```cpp
#include <iostream>
#include <sstream>
using namespace std;

int menu();

// تمرین اضافی جمع کننده اعداد بزرگ
string addBigNumber(string num, string num2)
{
    string sum;
    short carry = 0, numLength = num.length(), num2Length = num2.length();
    for (int i = 1; (numLength > num2Length) ? i < numLength / 18 + 2 : i < num2Length / 18 + 2; i++)
    {
        short pos = numLength - 18 * i, pos2 = num2Length - 18 * i;
        long long part = (pos > -18) ? ((pos > -1) ? stoll(num.substr(pos, 18)) : stoll(num.substr(0,
numLength % 18))) : 0;
        long long part2 = (pos2 > -18) ? ((pos2 > -1) ? stoll(num2.substr(pos2, 18)) :
stoll(num2.substr(0, num2Length % 18))) : 0;
        long long partSum = part + part2 + carry;
        if (partSum)
        {
            carry = partSum / 1000000000000000000;
            string hold = to_string(partSum % 1000000000000000000);
            sum = (i < numLength / 18 + 1) ? string(18 - hold.length(), '0') + hold + sum : hold +
sum;
        }
    }
    return sum;
}

// تمرین اول با کمی تغییر
void sumOfnNumbers()
{
    float sum;
    int count = 1;
    string message = "Enter the word \"end\" or \"result\" to stop process and get the results!";
    cout << string(message.length(), '*') << endl;
    cout << message << endl;
    cout << string(message.length(), '*') << endl;
    while (1)
    {
        string input;
        float num;
        cout << count << " Enter number to add: ";
        cin >> input;
        stringstream data(input);
        if (data >> num)
        {
            sum += num;
            count++;
        }
        else if (data.str() == "end" || data.str() == "result")
        {
            break;
        }
```

```
        else
            cout << "Enter a valid number!!! Try again." << endl;
    }
    cout << string(30, '*') << endl
         << "Process finished" << endl
         << "In total " << count - 1 << " numbers were added. "
         << "Total sum is equal to: " << sum << endl
         << string(30, '*') << endl;
    menu();
}

// تمرین دوم
void sumOfEvenTwoDigitNumbers()
{
    int sum = 0;
    for (int i = 10; i < 100; i += 2)
    {
        sum += i;
    }
    cout << string(30, '*') << endl
         << "Process finished" << endl
         << "Total sum of 2 digit even numbers is equal to: " << sum << endl
         << string(30, '*') << endl;
    menu();
}
// تمرین دوم با کمی تغییر
void sumOfEvenOrOddnDigitNumbers()
{
    string input, input1;
    long long sum = 0;
    int digitsCount;
    bool isOdd;
    cout << "Enter number of digits: ";
    cin >> input;
    cout << "Odd or Even? Enter \"1\" if odd or \"0\" if even : ";
    cin >> input1;
    stringstream data(input), data1(input1);
    if (data >> digitsCount && data1 >> isOdd && digitsCount > 0)
    {
        long long Efirst = stoll(((digitsCount > 1) ? '1' : '0') + string(digitsCount - 1, '0'));
        long long Elimit = stoll('1' + string(digitsCount, '0'));
        sum = (isOdd ? (Efirst + Elimit) * (Elimit - Efirst) / 4 : (Efirst + Elimit - 2) * (Elimit -
Efirst) / 4);
        cout << string(30, '*') << endl
             << "Process finished" << endl
             << "Total sum of " << digitsCount << " digit " << (isOdd ? "odd " : "even ")
             << "numbers is equal to: " << sum << endl
             << string(30, '*') << endl;
    }
    else
    {
        cout << "Enter valid parameters!!! Try again." << endl;
        sumOfEvenOrOddnDigitNumbers();
    }
    menu();
```

```
}

// تمرین سوم با کمی تغییر
void drawRightTriangle()
{
    string input;
    int height;
    cout << "Enter number of digits: ";
    cin >> input;
    stringstream data(input);
    if (data >> height && height > 0)
    {
        for (int i = 1; i <= height; i++)
        {
            for (int j = 1; j <= i; j++)
                cout << '*';
            cout << endl;
        }
        cout << string(30, '*') << endl
             << "Process finished" << endl
             << string(30, '*') << endl;
    }
    else
    {
        cout << "Enter a valid and positive number!!! Try again." << endl;
        drawRightTriangle();
    }
    menu();
}

// تمرین چهارم با کمی تغییر
void fibonacci()
{
    string input;
    int count;
    cout << "How many numbers of fibonacci sequence do you want? ";
    cin >> input;
    stringstream data(input);
    if (data >> count)
    {
        string num = "1", num2 = num;
        cout << "term " << 1 << ": " << num << endl;
        for (int i = 1; i < count; i++)
        {
            string hold = addBigNumber(num2, num);
            // cout << "hold" << hold << endl;
            num = num2;
            num2 = hold;
            cout << "term " << i + 1 << ": " << num << endl;
        }
        cout << endl
             << string(30, '*') << endl
             << "Process finished" << endl
             << string(30, '*') << endl;
    }
```

```
    else
    {
        cout << "Enter a valid and positive integer!!! Try again." << endl;
        fibonacci();
    }
    menu();
}

// تمرین پنجم با کمی تغییر
void baseConversionFrom10()
{
    string result, input, input1;
    long long num, base;
    cout << "Enter the number that you want to convert: ";
    cin >> input;
    cout << "Enter the base you want to convert to: ";
    cin >> input1;
    stringstream data(input), data1(input1);
    if (data >> num && data1 >> base && base > 1 && base != 10)
    {
        while (num >= base)
        {
            if (base < 10)
                result = to_string(num % base) + result;
            else
                result = '(' + to_string(num % base) + ')' + result;
            num /= base;
        }
        if (base < 10)
            result = to_string(num % base) + result;
        else
            result = '(' + to_string(num % base) + ')' + result;
        cout << string(30, '*') << endl
             << "Process finished" << endl
             << "Converted number is equal to: " << result << " in base: " << base << endl
             << string(30, '*') << endl;
    }
    else if (base == 10)
        cout << string(30, '*') << endl
             << "Process finished" << endl
             << "Coversion from base 10 to 10 makes no diffrence! " << endl
             << string(30, '*') << endl;
    else
    {
        cout << "Enter a valid and positive integer!!! Minimum base is two! Maximum input: 18 digits!
Try again." << endl;
        baseConversionFrom10();
    }
    menu();
}

// تمرین ششم با کمی تغییر
void sumOfDigits()
{
    string input;
```

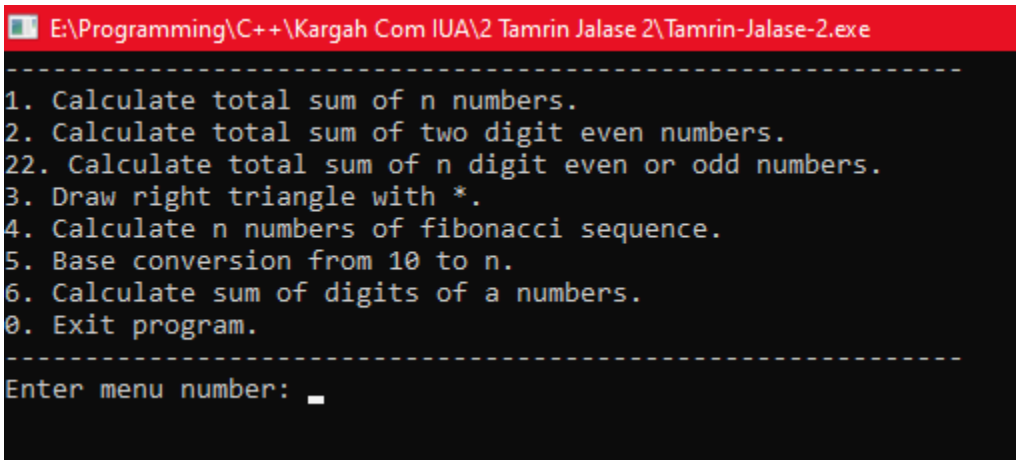
```
    long long num;
    cout << "Enter the number: ";
    cin >> input;
    stringstream data(input);
    if (data >> num)
    {
        short result = 0;
        for (int i = 0; i < input.length(); i++)
        {
            if ((int)input.at(i) > 48 && (int)input.at(i) < 58)
            {
                result += (int)input.at(i) - 48;
            }
        }
        cout << string(30, '*') << endl
             << "Process finished" << endl
             << "Total sum of digits is equal to: " << result << endl
             << string(30, '*') << endl;
    }
    else
    {
        cout << "Enter a valid and positive integer!!! Try again." << endl;
        sumOfDigits();
    }
    menu();
}

// منو
int menu()
{
    string input;
    cout << string(60, '-') << endl
         << "1. Calculate total sum of n numbers. " << endl
         << "2. Calculate total sum of two digit even numbers. " << endl
         << "22. Calculate total sum of n digit even or odd numbers. " << endl
         << "3. Draw right triangle with *. " << endl
         << "4. Calculate n numbers of fibonacci sequence. " << endl
         << "5. Base conversion from 10 to n. " << endl
         << "6. Calculate sum of digits of a numbers. " << endl
         << "0. Exit program. " << endl
         << string(60, '-') << endl
         << "Enter menu number: ";
    cin >> input;
    if (input == "1")
        sumOfnNumbers();
    else if (input == "2")
        sumOfEvenTwoDigitNumbers();
    else if (input == "22")
        sumOfEvenOrOddnDigitNumbers();
    else if (input == "3")
        drawRightTriangle();
    else if (input == "4")
        fibonacci();
    else if (input == "5")
        baseConversionFrom10();
```

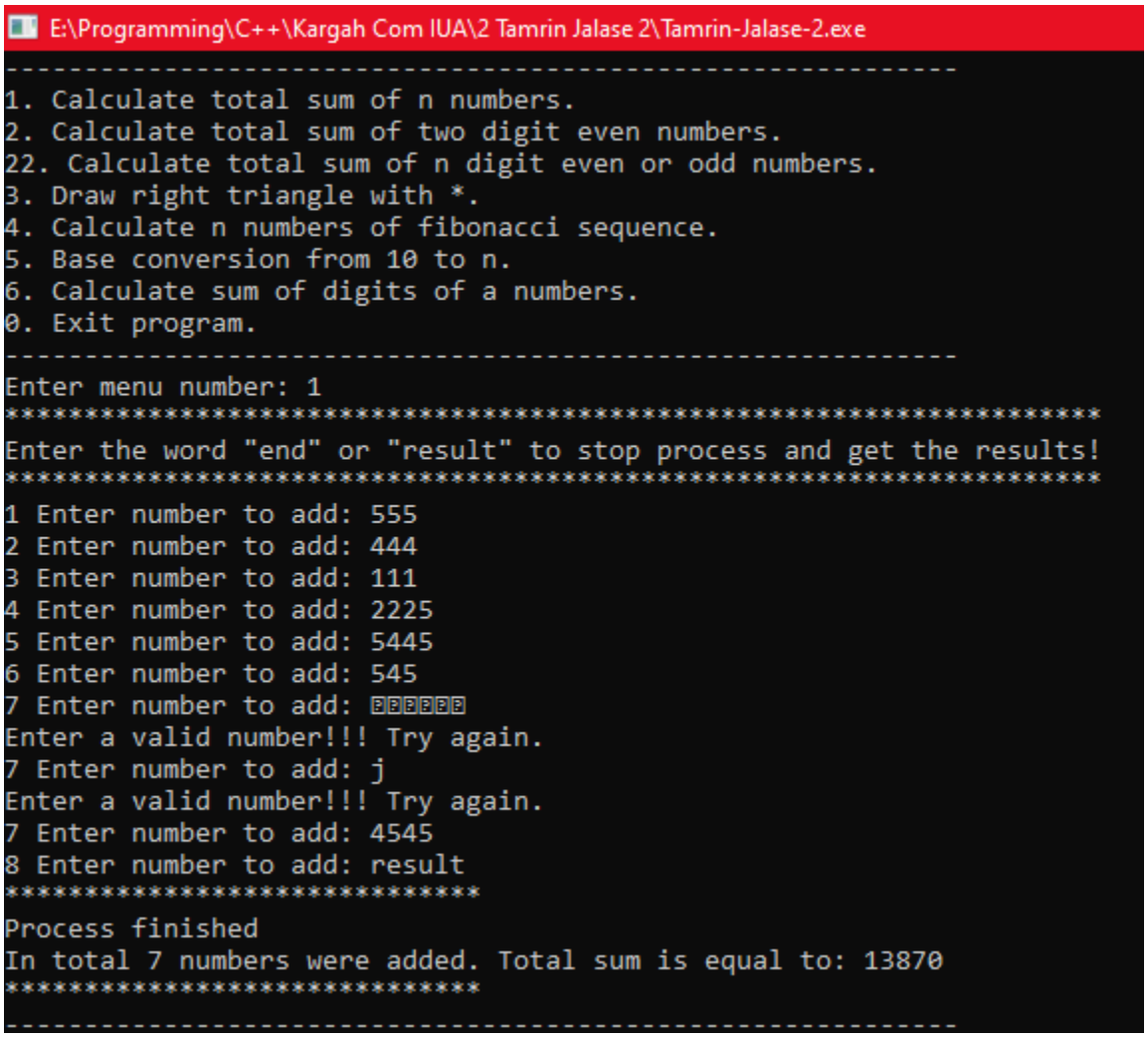
```
    else if (input == "6")
        sumOfDigits();
    else if (input == "0")
        return 0;
    else
    {
        cout << "Enter a valid menu number!!! Try again." << endl;
        menu();
    }
    return 0;
}

int main()
{
    menu();
    return 0;
}
```

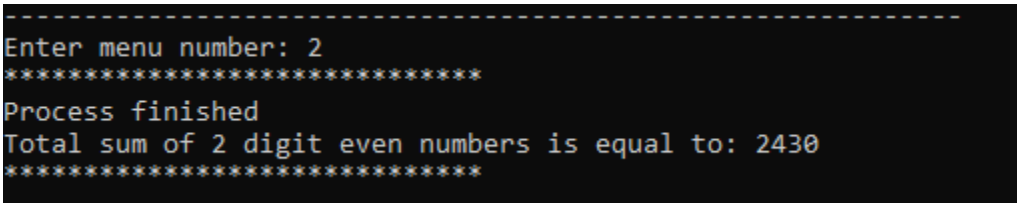
نتایج



جمع کردن تعداد نامشخص عدد



.برنامه ای بنویسید که مجموع اعداد زوج دورقمي را محاسبه و چاپ نماید



مجموع اعداد زوج یا فرد n رقمی

```
------------------------------------------------------------
Enter menu number: 22
Enter number of digits: 6
Odd or Even? Enter "1" if odd or "0" if even : 1
******************************
Process finished
Total sum of 6 digit odd numbers is equal to: 247500000000
******************************
```

مثلث با *

```
------------------------------------------------------------
Enter menu number: 3
Enter number of digits: 44
*
**
***
****
*****
******
*******
********
*********
**********
***********
************
*************
**************
***************
****************
*****************
******************
*******************
********************
*********************
**********************
***********************
************************
*************************
**************************
***************************
****************************************
*****************************************
******************************************
*******************************************
********************************************
*********************************************
**********************************************
***********************************************
************************************************
*************************************************
**************************************************
******************************
Process finished
******************************
------------------------------------------------------------
```

سری فیبوناچی

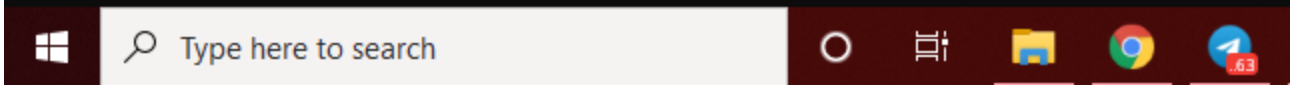
```
------------------------------------------------------------
Enter menu number: 4
How many numbers of fibonacci sequence do you want? 300
term 1: 1
term 2: 1
term 3: 2
term 4: 3
term 5: 5
term 6: 8
term 7: 13
term 8: 21
term 9: 34
term 10: 55
term 11: 89
term 12: 144
term 13: 233
term 14: 377
term 15: 610
term 16: 987
term 17: 1597
term 18: 2584
term 19: 4181
term 20: 6765
term 21: 10946
term 22: 17711
term 23: 28657
term 24: 46368
term 25: 75025
term 26: 121393
term 27: 196418
term 28: 317811
term 29: 514229
term 30: 832040
term 31: 1346269
term 32: 2178309
term 33: 3524578
term 34: 5702887
term 35: 9227465
term 36: 14930352
term 37: 24157817
term 38: 39088169
term 39: 63245986
term 40: 102334155
term 41: 165580141
term 42: 267914296
term 43: 433494437
term 44: 701408733
term 45: 1134903170
```

E:\Programming\C++\Kargah Com IUA\2 Tamrin Jalase 2\Tamrin-Jalase-2.exe

```
term 255: 875715953430188544580333863041781581743565882643903370
term 256: 14169381771405651323470996587541191965770779495819986 7
term 257: 22926541305707536769274335217959007783206438322259023 7
term 258: 37095923077113188092745331805500199748977217818079010 4
term 259: 60022464382820724862019667023459207532183656140338034 1
term 260: 97118387459933912954764998828959407281160873958417044 5
term 261: 15714085184275463781678466585241861481334453009875507 86
term 262: 25425923930268855077154966468137802209450540405717212 31
term 263: 41140009114544318858833433053379663690784993415592720 17
term 264: 66565933044813173935988399521517465900235533821309932 48
term 265: 10770594215935749279482183257489712959102052723690265265
term 266: 17427187520417066673081023209641459549125606105821258513
term 267: 28197781736352815952563206467131172508227658829511523778
term 268: 45624969256769882625644229676772632057353264935332782291
term 269: 73822750993122698578207436143903804565580923764844306069
term 270: 11944772024989258120385166582067643662293418870017708836 0
term 271: 19327047124301527978205910196458024118851511246502139442 9
term 272: 31271819149290786098591076778525667781144930116519848278 9
term 273: 50598866273592314076796986974983691899996441363021987721 8
term 274: 81870685422883100175388063753509359681141371479541836000 7
term 275: 13246955169647541425218505072849305158113781284256382372 25
term 276: 21434023711935851442757311448200241126227918432210565972 32
term 277: 34680978881583392867975816521049546284341699716466948344 57
term 278: 56115002593519244310733127969249787410569618148677514316 89
term 279: 90795981475102637178708944490299333694911317865144462661 46
term 280: 14691098406862188148944207245954912110548093601382197697835
term 281: 23770696554372451866815101694984845480039225387896643963981
term 282: 38461794961234640015759308940939757590587318989278841661816
term 283: 62232491515607091882574410635924603070626544377175485625797
term 284: 10069428647684173189833719576864360661213863366454327287613
term 285: 16292677799244882378090813021278896373184040774362981291341 0
term 286: 26362106446929055567924184978965332439305427111008414020102 3
term 287: 42654784246173937946014998000244228812489467885371395311443 3
term 288: 69016890693102993513939182979209561251794894996379809331545 6
term 289: 11167167493927693145995418097945379006428436288175120464298 89
term 290: 18068856563237992497389336395866335131607925787813101397453 45
term 291: 29236024057165685643384754493811714138036362075988221861752 34
term 292: 47304880620403678140774090889678049269644287863801323259205 79
term 293: 76540904677569363784158845383489763407680649939789545120958 13
term 294: 12384578529797304192493293627316781267732493780359086838016392
term 295: 20038668997554240570909178165665757608500558774338041350112205
term 296: 32423247527351544763402471792982538876233052554697128188128597
term 297: 52461916524905785334311649958648296484733611329035169538240802
term 298: 84885164052257330097714121751630835360966663883732297726369399
term 299: 13734708057716311543202577171027913184570027521276746726461020 1
term 300: 22223224462942044552973989346190996720666693909649976499097960 0

********************************
Process finished
********************************

------------------------------------------------------------
1. Calculate total sum of n numbers.
```



تبدیل مبنا از 10 به n

```
------------------------------------------------------------
Enter menu number: 5
Enter the number that you want to convert: 548656594
Enter the base you want to convert to: 1
Enter a valid and positive integer!!! Minimum base is two! Maximum input: 18 digits! Try again.
Enter the number that you want to convert: 65948451354
Enter the base you want to convert to: 1
Enter a valid and positive integer!!! Minimum base is two! Maximum input: 18 digits! Try again.
Enter the number that you want to convert: 65478455215
Enter the base you want to convert to: 2
*******************************
Process finished
Converted number is equal to: 1111001111101101000111101111101011111 in base: 2
*******************************
```

```
------------------------------------------------------------
Enter menu number: 5
Enter the number that you want to convert: 515
Enter the base you want to convert to: 14
*******************************
Process finished
Converted number is equal to: (2)(8)(11) in base: 14
*******************************
```

مجموع ارقام عدد

```
------------------------------------------------------------
Enter menu number: 6
Enter the number: -648485456484821
*******************************
Process finished
Total sum of digits is equal to: 77
*******************************
```