Project Name	:	Gonit Batayon v.2 (Horizon of Mathematics v.2)
Project Type	:	Program
Codes Used	:	C++ with Standard Template Library
Purpose	:	To perform simple algebraic addition operations with large variables
Project Year	:	2018
Achievements	:	Both Gonit Batayon and Gonit Batayon v.2 have won FIRST prize in EUSCIAN Science and Technology Fair
Input/Output	:	

```
                      Welcome to GONIT BATAYON V.2
------------------------------------------------------------------
                    Credits:    Sharif Bin Haque
                                Engineering University School & College

Your current time is now: Sun Sep 18 15:50:47 2022

Type your algebra problems in this format: X + Y or, X - Y. Best of luck

3x + 9y
= 3 * 1x + 3 * 3y
= 3 ( x + 3y )

1086x + 395478y
= 6 * 181x + 6 * 65913y
= 6 ( 181x + 65913y )

5x + 7x
= (5 + 7 )x
= 12x

1017x + 73y
= 1 * 1017x + 1 * 73y
=  ( 1017x + 73y )

476k + 47q
= 1 * 476k + 1 * 47q
=  ( 476k + 47q )


500a + 500b
= 500 * 1a + 500 * 1b
= 500 ( a + b )
```

```cpp
#include<iostream>
#include<string>
#include<cmath>
#include<ctime>
using namespace std;

const int default_value=1;

string aftercommon (string str, string str2);
string charcommon (string char1, string char2);
int intdifferer(string str);
int factor(int num, int num2);
string convert_int_to_string (int num);
int show_greetings();

int main ()
{
    show_greetings();
    while (1) {
        string input1,input2,commonstr,result_string;
        string tempinp1,tempinp2,chng_inp1,chng_inp2;
        string numbtemp1, numbtemp2,numbtemp3,void_string;
        char user_choice;
        cin>>input1>>user_choice>>input2;
        int common_number, int_frm_a, int_frm_b;

        //Identifying int from a string
        int_frm_a=intdifferer(input1);
        int_frm_b= intdifferer(input2);
        if (int_frm_a ==0 || int_frm_b==0) {
            if (int_frm_a==0) {
                int_frm_a=default_value;
            }
            if (int_frm_b==0) {
                int_frm_b=default_value;
            }
        }
        //Common only integers
        common_number= factor (int_frm_a, int_frm_b);

        //Separate int from strings;
        tempinp1=convert_int_to_string(int_frm_a);
        tempinp2=convert_int_to_string(int_frm_b);
        chng_inp1=aftercommon(tempinp1,input1);
        chng_inp2=aftercommon(tempinp2,input2);

        //common only strings
        commonstr=charcommon(chng_inp1,chng_inp2);

        //separate common value from strings
        tempinp1=aftercommon(commonstr,chng_inp1);
        tempinp2=aftercommon(commonstr,chng_inp2);

        //NUMBTEMP
        numbtemp1=convert_int_to_string(int_frm_a/common_number);
        numbtemp2=convert_int_to_string(int_frm_b/common_number);

        if (common_number!=1) {
            numbtemp3=convert_int_to_string(common_number);
        }

        //PRINTING ZONE
        if (chng_inp1==chng_inp2) {
            cout<<"= "<<"("<<int_frm_a<<" "<<user_choice<<" "<<int_frm_b<<" )"<<chng_inp1<<endl;
            if (user_choice=='+') {
                cout<<"= "<<int_frm_a+int_frm_b<<chng_inp1;
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                cout<<endl;
            }
            if (user_choice=='-') {
                cout<<"= "<<int_frm_a-int_frm_b;
                if (int_frm_a-int_frm_b!=0) {
                    cout<<chng_inp1;
                }
                cout<<endl;
            }
        }
        else if (input1=="0" || input2=="0") {
            if (input1=="0") {
                if (user_choice=='+') {
                    cout<<"= "<<input2<<endl;
                }
                if (user_choice=='-') {
                    cout<<"= "<<"-"<<input2<<endl;
                }
            }
            if (input2=="0") {
                cout<<"= "<<input1<<endl;
            }
        }

        else {
            if (numbtemp1=="1") {
                if (tempinp1!="") {
                    numbtemp1=void_string;
                }
            }
            if (numbtemp2=="1") {
                if (tempinp2!="") {
                    numbtemp2=void_string;
                }
            }
            if (user_choice=='+') {
                result_string = "= " + numbtemp3 + commonstr + " ( "   + numbtemp1 + tempinp1 + " + " +
numbtemp2+ tempinp2 + " ) ";
            }
            else if (user_choice=='-') {
                result_string ="= " + numbtemp3 + commonstr + " ( "   + numbtemp1 + tempinp1 + " - " +
numbtemp2+ tempinp2 + " ) ";
            }
            cout<<"= "<<common_number<<commonstr<<" * "<<int_frm_a/common_number<<tempinp1<<" "<<
user_choice<<" ";
            cout<<common_number<<commonstr<<" * "<<int_frm_b/common_number<<tempinp2<<endl;
            cout<<result_string<<endl;
        }
        cout<<endl;
    }
}

string charcommon (string char1, string char2)    //COMMON (ONLY WORKS AT POW 1)
{
    int length1=char1.size();
    int length2=char2.size();
    int x,y,z;
    string temporary, grand;
    for (x=0; x<length1;x++) {
        for (y=0;y<length2;y++) {
            if (char1[x]==char2[y] && char1[x]!='+' && char1[x]!='-') {
                temporary=temporary+char1[x];
                break;
            }
        }
    }
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    return temporary;
}

string aftercommon (string str, string str2)
{
    string last;
    int length,length2,x,y,flag=0;
    length=str.size();
    length2=str2.size();

    if (str!=str2) {
        for (x=0;x<length2;x++) {
            for (y=0;y<length;y++) {
                if (str2[x]==str[y]) {
                    flag++;
                }
            }
            if (flag==0) {
                last+=str2[x];
            }
            flag=0;
        }
        return last;
    }
}

int intdifferer(string str)
{
    int i,len,temp=0,flag=0;
    len=str.size();

    for (i=0;i<len;i++) {
        if (str[i]>='0' && str[i]<='9') {
            temp+=(str[i]-48);
            temp=temp*10;
        }
    }
    return temp/10;
}

int factor(int num, int num2)
{
    int  mod;
    while (1) {
        mod=num%num2;
        if (mod==0) {
            return num2;
            break;
        }
        num=num2;
        num2=mod;
    }
}

string convert_int_to_string (int num)
{
    string reversedstr, mainstr;
    int a,length,temporary;

    while (num>0) {
        temporary=num%10;
        reversedstr+=temporary+48;
        num=(num-temporary)/10;
    }
    length=reversedstr.size();
    for (a=length-1;a>=0;a--) {
```

```
196         mainstr+=reversedstr[a];
197     }
198     return mainstr;
199 }
200 
201 int show_greetings()
202 {
203     time_t now=time(0);
204     char *dt=ctime(&now);
205     cout<<"\t\t\t\t\tWelcome to GONIT BATAYON V.2"<<endl;
206     cout<<"\t\t  ------------------------------------------------------------------"<<endl;
207     cout<<"\t\t    Credits:\tSharif Bin Haque"<<endl;
208     cout<<"\t\t\t\tEngineering University School & College"<<endl<<endl;
209     cout<<"Your current time is now: "<<dt<<endl;
210     cout<<"Type your algebra problems in this format: X + Y or, X - Y. Best of luck"<<endl<<endl;
211 
212 }
213 
214 
215 
```