

Assignment on Yacc - 6

Q.1) A student needs to check whether the given number is palindrome or not? He had the problem of reversing the number. Write a YACC program that can solve his problem.

LEX File

```
%{
    #include <stdio.h>
    #include <stdlib.h>
    #include "y.tab.h"
}%
/* %option noyywrap */
%%

[a-zA-Z0-9]+    {yylval.f = yytext; return STR;}

[-+()**/]      {return yytext[0];}
[ \t]          {;}
[\n]           {return 0;}

%%

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

```
}
```

YACC File :

```
%{
```

```
    #include <stdio.h>
    #include <string.h>
    #include <stdlib.h>
    extern int yylex();

    void yyerror(char *msg);
```

```
    int flag;
    int i;
    int k = 0;
```

```
%}
```

```
%union {
    char* f;
}
```

```
%token <f> STR
```

```
%type <f> E
```

```
/* Rule Section */
```

```
%%
```

```
S : E    {
```

```
    flag = 0;
```

```
    k = strlen($1) - 1;
```



```
Enter a Number :  
141  
Palindrome  
F:\Compiler Design\Lab\LakhanKumawat>"f:\Compiler Design\Lab\LakhanKumawat\1\1906055_Ques1.exe"  
  
Enter a Number :  
5477  
Not Palindrome  
  
F:\Compiler Design\Lab\LakhanKumawat>
```

2. A grammar is given: $a^n b^n c^m d^m$, where $n, m \geq 0$. Check the validity of the following strings "abcd" and "aabbcd" using the given grammar with the help of a YACC program.

LEX File :

```
%{  
#include "y.tab.h"  
%}  
%%  
a |  
A {return A;}  
c |  
C {return C;}  
b |  
B {return B;}  
d |  
D {return D;}  
[ \t] {;}  
"\n" {return NEWLINE;}  
. {return yytext[0];}  
%%  
int yywrap()  
{
```

```
    return 1;
}
```

YACC File :

```
%{
#include<stdio.h>
#include<stdlib.h>
int yyerror(char*);
int yylex();
}%
%token A B C D NEWLINE
%%
stmt: S NEWLINE { printf("Valid \n");
return 1;
}
;
S: X Y
;

X: A X B
|
;
Y: C Y D
|
;
%%
extern FILE *yyin;
void main()
{
    printf("Enter A String\n");
    do
    {
        yyparse();
    }while(!feof(yyin));
}
```

```
int yyerror(char* str)
{
printf("Invalid \n");
return 1;
}
```

```
F:\Compiler Design\Lab\LakhanKumawat>"f:\Compiler Design\Lab\LakhanKumawat\2\1906055_Ques2.exe"
Enter A String
aabbccdd
Valid
abccdd
Valid
aaacbd
Invalid
-----
```

3.A C program file is given to a student and he was asked to recognize valid identifiers, operators and keywords in the given program. Write a YACC program that can solve his task.

LEX file:

```
%{
#include <stdio.h>
#include "y.tab.h"
extern yylval;
%}

%%

[ \t];
[+|-|*|/|=|<|>] {printf("Operator : %s\n",yytext);return OP;}
[0-9]+ {yylval = atoi(yytext); printf("Numbers : %d\n",yylval); return DIGIT;}
```

```
int|char|bool|float|void|for|do|while|if|else|return|void {printf("Keyword : %s\n",yytext);return KEY;}
[a-zA-Z0-9]+ {printf("Identifier : %s\n",yytext);return ID;}
. ;
%%

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

YACC file :

```
%{
#include <stdio.h>
#include <stdlib.h>
int id=0, dig=0, key=0, op=0;
%}
%token DIGIT ID KEY OP

%%

input:
DIGIT input { dig++; }
| ID input { id++; }
| KEY input { key++; }
| OP input { op++;}
| DIGIT { dig++; }
| ID { id++; }
| KEY { key++; }
| OP { op++;}
;
%%

#include <stdio.h>
extern int yylex();
```



```
extern int yyparse();
extern FILE *yyin;
main()
{
    FILE *myfile = fopen("input.c", "r");
    if (!myfile)
    {
        printf("I can't open input.c!");
        return -1;
    }
    yyin = myfile;
    do{
        yyparse();
    }while (!feof(yyin));
    printf("numbers = %d\nKeywords = %d\nIdentifiers = %d\noperators = %d\n",dig, key,id, op);
}

int yyerror(char *s) {
    printf("Error ");
    exit(-1);
}
```

y.tab > |

```
1 PS F:\Compiler Design\Lab\LakhanKumawat\3> .\1906055_Ques3.exe
2 Identifier : include
3 Operator : <
4 Identifier : stdio
5 Identifier : h
6 Operator : >
7
8 Keyword : void
9 Identifier : main
10
11 Identifier : printf
12 Identifier : hello
13
14
15 numbers = 0
16 Keywords = 1
17 Identifiers = 6
18 operators = 2
```

4. Let's say we have a thermostat that we want to control using a simple language. A session with the thermostat may look like this:

```
heat on
  Heater on!
heat off
  Heater off!
target temperature 22
  New temperature set!
```

Write a YACC program that can control the thermostat.

Lex file

```
%{
#include <stdio.h>
#include "y.tab.h"
}%
%%
[0-9]+          yylval=atoi(yytext); return NUMBER;
heat           return TOKHEAT;
on|off         yylval=!strcmp(yytext,"on"); return STATE;
target         return TOKTARGET;
temperature    return TOKTEMPERATURE;
\n             /* ignore end of line */;
[ \t]+         /* ignore whitespace */;
%%
```

YACC File :

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

```
void yyerror(const char *str)
{
    fprintf(stderr,"error: %s\n",str);
}

int yywrap()
{
    return 1;
}

main()
{
    yyparse();
}

%}

%token NUMBER TOKHEAT STATE TOKTARGET TOKTEMPERATURE
%%

commands: /* empty */
        | commands command
        ;

command:
        heat_switch
        |
        target_set
        ;

heat_switch:
        TOKHEAT STATE
        {
            if($2)
                printf("\tHeat on \n\tHeat turned on\n"
);
            else
```

```
printf("\tHeat on \n\tHeat turned off\n");
    }
;

target_set:
    TOKTARGET TOKTEMPERATURE NUMBER
    {
        printf("\t New Temperature Set ");
    }
;
```

```
F:\Compiler Design\Lab\LakhanKumawat>"f:\Compiler Design\Lab\LakhanKumawat\4\1906055_Ques4.exe"
heat off
    Heat on
    Heat turned off
heat on
    Heat on
    Heat turned on
target temperature 30
    New Temperature Set
```

End Of Assignment