Grammar:

P->prog DL SL end DL->D DL|#

D->TY VL; TY->int|float

VL->id VL' SL->S SL|#

IS->if BE then SL IS' WS->while BE do SL end

IOS->print PE|scan id PE->E|str

BE->AE BE' AE->NE AE'

 $NE->not NE | \{ BE \} | RE$ RE->E RE'

E->T E' T->F T'

F->(E)|id|ic|fc BE'->or AE BE'|#

AE'->and NE AE'|# E'->+ T E'|- T E'|#

T'->* F T'|/ F T'|# VL'->VL|#

IS'->end|else SL end RE'->= E|< E|> E

Parsing Table:

It can be found in the file 'Parsing_table.txt' in Grammar2 folder. It is saved as a file as it cannot be visualized easily on command prompt due to size.

Input 1:

prog

int i;

int count;

sum := 0;

count := 5;

scan count

print sum

if count = 3

then sum:=2;

else

if count<4

then sum:=2.3;

```
end
while count>2.3
do sum := sum - 1;
end
end
if count=3
then sum :=2;
end
end
```

Output 1:

```
Parsing:
Current Input
                     Current stack top
                                                     Next Action
prog
                                                     P-> prog DL SL end
prog
                     prog
                                                     Match
                                                     DL-> D DL
D-> TY VL ;
TY-> int
int
                     DL
int
int
                     ΤY
int
id
                                                     Match
                     int
                     VL
                                                     VL-> id VL'
                                                     Match
VL'->#
id
                     id
                     VL'
;
;
int
                                                     Match
                     ;
DL
                                                     DL-> D DL
int
                     D
                                                     D-> TY VL ;
                                                     TY-> int
int
                     TY
int
id
                     int
                                                     Match
                                                     VL-> id VL'
Match
VL'-> #
                     VL
id
                     id
;
id
id
id
                     VL'
                                                     Match
                     ;
DL
                                                     DL-> #
                                                     SL-> S SL
S-> ES
                     SL
id
id
                     ES
                                                     ES-> id := E ;
                     id
                                                     Match
:=
                                                     Match
ic
ic
                                                     E-> T E'
T-> F T'
                     Е
ic
                                                     F-> ic
ic
                                                     Match
;
;
id
                                                     T'-> #
                     Ē'
                                                     E'-> #
                     ;
SL
                                                     Match
                                                     SL-> S SL
id
id
                     S
                                                     S-> ES
                                                     ES-> id := E ;
id
                     id
                                                     Match
:=
ic
                                                     Match
ic
ic
                                                     F-> ic
ic
                                                     Match
```

```
Match
T'-> #
E'-> #
Match
SL-> S SL
S-> IOS
IOS-> scan id
Match
Match
SL-> S SL
S-> IOS
IOS-> print PE
Match
PE-> E
E-> T E'
T-> F T'
F-> id
Match
T'-> #
E'-> #
SL-> S SL
S-> IS
S-> IS
S-> IS
S-> IS
S-> IS
S-> IS
ic
                                                                                                                                                                                                                        Match
                                                                                       T:
E:
SL
SIOS
 scan
scan
1d
SL
                                                                                       S
                                                                                       print
PE
                                                                                       ETENTES
                                                                                       SIFE
                                                                                                                                                                                                                        3-2 ) if BE Match
BE-> AE BE.
AE-> NE AE.
NE-> RE RE.
E-> T T.
T-> F T.
T-> F J.
Match
T'-> #
RE'-> #
RE'-> = E
Match
T'-> #
RE'-> F
Match
T'-> #
RE'-> F
Match
T'-> H
RE'-> F
Match
T'-> H
RE'-> F
Match
                                                                                       AE
                                                                                       RET FITER
ic
ic
ic
ic
ic
then
then
                                                                                                                                                                                                                    F-> ic

Match

T'-> #

E'-> #

AE'-> #

AE'-> #

Match

SL-> S SL

S-> ES

S-> id := E;
 then
                                                                                     AE .
 then
then
then
id
id
id
id
                                                                                     then
SL
                                                                                     S
ES
                                                                                                                                                                                                                     Match
                                                                                     id
                                                                                                                                                                                                                    Match
E-> T E'
T-> F T'
F-> ic
Match
T'-> #
E'-> #
:=
1c
1c
ic
                                                                                     ic
T
                                                                                                                                                                                                                   T'-> #
E'-> #
Match
SL-> #
IS'-> else SL end
Match
SL-> S SL
S-> IS
IS-> if BE then SL IS'
Match
BE-> AE BE'
AE-> NE AE'
NE-> RE
RE-> E RE'
E-> T E'
T-> F T'
F-> id
Match
T'-> #
RE'-> < E
Match
E-> T E'
T-> F T'
F-> ic
Match
E-> T E'
T-> F T'
F-> ic
Match
E'-> #
AE'-> #
AE'-> #
AE'-> #
BE'-> #
BE'-> #
                                                                                     IS'
 else
else
if
if
id
id
id
id
id
id
id
id
id
                                                                                      SL
                                                                                     5
IS
                                                                                      14
                                                                                     BE
                                                                                     AE
                                                                                      NE
                                                                                      RE
                                                                                     id
T
                                                                                      RE'
ic
ic
ic
ic
then
then
                                                                                     ic
T
                                                                                     AE'
 then
 then
```

```
BE'
                                                                                                                                             BE'-> #
 then
                                                                                                                                             Match
SL-> S SL
S-> ES
 then
id
                                                          SL
 id
id
                                                                                                                                              ES-> id
                                                          ES
 id
                                                          id
                                                                                                                                              Match
 :=
fc
fc
fc
fc
                                                                                                                                              Match
                                                                                                                                              E-> T
T-> F
F-> fc
                                                         fc
T'
                                                                                                                                             Match
T'-> #
E'-> #
                                                                                                                                             Match
                                                                                                                                             SL-> #
IS'-> end
Match
 end
 end
                                                                                                                                            Match
SL-> S SL
S-> WS
WS-> while BE do SL end
Match
BE-> AE BE'
AE-> NE AE'
NE-> RE
RE-> E RE'
E-> T E'
T-> F T'
F-> id
Match
T'-> #
RE'-> > E
Match
 end
                                                          end
 while
                                                          SL
  while
 while
                                                         WS
  while
                                                         while
 id
id
id
id
id
id
                                                         ВΕ
                                                          ΑE
                                                          NE
                                                          RE
                                                         id
T'
E'
                                                          RE'
                                                                                                                                             RE'-> >
Match
E-> T E
T-> F T
F-> fc
Match
T'-> #
E'-> #
AE'-> #
BE'-> #
 fc
fc
fc
fc
                                                                                                                                                                  E'
                                                         fc
T'
 do
 do
 do
                                                         AE'
                                                         ВΕ
 do
                                                                                                                                             Match
 do
                                                         do
                                                                                                                                           Match
SL-> S S
S-> ES
ES-> id
Match
 do
                                                         do
 1d
id
id
                                                                                                                                                                   SL
                                                         5L
                                                        S
ES
                                                                                                                                           Match
Match
E-> T E'
T-> F T'
F-> id
Match
T'-> #
E'-> - T
Match
T-> F C
Match
T-> F T'
F-> ic
Match
T'-> #
F'-> #
E'-> #
Match
 10000
                                                        id
T.
                                                        TFITE
 ic
ic
1c
                                                                                                                                           E'-> #

Match

SL-> #

Match

SL-> #

Match

SL-> S SL

S-> IS

IS-> IF BE then SL IS'

Match

BE-> AE BE'

AE-> NE AE'

NE-> RE

EE-> T E'

T-> F T'

F-> Id

Match
                                                        .
SL
 end
end
                                                         end
                                                         SL
 end
end
if
if
if
id
id
id
id
id
id
id
                                                        end
SL
S
                                                        1 BEERE
                                                        F
1d
T
                                                                                                                                           F-> id

Match

T'-> #

E'-> #

RE'-> -

Match

E-> T E

T-> F C

Match
                                                         RE'
                                                                                                                                                                        Е
 10
10
10
```

```
ic
                  ic
                                            Match
                  Т'
then
                                             T'->#
                  Ė'
then
                                            E'-> #
then
                  AE'
                                            AE'-> #
                 BE'
                                            BE'-> #
then
then
                                            Match
                  then
                                            SL-> S SL
id
                  SL
id
                  S
                                            S-> ES
id
                  ES
                                            ES-> id := E ;
id
                  id
                                            Match
:=
                  :=
                                            Match
ic
                  Е
ic
                                             T-> F T'
ic
                                            F-> ic
                  F
                 ic
T'
ic
                                            Match
                 Ē'
                 ;
SL
                                            Match
                                            SL-> #
end
                  IS'
                                             IS'-> end
end
end
                  end
                                            Match
end
                 SL
                                            SL-> #
end
                  end
                                            Match
Accepted
```

Input 2:

```
Prog

if x = 5

then y = 2.3;

else

y := 2;

end

end
```

(Note = operator is used instead of := in line 3 i.e 8th input word.)

Output 2:

```
Parsing:
Current Input
                 Current stack top
                                            Next Action
prog
                                            P-> prog DL SL end
prog
                                            Match
                  prog
if
if
if
if
if
if
                                            DL-> #
                  DL
                  SL
                                            SL-> S SL
                  S
                                            S-> IS
                  IS
                                            IS-> if BE then SL IS'
                  if
                                            Match
                  ВΕ
                                            BE-> AE BE'
id
                  ΑE
                                            AE-> NE AE'
id
                 NE
                                            NE-> RE
id
                 RE
                                            RE-> E RE'
id
                  Е
                                            E-> T E'
id
                                            T-> F T'
                                            F-> id
id
id
                  id
                                            Match
                  Т'
                                            T'-> #
                  Ε'
                                            E'-> #
                 RE'
                                            RE' -> = E
                                            Match
ic
                 Е
                                            E-> T E'
ic
                                            T-> F T'
ic
                                            F-> ic
ic
                  ic
                                            Match
then
                 Т'
                 Ε'
then
                                            E'-> #
                 AE'
                                            AE'-> #
then
                 BE'
then
                                            BE'-> #
then
                 then
                                            Match
id
                 SL
                                            SL-> S SL
id
                                            S-> ES
                 S
id
                 ES
                                            ES-> id := E ;
id
                  id
                                            Match
Not Accepted
Some syntax error has occured near word number 8
```

Input 3:

```
Prog

if x = 5

then y := 2.3 :

else

y := 2 ;

end

end
```

(Note undefined symbol: is used instead of; in line 3 i.e 10th input word.)

Output 3:

```
Parsing:
Current Input
                 Current stack top
                                            Next Action
prog
                                            P-> prog DL SL end
                                            Match
prog
                 prog
if
if
if
if
if
if
                 DL
                                            DL-> #
                 SL
                                            SL-> S SL
                 S
                                            S-> IS
                                            IS-> if BE then SL IS'
                 IS
                 if
                                            Match
                 BE
                                            BE-> AE BE'
id
                 ΑE
                                            AE-> NE AE'
id
                 NE
                                            NE-> RE
id
                 RE
                                            RE-> E RE'
id
                 Е
                                            E-> T E'
id
                                            T-> F T'
id
                 F
                                            F-> id
id
                 id
                                            Match
                                            T'-> #
                                            E'-> #
                                            RE' \rightarrow = E
                 RE'
                                            Match
ic
                 Е
                                            E-> T E'
ic
                                            T-> F T'
ic
                 F
                                            F-> ic
ic
                 ic
                                            Match
                 т'
then
                                            T'-> #
                 Ē'
                                            E'-> #
then
                                            AE'-> #
then
                 AE'
                 BE'
then
                                            BE'-> #
then
                 then
                                            Match
id
                                            SL-> S SL
                 SL
id
                 S
                                            S-> ES
id
                 ES
                                            ES-> id := E ;
id
                 id
                                            Match
:=
                                            Match
fc
                 Е
                                            E-> T E'
fc
                                            T-> F T'
fc
                                            F-> fc
fc
                 fc
                                            Match
Not Accepted
Encountered lexical error
```