float naaq[ArSize];
cout << "Enter the NAAQs (New Age Awareness Quotients) 
" << "of your neighbors. Program terminates 
" << "when you make\n" << ArSize << " entries 
" << "or enter a negative value.\n";

int i = 0;
float temp;
cin >> temp;
while (i < ArSize && temp >= 0) // 2 quitting criteria
{
    naaq[i++] = temp;
    if (i < ArSize) // room left in the array,
        cin >> temp; // so get next value
}
if (i == 0)
    cout << "No data--bye\n";
else
{
    cout << "Enter your NAAQ: ";
    float you;
cin >> you;
    int count = 0;
    for (int j = 0; j < i; j++)
        if (naaq[j] > you)
            count++;
cout << count;
cout << " of your neighbors have greater awareness of\n" << "the New Age than you do.\n";
}
return 0;

Note that the program places input into a temporary variable temp. Only after it verifies that the input is valid does the program assign the value to the array.

Here are a couple of sample runs. One terminates after six entries, and the second