Loops

- Solution
- Programing with While
- Interactive and Batch Processing
- Selection
- Repetition

Solutions

- Program 1 page 105
- Program 1a page 105
- Ifelse4.cpp

Loop Components

1. Initialization of the **loop control variable.**
2. Evaluation of the **loop repetition condition**. Loop terminates when repetition condition becomes false.
3. Update of the **loop control variable.**
4. Counting loops
5. Sentinel Loops

Interactive and Batch Processing

- **Interative Processing**: Users provide input
- **Batch Processing:** Program input comes from a computer file or some other computer source (ie another program)

Batch Processing

- #include <fstream> - include library of programs to read and write date to a file.
- Ifstream infile(“indata.txt”, ios::in); - tells the computer that to read the input data from the file indata.txt.
- ofstream outfile(“outdata.txt”, ios::out); -tells the computer to write output data to the file outdata.txt.

Creating an Data File

1. Use your favorite editor to type in the data. Data values can be separated by spaces, tabs, or new lines. For now be sure to put the data file in the same folder as the program you are running.
2. Save the files as a .txt file.

Program Figure 4.4

- program
- coaldata.txt
- coal.out
- infile.close(), outfile.close()
- program killer: <cntrl>c
- Read errors not directly reported

IO Failures

- infile.fail();
- infile.eof()
- Program 4.5
- Program 4.14

Postponed

- for statement
- do while statement
- Increment and decrement operators
- io formating

Calling a Modem

- Two tones: a 1270 hz tone for 1 time unit is a 1; a 1070 hz tone for 1 time unit is a 0.
- 1100011110000
  - Emit a 1270hz tone for 2 time units
  - Emit a 1070hz tone for 3 time units
  - Emit a 1270hz tone for 4 time units
  - Emit a 1070hz tone for 4 time units

Calling a Modem

- Write a program to read in a sequence of zeros and ones from a file and print out tone list as above
- while (!file.fail()){
  read digit
  process digit
  }
- How do we process digit?

Calling a Modem

- while (!file.fail()){
  read digit
  if digit_change
  print out previous_digit and tone length
  else increase tone length
  }
- What do we need to know at the start of the loop?

Calling a Modem

- read in first digit
- while (!file.fail()){
  read digit
  if digit_change
  print out previous_digit and tone length
  set tone length to 1
  else increase tone length
  }

Calling a Modem

```
Read in first digit
 timeUnits=1;
 if (digit=='0') tone=Low_Tone;
 else tone=High_Tone;
 read in digit
 while (!file.fail()){
    if (digit =='0'){
        if (tone==High_Tone) { //digit change
            print out 1's sequence's timeUnits
            tone=Low_Tone
        else increase timeUnits
    }
    else {
        if (tone==Low_Tone) { //digit change
            print out 0's sequence's timeUnits
            tone=Low_Tone
        else increase timeUnit
    }
    read in digit

}
```

Exercises and Homework

- Exercise #1, #3, page 115.
- Exercise: How does one calculate the maximum (minimum) of a list of numbers in a file?
- Program 1, page 149

  Hand in: email to ruttan@cs.kent.edu with the subject: 10061 Submission Homework 2

  - fabs(x) calculates the absolute value of the variable x
  - sqrt(x) calculates the square root of the variable x