Write a Lex program that recognizes the following types of numbers and strings:

<table>
<thead>
<tr>
<th>token</th>
<th>examples</th>
<th>informal description</th>
</tr>
</thead>
<tbody>
<tr>
<td>unsigned integer</td>
<td>1, 5125, 315, ...</td>
<td>all sequences of digits</td>
</tr>
<tr>
<td>signed integer</td>
<td>+6, −152, ...</td>
<td>all sequences of digits starting with + or −</td>
</tr>
<tr>
<td>decimal number</td>
<td>10.151, 3.1415, −0.0001, ...</td>
<td>includes a decimal point and at least one digit to the left and right of the point. Possibly starts with + or −.</td>
</tr>
<tr>
<td>scientific number</td>
<td>10e-01, −43.21e+10, 21e10, ...</td>
<td>a decimal number or a (signed, unsigned) integer followed by e and a signed or unsigned integer.</td>
</tr>
<tr>
<td>name</td>
<td>a512, key, ch153, counter, ...</td>
<td>starts with a letter.</td>
</tr>
<tr>
<td>string</td>
<td>1a512, 61a, 12df as0, 01basdf, ...</td>
<td>starts with a digit but contains also other letters (and is not a scientific number).</td>
</tr>
<tr>
<td>relation</td>
<td></td>
<td>&lt; or &gt; or = or &lt;= or &gt;= or !=</td>
</tr>
<tr>
<td>unknown</td>
<td>any other character (errors)</td>
<td></td>
</tr>
</tbody>
</table>

Your Lex program should (i) scan out the white space, (ii) count the numbers, strings and names it reads (as well as the unknowns) (iii) print the corresponding lexeme, line number of the lexeme, and corresponding token.

Also each number with its line number should be stored in a "Number Table" as a float/double (except for unknowns, relations and strings), and at the end of your program you should print the total sum of all numbers in the Number Table as well as the contents of the number table. You may have a fixed size for the Number Table.

You should use the following declaration for the number table:

typedef struct {
    double num;
    int line_num;
} num_record;

num_record num_table[MAX_COUNT];
double sum = 0;
What to Submit

Submit (i) short description of your code (1 page) (ii) the LEX code (iii) the output of your program in the three sample files to be found in the web-site of the class (e.g. if you are using windows you can do that by pressing “PRINTSCREEN” and copying and pasting to a word-document).

The whole assignment should be prepared as a single file using MS Word or other word-processing / type-setting software package of your liking. The first page should contain only: (i) your name, (ii) the class number “CSE 244”, (iii) the semester “Fall 2004”, (iv) the project number “Project #1”.

Example:

12.3  local 21fa43
33.5e+3  x<=name
-44  +1520  a=3

should be processed as:

12.3, line1, decimal number
local, line1, name
21fa43, line1, string
33.5e+3, line2, scientific number
x, line2, name
<=, line2, relation
name, line2, name
-44, line3, signed integer
+1520, line3, signed integer
a, line3, name
=, line3, relation
3, line3, unsigned integer

5 numbers found.
SUM = 34991.300000

Contents of Number Table
0   L1  12.300000
1   L2  33500.000000
2   L3  -44.000000
3   L3  1520.000000
4   L3  3.000000