1 a)

Language Specification:

Alphabet:

1. Upper (A-Z) and lower case letters (a-z) of the English alphabet
2. Decimal digits (0-9);
3. Underline character ‘\_’;

Lexic:

1. Special symbols: - operators + - \* / = < <= == > >= << >> # %

-separators [ ] { } : ; space

-reserved words: int, do, else, if, while, for, break, cout, cin, endl, include, iostream, using, namespace, std

b. Identifiers

-a sequence of letters, the rule is:

identifier ::= letter | letter{letter}

letter:: = “A”|”B”|…|”Z” |”a”|…|”z”

c.Constants

1.integer -rule:

integer ::= digit {digit}

digit ::= “0”|…|”9”

Syntax:

program ::= "include" "iostream" ";" "using namespace" "std" ";" "int" "main" "(" ")" "{" stmt\_list "}"

stmt\_list ::= stmt ";" | stmt ";" stmt\_list

stmt::== decl\_stmt | assign\_stmt | io\_stmt | if\_stmt | for\_stmt | expr\_stmt

decl\_stmt ::=“int” identifier| “int identifier”,”{identifier}

assign\_stmt::=identifier “=” expression

expression::= term | term “+” expression

term::= factor | factor “%” term

factor::= integer | identifier | “(“ expression “)”

io\_stmt::= “cin” “>>” identifier | “cout” “<<” identifier | “cout” “<<” “endl|| “cout” “<<” “ “

if\_stmt:== "if" "(" condition ")" "{" stmt\_list "}" ["else" "{" stmt\_list "}"]

for\_stmt:== “for” “(“ assign\_stmt “;” condition “;” assign\_stmt “)” "{" stmt\_list "}"

expr\_stmt::= expression

condition ::= expression rel\_op expression

rel\_op ::= “"<" | "<=" | "==" | ">" | ">="

b. include iostream;

using namespace std;

int main() {

int k,i,j;

int isPrime;

cout << "Enter a number: ";

cin >> k;

for ( i = 2; i < k; i = i + 1) {

isPrime = 1;

for ( j = 2; j < i; j = j + 1) {

if (i % j == 0) {

isPrime = 0;

break;

}

}

if (isPrime == 1) {

cout << i << " ";

}

}

cout << endl;

}

program ::= "include" "iostream" ";" "using namespace" "std" ";" "int" "main" "(" ")" "{" stmt\_list "}"

Dupa care mergem in stmt\_list si avem

Int k,I,j;

Int isPrime; care sunt a doua ramura de stmt\_list

Apoi avem 2 io\_stmt cout<< “enter a number: “; si cin>>k

Apoi for\_stmt care este format din assign\_stmt, condition si stmt\_list

For ( inti=2; i<k; i=i+1) = for “(“ assignt\_stmt “;” condition “;” assignt\_stmt ")”

Apoi avem in acoladele for-ului stmt\_list care de fapt este o lista de stmt: assign\_stmt (isPrime = 1; ) un for statement ca mai devreme si if\_stmt si arata asa “if” “(“ condition “)” “{stmt\_list “}”

Acel isPrime=0 si break este un stmt\_list care de fapt e un assignt statement si corespunde definitiei assign\_stmt de identifier = expression unde expresia e un termen, care este un factor care este un integer in cazul acesta si break fiind un keyword

Apoi urmeaza urmatorul stmt\_list care este un if\_stmt care corespunde din nou definitiei, un io\_stmt care din nou corespunde si ultimul cout<<endl care corespunde si acesta