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Ex3: YACC Quick Sort in Java

Lex.l

```
%{
#include <stdio.h>
#include <ctype.h>
#include "y.tab.h"
extern int yylval;
int yylex();
%}
identifier ([a-zA-Z][0-9])+|[a-zA-Z]+
%%
^import\ java\.[^;]* return IMPORT;
class return CLASS;
public return PUBLIC;
static return STATIC;
int return INT;
void return VOID;
String return STRING;
if return IF;
else return ELSE;
for return FOR;
return {return RETURN;}
length return LENGTH;
System\.out\.print(ln)?\(.*\) return PRINT;
[0-9]+ return NUMBER;
{identifier} return ID;
[\n\t\ ]+ ;
. return yytext[0];
%%
```

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Yacc.y

```
%{

#include<stdio.h>

int yylex(void);

int yyerror();

#include <fcntl.h>

#include <unistd.h>

#include "y.tab.h"

int flag=0;

extern FILE *yyin;

int error = 0;

%}

%token IMPORT CLASS ID PUBLIC STATIC

%token INT STRING VOID NUMBER

%token IF ELSE FOR RETURN LENGTH PRINT

%left '+' '-'

%left '*' '/' '%'

%left '(' ')'

%%

START: S{return 0;}

;

S: IMPORTS MCL

;

IMPORTS: IMPORTS IMPORT';'

| IMPORT';'

;

MCL: MCL CL

| CL

;
```

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CL: CLASS ID BLOCK

;

BLOCK: '{' LINES '}'

| LINE

;

LINES: LINES LINE

| LINE

;

LINE: FN | ST

;

FN: T ID '(' PARAS ')' BLOCK

| FAS FN

| QL FN

;

PARAS: PARAS ',' PARA

| PARA

;

PARA: T ID

| T '['']' ID

| ;

FAS: PUBLIC ;

QL: STATIC ;

ST: DL';'

| AS';'

| FORS

| IFS

| RT';'

| PRINT';'

;

DL: T V

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| T '[' ']' V

;

V: V ',' AS

| AS

;

AS: AS '=' EXP

| EXP

;

EXP: E A EXP

| E R EXP

| E

| E INC

| '(' EXP ')'

| FNC

| E '.' ATT

| ARR

;

FORS: FOR '(' FD ';' FC ';' FU ')' BLOCK

;

FD: DL

| ;

FC: EXP

| ;

FU: ID INC

| ;

IFS: IF '(' EXP ')' BLOCK

;

FNC: ID '(' FP ')'

;

FP: EXP

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| FP ',' EXP

;

RT: RETURN EXP;

E: ID

| NUMBER

| ID '[' E ']'

;

ARR: '{' NUMS '}';

NUMS: NUMS ',' NUMBER

| NUMBER;

ATT: LENGTH;

INC: '+''+' | '-''-'

;

A: '+' | '-' | '*' | '/' | '%'

;

R: '<''=' | '<' | '>''=' | '>' | '!''='

;

T: INT

| VOID

| STRING

;

%%

int yyerror()

{

fprintf(stderr, "Syntax is NOT valid!\n");

error = 1;

return 0;

}

int yywrap(){

return 1;

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```c
}

int main(int args, char *argv[]){

yyin = fopen(argv[1], "rt");

if(!yyin)

{

printf("File not found!\n");

return 0;

}

yyparse();

if(!error){

printf("The input program has a valid syntax!\n");

}

return 0;

}
```

JAVA FILE

```java
import java.io.*;

class QuickSort {

static void swap(int[] arr, int i, int j)

{

int temp = arr[i];

arr[i] = arr[j];

arr[j] = temp;

}

static int partition(int[] arr, int low, int high)

{

int pivot = arr[high];

int i = (low - 1);
```

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```java
for (int j = low; j <= high - 1; j++) {

if (arr[j] < pivot) {

i++;

swap(arr, i, j);

}

}

swap(arr, i + 1, high);

return (i + 1);

}

static void quickSort(int[] arr, int low, int high)

{

if (low < high) {

int pi = partition(arr, low, high);

quickSort(arr, low, pi - 1);

quickSort(arr, pi + 1, high);

}

}

static void printArr(int[] arr, int size)

{

for (int i = 0; i < size; i++)

System.out.print(arr[i] + " ");

System.out.println();

}

public static void main(String[] args)

{

int[] arr = { 10, 7, 8, 9, 1, 5 };

int n = arr.length;

quickSort(arr, 0, n - 1);

System.out.println("Sorted array: ");

printArr(arr, n);
```

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}

}

OUTPUT

```
thejas@LAPTOP-DJ85DLV5:~$ ./a.out
the code has valid syntaxthejas@LAPTOP-DJ85DLV5:~$
```