4

Result = Yes. k = 1, i = 13, j = 1, l = 2

Test N 60: i0 = 3, j0 = 2, l0 = 5

Result = Yes. k = 1, i = 16, j = 1, l = 2

Test N 61: i0 = 3, j0 = 3, l0 = 1

Result = Yes. k = 1, i = 10, j = 0, l = 3

Test N 62: i0 = 3, j0 = 3, l0 = 2

Result = Yes. k = 1, i = 10, j = 0, l = 3

Test N 63: i0 = 3, j0 = 3, l0 = 3

Result = Yes. k = 1, i = 10, j = 0, l = 3

Test N 64: i0 = 3, j0 = 3, l0 = 4

Result = Yes. k = 1, i = 13, j = 0, l = 3

Test N 65: i0 = 3, j0 = 3, l0 = 5

Result = Yes. k = 1, i = 16, j = 0, l = 3

Test N 66: i0 = 3, j0 = 4, l0 = 1

Result = Yes. k = 1, i = 13, j = 1, l = 3

Test N 67: i0 = 3, j0 = 4, l0 = 2

Result = Yes. k = 1, i = 13, j = 1, l = 3

Test N 68: i0 = 3, j0 = 4, l0 = 3

Result = Yes. k = 1, i = 13, j = 1, l = 3

Test N 69: i0 = 3, j0 = 4, l0 = 4

Result = Yes. k = 1, i = 17, j = -1, l = 3

Test N 70: i0 = 3, j0 = 4, l0 = 5

Result = Yes. k = 1, i = 21, j = -1, l = 3

Test N 71: i0 = 3, j0 = 5, l0 = 1

Result = Yes. k = 1, i = 16, j = 2, l = 3

Test N 72: i0 = 3, j0 = 5, l0 = 2

Result = Yes. k = 1, i = 16, j = 2, l = 3

Test N 73: i0 = 3, j0 = 5, l0 = 3

Result = Yes. k = 1, i = 16, j = 2, l = 3

Test N 74: i0 = 3, j0 = 5, l0 = 4

Result = Yes. k = 1, i = 21, j = 0, l = 3

Test N 75: i0 = 3, j0 = 5, l0 = 5

Result = Yes. k = 1, i = 26, j = -2, l = 3

Test N 76: i0 = 4, j0 = 1, l0 = 1

Result = Yes. k = 3, i = 29, j = 1, l = 7

Test N 77: i0 = 4, j0 = 1, l0 = 2

Result = No. k = 50, i = 62, j = 53, l = 12

Test N 78: i0 = 4, j0 = 1, l0 = 3

Result = Yes. k = 1, i = 13, j = 1, l = 1

Test N 79: i0 = 4, j0 = 1, l0 = 4

Result = Yes. k = 1, i = 17, j = 3, l = 1

Test N 80: i0 = 4, j0 = 1, l0 = 5

Result = Yes. k = 1, i = 21, j = 3, l = 1

Test N 81: i0 = 4, j0 = 2, l0 = 1

Result = Yes. k = 16, i = 24, j = -3, l = 17

Test N 82: i0 = 4, j0 = 2, l0 = 2

Result = Yes. k = 16, i = 24, j = -3, l = 17

Test N 83: i0 = 4, j0 = 2, l0 = 3

Result = Yes. k = 1, i = 13, j = 0, l = 2

Test N 84: i0 = 4, j0 = 2, l0 = 4

Result = Yes. k = 1, i = 17, j = 2, l = 2

Test N 85: i0 = 4, j0 = 2, l0 = 5

Result = Yes. k = 1, i = 21, j = 2, l = 2

Test N 86: i0 = 4, j0 = 3, l0 = 1

Result = Yes. k = 1, i = 13, j = -1, l = 3

Test N 87: i0 = 4, j0 = 3, l0 = 2

Result = Yes. k = 1, i = 13, j = -1, l = 3

Test N 88: i0 = 4, j0 = 3, l0 = 3

Result = Yes. k = 1, i = 13, j = -1, l = 3

Test N 89: i0 = 4, j0 = 3, l0 = 4

Result = Yes. k = 1, i = 17, j = 1, l = 3

Test N 90: i0 = 4, j0 = 3, l0 = 5

Result = Yes. k = 1, i = 21, j = 1, l = 3

Test N 91: i0 = 4, j0 = 4, l0 = 1

Result = Yes. k = 1, i = 17, j = 0, l = 4

Test N 92: i0 = 4, j0 = 4, l0 = 2

Result = Yes. k = 1, i = 17, j = 0, l = 4

Test N 93: i0 = 4, j0 = 4, l0 = 3

Result = Yes. k = 1, i = 17, j = 0, l = 4

Test N 94: i0 = 4, j0 = 4, l0 = 4

Result = Yes. k = 1, i = 17, j = 0, l = 4

Test N 95: i0 = 4, j0 = 4, l0 = 5

Result = Yes. k = 1, i = 21, j = 0, l = 4

Test N 96: i0 = 4, j0 = 5, l0 = 1

Result = Yes. k = 1, i = 21, j = 1, l = 4

Test N 97: i0 = 4, j0 = 5, l0 = 2

Result = Yes. k = 1, i = 21, j = 1, l = 4

Test N 98: i0 = 4, j0 = 5, l0 = 3

Result = Yes. k = 1, i = 21, j = 1, l = 4

Test N 99: i0 = 4, j0 = 5, l0 = 4

Result = Yes. k = 1, i = 21, j = 1, l = 4

Test N 100: i0 = 4, j0 = 5, l0 = 5

Result = Yes. k = 1, i = 26, j = -1, l = 4

Test N 101: i0 = 5, j0 = 1, l0 = 1

Result = Yes. k = 3, i = 23, j = 2, l = 8

Test N 102: i0 = 5, j0 = 1, l0 = 2

Result = Yes. k = 1, i = 11, j = -2, l = 2

Test N 103: i0 = 5, j0 = 1, l0 = 3

Result = Yes. k = 1, i = 16, j = 0, l = 2

Test N 104: i0 = 5, j0 = 1, l0 = 4

Result = Yes. k = 1, i = 21, j = 2, l = 1

Test N 105: i0 = 5, j0 = 1, l0 = 5

Result = Yes. k = 1, i = 26, j = 4, l = 1

Test N 106: i0 = 5, j0 = 2, l0 = 1

Result = Yes. k = 1, i = 11, j = -3, l = 2

Test N 107: i0 = 5, j0 = 2, l0 = 2

Result = Yes. k = 1, i = 11, j = -3, l = 2

Test N 108: i0 = 5, j0 = 2, l0 = 3

Result = Yes. k = 1, i = 16, j = -1, l = 2

Test N 109: i0 = 5, j0 = 2, l0 = 4

Result = Yes. k = 1, i = 21, j = 1, l = 2

Test N 110: i0 = 5, j0 = 2, l0 = 5

Result = Yes. k = 1, i = 26, j = 3, l = 2

Test N 111: i0 = 5, j0 = 3, l0 = 1

Result = Yes. k = 1, i = 16, j = -2, l = 3

Test N 112: i0 = 5, j0 = 3, l0 = 2

Result = Yes. k = 1, i = 16, j = -2, l = 3

Test N 113: i0 = 5, j0 = 3, l0 = 3

Result = Yes. k = 1, i = 16, j = -2, l = 3

Test N 114: i0 = 5, j0 = 3, l0 = 4

Result = Yes. k = 1, i = 21, j = 0, l = 3

Test N 115: i0 = 5, j0 = 3, l0 = 5

Result = Yes. k = 1, i = 26, j = 2, l = 3

Test N 116: i0 = 5, j0 = 4, l0 = 1

Result = Yes. k = 1, i = 21, j = -1, l = 4

Test N 117: i0 = 5, j0 = 4, l0 = 2

Result = Yes. k = 1, i = 21, j = -1, l = 4

Test N 118: i0 = 5, j0 = 4, l0 = 3

Result = Yes. k = 1, i = 21, j = -1, l = 4

Test N 119: i0 = 5, j0 = 4, l0 = 4

Result = Yes. k = 1, i = 21, j = -1, l = 4

Test N 120: i0 = 5, j0 = 4, l0 = 5

Result = Yes. k = 1, i = 26, j = 1, l = 4

Test N 121: i0 = 5, j0 = 5, l0 = 1

Result = Yes. k = 1, i = 26, j = 0, l = 5

Test N 122: i0 = 5, j0 = 5, l0 = 2

Result = Yes. k = 1, i = 26, j = 0, l = 5

Test N 123: i0 = 5, j0 = 5, l0 = 3

Result = Yes. k = 1, i = 26, j = 0, l = 5

Test N 124: i0 = 5, j0 = 5, l0 = 4

Result = Yes. k = 1, i = 26, j = 0, l = 5

Test N 125: i0 = 5, j0 = 5, l0 = 5

Result = Yes. k = 1, i = 26, j = 0, l = 5