IT250 – AUTOMATA & COMPILER DESIGN

ASSIGNMENT 2

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1)

Code Written:

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

%%

[0-1]+[ \n\t]  {
    printf("binary ");}

[0-7]+[ \n\t ] {printf("octal ");}

[0-9]+[ \n\t] {printf("decimal ");}

[0-9a-f]+[ \n\t] {printf("hexadecimal ");}

[^0-9a-f \n\t' ']+[ \n\t] {printf("invalid ");}



. {}
```

```
%%

int yywrap(void){
    return 1;
}

int main(){

    scanf("%d", &n);
    for (int i = 0; i < n; i++) {
        char input[100];
        scanf(" %[^\n ]", input);
        strcat(input, " ");
        yy_scan_string(input);
        yylex();
        yy_delete_buffer(YY_CURRENT_BUFFER);
    }

    printf("\n");

    return 0;

}
```

Code Logic:

Since the question a little ambiguous, as a single number can have multiple representations, for example, “10” can be binary, octal, decimal, or hexadecimal. Hence, the logic implemented for the classification is as follows:

Number combinations of 0-1 -> **Binary**
Number combinations of 0-7 -> **Octal**
Number combinations of 0-9 -> **Decimal**
Number combinations of 0-9 and a-f -> **Hexadecimal**

Outputs:

```
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$ lex exercise5.l
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$ cc lex.yy.c -ll
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$ ./a.out
5
1011 sachin 938239 377321 abcdef219
binary invalid decimal octal hexadecimal
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$
```

```
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$ lex exercise5.l
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$ cc lex.yy.c -ll
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$ ./a.out
3
1010011 9821 f34a
binary decimal hexadecimal
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$
```

2)

Code Written:

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

%%

[0-9]+[.][0-9]+ {printf("positive real");}

[-][0-9]+[.][0-9]+ {printf("negative real");}

[0-9]+ {printf("positive integer");}

[+][0-9]+ {printf("positive integer");}

[-][0-9]+ {printf("negative integer");}

[-][0-9]+[.][0-9]+[e][-][0-9]+ {printf("negative real in negative exponential
form");}

[0-9]+[.][0-9]+[e][-][0-9]+ {printf("positive real in negative exponential
form");}

[0-9]+[.][0-9]+[e][+][0-9]+ {printf("positive real in positive exponential
form");}

[-][0-9]+[.][0-9]+[e][+][0-9]+ {printf("negative real in positive exponential
form");}

[0-9]+[.][0-9]+[e][0-9]+ {printf("positive real in positive exponential form");}

[-][0-9]+[.][0-9]+[e][0-9]+ {printf("negative real in positive exponential
form");}

[-][0-9]+[e][-][0-9]+ {printf("negative integer in negative exponential form");}
```

```
[0-9]+[e][-][0-9]+ {printf("positive integer in negative exponential form");}

[0-9]+[e][+][0-9]+ {printf("positive integer in positive exponential form");}

[-][0-9]+[e][+][0-9]+ {printf("negative integer in positive exponential form");}

[0-9]+[e][0-9]+ {printf("positive integer in positive exponential form");}

[-][0-9]+[e][0-9]+ {printf("negative integer in positive exponential form");}

.* {printf("neither integer nor real");}

%%

int yywrap(void){
    return 1;
}

int main(){

    yylex();
      return 0;
}
```

Outputs:

```
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$ lex exercise3.l
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$ cc lex.yy.c -ll
sachinprasanna@LAPTOP-740CVK81:/mnt/c/Users/91900/Desktop/Computer/Semester 4/IT250 - Automata and Compiler Design/Labs/Assignment 2$ ./a.out
positive integer
0.10
positive real
12.2e-3
positive real in negative exponential form
0.2.3
neither integer nor real
43.2
positive real
-43.2
negative real
-932
negative integer
-32e3
negative integer in positive exponential form
434e3
positive integer in positive exponential form
-32e+4
negative integer in positive exponential form
32e-4
positive integer in negative exponential form
-323.43e+2
negative real in positive exponential form
32.4e2
positive real in positive exponential form
```

****