Assignment 3
Parser Design

In the previous assignment, you developed a lexical analyzer for the language JAVA--. Your task now is to design a parser for it.

To do this, you first must define the grammar of the language JAVA--. Your grammar should contain all necessary attributes of a language, including conditions and loops, input and output, complex expressions, functions, etc.

Following is a sample program written in JAVA--.

```
int numPrint (int num, int length)
{
        int i, j, first, temp;
        char a;
        a <- 'x';
        jOut ("enter number");
        jin(i);
        jOut(i);
        i <- length;
        while (i > 0)
        {
                first<- 0;              /*this line contains a comment*/
                j <-1;
                while (j < i)
                {
                        jOut( j);
                        j <- j + 1;
                }
                /* this is a comment */
                i<- i - 1;
                /*This is a
                Multiline
                Comment*/
        }
        jOut( "temp is ");
        jIn( temp);
        return i;
}
```

The language contains the following elements:
data types: int char
Keywords: if else while return jIn jOut
arithmetic operators: + - * /
relational operators: < <= > >= == !=
comments: /* enclose comment in */
identifier: a letter followed by any number of letters or digits
numeric constants: only integers
literal constants: a letter enclosed in single quotes
strings: no need to store as variables, only used in print statements
parenthesis, braces, square brackets
assignment operator <-
semi colon
colon
comma

Requirements:

Your task in this assignment is to design a parser for the language JAVA--. There will be no implementation in this assignment. Type out your grammar. No photographs of hand-written text will be accepted. Starting on a new page, add to your previous document.pdf:

Complete grammar for the language JAVA--. Perform all steps required to make this grammar ready for implementation.

This will be a continuation of Phase 1. Do not submit a separate file, without the first part. Only pdf format will be accepted.

Submission Instructions:
Submit only one file, unzipped. Name it *documentation.pdf*
There will be zero tolerance for plagiarism. Your assignments will be checked far more thoroughly than you are anticipating. Once detected, no appeals for removal of plagiarism will be entertained.