```cpp
/*
Memo for P3
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Date: 2022/03/10
*/


#include <iostream>
#include <cstdlib>          //Library is used because the system function is part of cstdlib

using namespace std;

int main()
{
    bool blnLoop = true;        //Variable used to manage the main loop of the solution
    char chInput = '\0';        //Stores the menu option

    //Do-While loop is used to handle the main loop
    do
    {
        system("cls");      //Clears the screen on Windows.  The following is also acceptable, system("clear").  This clears the screen on Linux based terminals.
        //Output the menu and get input
        cout << "Option A: Display the A046901 series." << endl
             << "Option B: Calculate the sum of n-number of terms in the A046901 series." << endl
             << "Option C: Read in a sentence and reverse the characters." << endl
             << "Option X: Exit the program" << endl;
        cin >> chInput;

        //Evaluate the selection and execute the corresponding section of code
        switch(chInput)
        {
        case 'a':
        case 'A':
            {
                //Prompt
                int intNum = 0;
                cout << "Number of terms for A046901 to be displayed (>1):";
                cin >> intNum;

                //Confirm no conversion error occured
                //Repeat until a proper number has been entered.
                while(cin.fail())
                {
                    cin.clear();            //Clear the fail flag
                    string strJunk;
                    cin >> strJunk;         //Get rid of any characters still on the input stream
                    cerr << "Please type a valied number greater than 1" << endl;
                    cout << "Number of terms for A046901 to be displayed (>1):";
                    cin >> intNum;
                }

                //Confirm the number enterd is greater than 1, if not break out and present main menu again
                if(intNum <=1)
                {
                    cerr << "The number of terms should be greater than 1." << endl;
                    break;
                }

                //Output the first term
                int intPrev = 1;                    //Stores the value of the previous term a(n-1)
                cout << "1 ";
                //Calculate the rest of the terms.  Start with the second term in the series.
                for(int n=2;n<=intNum;n++)
                {
                    int intNew = 0;                 //Stores the value of the new term a(n)
                    if(intPrev > n)                 //a(n) = a(n-1) - n if a(n-1) > n, else a(n) = a(n-1) + n.
                        intNew = intPrev - n;
                    else
                        intNew = intPrev + n;
                    cout << intNew << " ";          //Output the new term
                    intPrev = intNew;               //Update a(n-1)
                }
                cout << endl;
                break;
            }
        case 'b':
        case 'B':
            {
                //Uses the exact same code as in (A)
                int intNum = 0;
```

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81                  cout << "Number of terms for A046901 to be added (>1):";
82                  cin >> intNum;
83
84                  while(cin.fail())
85                  {
86                      cin.clear();
87                      string strJunk;
88                      cin >> strJunk;
89                      cerr << "Please type a valied number greater than 1" << endl;
90                      cout << "Number of terms for A046901 to be added (>1):";
91                      cin >> intNum;
92                  }
93
94                  if(intNum <=1)
95                  {
96                      cerr << "The number of terms should be greater than 1." << endl;
97                      break;
98                  }
99
100                 int intPrev = 1;
101                 int intSum = intPrev;                   //Used to store the sum of the series.
    Store the first term into the sum
102                 for(int n=2;n<=intNum;n++)
103                 {
104                     int intNew = 0;
105                     if(intPrev > n)
106                         intNew = intPrev - n;
107                     else
108                         intNew = intPrev + n;
109
110                     intPrev = intNew;
111                     intSum = intSum + intPrev;          //Update the sum with the newly
    calculated term in the series
112                 }
113                 cout << "The sum of " << intNum << " terms are: " << intSum;
114                 cout << endl;
115                 break;
116                 break;
117             }
118         case 'c':
119         case 'C':
120             {
121                 //Prompt
122                 string strSentence;
123                 cout << "Please type in a sentence that will be reversed:" << endl;
124                 cin.ignore(100,'\n');                   //getline will read any new-line
    characters stuck on the input stream.  Ignore any stuck characters.
125                 getline(cin, strSentence);              //Get not just one word, but a
    whole sentence
126
127                 string strNew;
128                 for(char c: strSentence)                //Put each character in strSentence
    into c during each round.  Start with the first character
129                 {
130                     strNew = c + strNew;                //Concatenate the character to the
    front of the new string.  This creates a reversed string.
131                 }
132
133                 //Output the answer
134                 cout << "The reverse sentence is:" << endl;
135                 cout << strNew << endl;
136
137                 break;
138             }
139         case 'x':
140         case 'X':
141             {
142                 blnLoop = false;                        //Change the loop flag to ensure
    the do-while loop does not repeat
143                 break;
144             }
145         default:
146             //An incorrect option was selected
147             cerr << "Incorrect option please select only A,B,C or X" << endl;
148         }
149
150         //Pause the terminal
151         cout << "Press Enter key to continue";
152         cin.ignore(100,'\n');
153         cin.get();
154     }while(blnLoop);
155
156
157     return 0;
```

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158   }
159
```