1. **Write a program in LEX to identify the type of user input:** alphabet, integer, decimal, alphanumeric, or other character.

```
%{
#include <stdio.h>
%}

%%
[a-zA-Z]+       { printf("Alphabet\n"); }
[0-9]+          { printf("Integer\n"); }
[0-9]+\.[0-9]+  { printf("Decimal\n"); }
[a-zA-Z0-9]+    { printf("Alphanumeric\n"); }
.           { printf("Other character\n"); }
%%

int main() {
   yylex();
   return 0;
}

int yywrap() {
   return 1;
}
```

Output:

```
hello
Alphabet
123
Integer
```

3.14

Decimal

code123

Alphanumeric

!@#$

Other character

2. **Write a program in LEX to print all the factors of a number:** The number is taken as input from the user.

```
%{
#include <stdio.h>
int num;
%}

%%
[0-9]+ { num = atoi(yytext); }
. {;}
%%

int main() {
   yylex();
   if (num > 0) {
      printf("Factors of %d are: ", num);
      for (int i = 1; i <= num; i++) {
         if (num % i == 0) {
            printf("%d ", i);
```

```
        }
      }
      printf("\n");
   } else {
      printf("Invalid input. Please enter a positive integer.\n");
   }
   return 0;
}

int yywrap() {
   return 1;
}
```

Output:

12

Factors of 12 are: 1 2 3 4 6 12

7

Factors of 7 are: 1 7

-5

Invalid input. Please enter a positive integer.

3. **Write a program in LEX to check if the input number is a perfect number:** A perfect number is a positive integer that is equal to the sum of its proper positive divisors (excluding the number itself).

```
%{
#include <stdio.h>
int num;
%}

%%
[0-9]+ { num = atoi(yytext); }
```

```
. {;}
%%

int main() {
    yylex();
    if (num > 0) {
        int sum = 0;
        for (int i = 1; i < num; i++) {
            if (num % i == 0) {
                sum += i;
            }
        }
        if (sum == num) {
            printf("%d is a perfect number.\n", num);
        } else {
            printf("%d is not a perfect number.\n", num);
        }
    } else {
        printf("Invalid input. Please enter a positive integer.\n");
    }
    return 0;
}

int yywrap() {
    return 1;
}
```

Output:

6

6 is a perfect number.

28

28 is a perfect number.

10

10 is not a perfect number.

-1

Invalid input. Please enter a positive integer.