

1. We will be reading in a chemical compound such as CH_3CH_3 and recording how many of each type of atom occurs in the compound. Right now we don't know how to have the computer read in characters such as H or C so we will have the user help us. However, since we would like to later have this process automated the user only reads from left to right saying what type of element it is and then the number immediately following it. He doesn't do any adding.

A sample dialogue for reading in this compound would be as follows.

output: please input the code for your next element: 1 for H, 2 for O, 3 for C, 4 for N, 5 for Br, 6 for Cl, -1 to finish.
input: 3

output: how many carbon atoms are there? *input:* 1

output: please input the code for your next element: 1 for H, 2 for O, 3 for C, 4 for N, 5 for Br, 6 for Cl, -1 to finish.
input: 1

output: how many hydrogen atoms are there? *input:* 3

output: please input the code for your next element: 1 for H, 2 for O, 3 for C, 4 for N, 5 for Br, 6 for Cl, -1 to finish.
input: 3

output: how many carbon atoms are there? *input:* 1

output: please input the code for your next element: 1 for H, 2 for O, 3 for C, 4 for N, 5 for Br, 6 for Cl, -1 to finish.
input: 1

output: how many hydrogen atoms are there? *input:* 3

output: please input the code for your next element: 1 for H, 2 for O, 3 for C, 4 for N, 5 for Br, 6 for Cl, -1 to finish.
input: -1

output: 2 atoms of carbon, 6 atoms of hydrogen

a) We will need a loop to do this. Should it be a while or a for loop? _____ Why?
_____. Is the loop user controlled or counter controlled?

b) What will cause an exit from the loop? _____
Write a while or for statement for this

c) Write in plain English (ie not C) what should occur each time through the loop.

d) Seven things could potentially change each time through the loop. What are they?
Give C variable declarations for them.

In actuality only two things do each time. What are they?

e) You will need a switch structure in your loop. What variable will control that structure?
Write the full switch structure with all its cases.

f) Write the full loop including the switch statement.

g) Write a program using the above to read in a compound.

2. We want to write a program that takes in the high and low temperatures for each day of a given week and computes the average difference between the daily highs and lows.

a) Which makes more sense here- a while or a for loop?

b) What controls the loop?

c) What will be changing in the loop?

d) What needs to be read in within the loop?

e) What needs to be calculated in the loop?

f) What variable do you need when the loop is finished?

g) Write a program to perform this.

Sample input and output (P stands for the prompt, "please put in the day's high followed by its low temperature." Output is in bold):

P 60 30 P 50 20 P 65 35 P 70 40 P 80 50 P 82 42 P 61 31 Average temperature difference is 31.4 degrees

3) Suppose we now want to write a program incorporating 2) which allows the user to enter many weeks of data and for each week it gives the above average difference. The user enters what week they are entering data for (e.g. 1 for the first week of the year, 52 for the last) and signifies they are finished by entering a -1. We will have to use nested loops.

What controls the outer loop? _____ The loop from 2) will be the inner loop.

What else besides this inner loop will need to be in the body of the outer loop? Write this outer loop on an attached sheet. BONUS(3) Turn in a program for this problem