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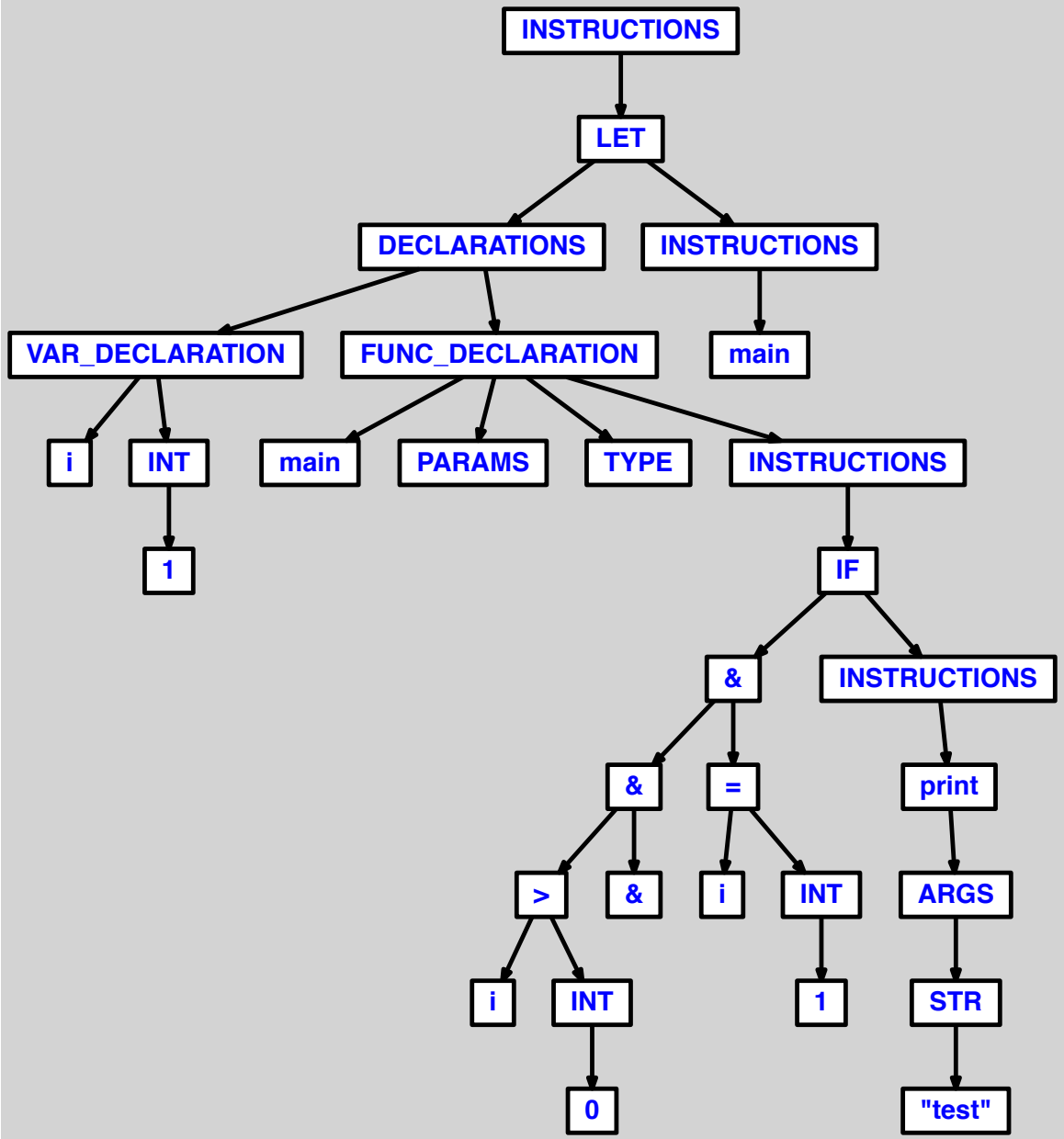
1 and

1.1 KO

1.1.1 <&> mal ecrit

```
let
  var i := 1

  function main() =
    if i > 0 && i = 1 then print("test")
in main() end
```

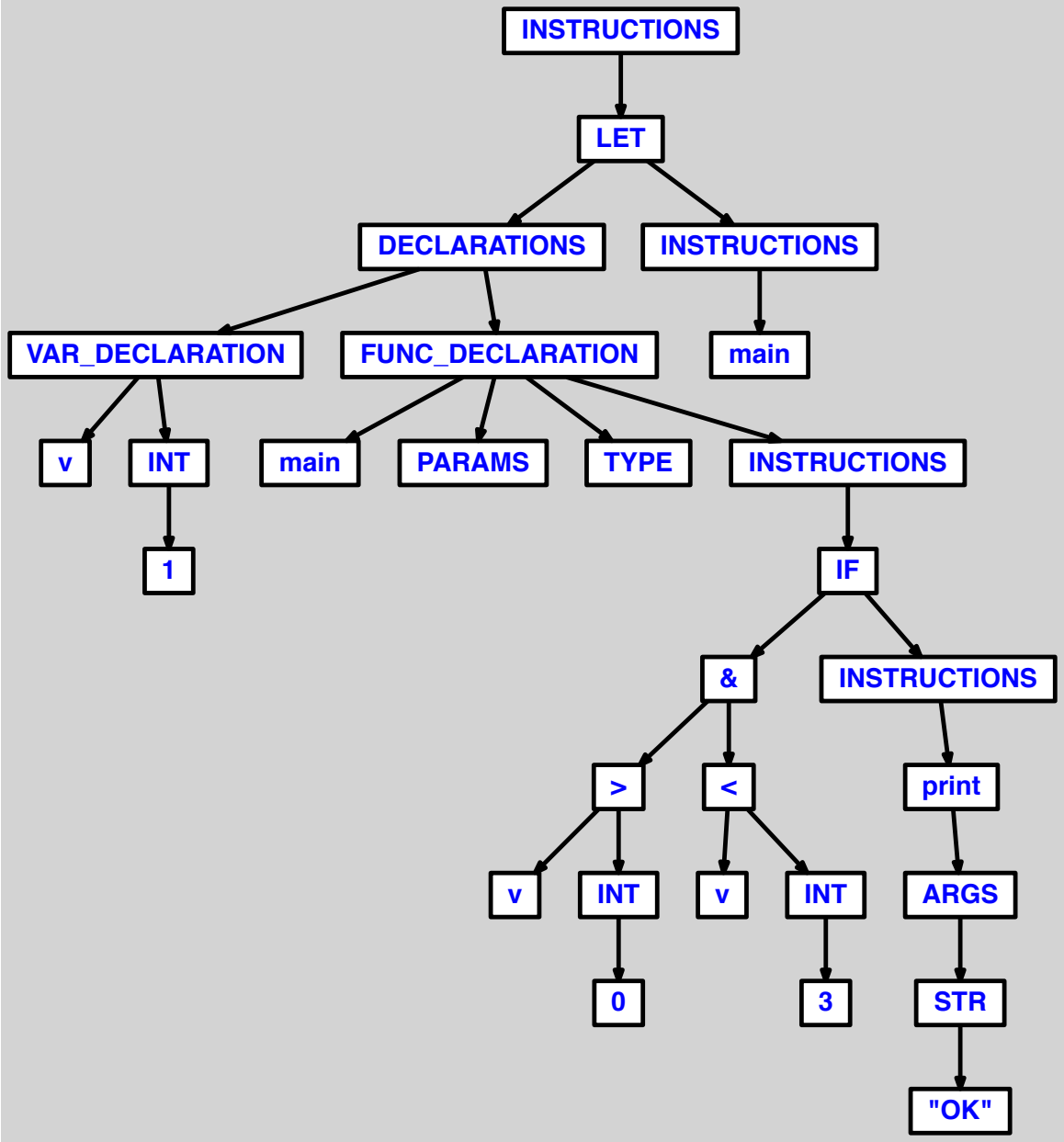

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
IF
&
INSTRUCTIONS
&
=
print
>
&
i
INT
ARGS
i
INT
1
STR
0
"test"

1.2 OK

1.2.1 condition avec 1 <&>

```
let
  var v := 1

  function main() =
    if v > 0 & v < 3 then print("OK")
in main() end
```


INSTRUCTIONS
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main
v
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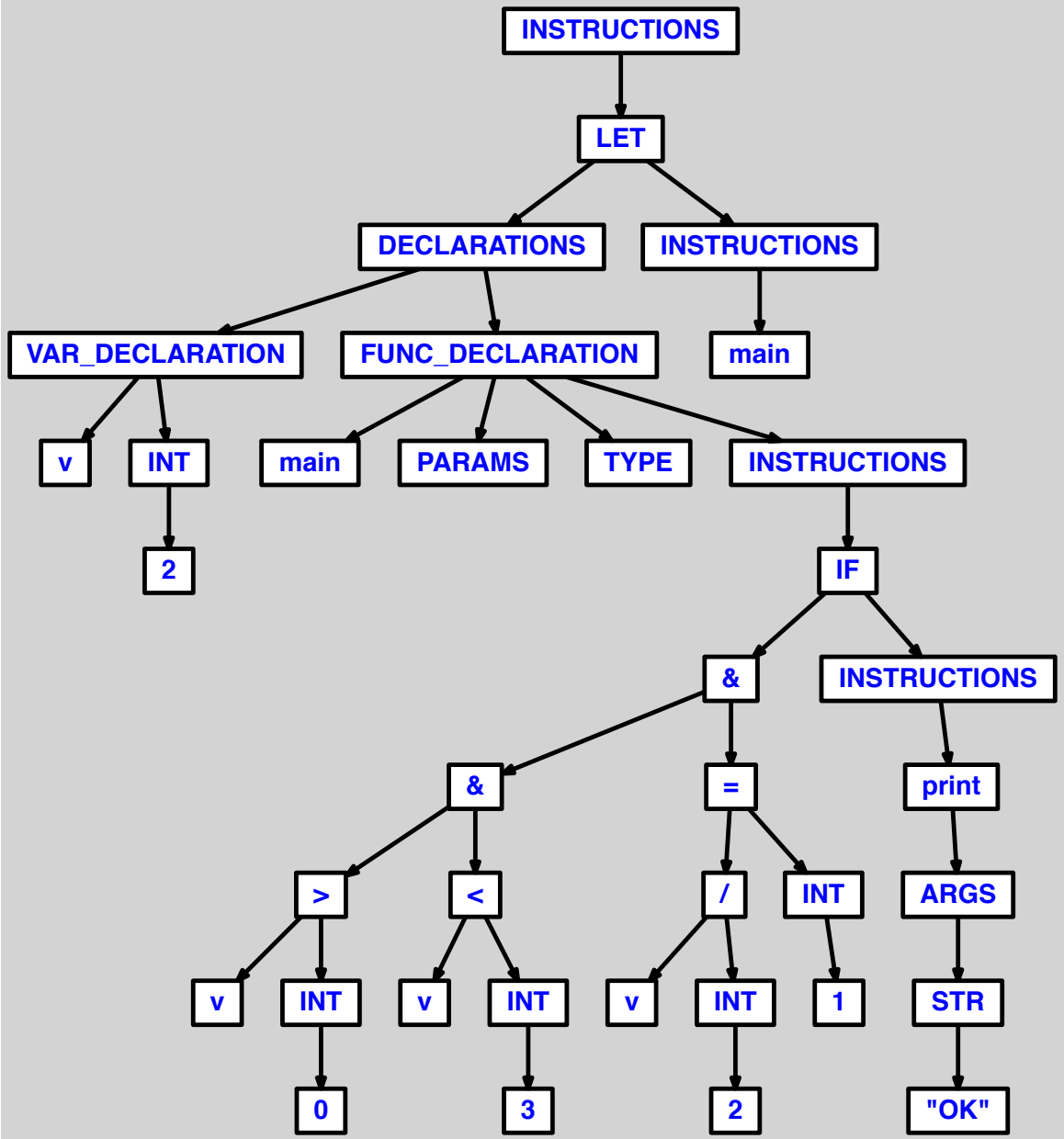
main
PARAMS
TYPE
INSTRUCTIONS
1
IF
&
INSTRUCTIONS
>
<
print
v
INT
v
INT
ARGS
0
3
STR
"OK"

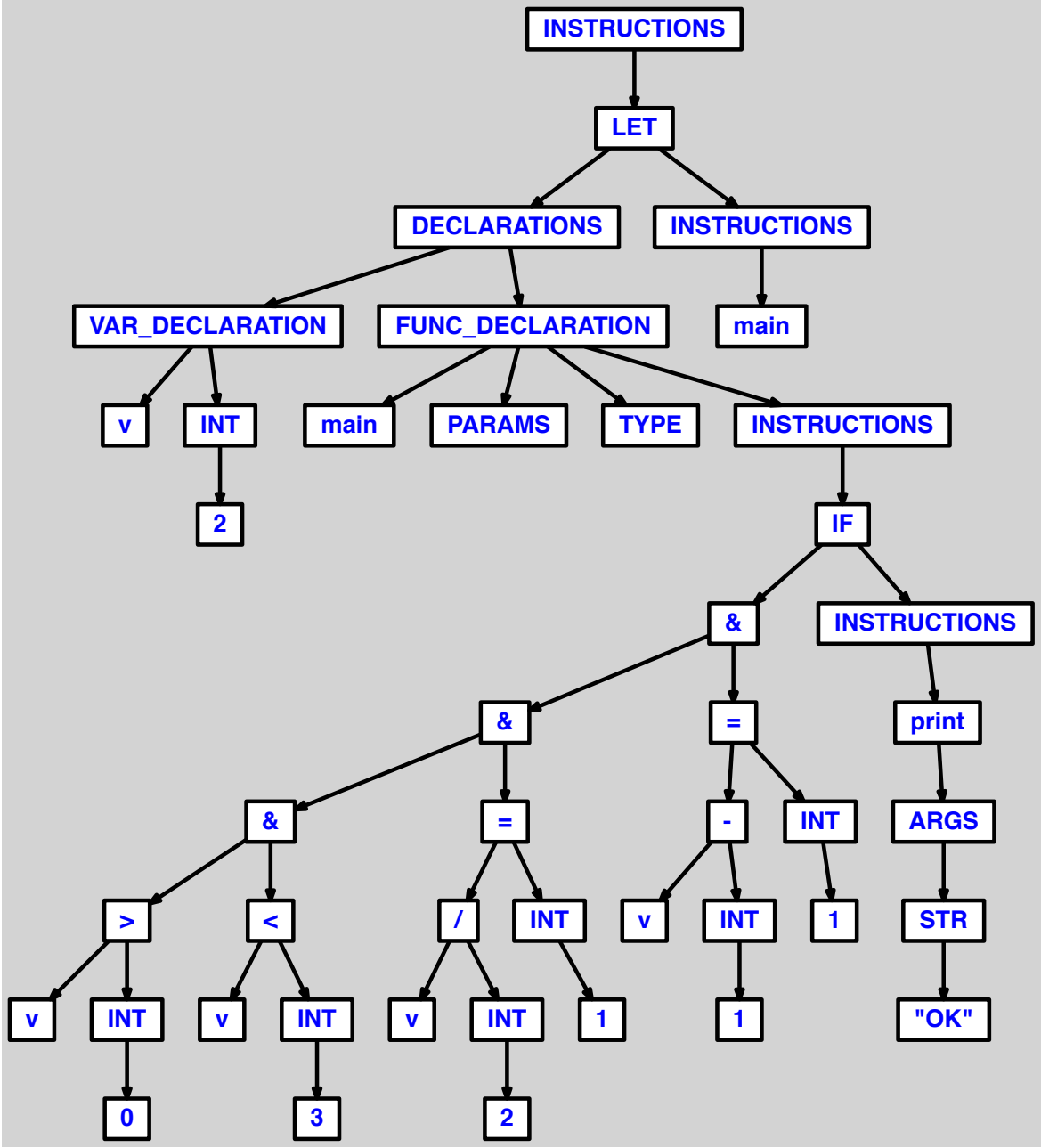
1.2.2 condition avec 2 <&>

```
let
  var v := 2

  function main() =
    if v > 0 & v < 3 & v/2 = 1 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
v
INT
main
PARAMS
TYPE
INSTRUCTIONS
2
IF
&
INSTRUCTIONS
&
=
print
>
<
/
INT
ARGS
v
INT
v
INT
v
INT
1
STR
0
3
2
"OK"

1.2.3 condition avec 3 <&>

```
let
  var v := 2

  function main() =
    if v > 0 & v < 3 & v/2 = 1 & v-1 = 1 then print("OK")
in main() end
```


INSTRUCTIONS
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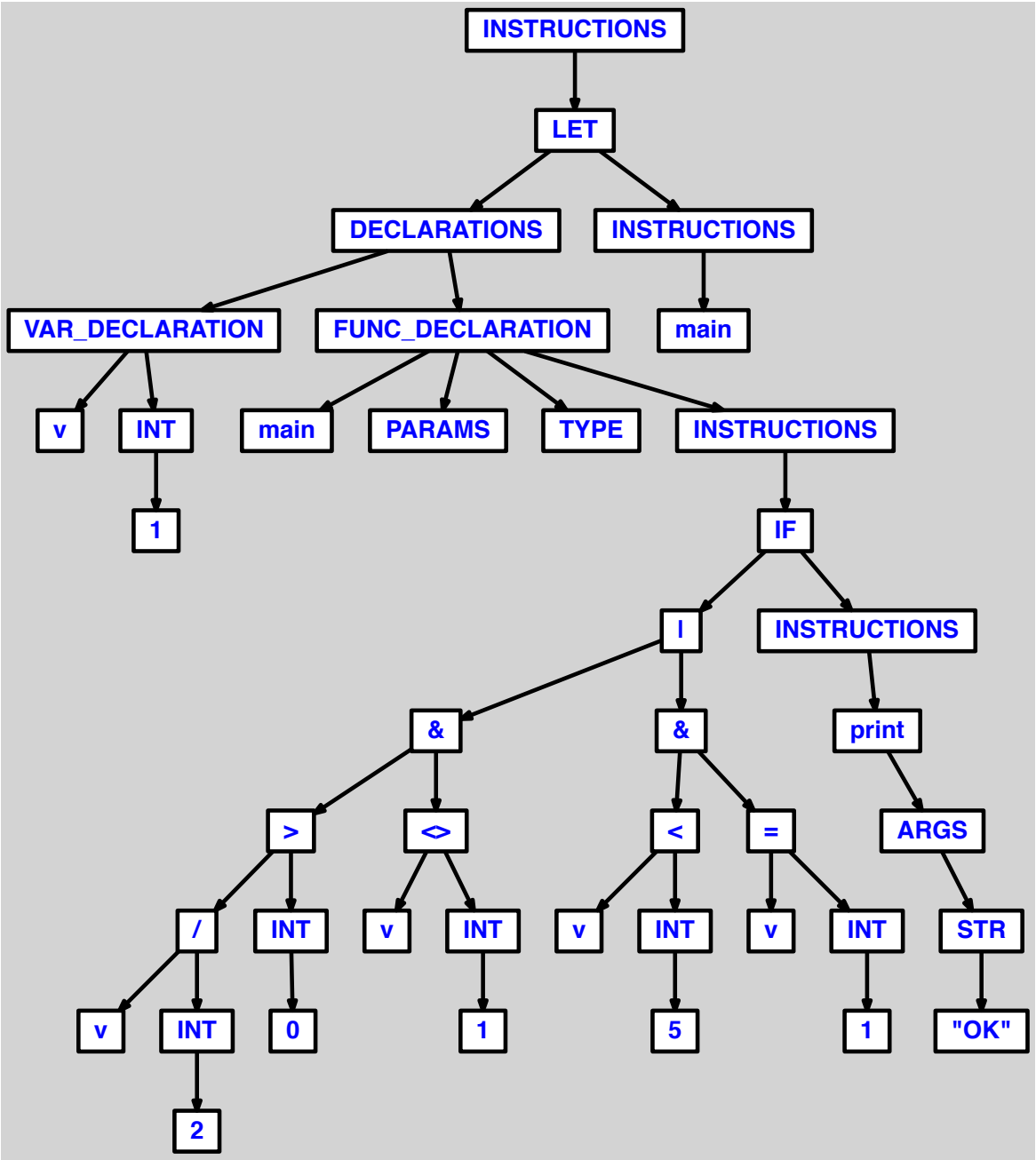
VAR_DECLARATION
FUNC_DECLARATION
main
v
INT
main
PARAMS
TYPE
INSTRUCTIONS
2
IF
&
INSTRUCTIONS
&
=
print
&
=
-
INT
ARGS
>
<
/
INT
v
INT
1
STR
v
INT
v
INT
v
INT
1
1
"OK"
0
3
2

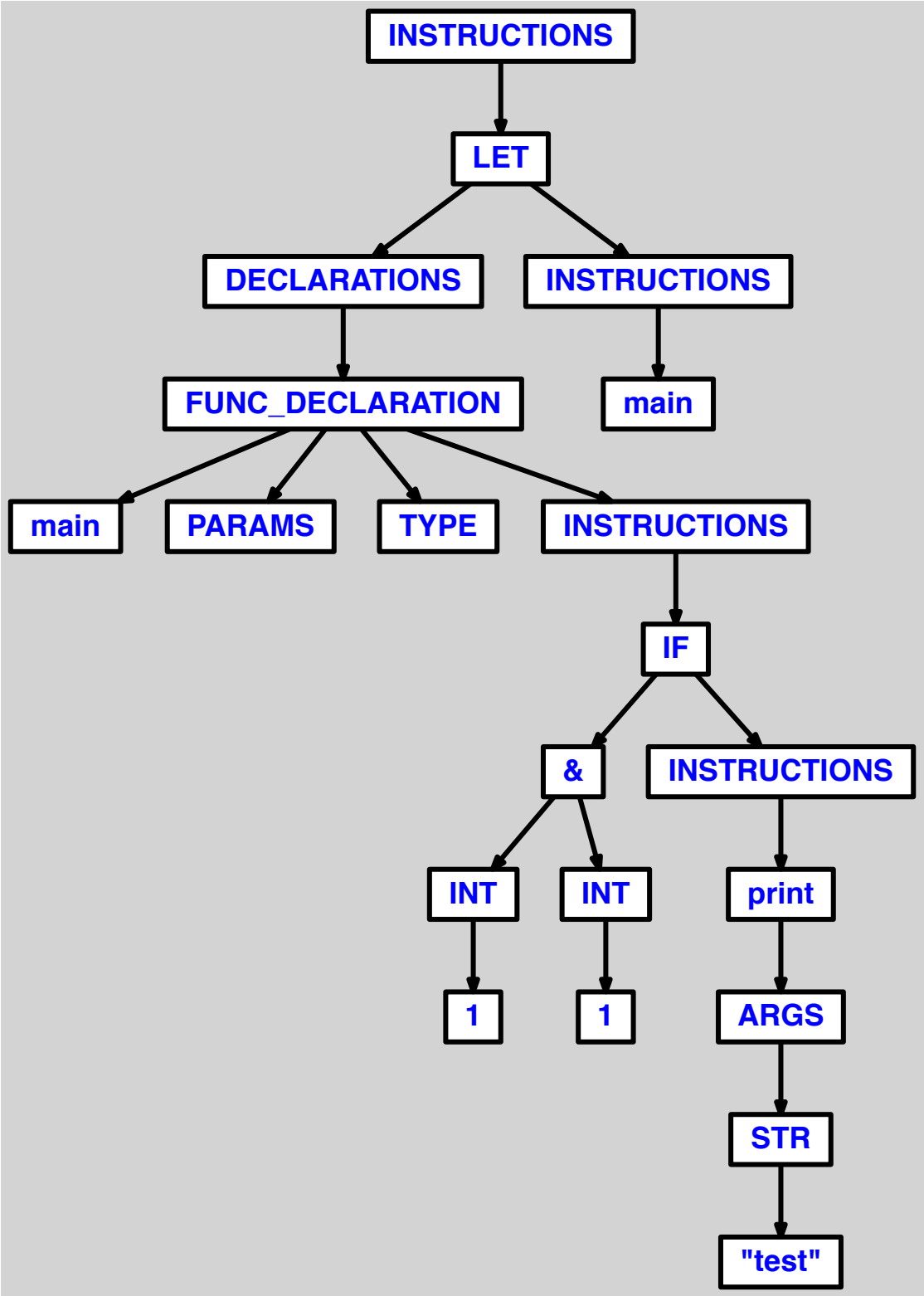
1.2.4 condition avec 2 <&> et 1 <|>

```
let
  var v := 1

  function main() =
    if v/2 > 0 & v <> 1 | v < 5 & v = 1 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
v
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
IF
|
INSTRUCTIONS
&
&
print
>
<>
<
=
ARGS
/
INT
v
INT
v
INT
v
INT
STR
v
INT
0
1
5
1
"OK"
2

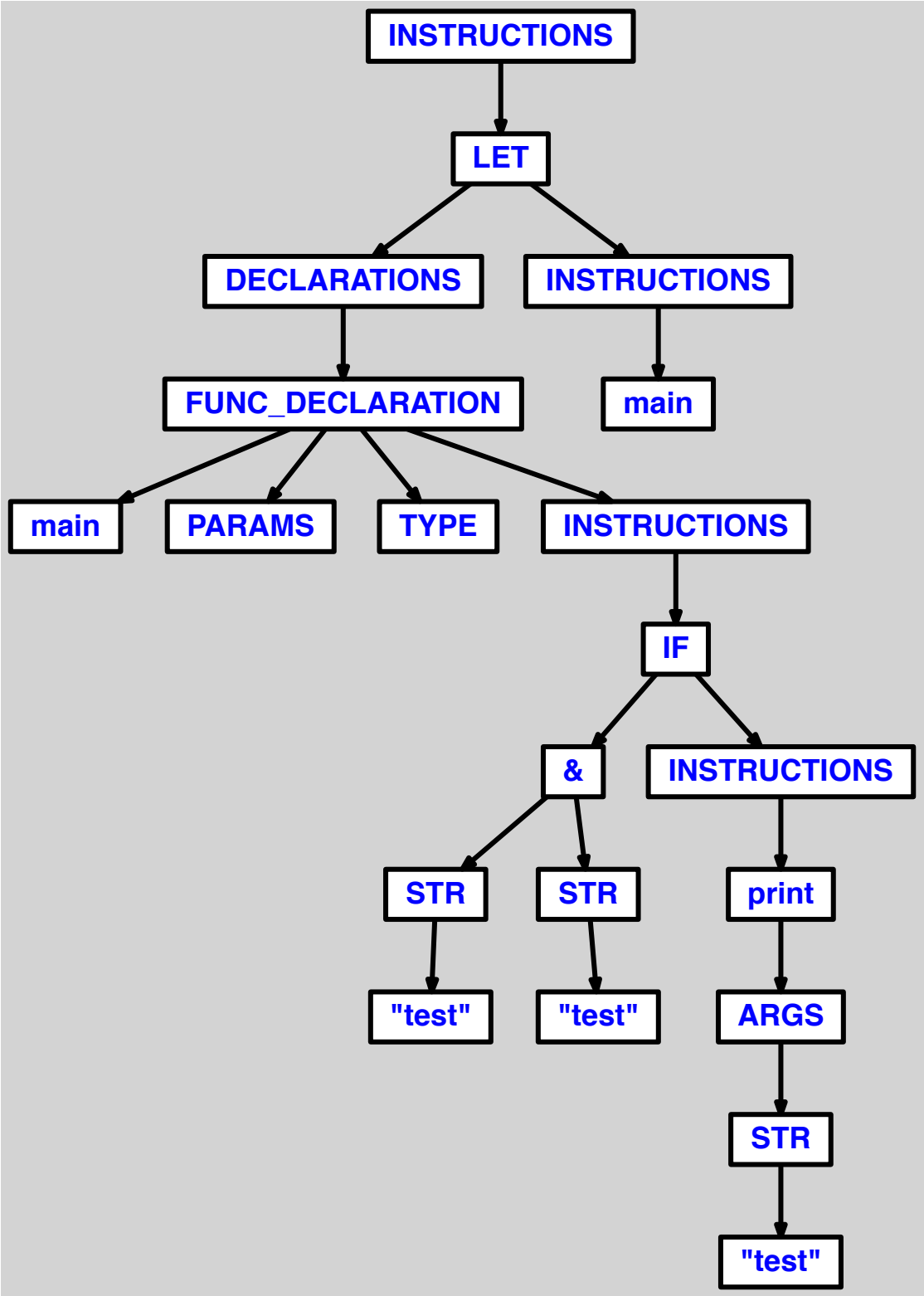
1.2.5 <&> avec des entiers

```
let
  function main() =
    if 1 & 1 then print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
&
INSTRUCTIONS
INT
INT
print
1
1
ARGS
STR
"test"

1.2.6 <&> avec des chaines

```
let
  function main() =
    if "test" & "test" then print("test")
in main() end
```

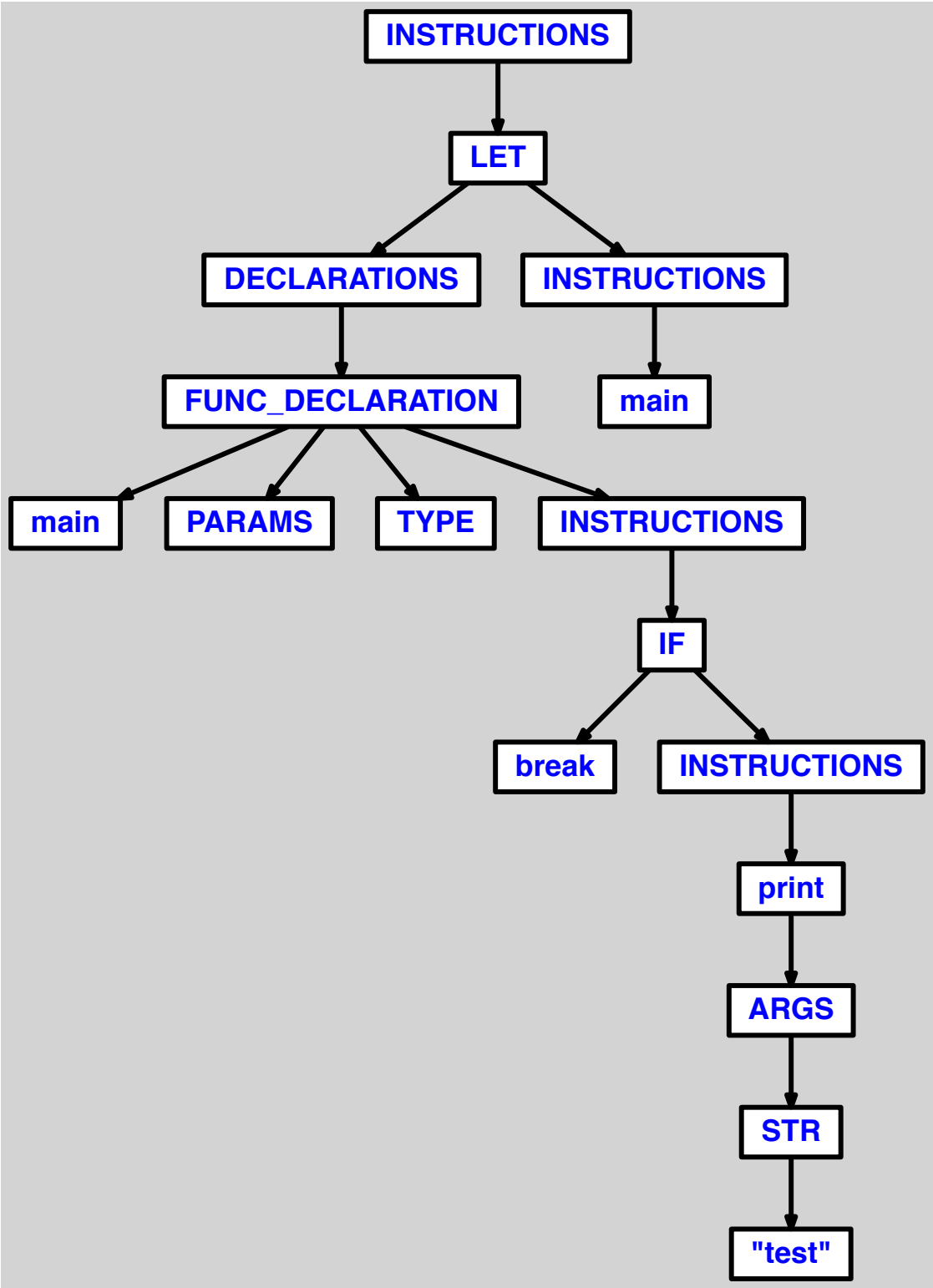

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
&
INSTRUCTIONS
STR
STR
print
"test"
"test"
ARGS
STR
"test"

2 break

2.1 KO

2.1.1 <break> comme condition dans <if>

```
let
  function main() =
    if break then
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
break
INSTRUCTIONS
print
ARGS
STR
"test"

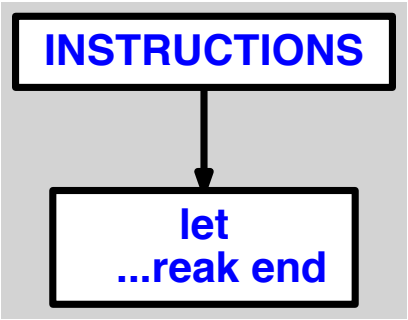
2.1.2 <break> comme condition dans <while>

```
let
  function main() =
    while break then
      print("test")
in main() end
```

Pas d'AST, problème de syntaxe.

2.1.3 appel de <break>, avec corps de programme contenant <break>

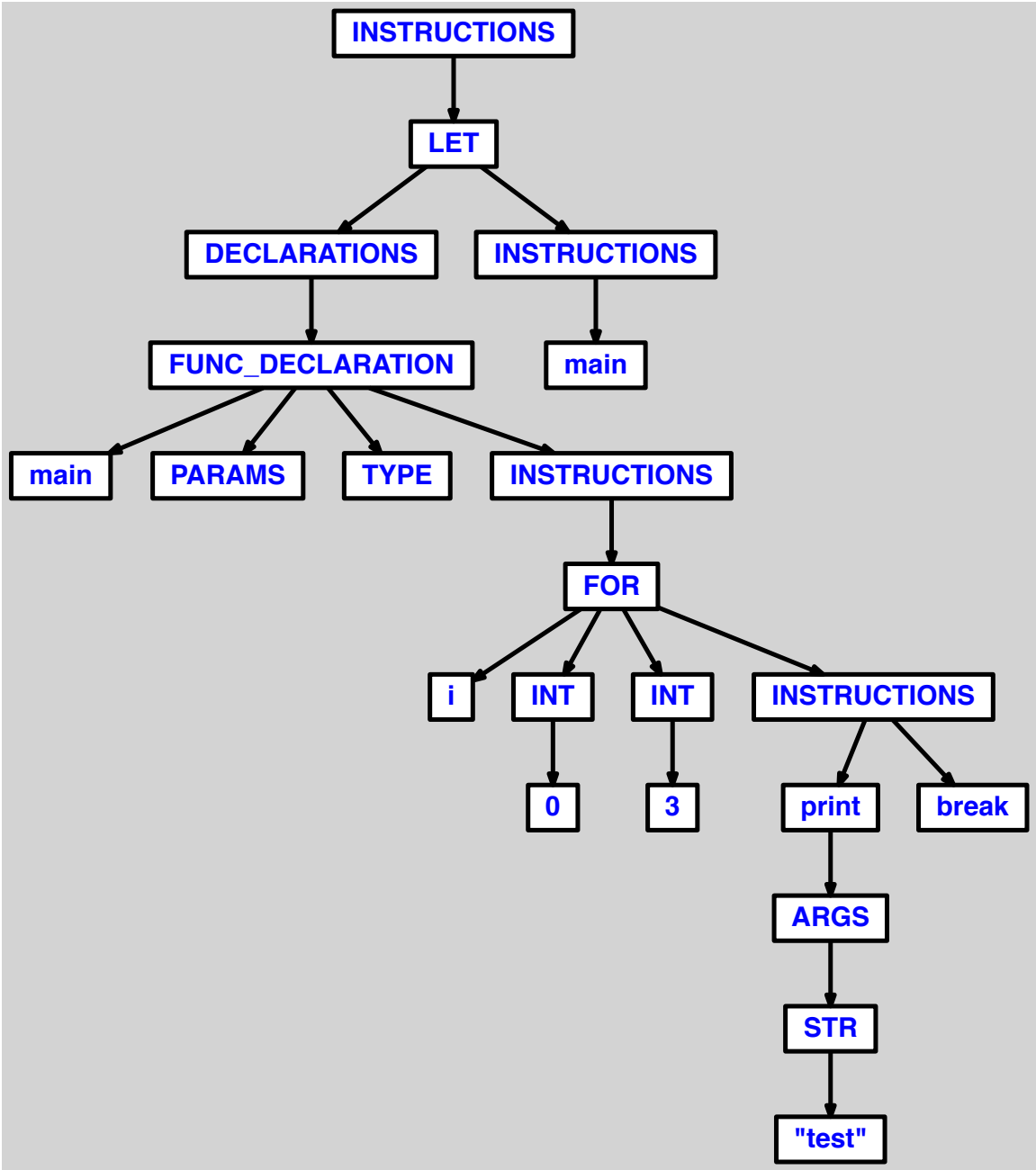
```
let
  break
in break end
```


INSTRUCTIONS
let
...reak end

2.2 OK

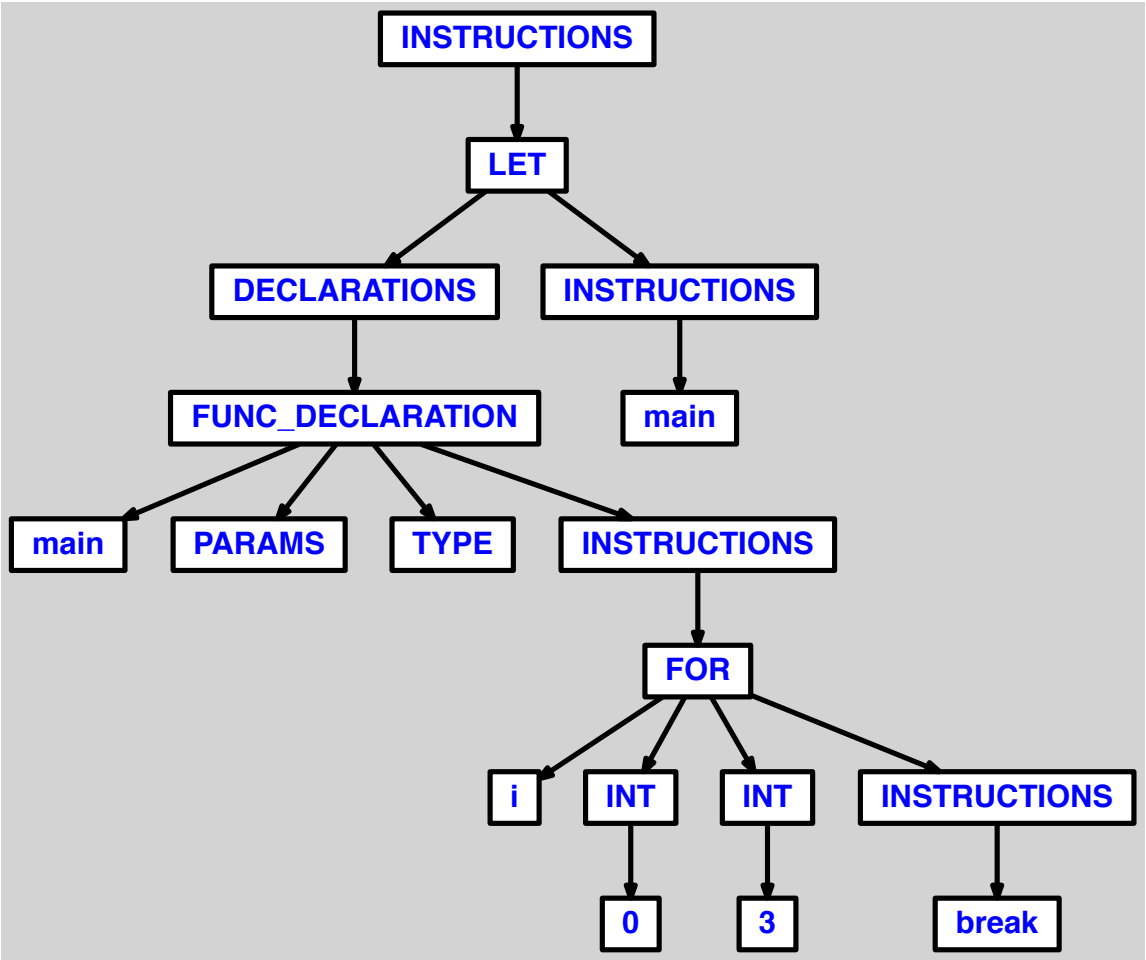
2.2.1 <break> dans un <for>, apres instruction

```
let
  function main() =
    for i := 0 to 3 do
      (print("test"); break)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
print
break
ARGS
STR
"test"

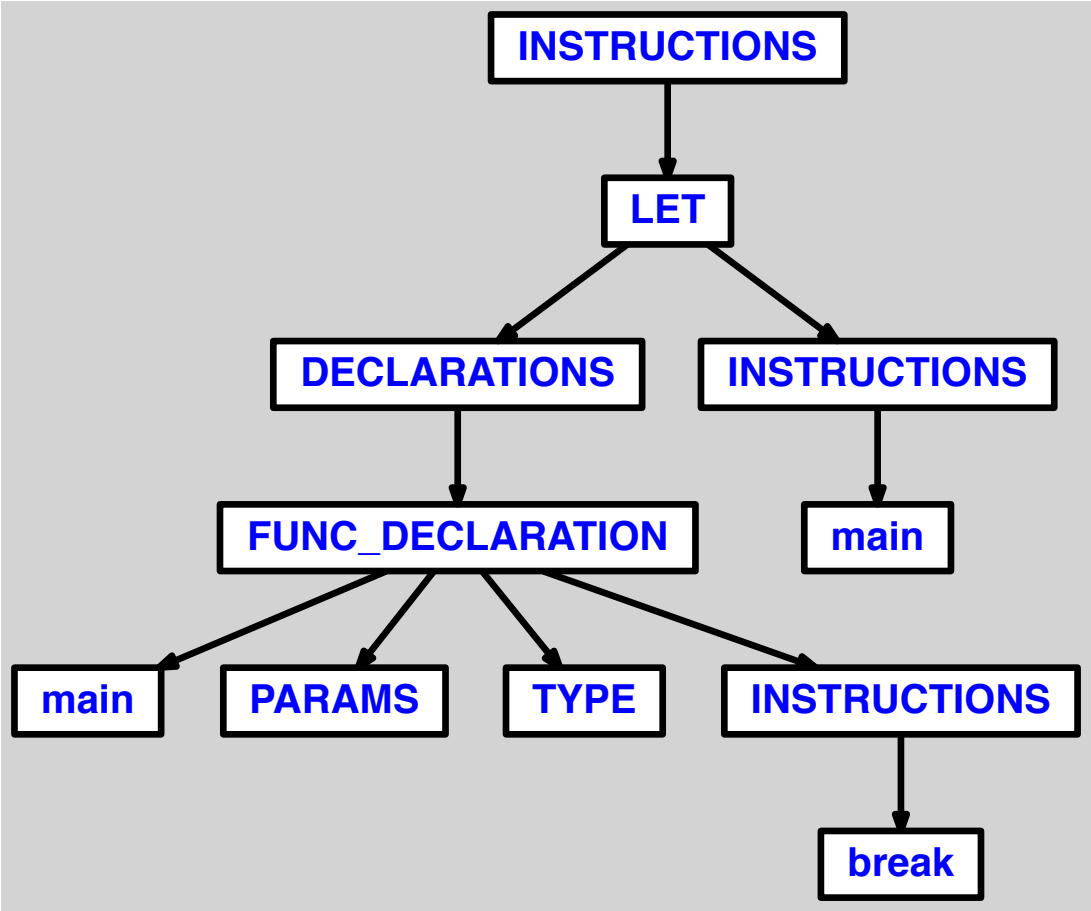
2.2.2 <break> dans un <for>, sans instruction avant

```
let
  function main() =
    for i := 0 to 3 do
      break
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
break

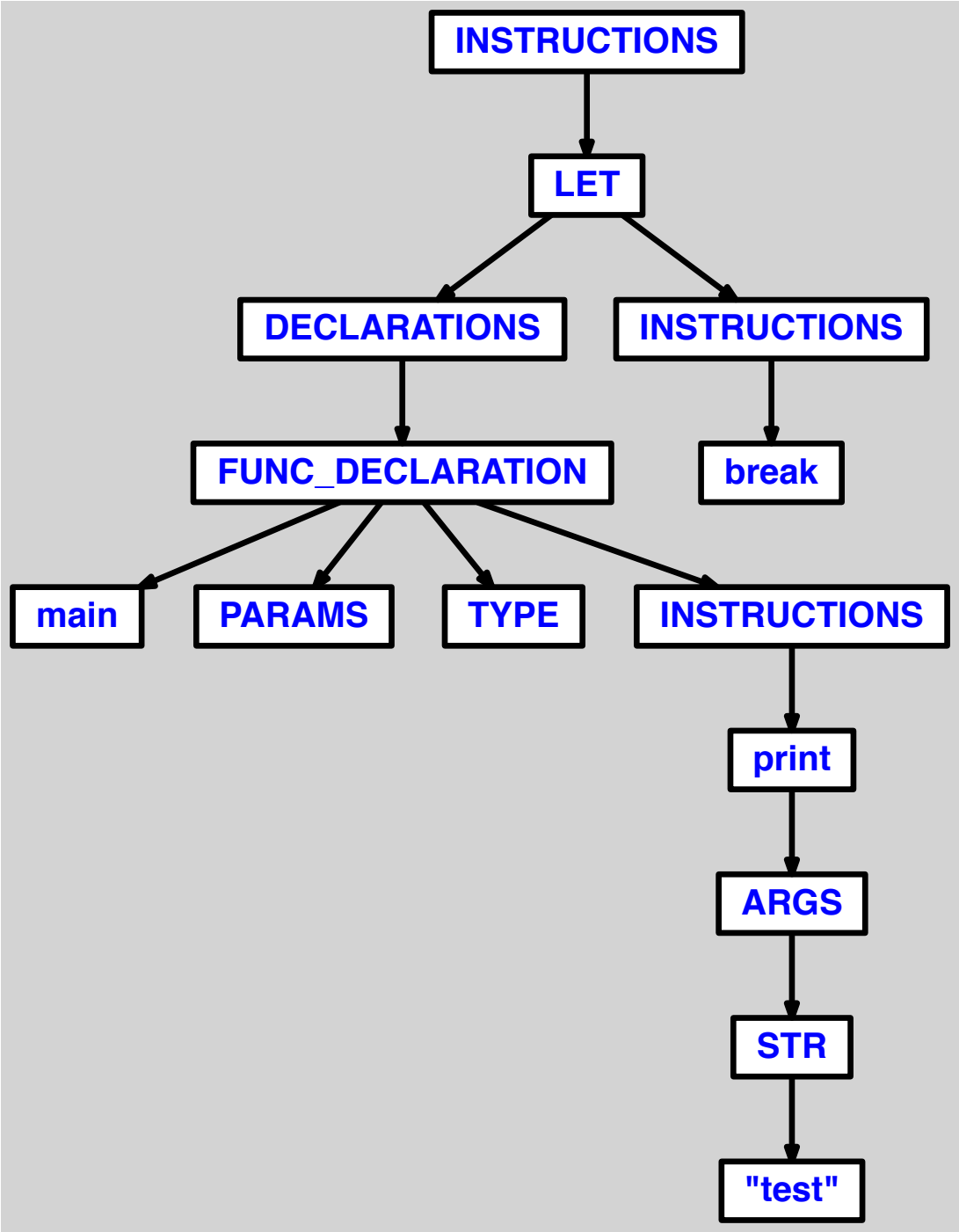
2.2.3 fonction executant seulement <break>

```
let
  function main() = break
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
break

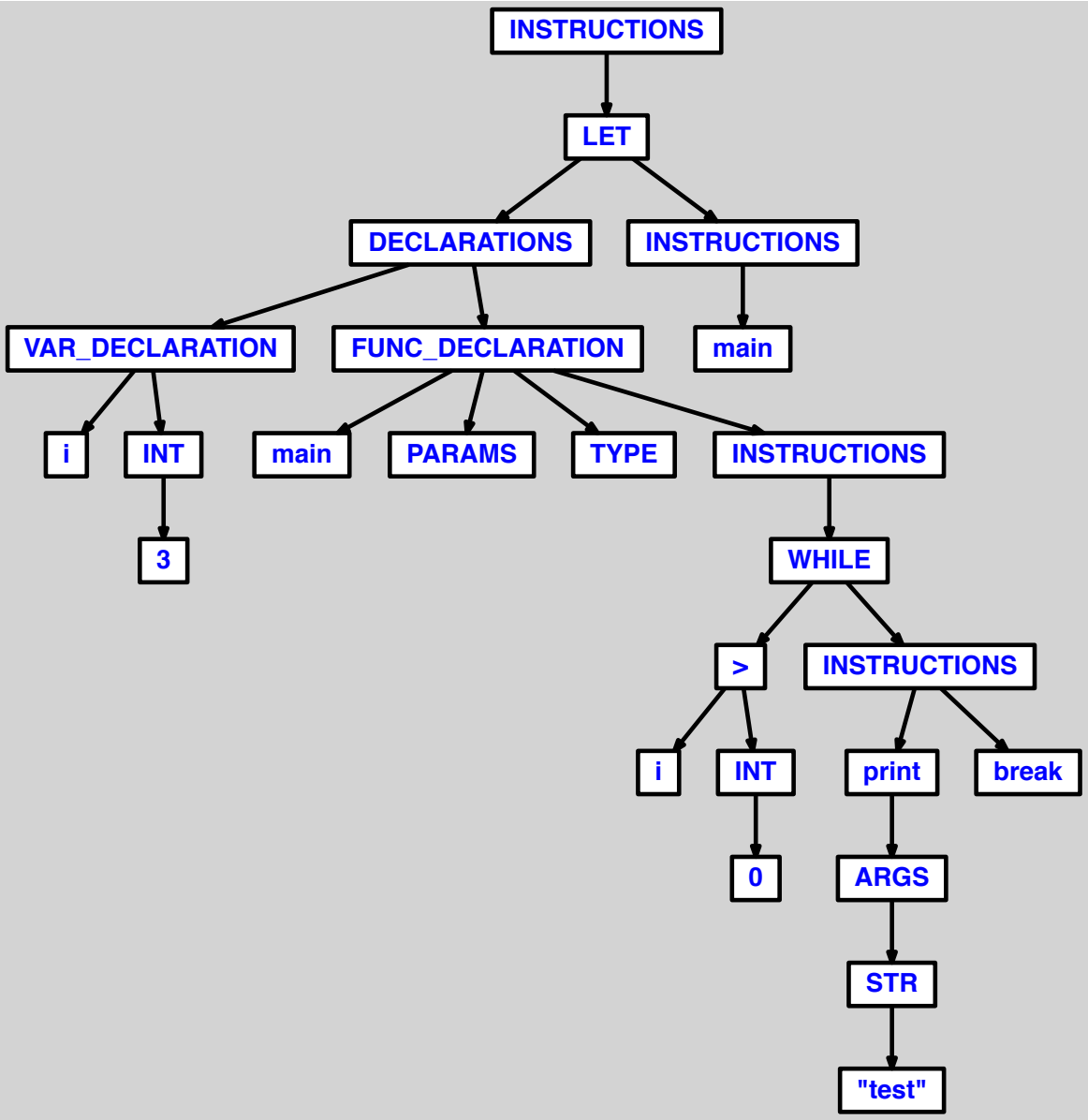
2.2.4 appel de <break>, avec corps de programme ne contenant pas <break>

```
let
  function main() = print("test")
in break end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
break
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

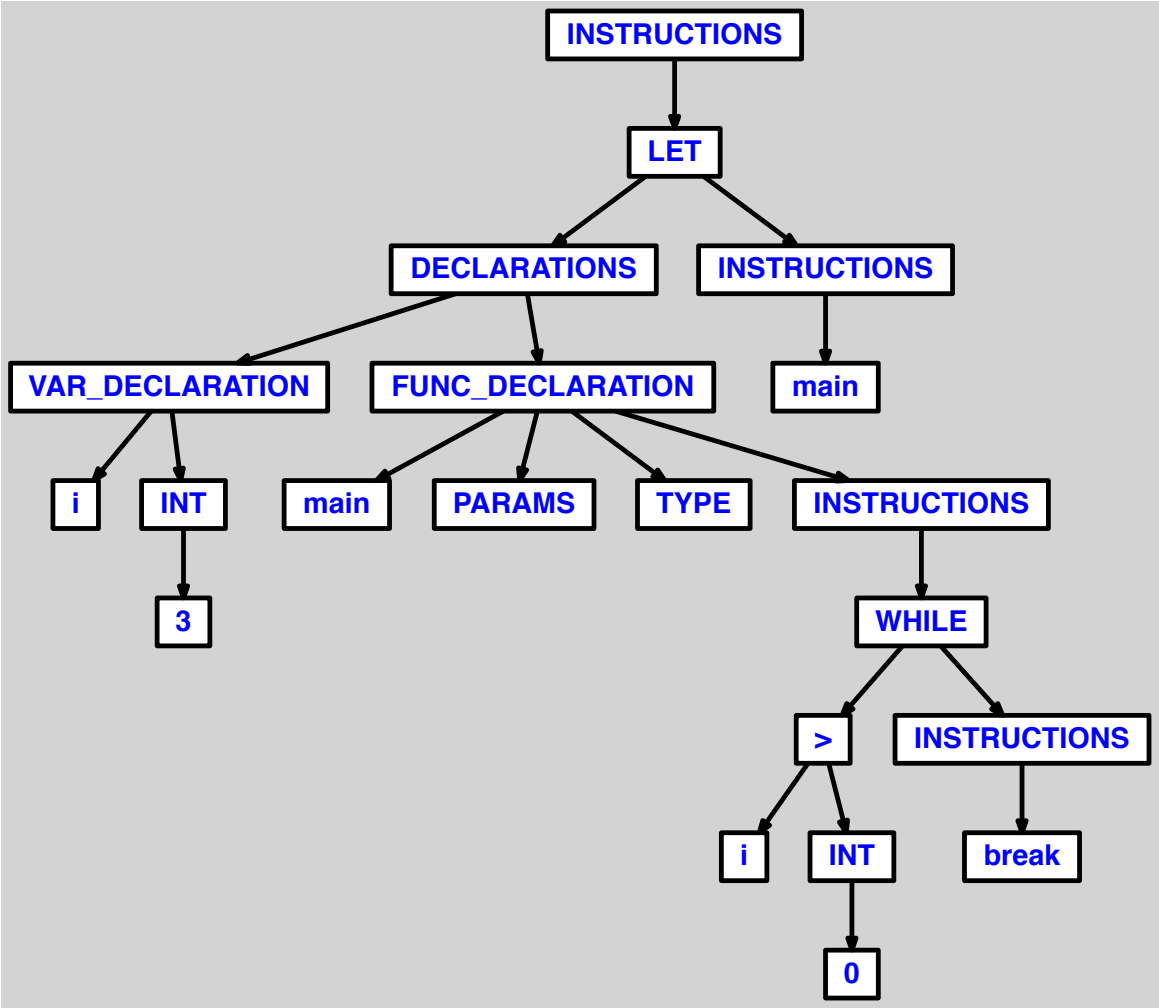
2.2.5 <break> dans un <while>, apres instruction

```
let
  var i := 3

  function main() =
    while i > 0 do
      (print("test"); break)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
3
WHILE
>
INSTRUCTIONS
i
INT
print
break
0
ARGS
STR
"test"

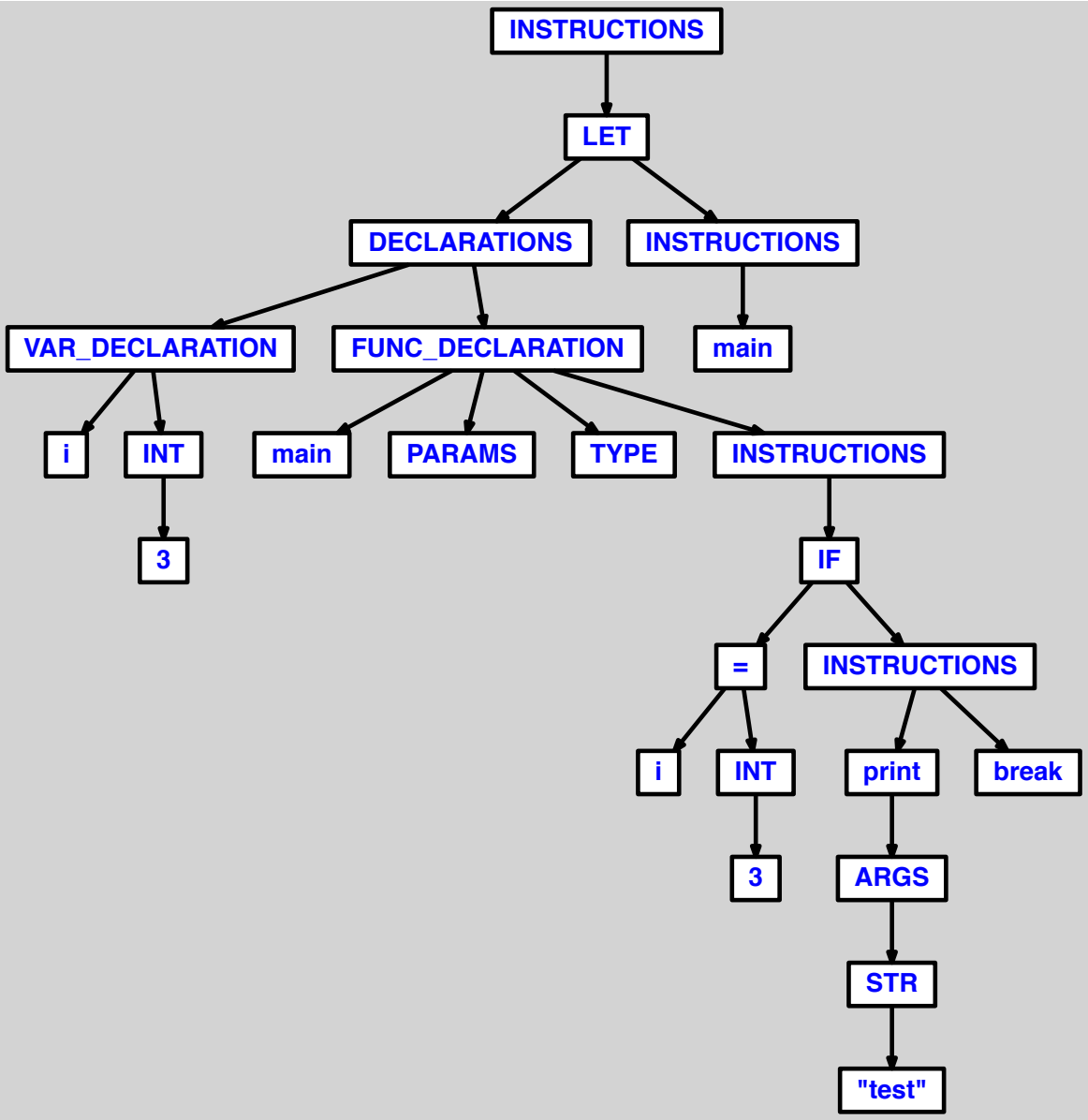
2.2.6 <break> dans un <while>, sans instruction avant

```
let
  var i := 3

  function main() =
    while i > 0 do
      break
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
3
WHILE
>
INSTRUCTIONS
i
INT
break
0

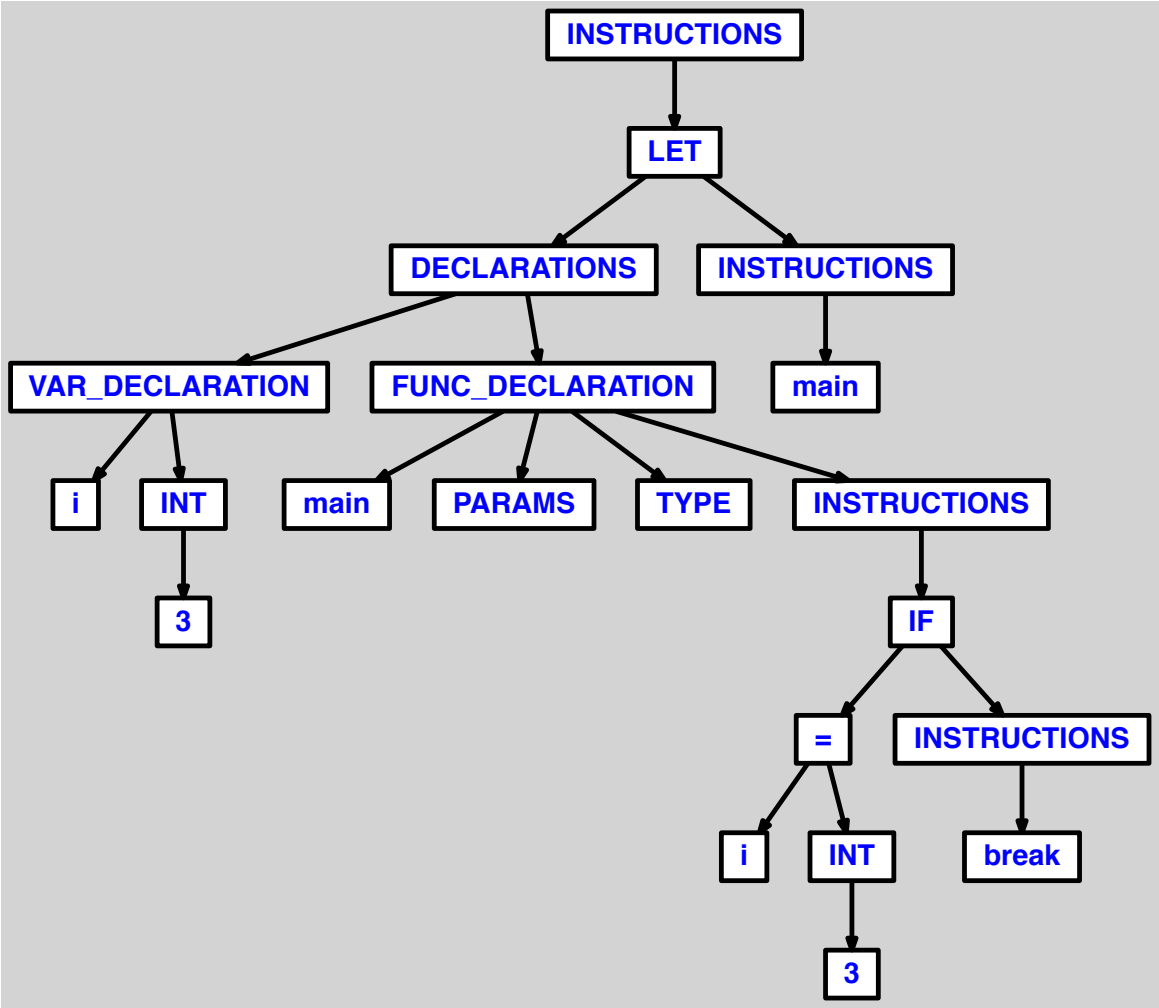
2.2.7 <break> dans un <if then>, apres instruction

```
let
  var i := 3

  function main() =
    if i=3 then
      (print("test"); break)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
3
IF
=
INSTRUCTIONS
i
INT
print
break
3
ARGS
STR
"test"

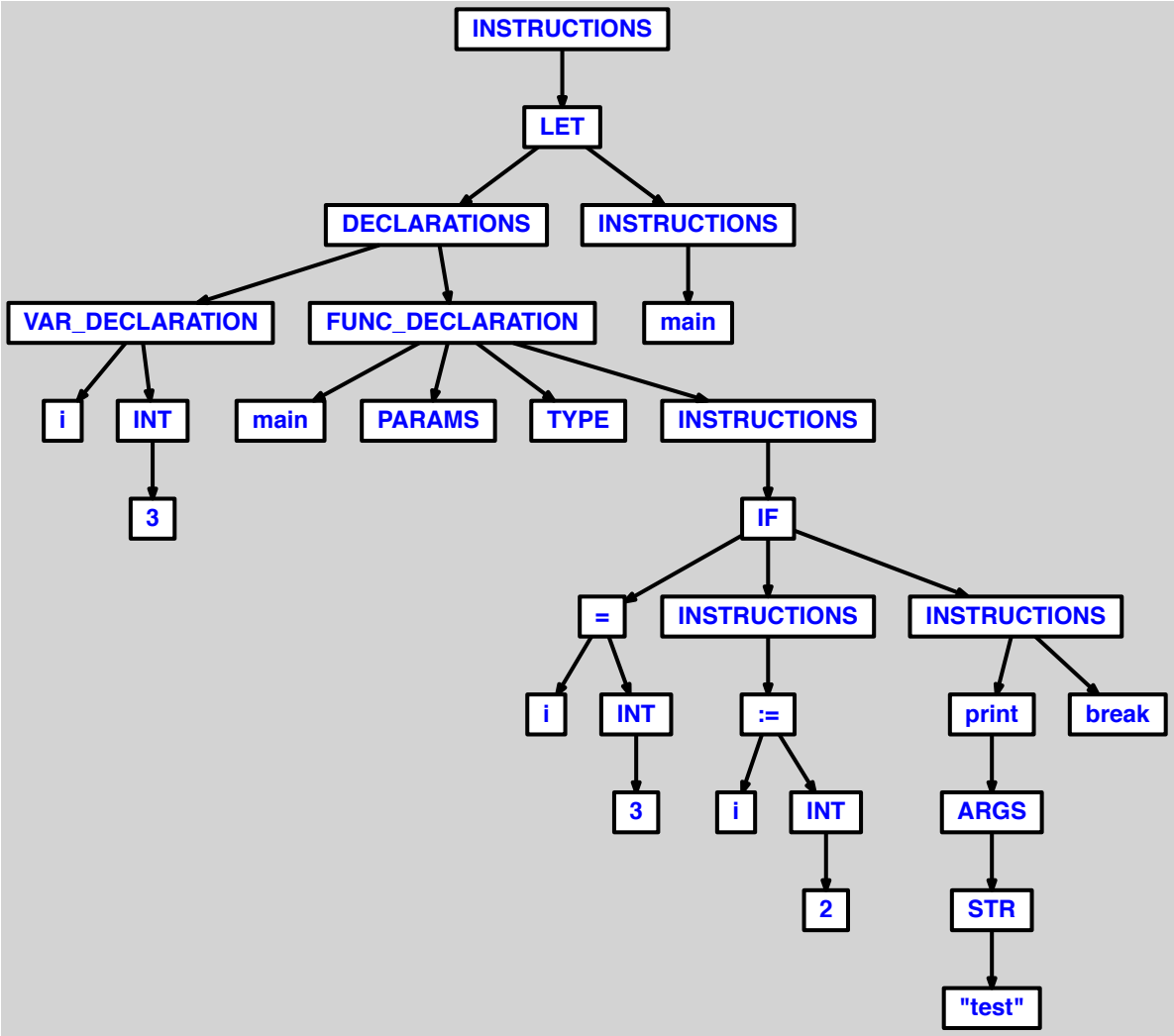
2.2.8 <break> dans un <if then>, sans instruction avant

```
let
  var i := 3

  function main() =
    if i=3 then
      break
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
3
IF
=
INSTRUCTIONS
i
INT
break
3

2.2.9 <break> dans un <if then else>, apres instruction

```
let
  var i := 3

  function main() =
    if i=3 then
      i := 2
    else
      (print("test"); break)
in main() end
```


INSTRUCTIONS
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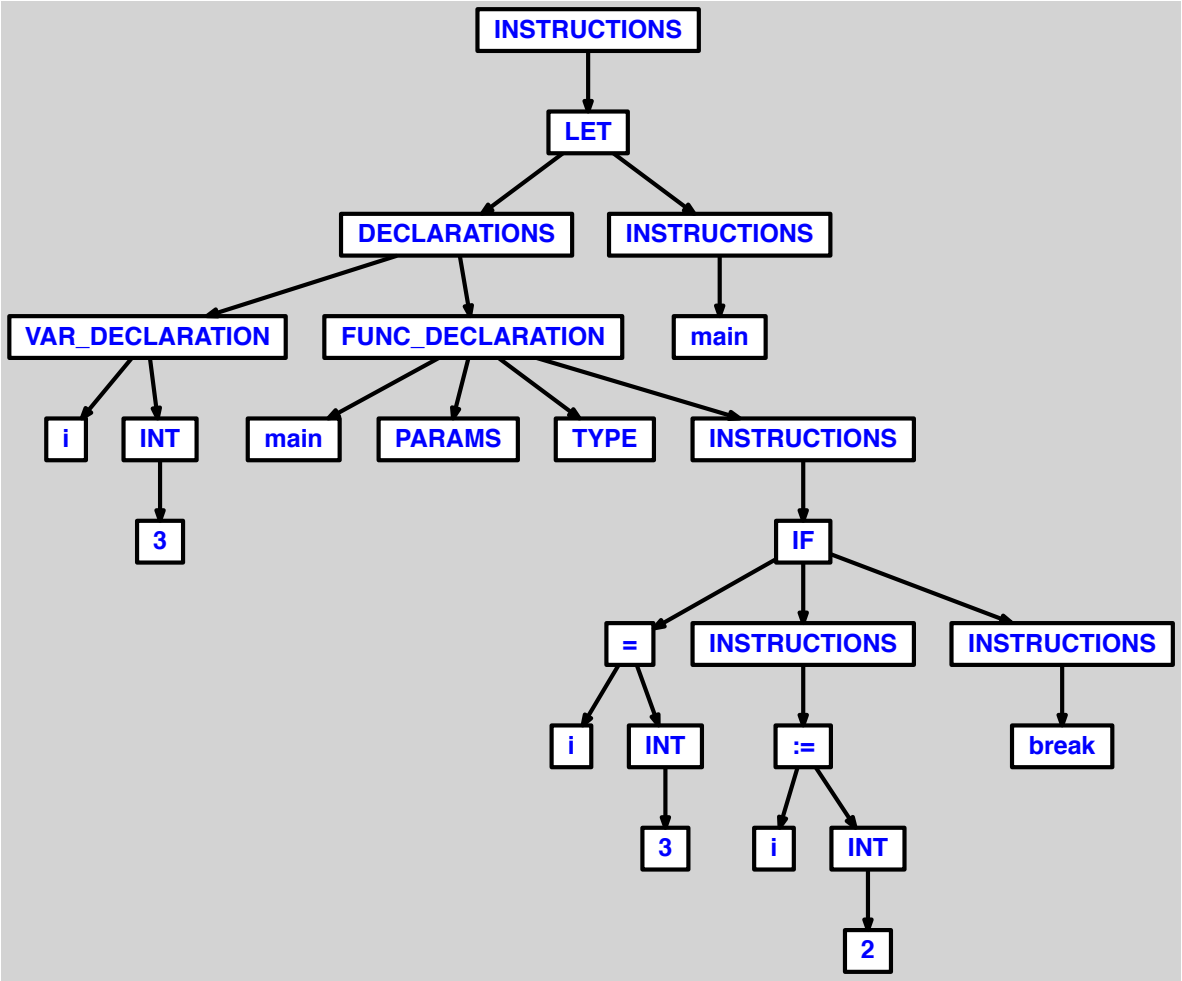
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
3
IF
=
INSTRUCTIONS
INSTRUCTIONS
i
INT
:=
print
break
3
i
INT
ARGS
2
STR
"test"

2.2.10 <break> dans un <if then else>, sans instruction avant

```
let
  var i := 3

  function main() =
    if i=3 then
      i := 2
    else
      break
in main() end
```


INSTRUCTIONS
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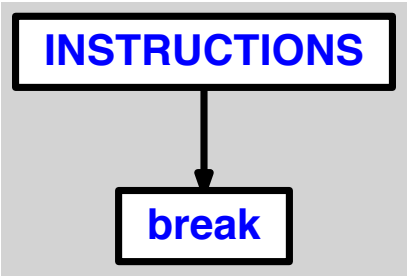
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
3
IF
=
INSTRUCTIONS
INSTRUCTIONS
i
INT
:=
break
3
i
INT
2

2.2.11 <break> seul

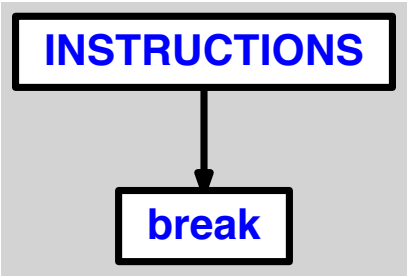
```
break
```


INSTRUCTIONS
break

2.2.12 <break> seul, apres saut de ligne

```

break
```

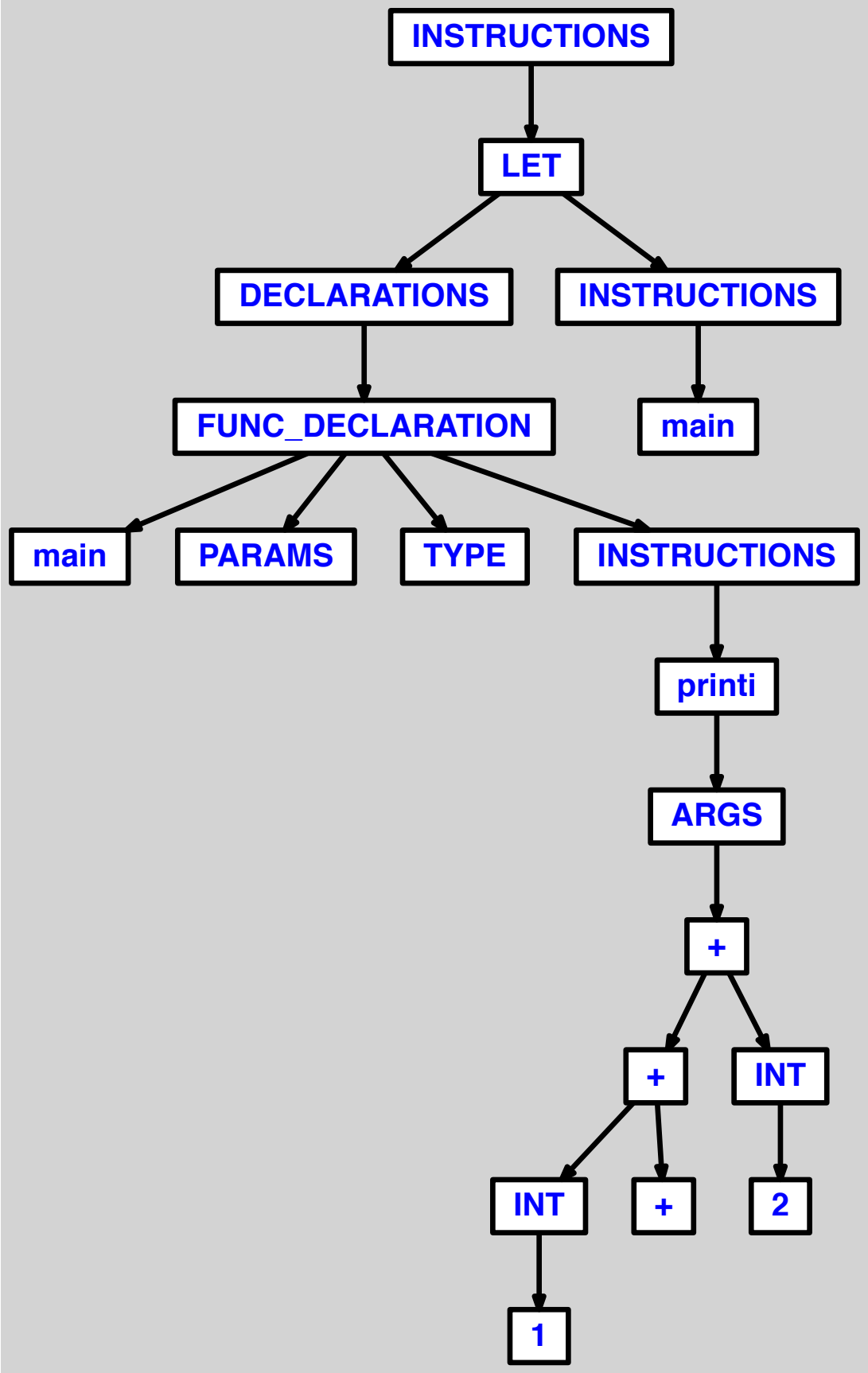

INSTRUCTIONS
break

3 calcul

3.1 KO

3.1.1 addition avec operateur mal ecrit

```
let
  function main() = printi(1++2)
in main() end
```


INSTRUCTIONS
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DECLARATIONS
INSTRUCTIONS
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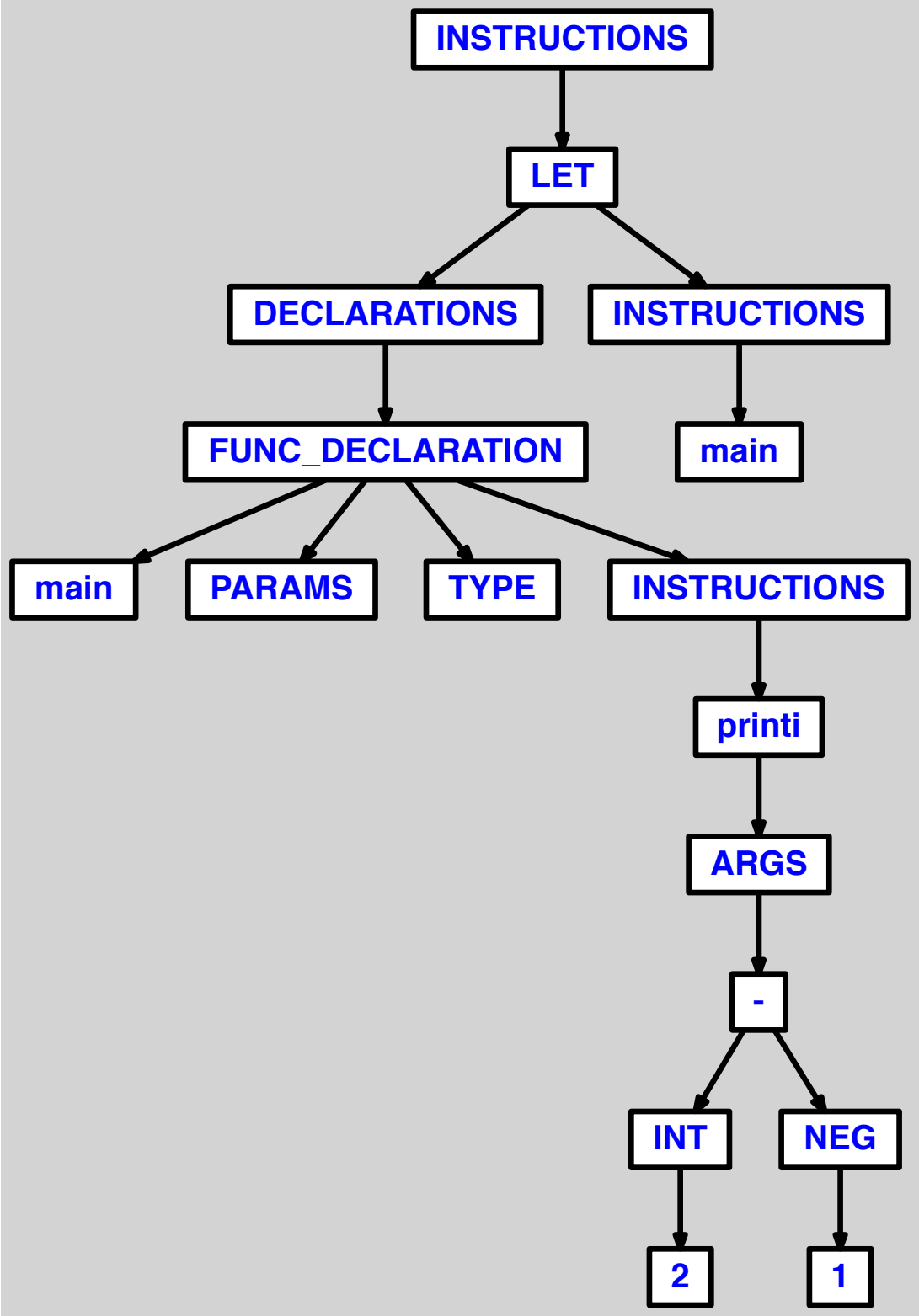
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
+
INT
INT
+
2
1

3.1.2 soustraction avec operateur mal ecrit

```
let
  function main() = printi(2--1)
in main() end
```


INSTRUCTIONS
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DECLARATIONS
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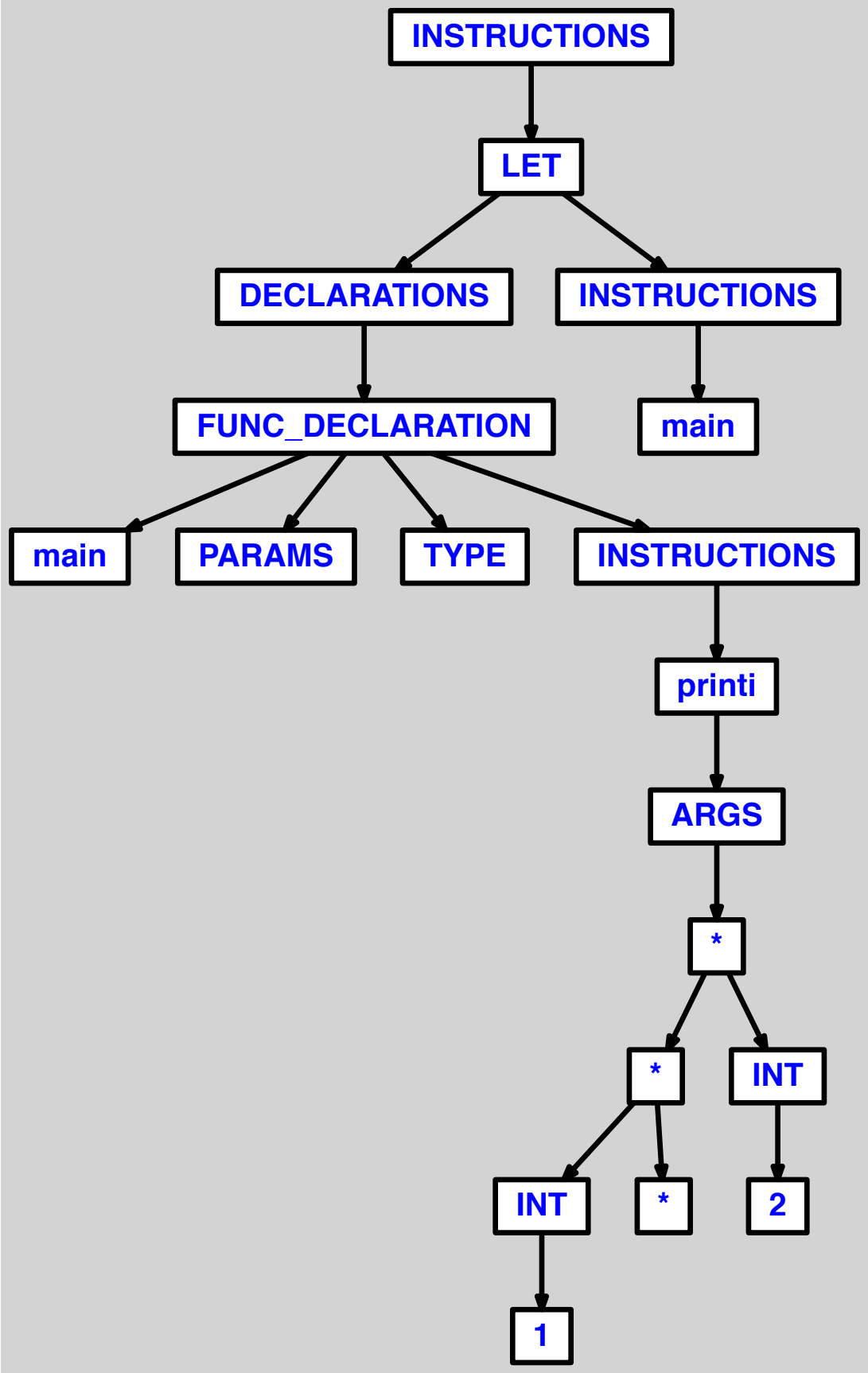
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
-
INT
NEG
2
1

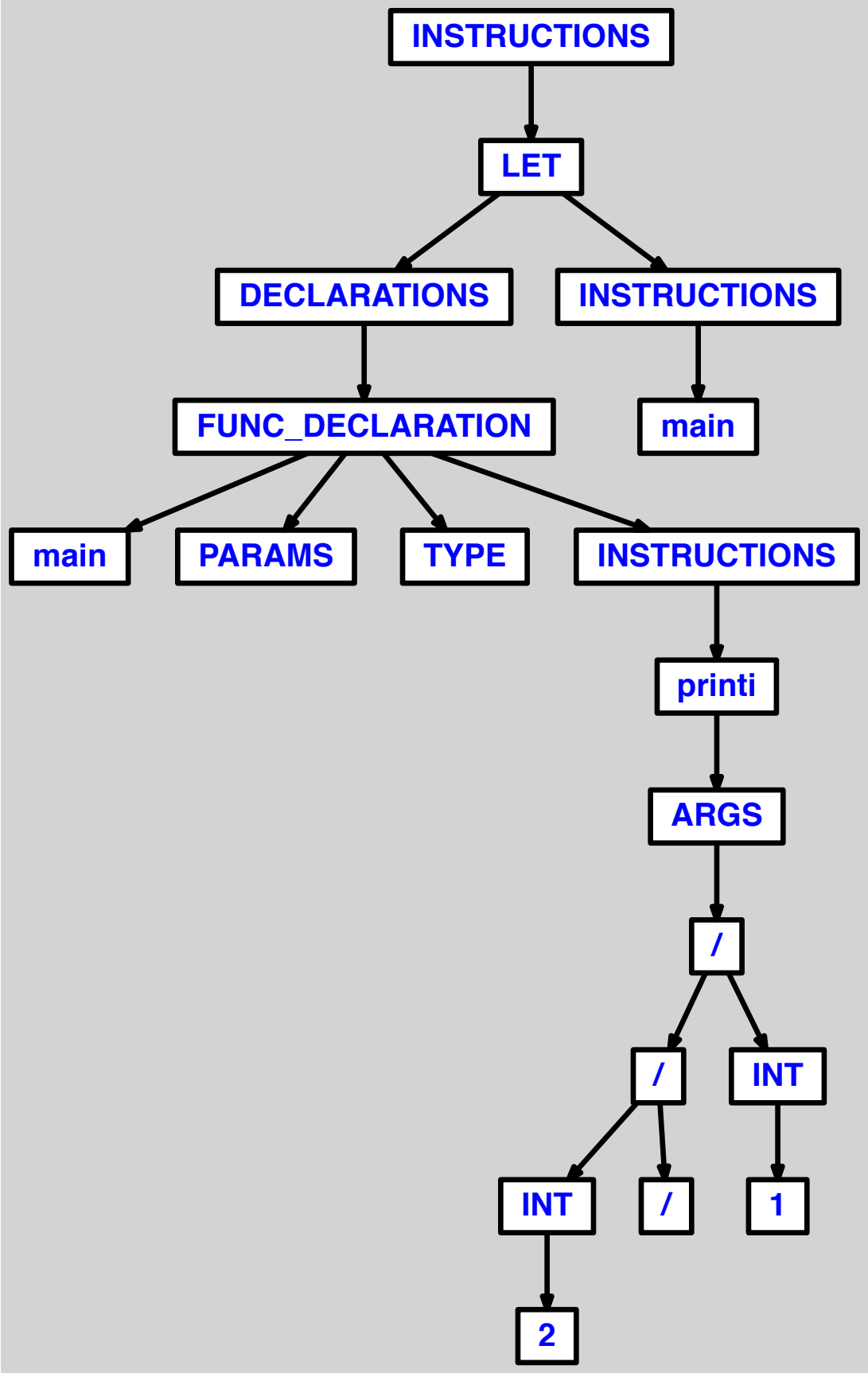
3.1.3 multiplication avec operateur mal ecrit

```
let
  function main() = printi(1**2)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
*
*
INT
INT
*
2
1

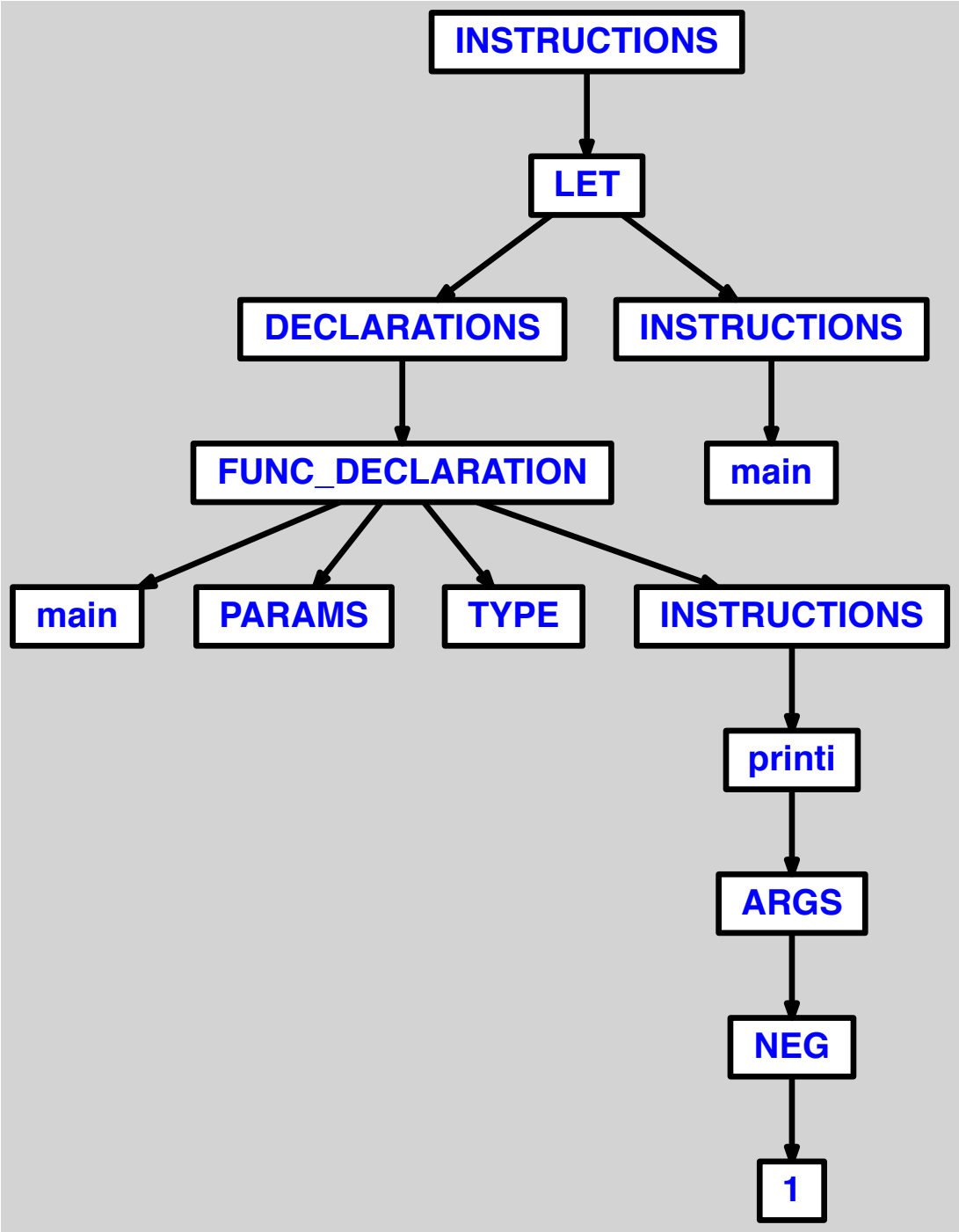
3.1.4 division avec operateur mal ecrit

```
let
  function main() = printi(2//1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
/
/
INT
INT
/
1
2

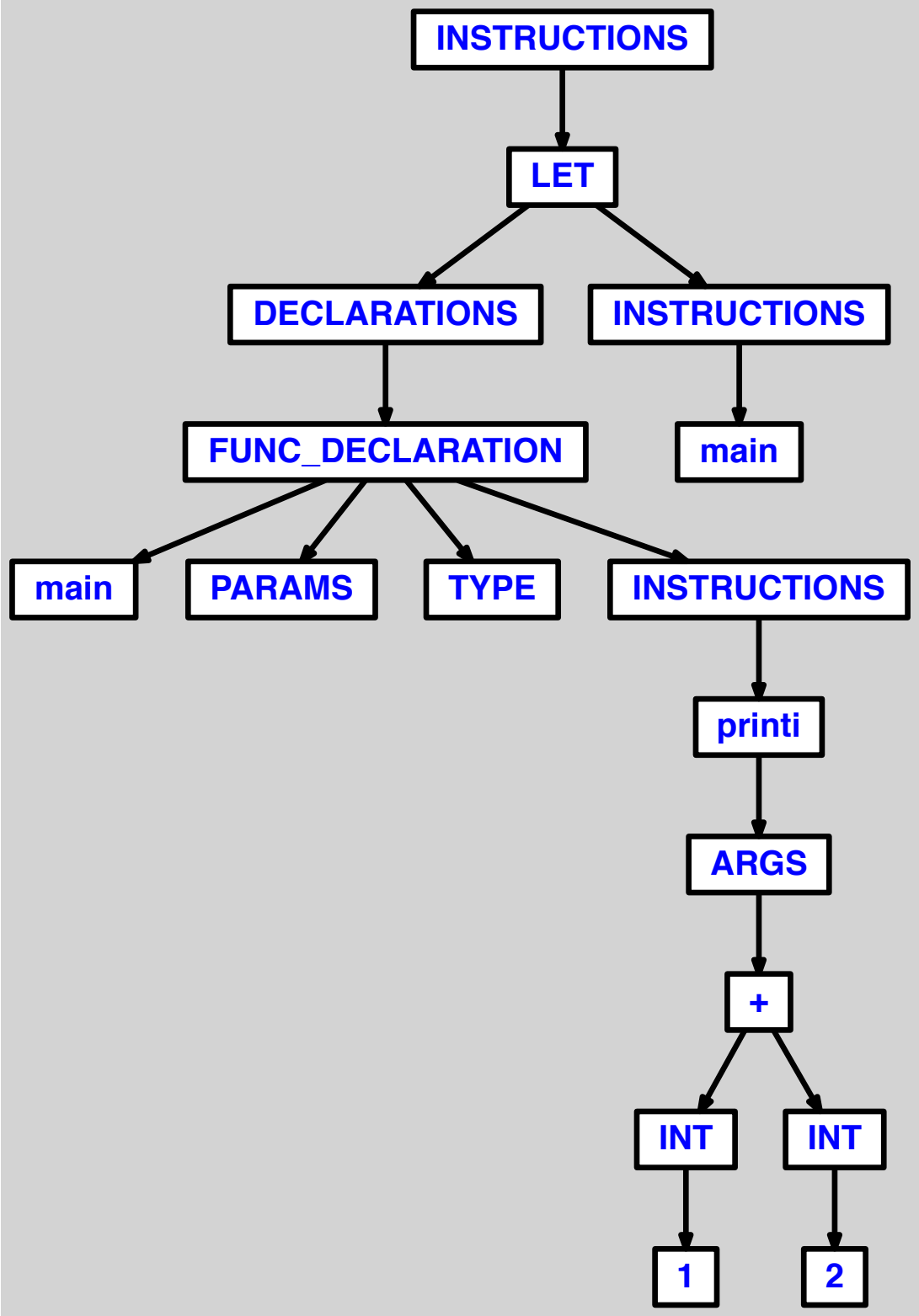
3.1.5 moins unaire avec operateur mal ecrit

```
let
  function main() = printi(--1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
NEG
1

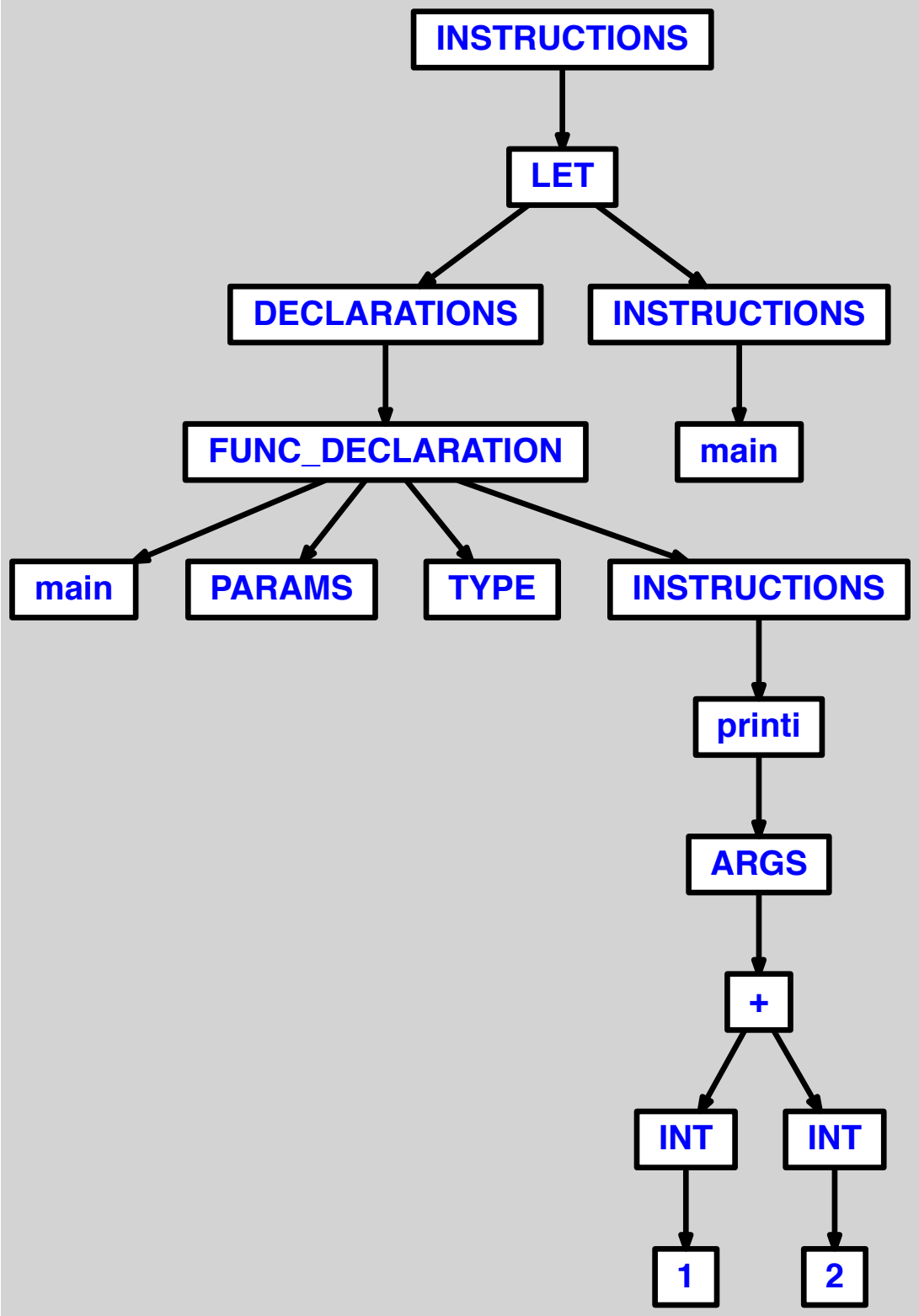
3.1.6 calcul a 2 termes avec oubli de parenthese gauche

```
let function main() = printi(1+2)) in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
INT
INT
1
2

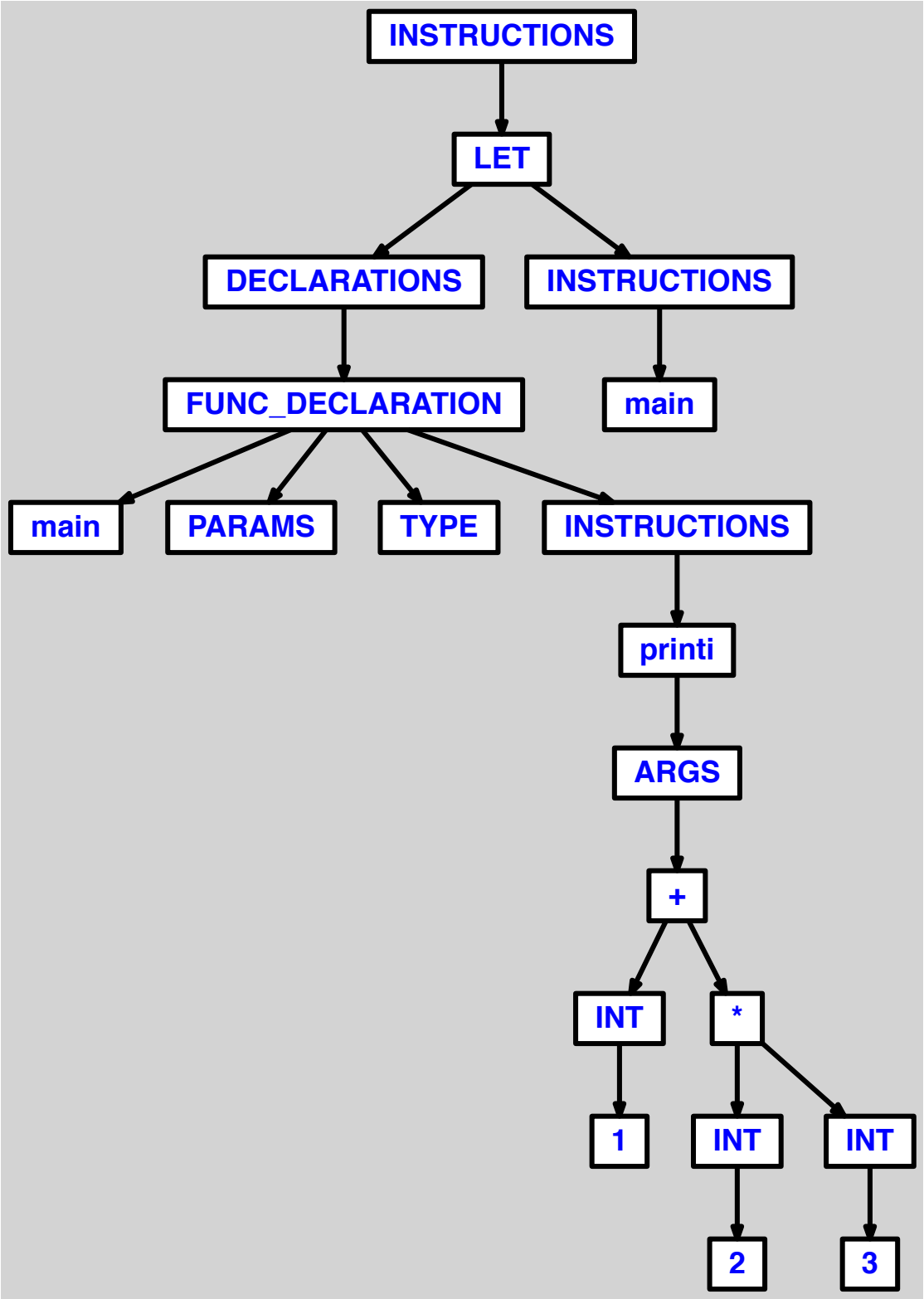
3.1.7 calcul a 2 termes avec oubli de parenthese droite

```
let function main() = printi((1+2) in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
INT
INT
1
2

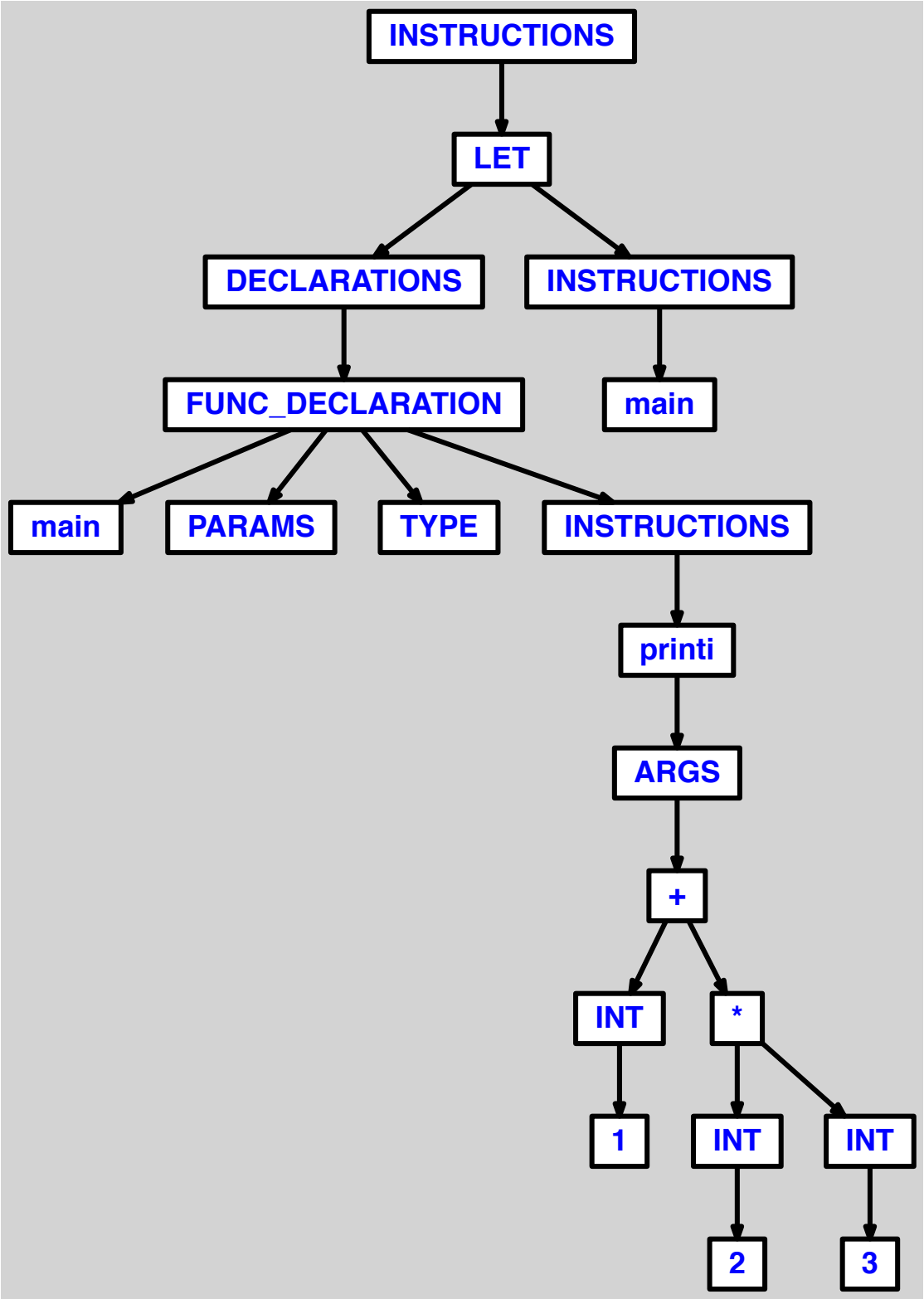
3.1.8 calcul a 3 termes avec oubli de parenthese gauche

```
let function main() = printi(1+(2*3))) in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
INT
*
1
INT
INT
2
3

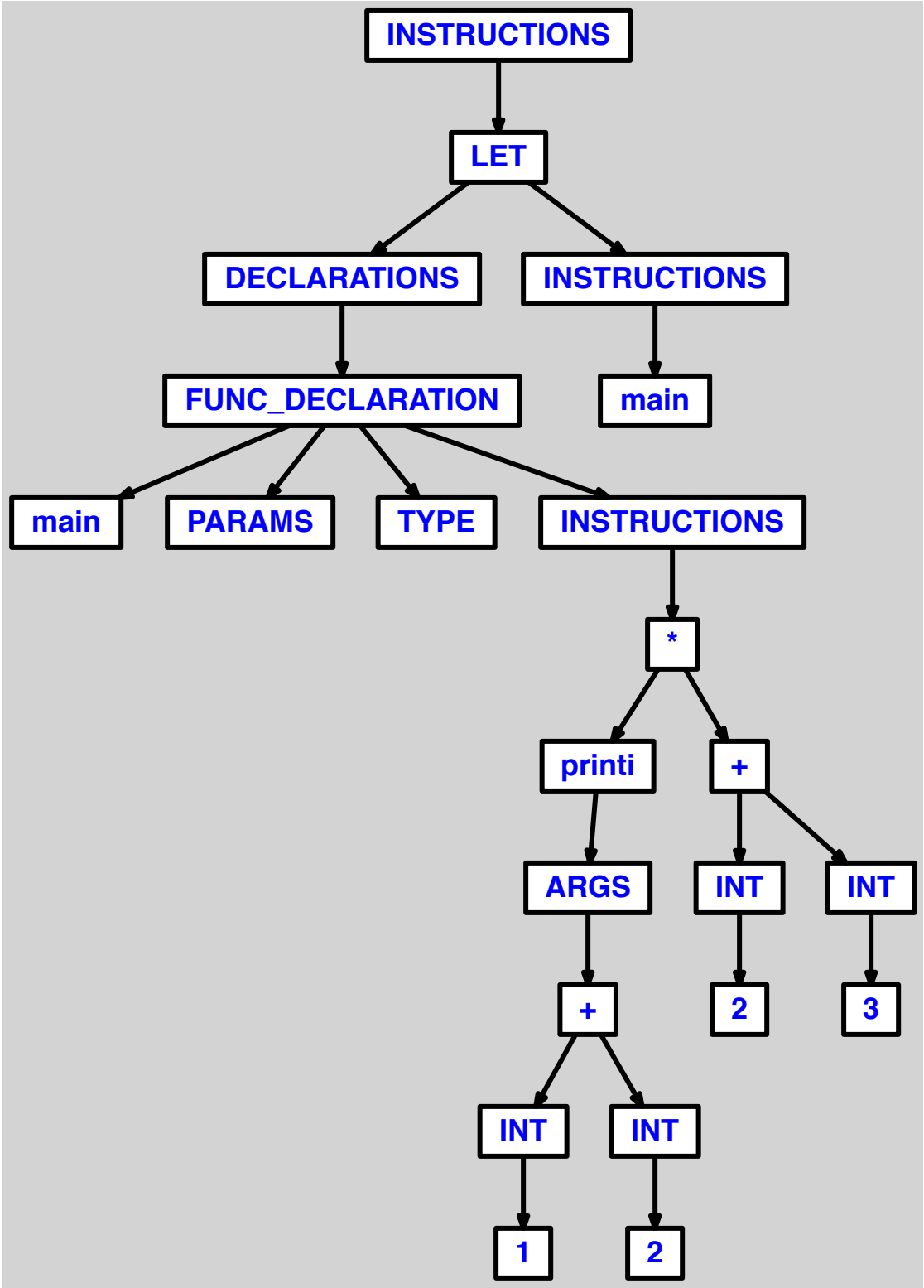
3.1.9 calcul a 3 termes avec oubli de parenthese droite

```
let function main() = printi((1+(2*3)) in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
INT
*
1
INT
INT
2
3

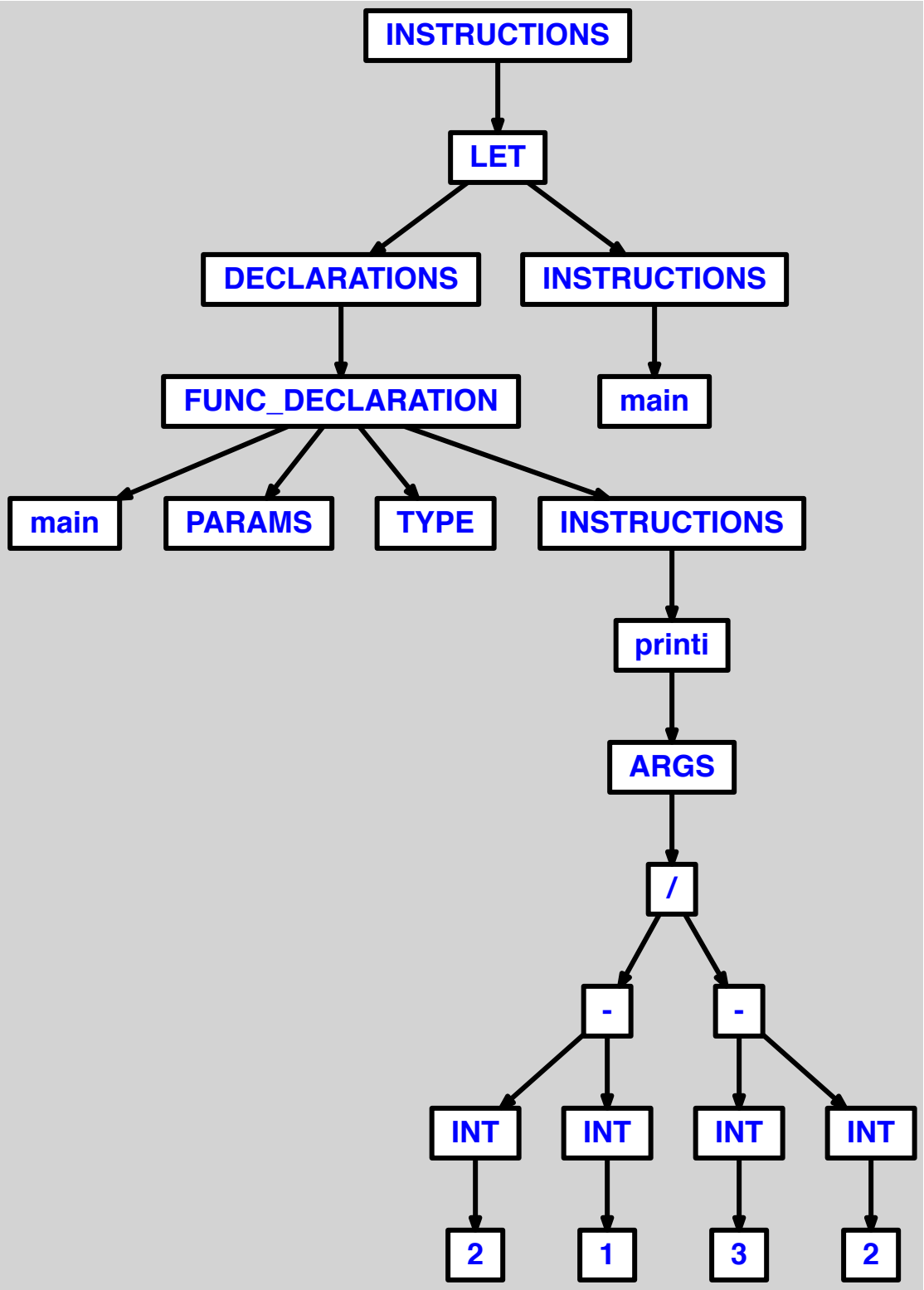
3.1.10 calcul a 4 termes avec oubli de parenthese gauche

```
let function main() = printi(1+2)*(2+3)) in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
*
printi
+
ARGS
INT
INT
+
2
3
INT
INT
1
2

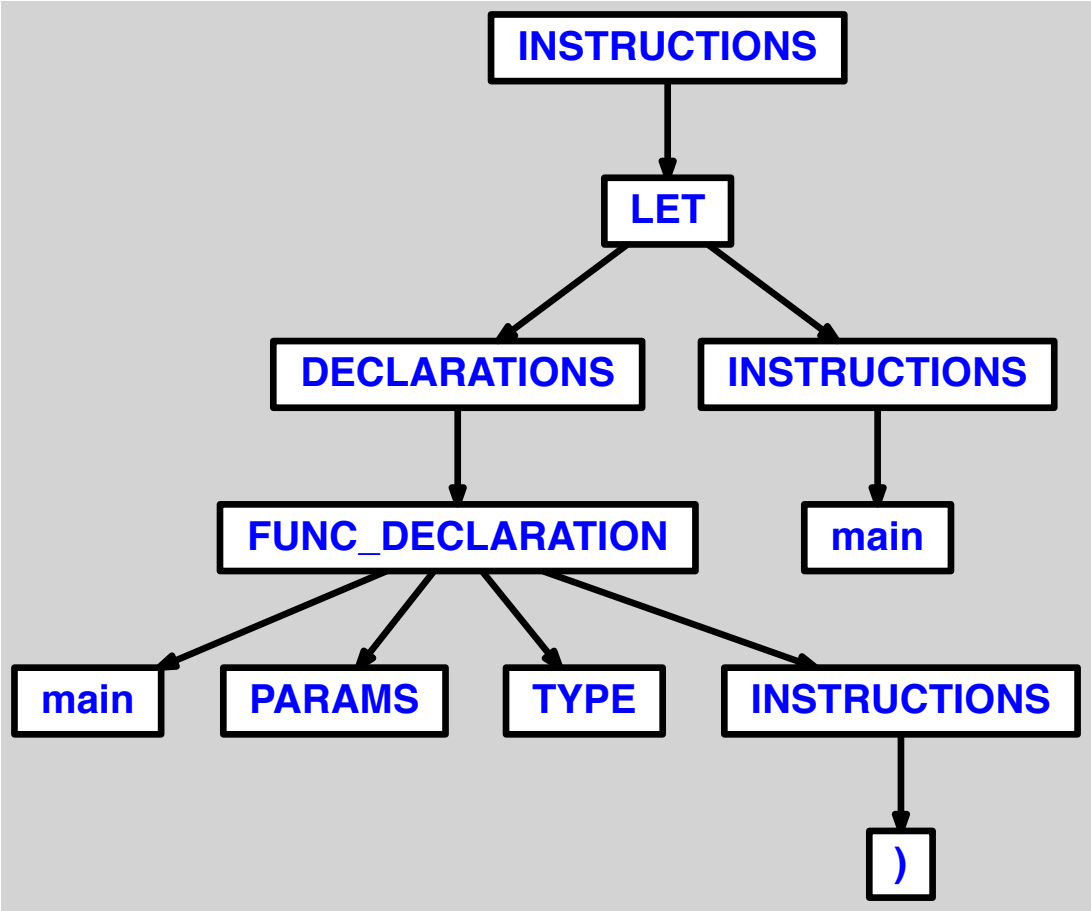
3.1.11 calcul a 4 termes avec oubli de parenthese droite

```
let function main() = printi((2-1)/(3-2) in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
/
-
-
INT
INT
INT
INT
2
1
3
2

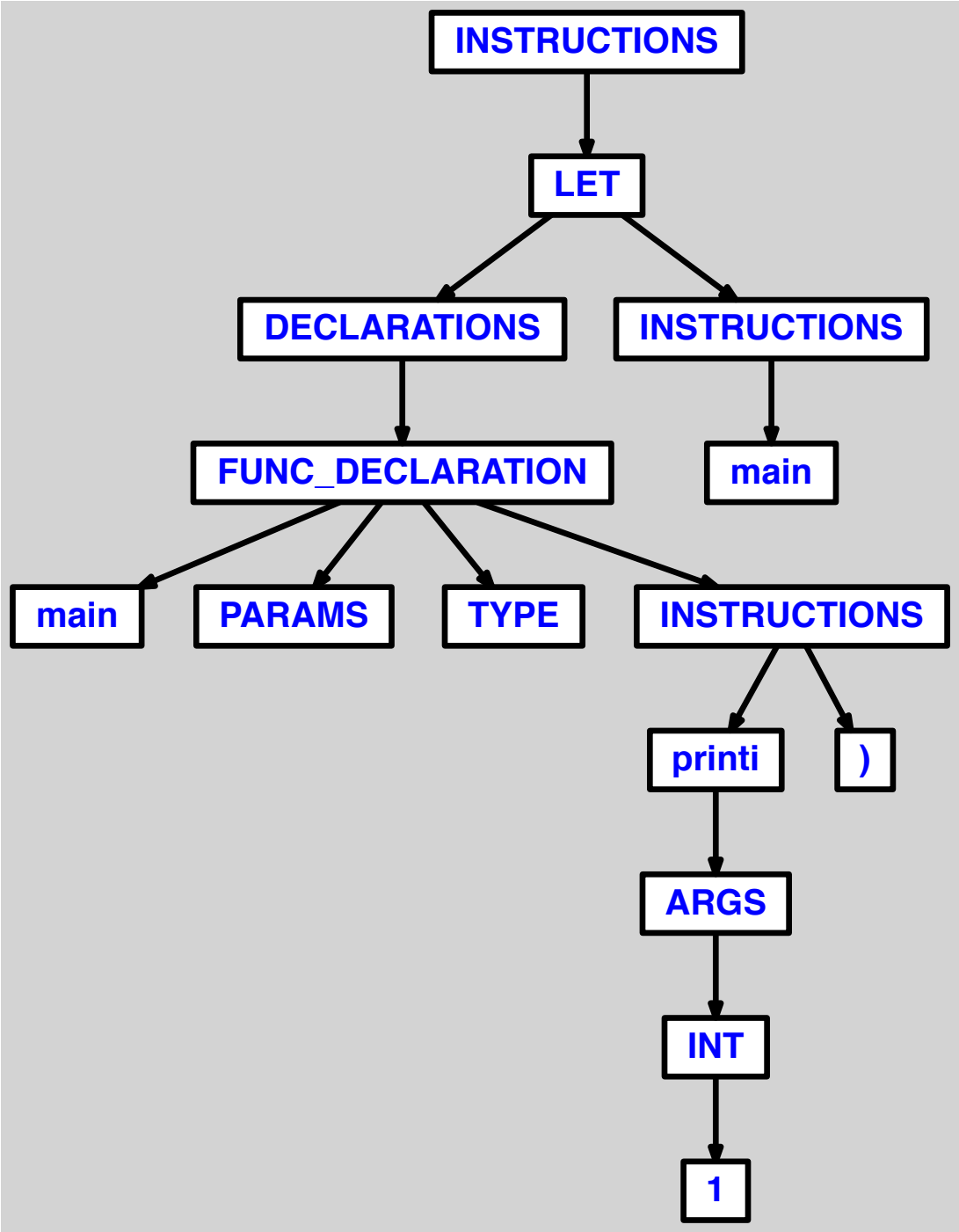
3.1.12 parenthesage sans contenu

```
let function main() = () in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
)

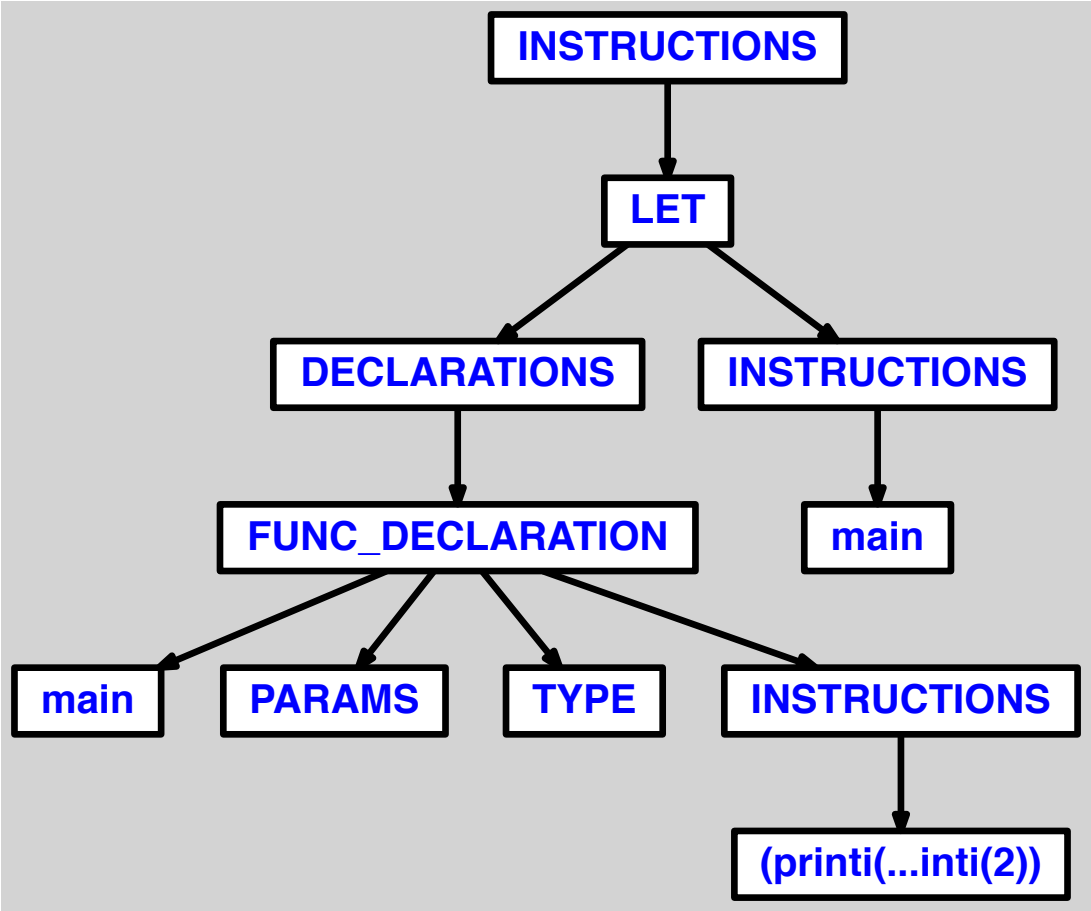
3.1.13 expression parenthesee avec <;> en trop

```
let function main() = (printi(1);) in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
)
ARGS
INT
1

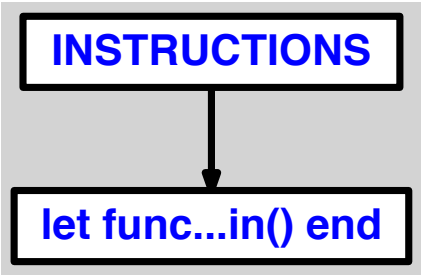
3.1.14 expression parenthesee avec oubli de <;>

```
let function main() = (printi(1) printi(2)) in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
(printi(...inti(2))

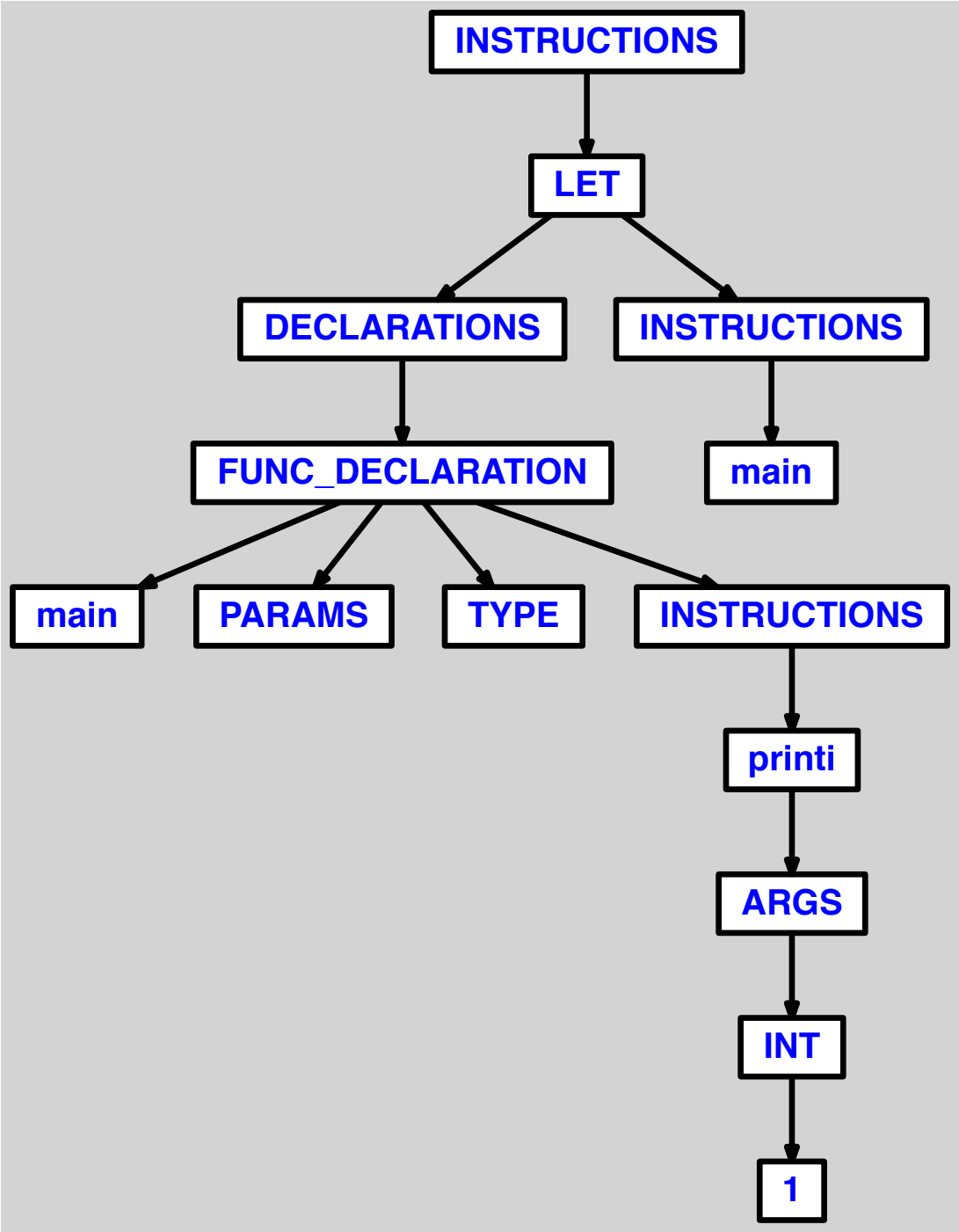
3.1.15 expression non parenthesee avec oubli de <;>

```
let function main() = printi(1) printi(2) in main() end
```


INSTRUCTIONS
let func...in() end

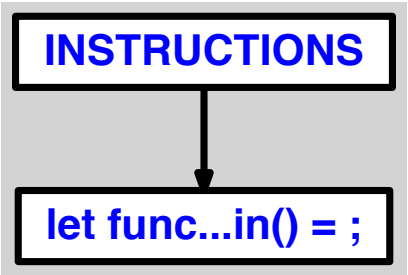
3.1.16 expression non parenthesee avec <;> en trop

```
let function main() = printi(1); in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
INT
1

3.1.17 <;> sans instruction avant

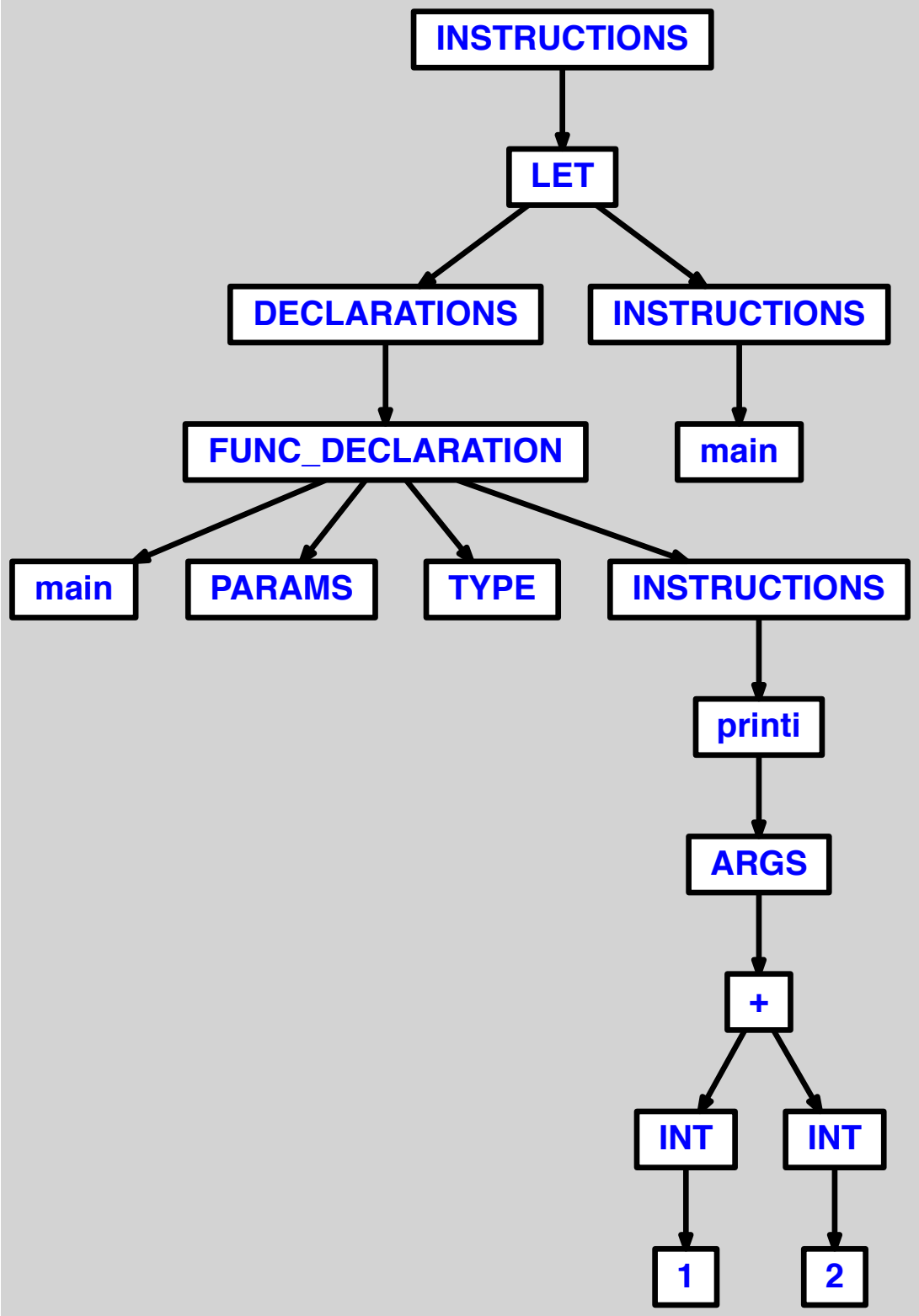
```
let function main() = ;
```


INSTRUCTIONS
let func...in() = ;

3.2 OK

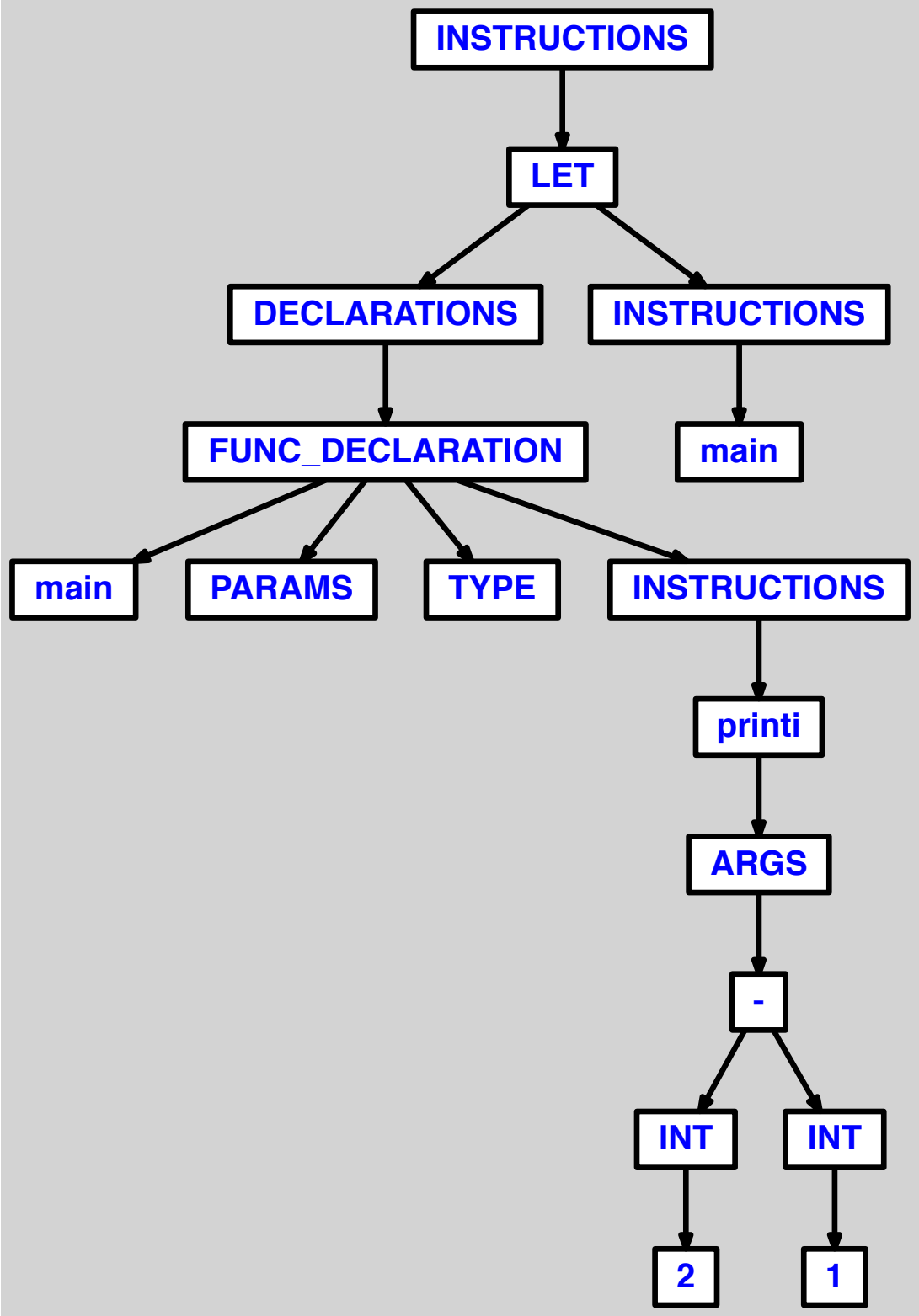
3.2.1 addition simple, a 2 termes

```
let
  function main() = printi(1+2)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
INT
INT
1
2

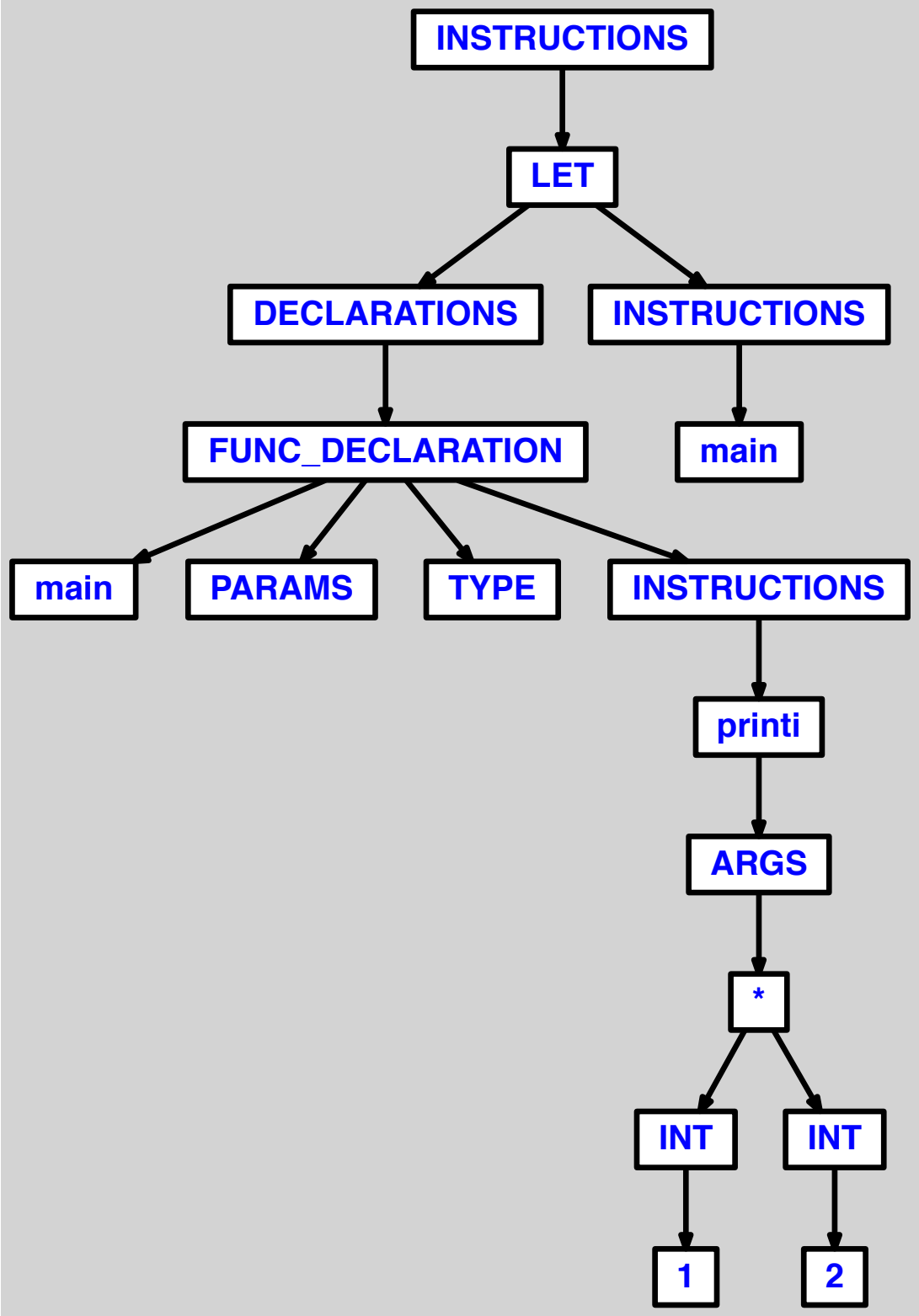
3.2.2 soustraction simple, a 2 termes

```
let
  function main() = printi(2-1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
-
INT
INT
2
1

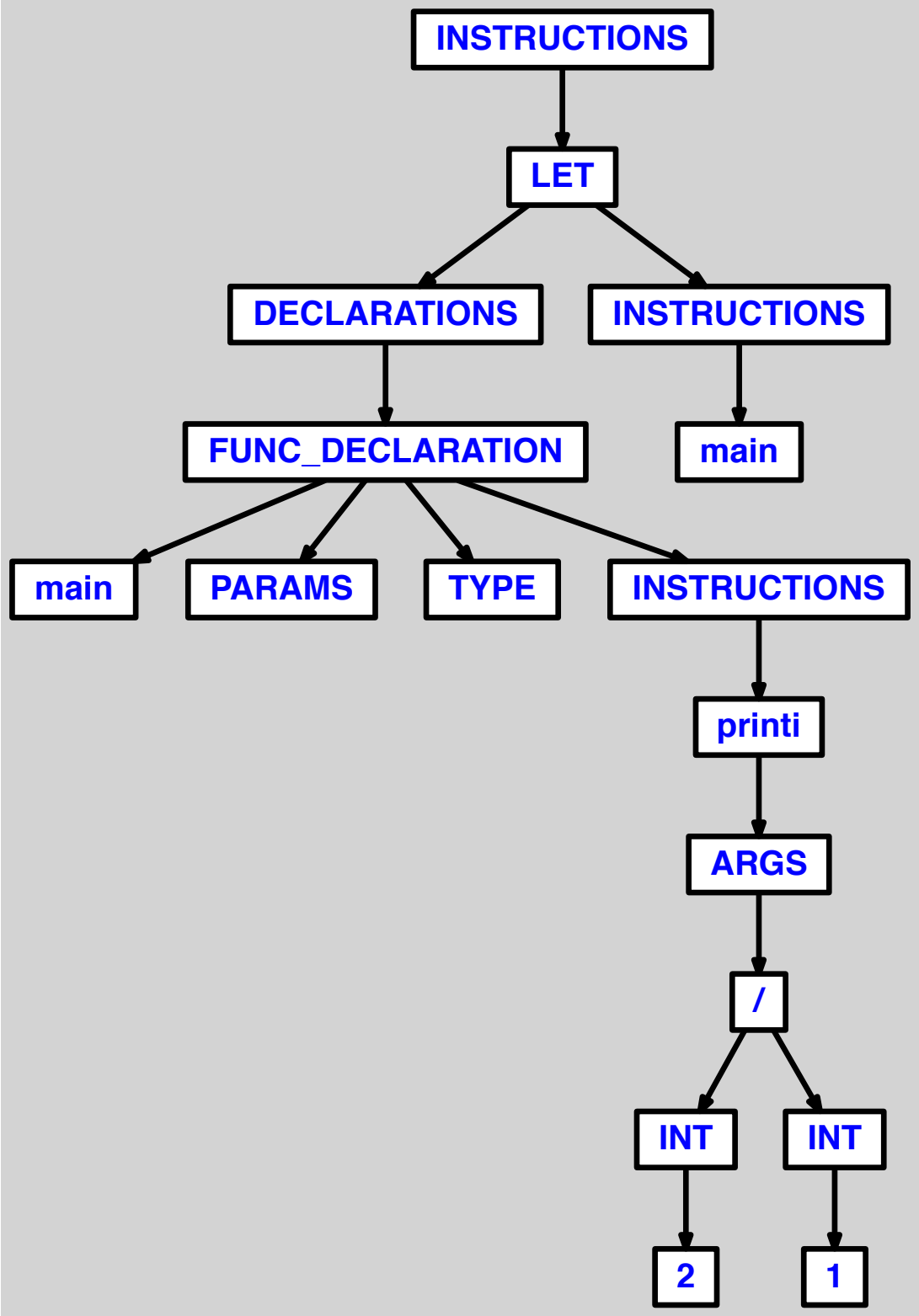
3.2.3 multiplication simple, a 2 termes

```
let
  function main() = printi(1*2)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
*
INT
INT
1
2

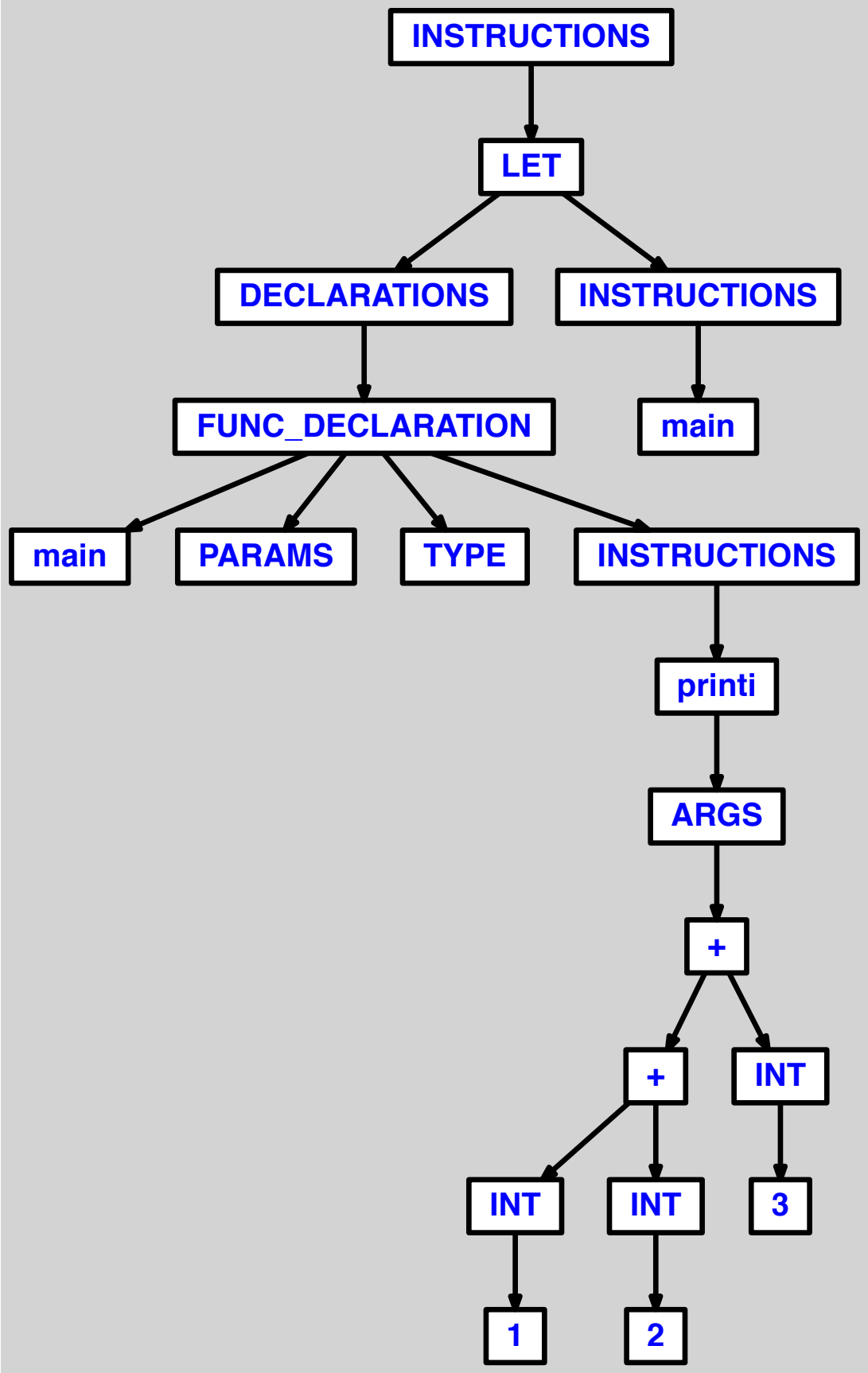
3.2.4 division simple, a 2 termes

```
let
  function main() = printi(2/1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
/
INT
INT
2
1

3.2.5 addition a 3 termes

```
let
  function main() = printi(1+2+3)
in main() end
```


INSTRUCTIONS
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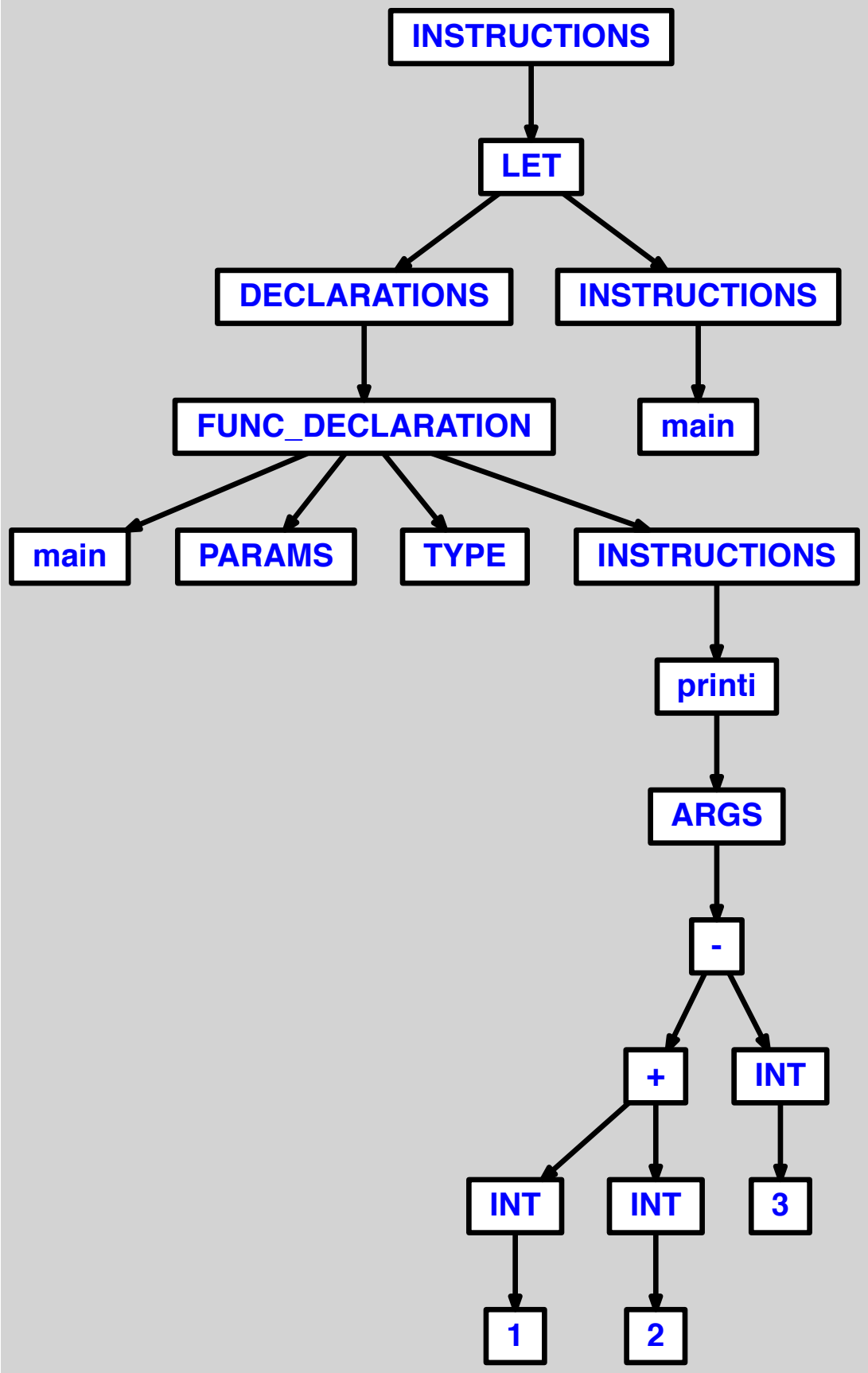
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
+
INT
INT
INT
3
1
2

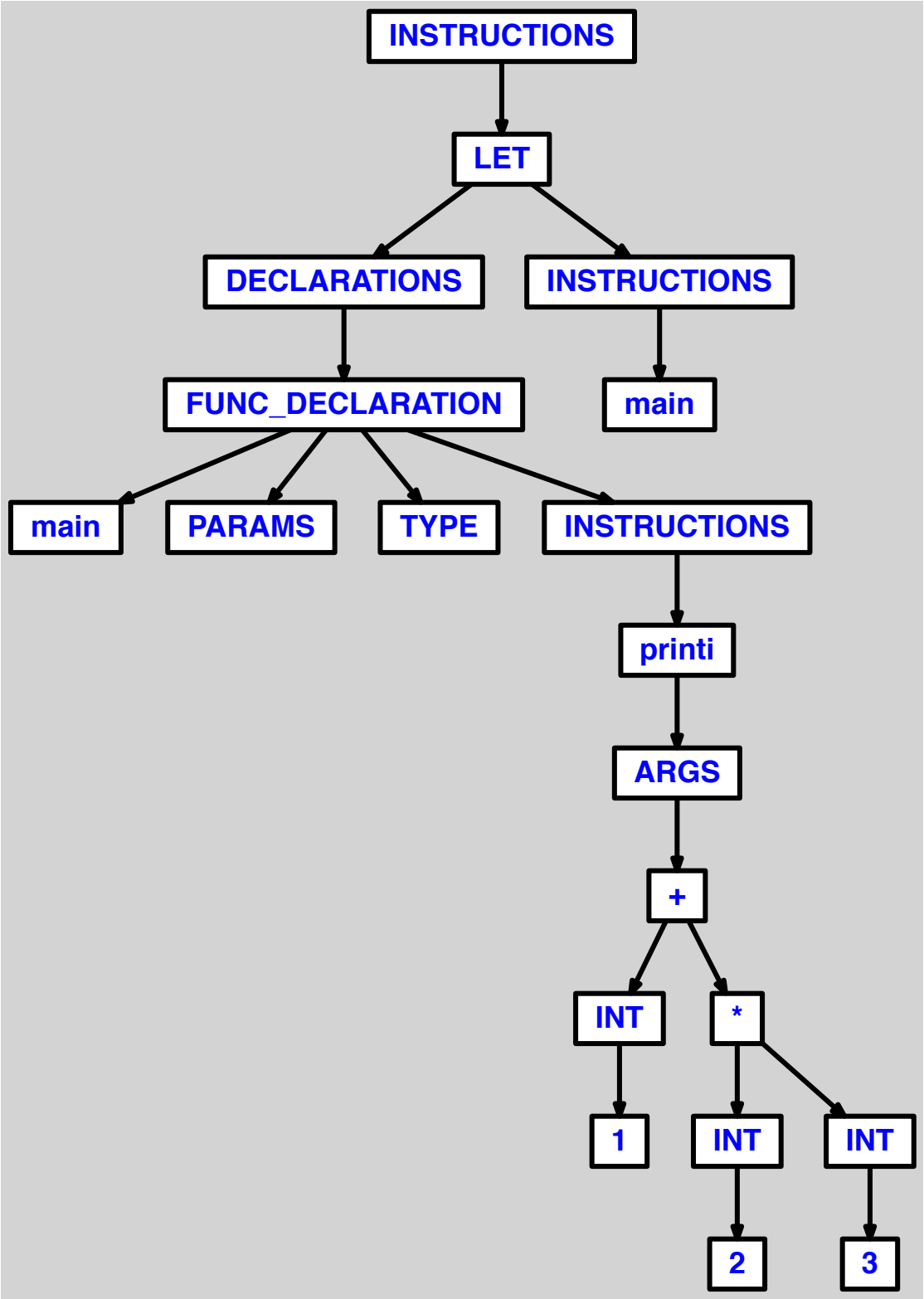
3.2.6 addition suivie de soustraction

```
let
  function main() = printi(1+2-3)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
-
+
INT
INT
INT
3
1
2

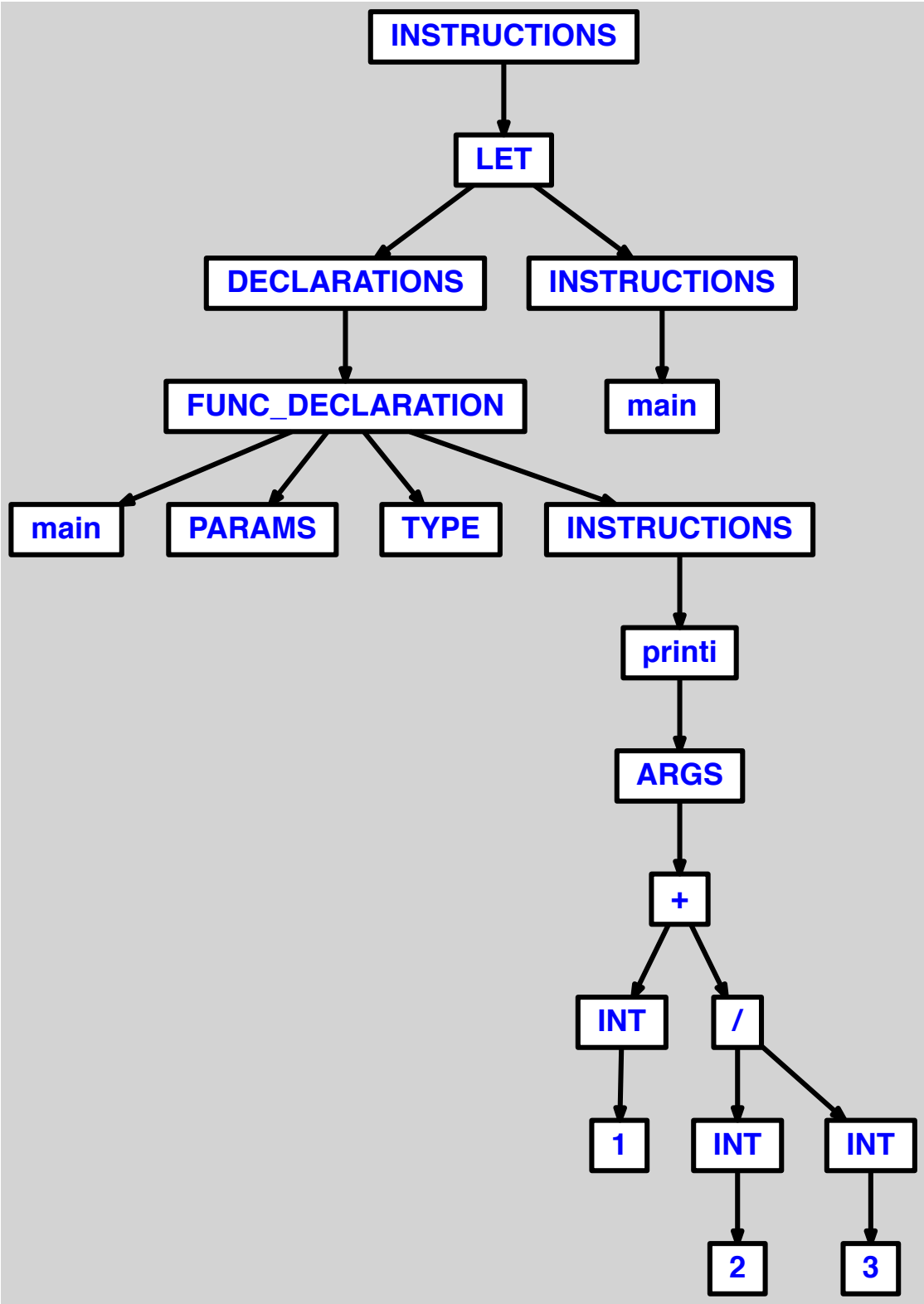
3.2.7 addition suivie de multiplication

```
let
  function main() = printi(1+2*3)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
INT
*
1
INT
INT
2
3

3.2.8 addition suivie de division

```
let
  function main() = printi(1+2/3)
in main() end
```


INSTRUCTIONS
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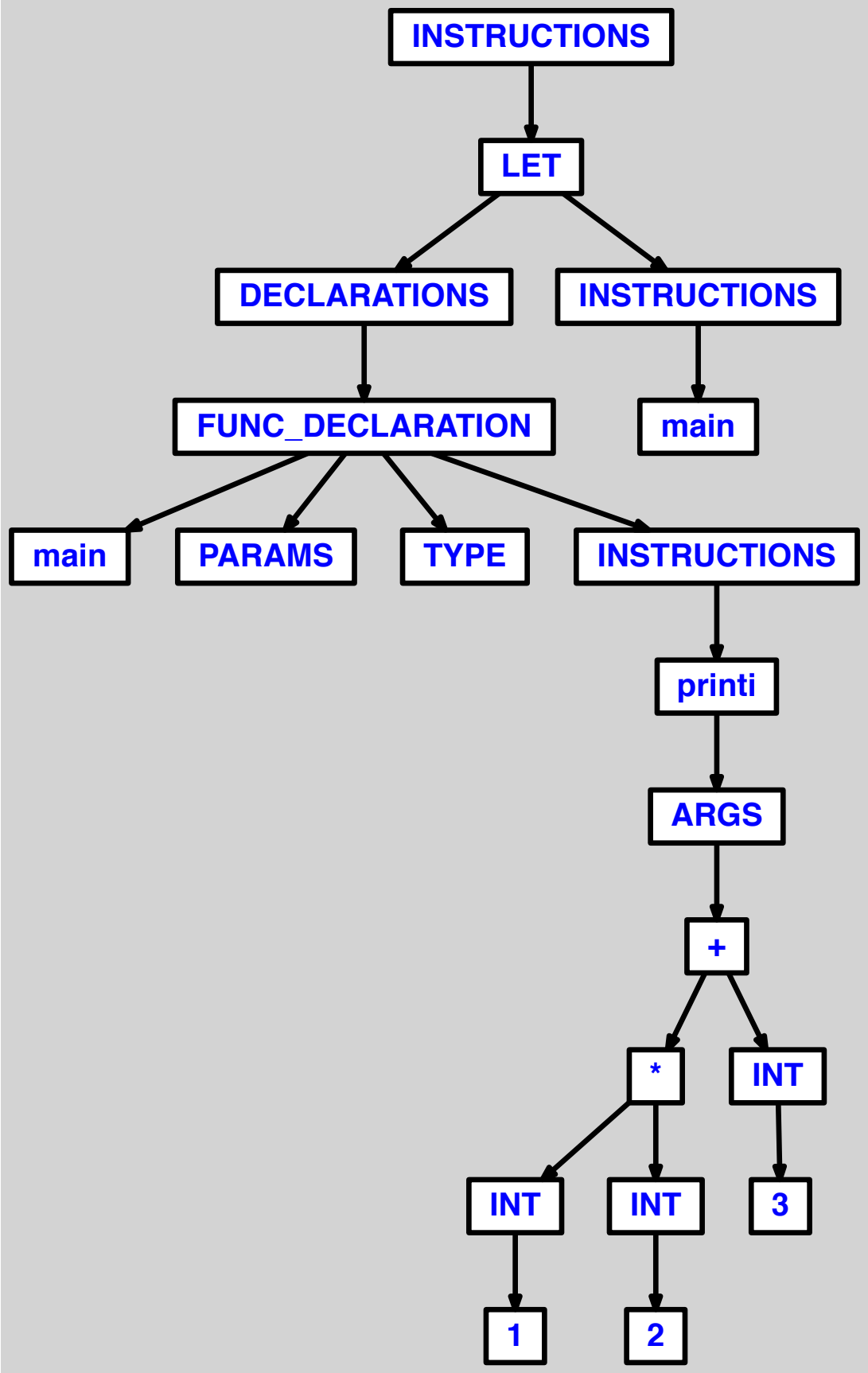
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
INT
/
1
INT
INT
2
3

3.2.9 multiplication suivie d'addition

```
let
  function main() = printi(1*2+3)
in main() end
```


INSTRUCTIONS
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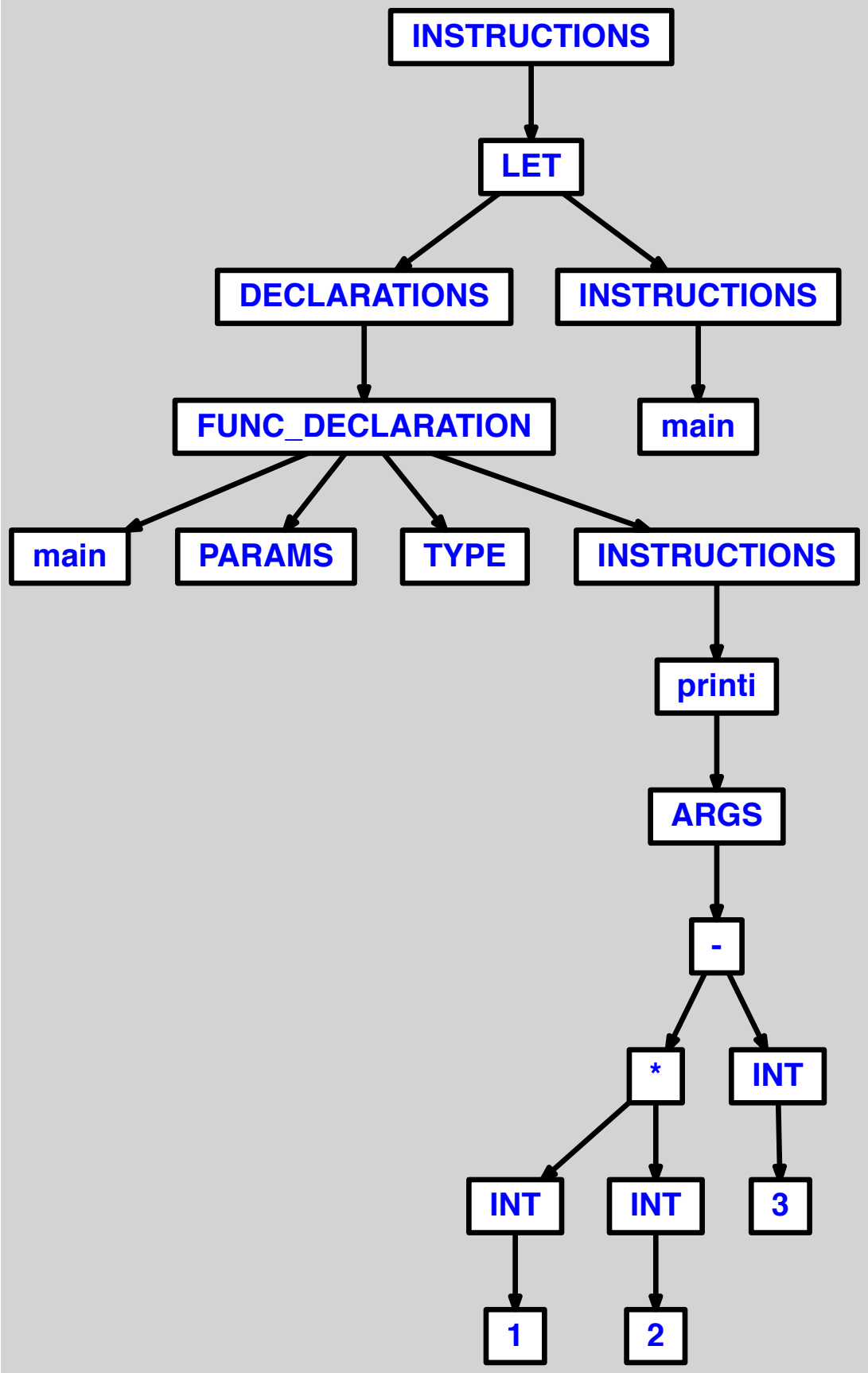
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
*
INT
INT
INT
3
1
2

3.2.10 multiplication suivie de soustraction

```
let
  function main() = printi(1*2-3)
in main() end
```


INSTRUCTIONS
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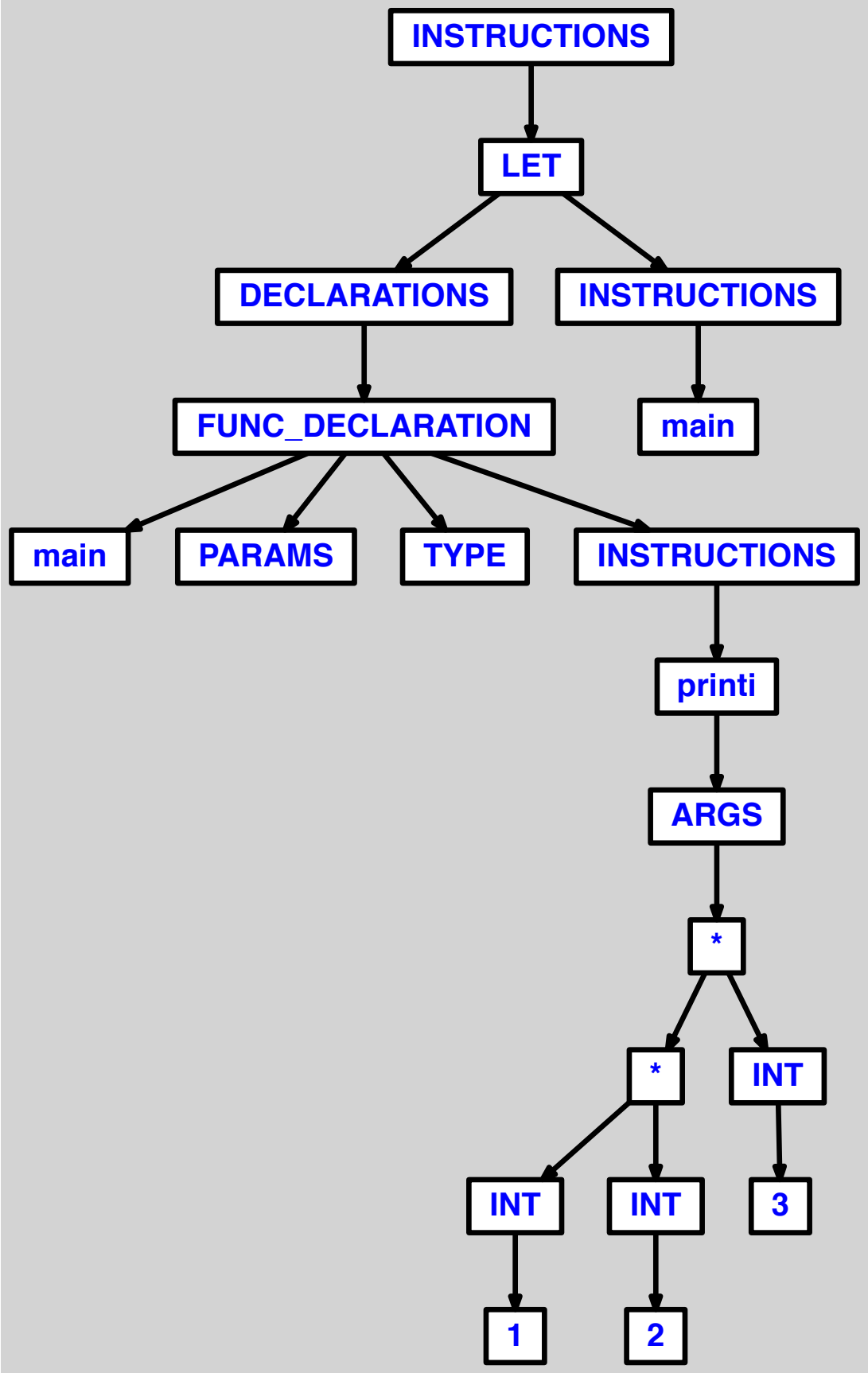
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
-
*
INT
INT
INT
3
1
2

3.2.11 multiplication a 3 termes

```
let
  function main() = printi(1*2*3)
in main() end
```


INSTRUCTIONS
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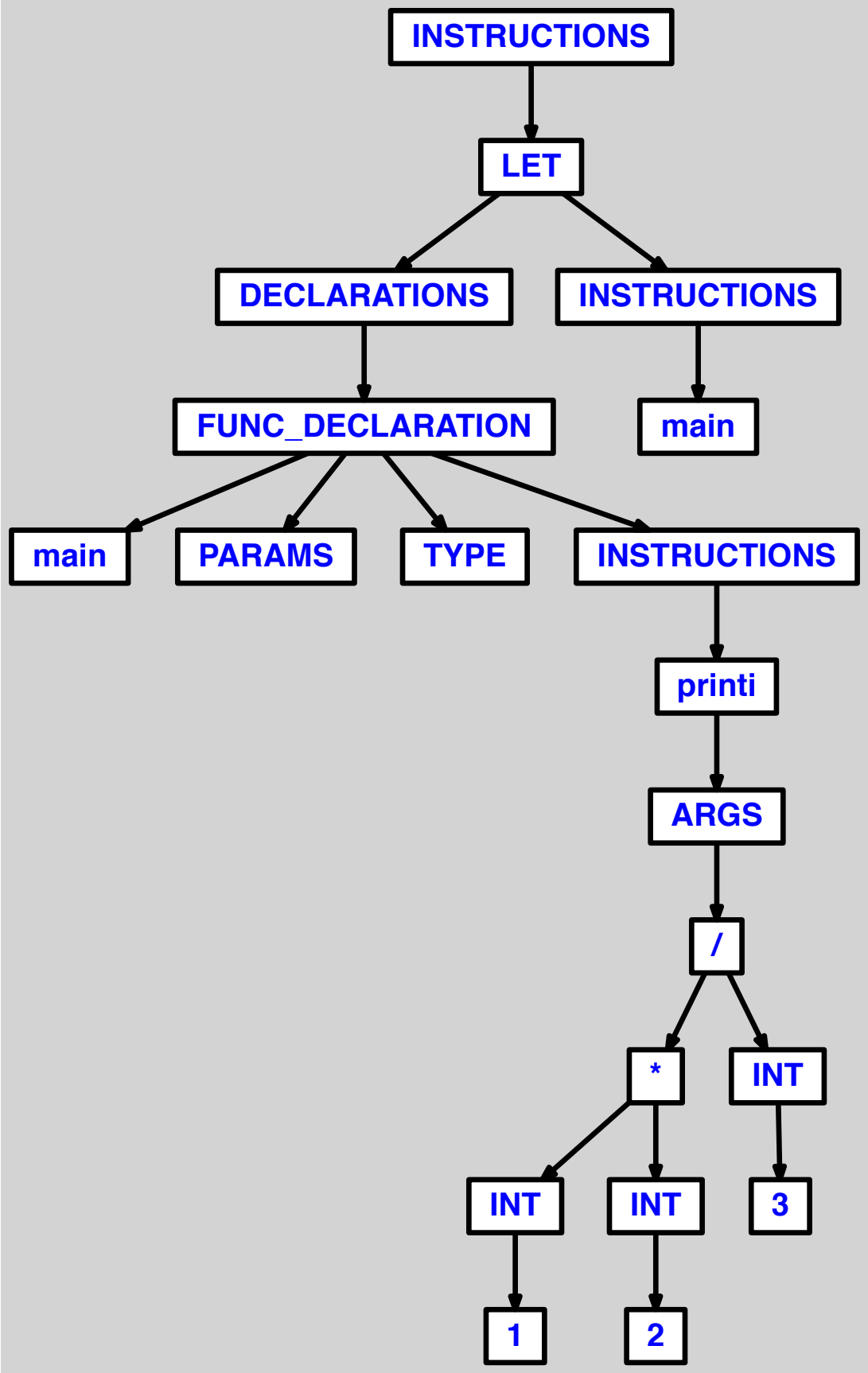
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
*
*
INT
INT
INT
3
1
2

3.2.12 multiplication suivie de division

```
let
  function main() = printi(1*2/3)
in main() end
```


INSTRUCTIONS
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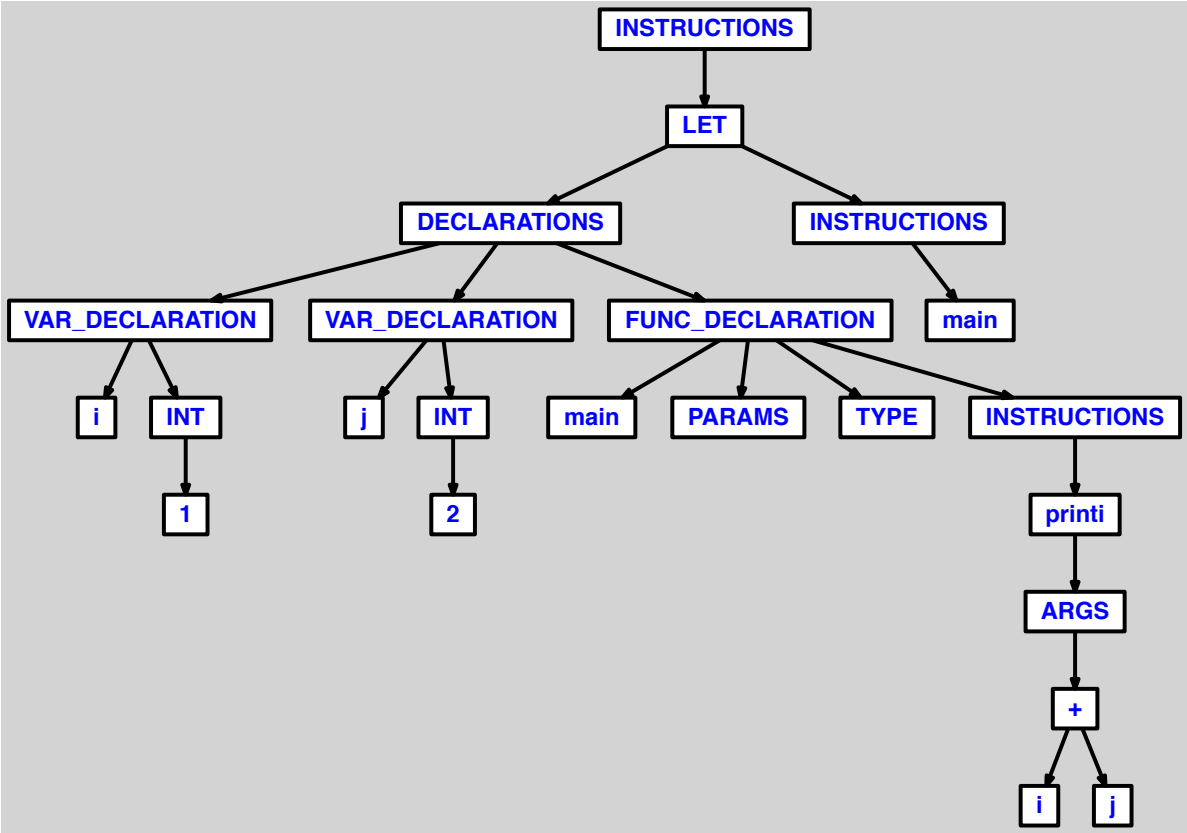
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
/
*
INT
INT
INT
3
1
2

3.2.13 addition simple, a 2 termes, identifies par des variables

```
let
  var i := 1
  var j := 2

  function main() = printi(i+j)
in main() end
```


INSTRUCTIONS
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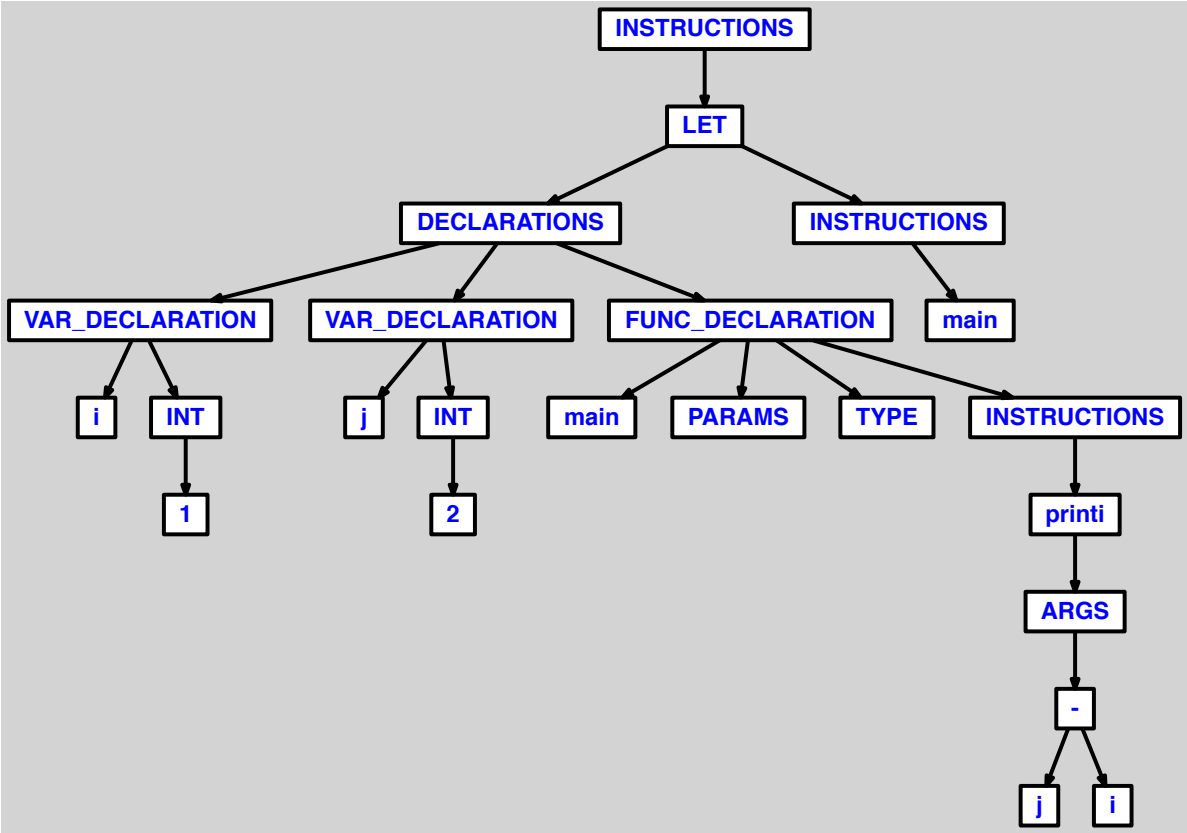
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
printi
ARGS
+
i
j

3.2.14 soustraction simple, a 2 termes, identifies par des variables

```
let
  var i := 1
  var j := 2

  function main() = printi(j-i)
in main() end
```


INSTRUCTIONS
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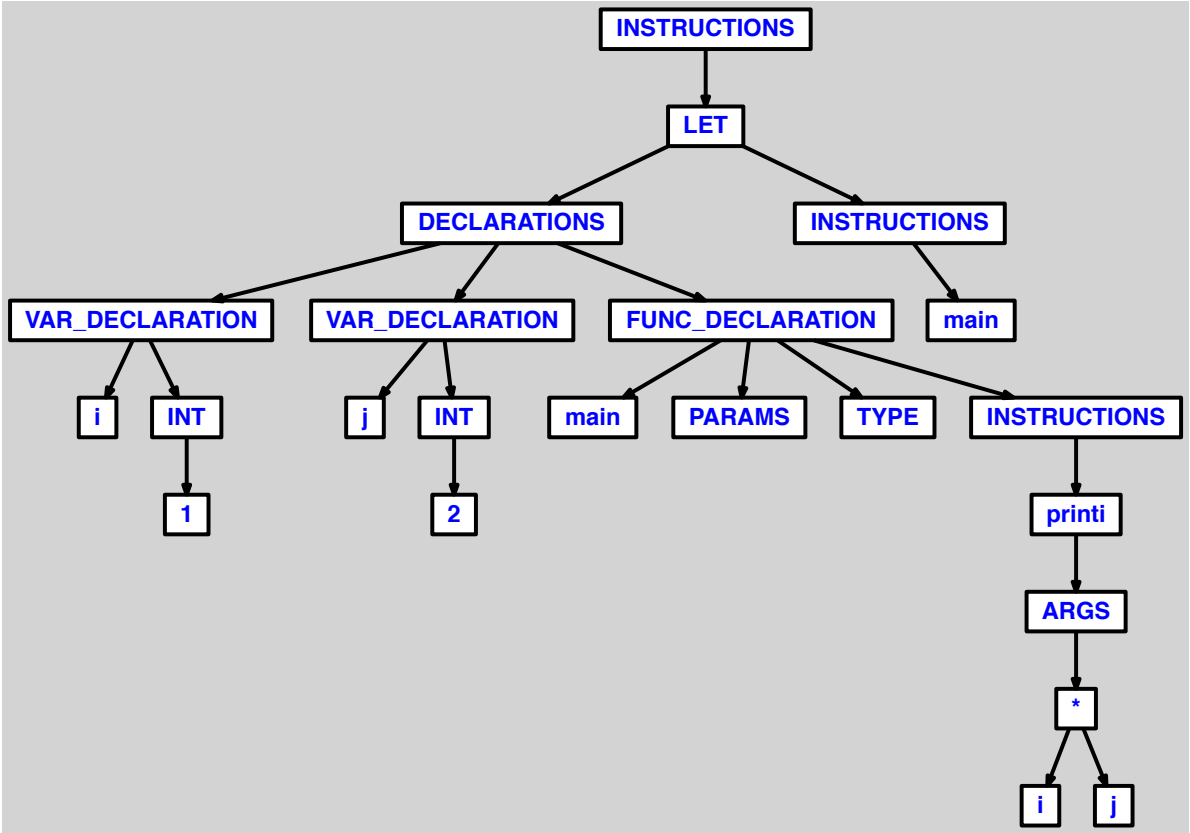
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
printi
ARGS
-
j
i

3.2.15 multiplication simple, a 2 termes, identifies par des variables

```
let
  var i := 1
  var j := 2

  function main() = printi(i*j)
in main() end
```


INSTRUCTIONS
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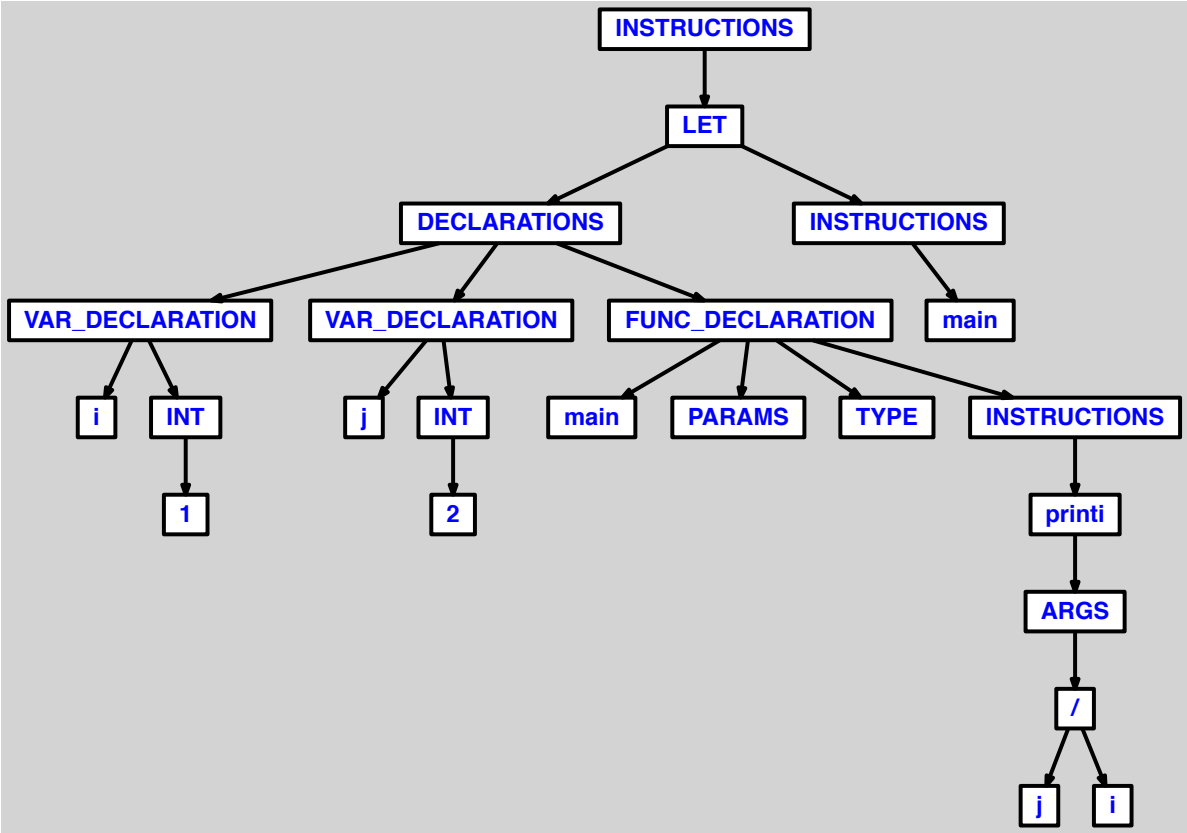
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
printi
ARGS
*
i
j

3.2.16 division simple, a 2 termes, identifies par des variables

```
let
  var i := 1
  var j := 2

  function main() = printi(j/i)
in main() end
```


INSTRUCTIONS
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DECLARATIONS
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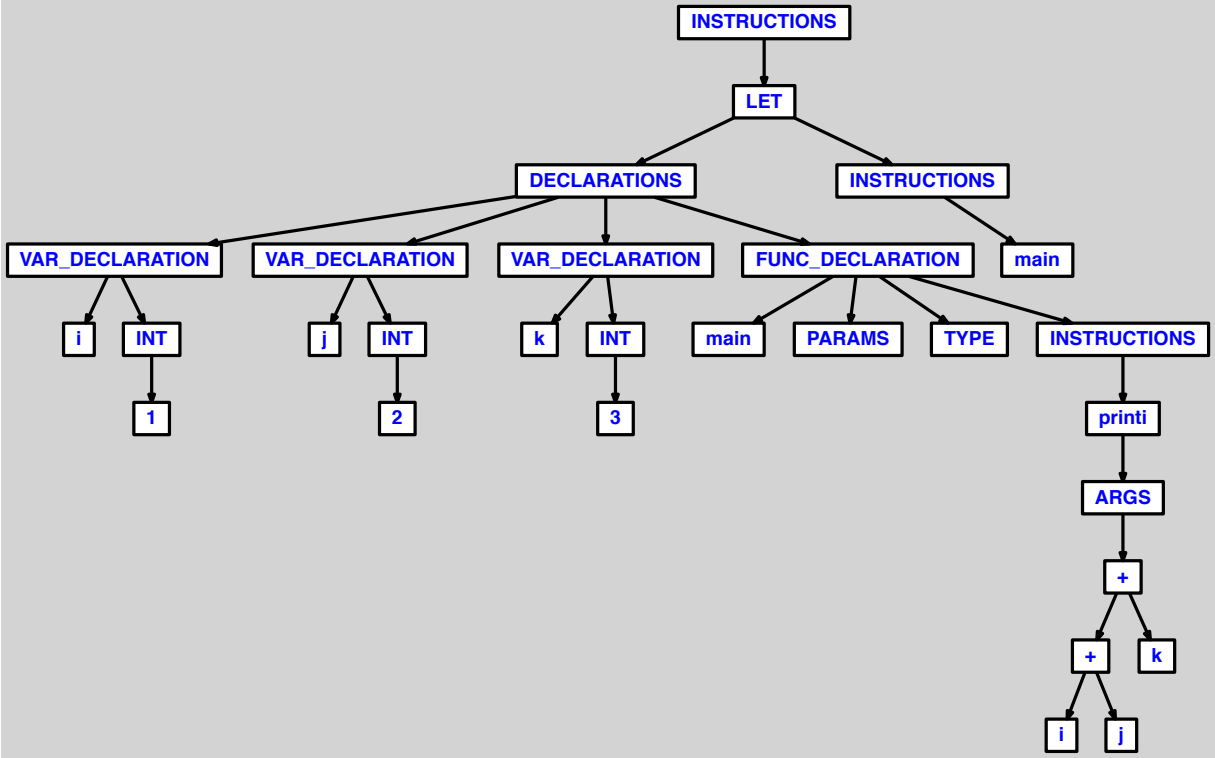
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
printi
ARGS
/
j
i

3.2.17 addition a 3 termes, identifies par des variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i+j+k)
in main() end
```


INSTRUCTIONS
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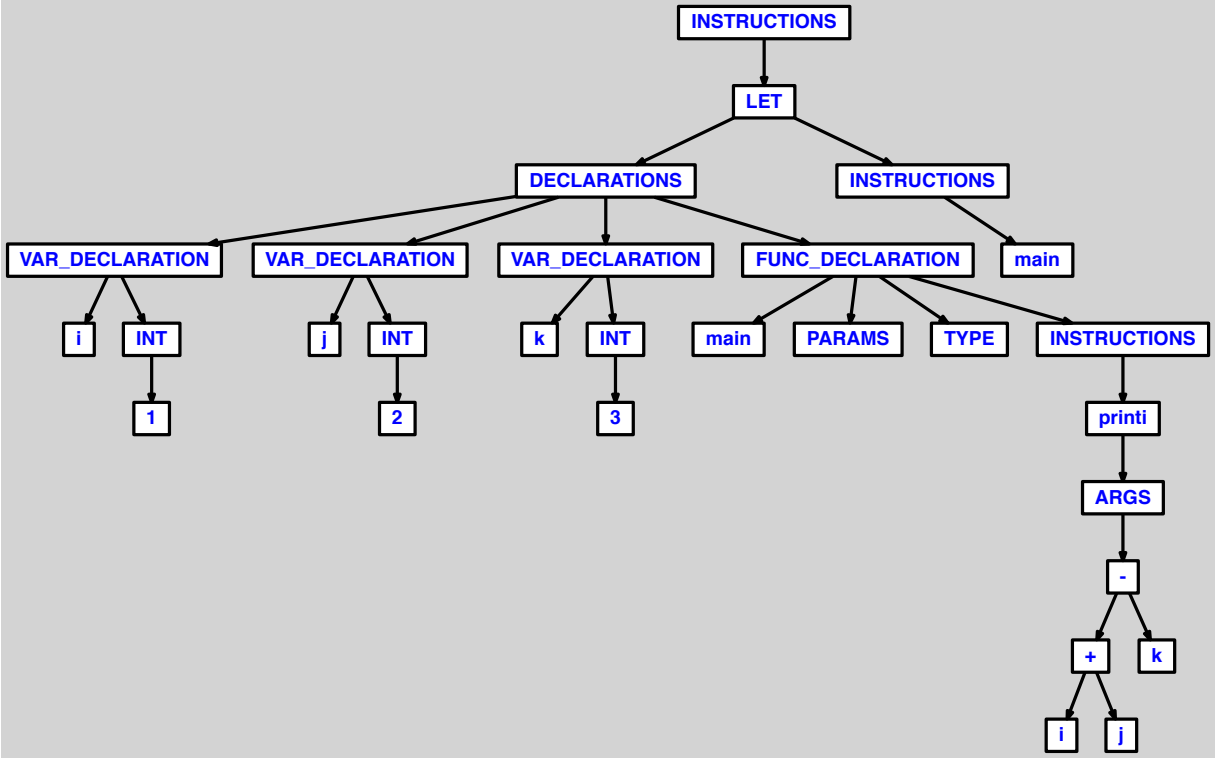
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
+
k
i
j

3.2.18 addition suivie de soustraction, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i+j-k)
in main() end
```


INSTRUCTIONS
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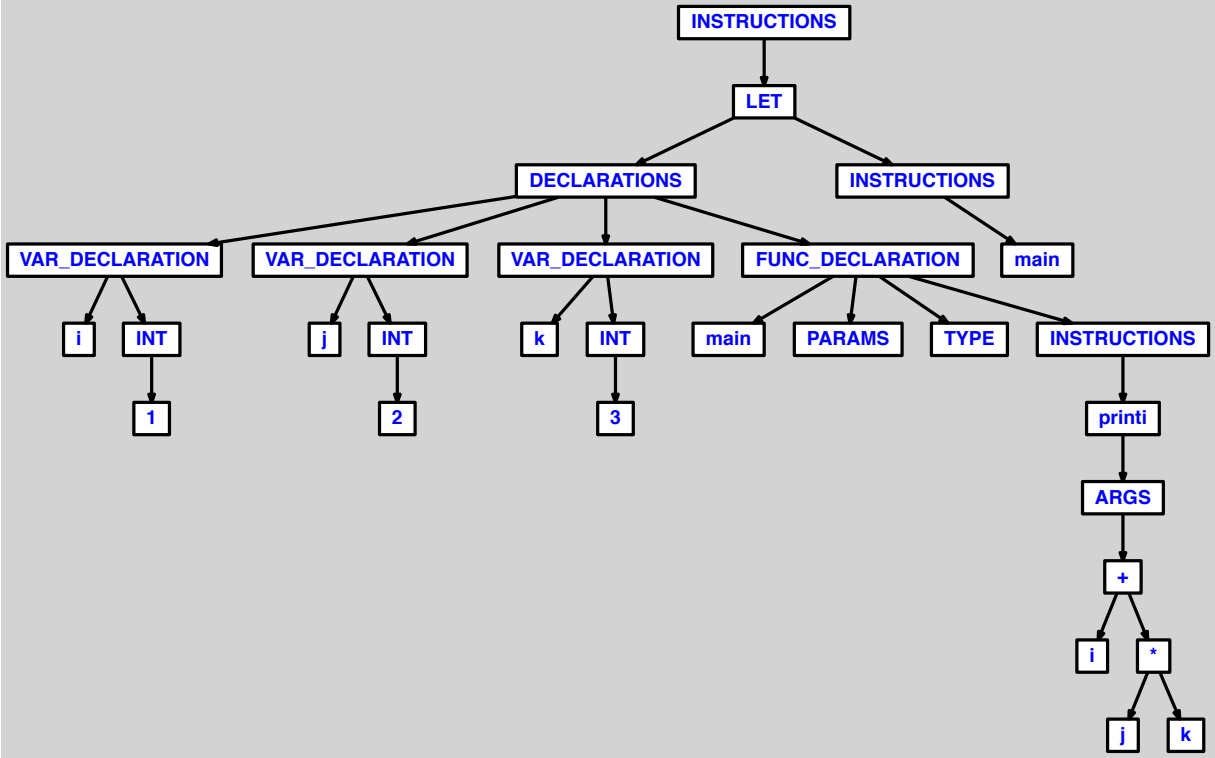
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
-
+
k
i
j

3.2.19 addition suivie de multiplication, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i+j*k)
in main() end
```


INSTRUCTIONS
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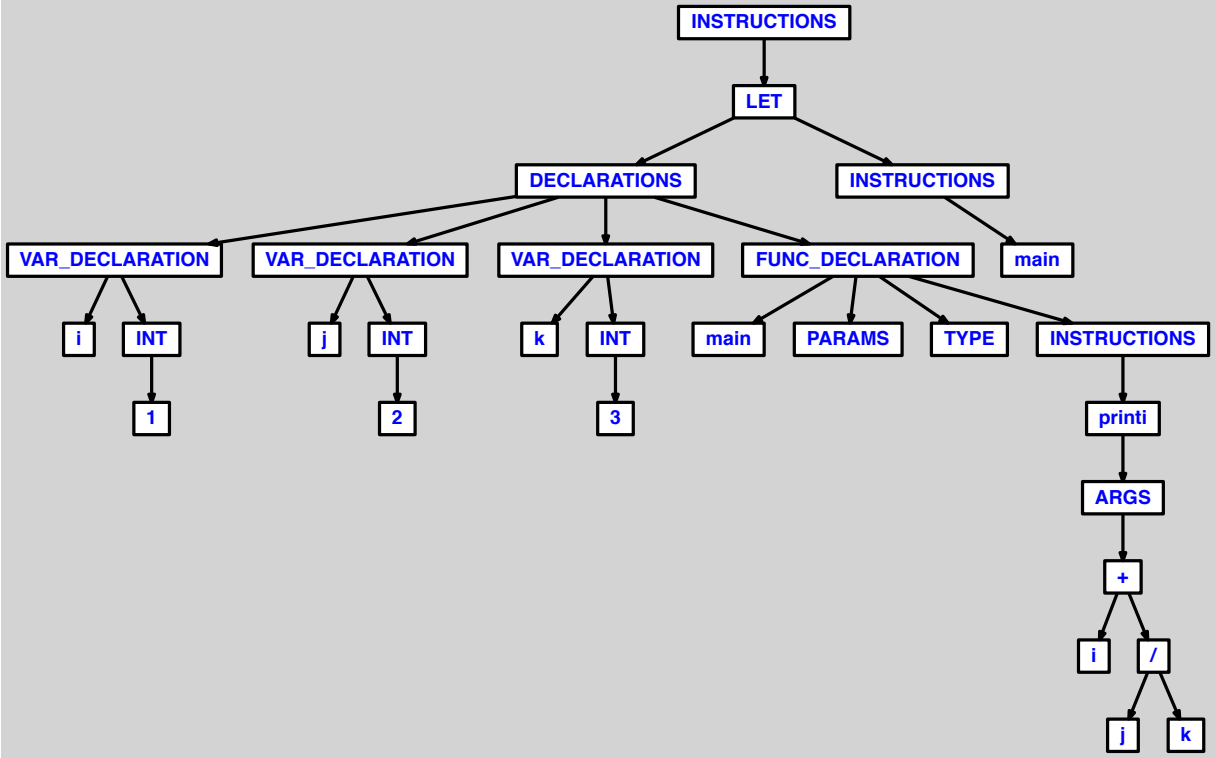
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
i
*
j
k

3.2.20 addition suivie de division, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i+j/k)
in main() end
```


INSTRUCTIONS
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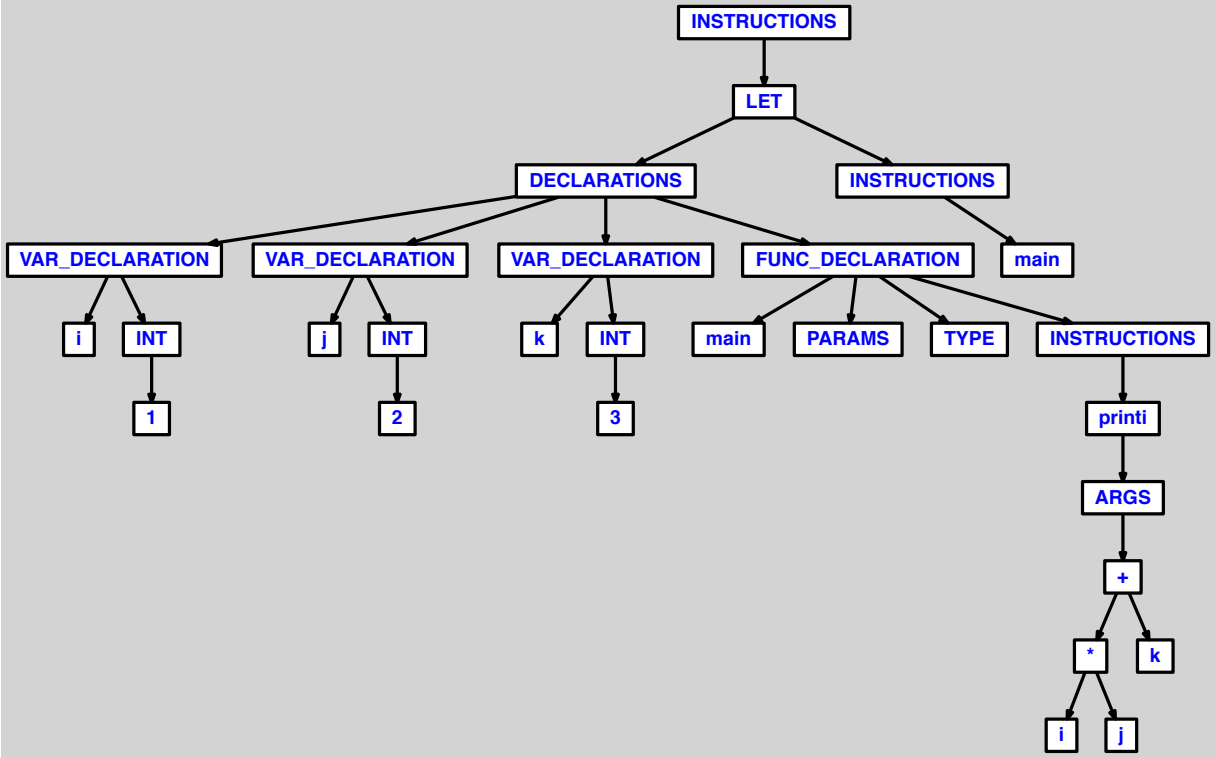
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
i
/
j
k

3.2.21 multiplication suivie d'addition, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i*j+k)
in main() end
```


INSTRUCTIONS
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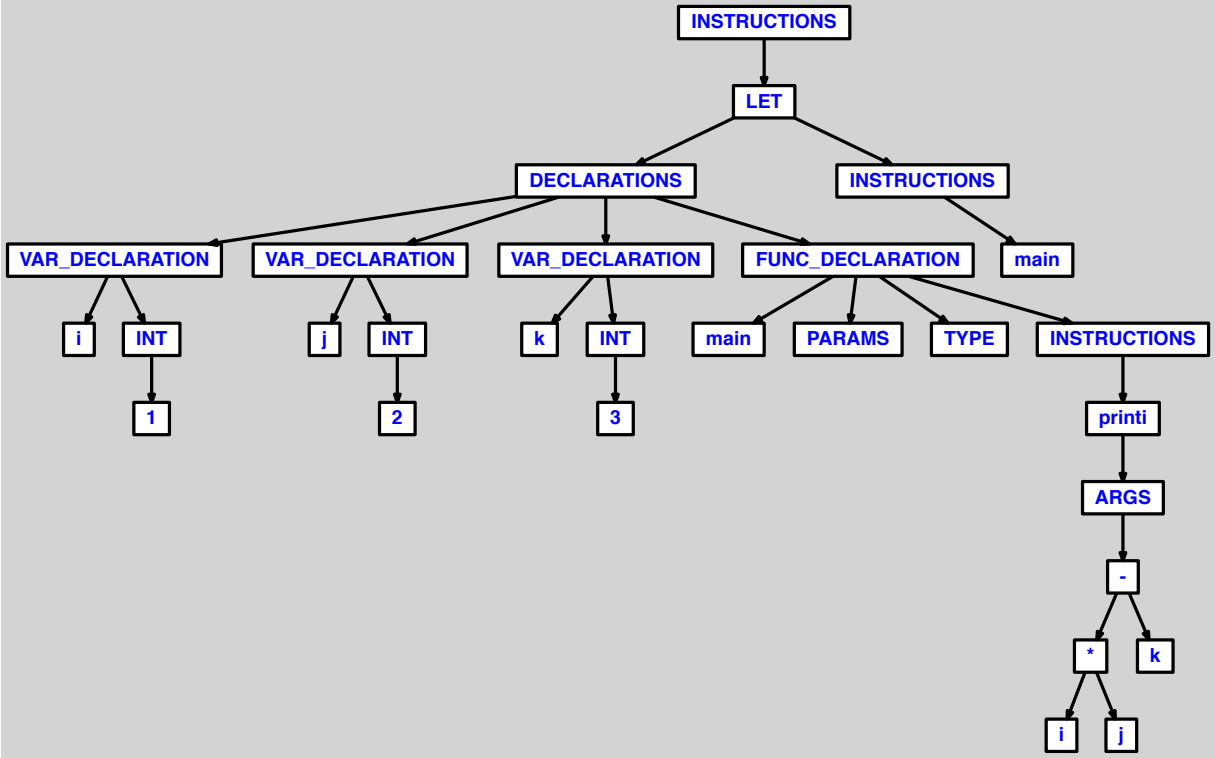
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
*
k
i
j

3.2.22 multiplication suivie de soustraction, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i*j-k)
in main() end
```


INSTRUCTIONS
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FUNC_DECLARATION
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i
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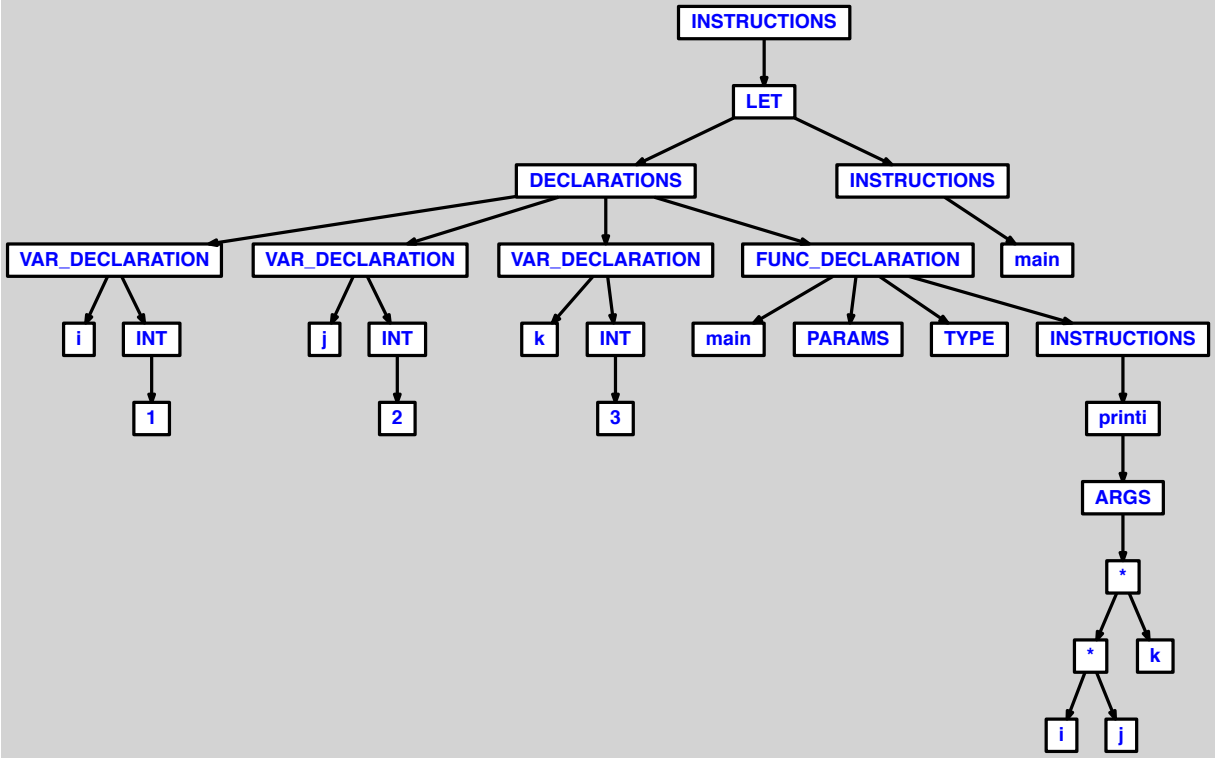
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
-
*
k
i
j

3.2.23 multiplication a 3 termes, identifies par des variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i*j*k)
in main() end
```


INSTRUCTIONS
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INSTRUCTIONS
VAR_DECLARATION
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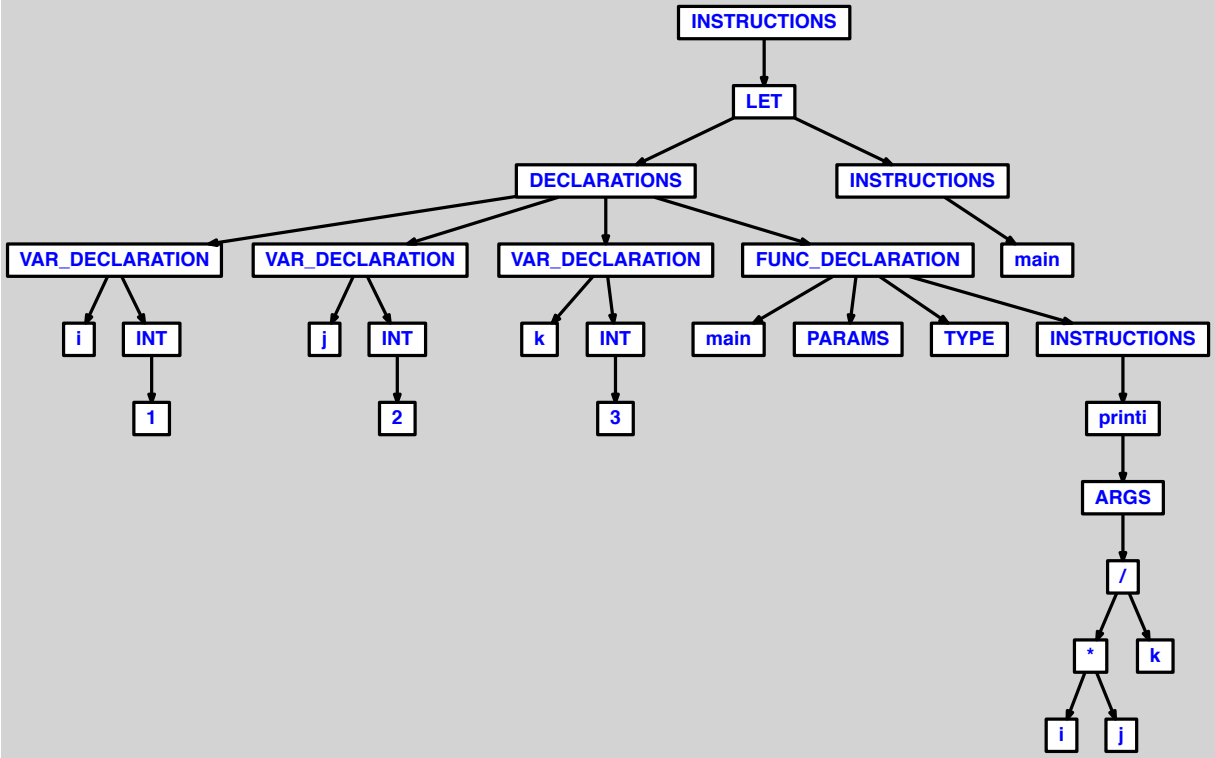
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
*
*
k
i
j

3.2.24 mutliplication suivie de division, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i*j/k)
in main() end
```


INSTRUCTIONS
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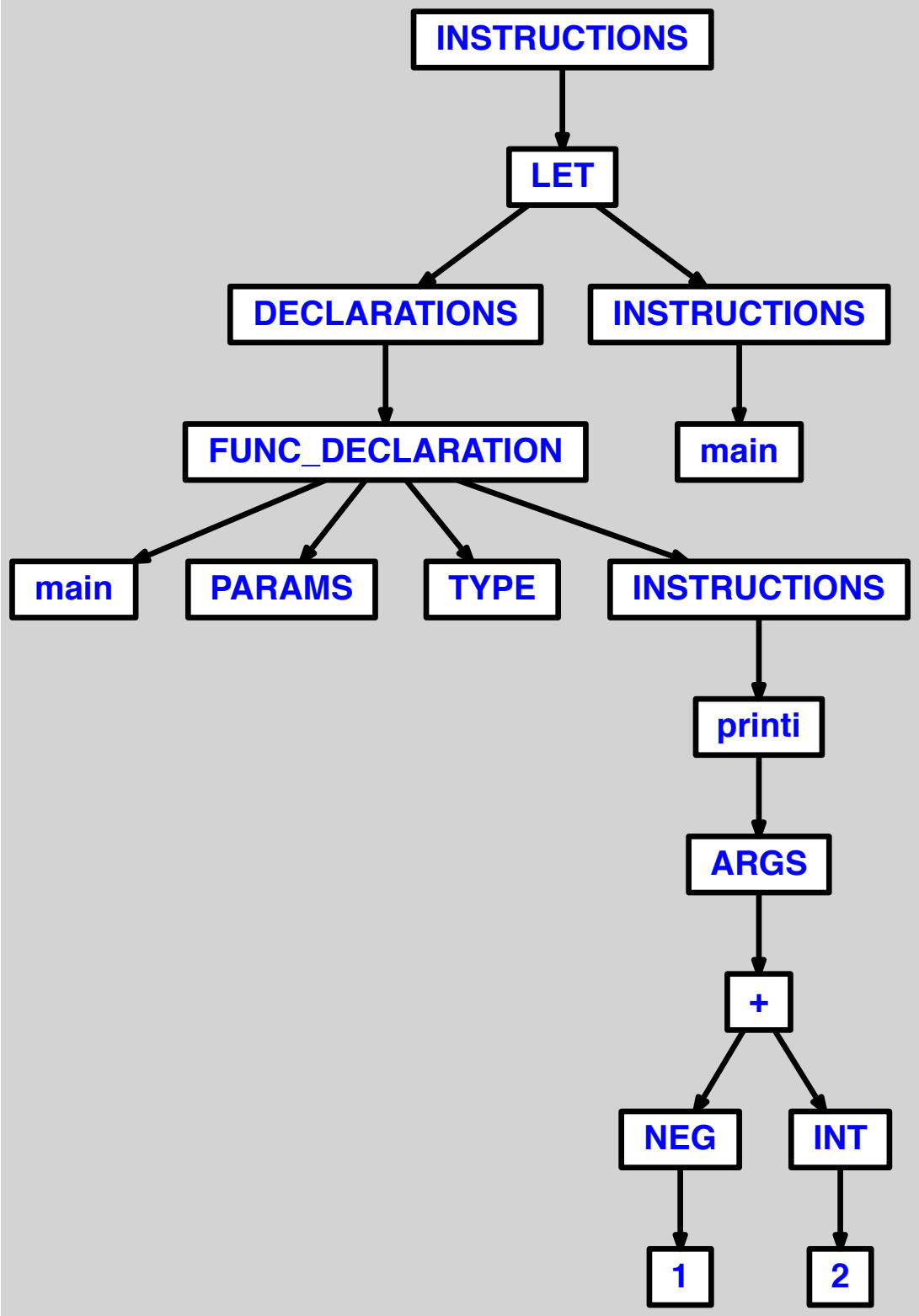
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
/
*
k
i
j

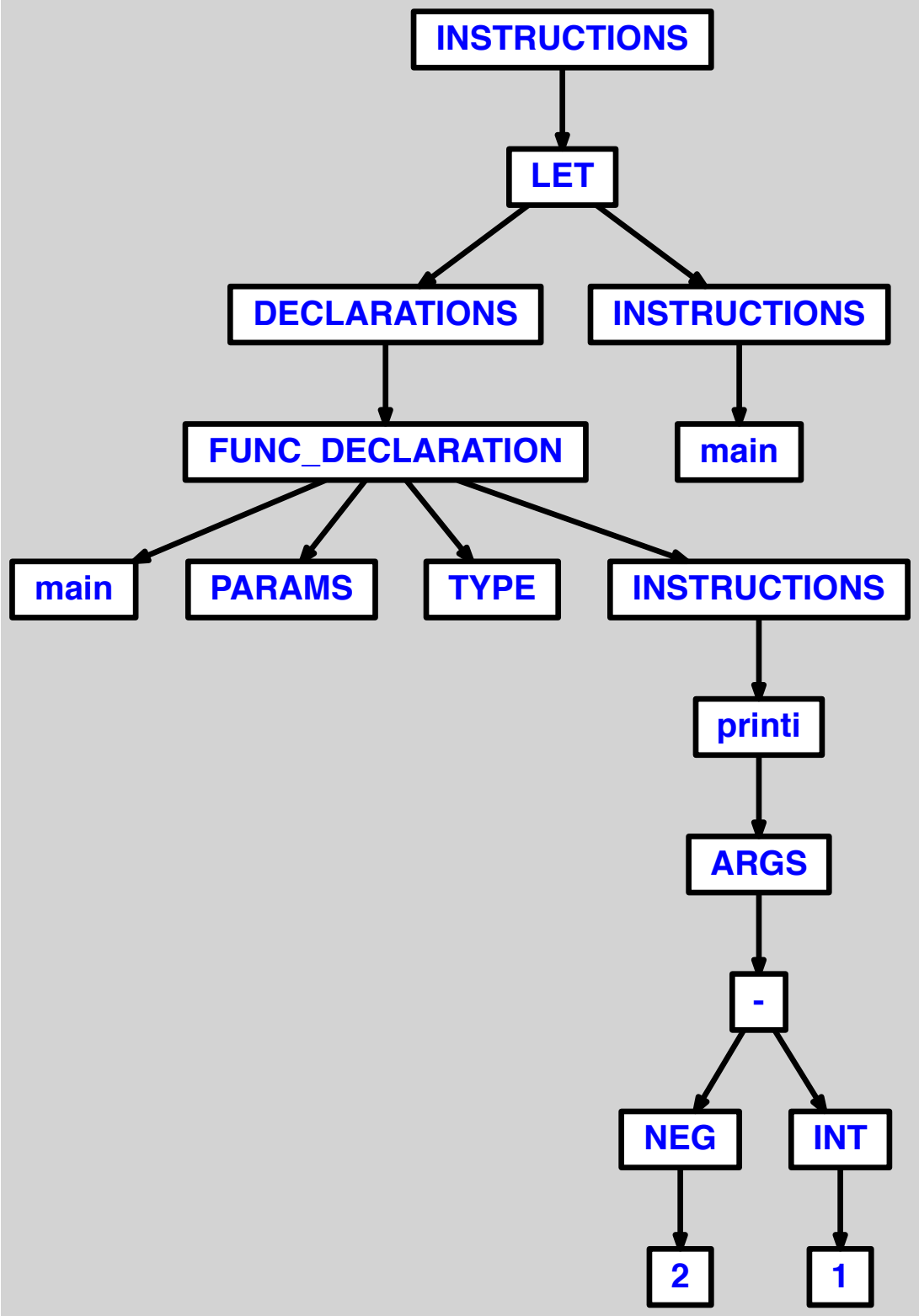
3.2.25 addition simple, a 2 termes, dont un ayant moins unaire

```
let
  function main() = printi(-1+2)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
NEG
INT
1
2

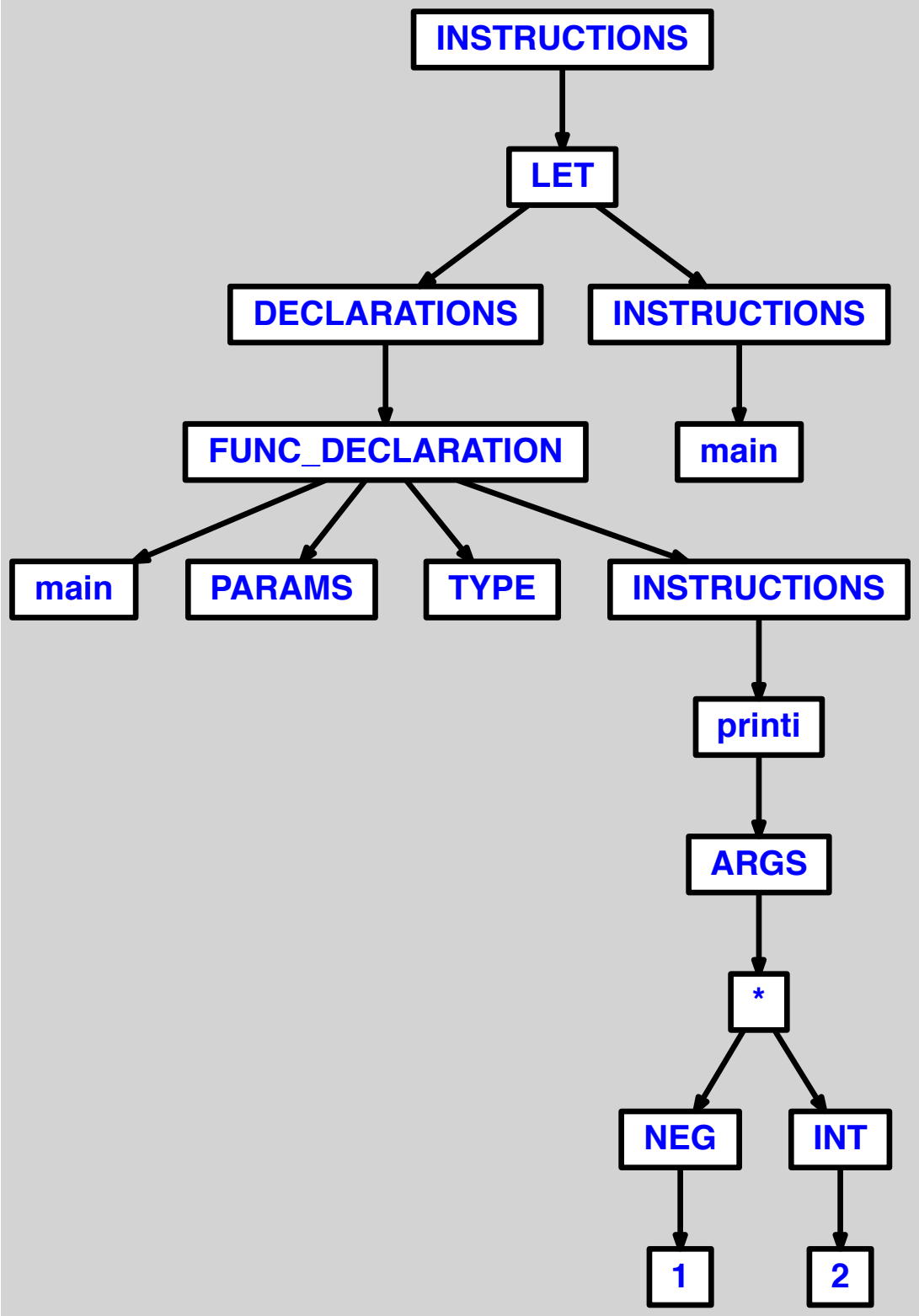
3.2.26 soustraction simple, a 2 termes, dont ayant moins unaire

```
let
  function main() = printi(-2-1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
-
NEG
INT
2
1

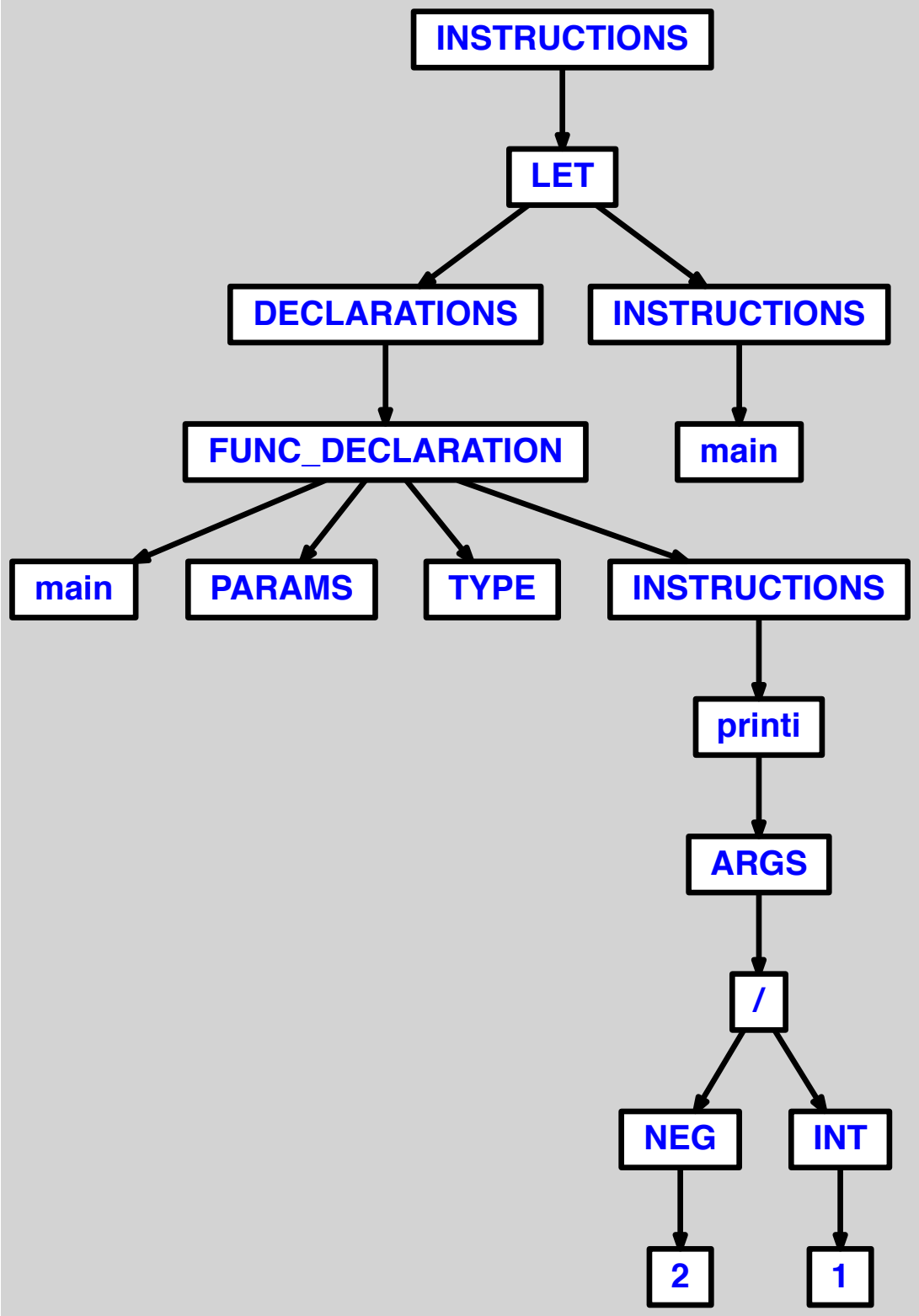
3.2.27 multiplication simple, a 2 termes, dont un ayant moins unaire

```
let
  function main() = printi(-1*2)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
*
NEG
INT
1
2

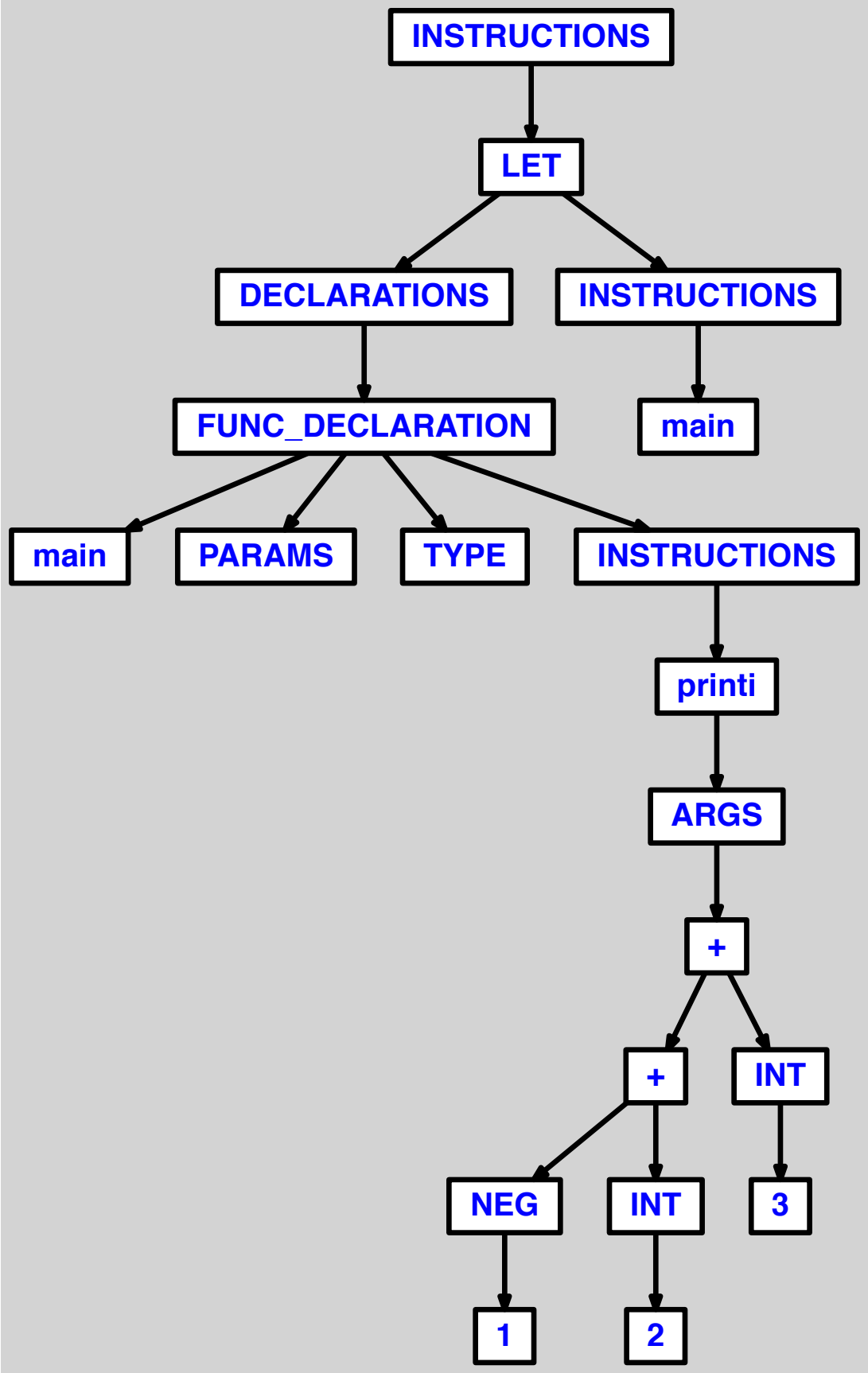
3.2.28 division simple, a 2 termes, dont un ayant moins unaire

```
let
  function main() = printi(-2/1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
/
NEG
INT
2
1

3.2.29 addition a 3 termes, dont un ayant moins unaire

```
let
  function main() = printi(-1+2+3)
in main() end
```


INSTRUCTIONS
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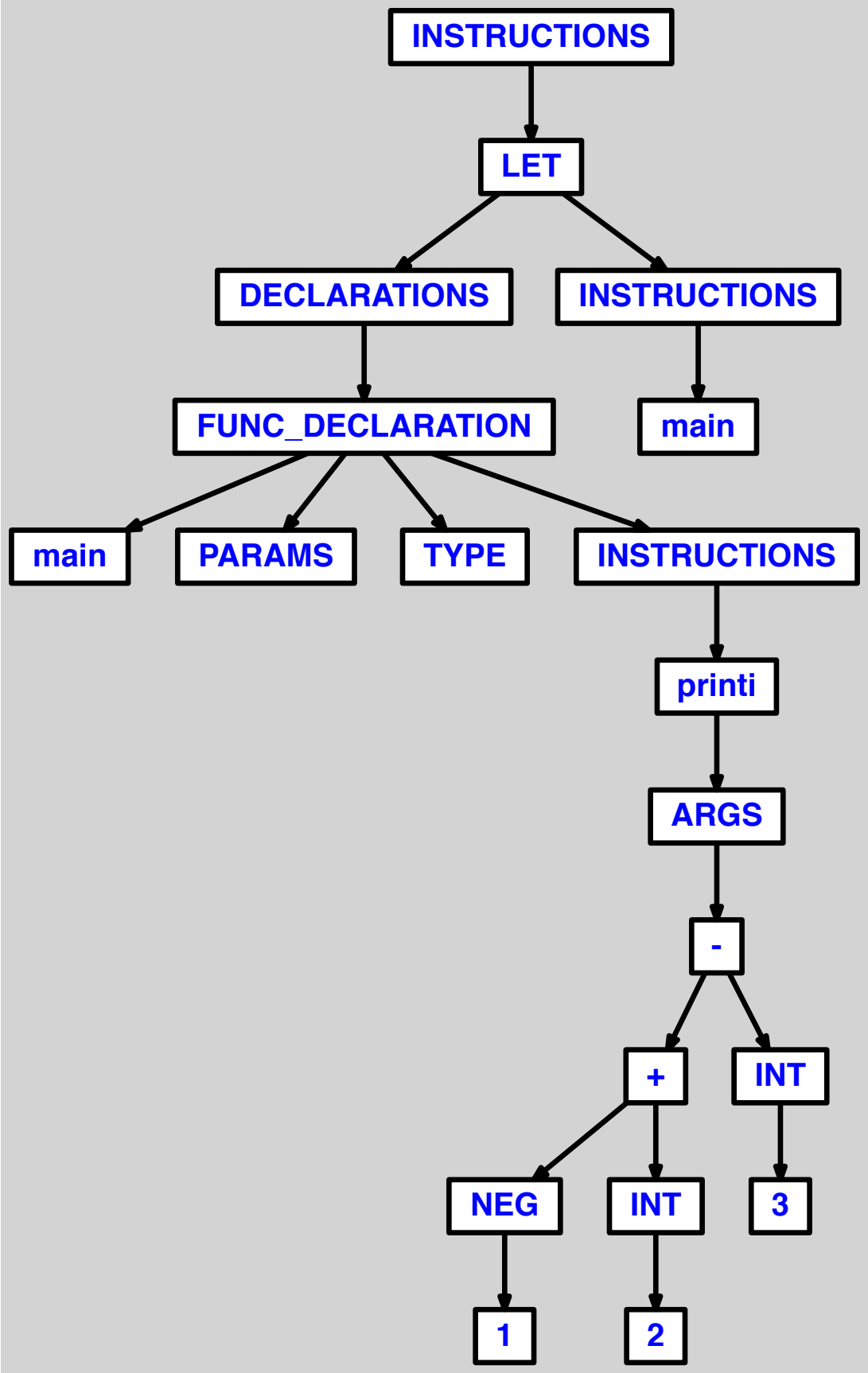
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
+
INT
NEG
INT
3
1
2

3.2.30 addition suivie de soustraction, avec un terme ayant moins unaire

```
let
  function main() = printi(-1+2-3)
in main() end
```


INSTRUCTIONS
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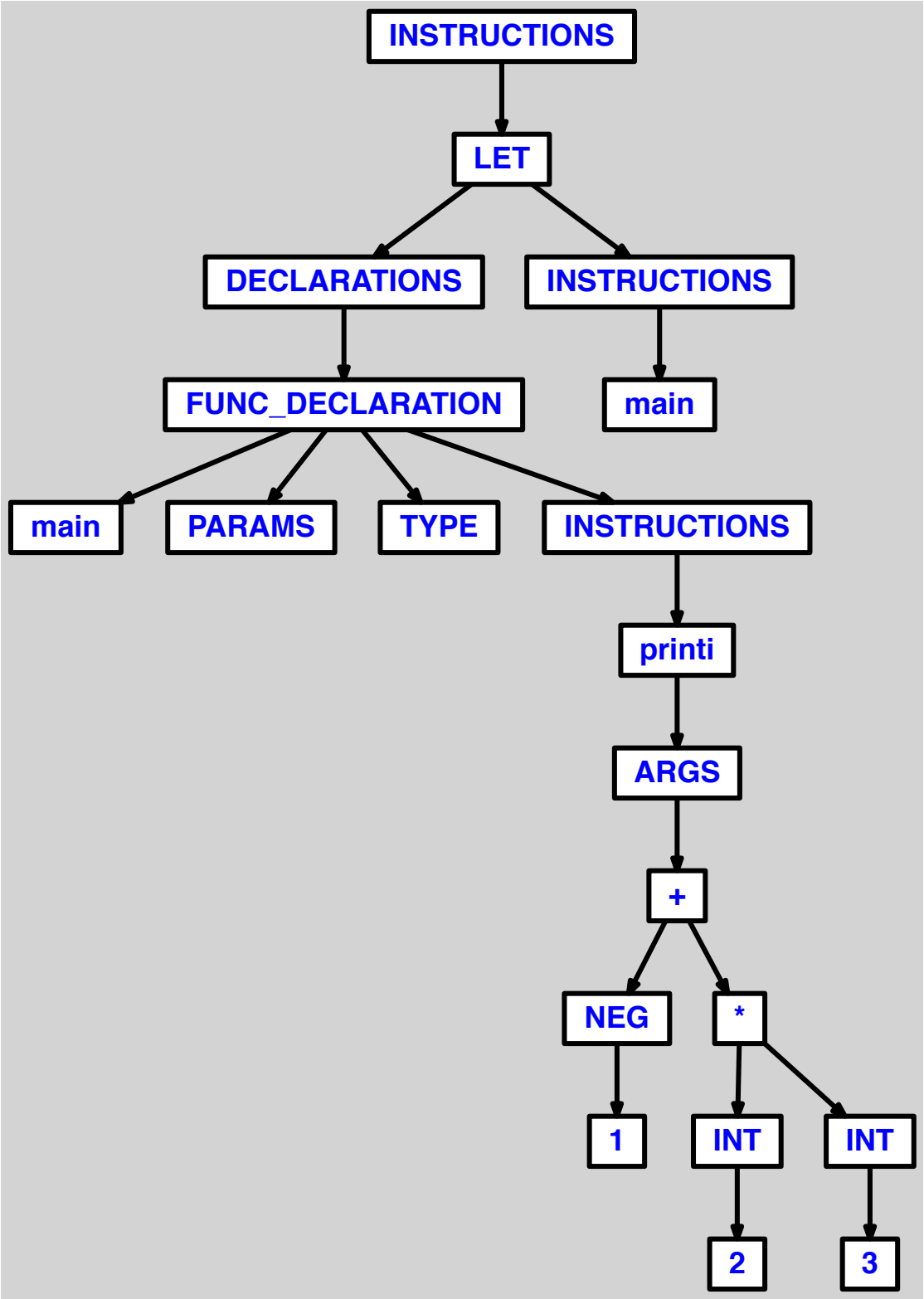
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
-
+
INT
NEG
INT
3
1
2

3.2.31 addition suivie de multiplication, avec un terme ayant moins unaire

```
let
  function main() = printi(-1+2*3)
in main() end
```


INSTRUCTIONS
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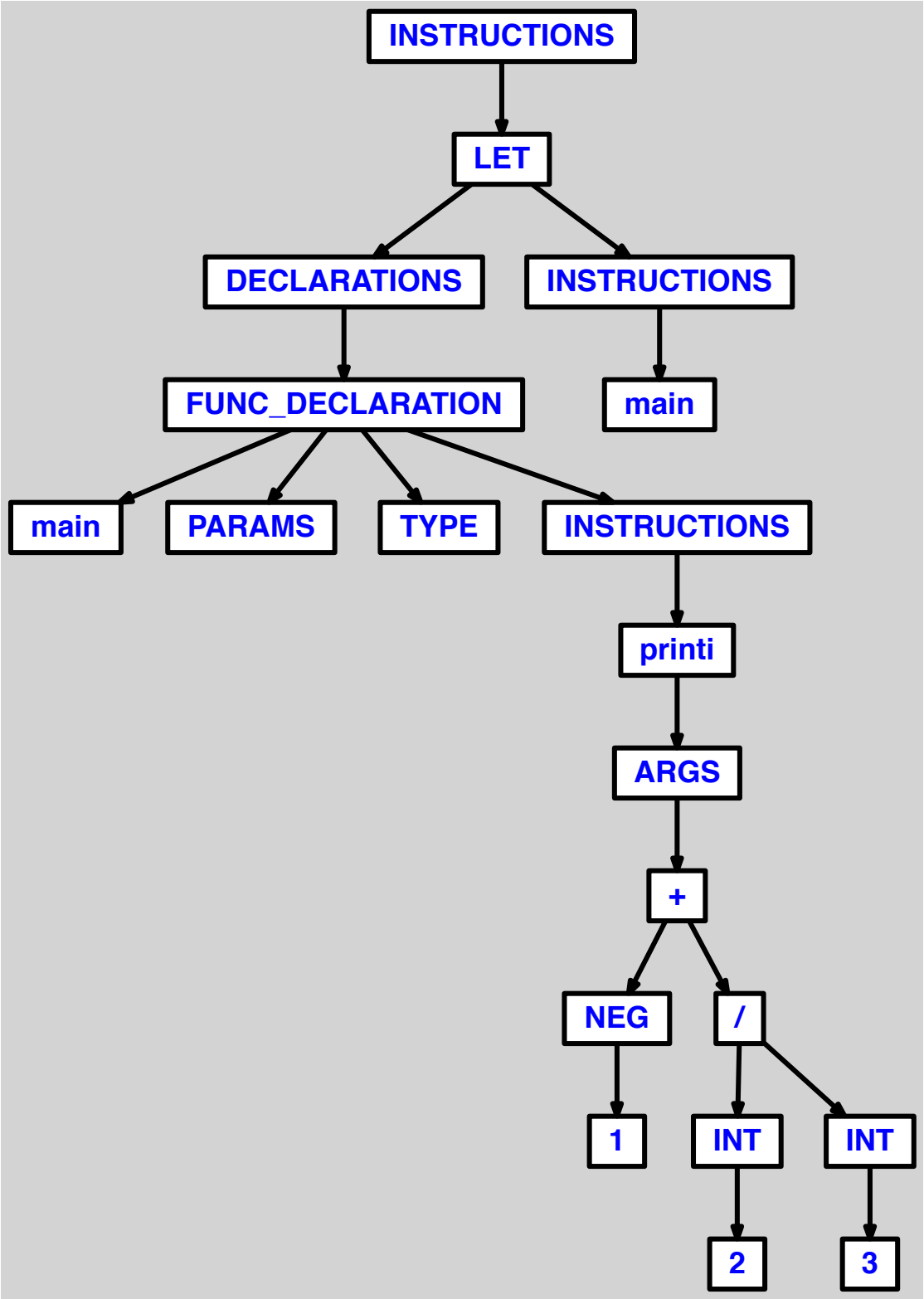
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
NEG
*
1
INT
INT
2
3

3.2.32 addition suivie de division, avec un terme ayant moins unaire

```
let
  function main() = printi(-1+2/3)
in main() end
```


INSTRUCTIONS
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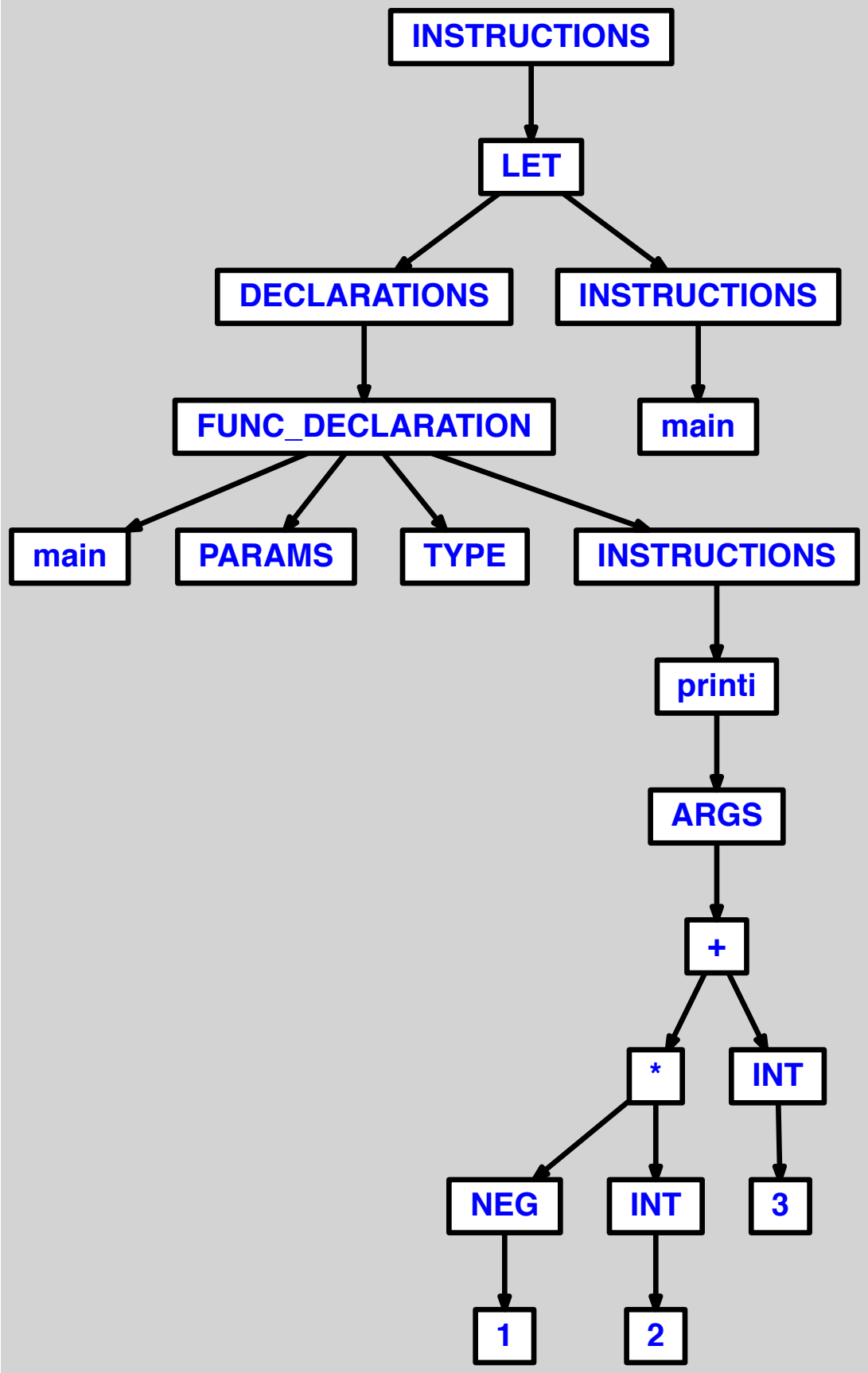
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
NEG
/
1
INT
INT
2
3

3.2.33 multiplication suivie d'addition, dont un terme ayant moins unaire

```
let
  function main() = printi(-1*2+3)
in main() end
```


INSTRUCTIONS
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FUNC_DECLARATION
main
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PARAMS
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INSTRUCTIONS
printi
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INT
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INT
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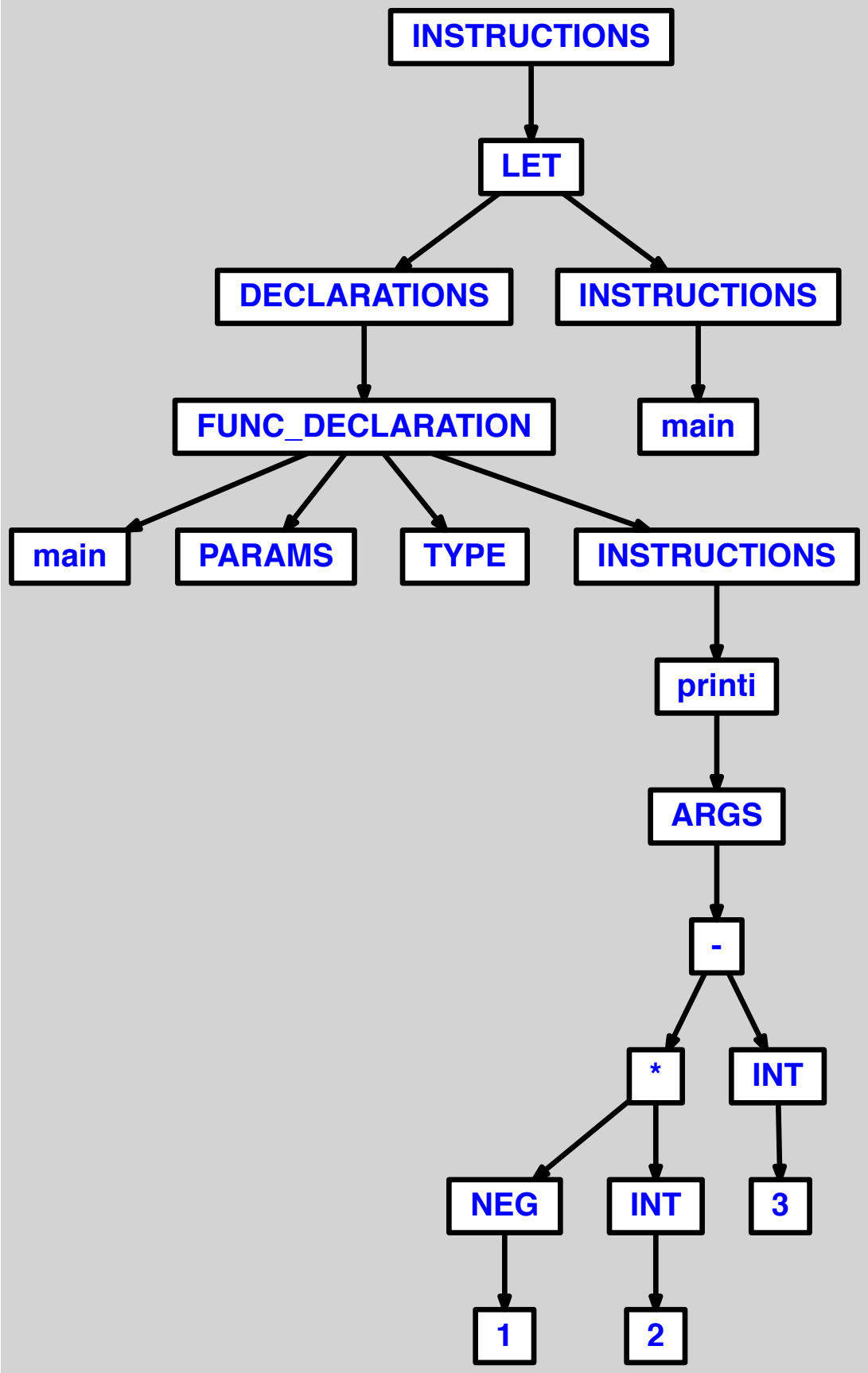
3.2.34 multiplication suivie de soustraction, dont un terme ayant moins unaire

```
let
  function main() = printi(-1*2-3)
in main() end
```


INSTRUCTIONS
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PARAMS
TYPE
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printi
ARGS
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*
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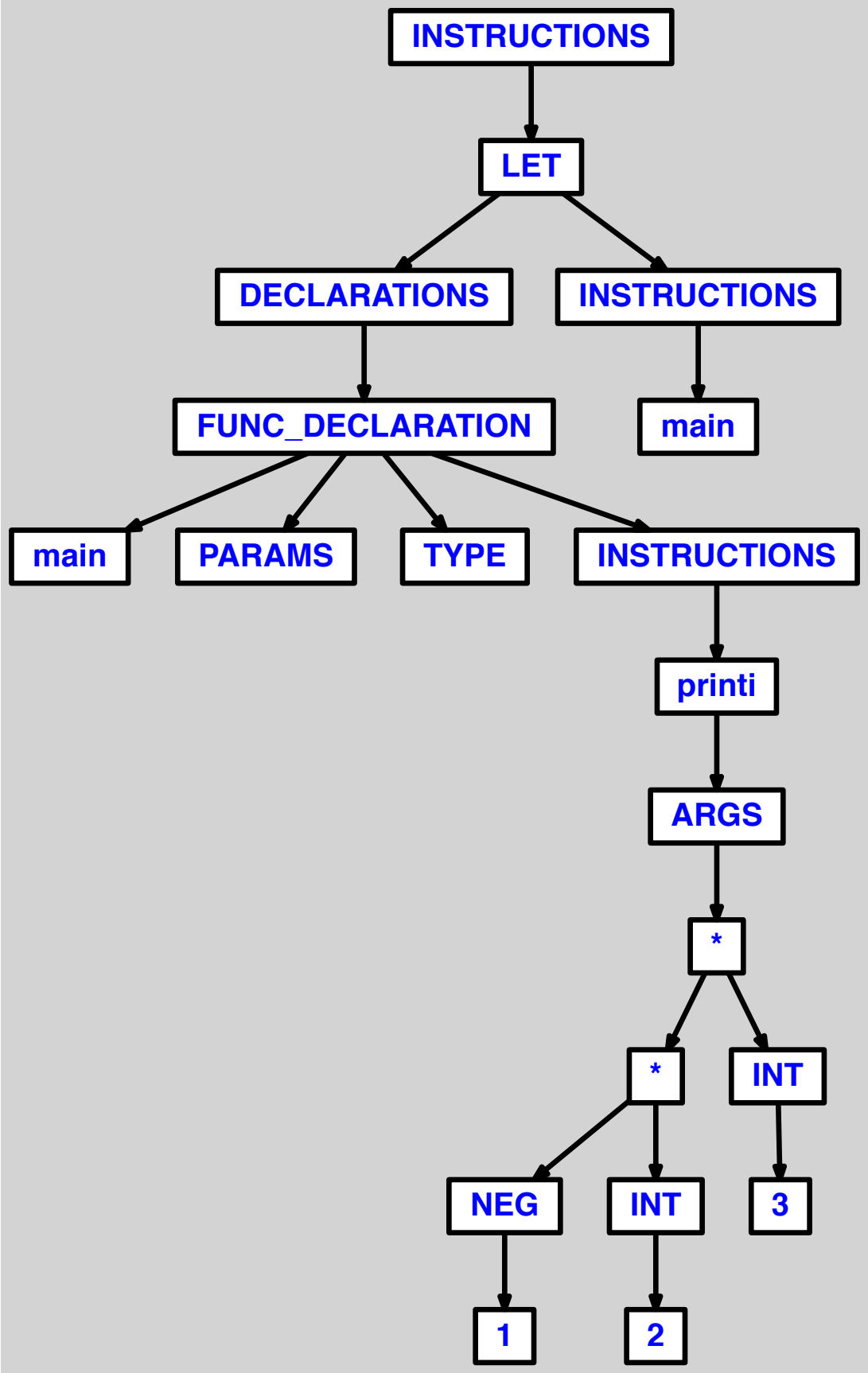
INT
3
1
2

3.2.35 multiplication a 3 termes, dont un ayant moins unaire

```
let
  function main() = printi(-1*2*3)
in main() end
```


INSTRUCTIONS
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FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
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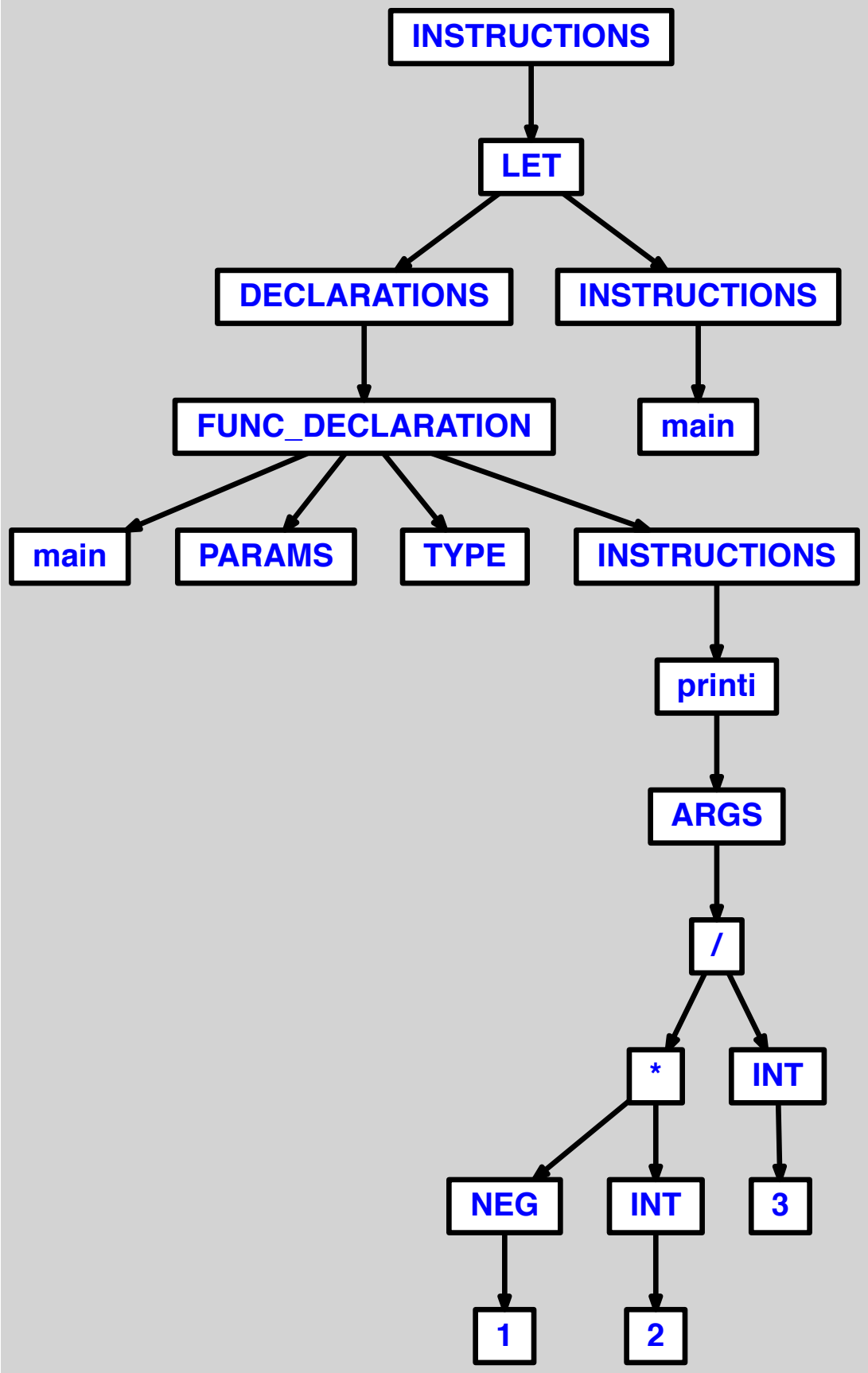
*
INT
NEG
INT
3
1
2

3.2.36 multiplication suivie de division, dont un terme ayant moins unaire

```
let
  function main() = printi(-1*2/3)
in main() end
```


INSTRUCTIONS
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FUNC_DECLARATION
main
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PARAMS
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INT
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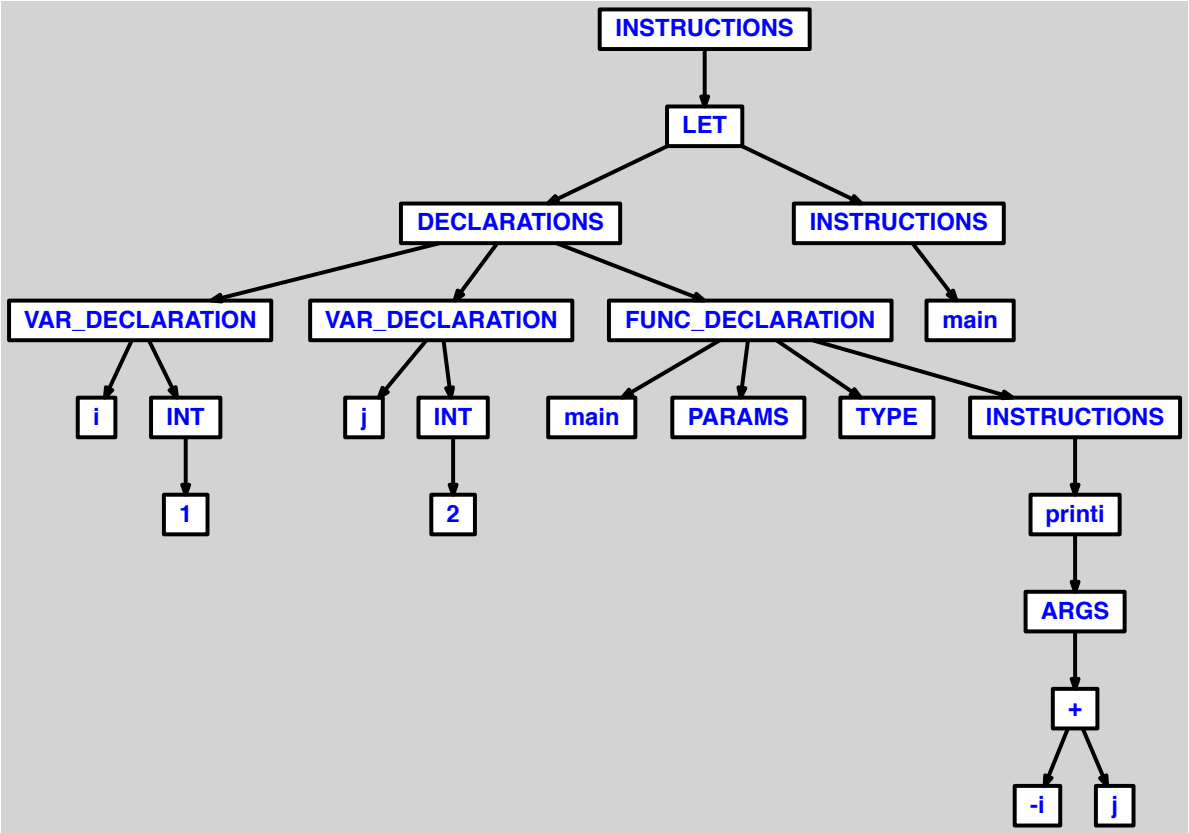
3
1
2

3.2.37 addition simple, a 2 termes, identifies par des variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2

  function main() = printi(-i+j)
in main() end
```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FUNC_DECLARATION
main
i
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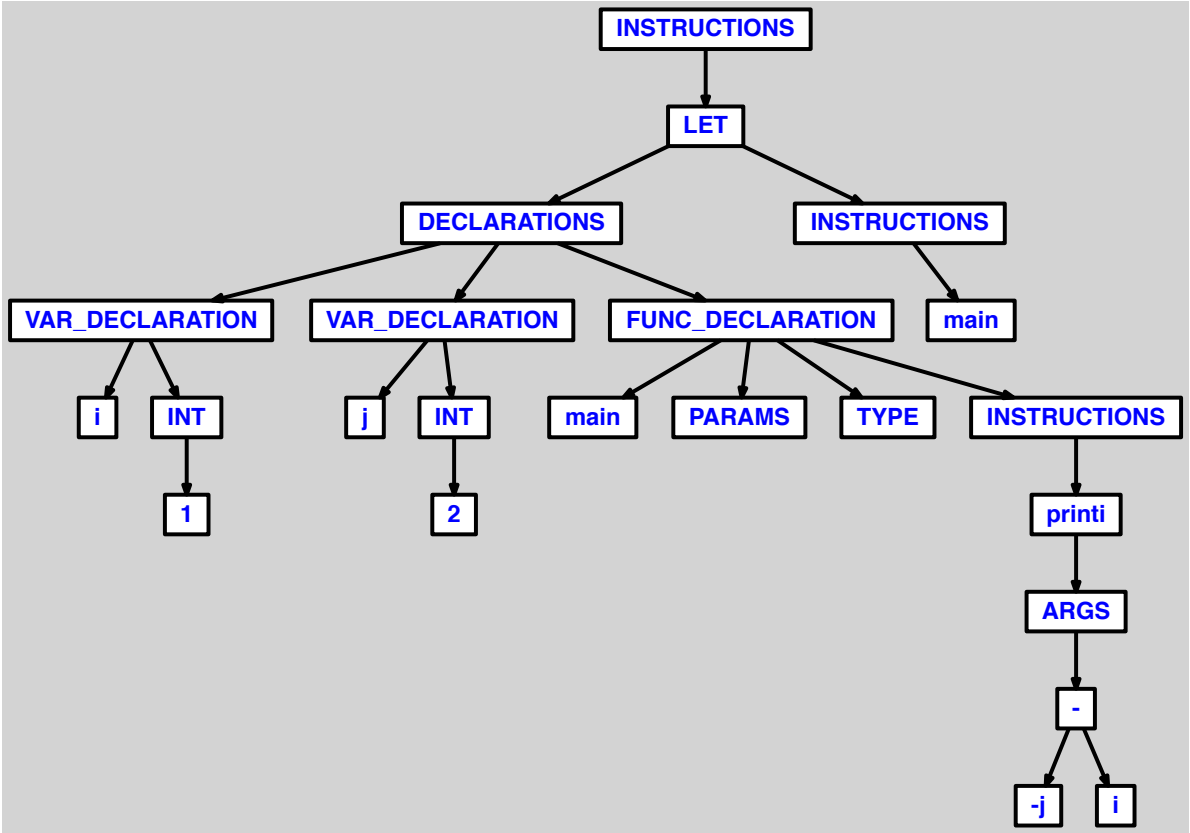
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
printi
ARGS
+
-i
j

3.2.38 soustraction simple, a 2 termes, identifies par des variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2

  function main() = printi(-j-i)
in main() end
```


INSTRUCTIONS
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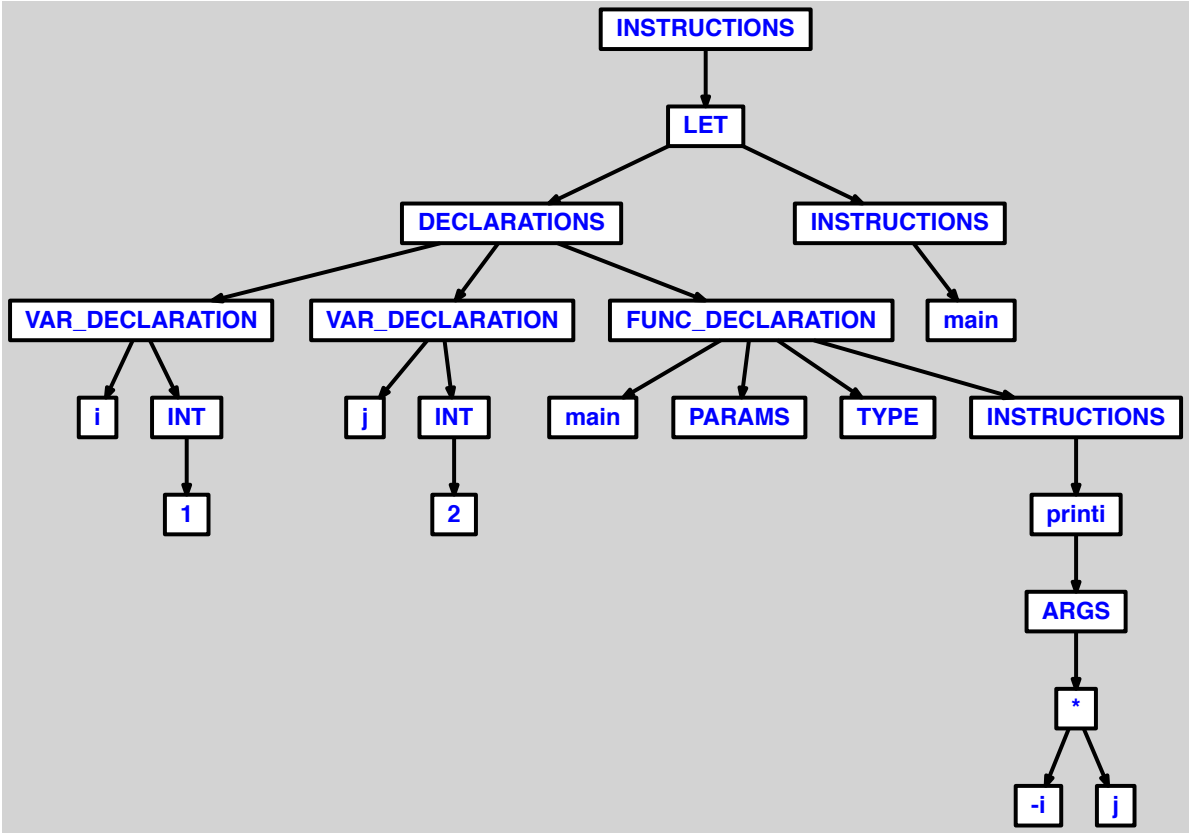
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
printi
ARGS
-
-j
i

3.2.39 multiplication simple, a 2 termes, identifies par des variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2

  function main() = printi(-i*j)
in main() end
```


INSTRUCTIONS
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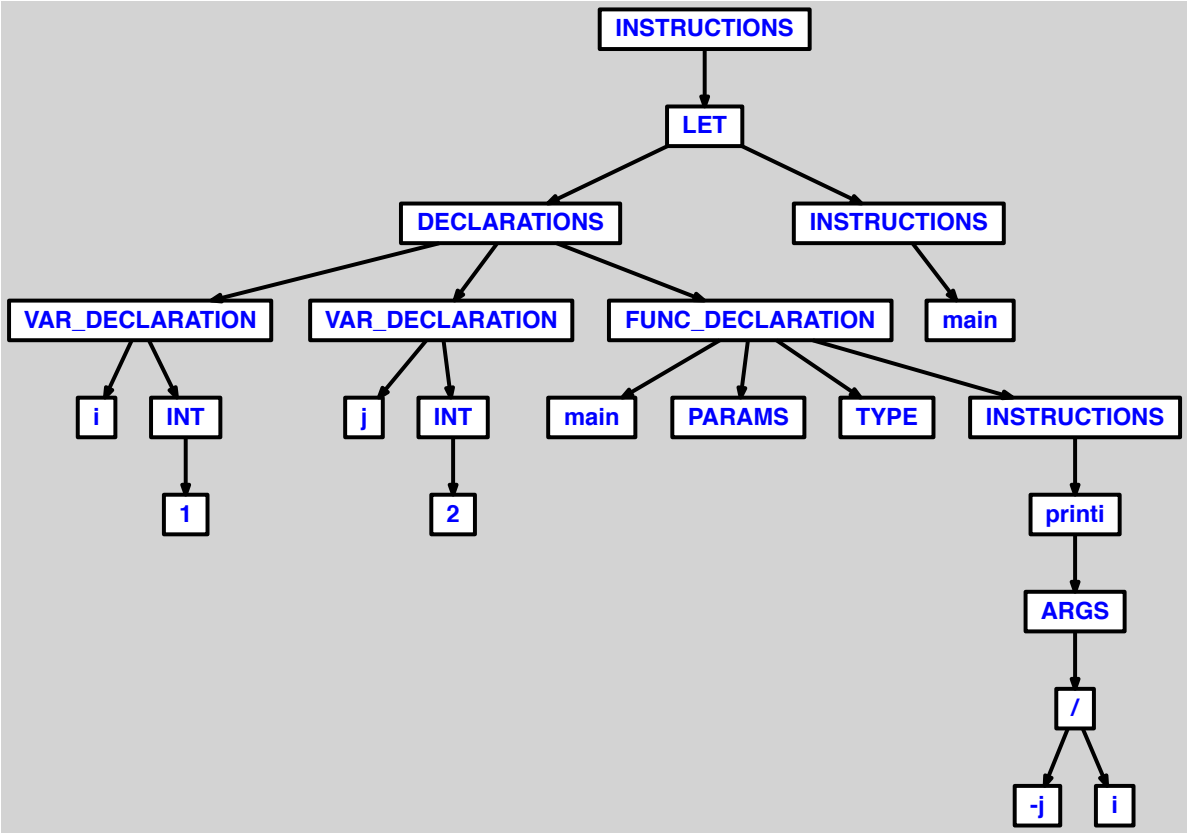
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
printi
ARGS
*
-i
j

3.2.40 division simple, a 2 termes, identifies par des variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2

  function main() = printi(-j/i)
in main() end
```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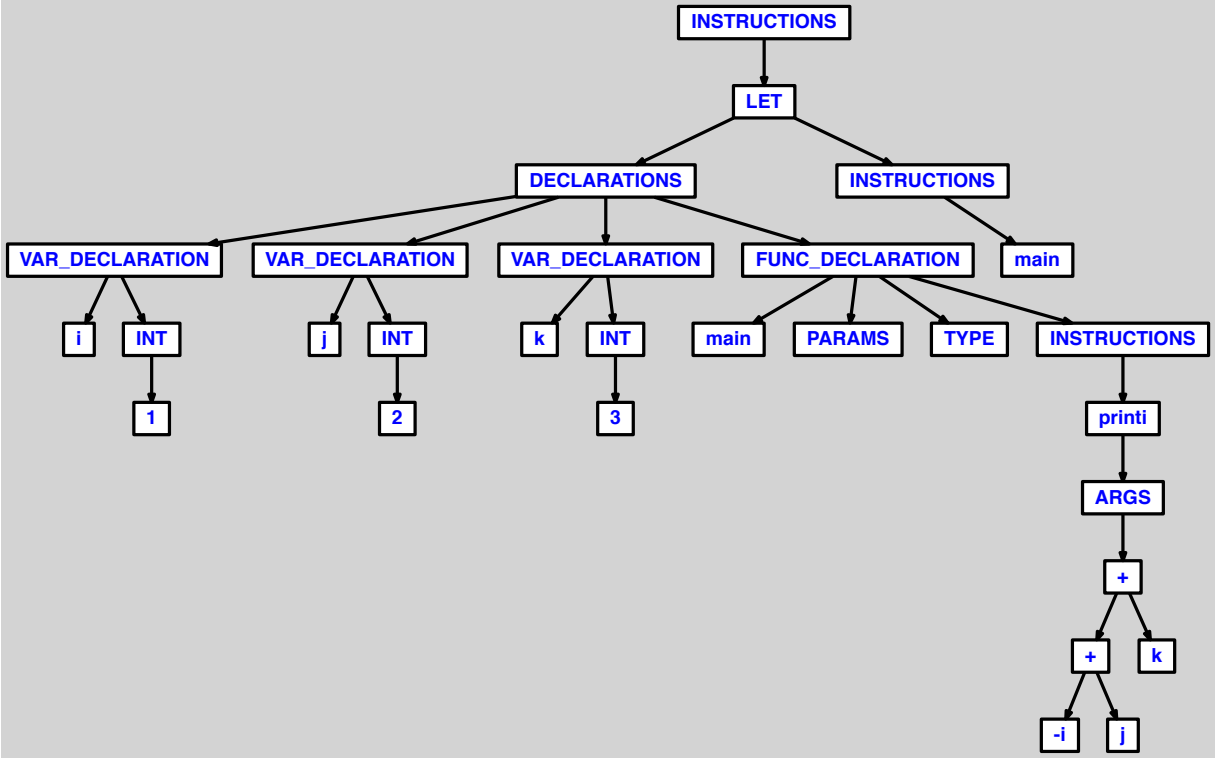
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
printi
ARGS
/
-j
i

3.2.41 addition a 3 termes, identifies par des variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(-i+j+k)
in main() end
```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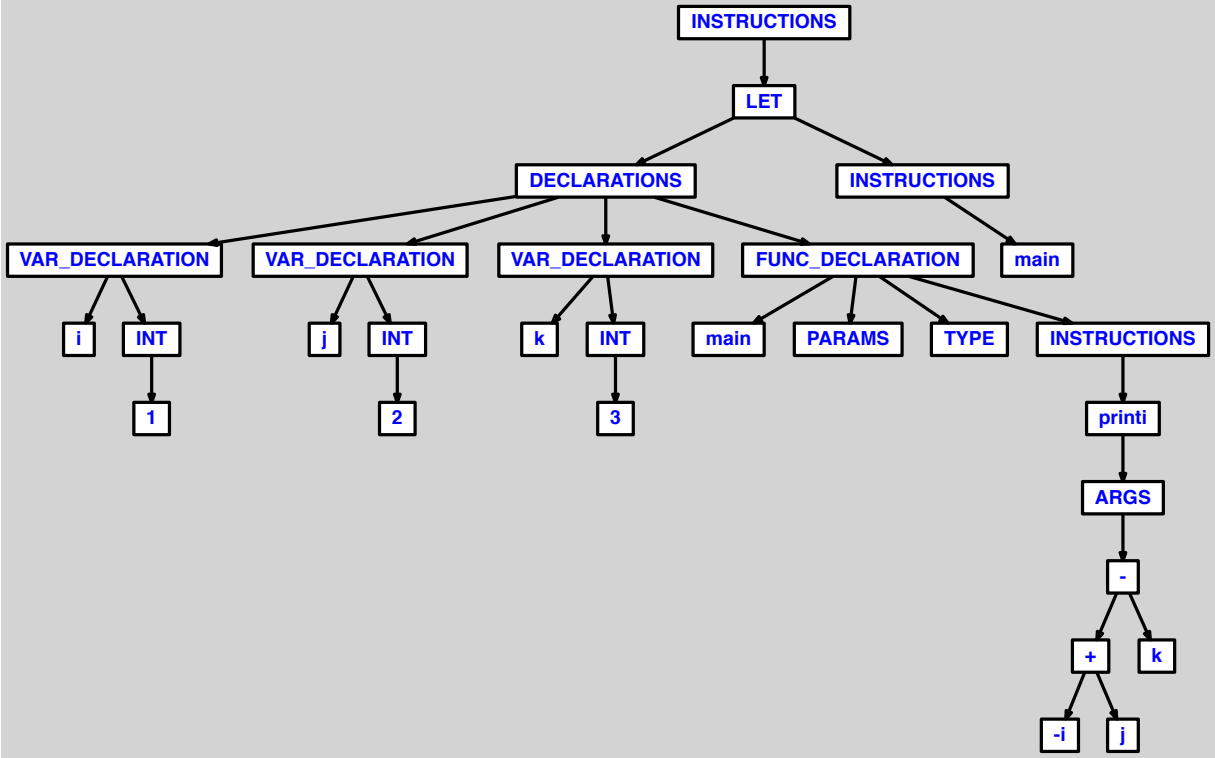
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
+
k
-i
j

3.2.42 addition suivie de soustraction, avec termes identifies par variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(-i+j-k)
in main() end
```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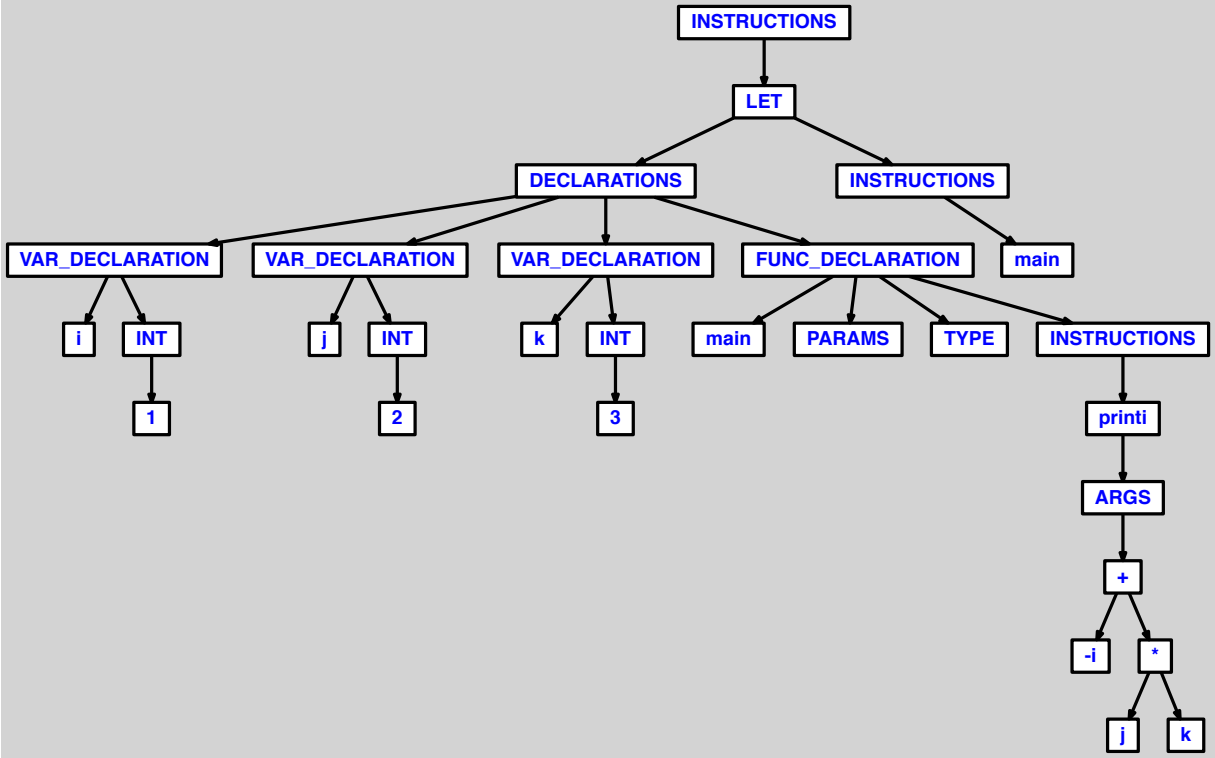
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
-
+
k
-i
j

3.2.43 addition suivie de multiplication, avec termes identifies par variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(-i+j*k)
in main() end
```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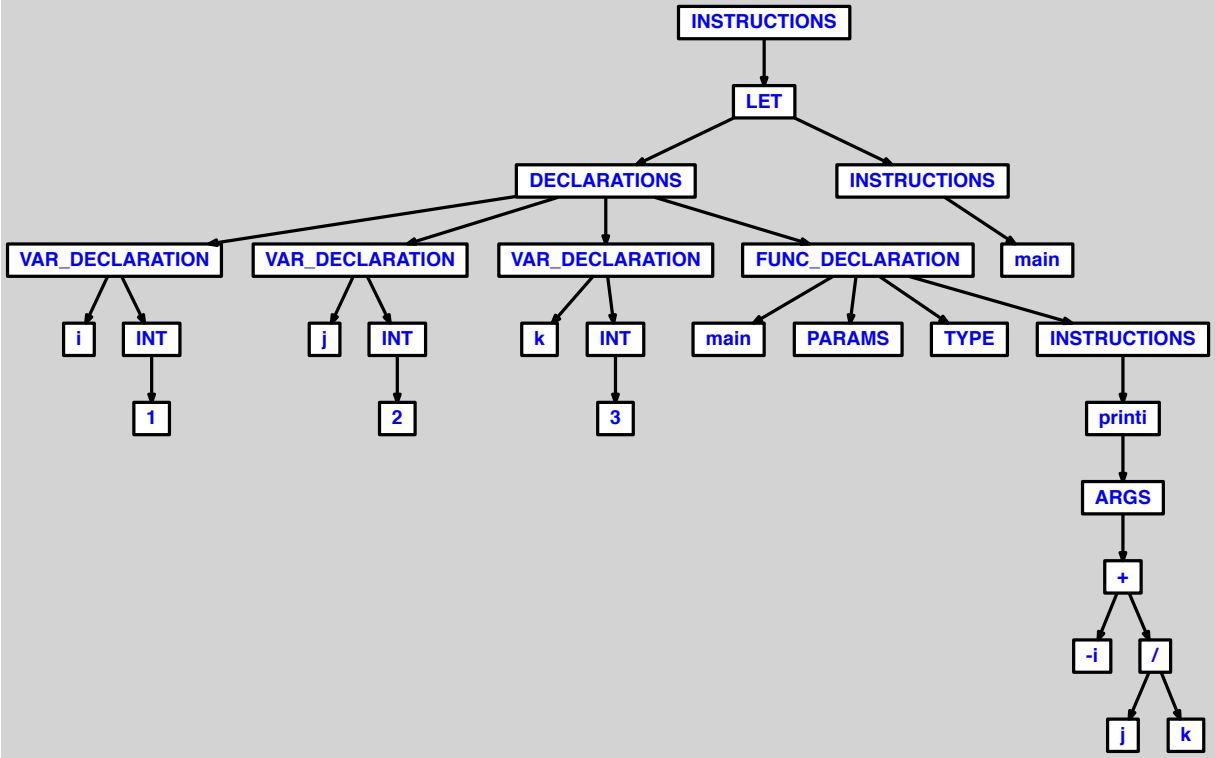
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
-i
*
j
k

3.2.44 addition suivie de division, avec termes identifies par variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(-i+j/k)
in main() end
```


INSTRUCTIONS
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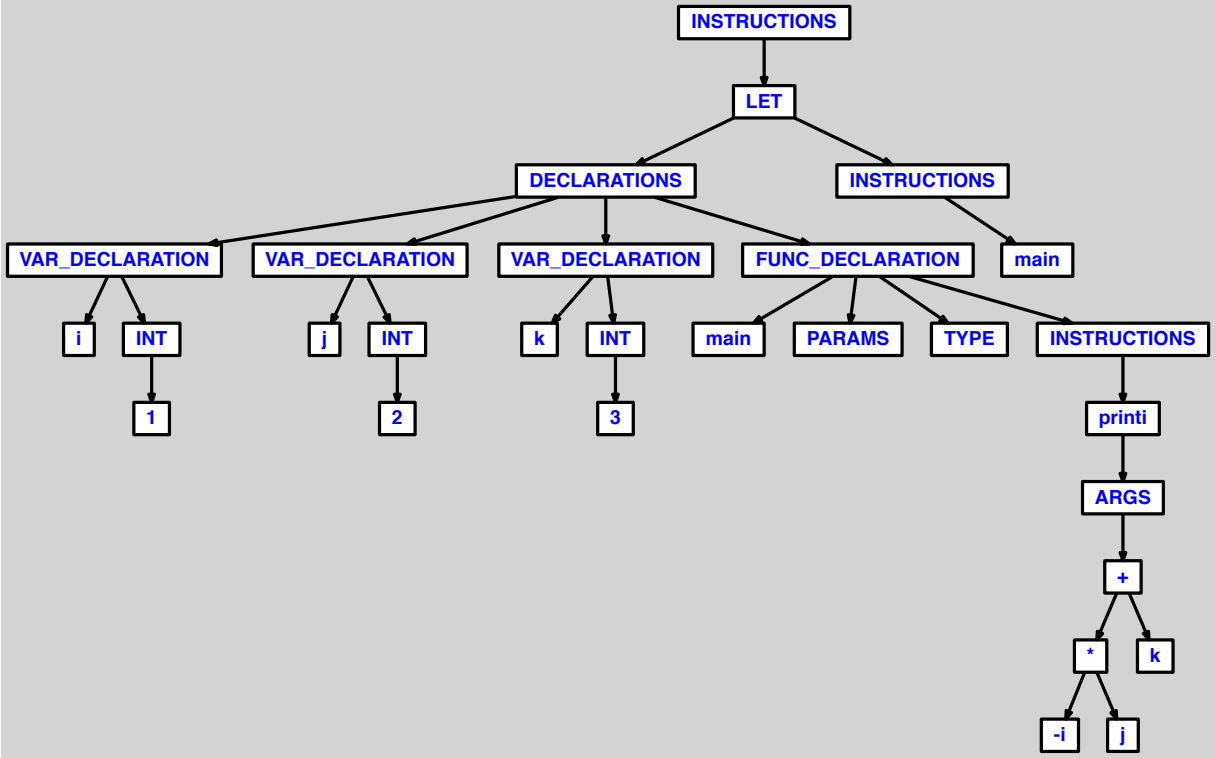
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
-i
/
j
k

3.2.45 multiplication suivie d'addition, avec termes identifies par variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(-i*j+k)
in main() end
```


INSTRUCTIONS
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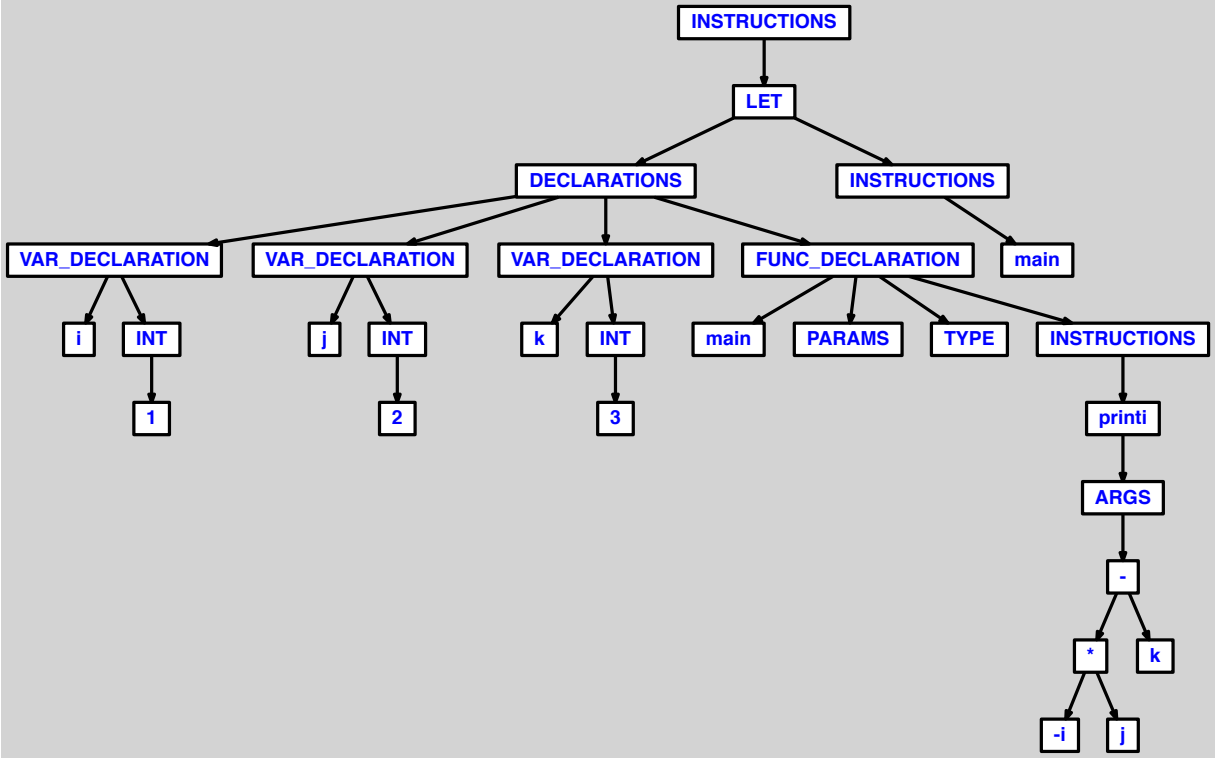
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
*
k
-i
j

3.2.46 multiplication suivie de soustraction, avec termes identifies par variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(-i*j-k)
in main() end
```


INSTRUCTIONS
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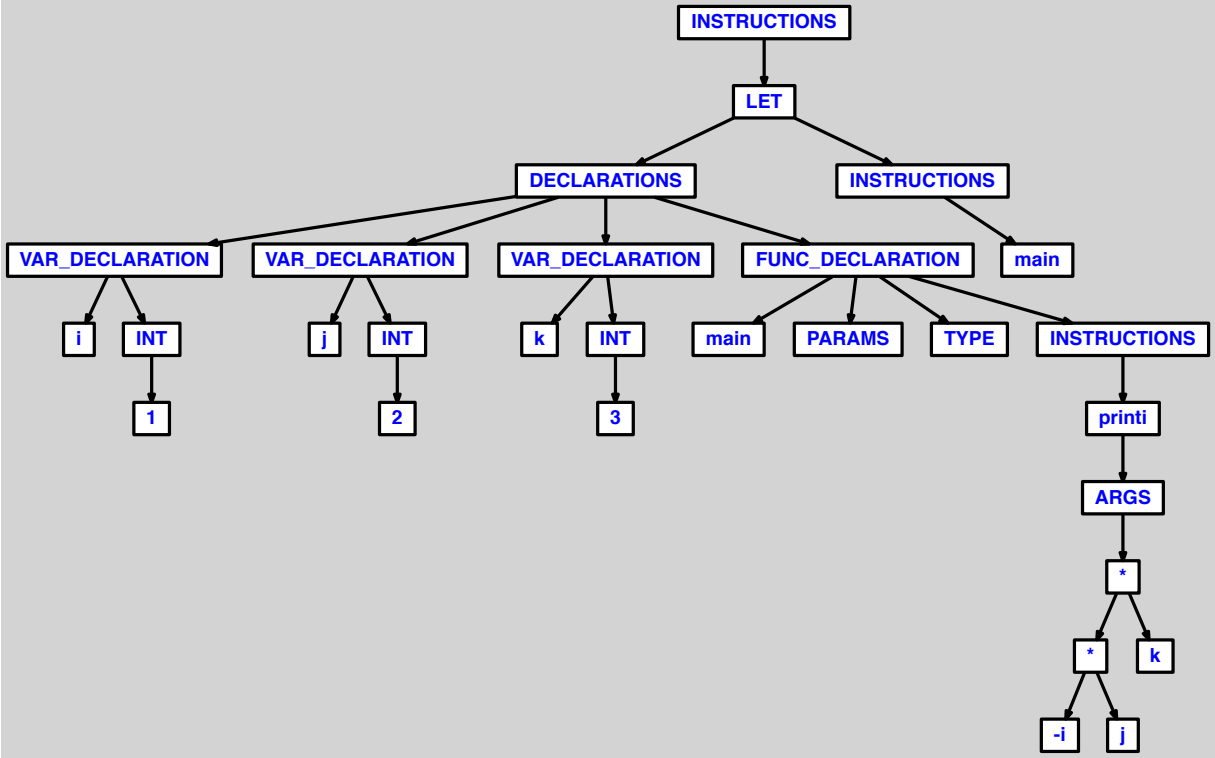
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
-
*
k
-i
j

3.2.47 multiplication a 3 termes, identifies par des variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(-i*j*k)
in main() end
```


INSTRUCTIONS
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FUNC_DECLARATION
main
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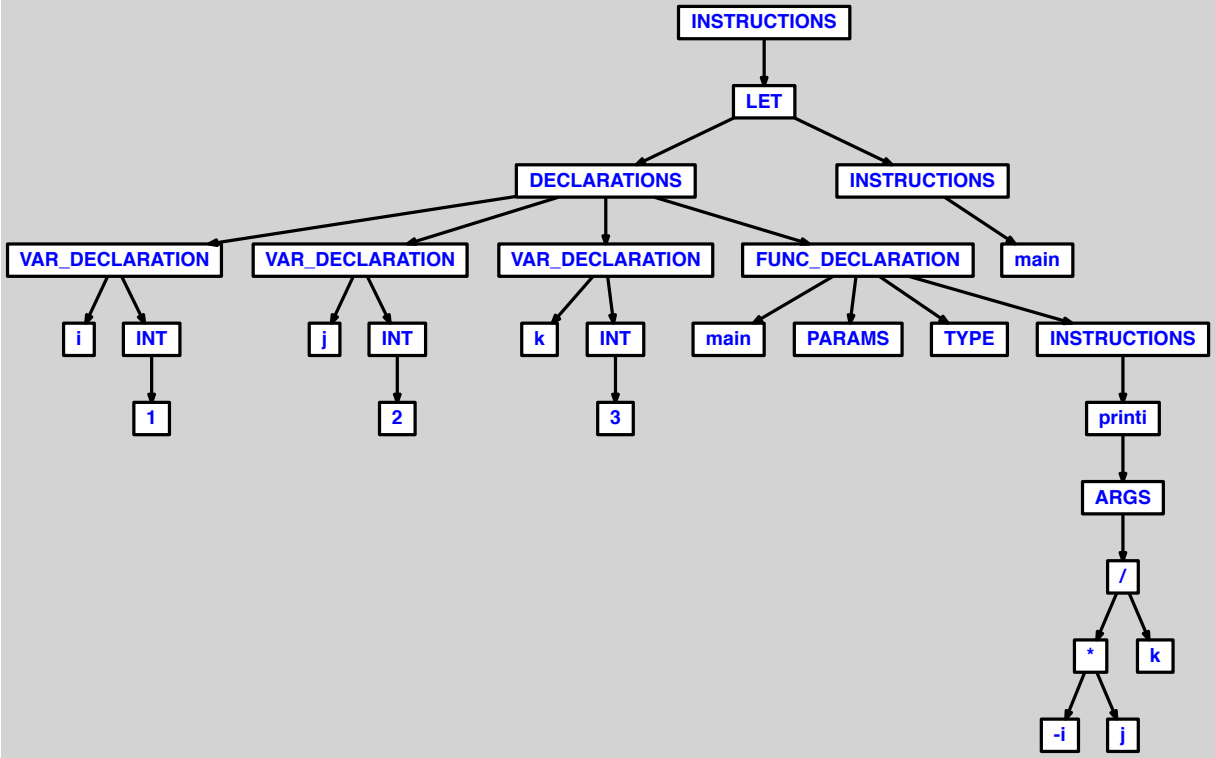
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
*
*
k
-i
j

3.2.48 mutliplication suivie de division, avec termes identifies par variables, dont une ayant moins unaire

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(-i*j/k)
in main() end
```


INSTRUCTIONS
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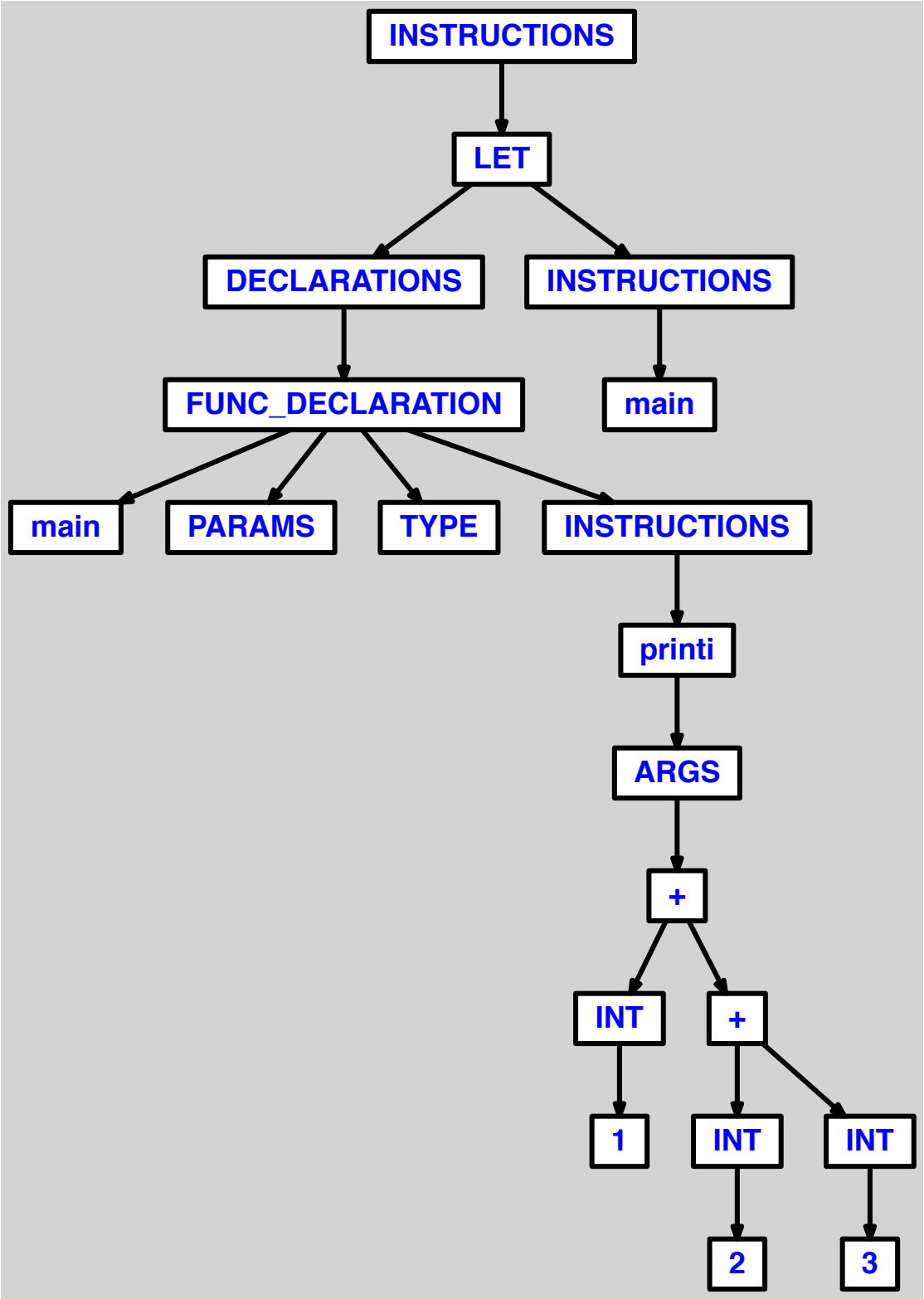
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
/
*
k
-i
j

3.2.49 addition a 3 termes, avec parenthesage des 2 termes a droite

```
let function main() = printi(1+(2+3)) in main() end
```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FUNC_DECLARATION
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PARAMS
TYPE
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printi
ARGS
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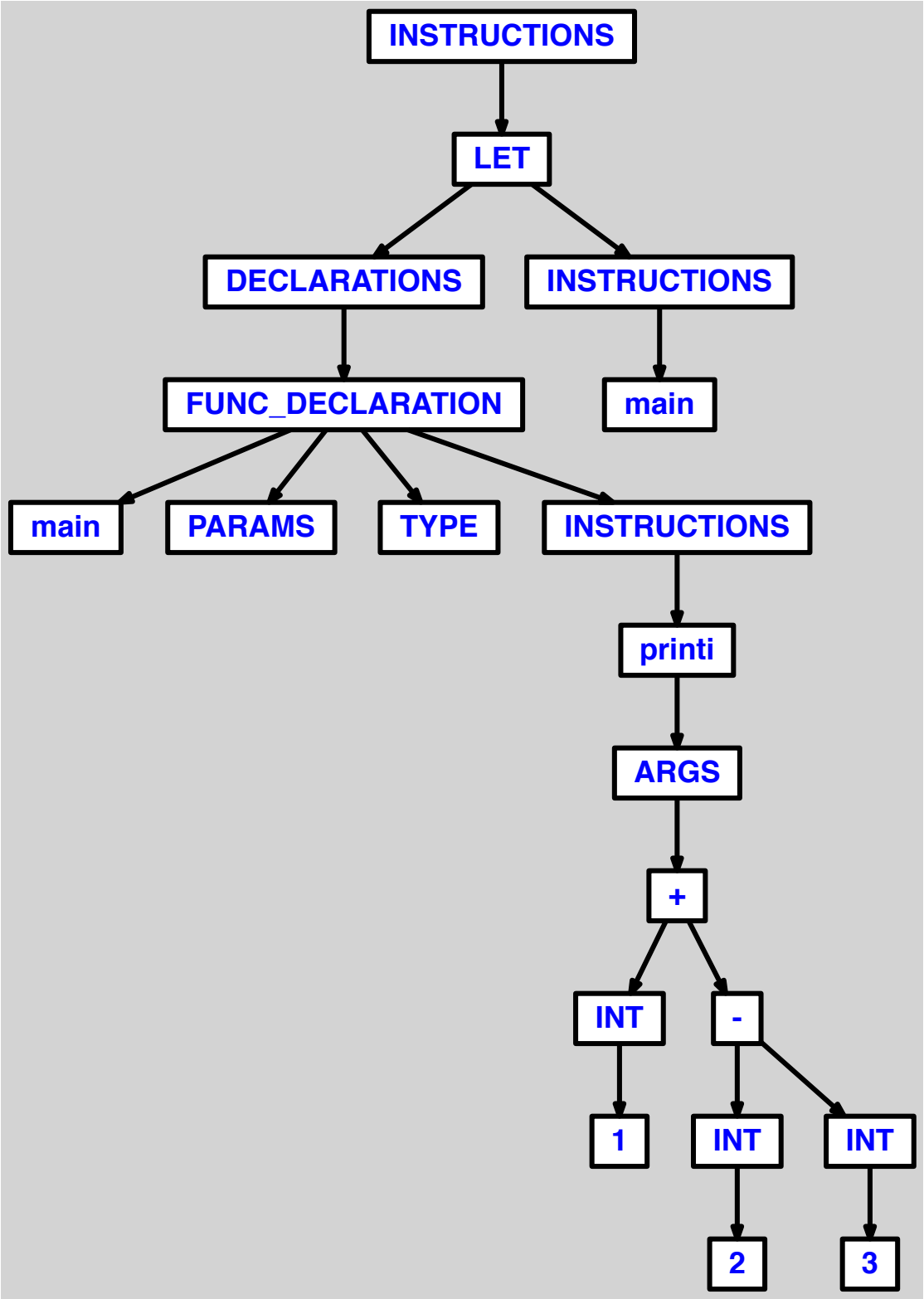
3.2.50 addition suivie de soustraction, avec parenthesage des 2 termes a droite

```
let function main() = printi(1+(2-3)) in main() end
```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PARAMS
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printi
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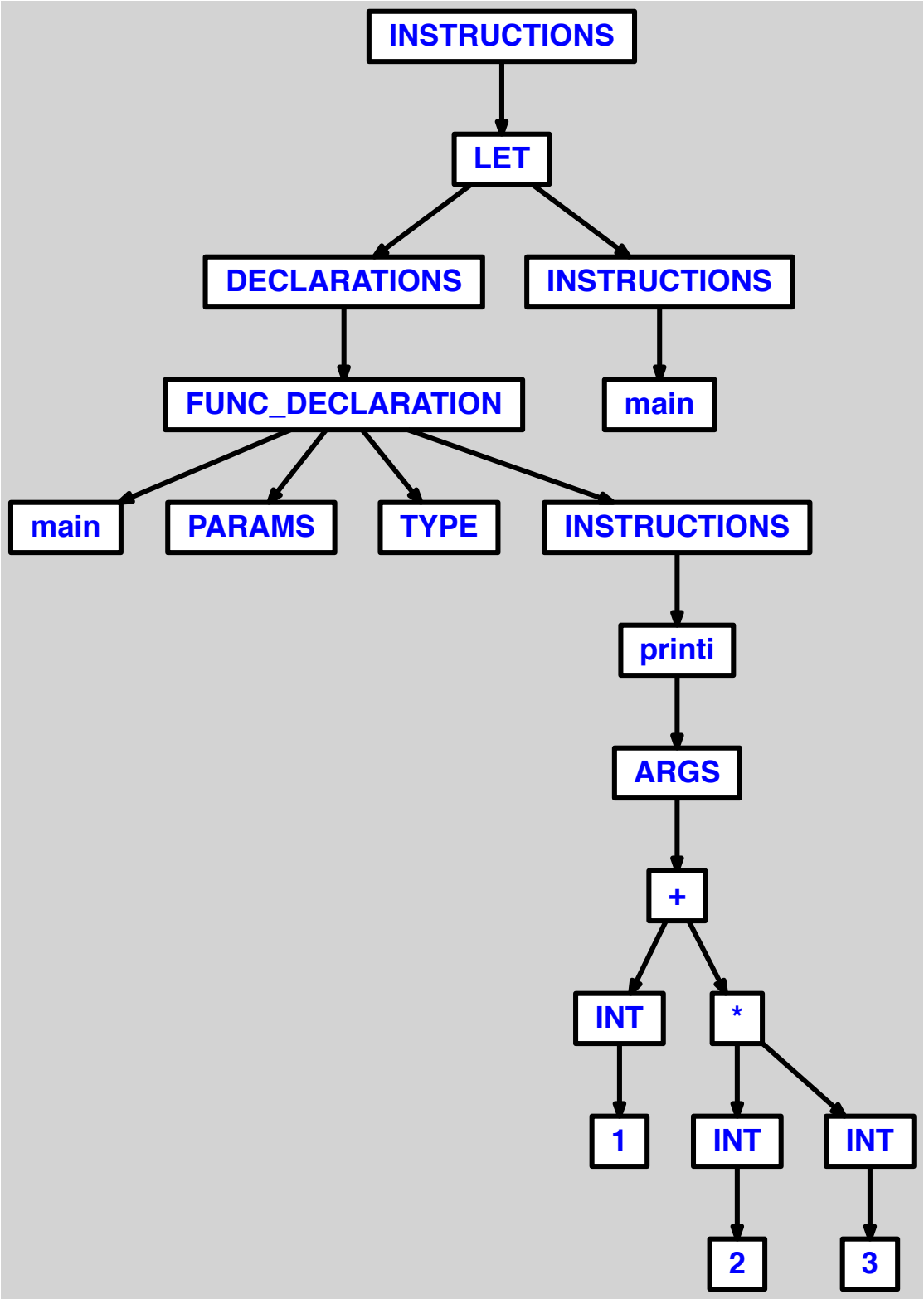
3.2.51 addition suivie de multiplication, avec parenthesage des 2 termes a droite

```
let function main() = printi(1+(2*3)) in main() end
```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FUNC_DECLARATION
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PARAMS
TYPE
INSTRUCTIONS
printi
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*
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INT
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2
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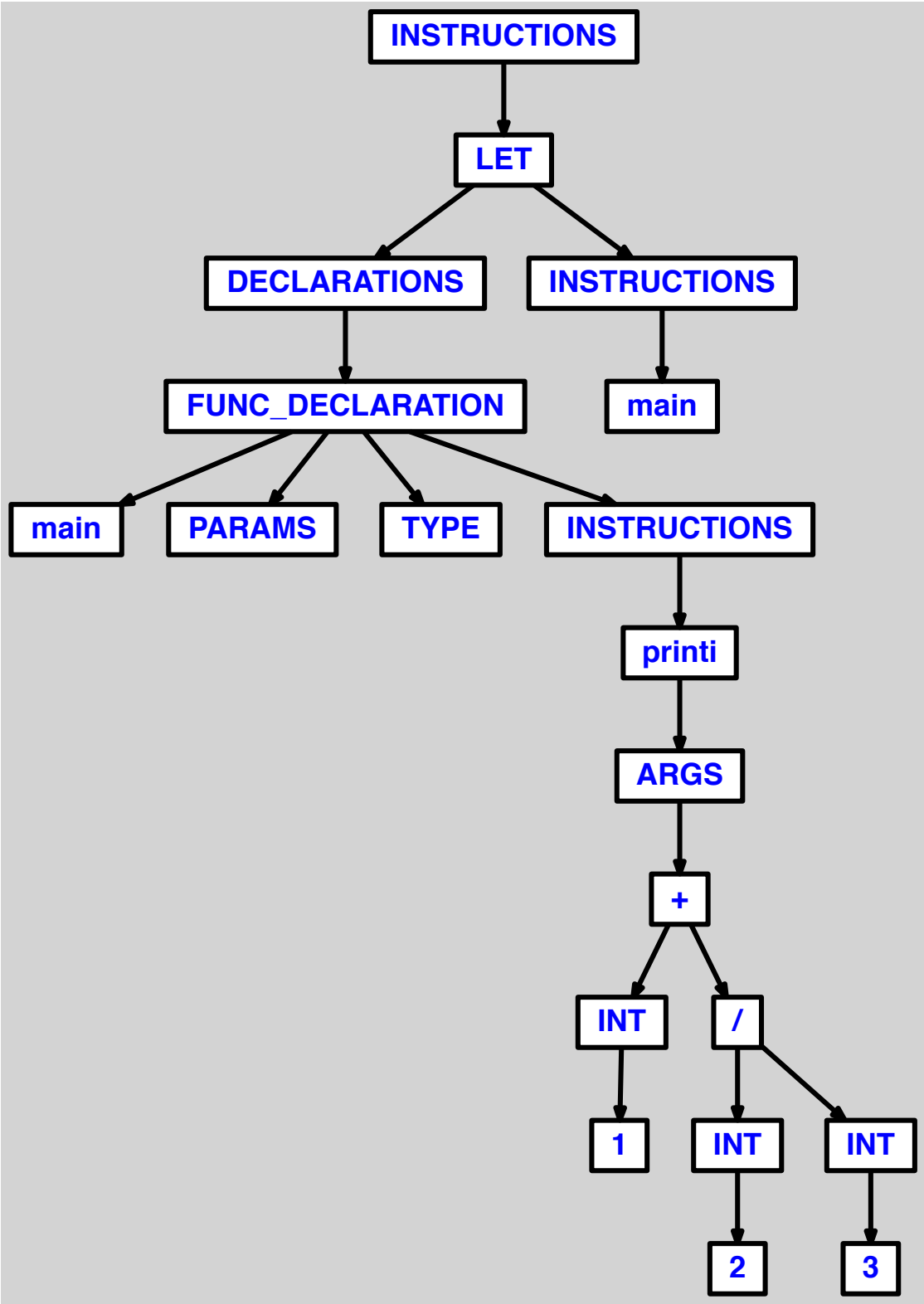
3.2.52 addition suivie de division, avec parenthesage des 2 termes a droite

```
let function main() = printi(1+(2/3)) in main() end
```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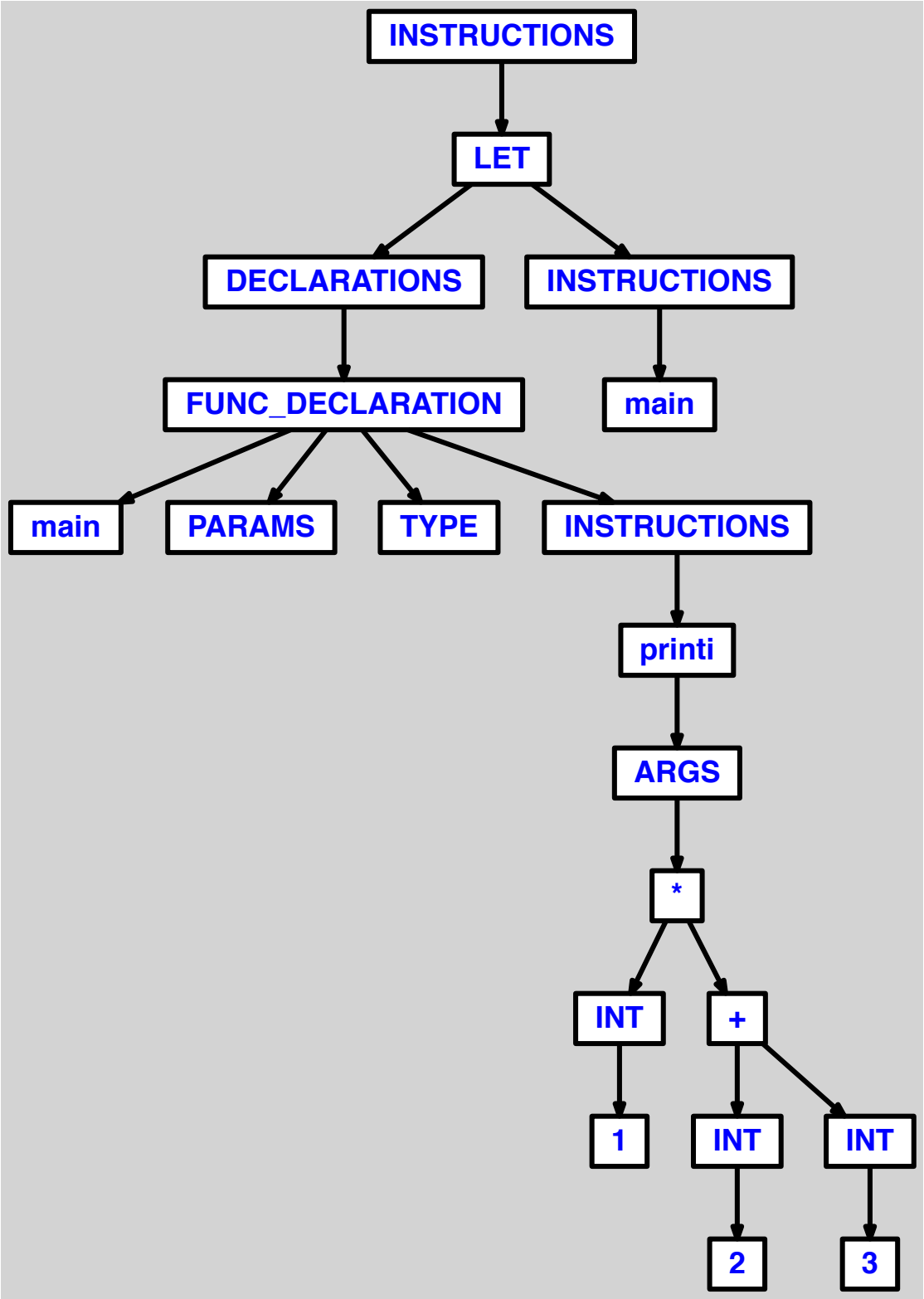
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
+
INT
/
1
INT
INT
2
3

3.2.53 multiplication suivie d'addition, avec parenthesage des 2 termes a droite

```
let function main() = printi(1*(2+3)) in main() end
```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main
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PARAMS
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INSTRUCTIONS
printi
ARGS
*
INT
+
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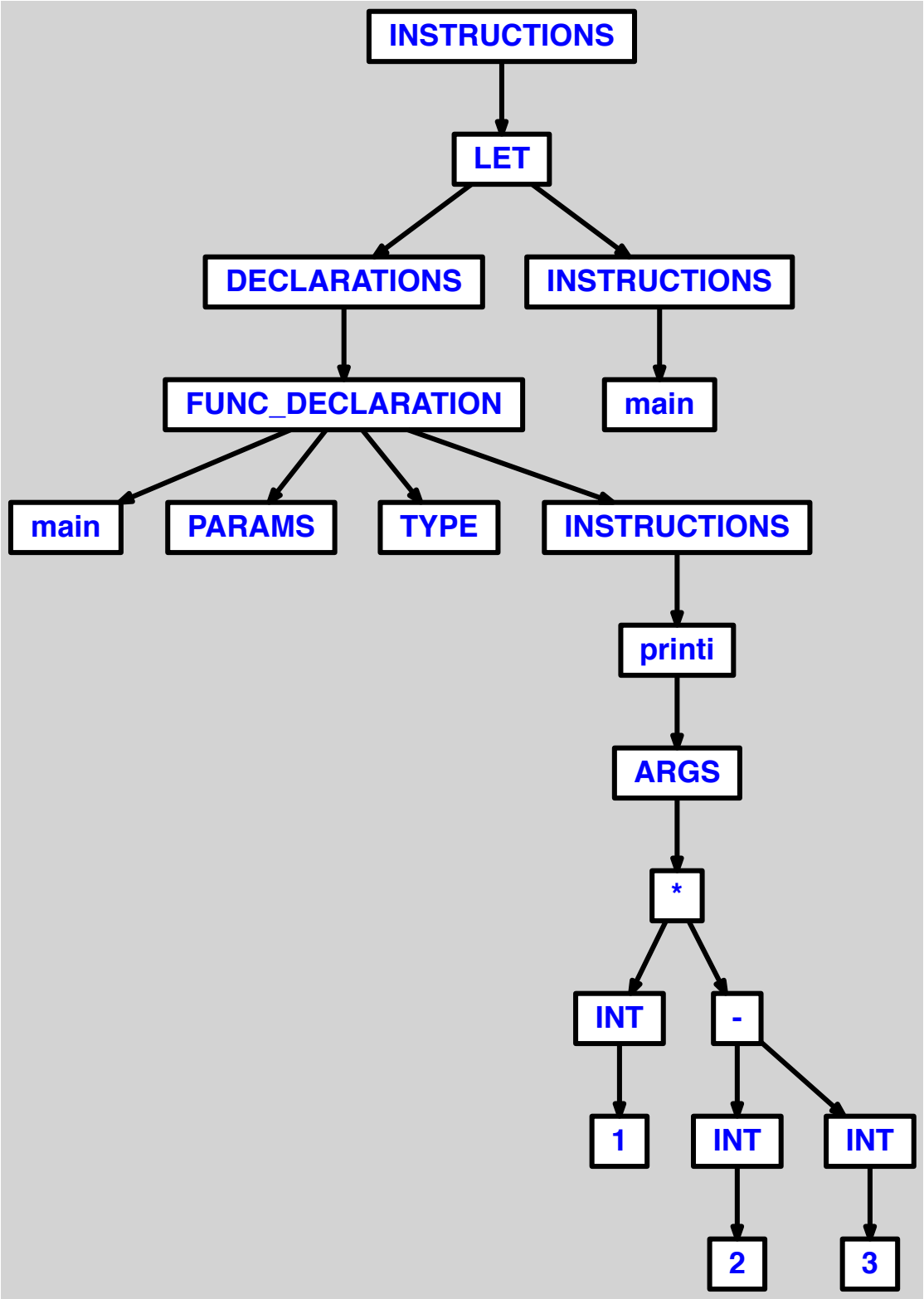
3

3.2.54 multiplication suivie de soustraction, avec parenthesage des 2 termes a droite

```
let function main() = printi(1*(2-3)) in main() end
```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PARAMS
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printi
ARGS
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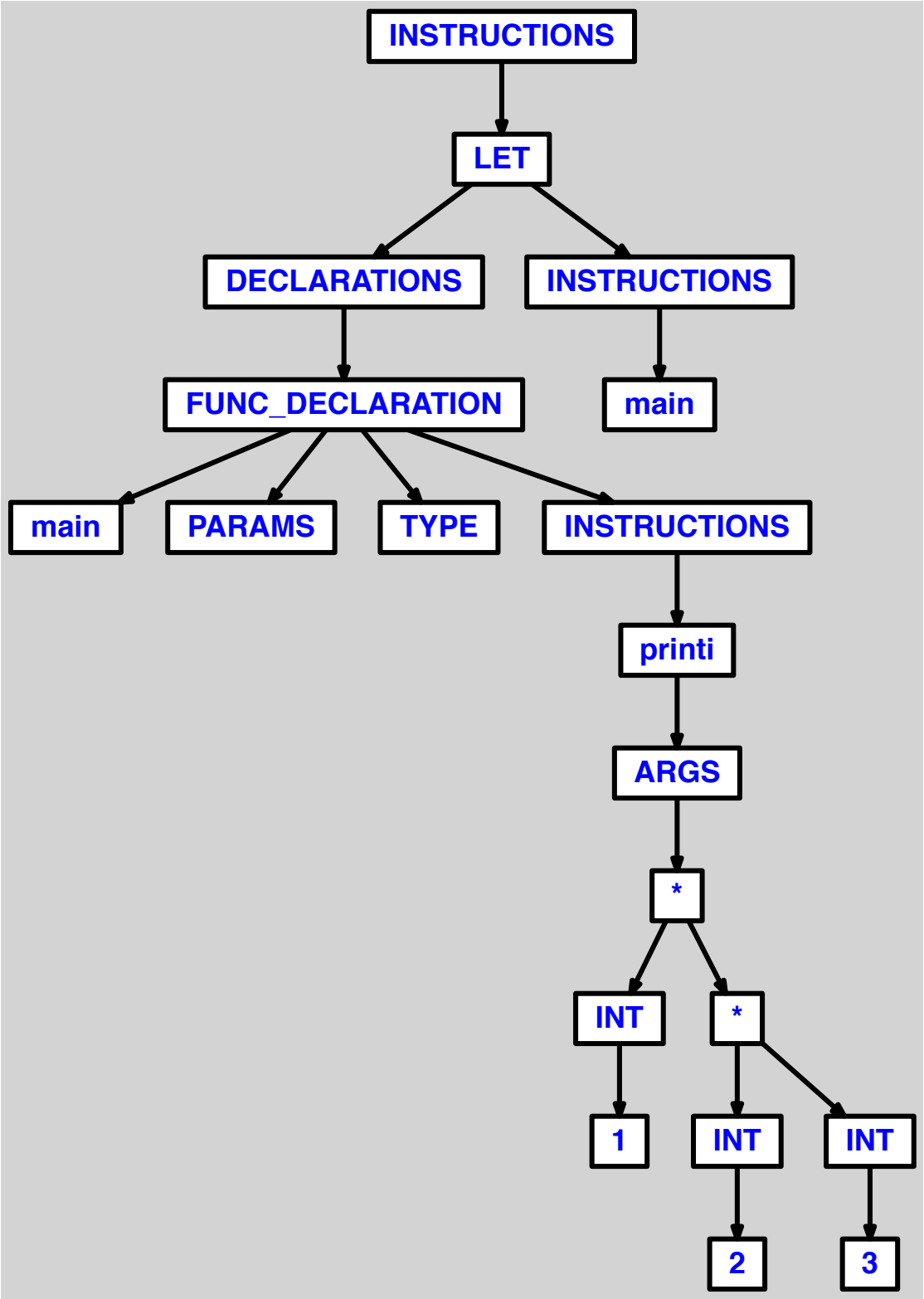
3.2.55 multiplication a 3 termes, avec parenthesage des 2 termes a droite

```
let function main() = printi(1*(2*3)) in main() end
```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PARAMS
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printi
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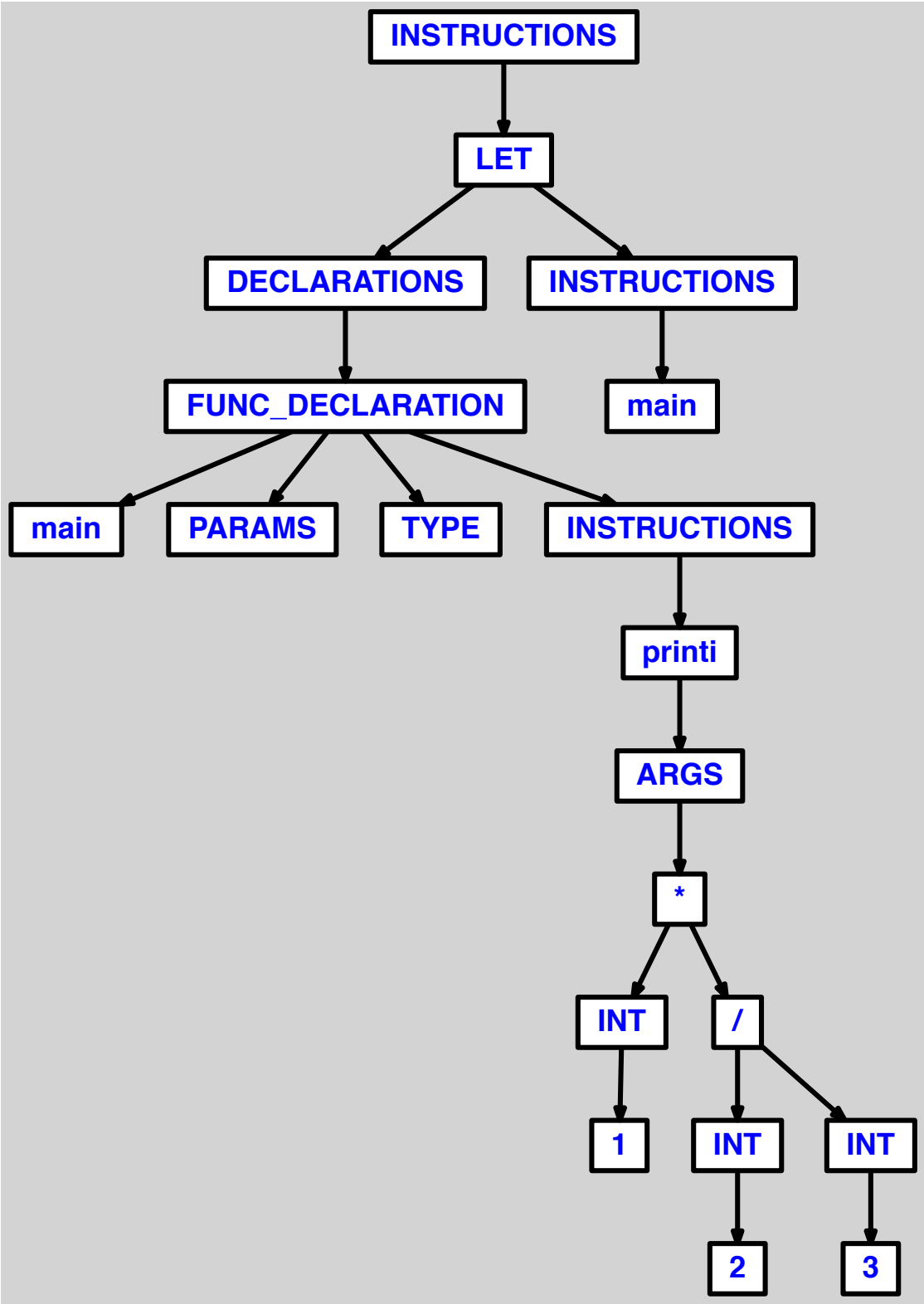
3.2.56 multiplication suivie de vision, avec parenthesage des 2 termes a droite

```
let function main() = printi(1*(2/3)) in main() end
```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PARAMS
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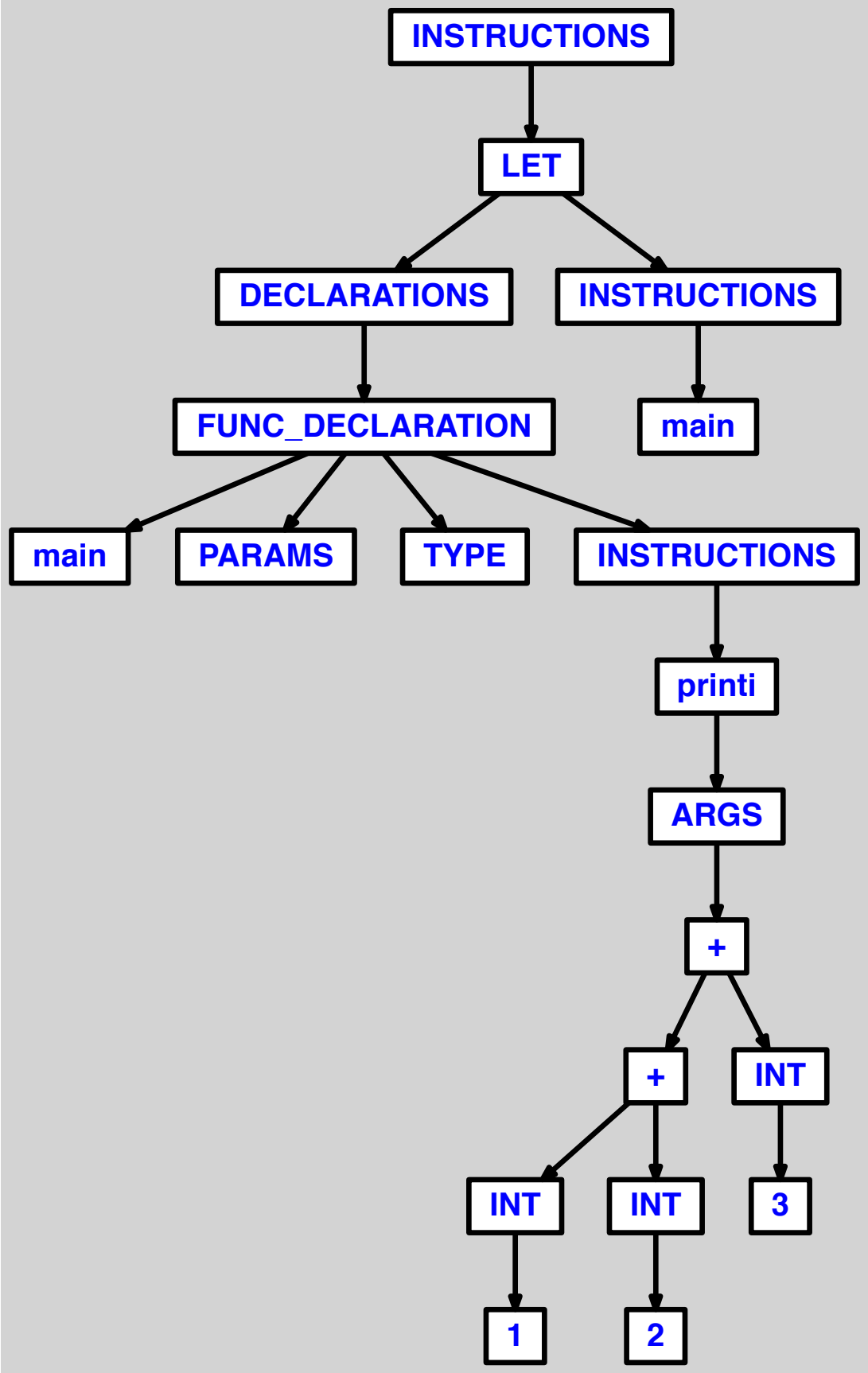
printi
ARGS
*
INT
/
1
INT
INT
2
3

3.2.57 addition a 3 termes, avec parenthesage des 2 termes a gauche

```
let function main() = printi((1+2)+3) in main() end
```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printi
ARGS
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3
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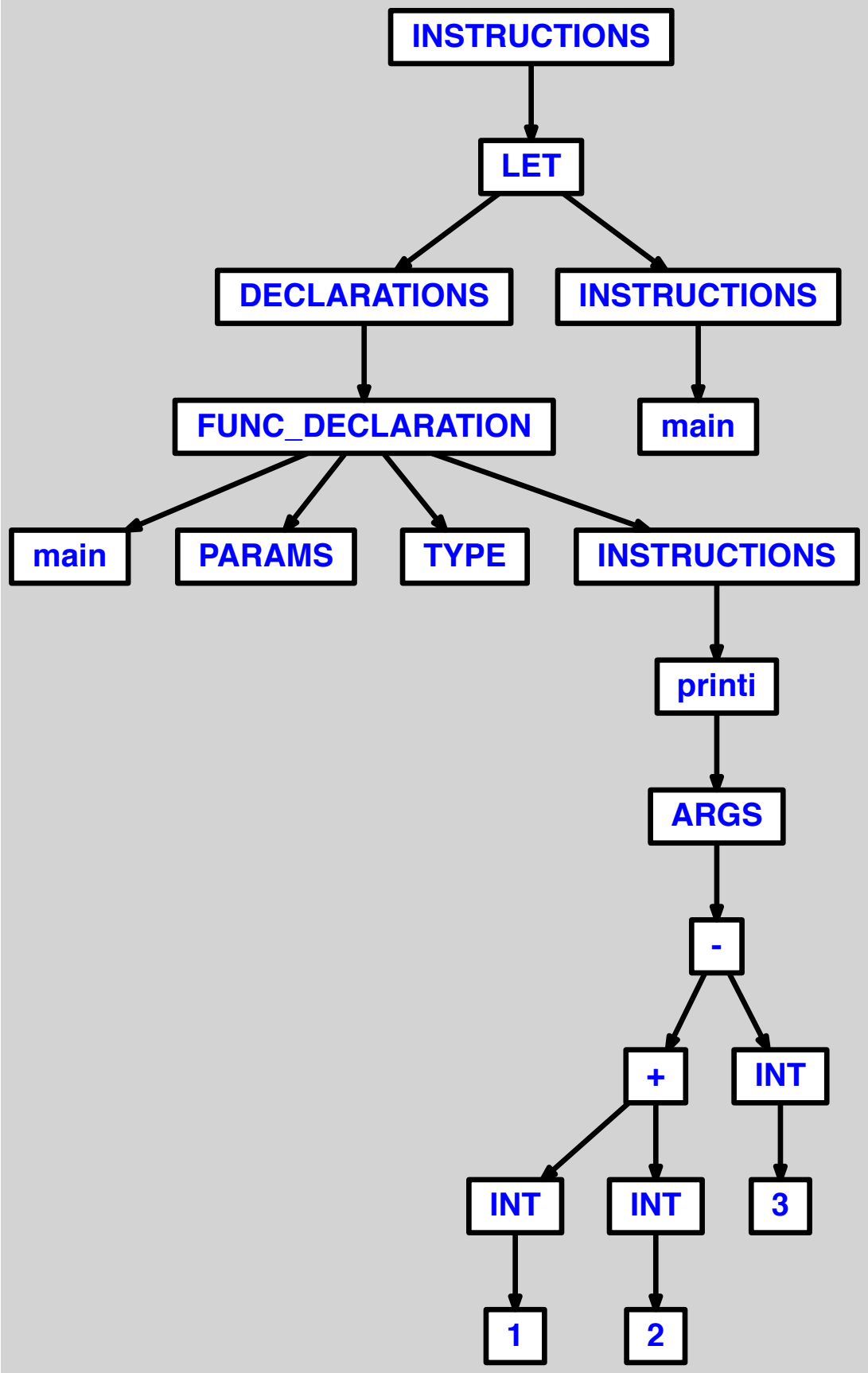
2

3.2.58 addition suivie de soustraction, avec parenthesage des 2 termes a gauche

```
let function main() = printi((1+2)-3) in main() end
```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PARAMS
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printi
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+
INT
INT
INT
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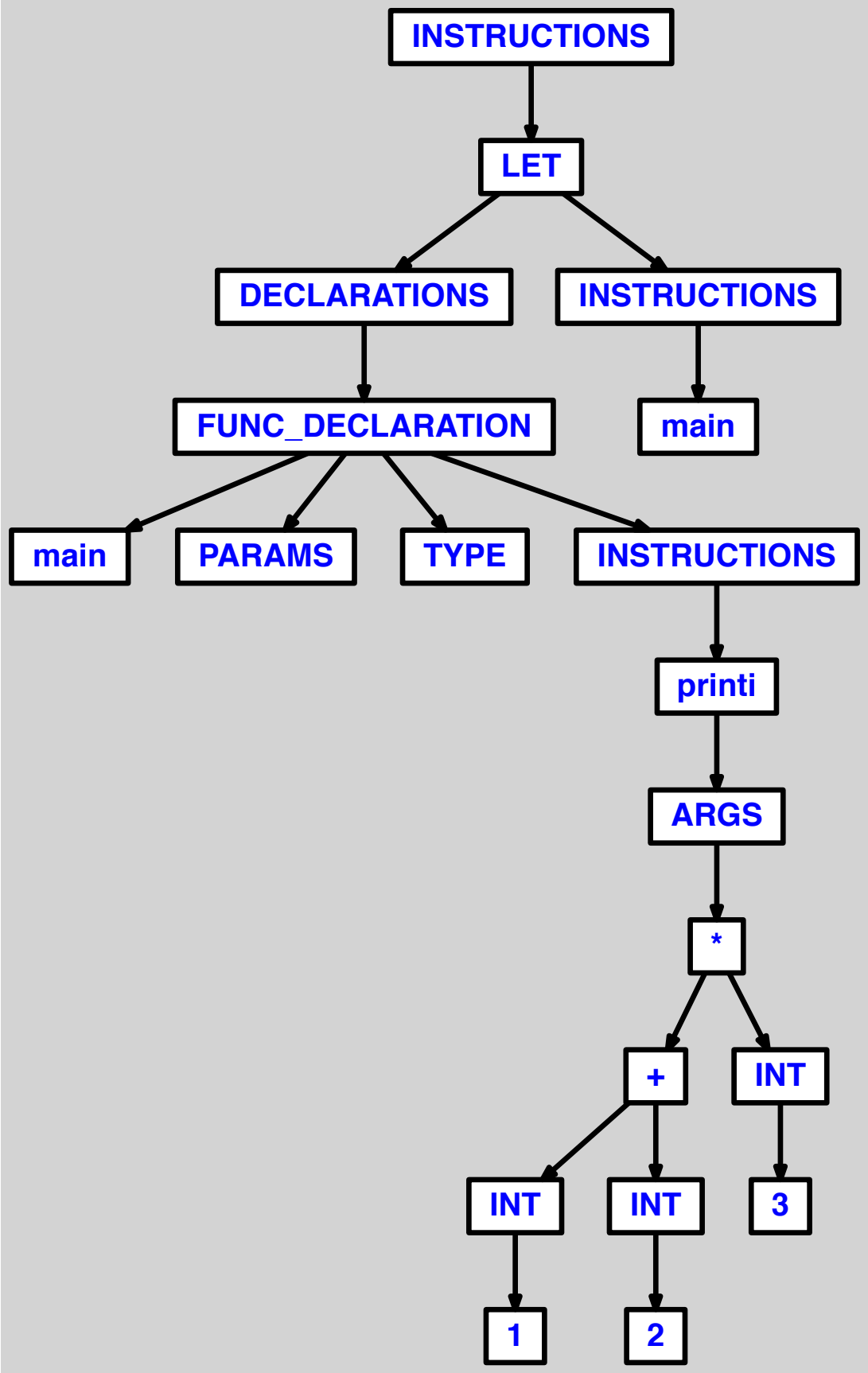
1
2

3.2.59 addition suivie de multiplication, avec parenthesage des 2 termes a gauche

```
let function main() = printi((1+2)*3) in main() end
```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PARAMS
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printi
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+
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INT
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3
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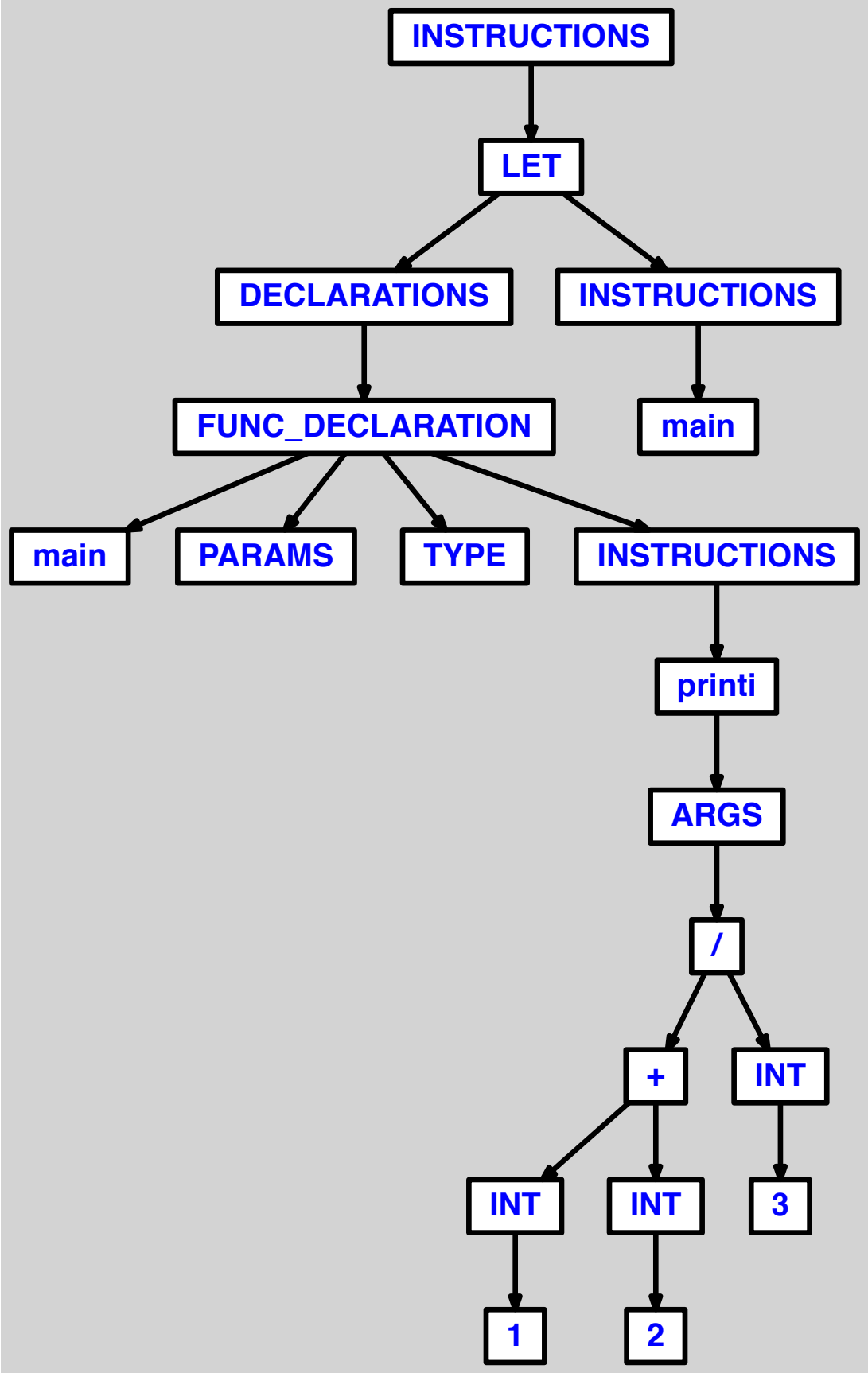
2

3.2.60 addition suivie de division, avec parenthesage des 2 termes a gauche

```
let function main() = printi((1+2)/3) in main() end
```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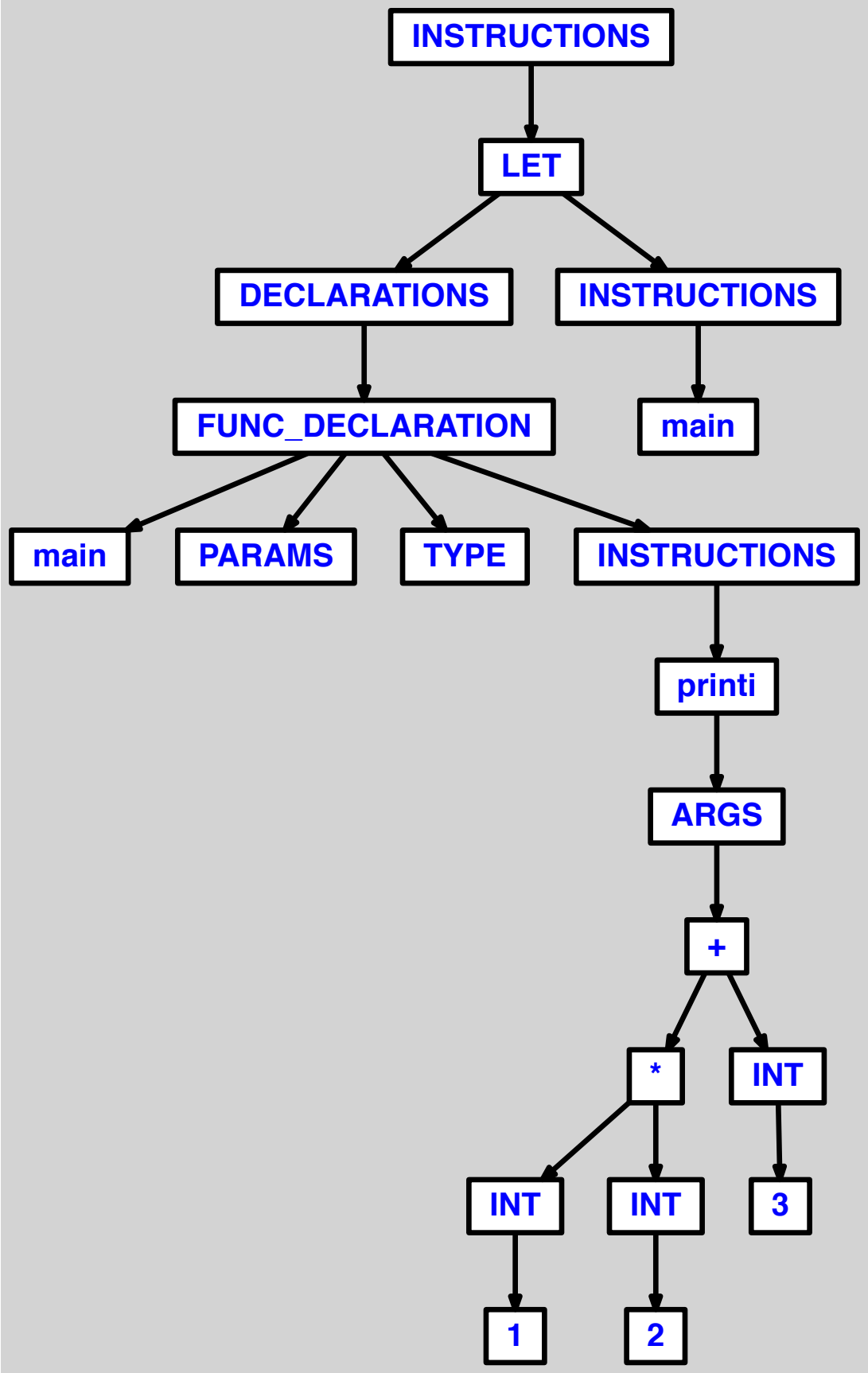
3.2.61 multiplication suivie d'addition, avec parenthesage des 2 termes a gauche

```
let function main() = printi((1*2)+3) in main() end
```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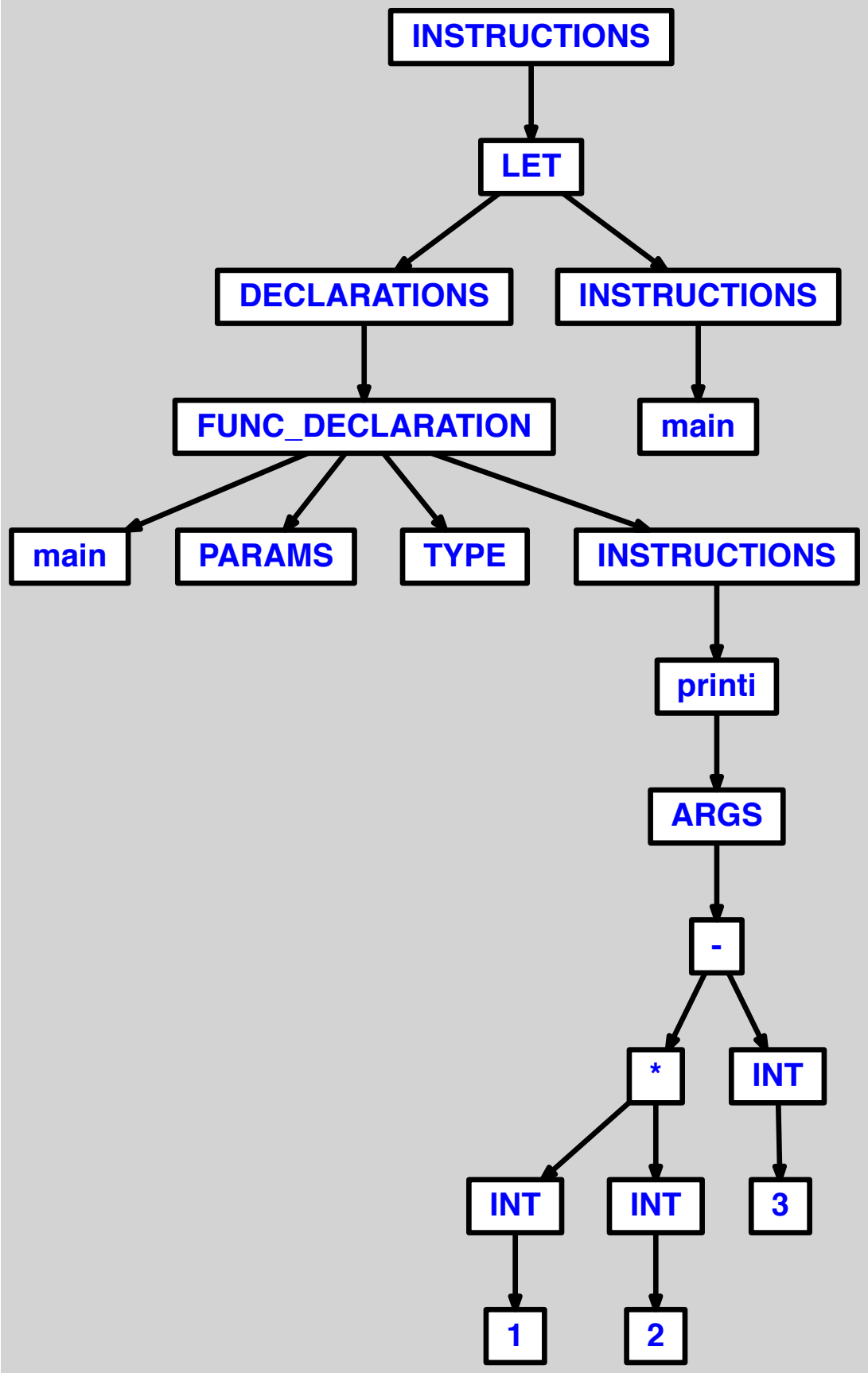
3.2.62 multiplication suivie de soustraction, avec parenthesage des 2 termes a gauche

```
let function main() = printi((1*2)-3) in main() end
```


INSTRUCTIONS
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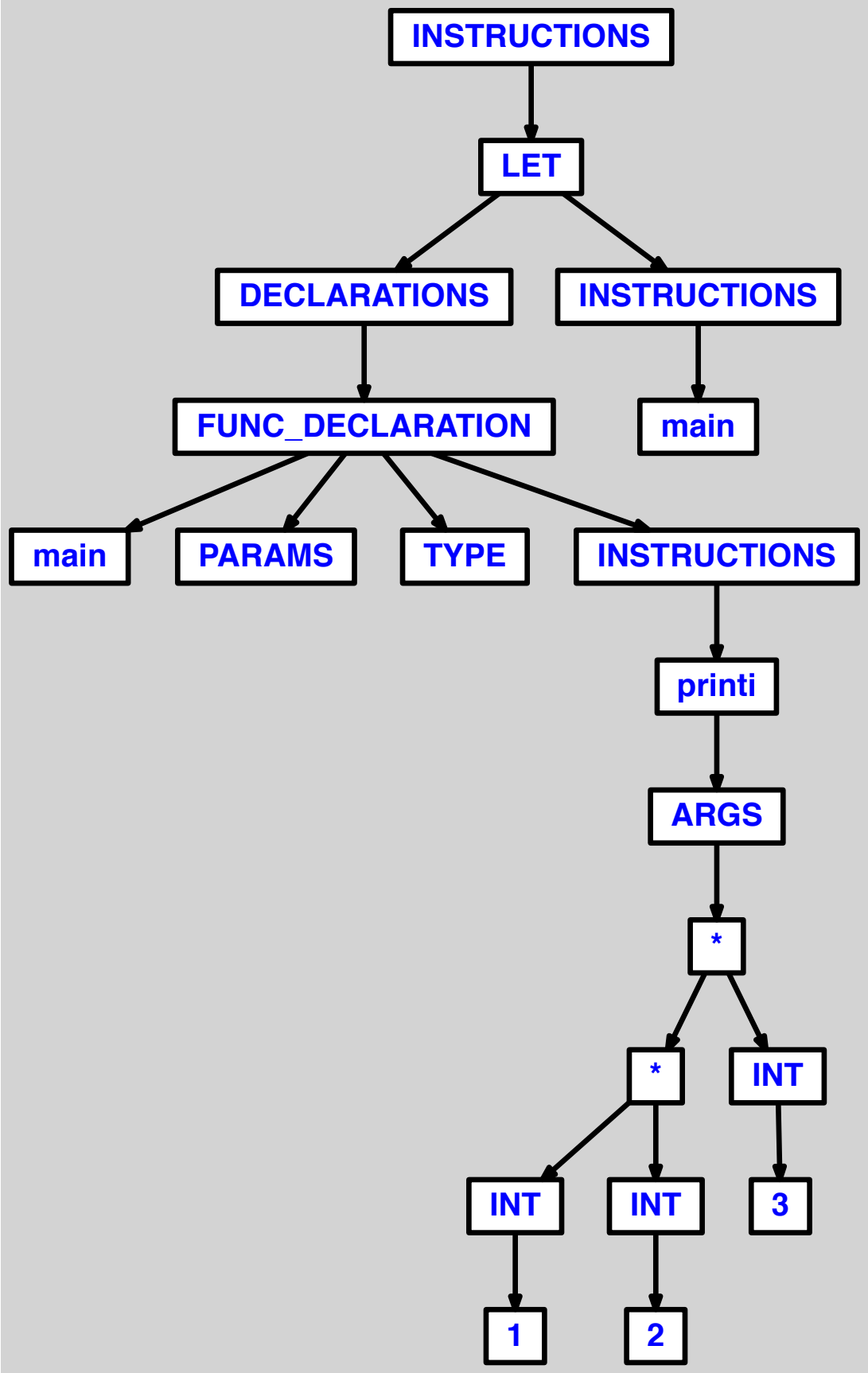
3.2.63 multiplication a 3 termes, avec parenthesage des 2 termes a gauche

```
let function main() = printi((1*2)*3) in main() end
```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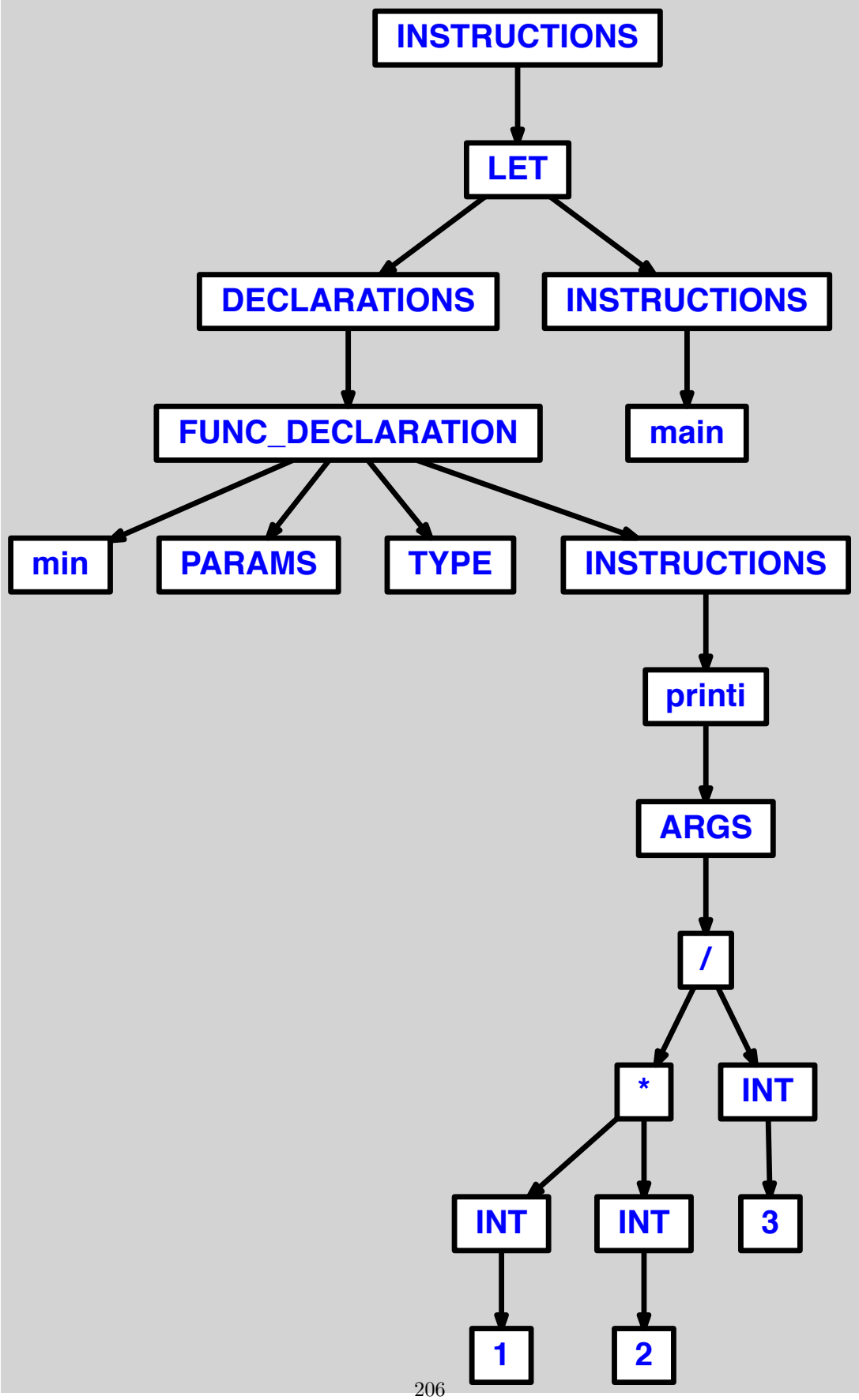
3.2.64 multiplication suivie de division, avec parenthesage des 2 termes a gauche

```
let function min() = printi((1*2)/3) in main() end
```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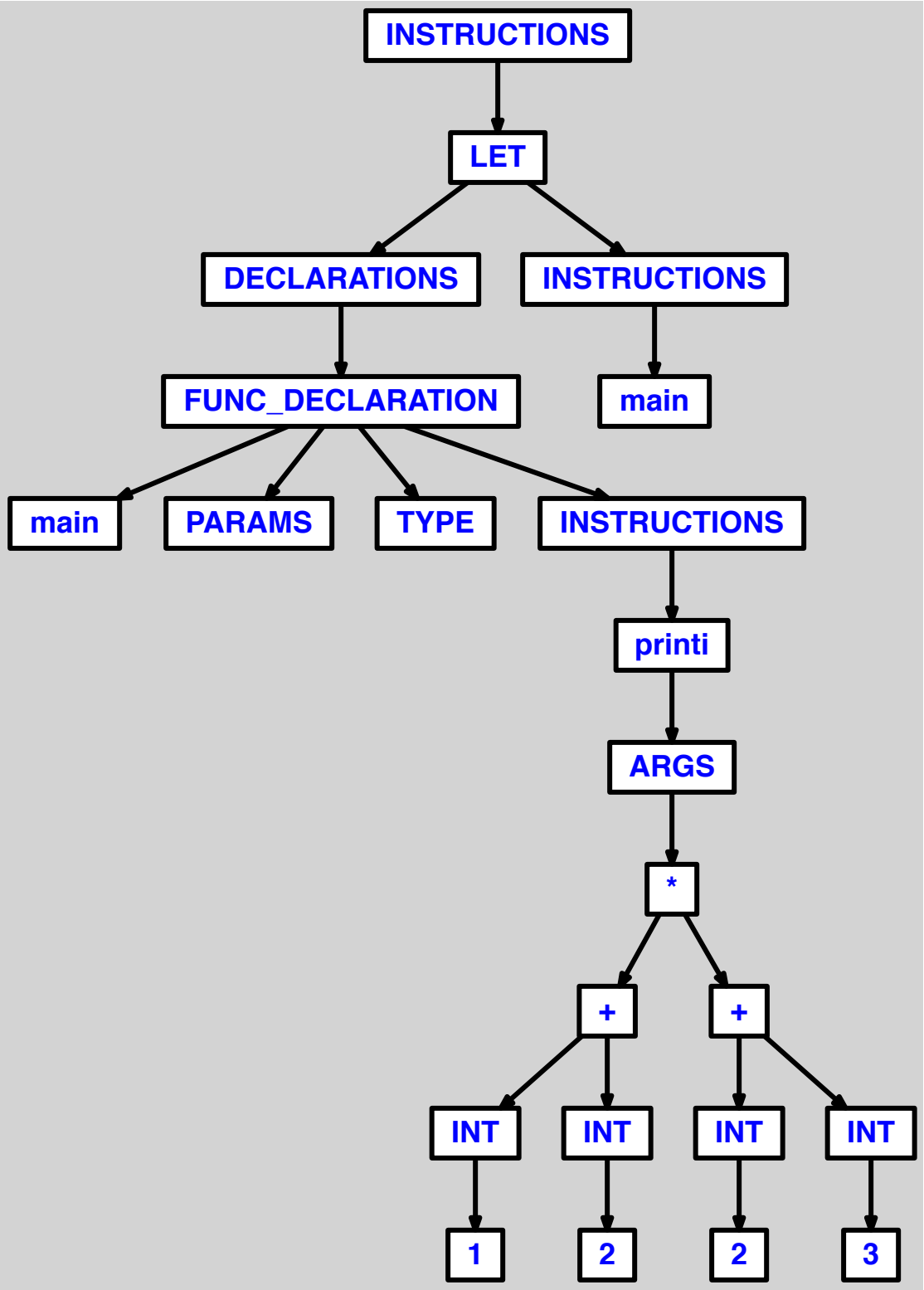
2

3.2.65 multiplication de 2 additions parenthesees

```
let function main() = printi((1+2)*(2+3)) in main() end */
```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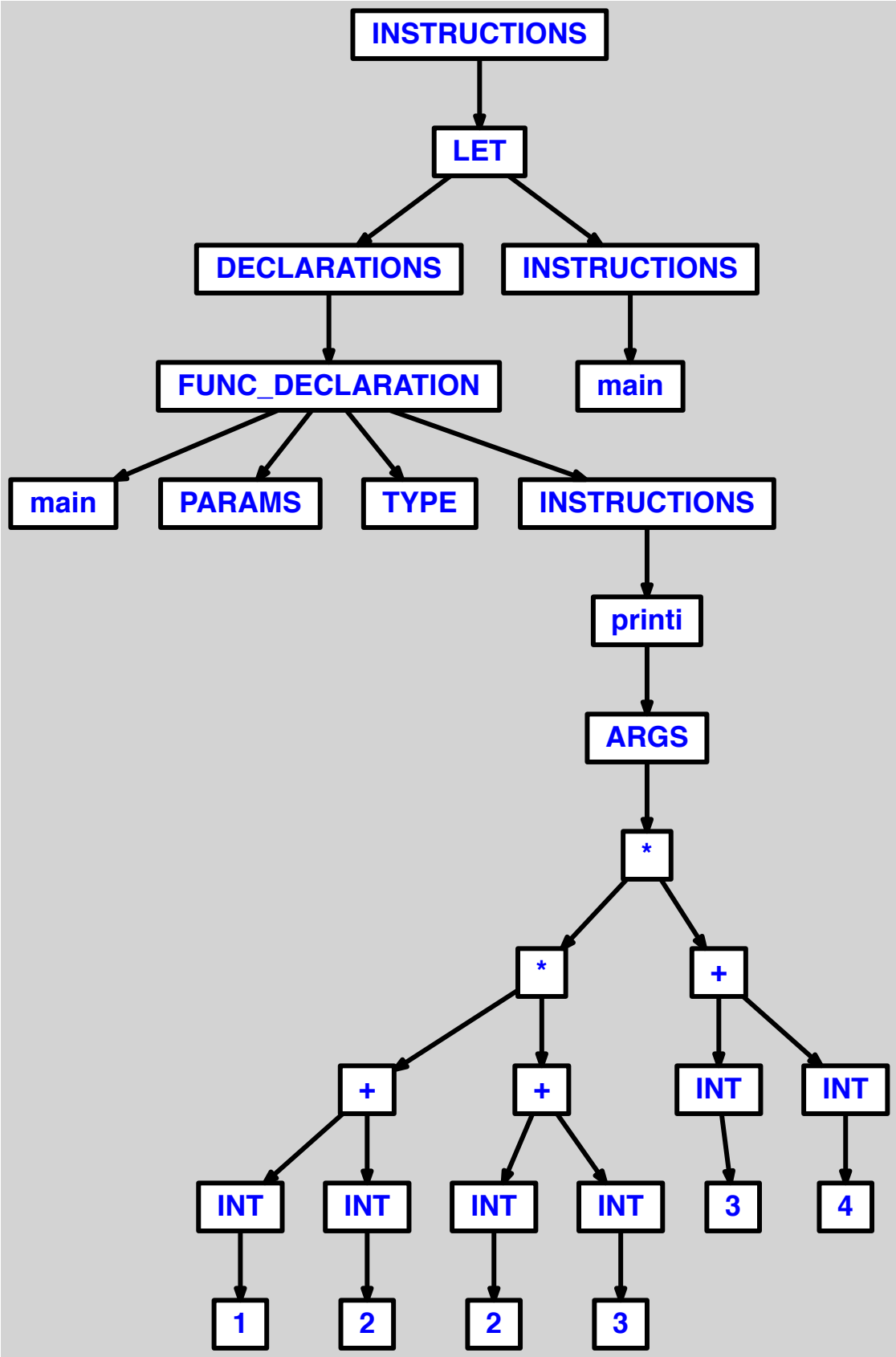
3.2.66 multiplication de 3 additions parenthesees

```
let function main() = printi((1+2)*(2+3)*(3+4)) in main() end
```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INT
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INT
3
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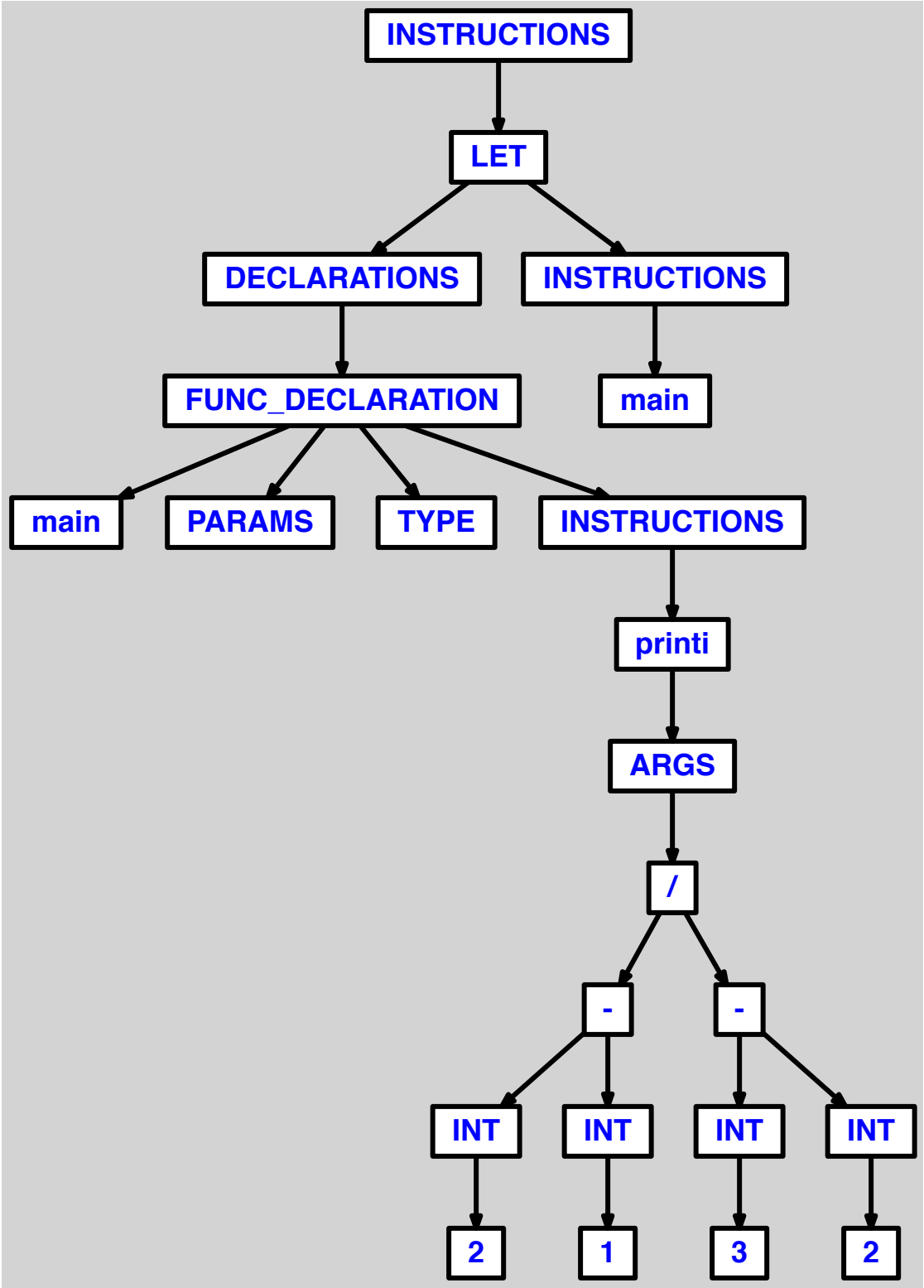
1
2
2
3

3.2.67 division de 2 soustractions parenthesees

```
let function main() = printi((2-1)/(3-2)) in main() end
```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INT
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INT
2
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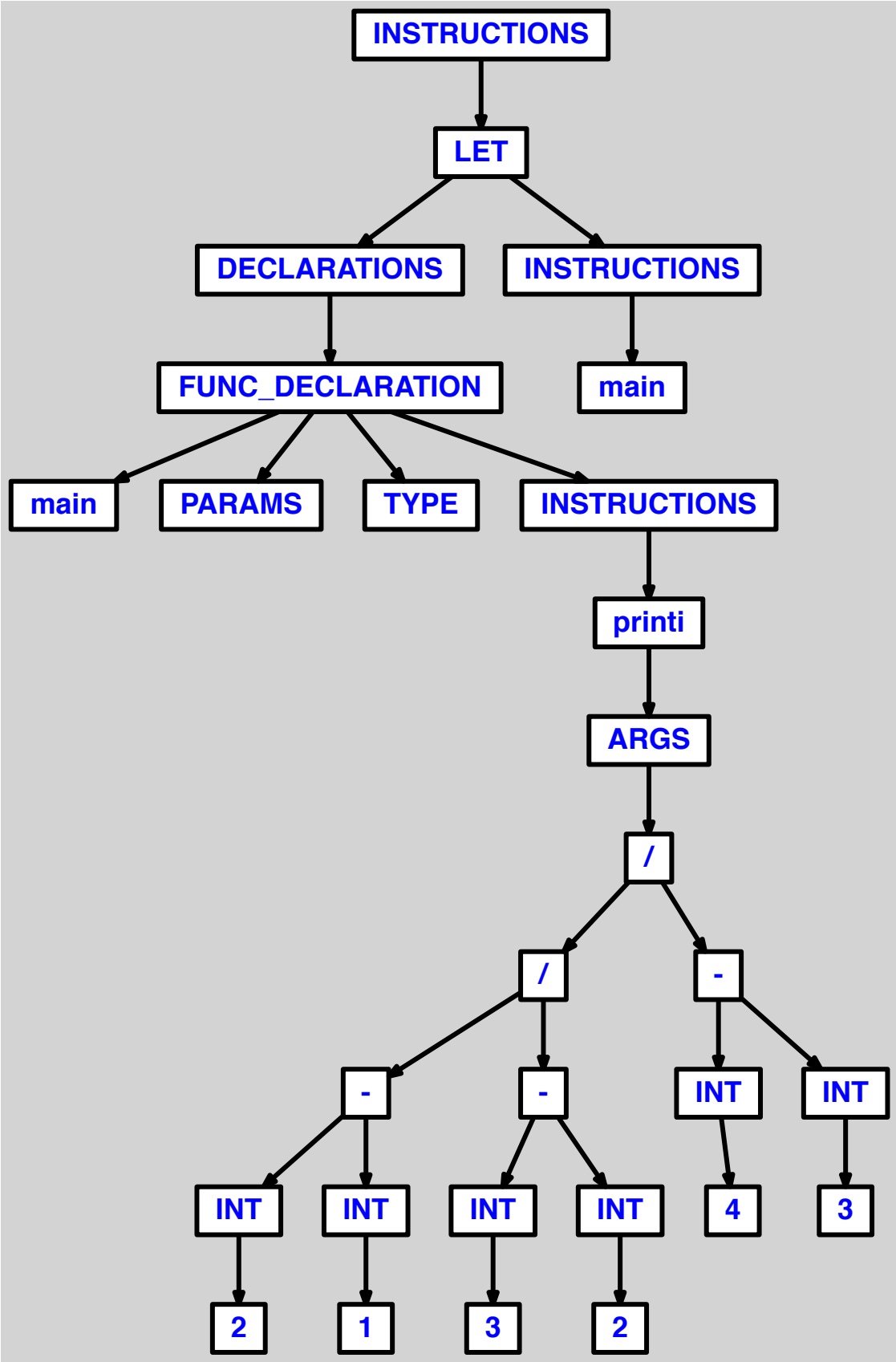
3
2

3.2.68 division de 3 soustractions parenthesees

```
let function main() = printi((2-1)/(3-2)/(4-3)) in main() end
```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INT
INT
INT
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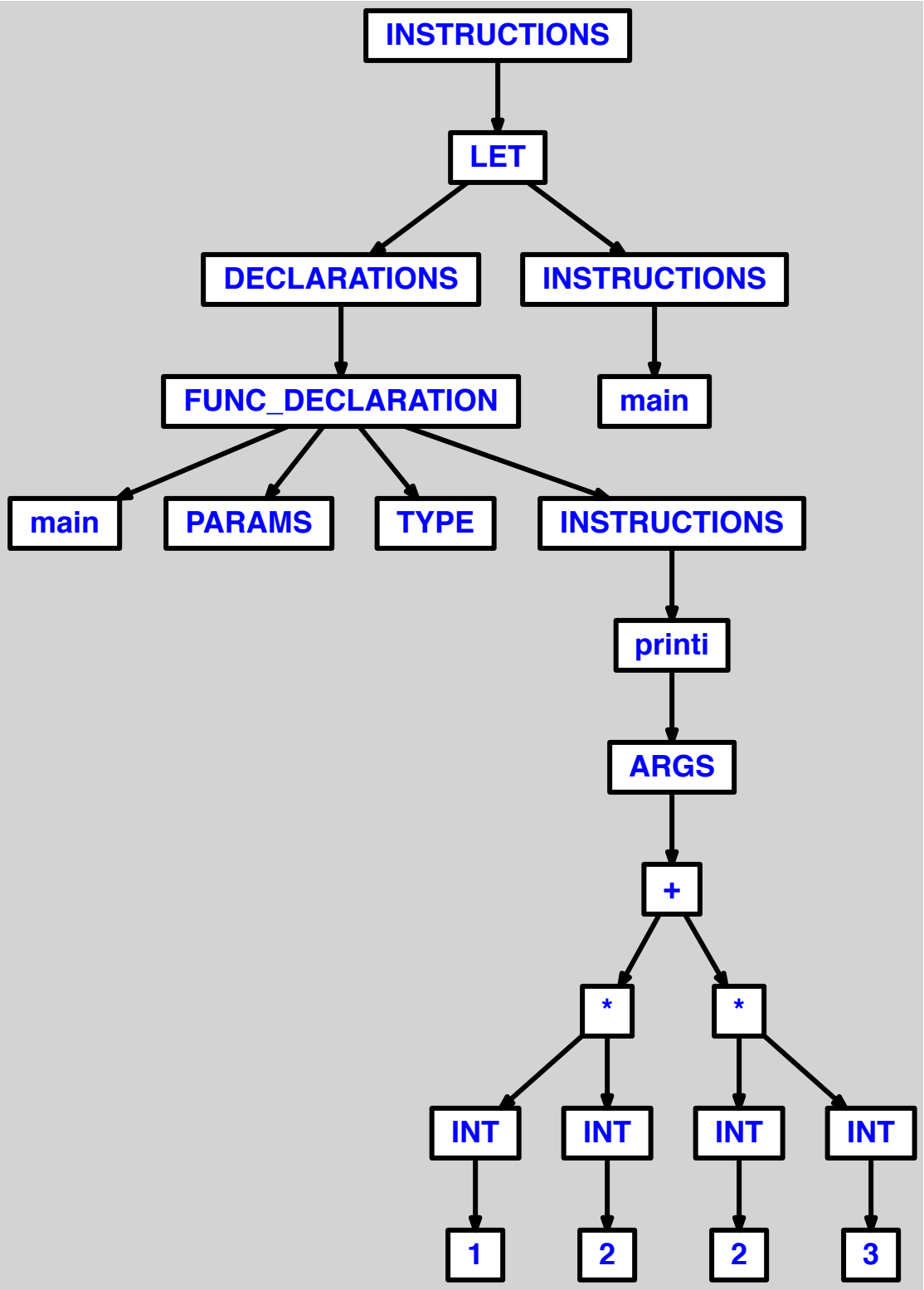
2
1
3
2

3.2.69 addition de 2 multiplications parenthesees

```
let function main() = printi((1*2)+(2*3)) in main() end
```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2
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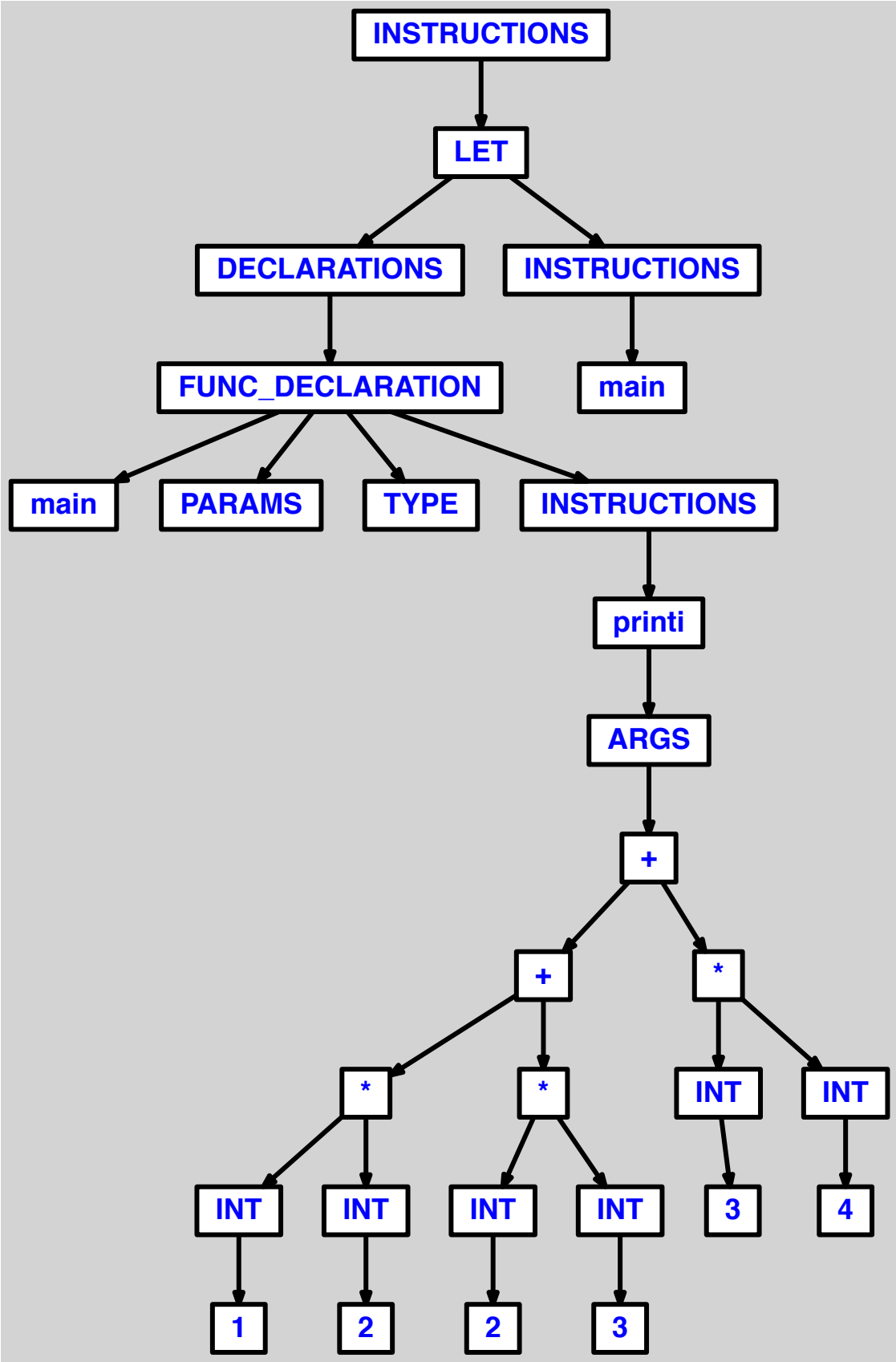
3.2.70 addition de 3 multiplications parenthesees

```
let function main() = printi((1*2)+(2*3)+(3*4)) in main() end
```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INT
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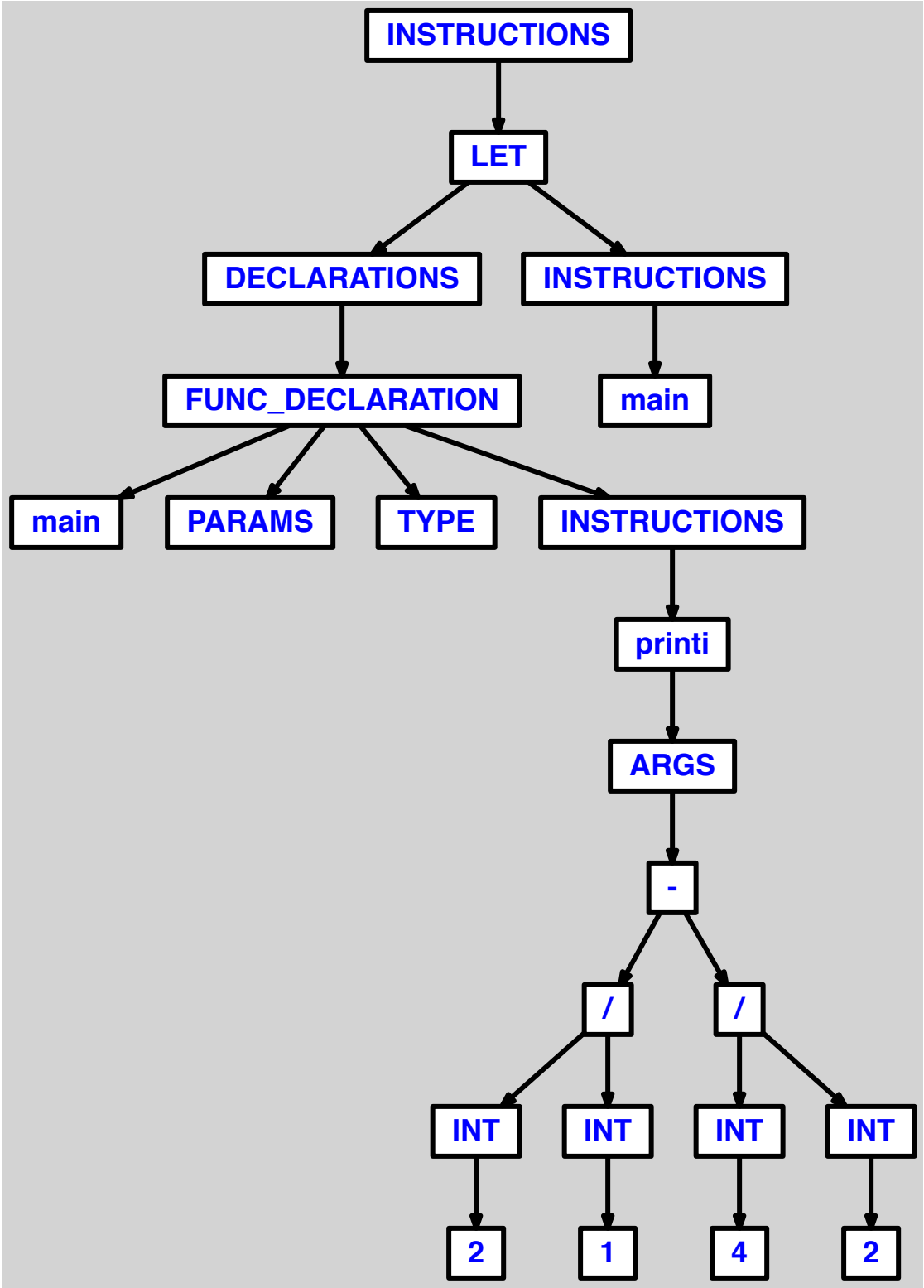
INT
INT
INT
3
4
1
2
2
3

3.2.71 soustraction de 2 divisions parenthesees

```
let function main() = printi((2/1)-(4/2) in main() end
```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PARAMS
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INSTRUCTIONS
printi
ARGS
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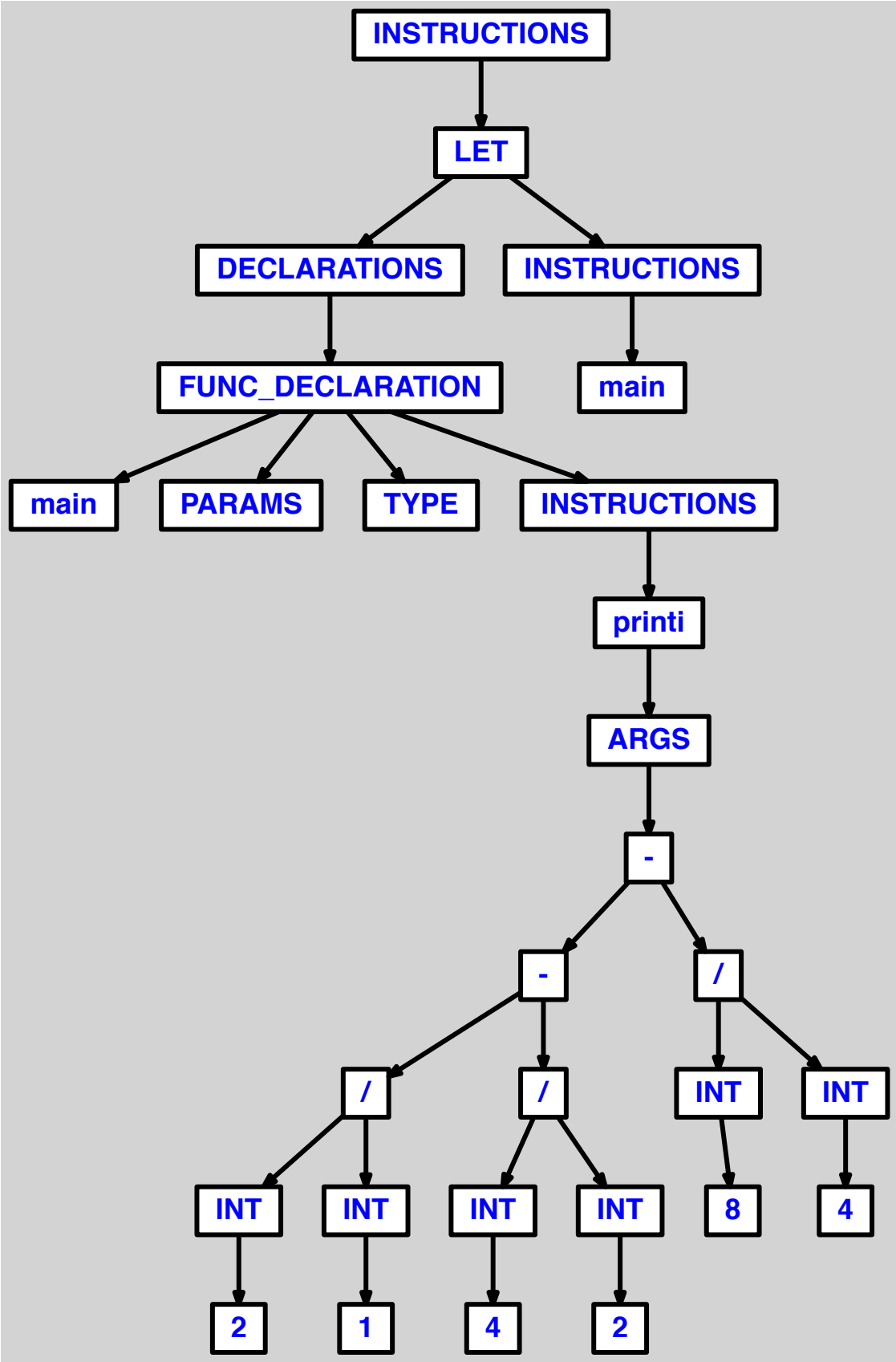
/
INT
INT
INT
INT
2
1
4
2

3.2.72 soustraction de 3 divisions parenthesees

```
let function main() = printi((2/1)-(4/2)-(8/4)) in main() end
```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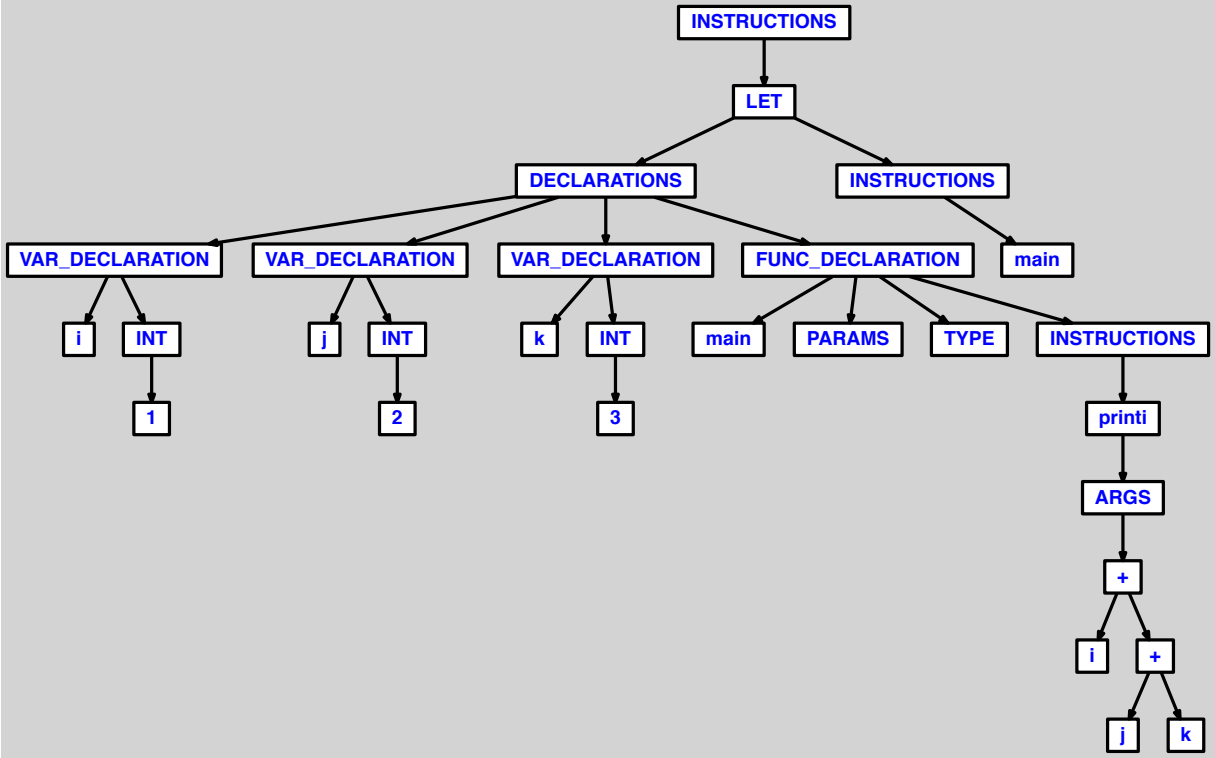
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
-
-
/
/
/
INT
INT
INT
INT
INT
INT
8
4
2
1
4
2

3.2.73 addition a 3 termes identifies par variables, avec parenthesage des 2 variables a droite

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i+(j+k))
in main() end
```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FUNC_DECLARATION
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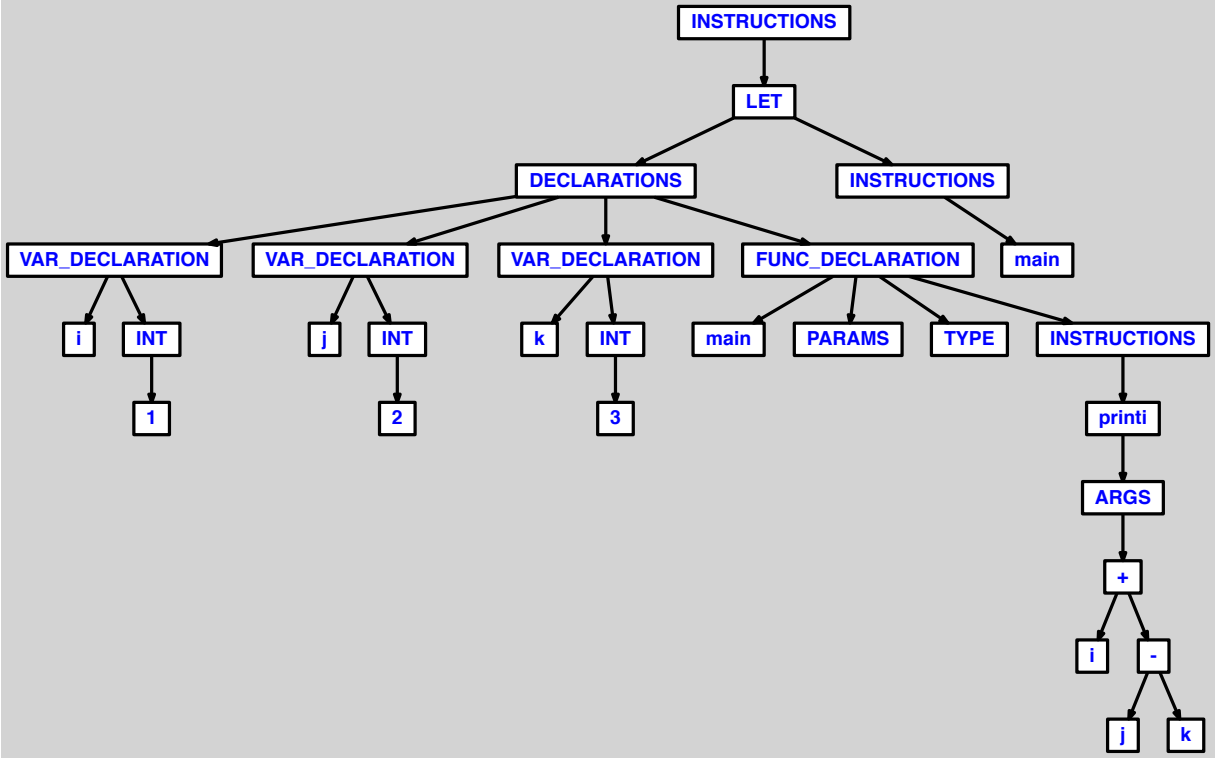
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
i
+
j
k

3.2.74 addition suivie de soustraction, avec termes identifies par variables et parenthesage des 2 variables a droite

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i+(j-k))
in main() end
```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i
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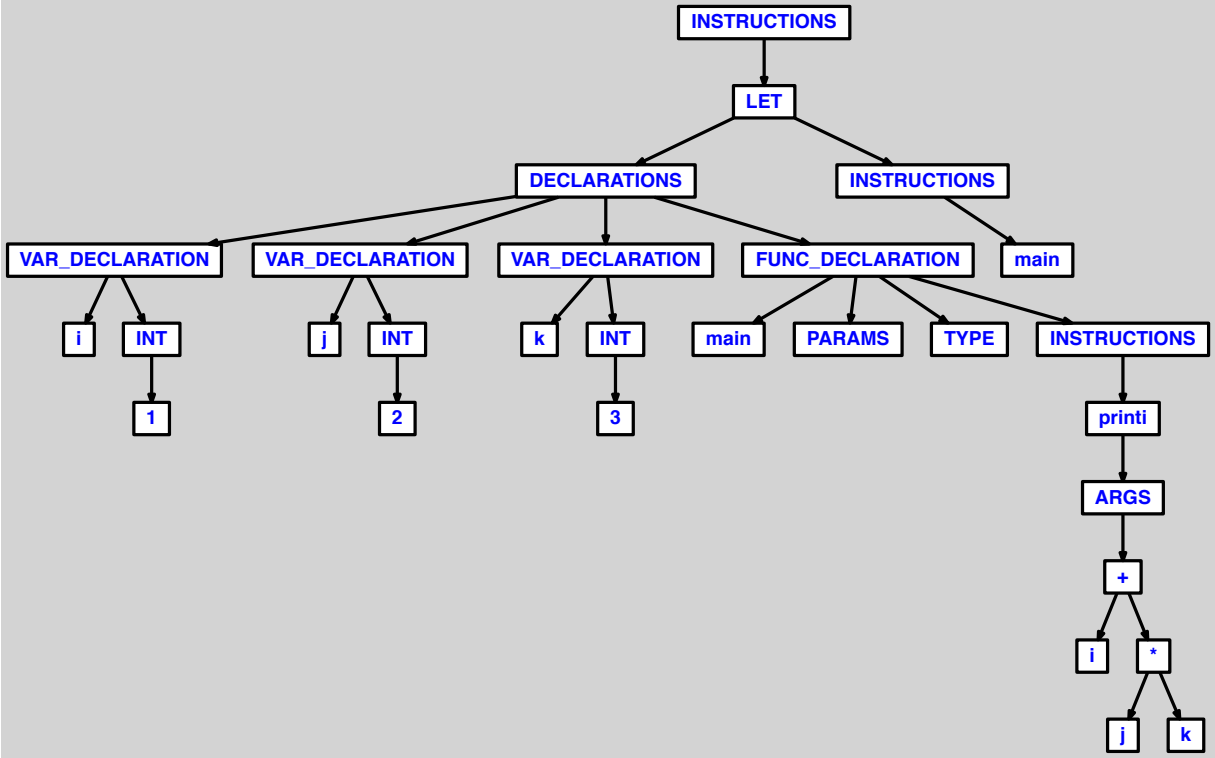
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
i
-
j
k

3.2.75 addition suivie de multiplication, avec termes identifies par variables et parenthesage des 2 variables a droite

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i+(j*k))
in main() end
```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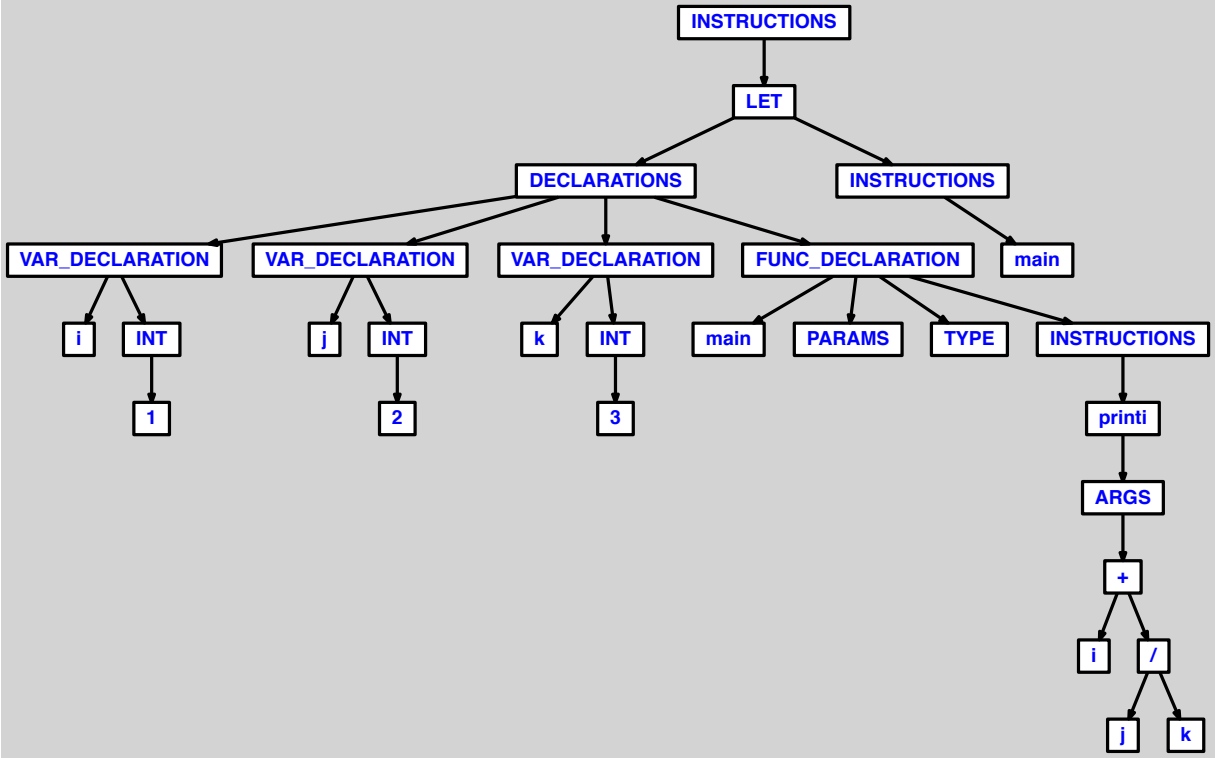
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
i
*
j
k

3.2.76 addition suivie de division, avec termes identifies par variables et parenthesage des 2 variables a droite

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i+(j/k))
in main() end
```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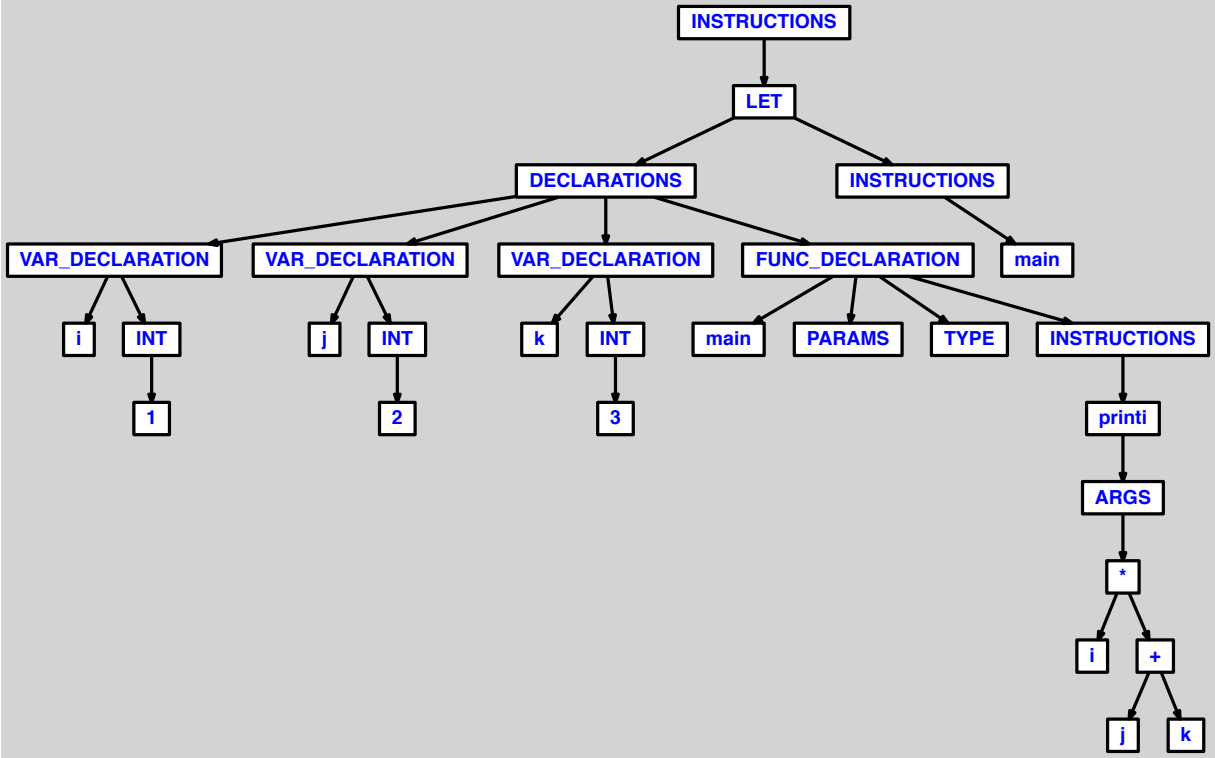
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
i
/
j
k

3.2.77 multiplication suivie d'addition, avec termes identifies par variables et parenthesage des 2 variables a droite

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i*(j+k))
in main() end
```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PARAMS
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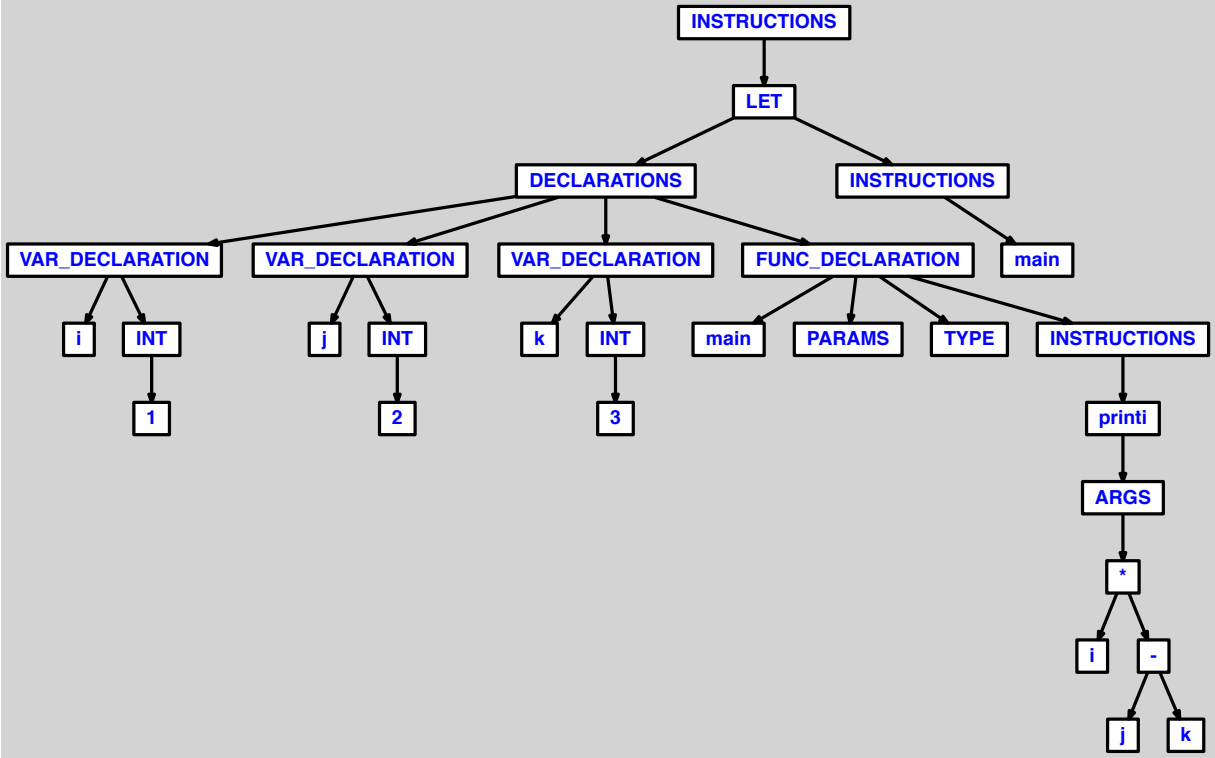
1
2
3
printi
ARGS
*
i
+
j
k

3.2.78 multiplication suivie de soustraction, avec termes identifies par variables et parenthesage des 2 variables a droite

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i*(j-k))
in main() end
```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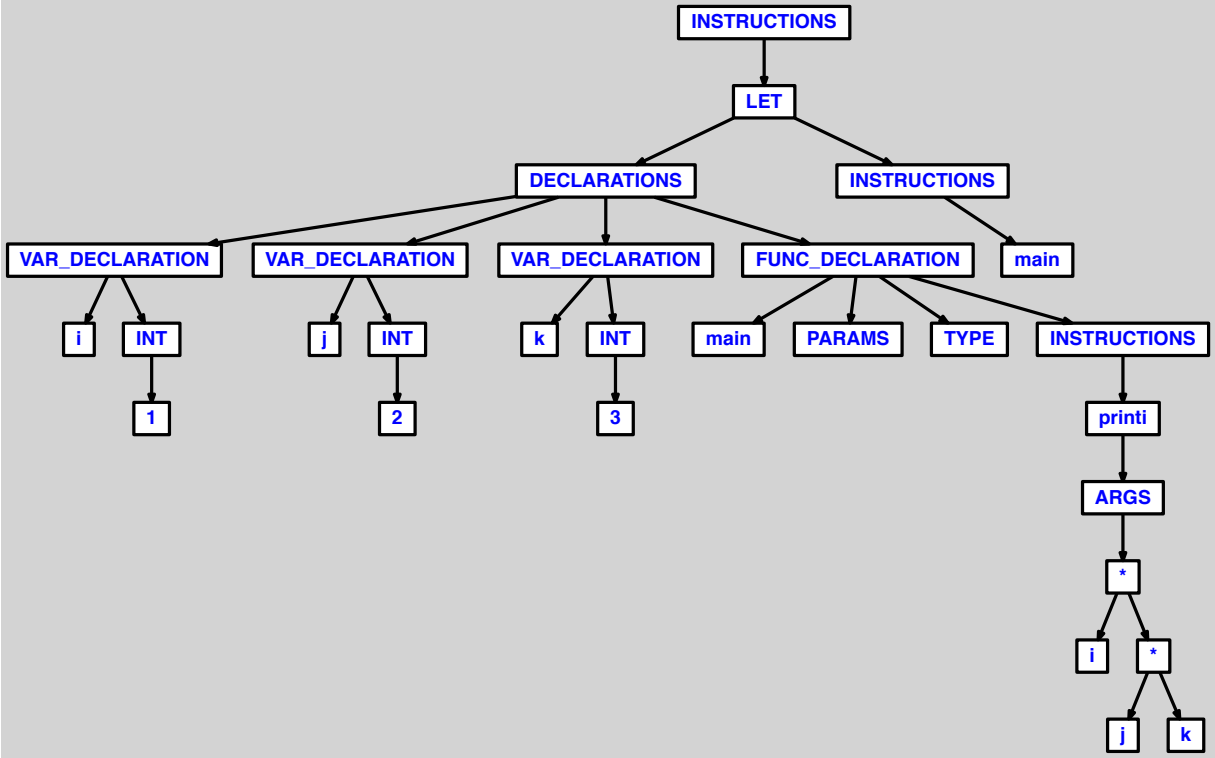
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
*
i
-
j
k

3.2.79 multiplication a 3 termes identifies par variables, avec parenthesage des 2 variables a droite

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i*(j*k))
in main() end
```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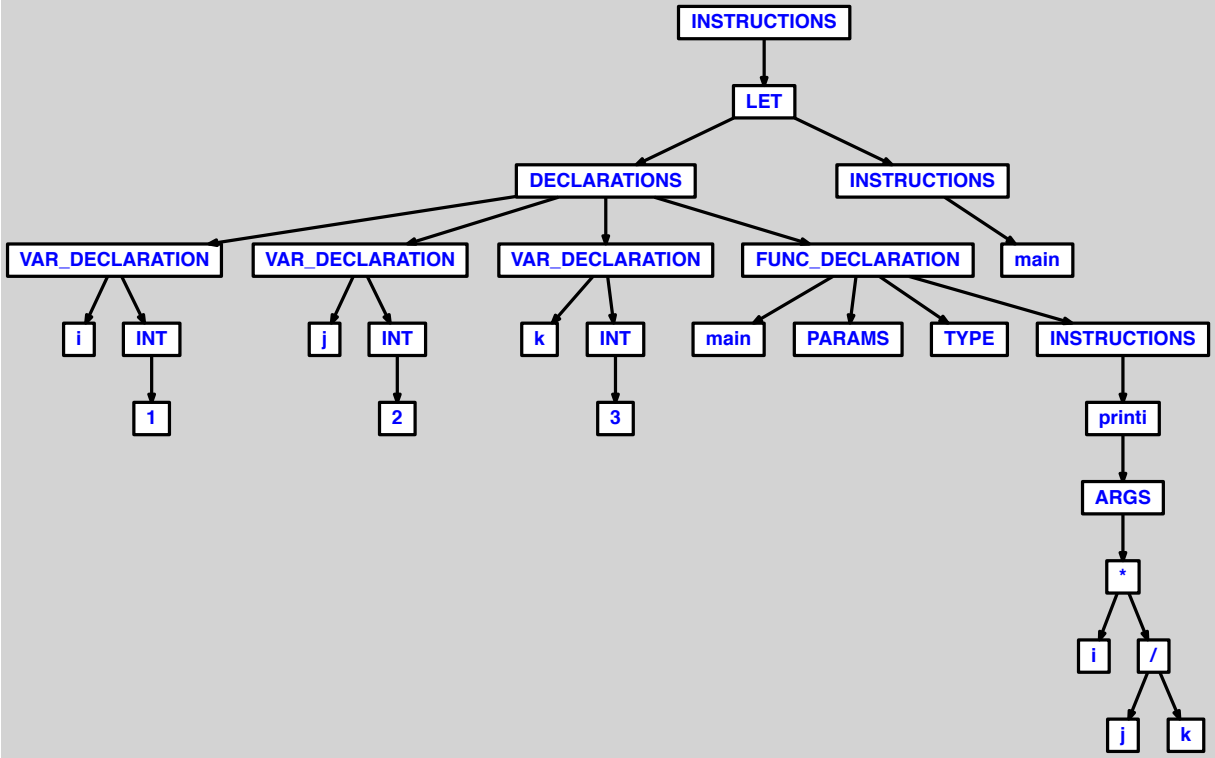
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
*
i
*
j
k

3.2.80 multiplication suivie de division, avec termes identifies par variables et parenthesage des 2 variables a droite

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi(i*(j/k))
in main() end
```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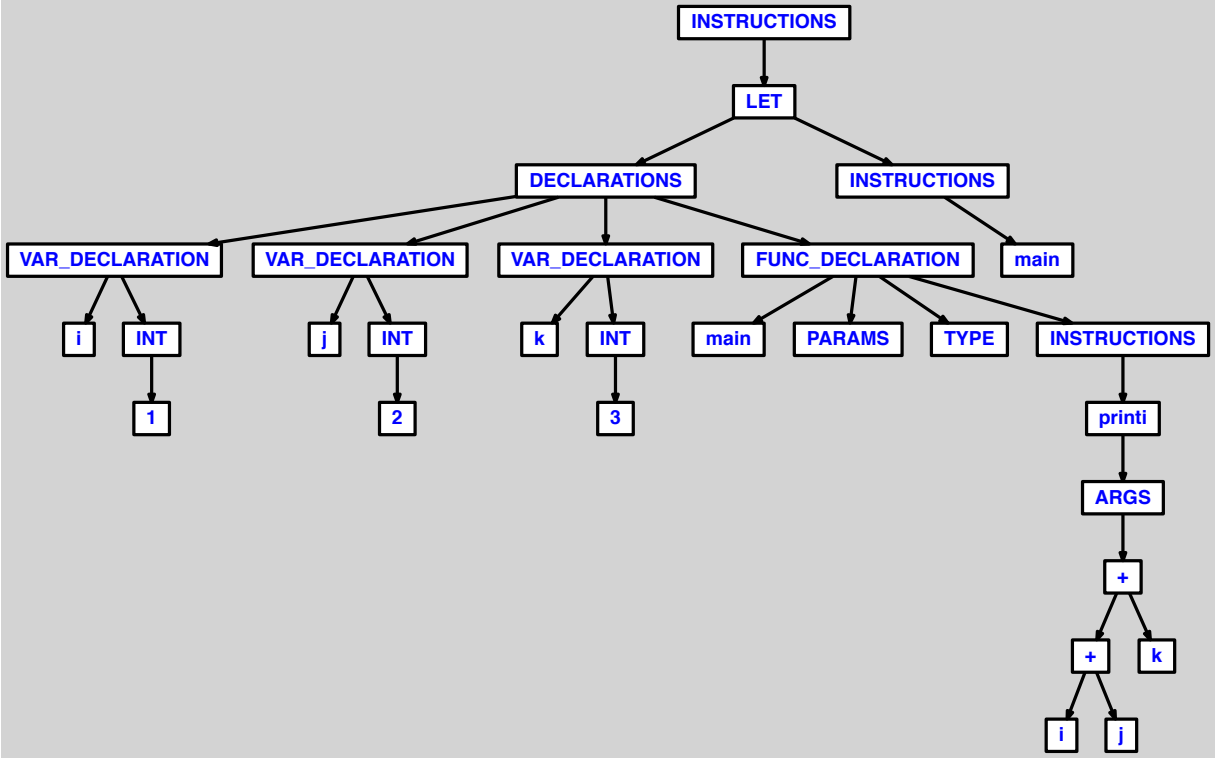
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
*
i
/
j
k

3.2.81 addition a 3 termes identifies par variables, avec parenthesage des 2 variables a gauche

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((i+j)+k)
in main() end
```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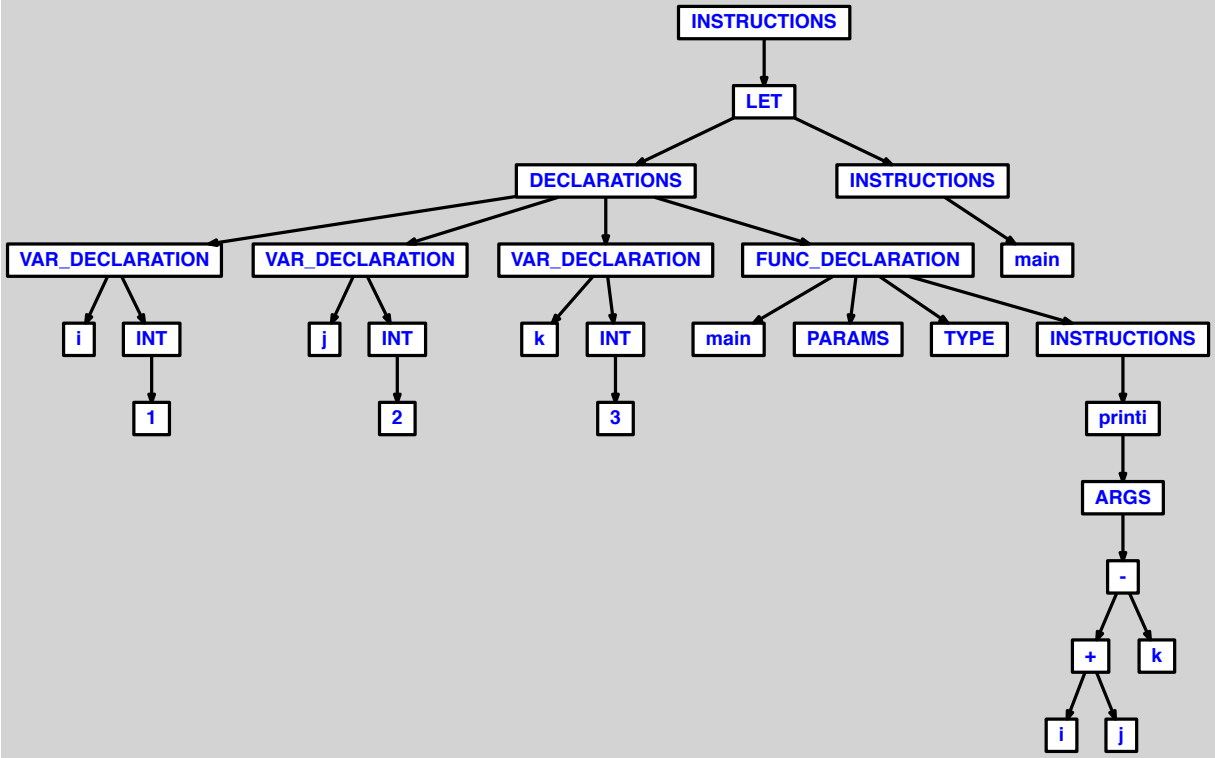
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
+
k
i
j

3.2.82 addition suivie de soustraction, avec termes identifies par variables et parenthesage des 2 variables a gauche

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((i+j)-k)
in main() end
```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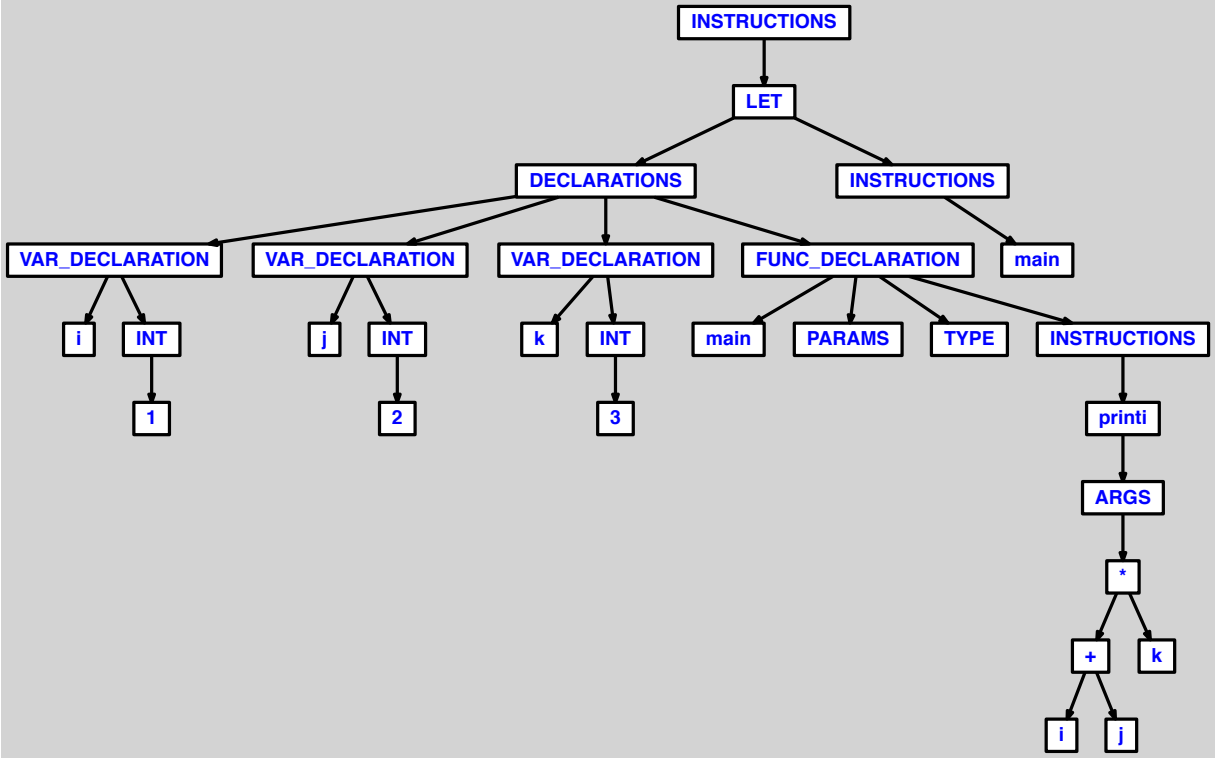
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
-
+
k
i
j

3.2.83 addition suivie de multiplication, avec termes identifies par variables et parenthesage des 2 variables a gauche

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((i+j)*k)
in main() end
```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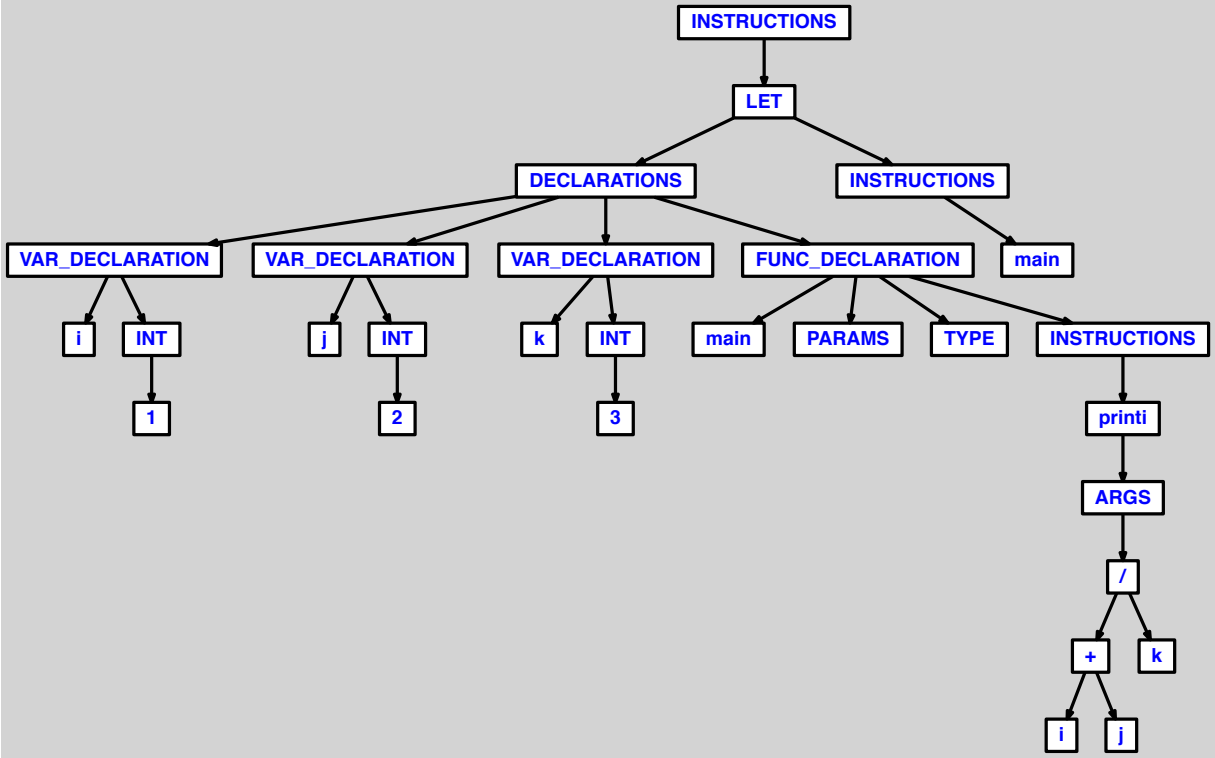
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
*
+
k
i
j

3.2.84 addition suivie de division, avec termes identifies par variables et parenthesage des 2 variables a gauche

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((i+j)/k)
in main() end
```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FUNC_DECLARATION
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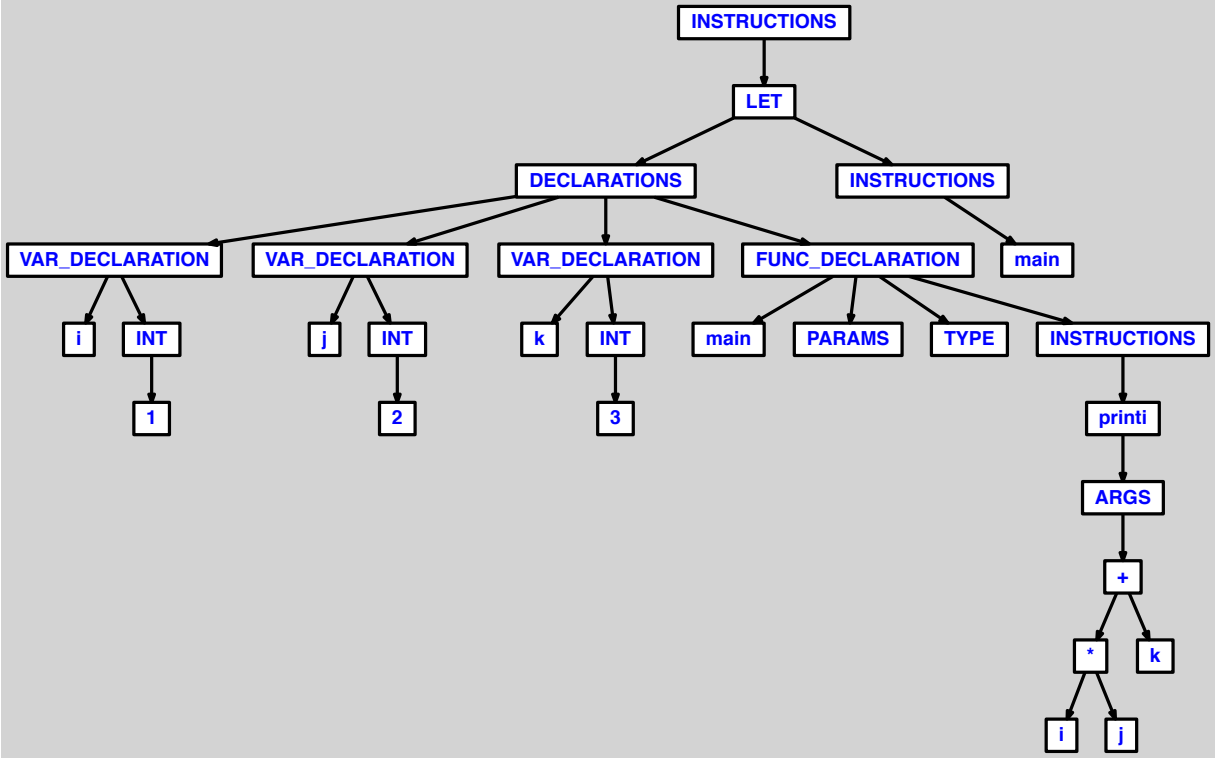
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
/
+
k
i
j

3.2.85 multiplication suivie d'addition, avec termes identifies par variables et parenthesage des 2 variables a gauche

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((i*j)+k)
in main() end
```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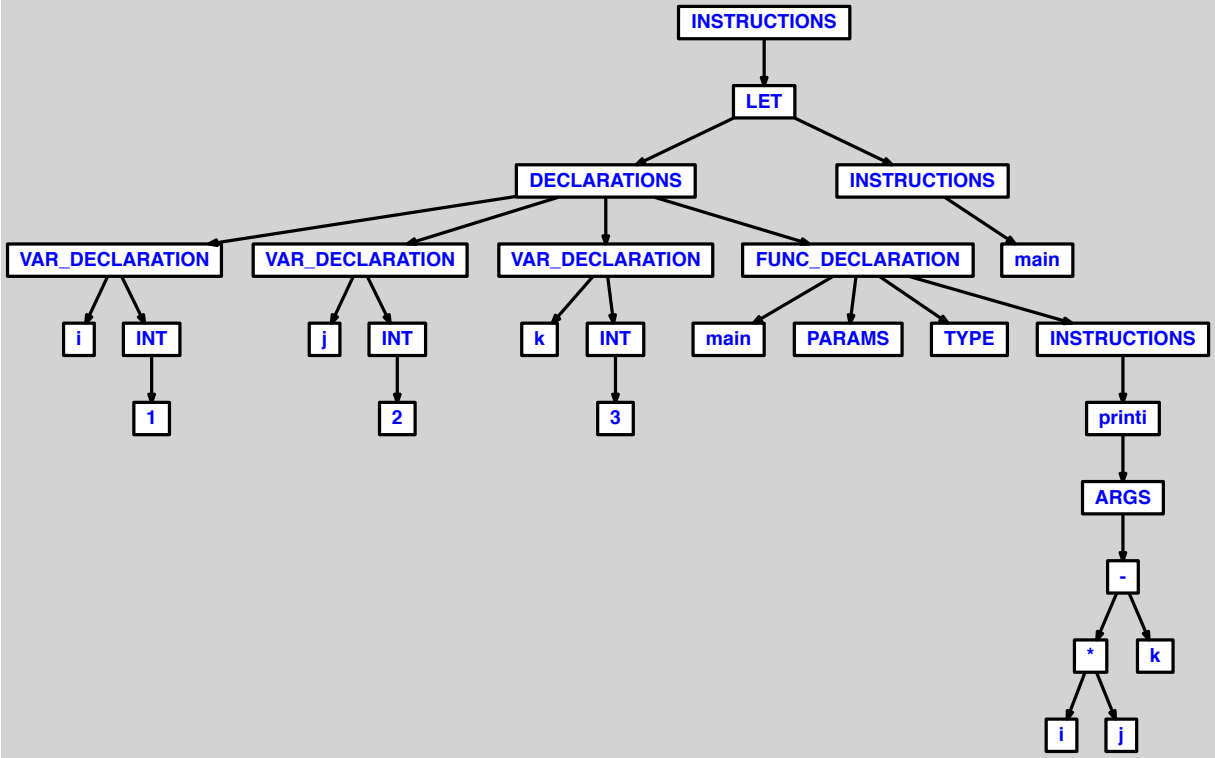
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
*
k
i
j

3.2.86 multiplication suivie de soustraction, avec termes identifies par variables et parenthesage des 2 variables a gauche

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((i*j)-k)
in main() end
```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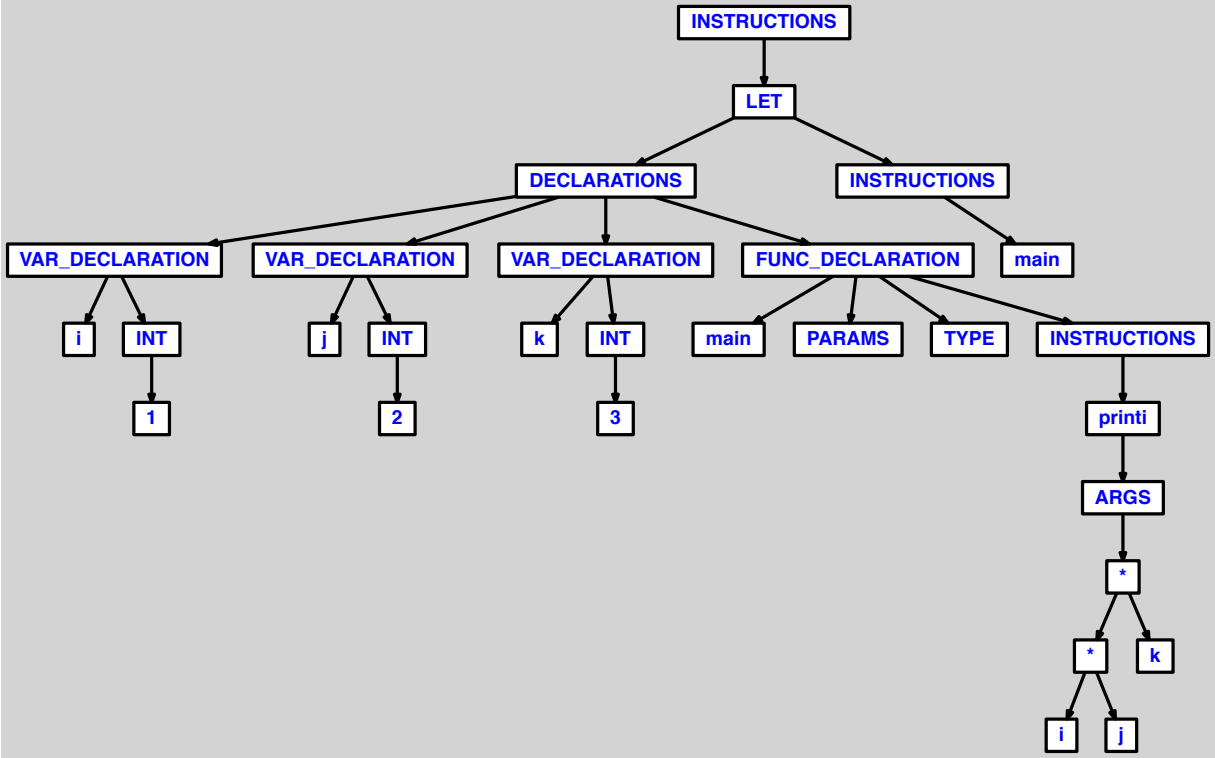
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
-
*
k
i
j

3.2.87 multiplication a 3 termes identifies par variables, avec parenthesage des 2 variables a gauche

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((i*j)*k)
in main() end
```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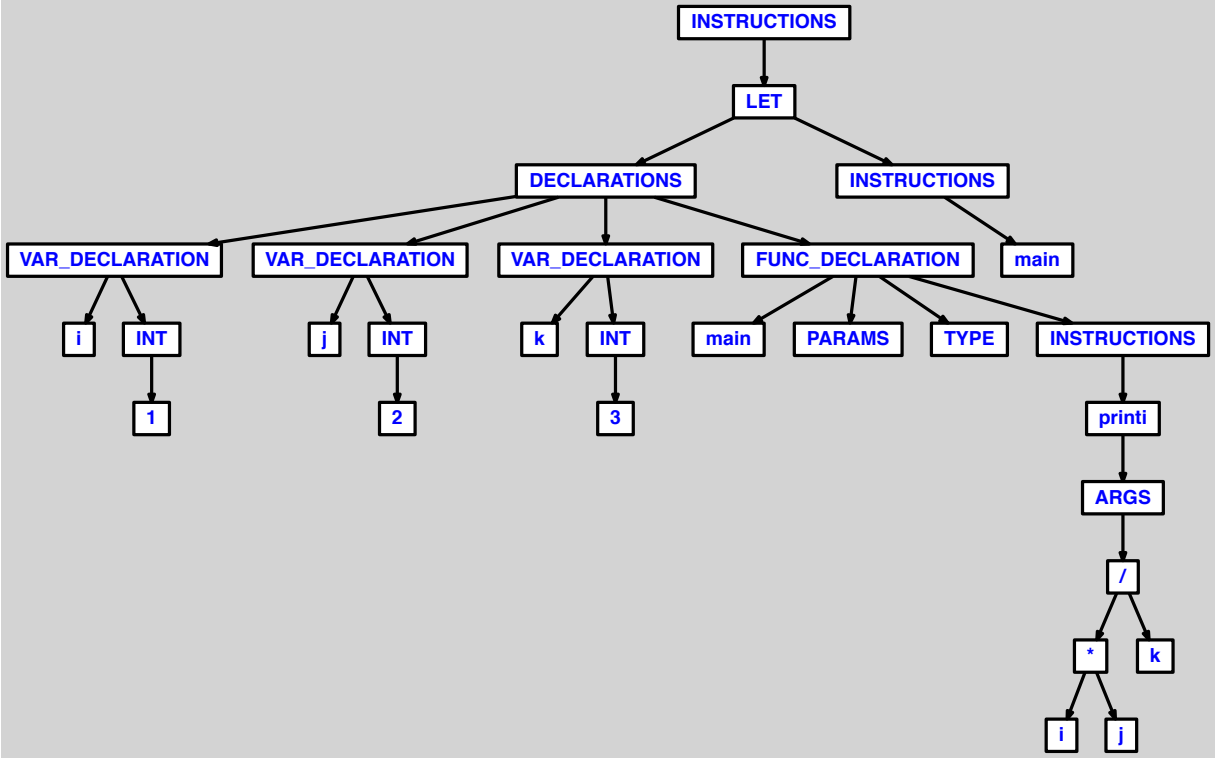
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
*
*
k
i
j

3.2.88 multiplication suivie de division, avec termes identifies par variables et parenthesage des 2 variables a gauche

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((i*j)/k)
in main() end
```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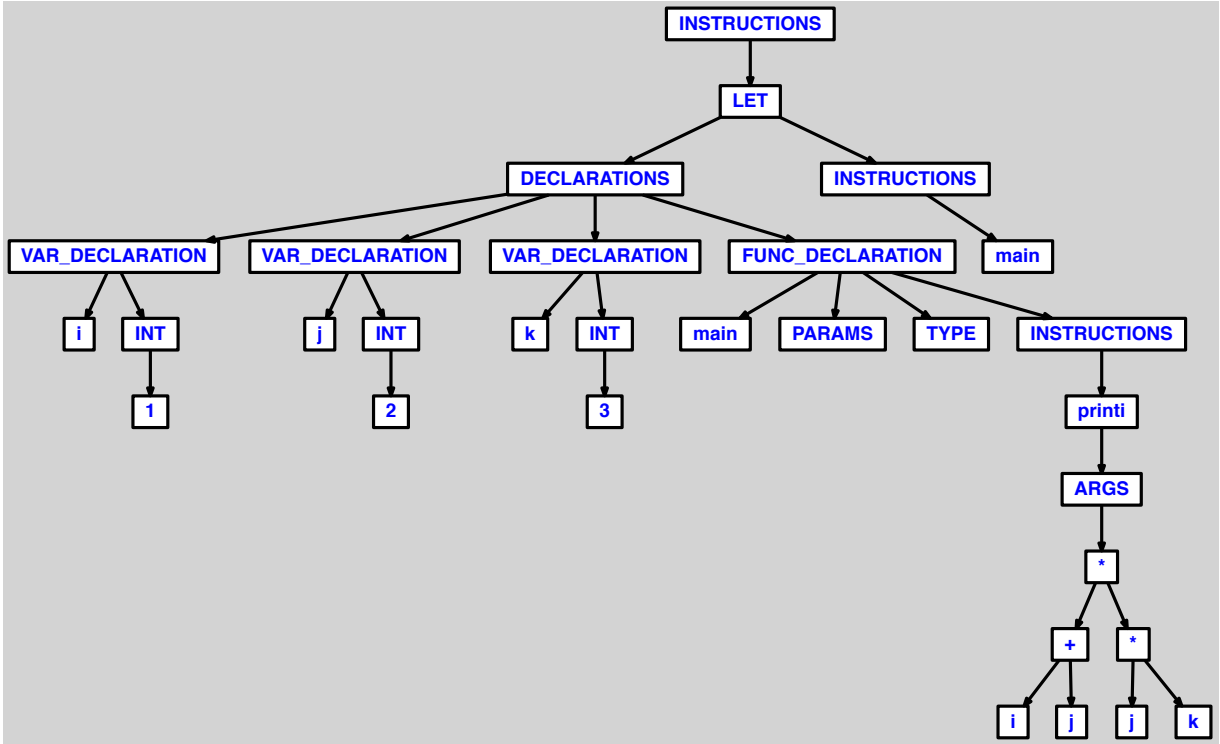
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
/
*
k
i
j

3.2.89 multiplication de 2 additions parenthesees, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((i+j)*(j*k))
in main() end
```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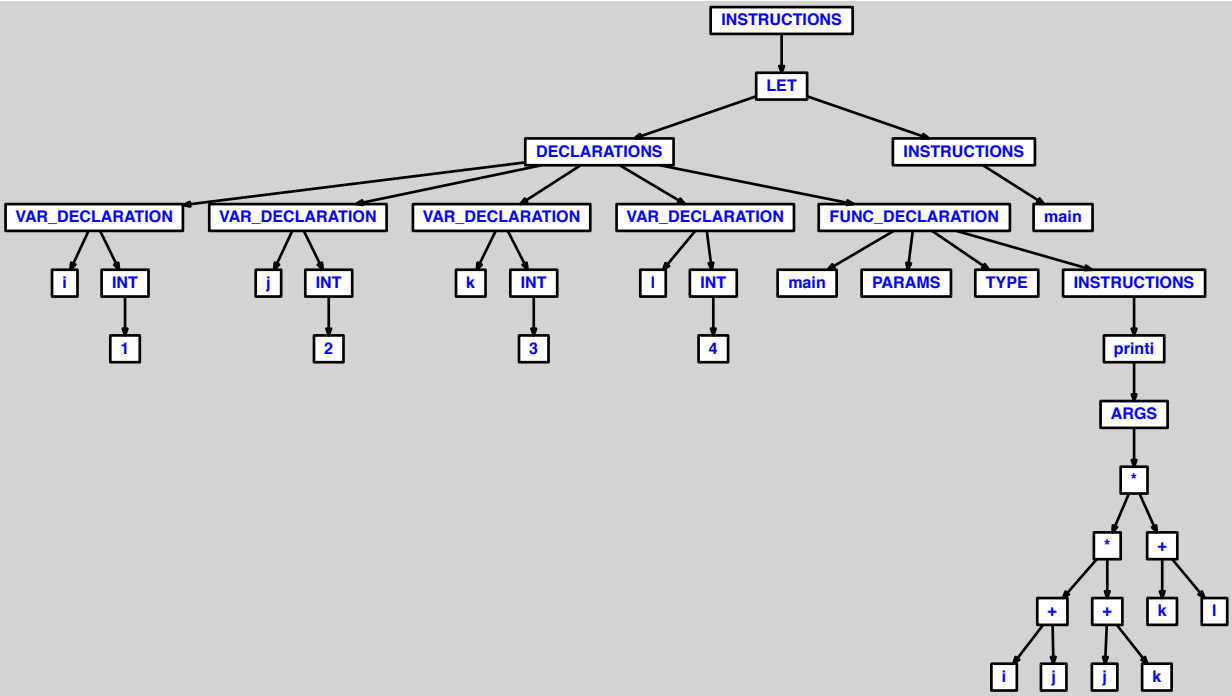
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
*
+
*
i
j
j
k

3.2.90 multiplication de 3 additions parenthesees, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3
  var l := 4

  function main() = printi((i+j)*(j+k)*(k+l))
in main() end
```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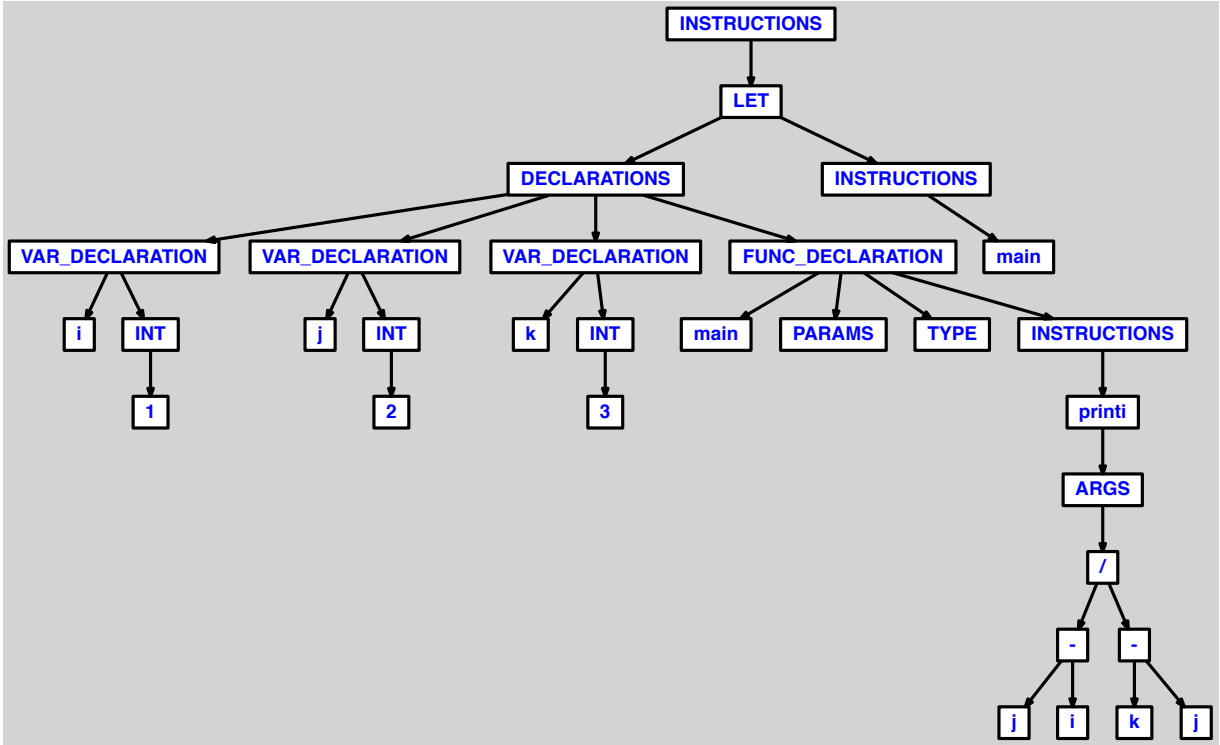
PARAMS
TYPE
INSTRUCTIONS
1
2
3
4
printi
ARGS
*
*
+
+
+
k
l
i
j
j
k

3.2.91 division de 2 soustractions parenthesees, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((j-i)/(k-j))
in main() end
```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INT
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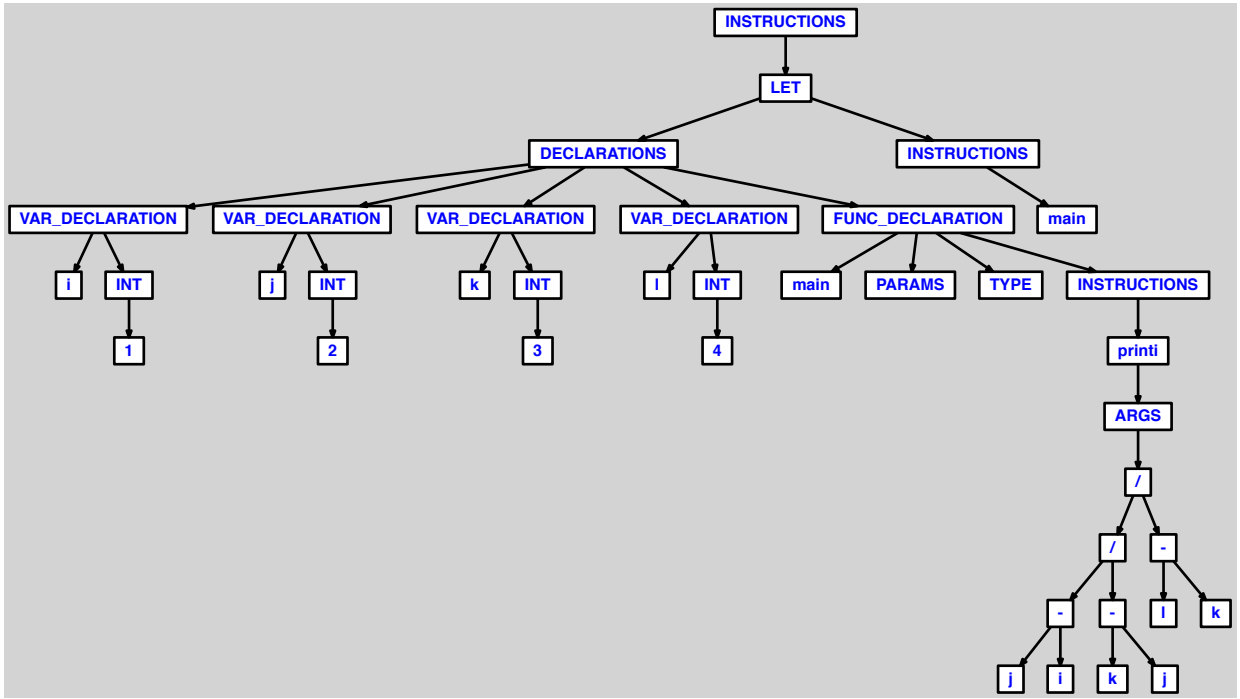
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
/
-
-
j
i
k
j

3.2.92 division de 3 soustractions parenthesees, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3
  var l := 4

  function main() = printi((j-i)/(k-j)/(l-k))
in main() end
```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main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
/
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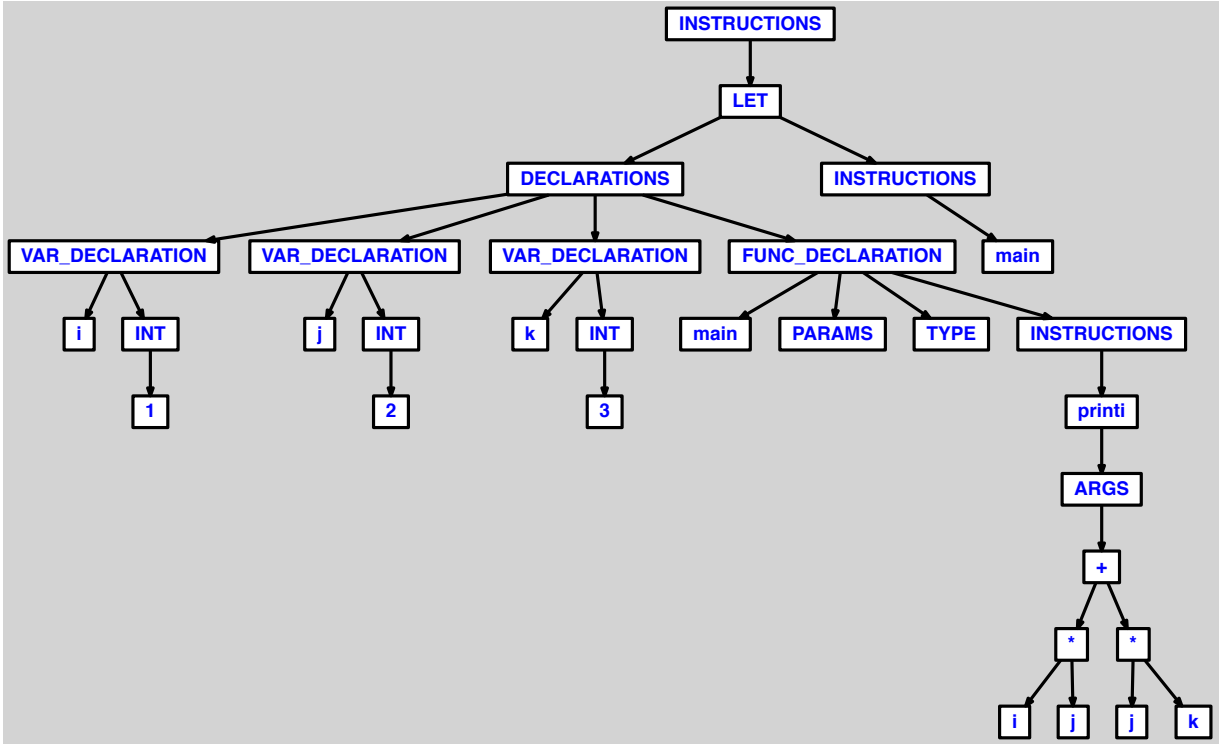
-
l
k
j
i
k
j

3.2.93 addition de 2 multiplications parenthesees, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3

  function main() = printi((i*j)+(j*k))
in main() end
```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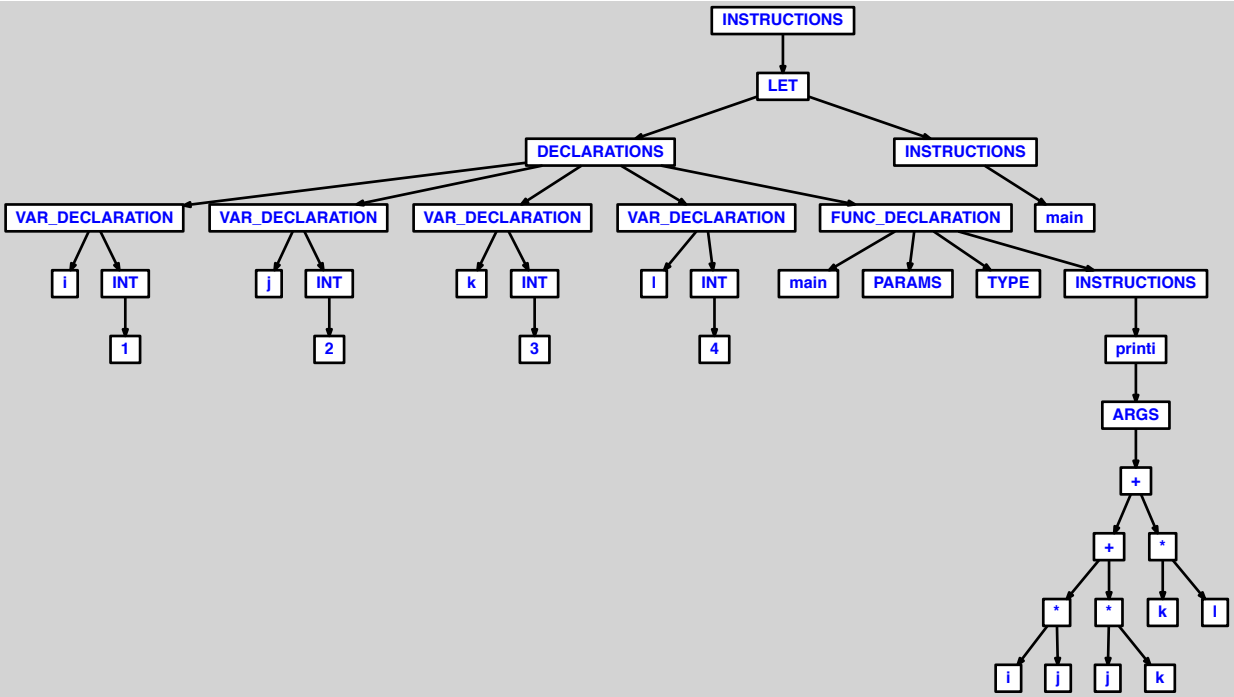
PARAMS
TYPE
INSTRUCTIONS
1
2
3
printi
ARGS
+
*
*
i
j
j
k

3.2.94 addition de 3 multiplications parenthesees, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 3
  var l := 4

  function main() = printi((i*j)+(j*k)+(k*l))
in main() end
```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INSTRUCTIONS
1
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printi
ARGS
+
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*
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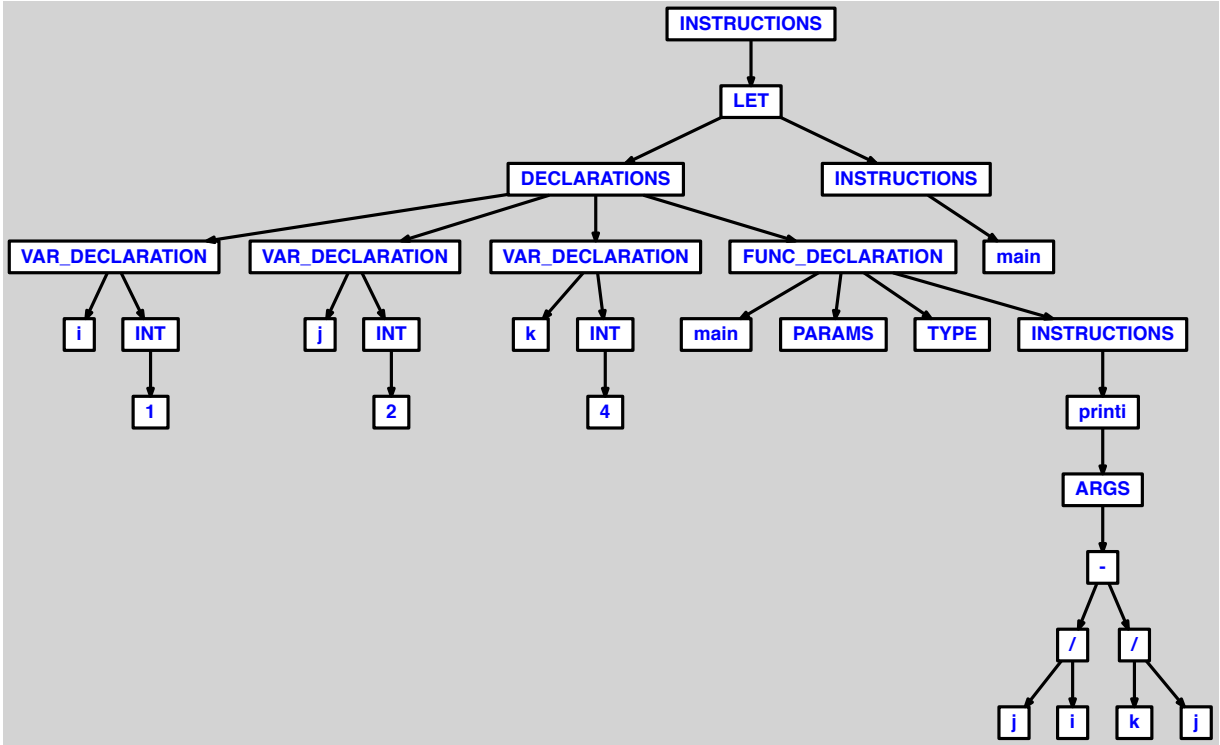
i
j
j
k

3.2.95 soustraction de 2 divisions parenthesees, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 4

  function main() = printi((j/i)-(k/j))
in main() end
```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PARAMS
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INSTRUCTIONS
1
2
4
printi
ARGS
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j
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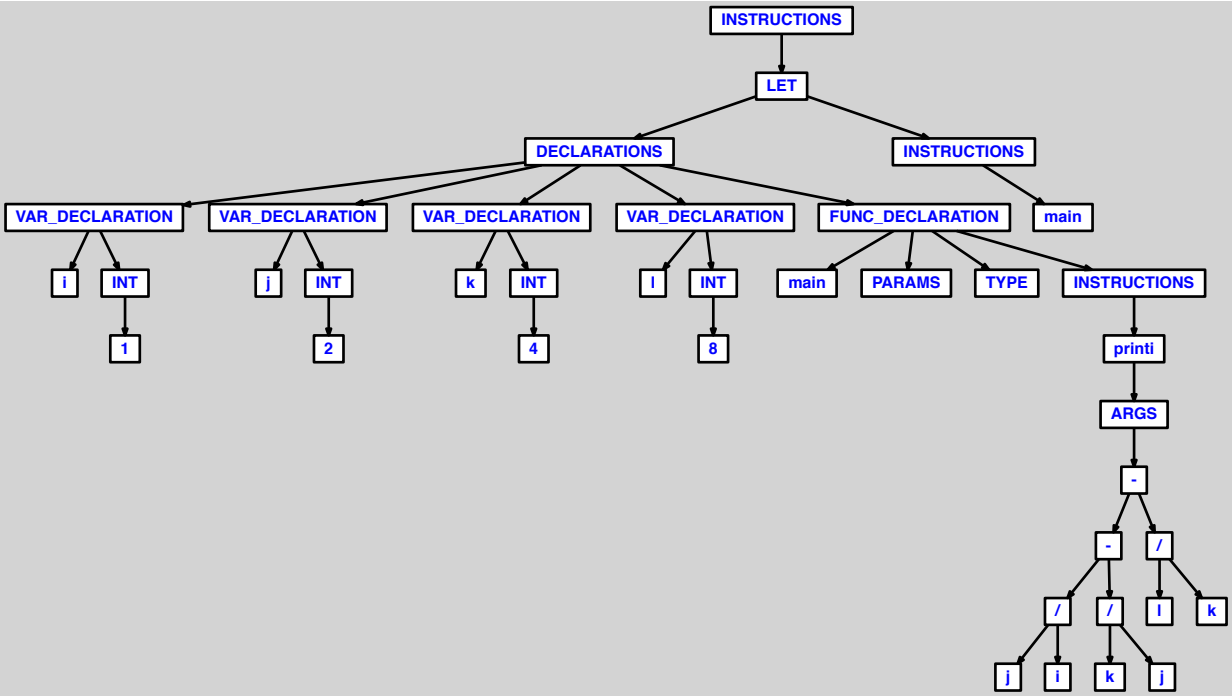
k
j

3.2.96 soustraction de 3 divisions parenthesees, avec termes identifies par variables

```
let
  var i := 1
  var j := 2
  var k := 4
  var l := 8

  function main() = printi((j/i)-(k/j)-(l/k))
in main() end
```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printi
ARGS
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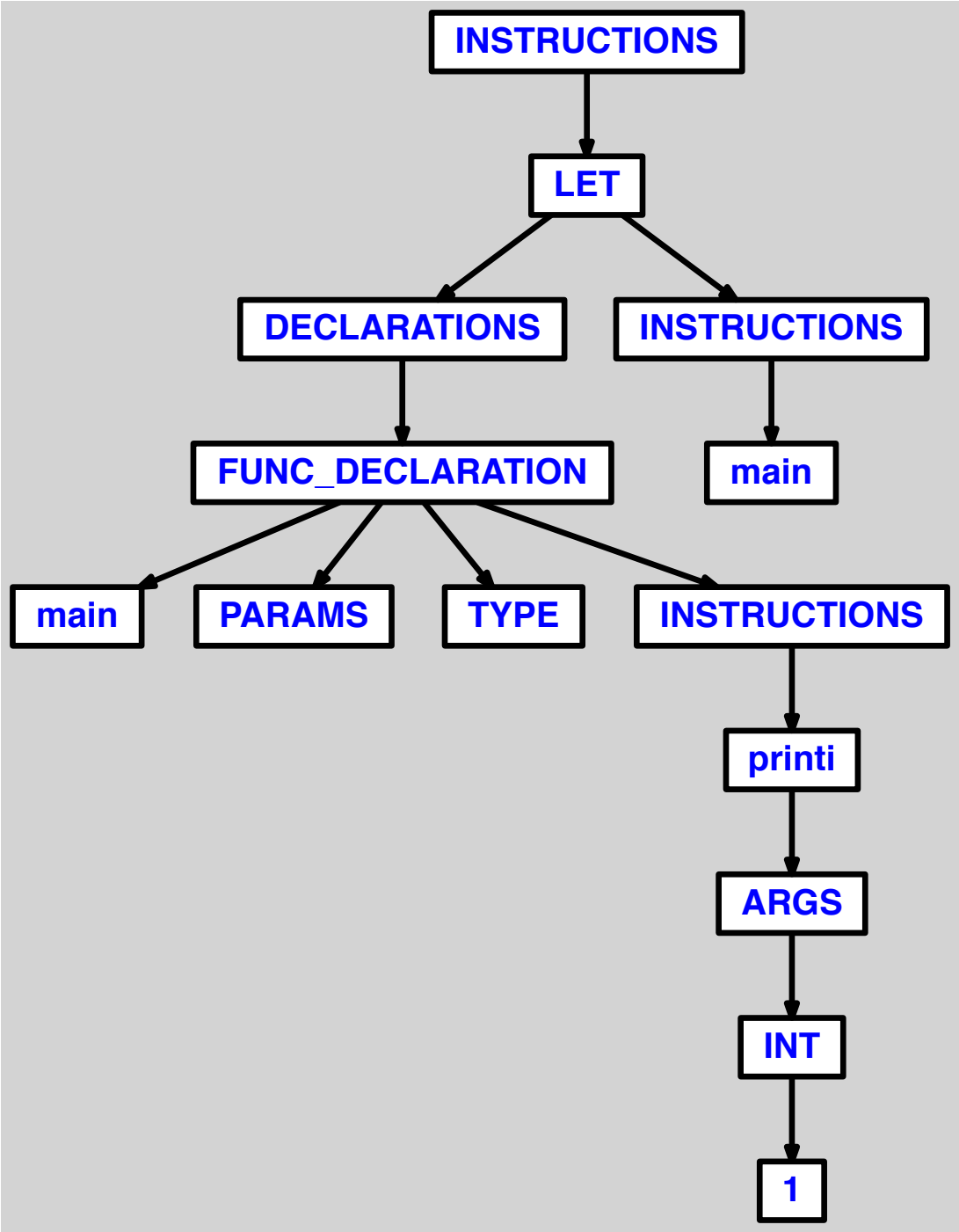
3.2.97 parenthesage d'une instruction

```
let function main() = (printi(1)) in main() end
```


INSTRUCTIONS
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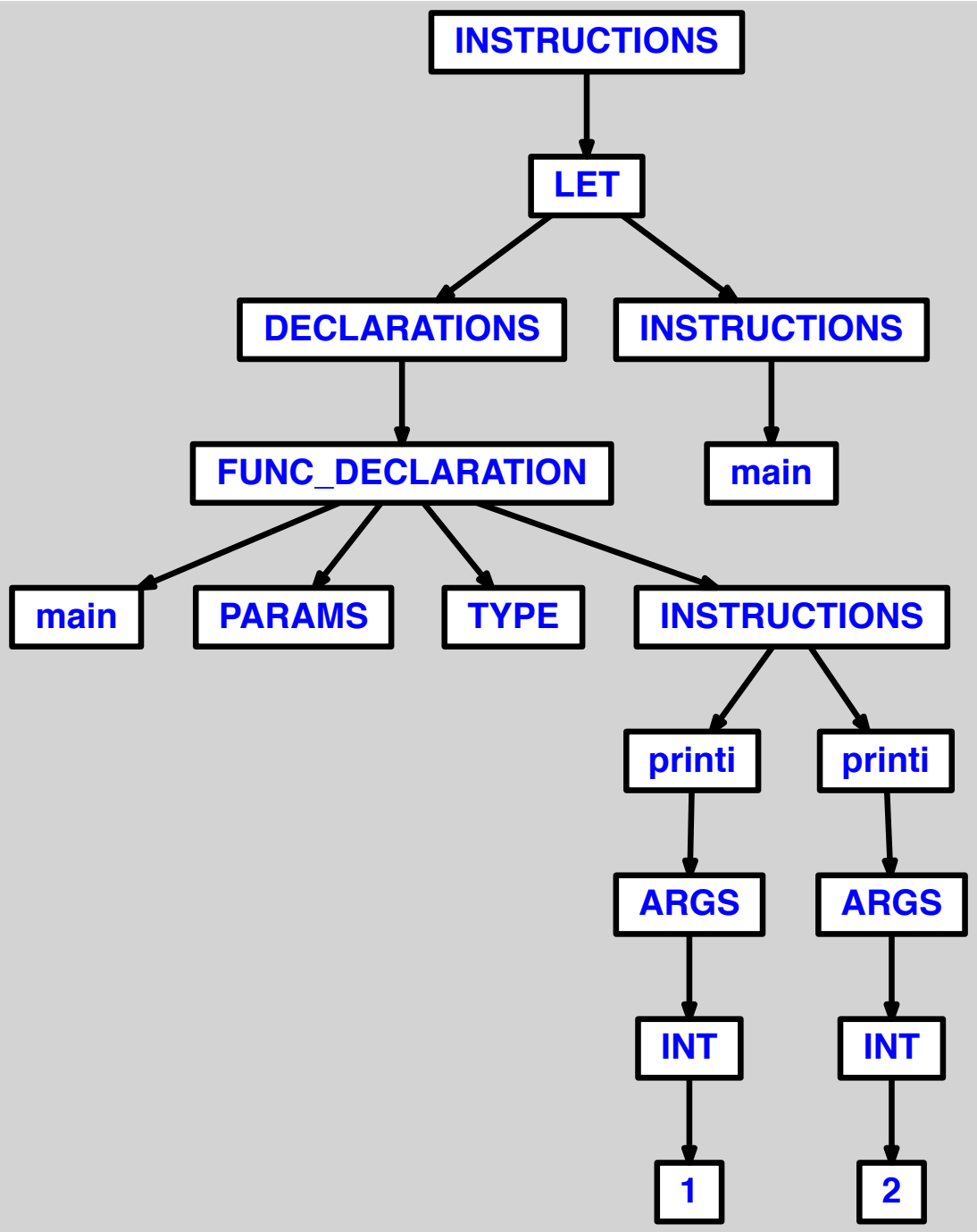
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
INT
1

3.2.98 parenthesage de 2 instructions

```
let function main() = (printi(1); printi(2)) in main() end
```


INSTRUCTIONS
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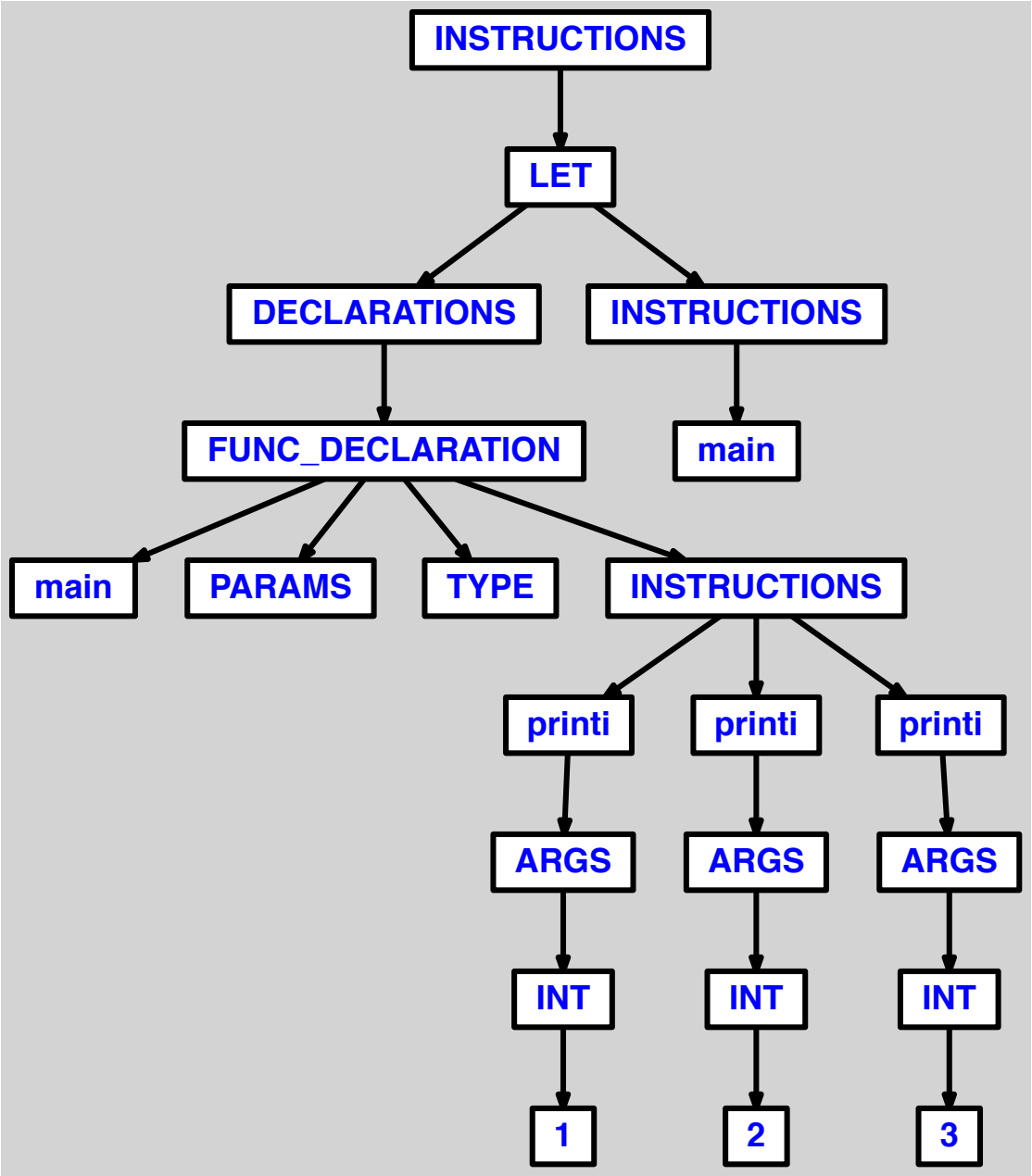
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
printi
ARGS
ARGS
INT
INT
1
2

3.2.99 parenthesage de 3 instructions

```
let function main() = (printi(1); printi(2); printi(3)) in main() end
```


INSTRUCTIONS
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INSTRUCTIONS
printi
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printi
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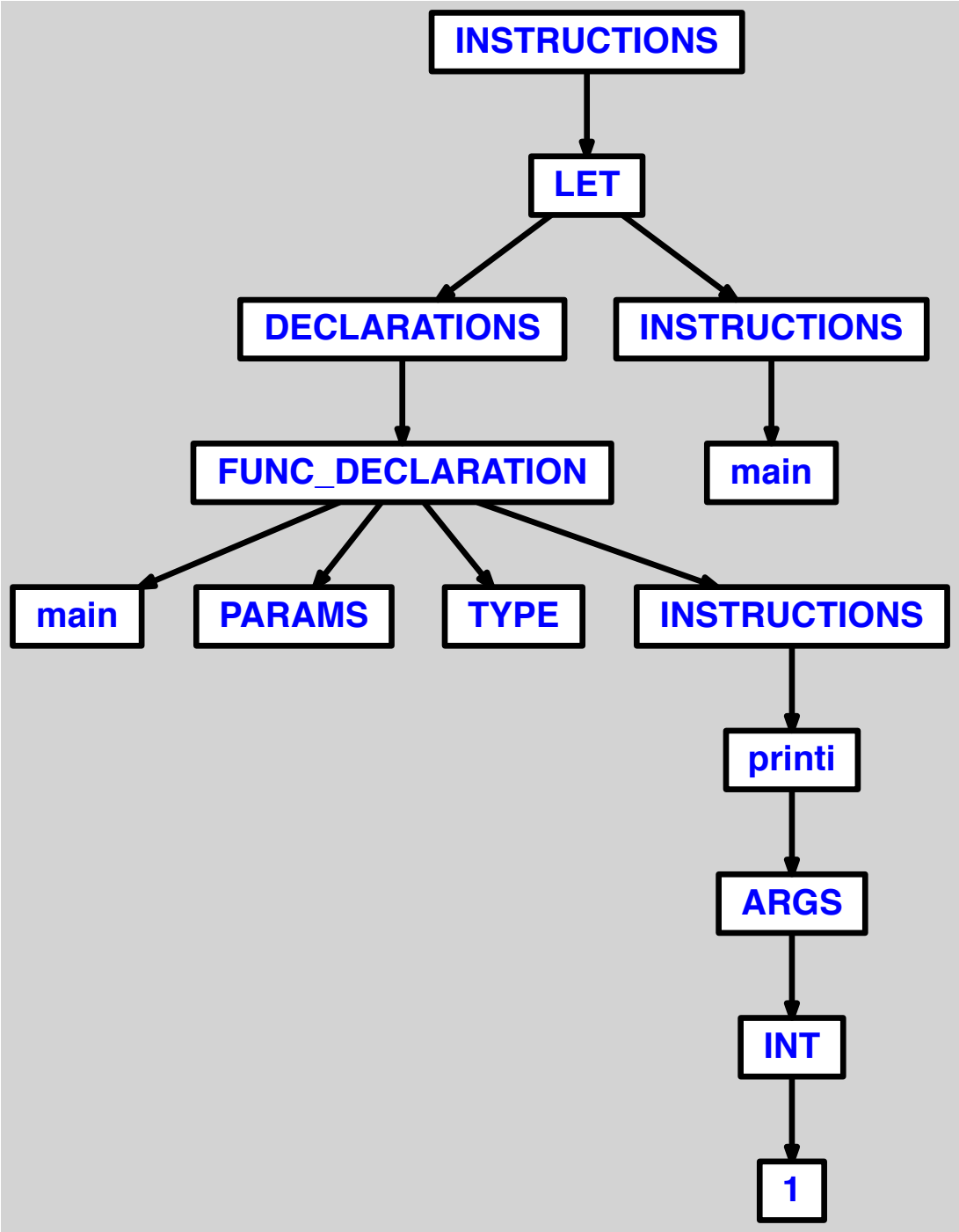
ARGS
ARGS
INT
INT
INT
1
2
3

3.2.100 1 instruction sans parentheses

```
let function main() = printi(1) in main() end
```


INSTRUCTIONS
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FUNC_DECLARATION
main
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PARAMS
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INSTRUCTIONS
printi
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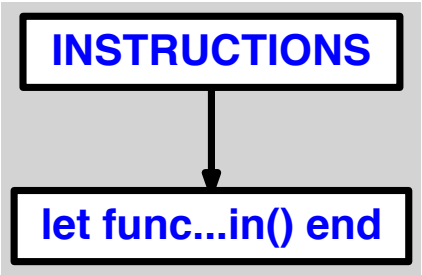
1

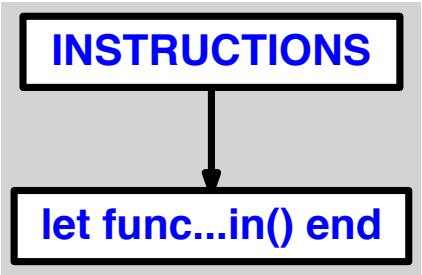
3.2.101 2 instructions sans parentheses

```
let function main() = printi(1); printi(2) in main() end
```


INSTRUCTIONS
let func...in() end

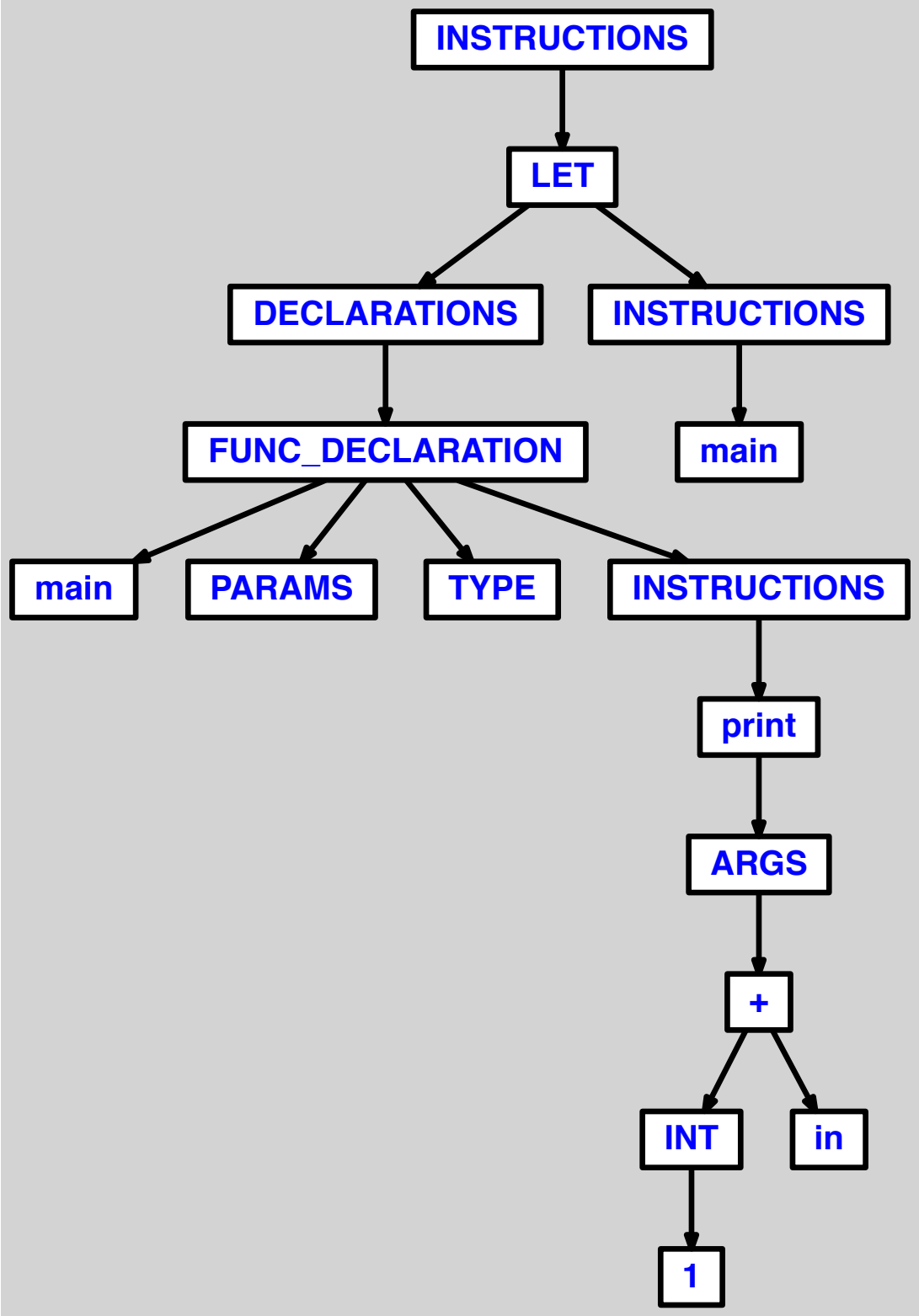
3.2.102 3 instructions sans parentheses

```
let function main() = printi(1); printi(2); printi(3) in main() end
```


INSTRUCTIONS
let func...in() end

3.2.103 concatenation d'entier et de chaine

```
let
  function main() = print(1+"2")
in main() end
```


INSTRUCTIONS
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DECLARATIONS
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FUNC_DECLARATION
main
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PARAMS
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INSTRUCTIONS
print
ARGS
+
INT
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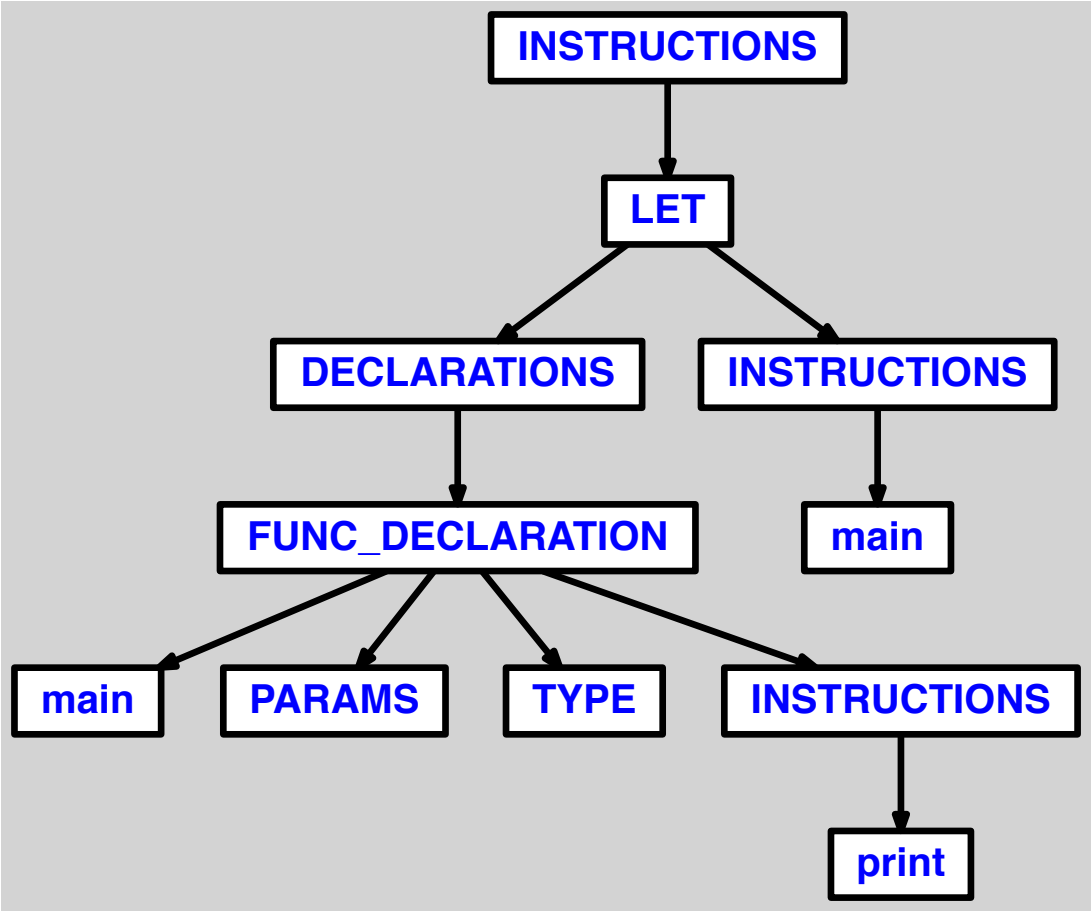
1

3.2.104 concatenation de 2 chaines

```
let
  function main() = print("1"+"2")
in main() end
```

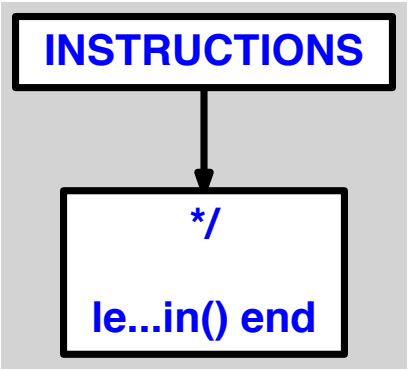

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print

4 commentaire

4.1 KO

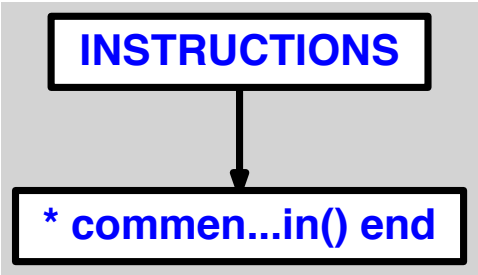
4.1.1 imbrication

```
/*
  un commentaire
  /* imbrique dans ce commentaire */
*/

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
*/
le...in() end

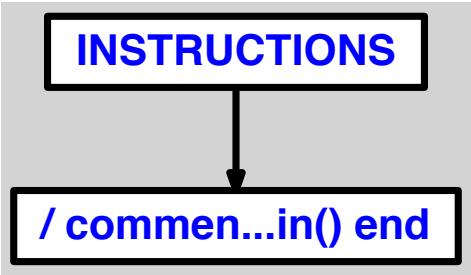
4.1.2 oubli de </> en debut de commentaire

```
* commentaire */

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
* commen...in() end

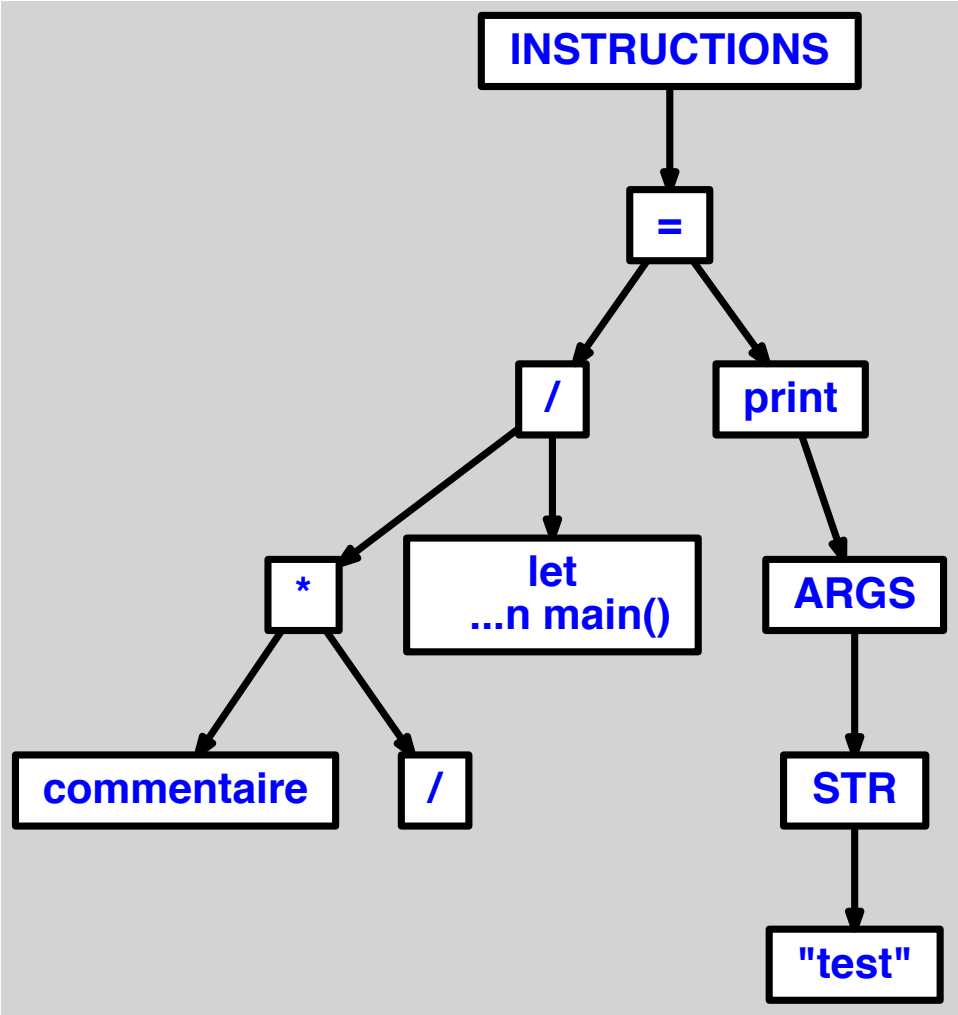
4.1.3 oubli de <*> en debut de commentaire

```
/ commentaire */

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
/ commen...in() end

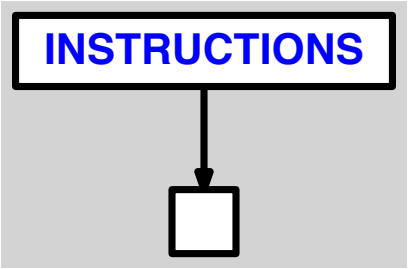
4.1.4 oubli de </*> en debut de commentaire

```
commentaire */

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
=
/
print
*
let
...n main()
ARGS
commentaire
/
STR
"test"

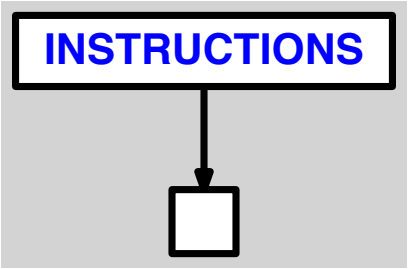
4.1.5 oubli de <*> en fin de commentaire

```
/* commentaire /

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS

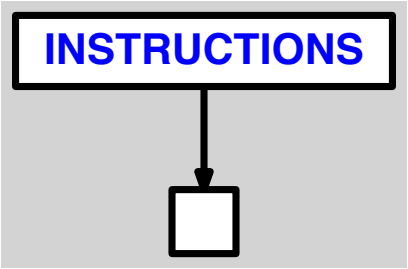
4.1.6 oubli de </> en fin de commentaire

```
/* commentaire *

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS

4.1.7 oubli de <*/> en fin de commentaire

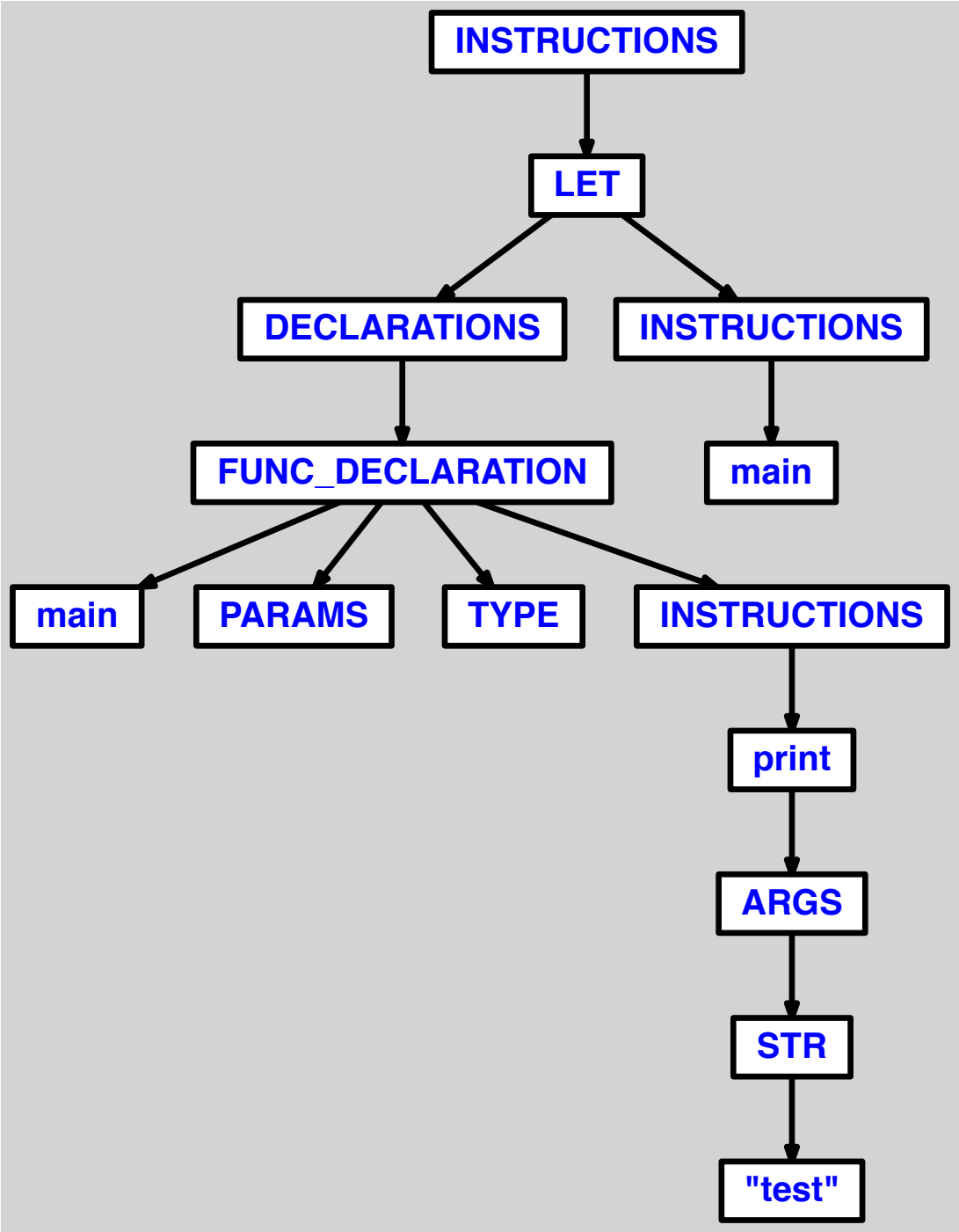
```
/* commentaire

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS

4.2 OK

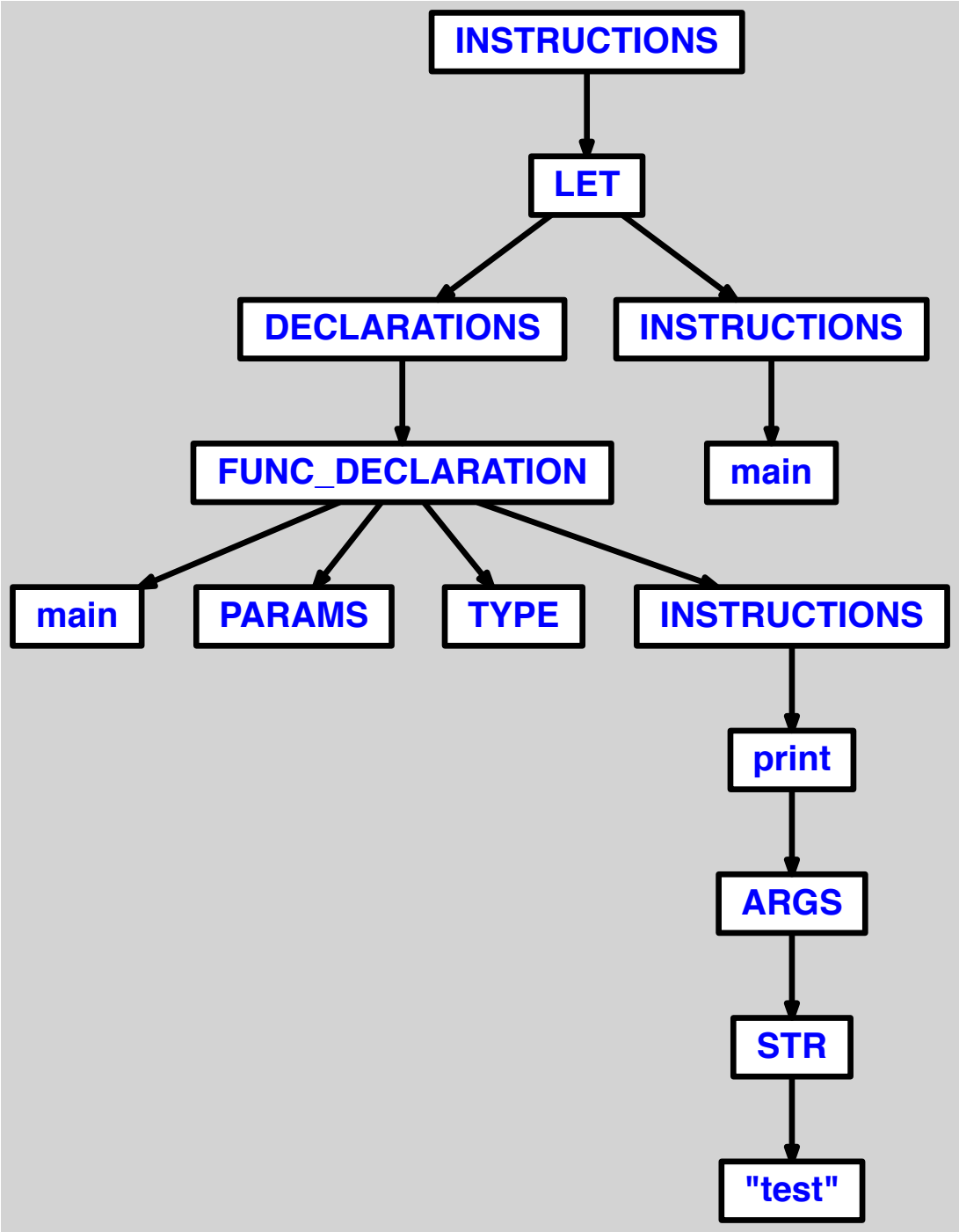
4.2.1 1 commentaire, sans instruction avant, sur 1 ligne

```
/* commentaire */

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

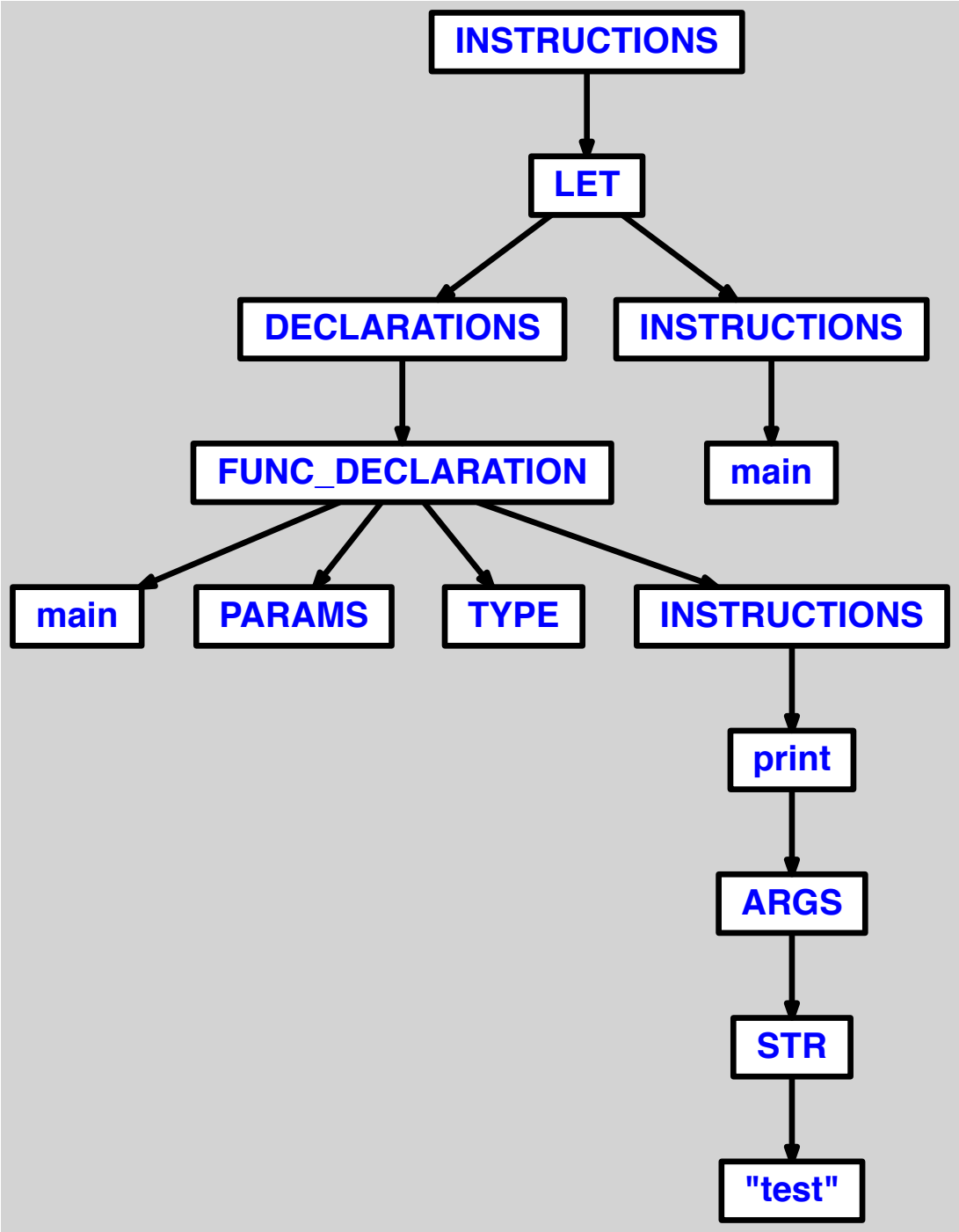
4.2.2 1 commentaire, sans instruction avant, sur plusieurs lignes

```
/*
1
2
3
*/

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

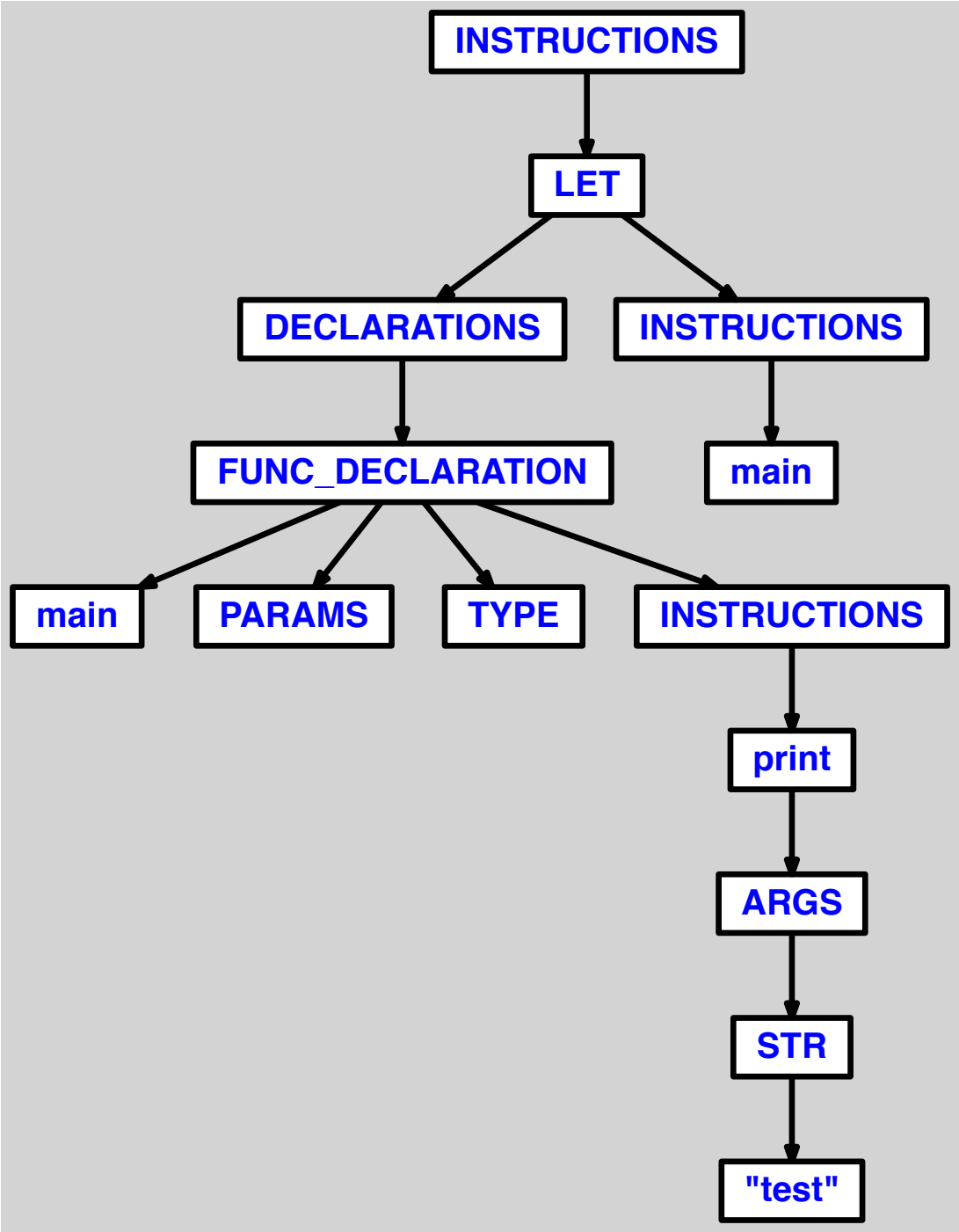
4.2.3 1 commentaire, apres instruction, sur 1 ligne

```
let
  function main() = print("test")
  /* commentaire */
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

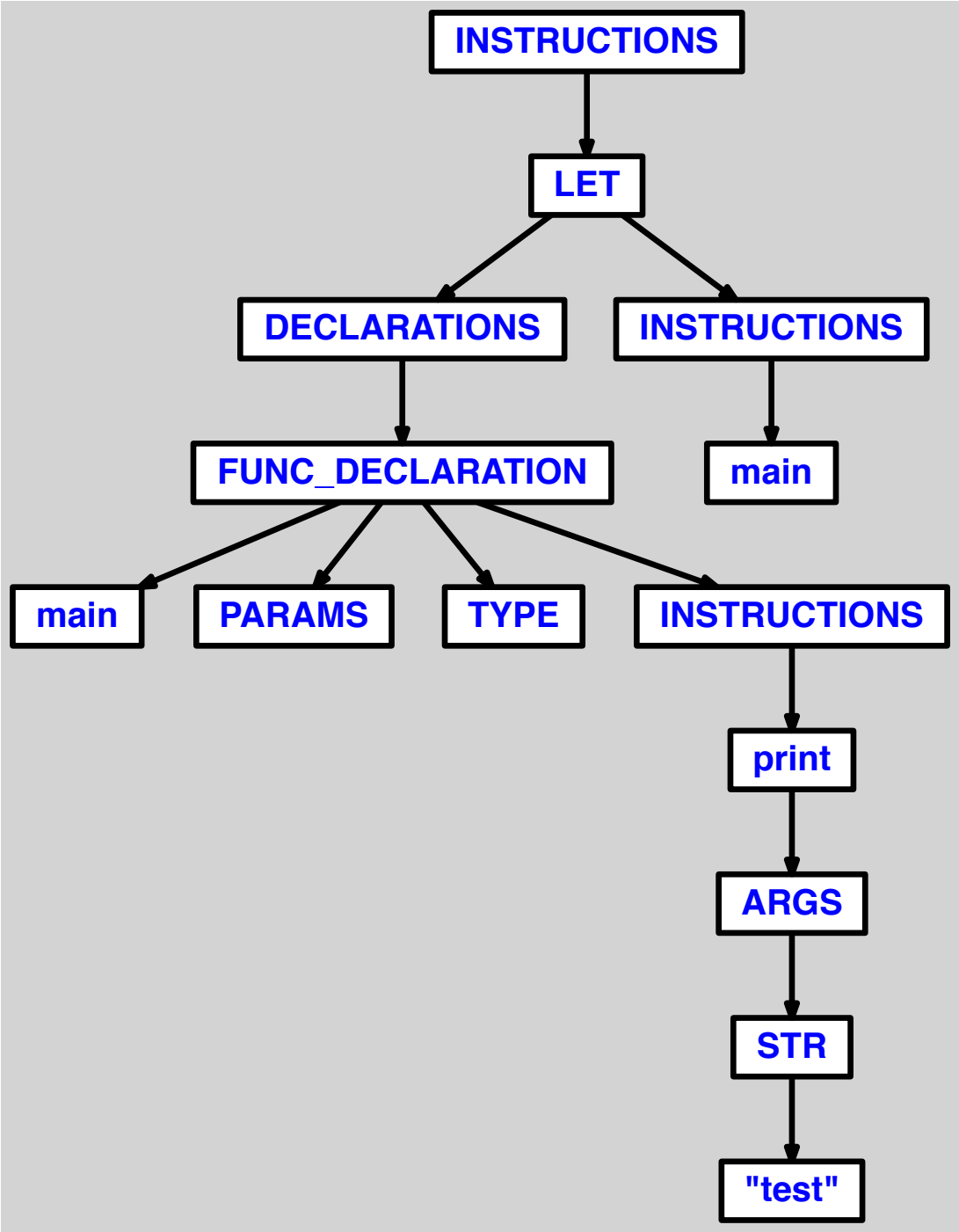
4.2.4 1 commentaire, apres instruction, sur plusieurs lignes

```
let
  function main() = print("test")
  /*
  1
  2
  3
  */
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

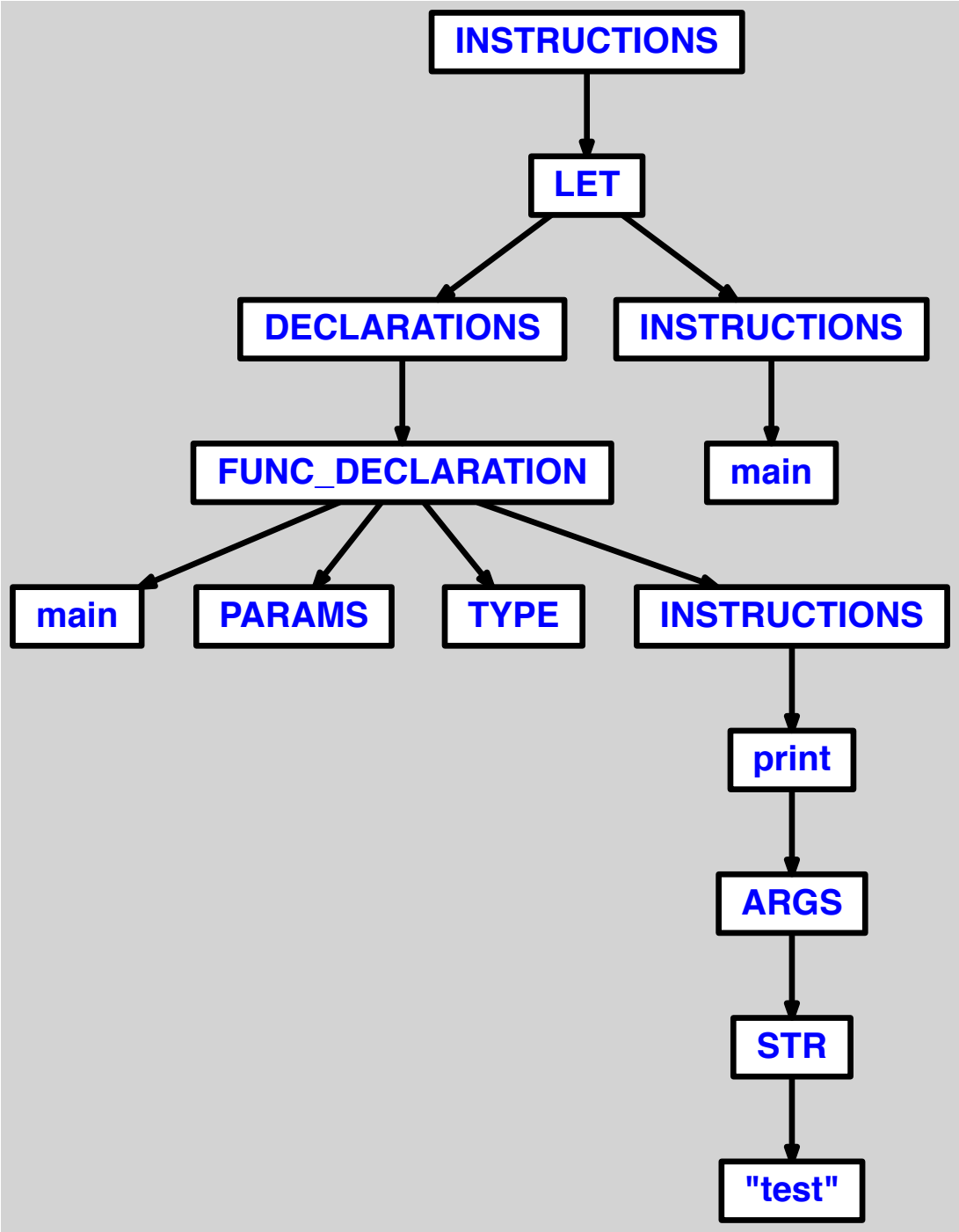
4.2.5 2 commentaires, sans instruction avant, sur 1 ligne

```
/* commentaire 1 */

/* commentaire 2 */

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

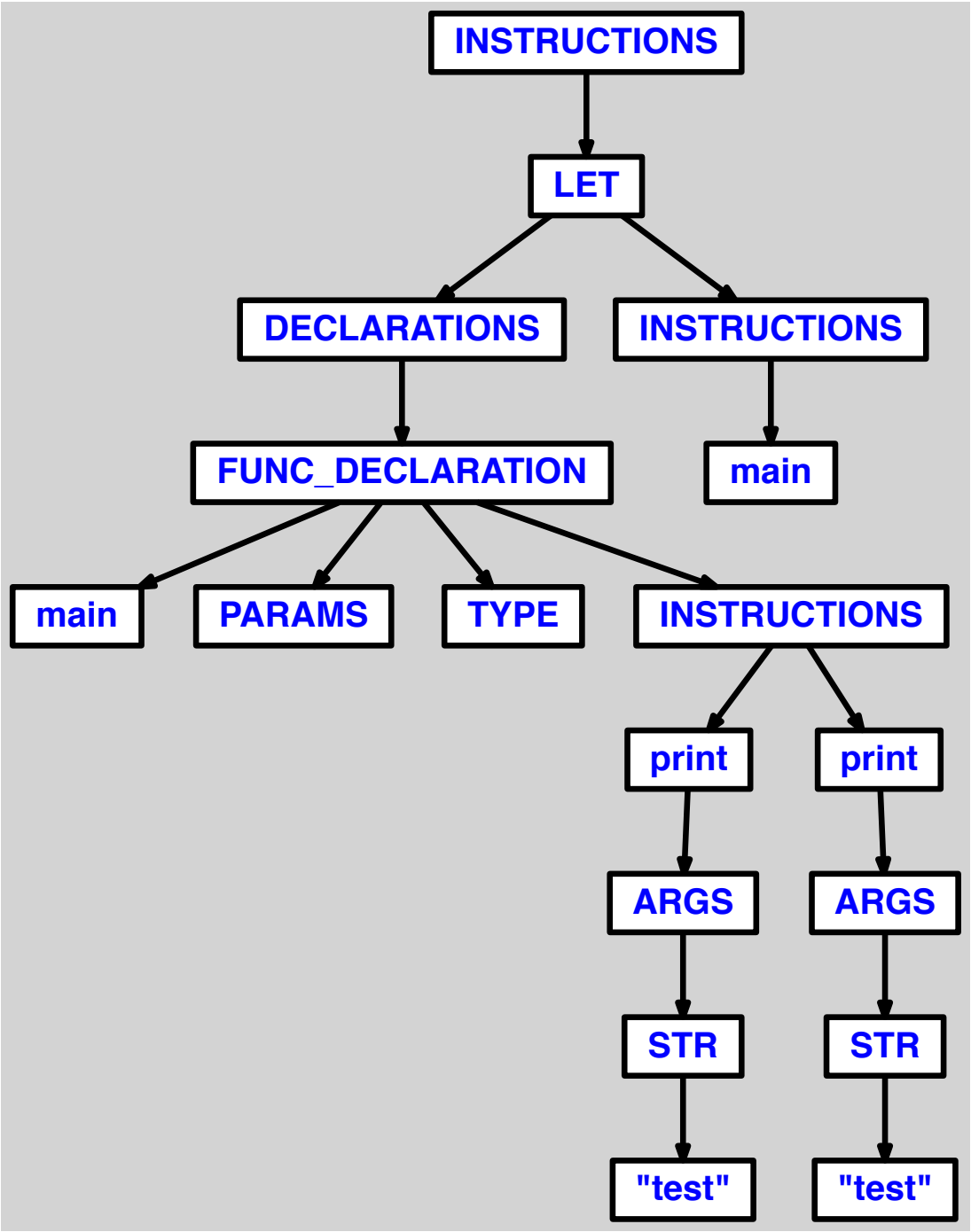
4.2.6 2 commentaires, sans instruction avant, sur plusieurs lignes

```
/*
1
2
3
*/

/*
4
5
6
*/

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

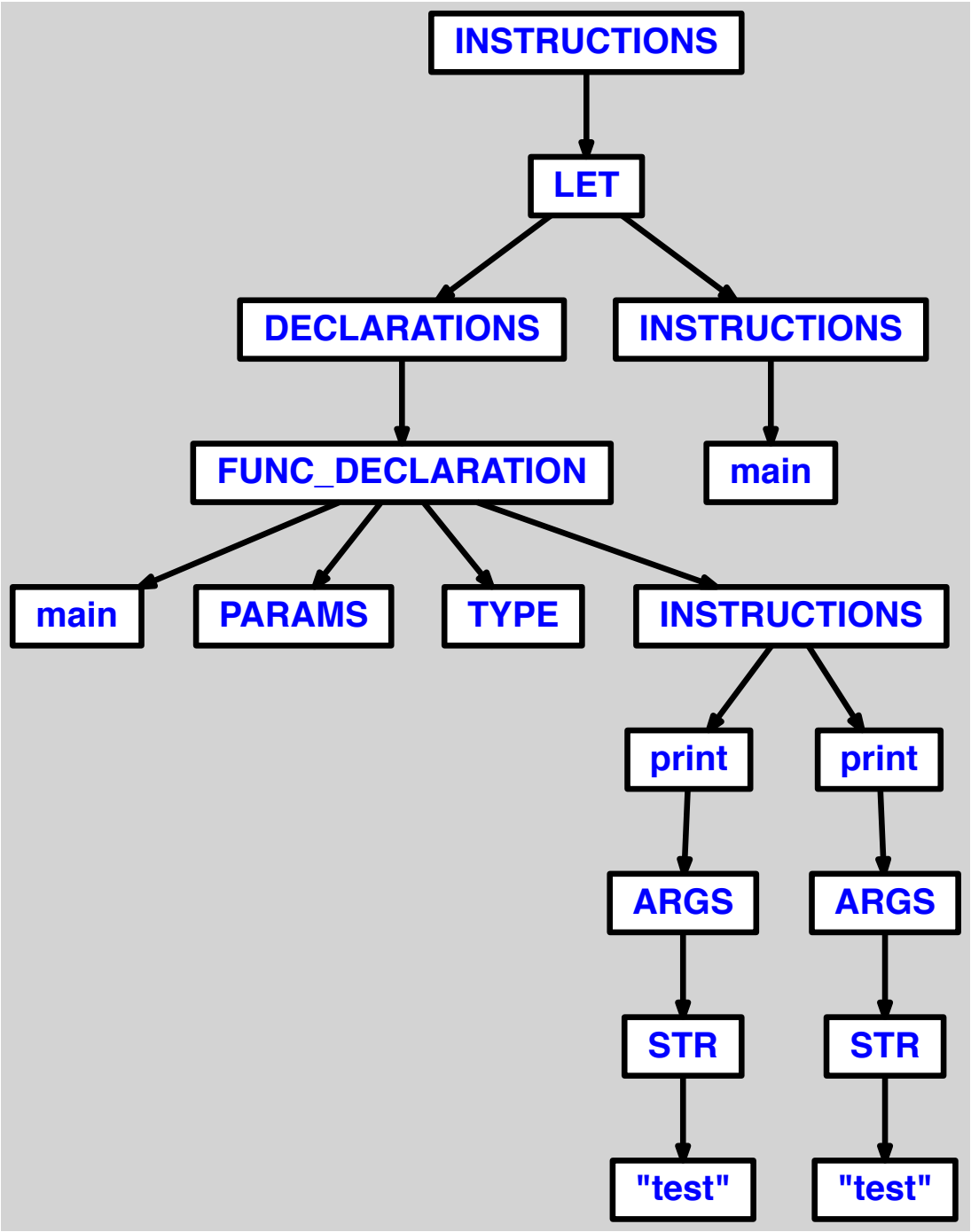
4.2.7 2 commentaires, apres instructions, sur 1 ligne

```
let
  function main() =
    (print("test");
    /* commentaire 1 */
    print("test")
    /* commentaire 2 */
    )
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
print
ARGS
ARGS
STR
STR
"test"
"test"

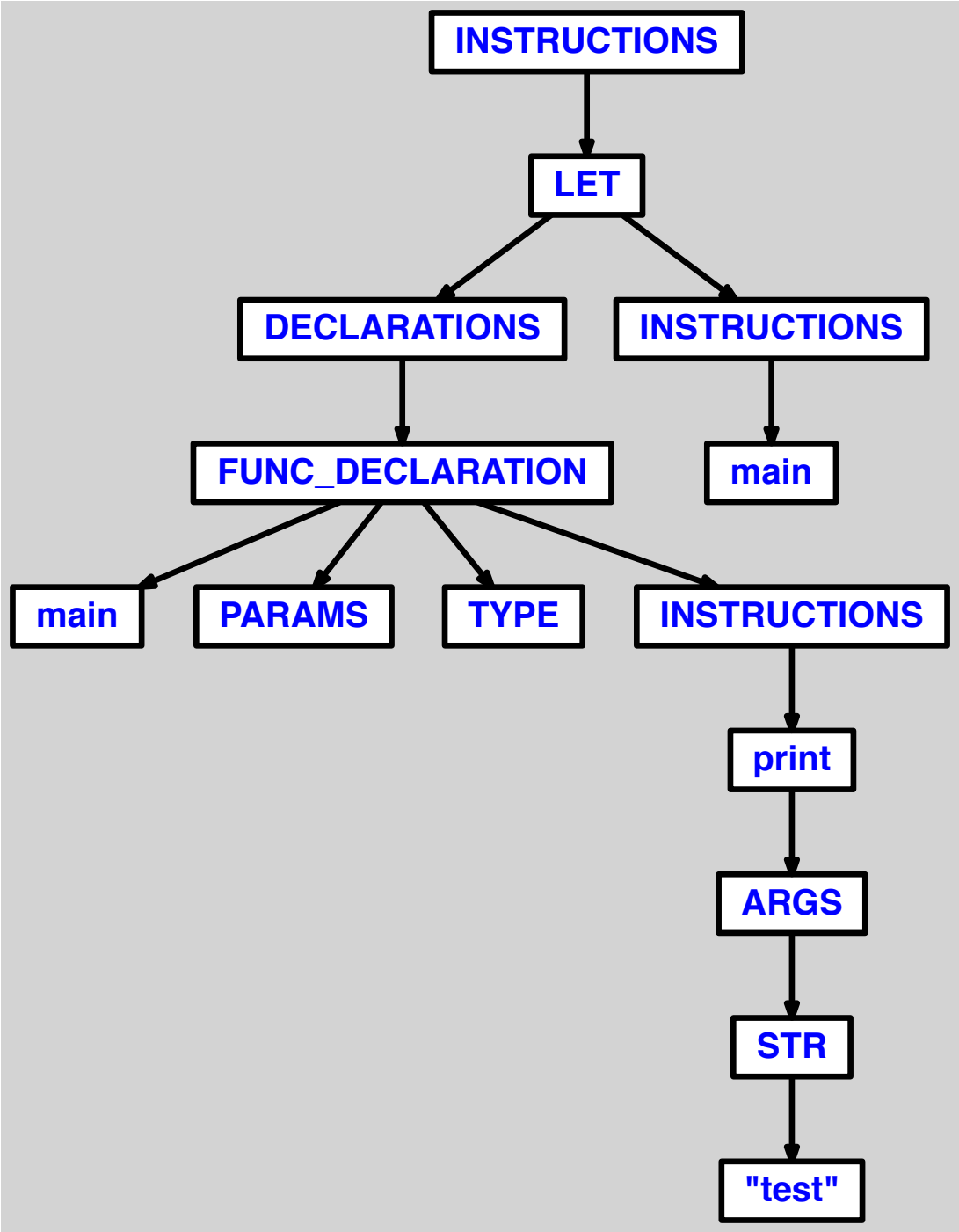
4.2.8 2 commentaires, apres instructions, sur plusieurs lignes

```
let
  function main() =
    (print("test");
    /*
    1
    2
    3
    */
    print("test")
    /*
    4
    5
    6
    */
    )
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
print
ARGS
ARGS
STR
STR
"test"
"test"

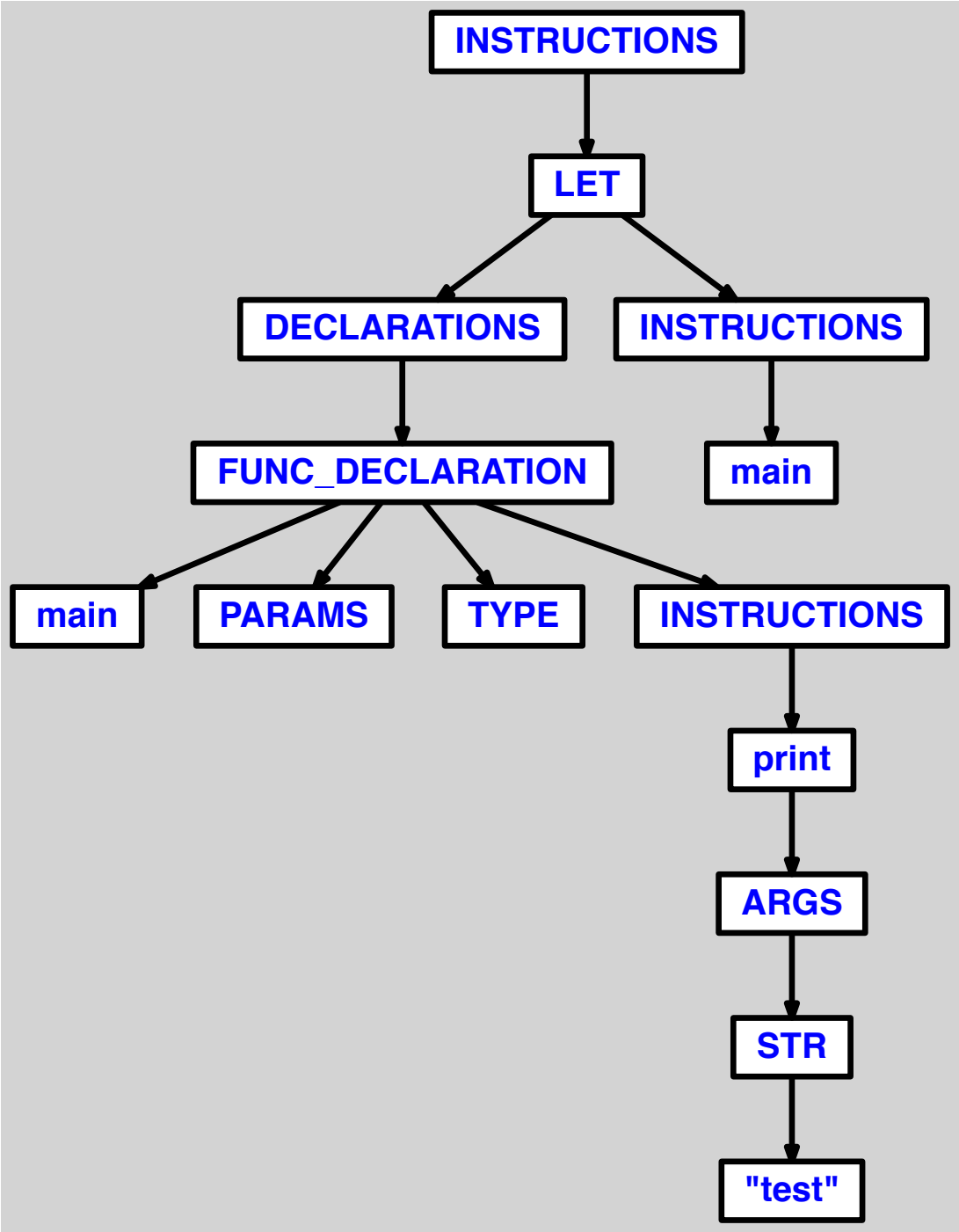
4.2.9 3 commentaires, sans instruction avant, sur 1 ligne

```
/* commentaire 1 */

/* commentaire 2 */

/* commentaire 3 */

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

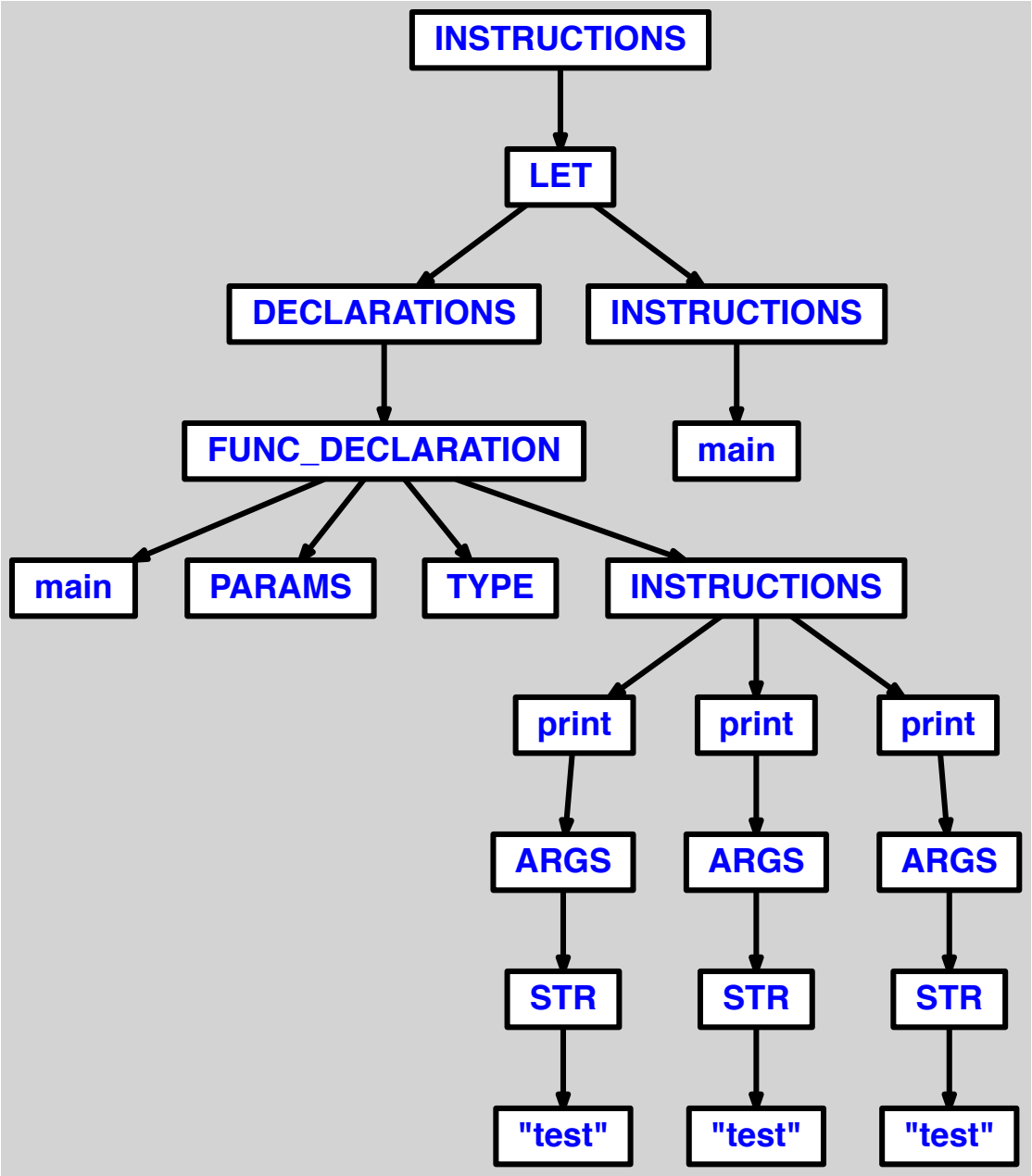
4.2.10 3 commentaires, sans instruction avant, sur plusieurs lignes

```
/*
1
2
3
*/

/*
4
5
6
*/

/*
7
8
9
*/

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

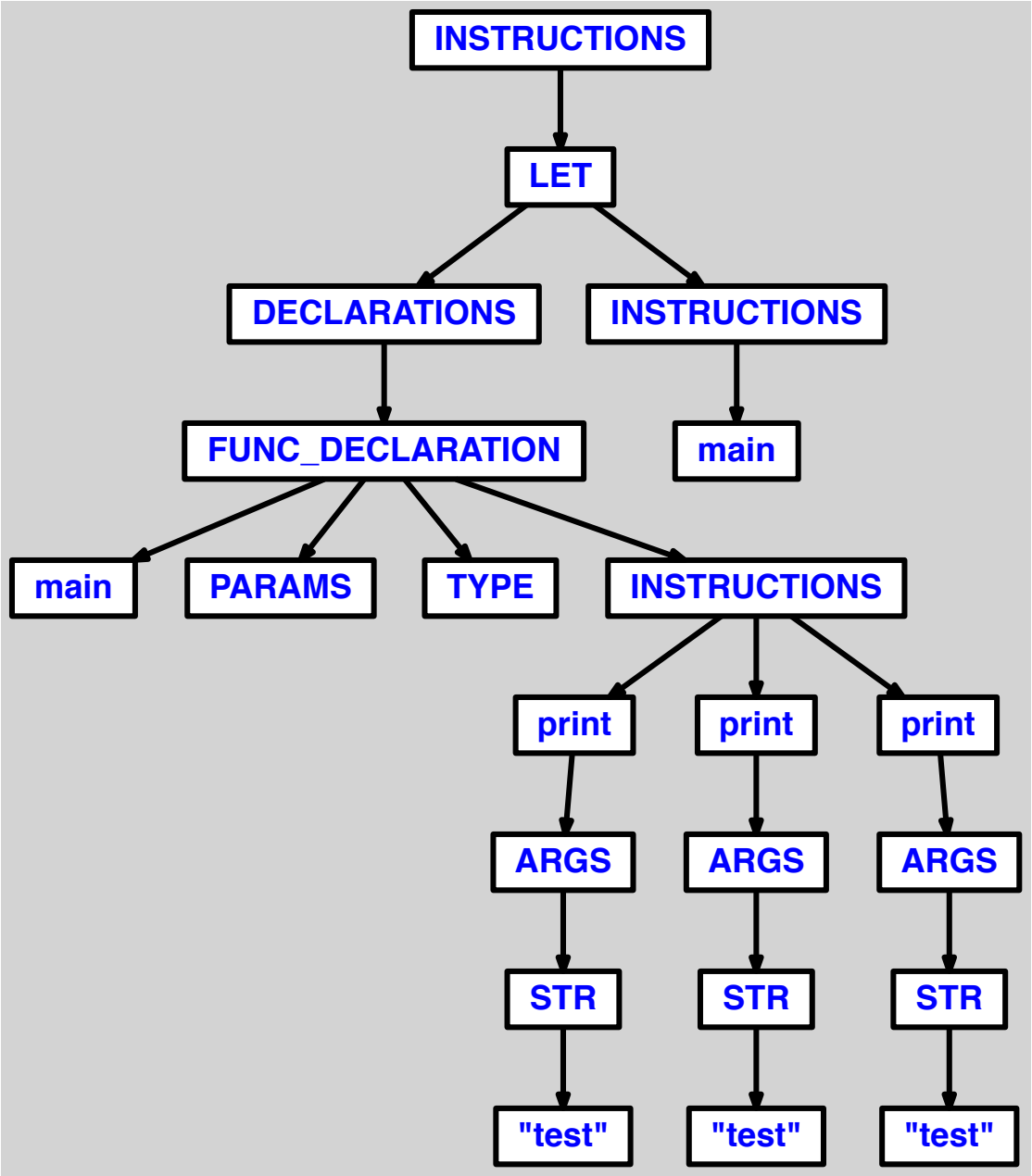
4.2.11 3 commentaires, apres instructions, sur 1 ligne

```
let
  function main() =
    (print("test");
    /* commentaire 1 */
    print("test");
    /* commentaire 2 */
    print("test")
    /* commentaire 3 */
    )
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
print
print
ARGS
ARGS
ARGS
STR
STR
STR
"test"
"test"
"test"

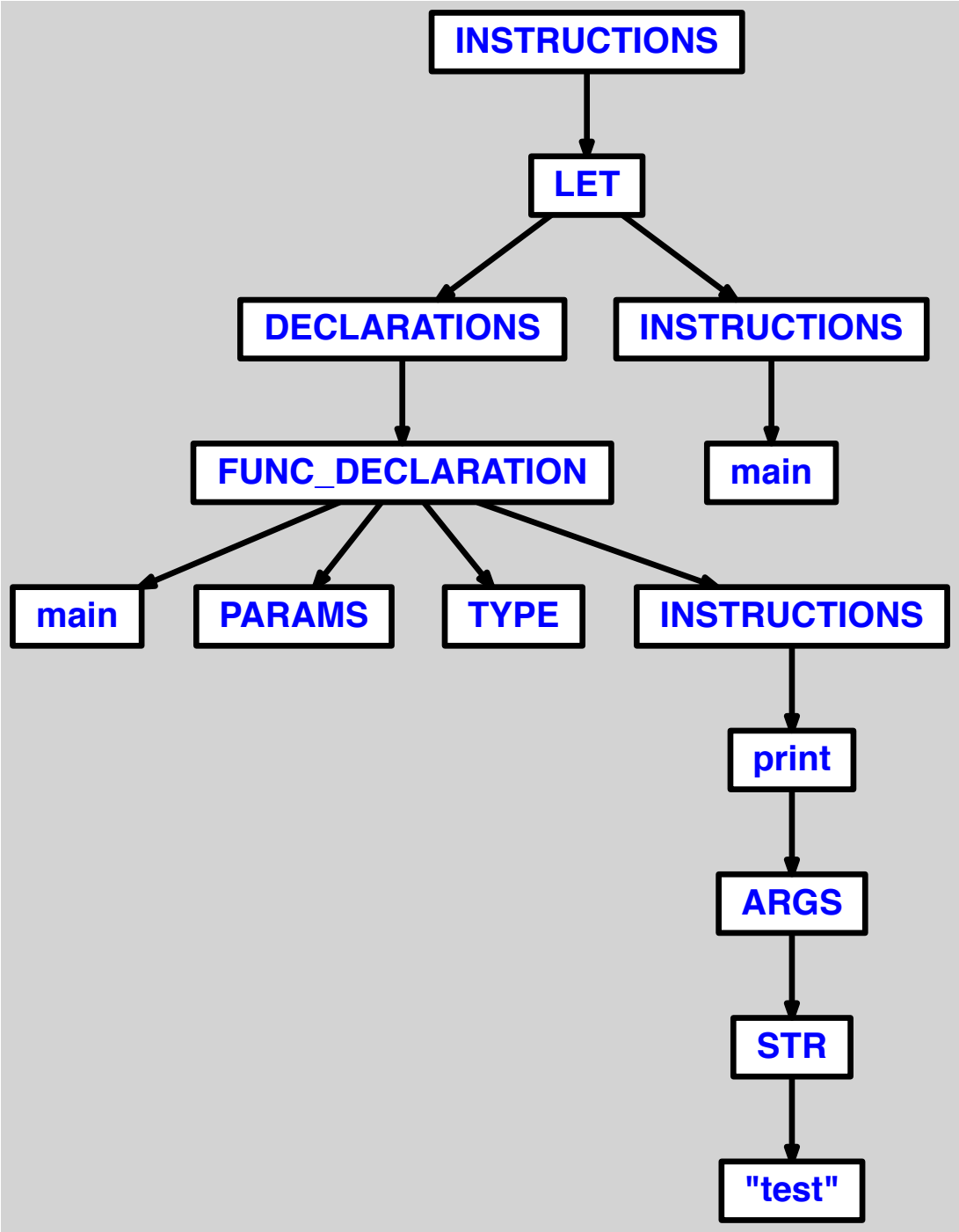
4.2.12 3 commentaires, apres instructions, sur plusieurs lignes

```
let
  function main() =
    (print("test");
    /*
    1
    2
    3
    */
    print("test");
    /*
    4
    5
    6
    */
    print("test")
    /*
    7
    8
    9
    */
    )
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
print
print
ARGS
ARGS
ARGS
STR
STR
STR
"test"
"test"
"test"

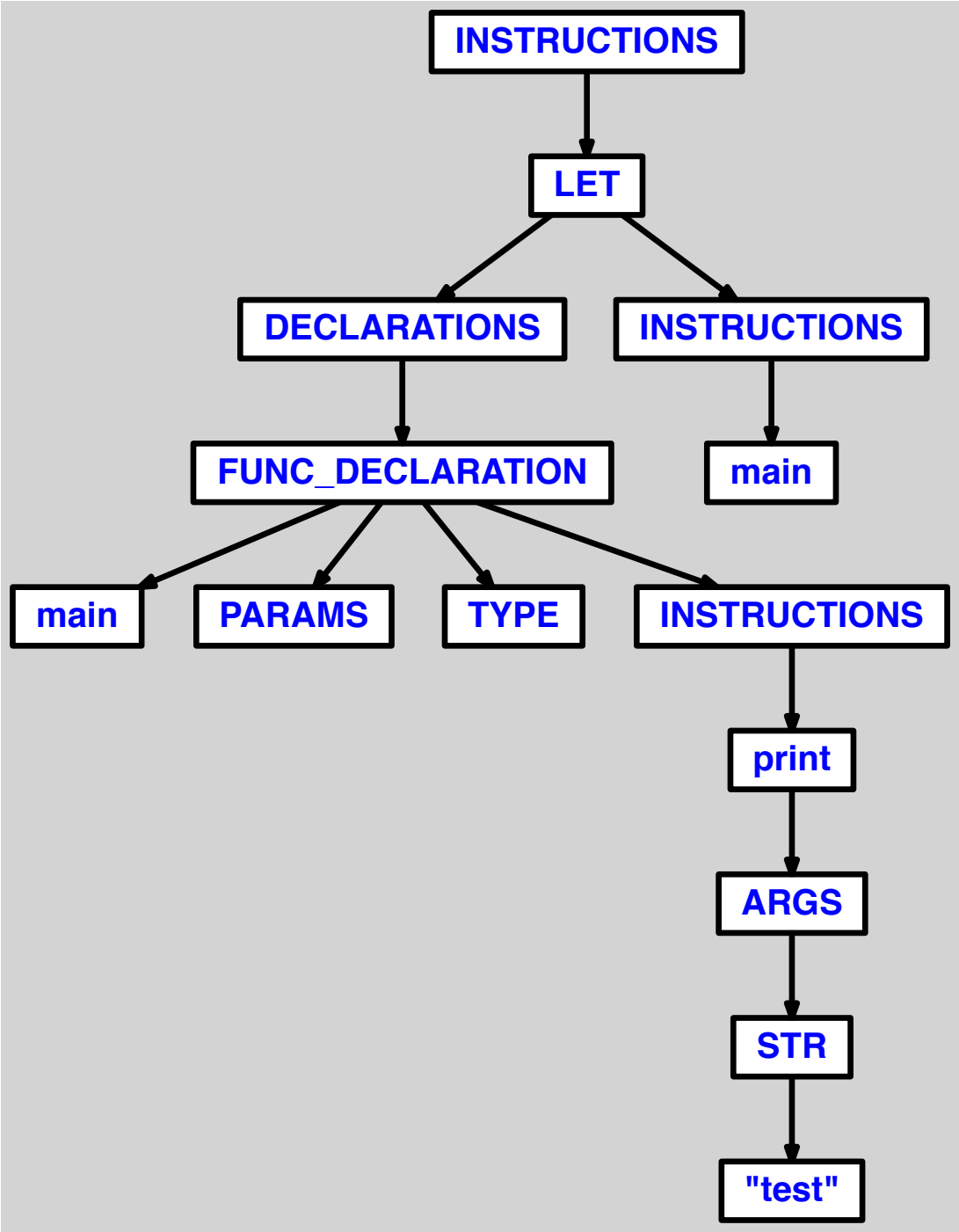
4.2.13 commentaire sans contenu sur 1 ligne

```
/* */

let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

4.2.14 commentaire sans contenu sur plusieurs lignes

```
/*



*/

let
  function main() = print("test")
in main() end
```

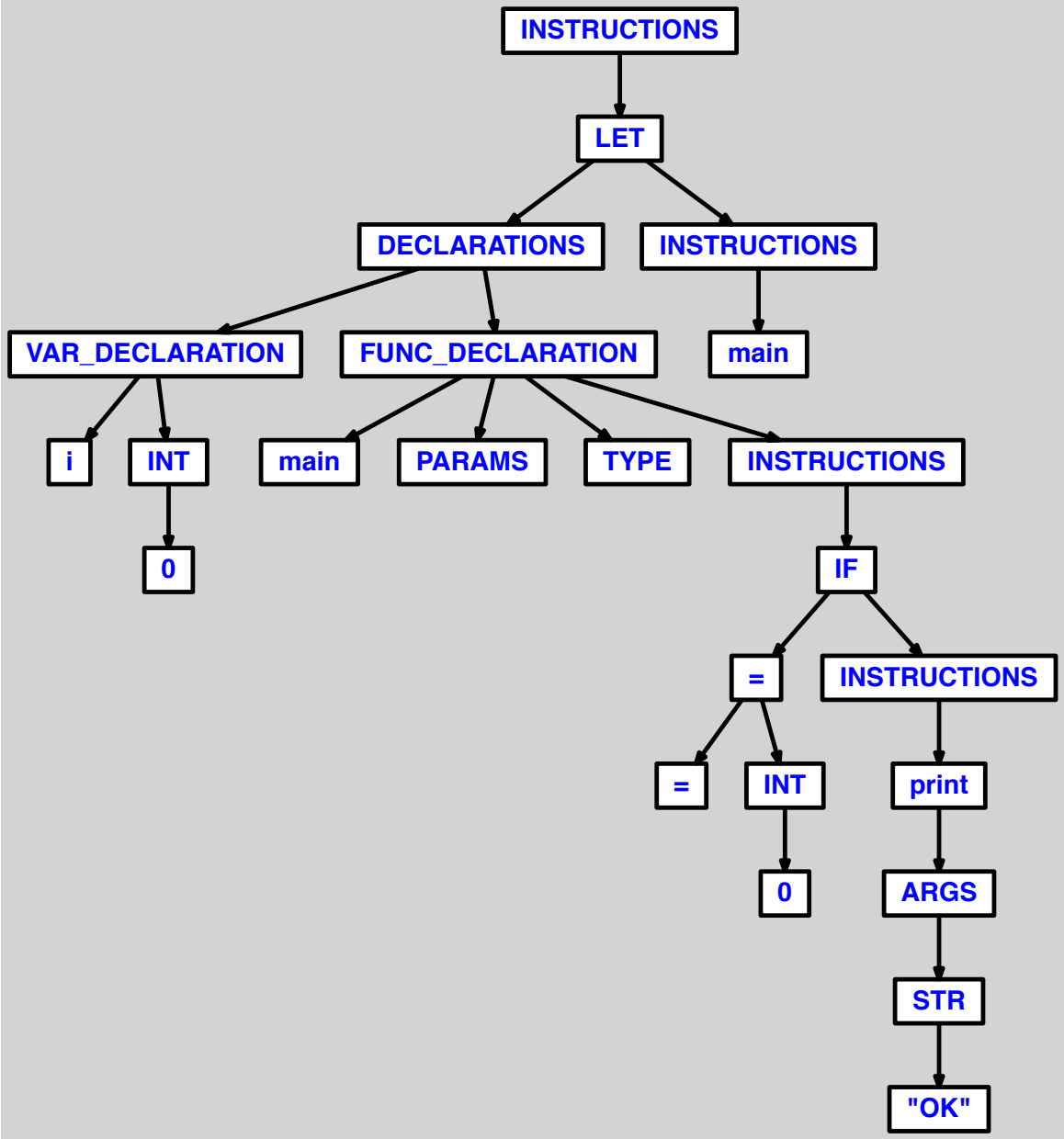

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

5 comparaison

5.1 KO

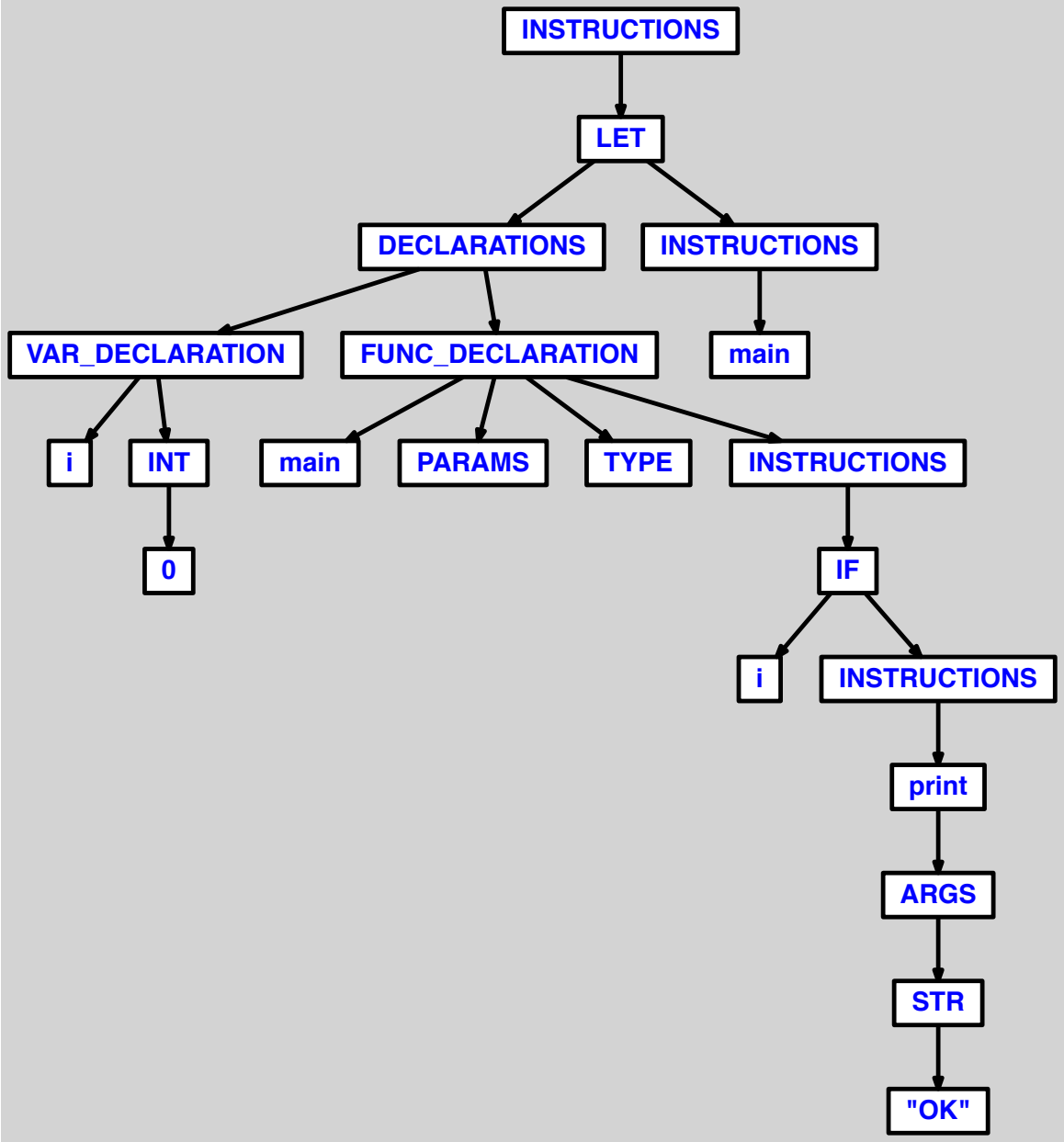
5.1.1 comparaison avec oubli d'operande gauche

```
let
  var i := 0

  function main() =
    if = 0 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
=
INSTRUCTIONS
=
INT
print
0
ARGS
STR
"OK"

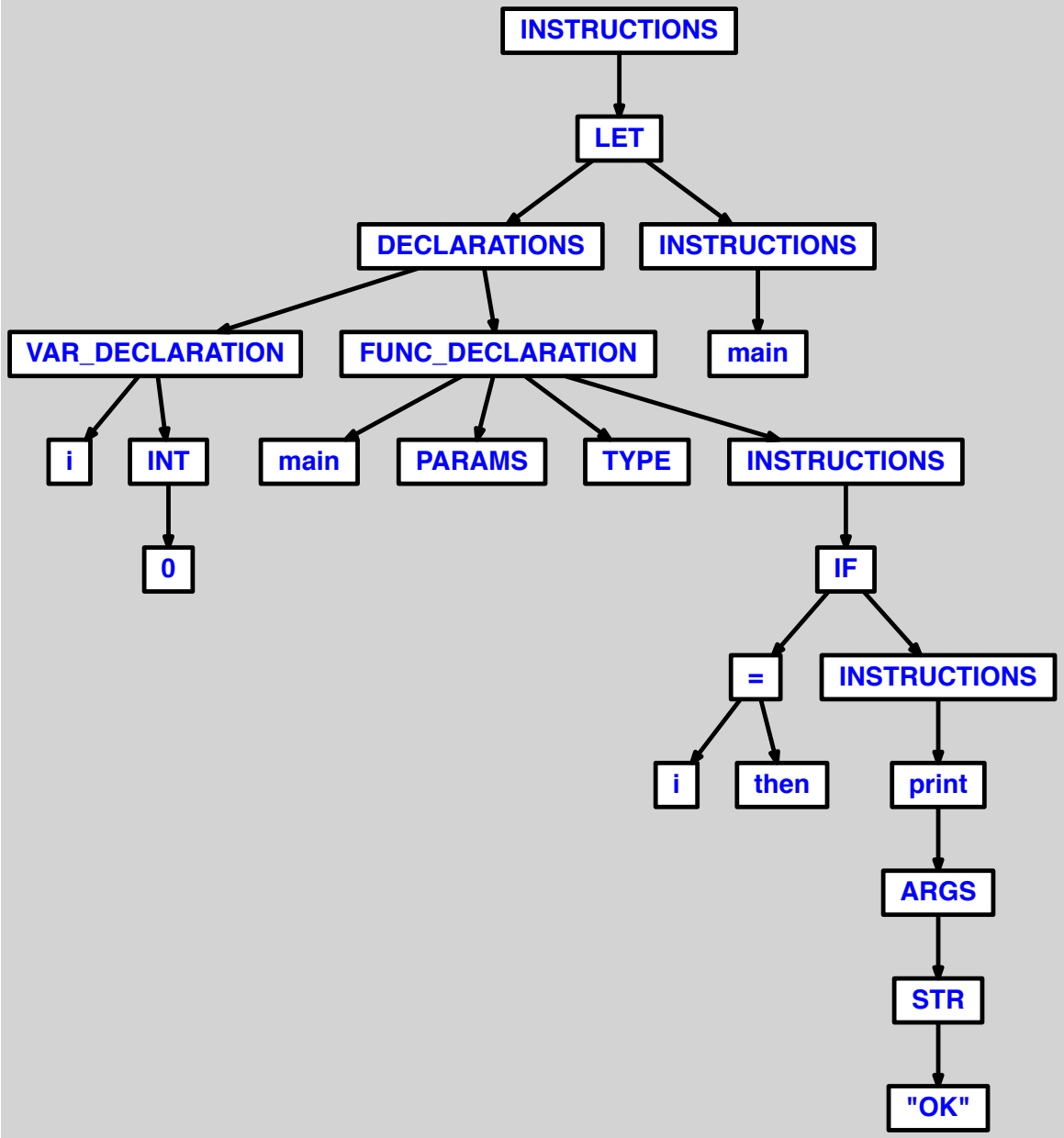
5.1.2 comparaison avec oubli d'operateur

```
let
  var i := 0

  function main() =
    if i 0 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
i
INSTRUCTIONS
print
ARGS
STR
"OK"

5.1.3 comparaison avec oubli d'operateur droit

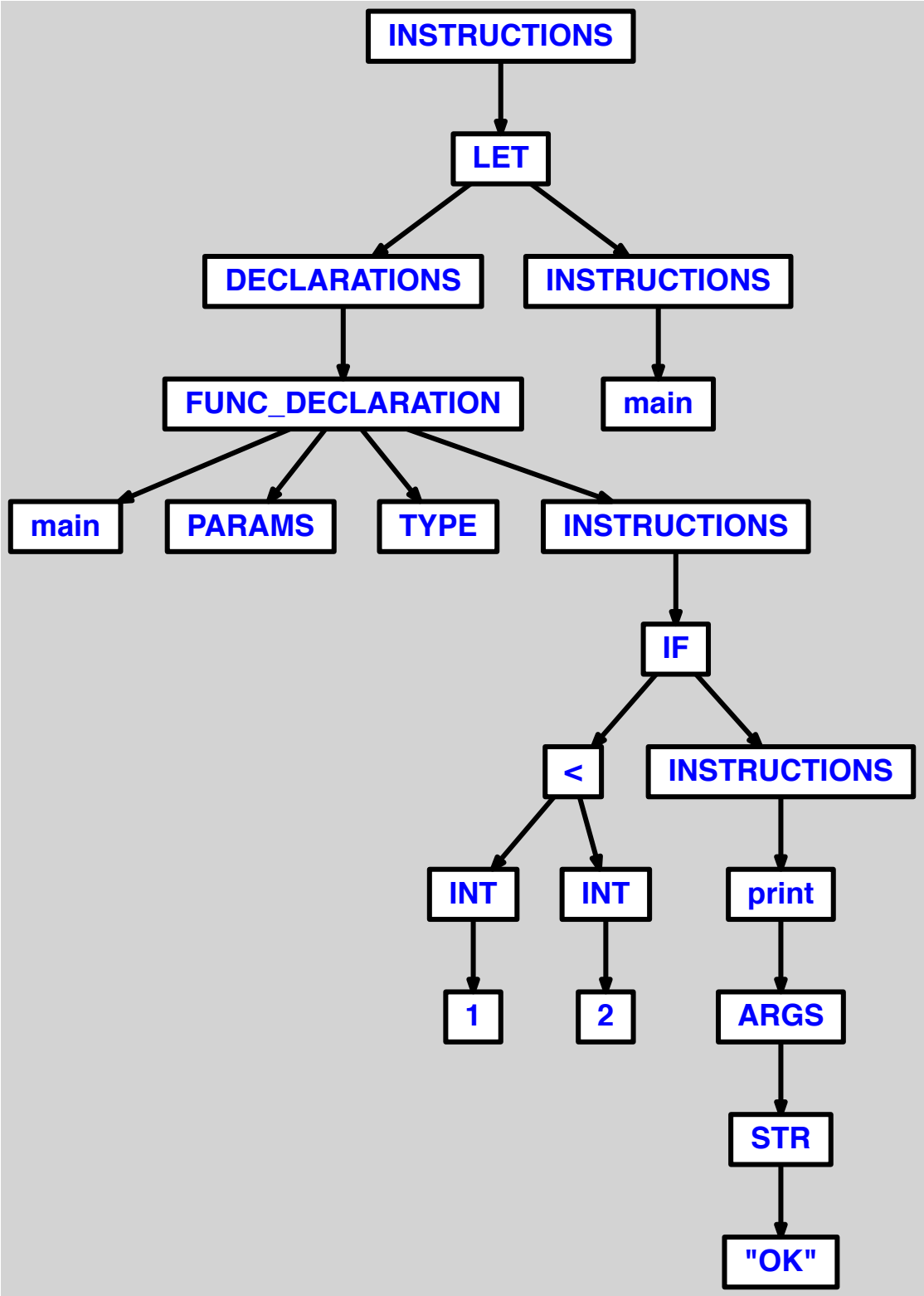
```
let
  var i := 0

  function main() =
    if i = then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
=
INSTRUCTIONS
i
then
print
ARGS
STR
"OK"

5.2 OK

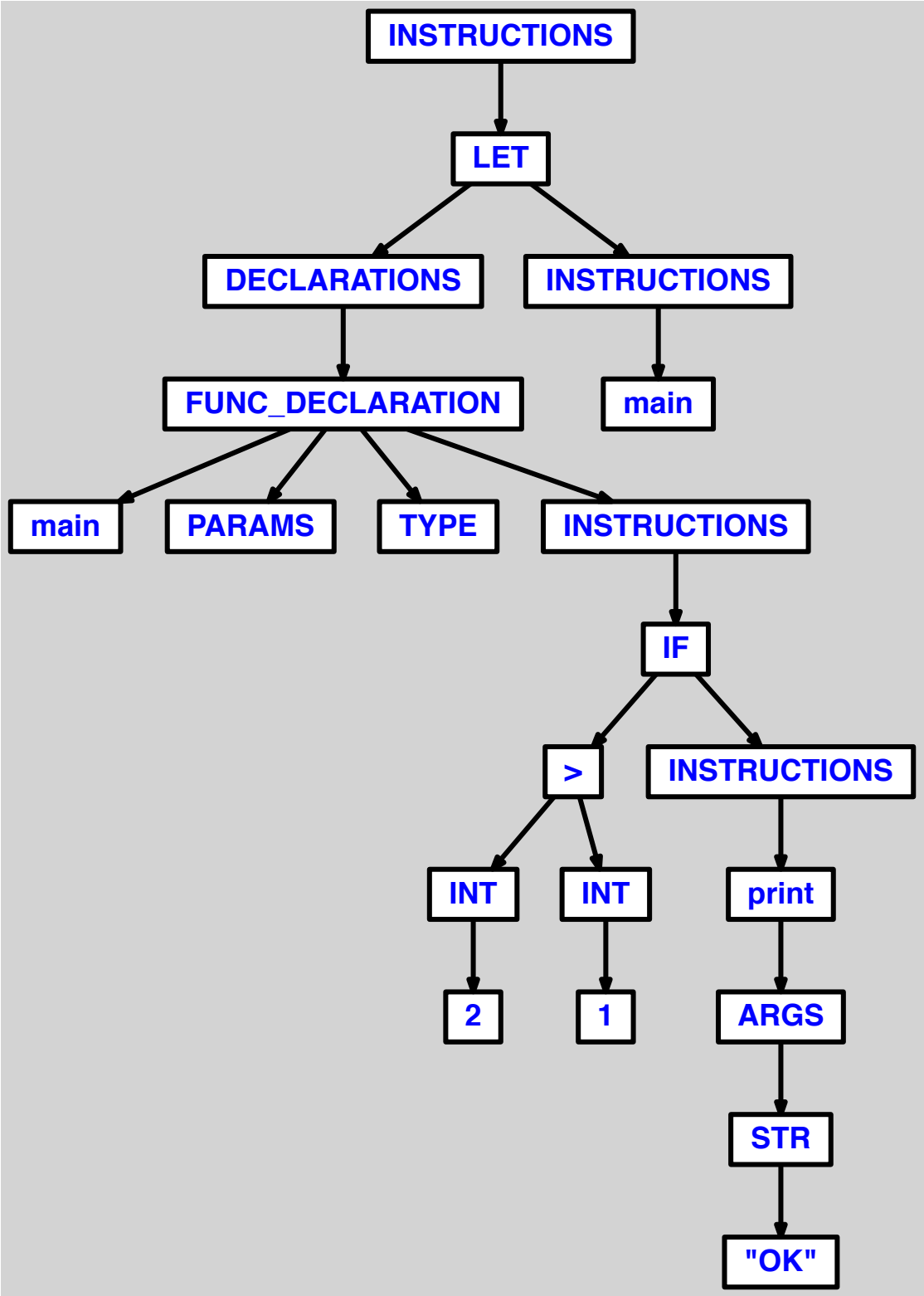
5.2.1 comparaison simple d'entiers avec <"<">

```
let
  function main() =
    if 1 < 2 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
<
INSTRUCTIONS
INT
INT
print
1
2
ARGS
STR
"OK"

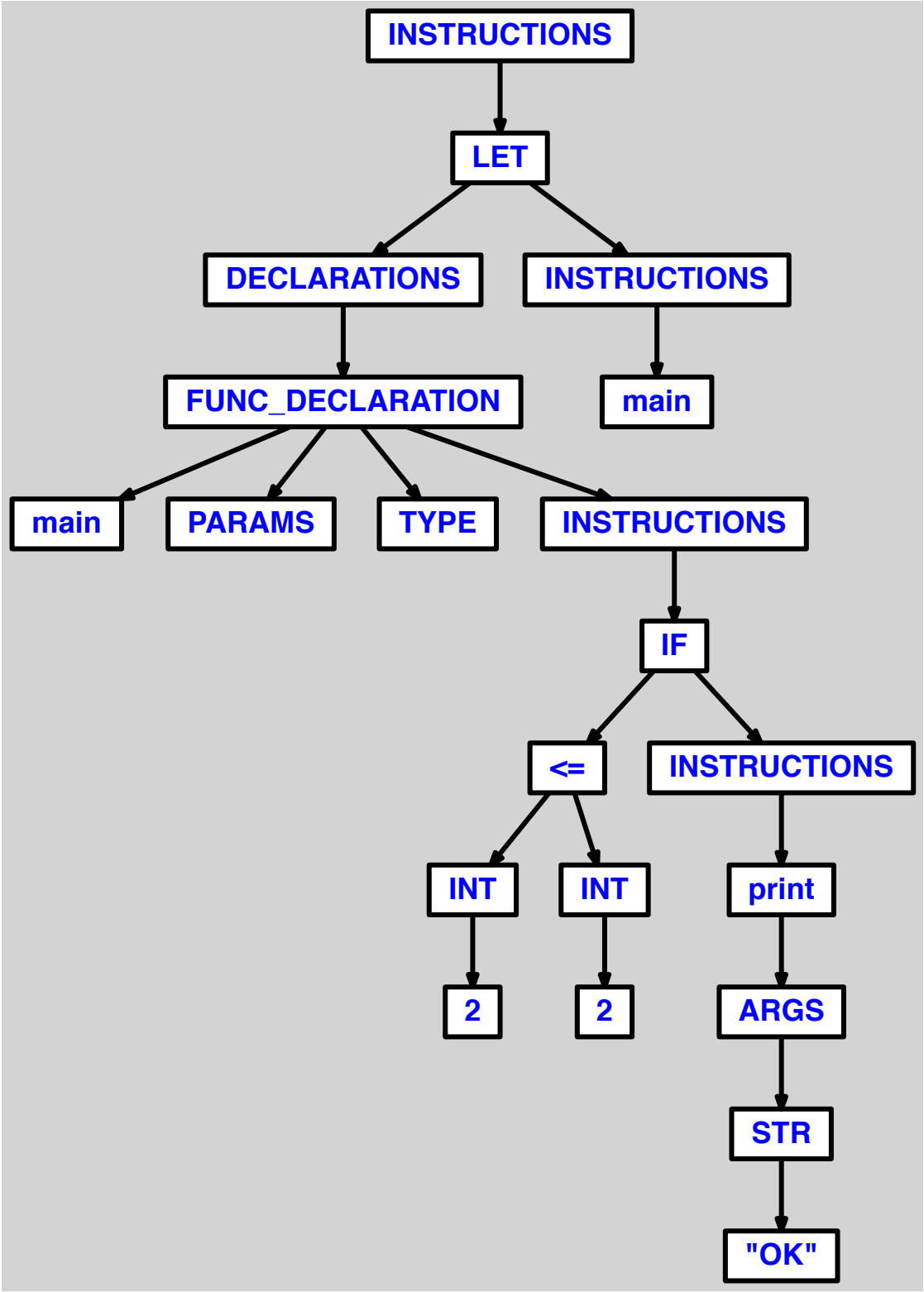
5.2.2 comparaison simple d'entiers avec <">">

```
let
  function main() =
    if 2 > 1 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
>
INSTRUCTIONS
INT
INT
print
2
1
ARGS
STR
"OK"

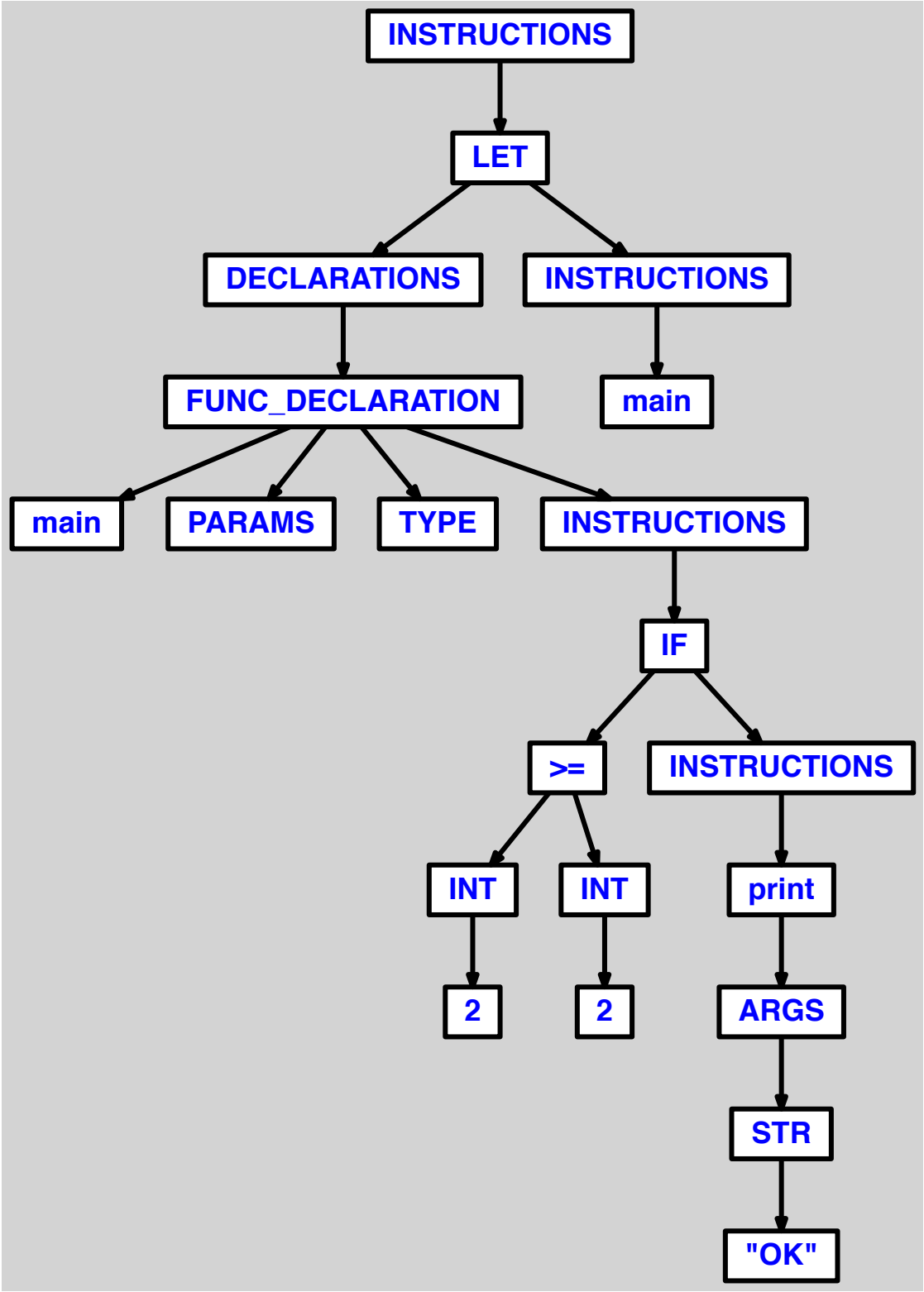
5.2.3 comparaison simple d'entiers avec <"<="><

```
let
  function main() =
    if 2 <= 2 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
<=
INSTRUCTIONS
INT
INT
print
2
2
ARGS
STR
"OK"

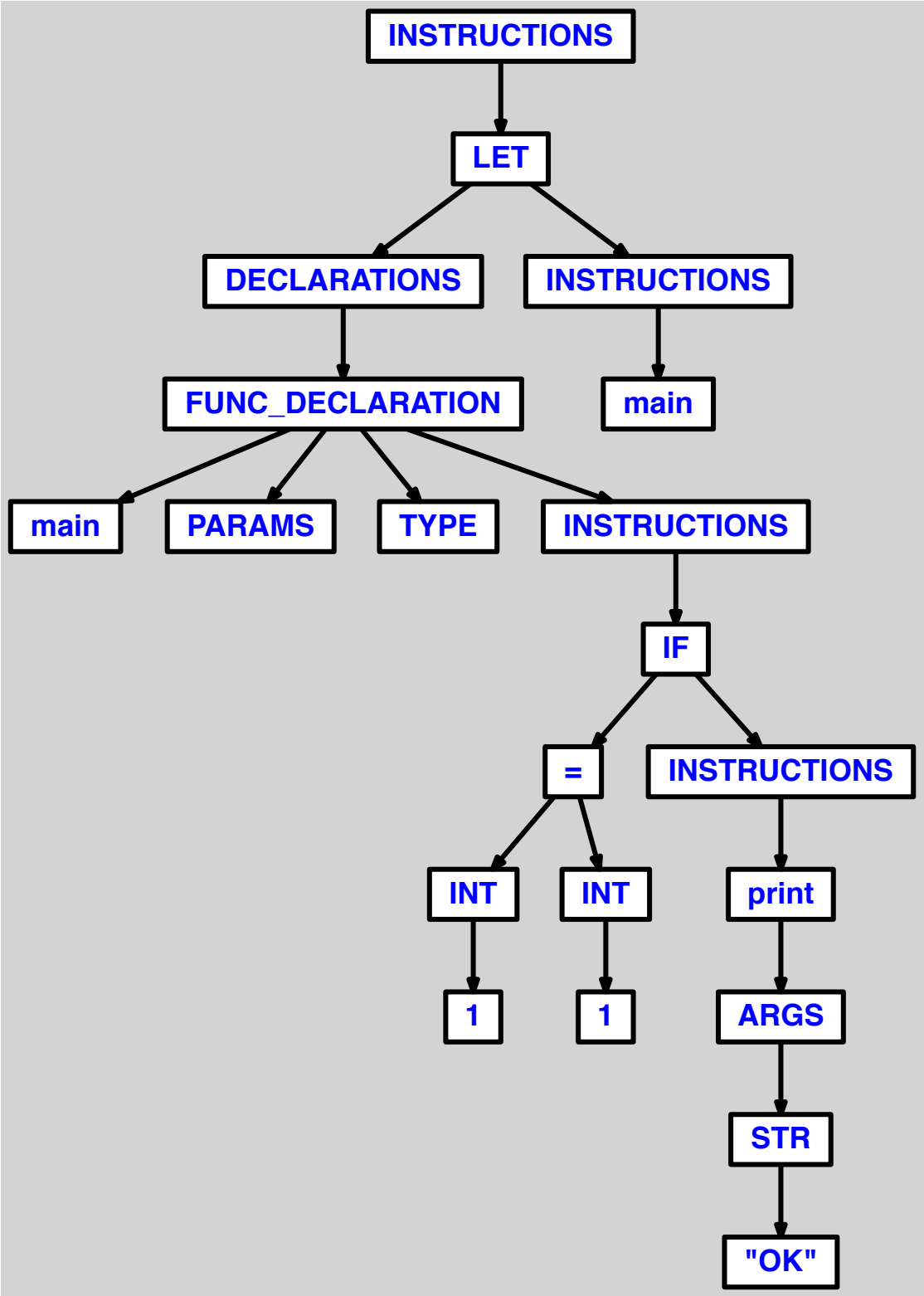
5.2.4 comparaison simple d'entiers avec <">="><

```
let
  function main() =
    if 2 >= 2 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
>=
INSTRUCTIONS
INT
INT
print
2
2
ARGS
STR
"OK"

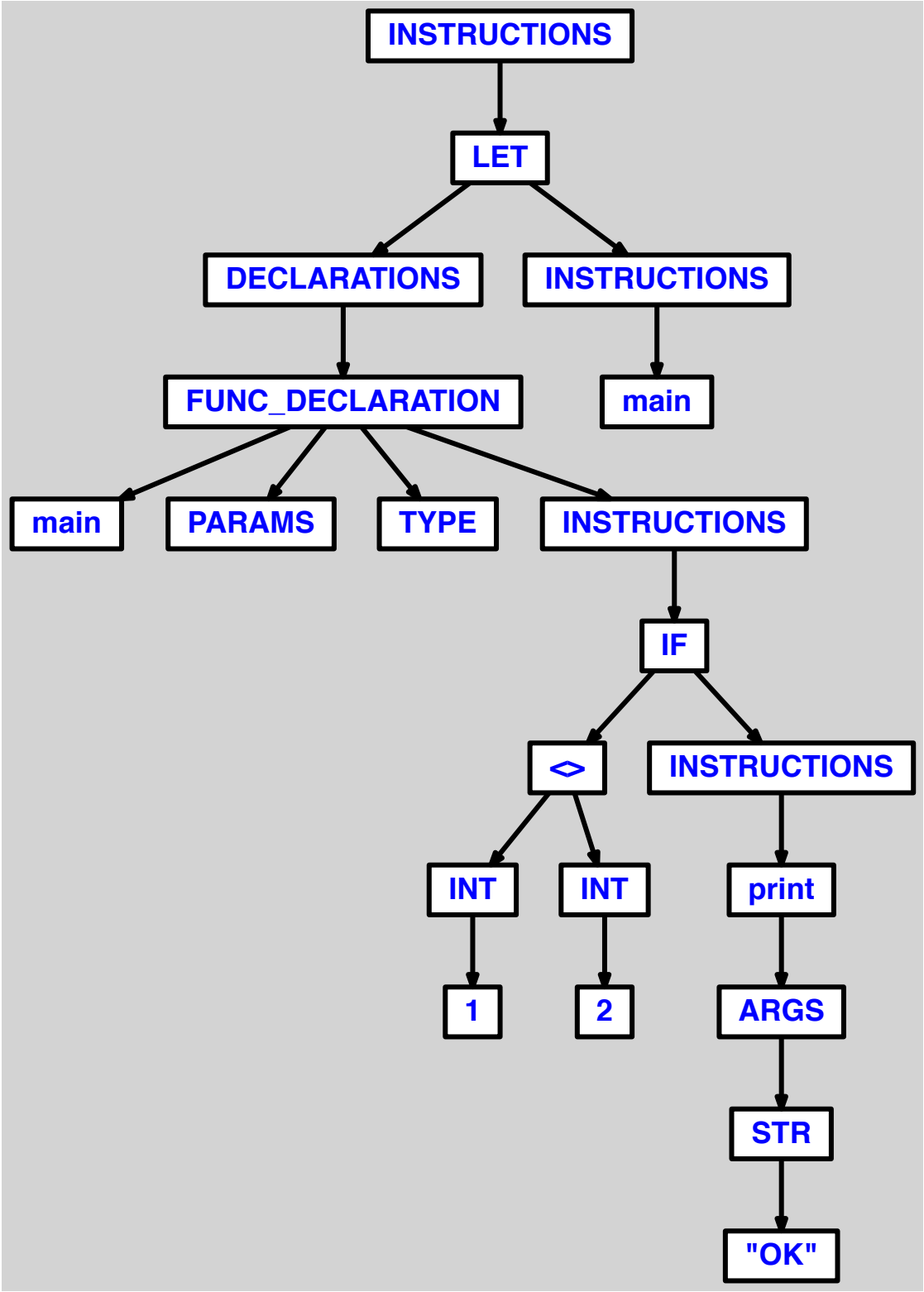
5.2.5 comparaison simple d'entiers avec <=>

```
let
  function main() =
    if 1 = 1 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
=
INSTRUCTIONS
INT
INT
print
1
1
ARGS
STR
"OK"

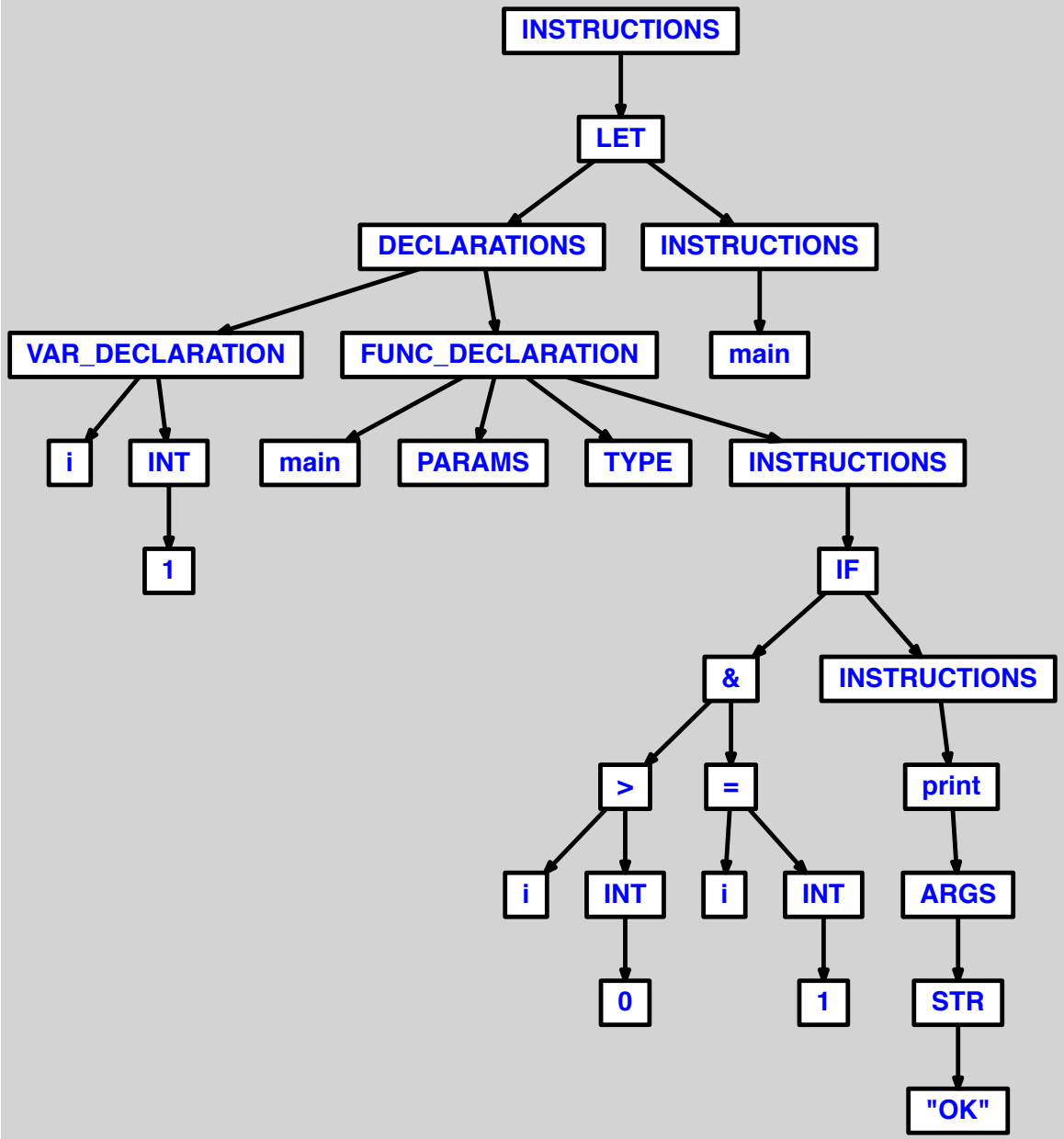
5.2.6 comparaison simple d'entiers avec <"<>">

```
let
  function main() =
    if 1 <> 2 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
<>
INSTRUCTIONS
INT
INT
print
1
2
ARGS
STR
"OK"

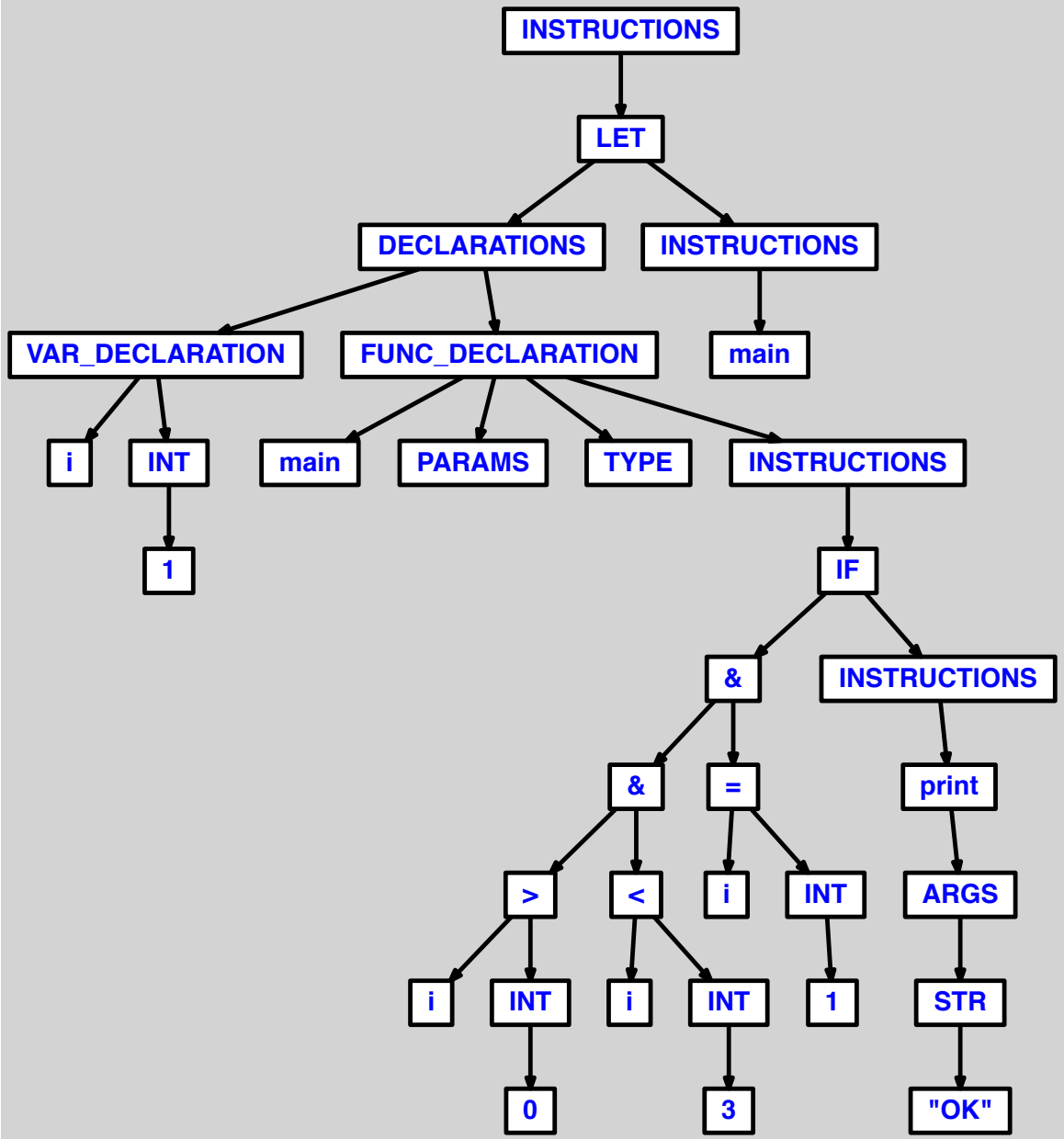
5.2.7 comparaison double d'entiers

```
let
  var i := 1

  function main() =
    if i > 0 & i = 1 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
IF
&
INSTRUCTIONS
>
=
print
i
INT
i
INT
ARGS
0
1
STR
"OK"

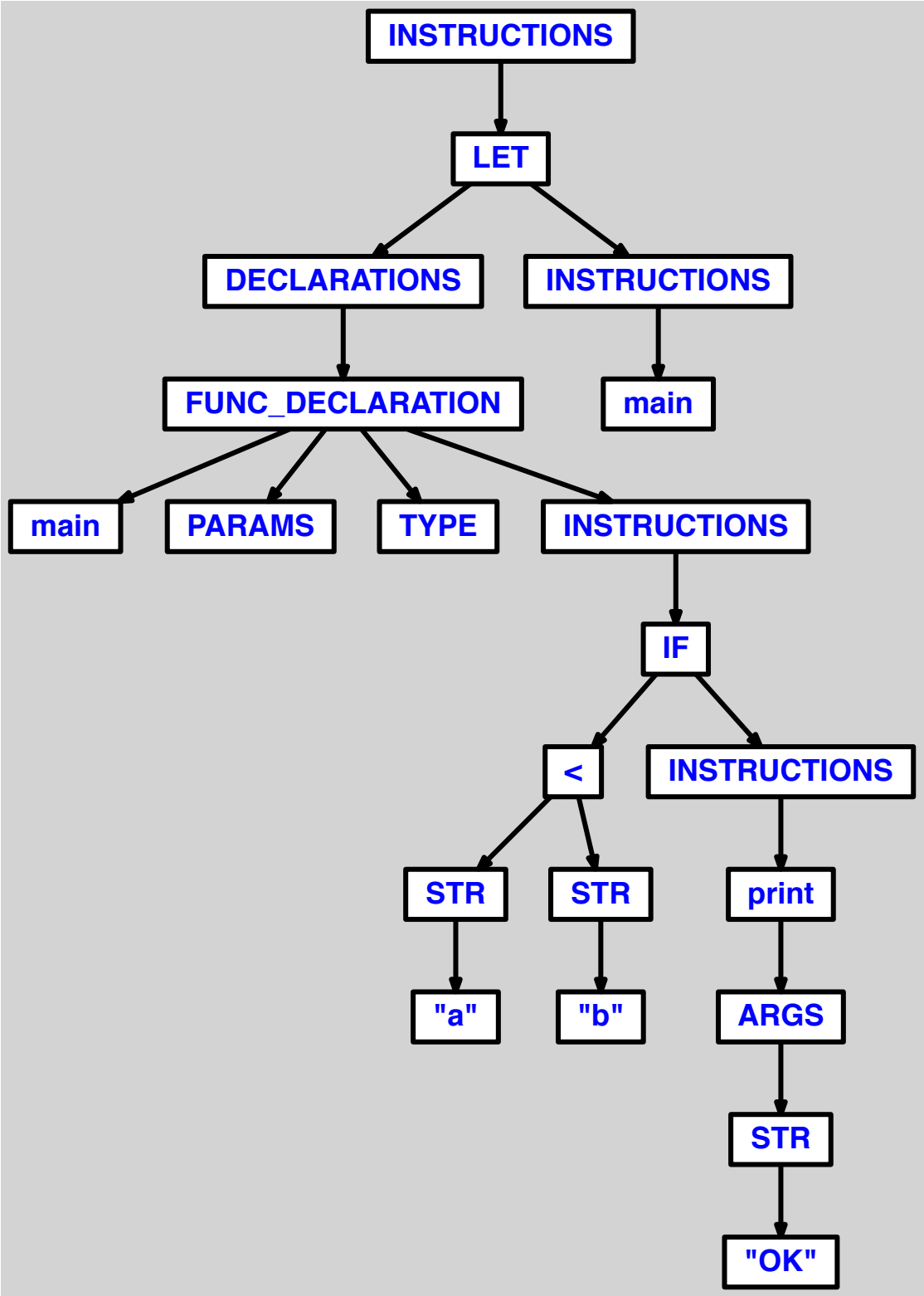
5.2.8 comparaison triple d'entiers

```
let
  var i := 1

  function main() =
    if i > 0 & i < 3 & i = 1 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
IF
&
INSTRUCTIONS
&
=
print
>
<
i
INT
ARGS
i
INT
i
INT
1
STR
0
3
"OK"

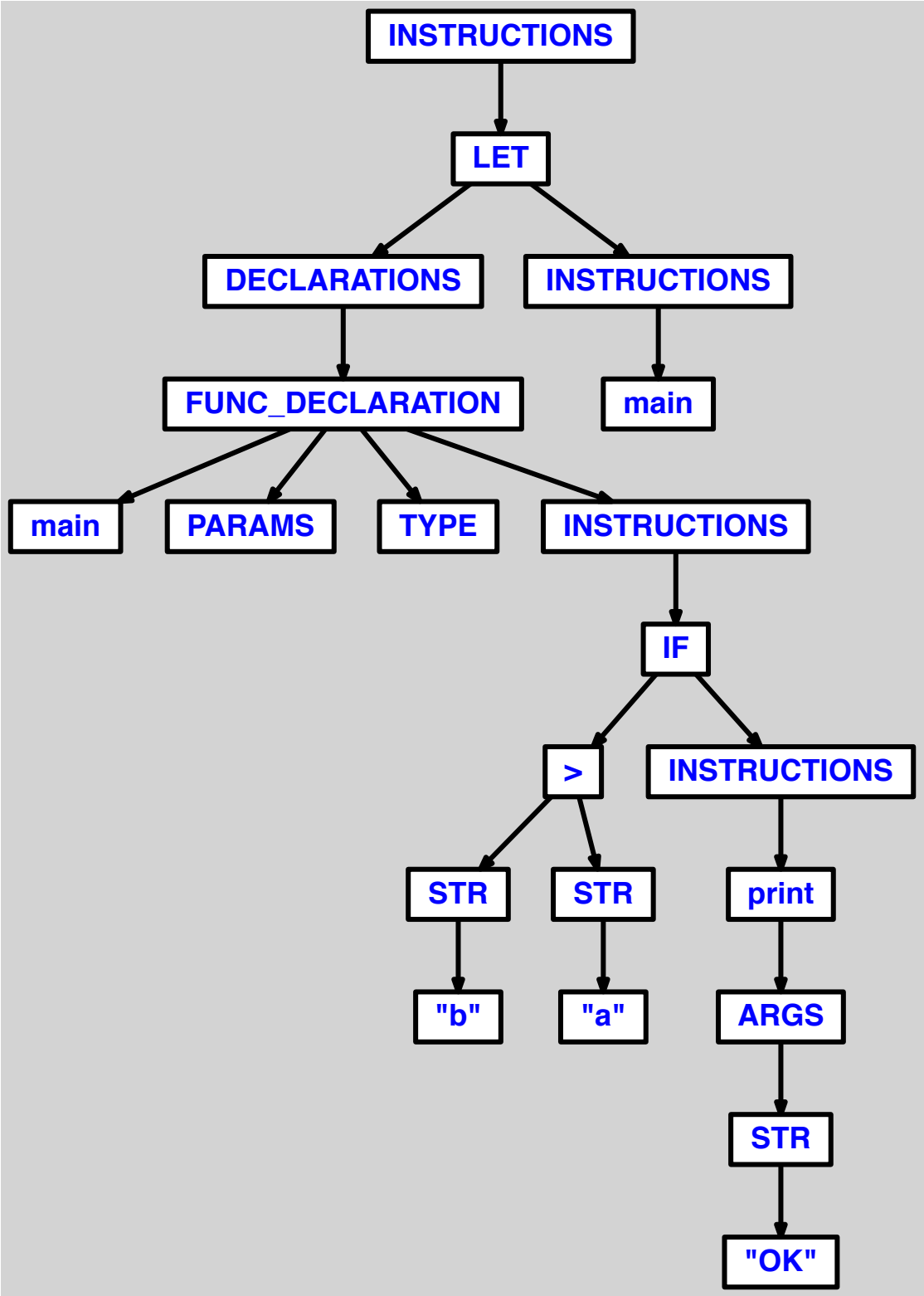
5.2.9 comparaison simple de chaines avec <"<">

```
let
  function main() =
    if "a" < "b" then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
<
INSTRUCTIONS
STR
STR
print
"a"
"b"
ARGS
STR
"OK"

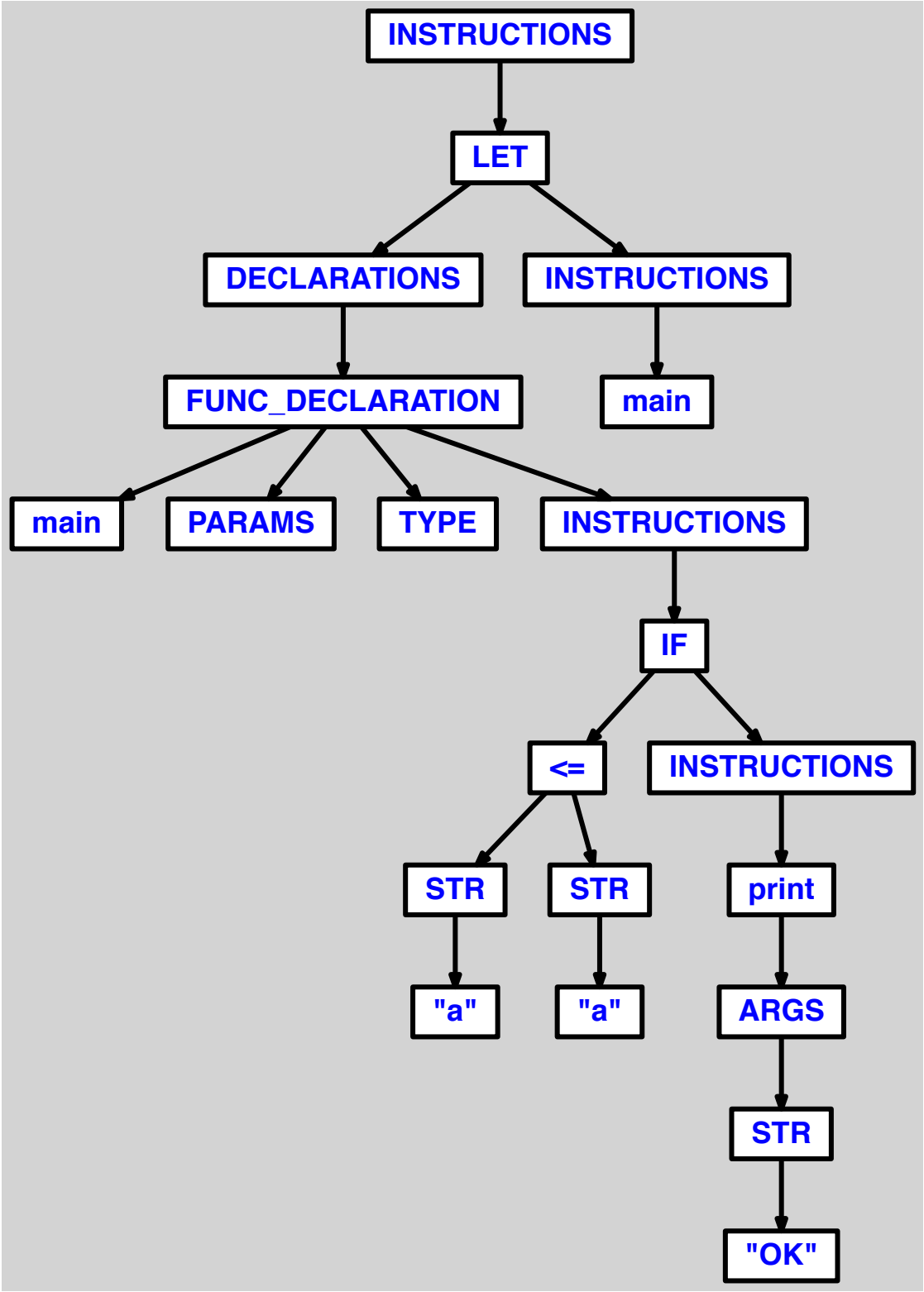
5.2.10 comparaison simple de chaines avec <">">

```
let
  function main() =
    if "b" > "a" then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
>
INSTRUCTIONS
STR
STR
print
"b"
"a"
ARGS
STR
"OK"

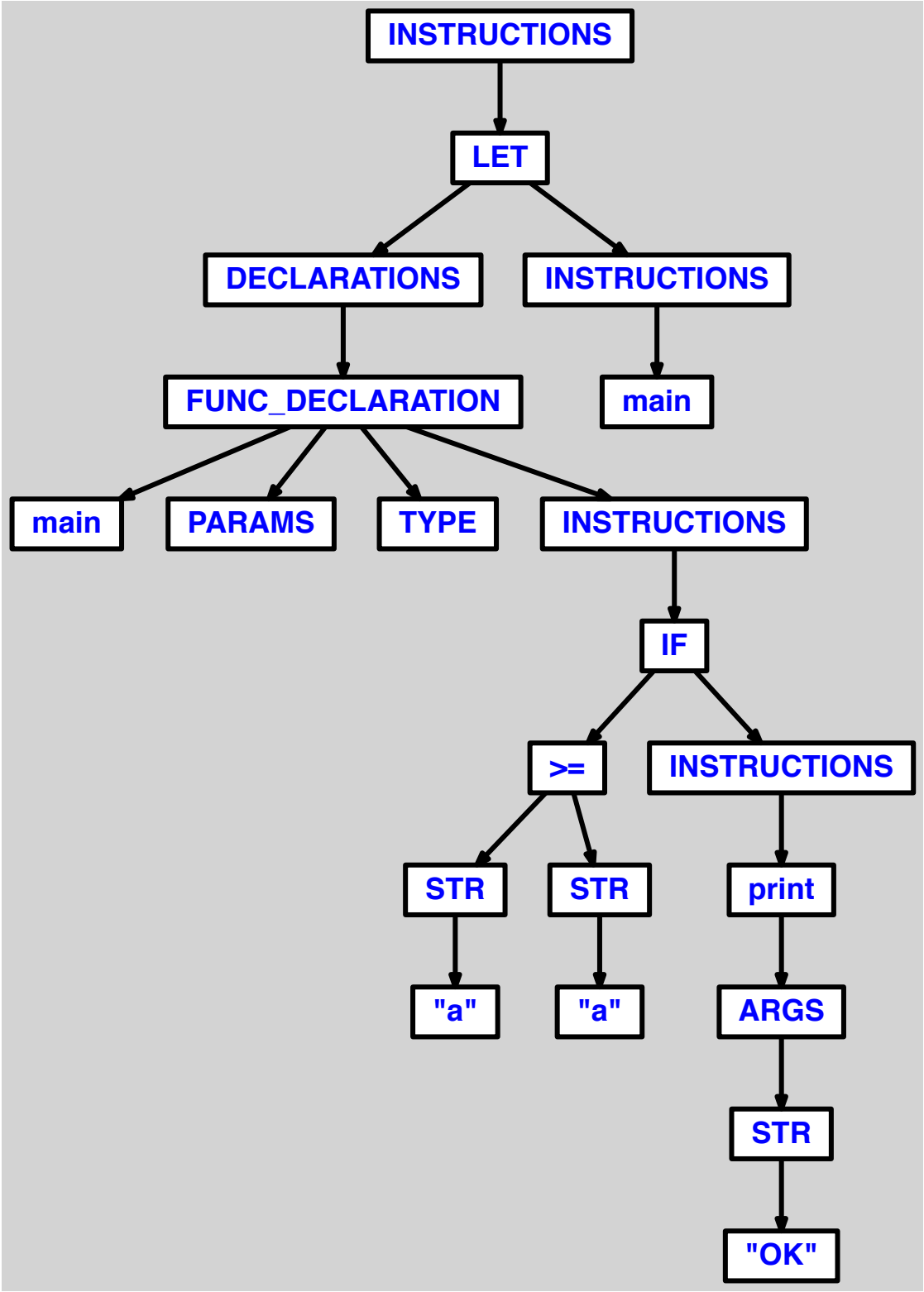
5.2.11 comparaison simple de chaines avec <"<="><

```
let
  function main() =
    if "a" <= "a" then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
<=
INSTRUCTIONS
STR
STR
print
"a"
"a"
ARGS
STR
"OK"

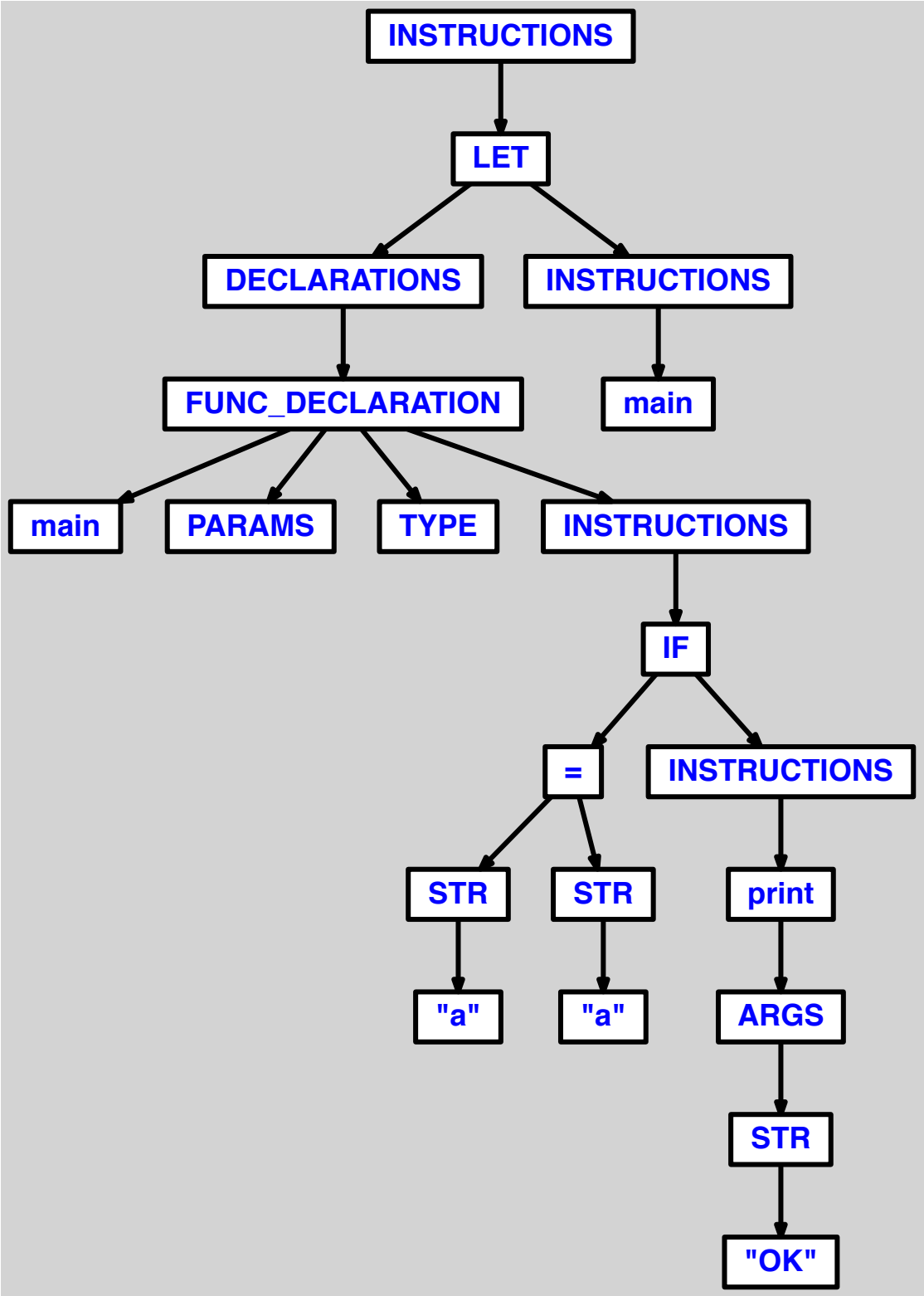
5.2.12 comparaison simple de chaines avec <">="><

```
let
  function main() =
    if "a" >= "a" then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
>=
INSTRUCTIONS
STR
STR
print
"a"
"a"
ARGS
STR
"OK"

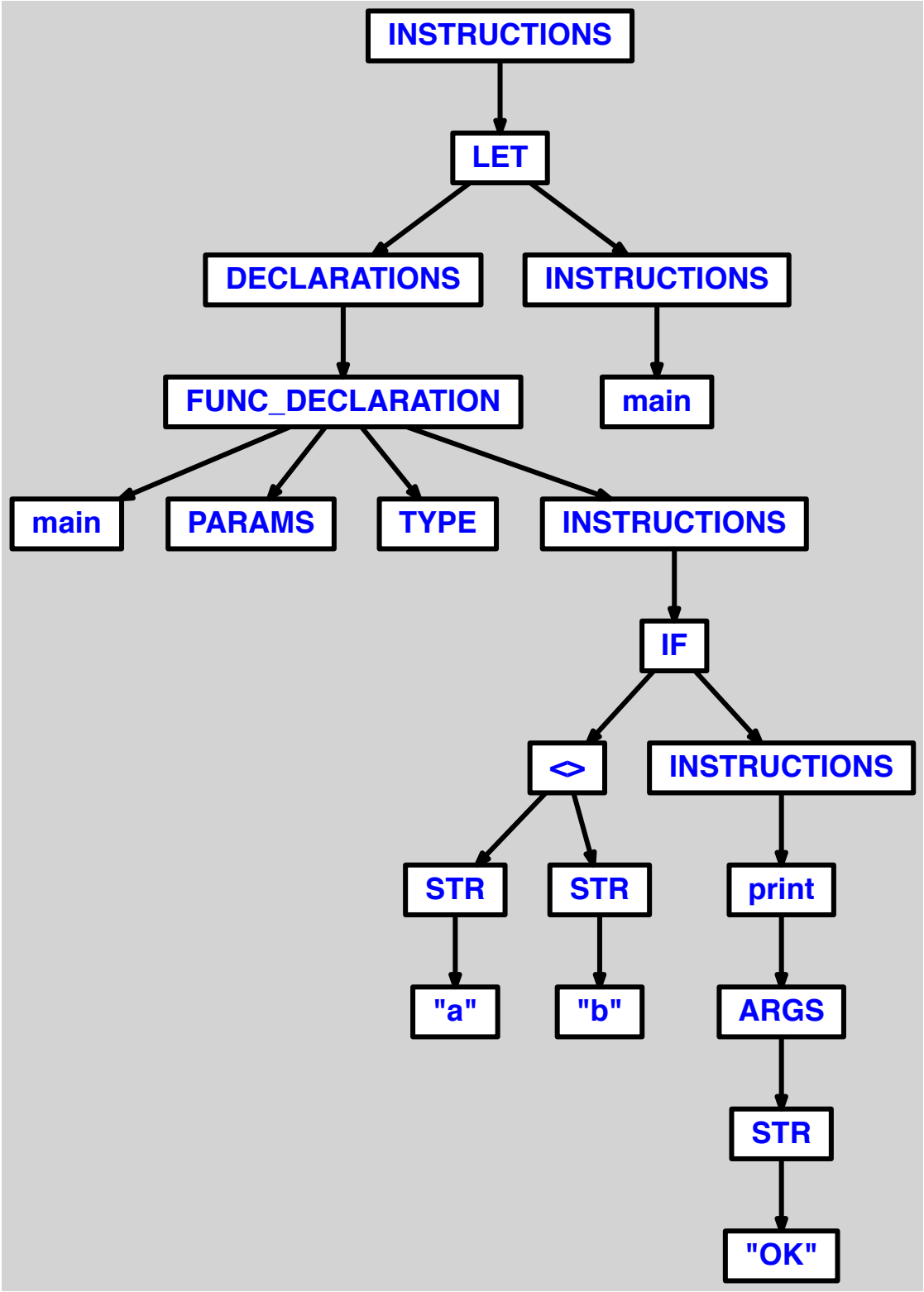
5.2.13 comparaison simple de chaines avec <=>

```
let
  function main() =
    if "a" = "a" then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
=
INSTRUCTIONS
STR
STR
print
"a"
"a"
ARGS
STR
"OK"

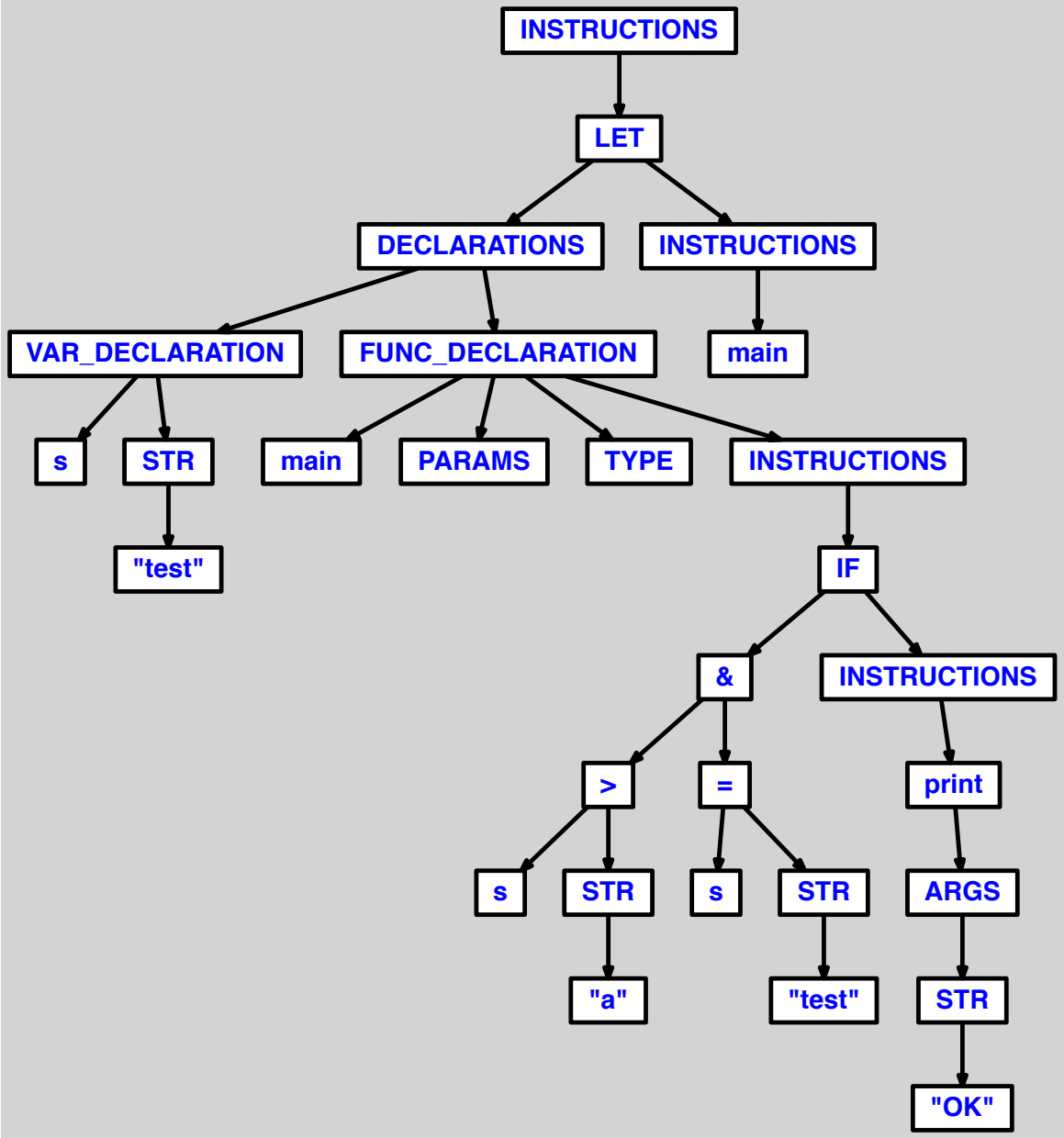
5.2.14 comparaison simple de chaines avec <"<>">

```
let
  function main() =
    if "a" <> "b" then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
<>
INSTRUCTIONS
STR
STR
print
"a"
"b"
ARGS
STR
"OK"

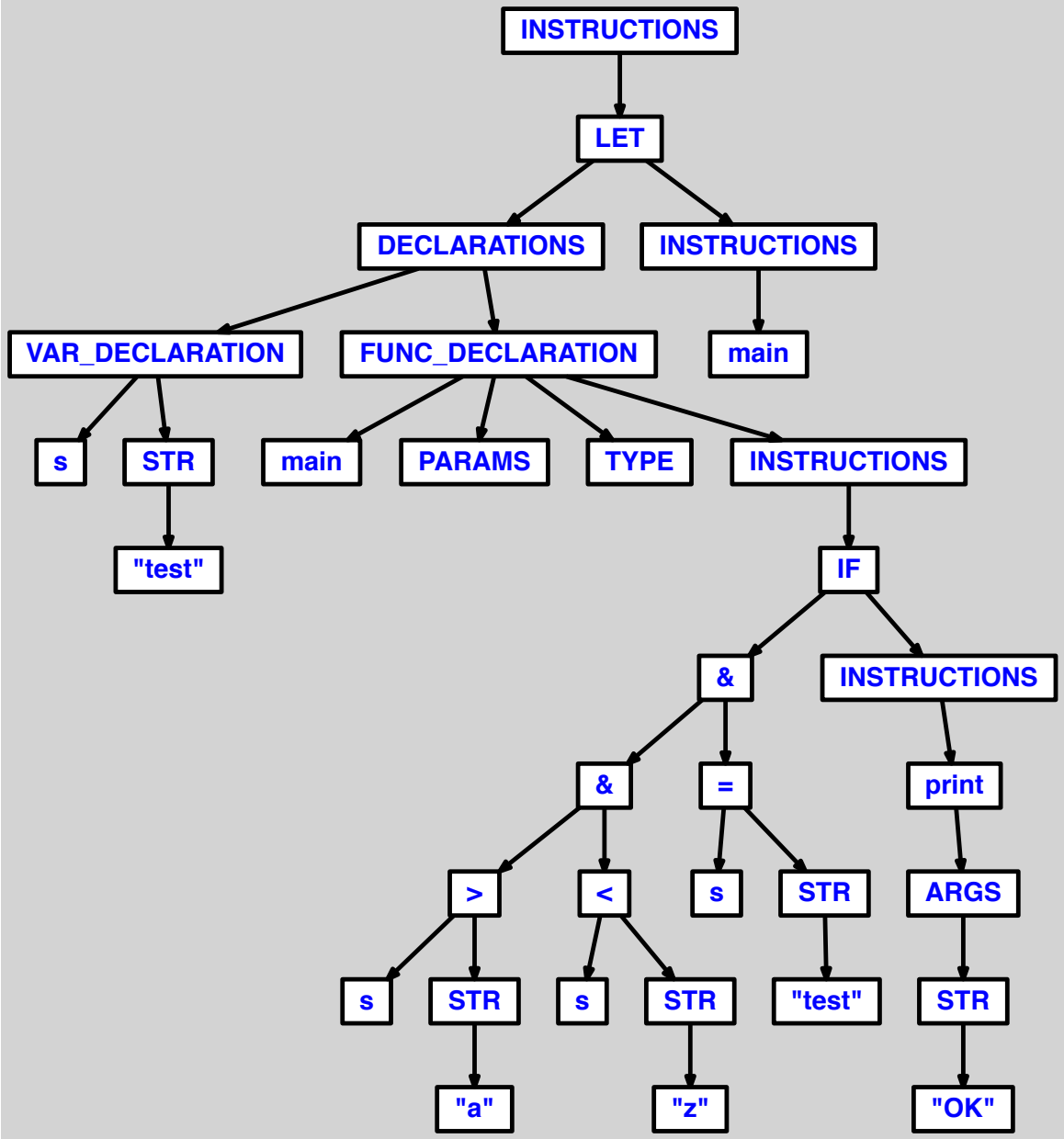
5.2.15 comparaison double de chaines

```
let
  var s := "test"

  function main() =
    if s > "a" & s = "test" then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
s
STR
main
PARAMS
TYPE
INSTRUCTIONS
"test"
IF
&
INSTRUCTIONS
>
=
print
s
STR
s
STR
ARGS
"a"
"test"
STR
"OK"

5.2.16 comparaison triple de chaines

```
let
  var s := "test"

  function main() =
    if s > "a" & s < "z" & s = "test" then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
s
STR
main
PARAMS
TYPE
INSTRUCTIONS
"test"
IF
&
INSTRUCTIONS
&
=
print
>
<
s
STR
ARGS
s
STR
s
STR
"test"
STR
"a"
"z"
"OK"

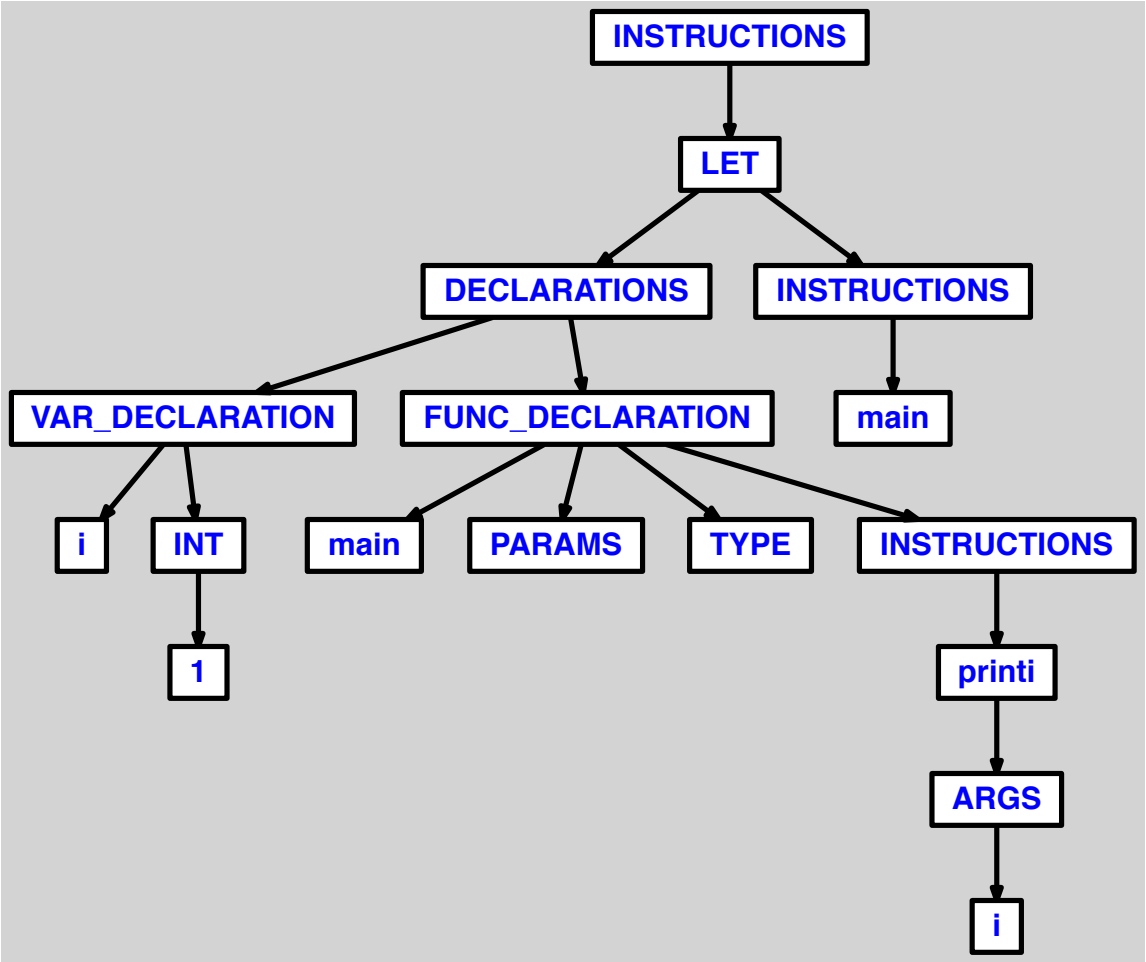
6 espace

6.1 KO

6.2 OK

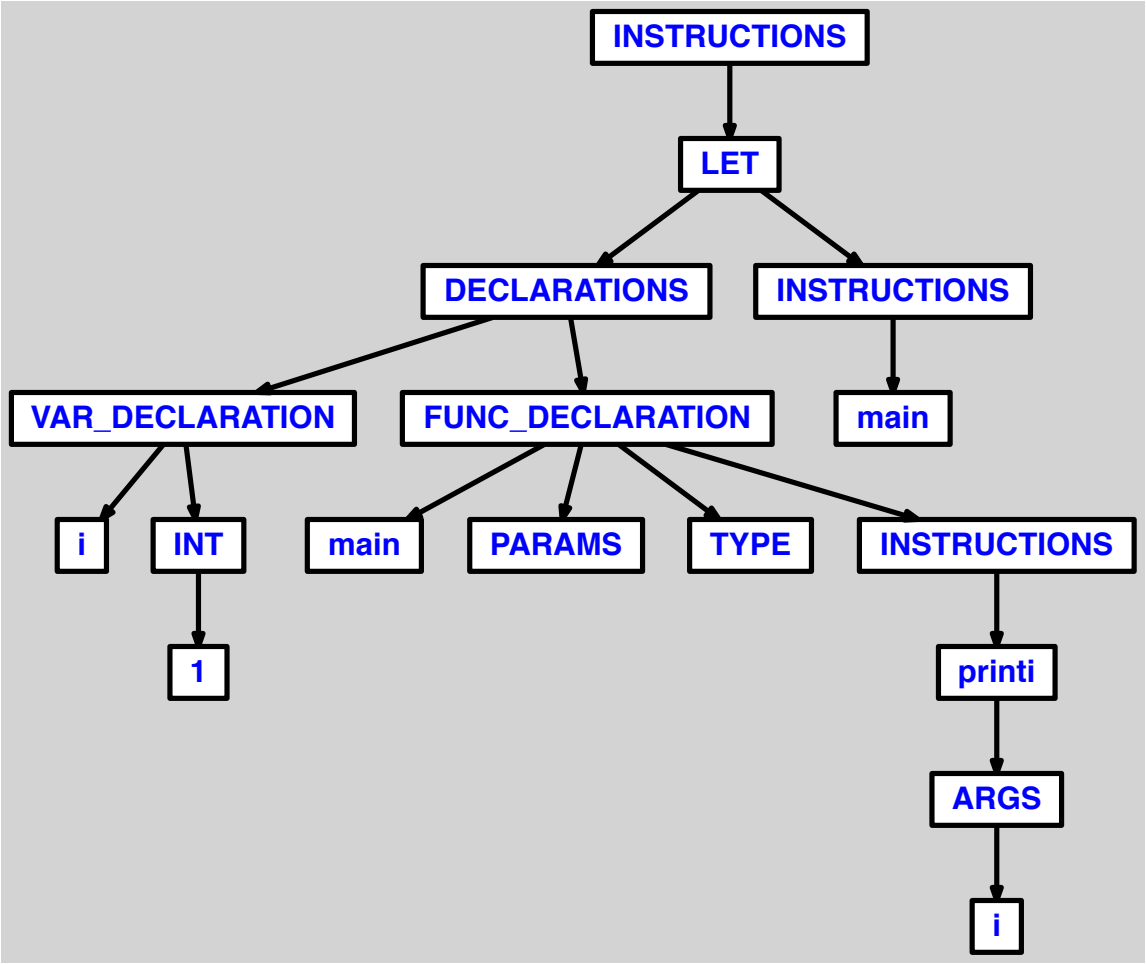
6.2.1 1 espace entre <var> et <i>

```
let
  var i := 1

  function main() = printi(i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
i

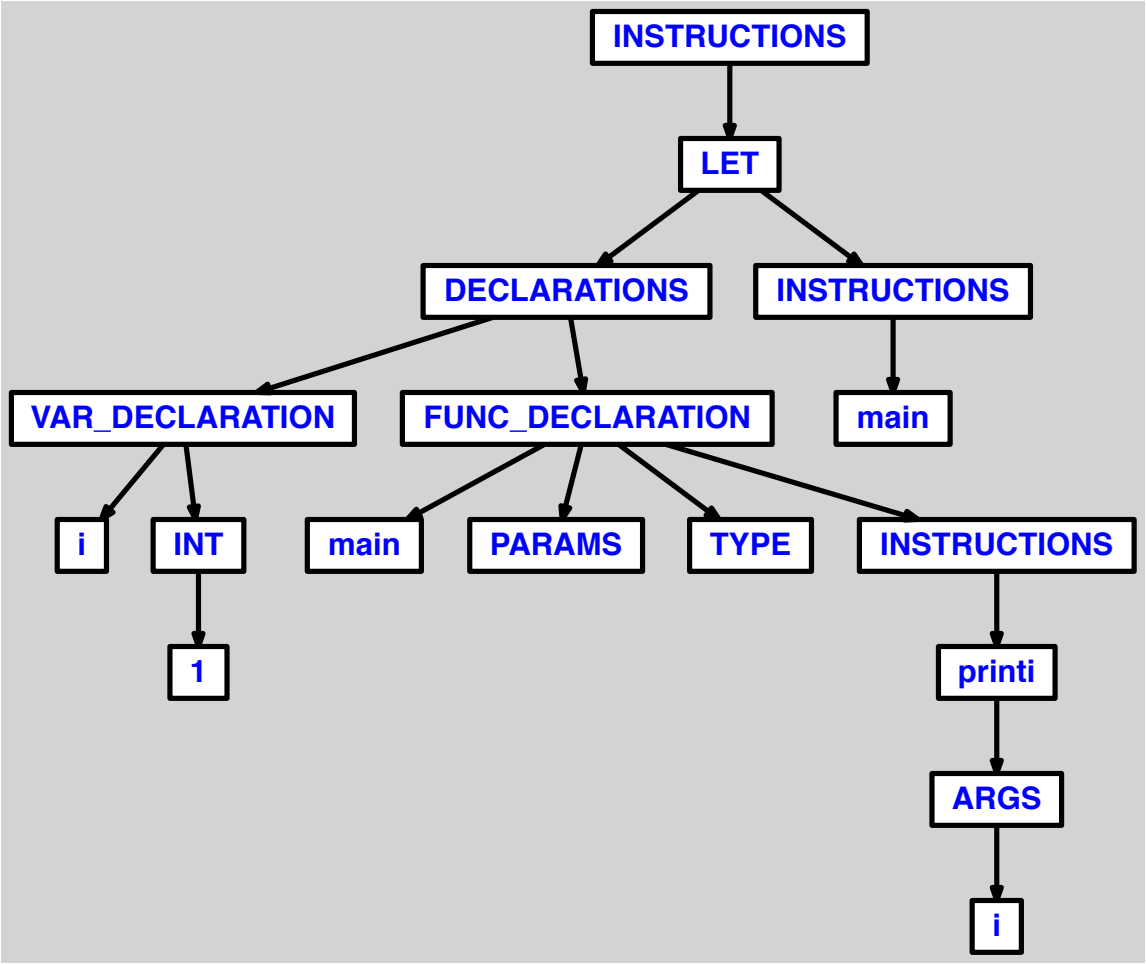
6.2.2 1 tabulation entre <var> et <i>

```
let
  var i := 1

  function main() = printi(i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
i

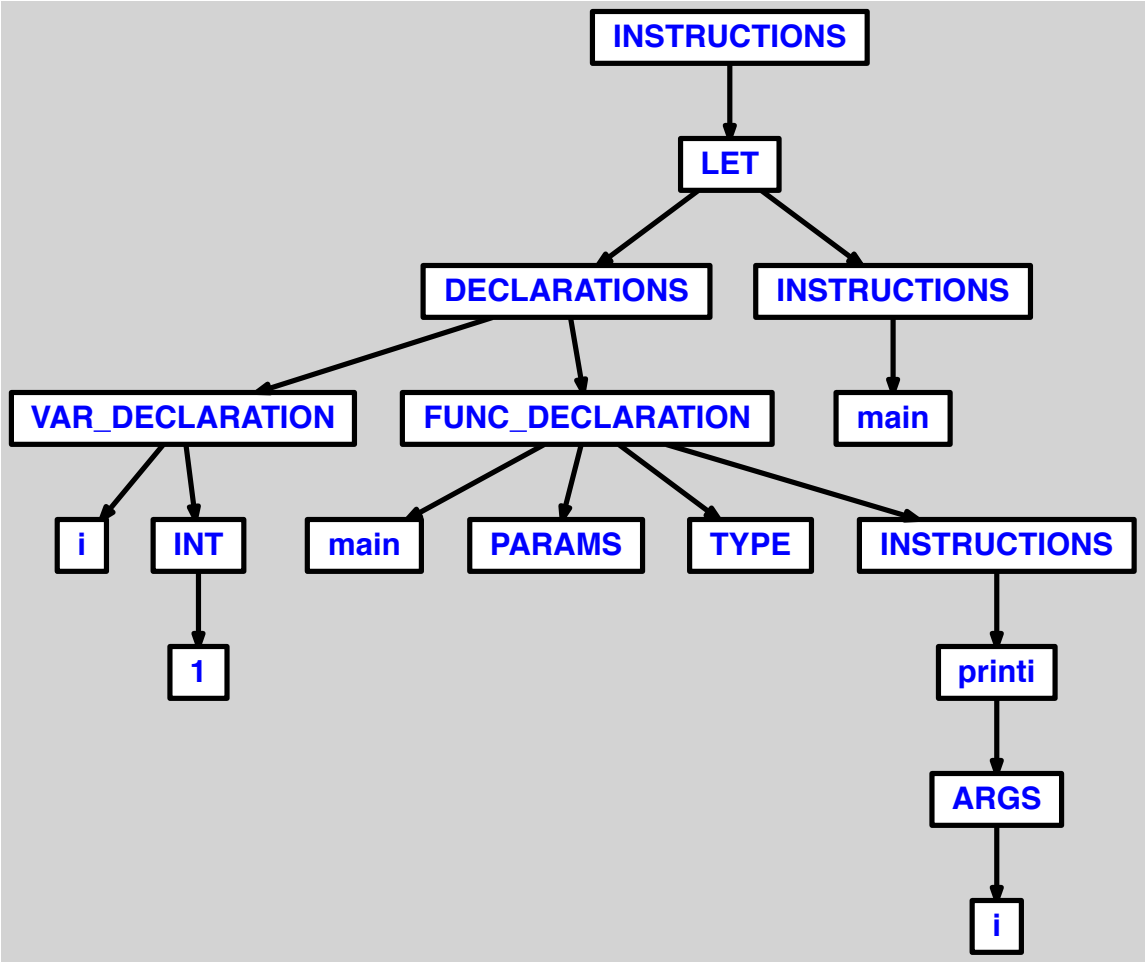
6.2.3 1 saut de ligne entre <var> et <i>

```
let
  var
  i := 1

  function main() = printi(i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
i

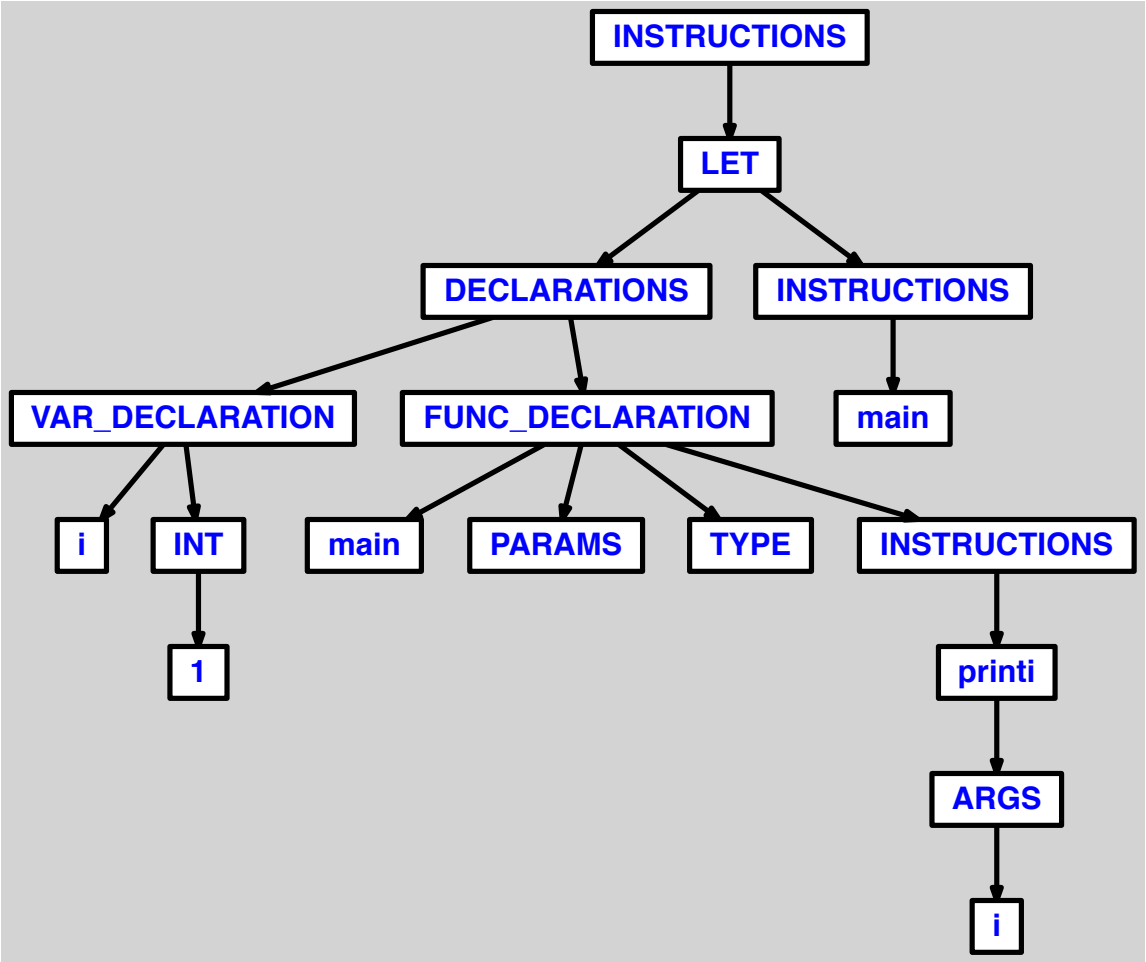
6.2.4 2 espaces entre <var> et <i>

```
let
  var  i := 1

  function main() = printi(i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
i

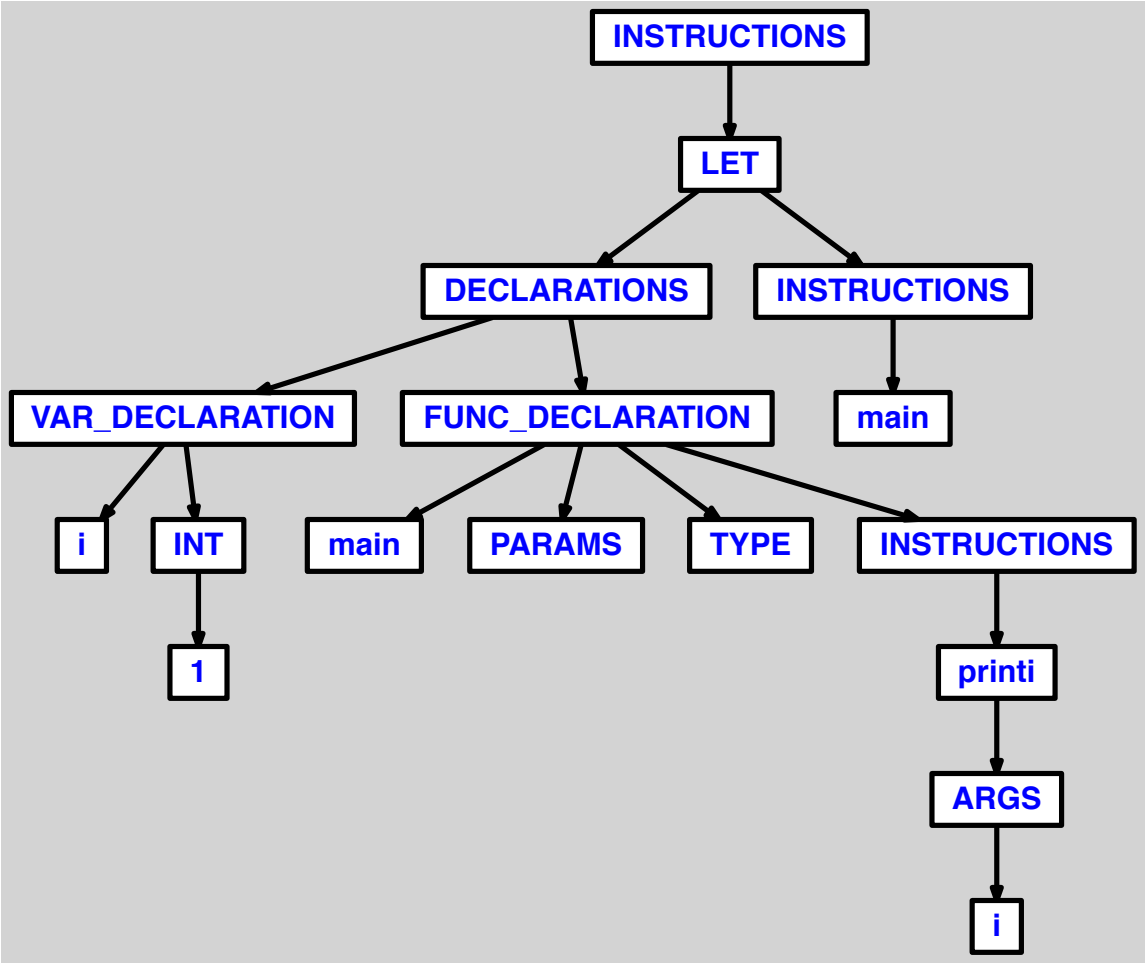
6.2.5 2 tabulations entre <var> et <i>

```
let
  var   i := 1

  function main() = printi(i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
i

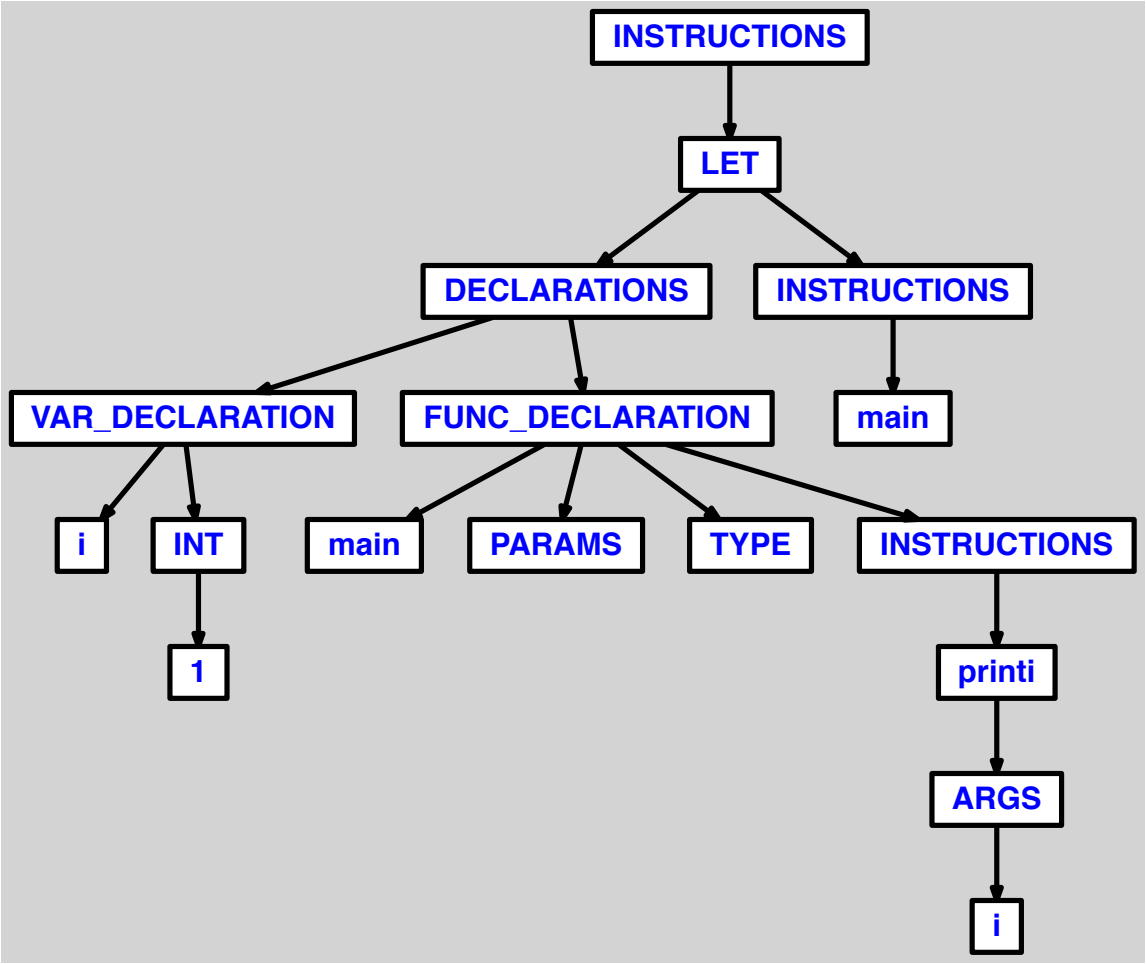
6.2.6 2 sauts de ligne entre <var> et <i>

```
let
  var

  i := 1

  function main() = printi(i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
i

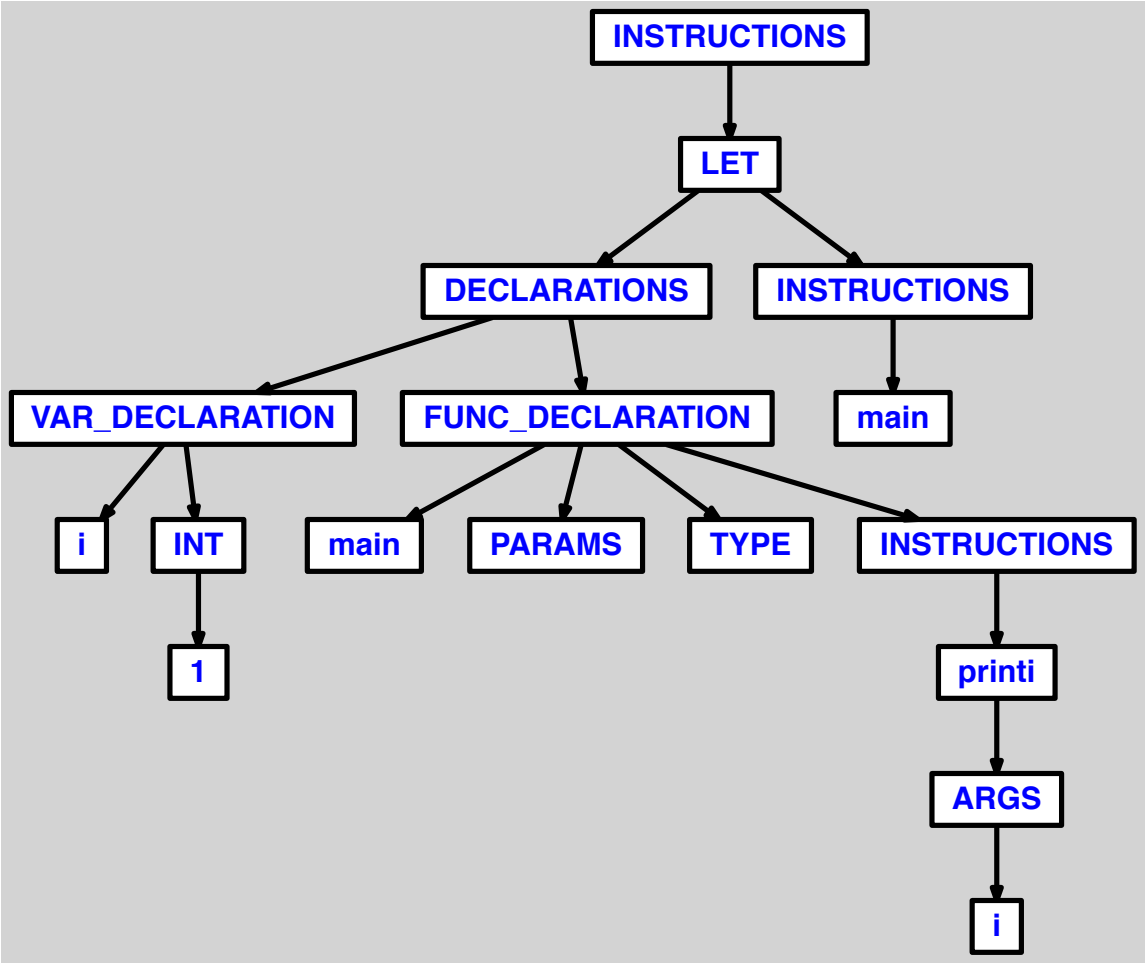
6.2.7 3 espaces entre <var> et <i>

```
let
  var   i := 1

  function main() = printi(i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
i

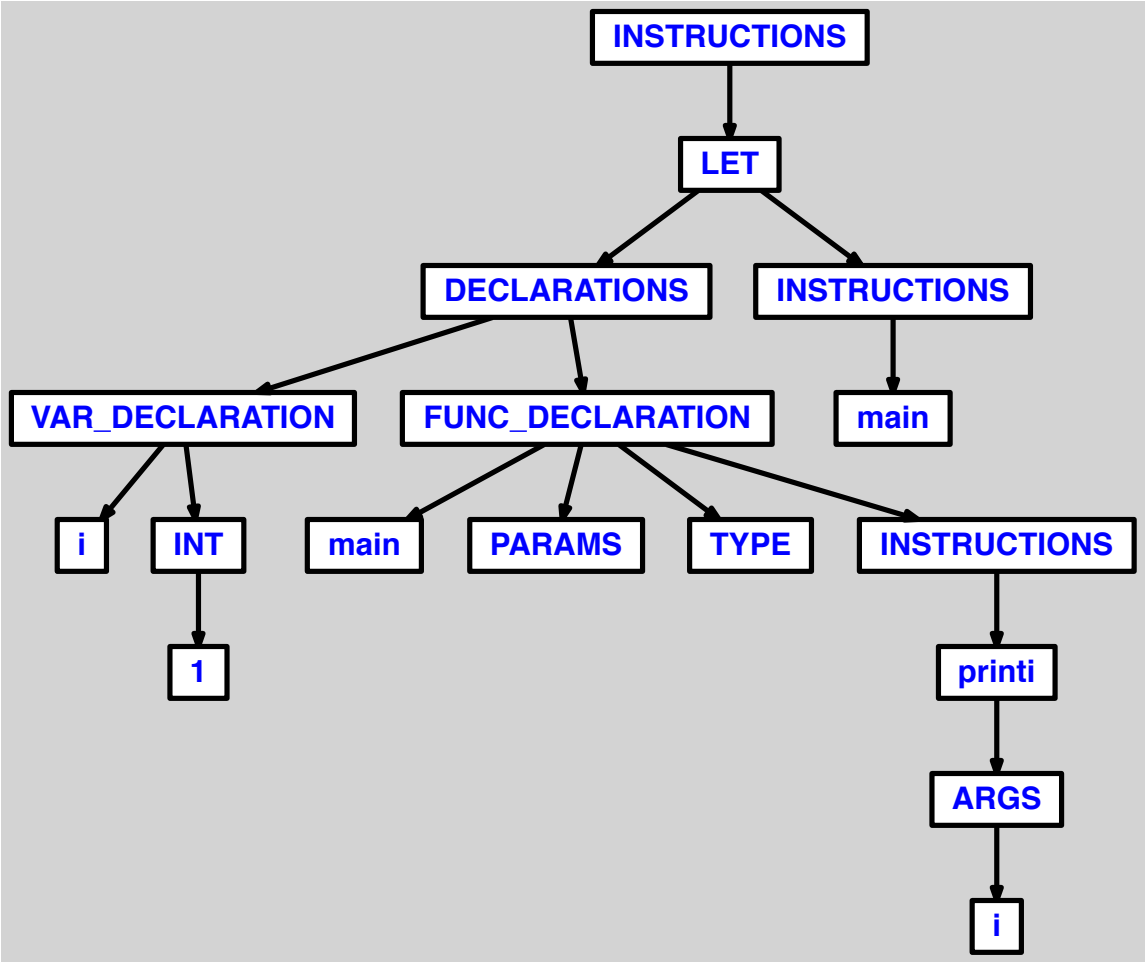
6.2.8 3 tabulations entre <var> et <i>

```
let
  var     i := 1

  function main() = printi(i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
i

6.2.9 3 sauts de ligne entre <var> et <i>

```
let
  var


  i := 1

  function main() = printi(i)
in main() end
```

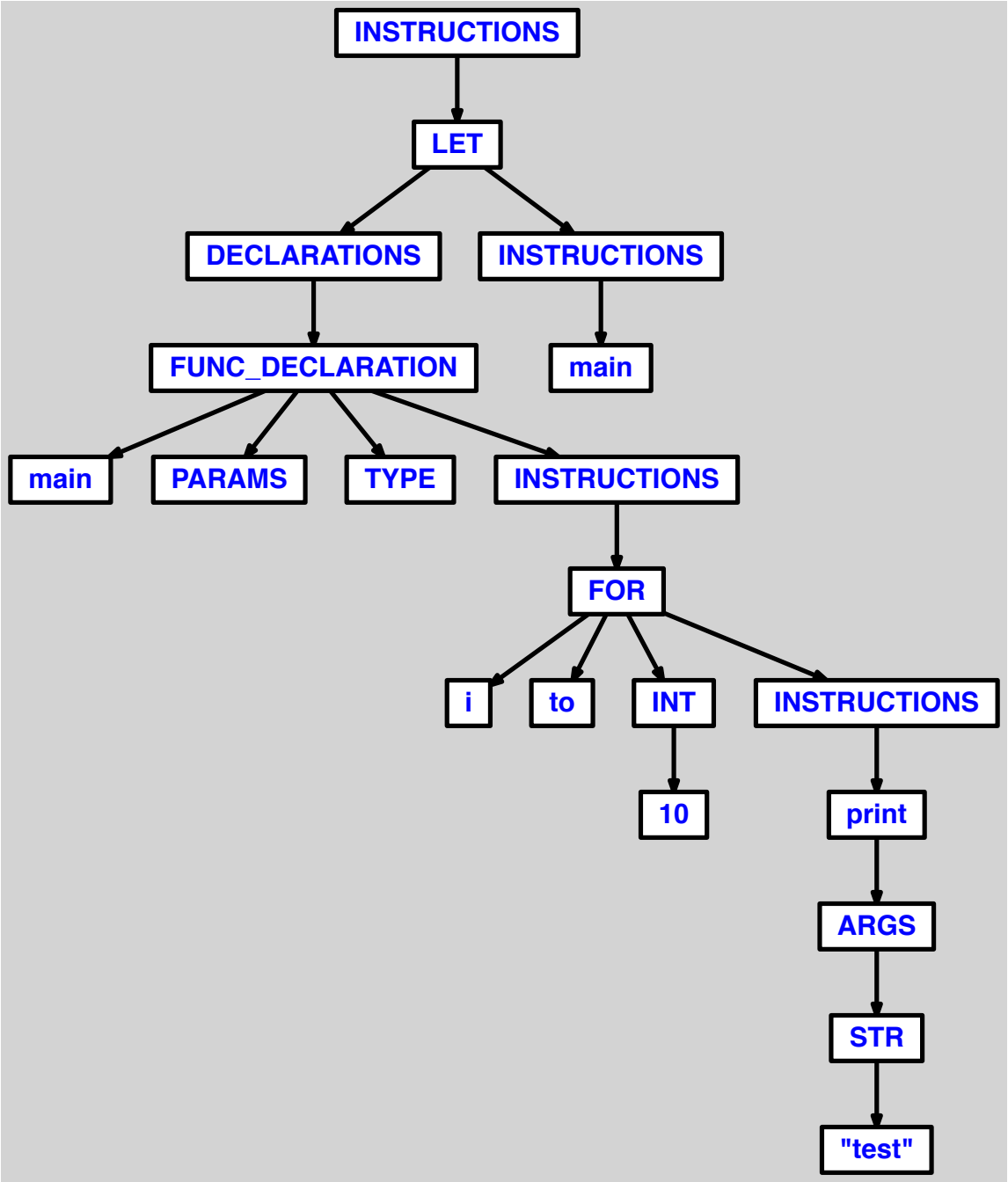

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
i

7 for

7.1 KO

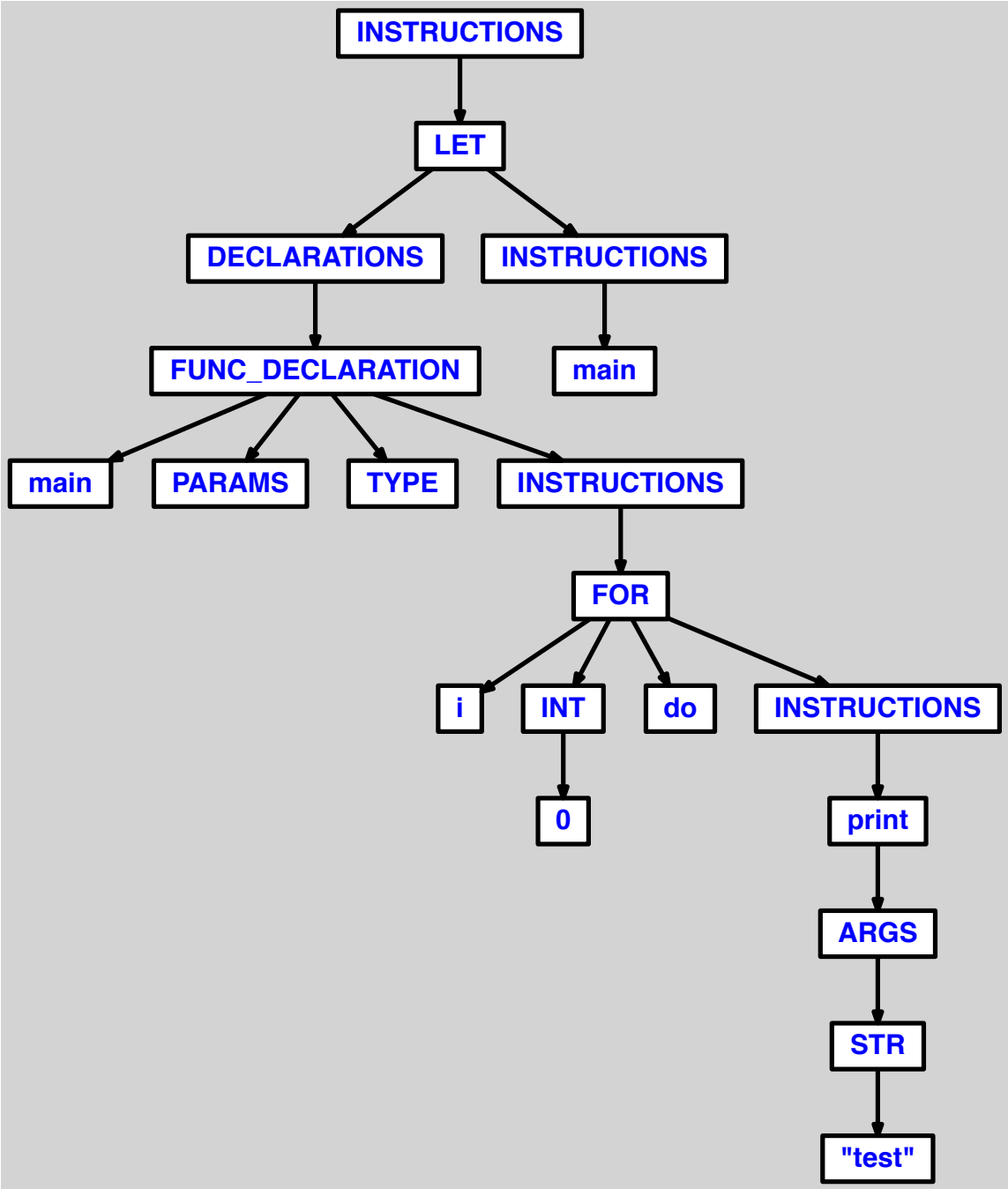
7.1.1 <for> avec affectation de chaine pour le compteur

```
let
  function main() =
    for i := "3" to 10 do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
to
INT
INSTRUCTIONS
10
print
ARGS
STR
"test"

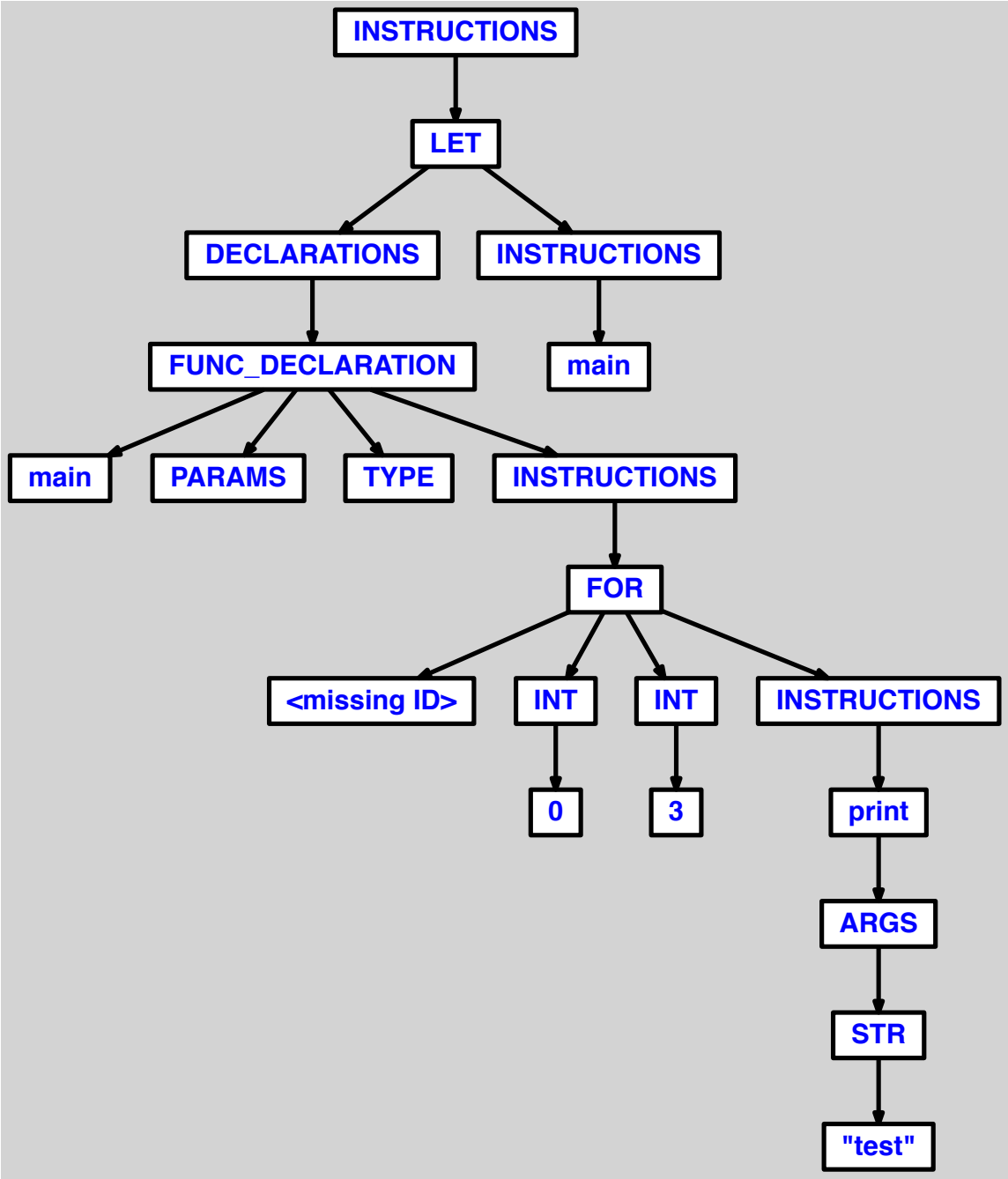
7.1.2 <for> avec affectation de chaine pour la borne superieure de l'iteration

```
let
  function main() =
    for i := 0 to "3" do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
do
INSTRUCTIONS
0
print
ARGS
STR
"test"

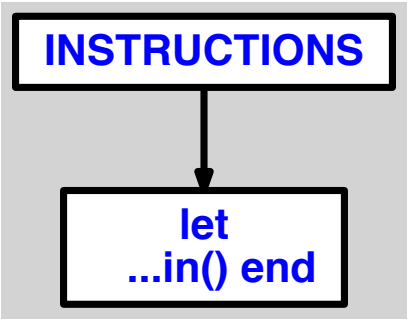
7.1.3 <for> avec oubli de l'identifiant du compteur

```
let
  function main() =
    for := 0 to 3 do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
<missing ID>
INT
INT
INSTRUCTIONS
0
3
print
ARGS
STR
"test"

7.1.4 <for> avec oubli du <for>

```
let
  function main() =
    i := 0 to 3 do
      print("test")
in main() end
```


INSTRUCTIONS
let
...in() end

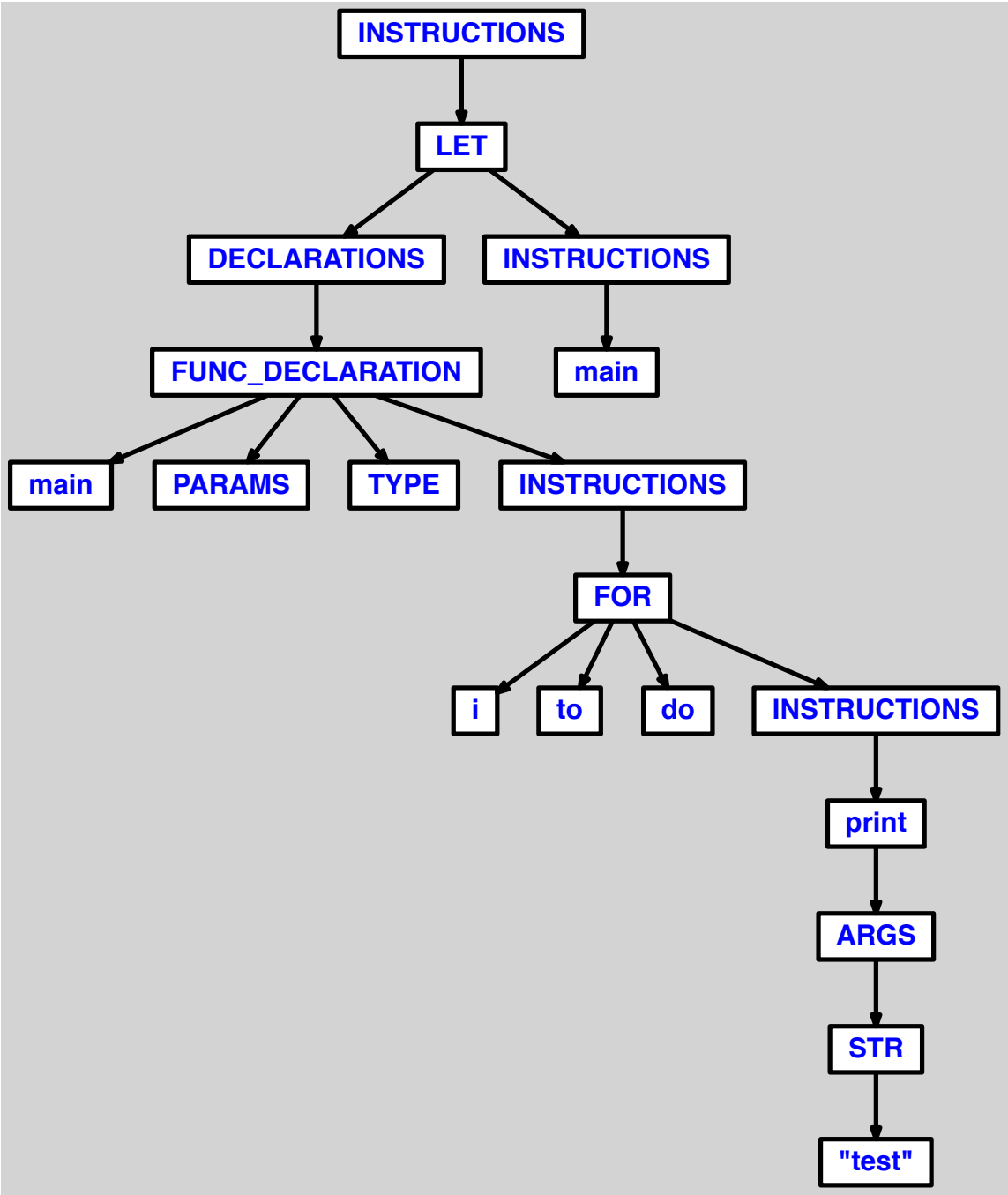
7.1.5 <for> "express"

```
let
  function main() =
    for 3 to 5 do
      print("test")
in main() end
```

Pas d'AST, problème de syntaxe.

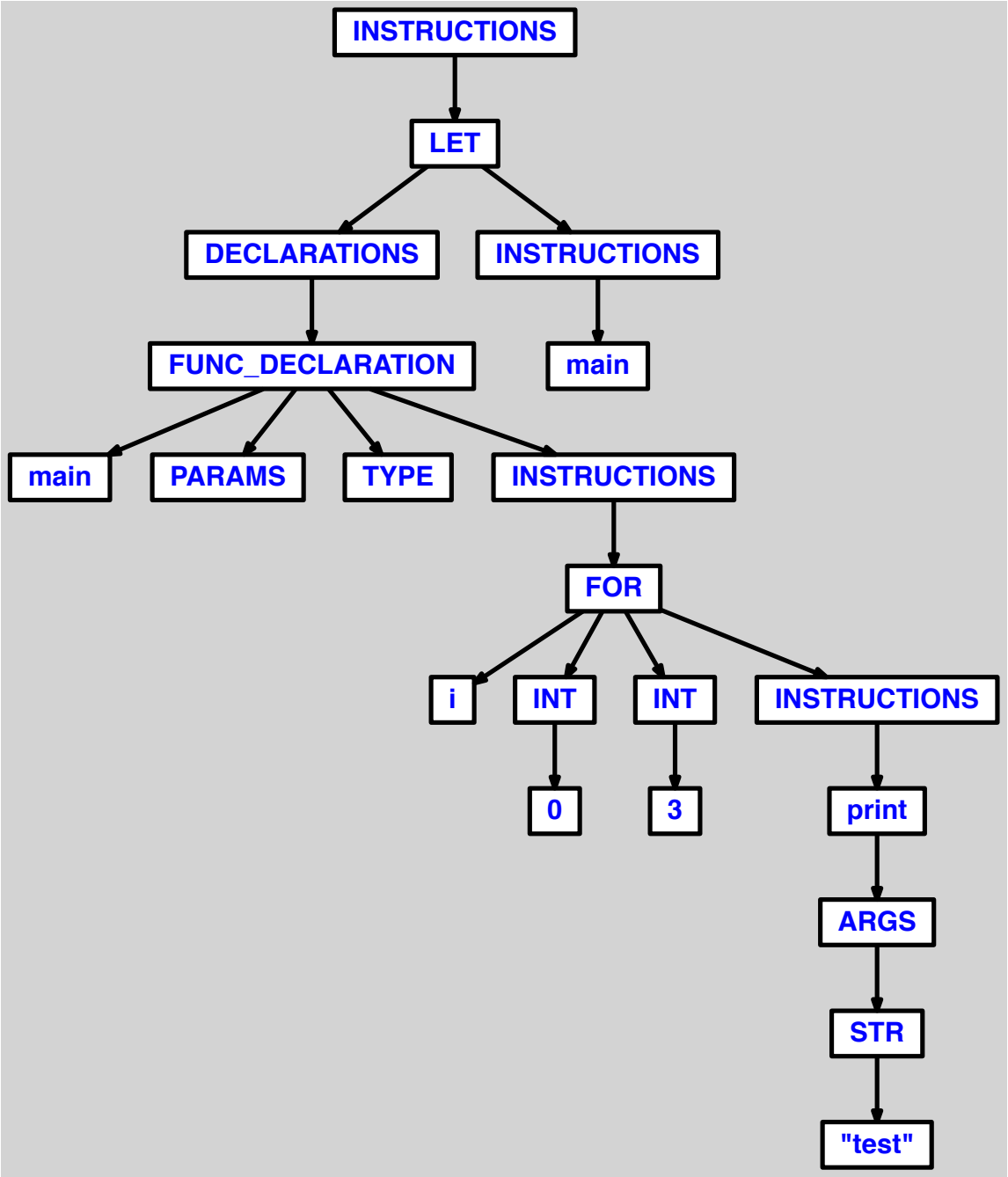
7.1.6 <for> avec affectation de chaines pour le compteur et la borne maximale de l'iteration

```
let
  function main() =
    for i := "0" to "3" do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
to
do
INSTRUCTIONS
print
ARGS
STR
"test"

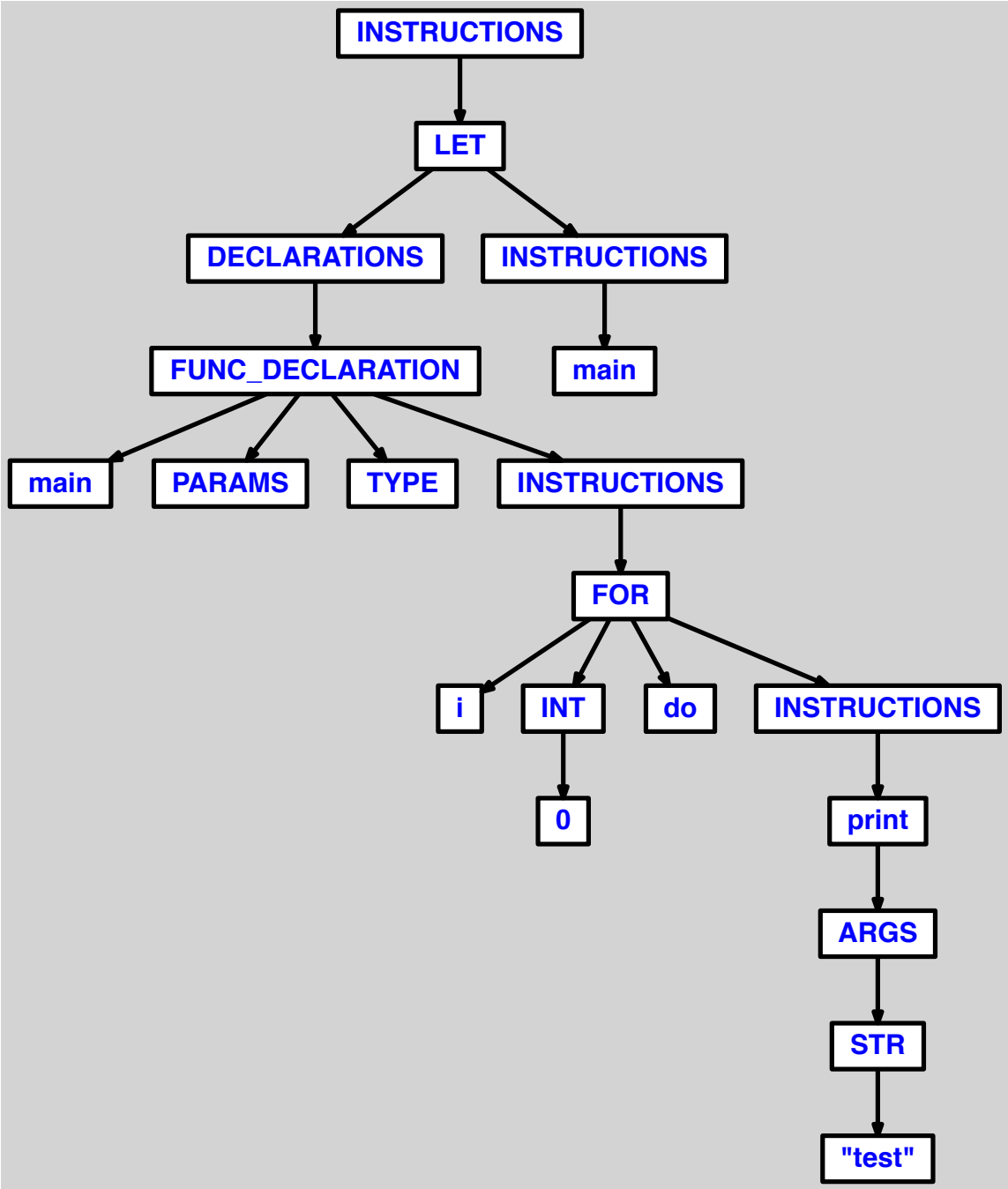
7.1.7 <for> avec oubli du <do>

```
let
  function main() =
    for i := 0 to 3
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
print
ARGS
STR
"test"

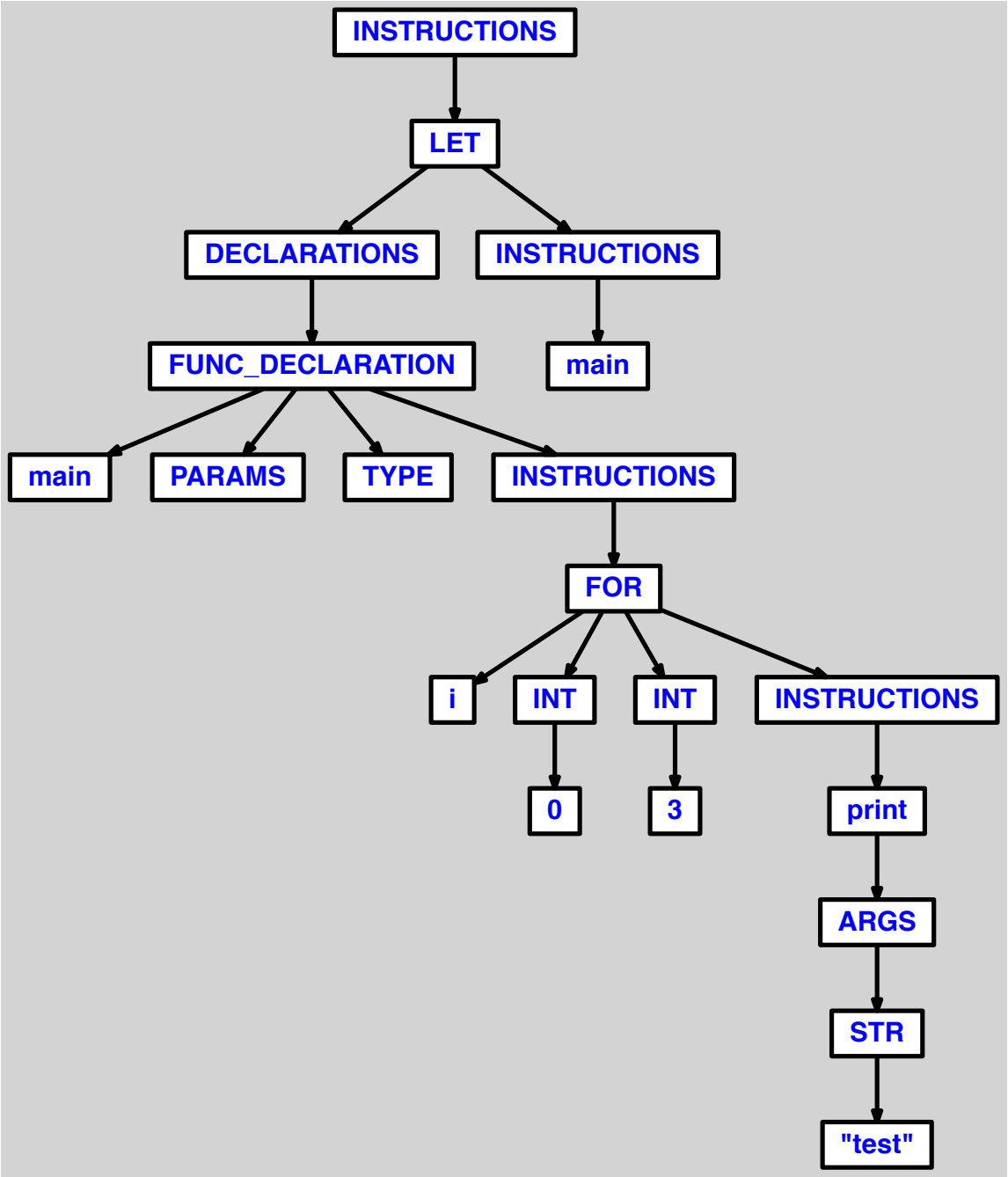
7.1.8 <for> avec oubli de la borne maximale de l'iteration

```
let
  function main() =
    for i := 0 to do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
do
INSTRUCTIONS
0
print
ARGS
STR
"test"

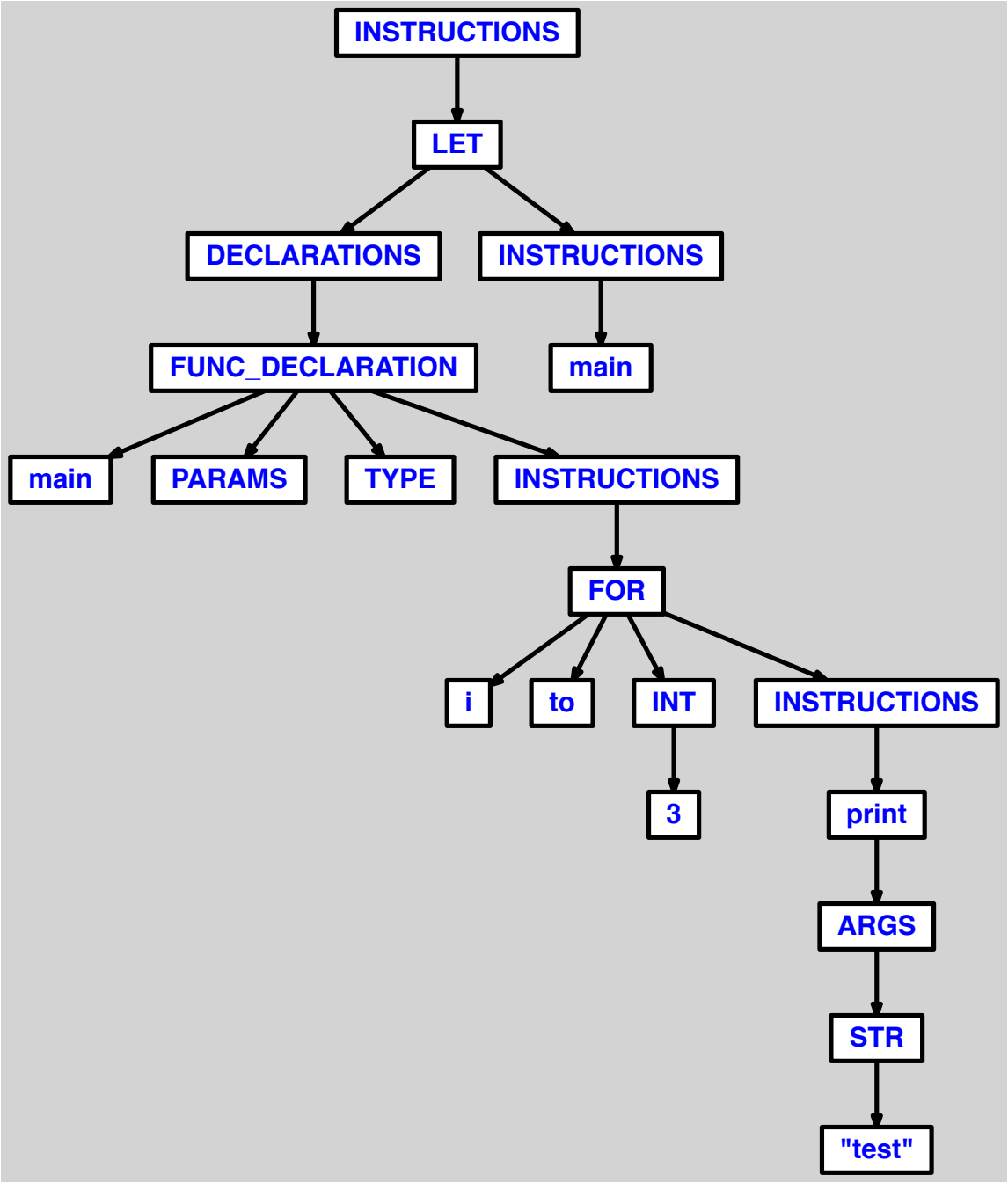
7.1.9 <for> avec oubli du <to>

```
let
  function main() =
    for i := 0 3 do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
print
ARGS
STR
"test"

7.1.10 <for> avec oubli de la borne inferieure de l'iteration

```
let
  function main() =
    for i := to 3 do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
to
INT
INSTRUCTIONS
3
print
ARGS
STR
"test"

7.1.11 <for> avec oubli du <=>

```
let
  function main() =
    for i : 0 to 3 do
      print("test")
in main() end
```

Pas d'AST, problème de syntaxe.

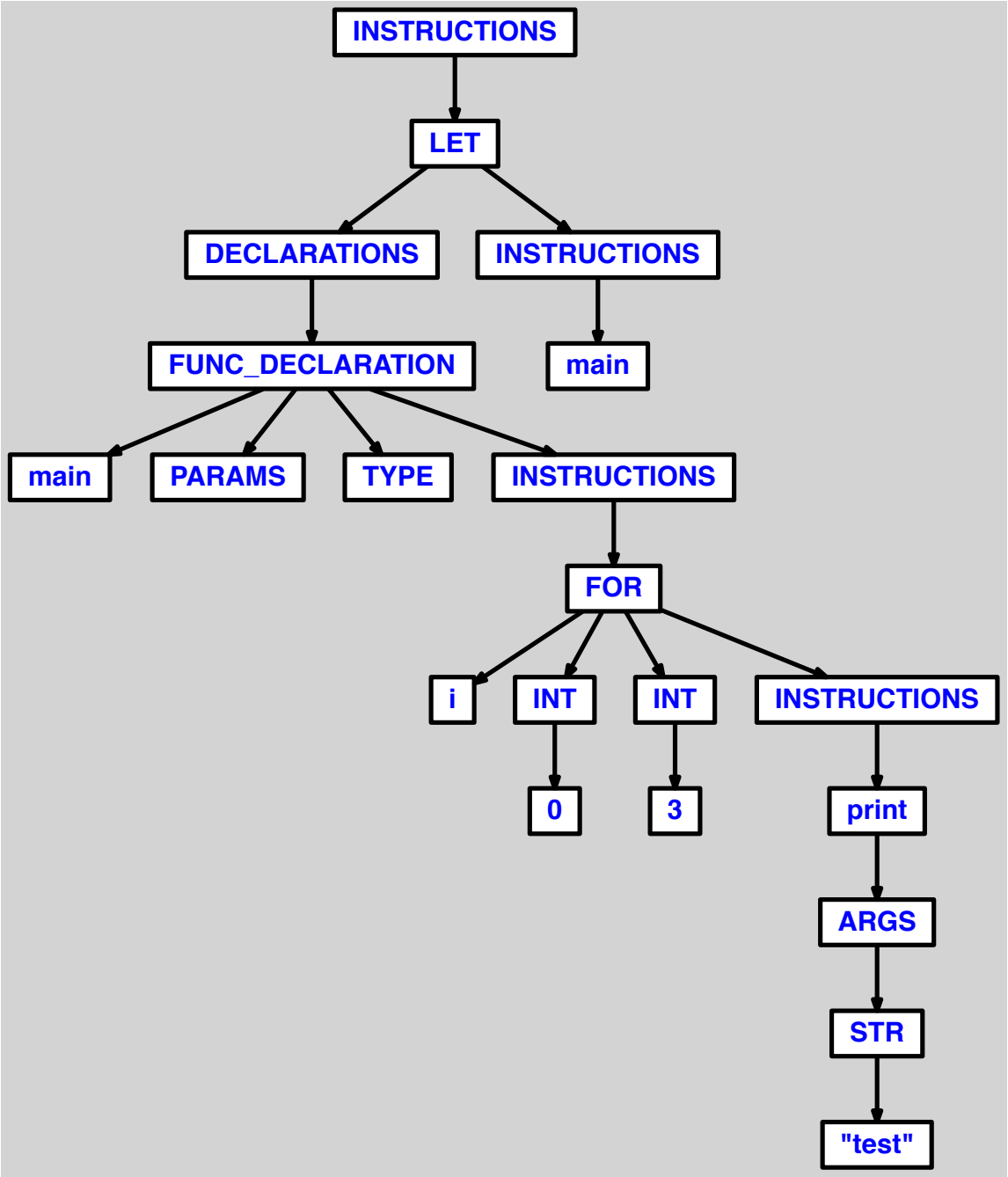
7.1.12 <for> avec oubli du < :>

```
let
  function main() =
    for i = 0 to 3 do
      print("test")
in main() end
```

Pas d'AST, problème de syntaxe.

7.1.13 <for> avec oubli du < :=>

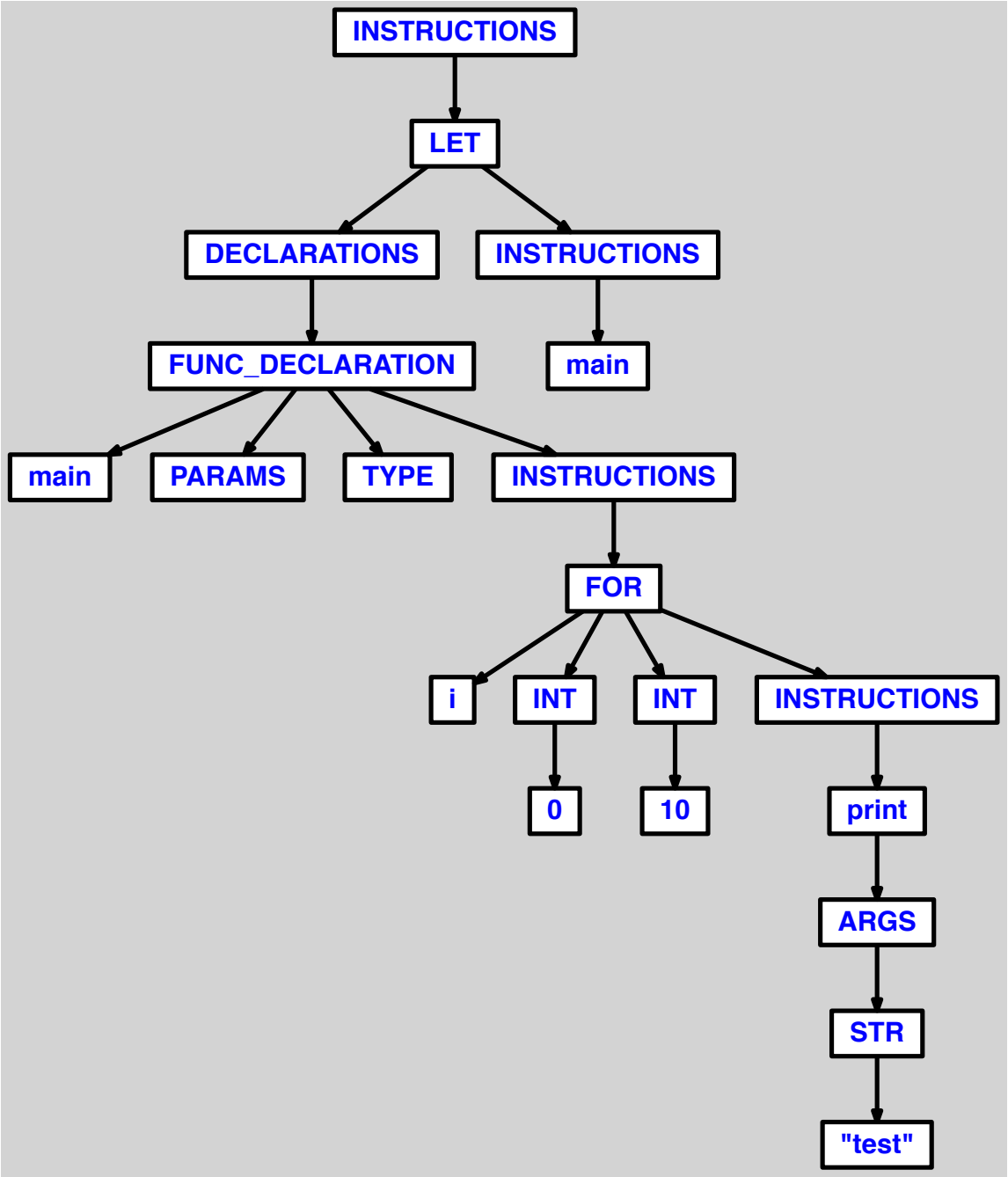
```
let
  function main() =
    for i 0 to 3 do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
print
ARGS
STR
"test"

7.2 OK

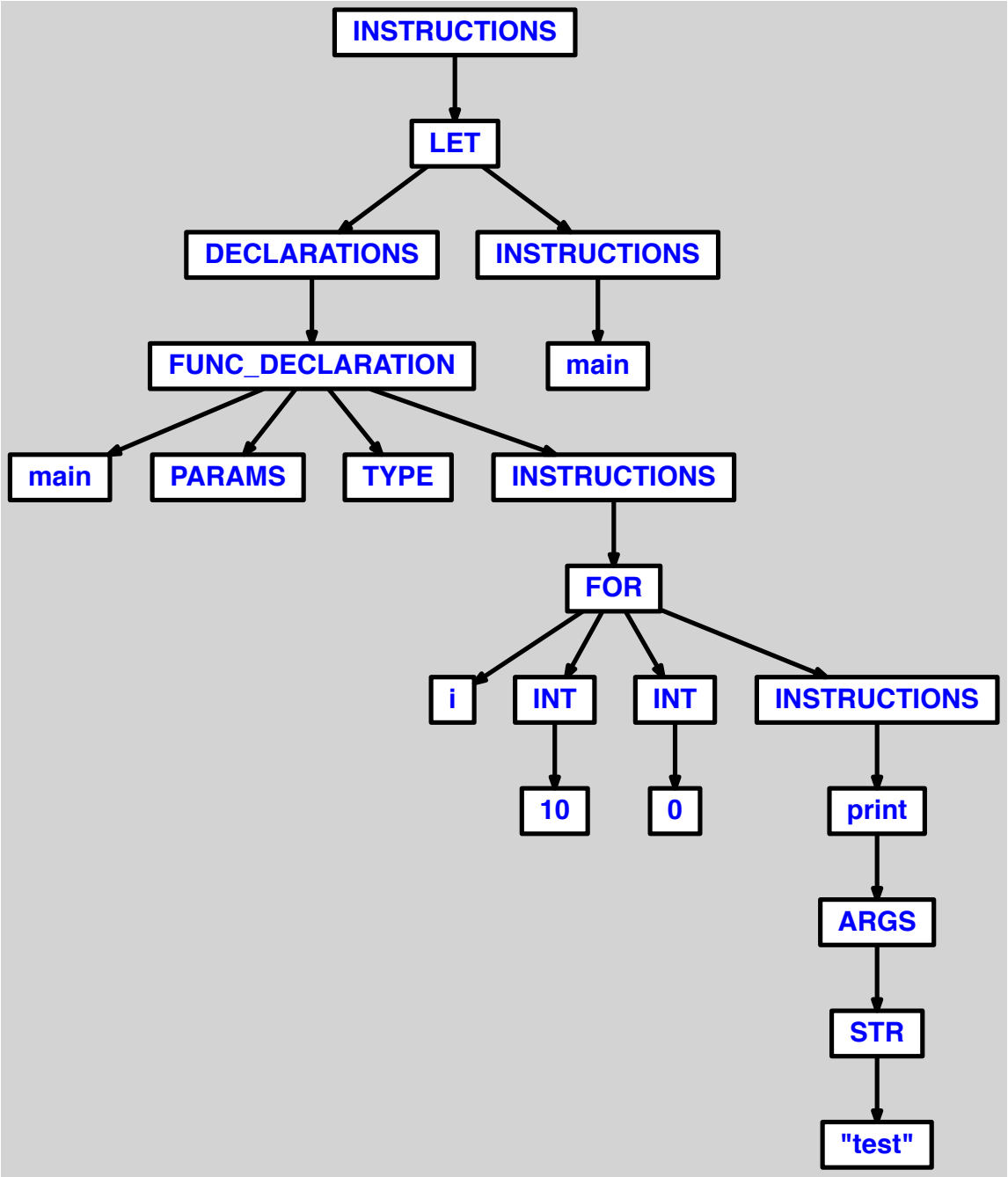
7.2.1 <for> simple croissant

```
let
  function main() =
    for i := 0 to 10 do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
10
print
ARGS
STR
"test"

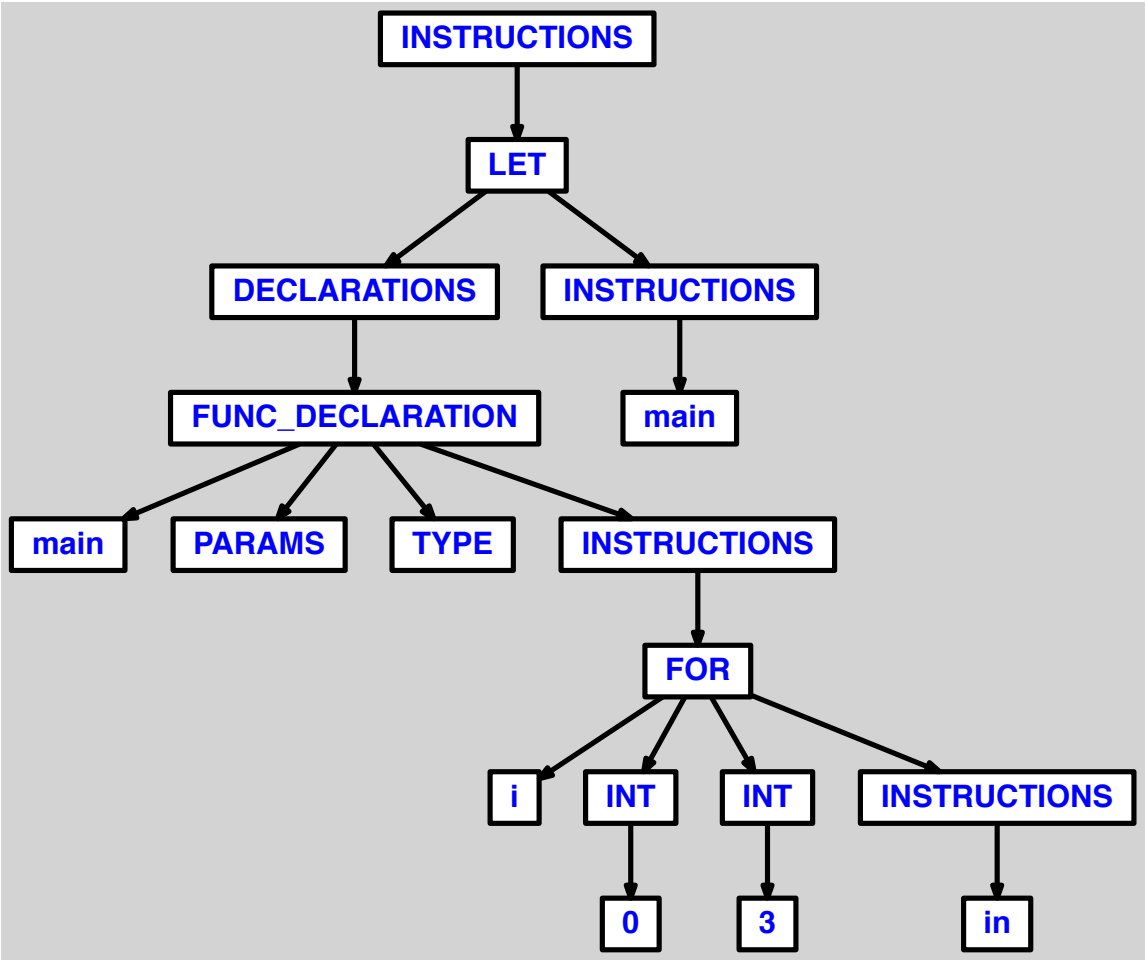
7.2.2 <for> simple decroissant

```
let
  function main() =
    for i := 10 to 0 do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
10
0
print
ARGS
STR
"test"

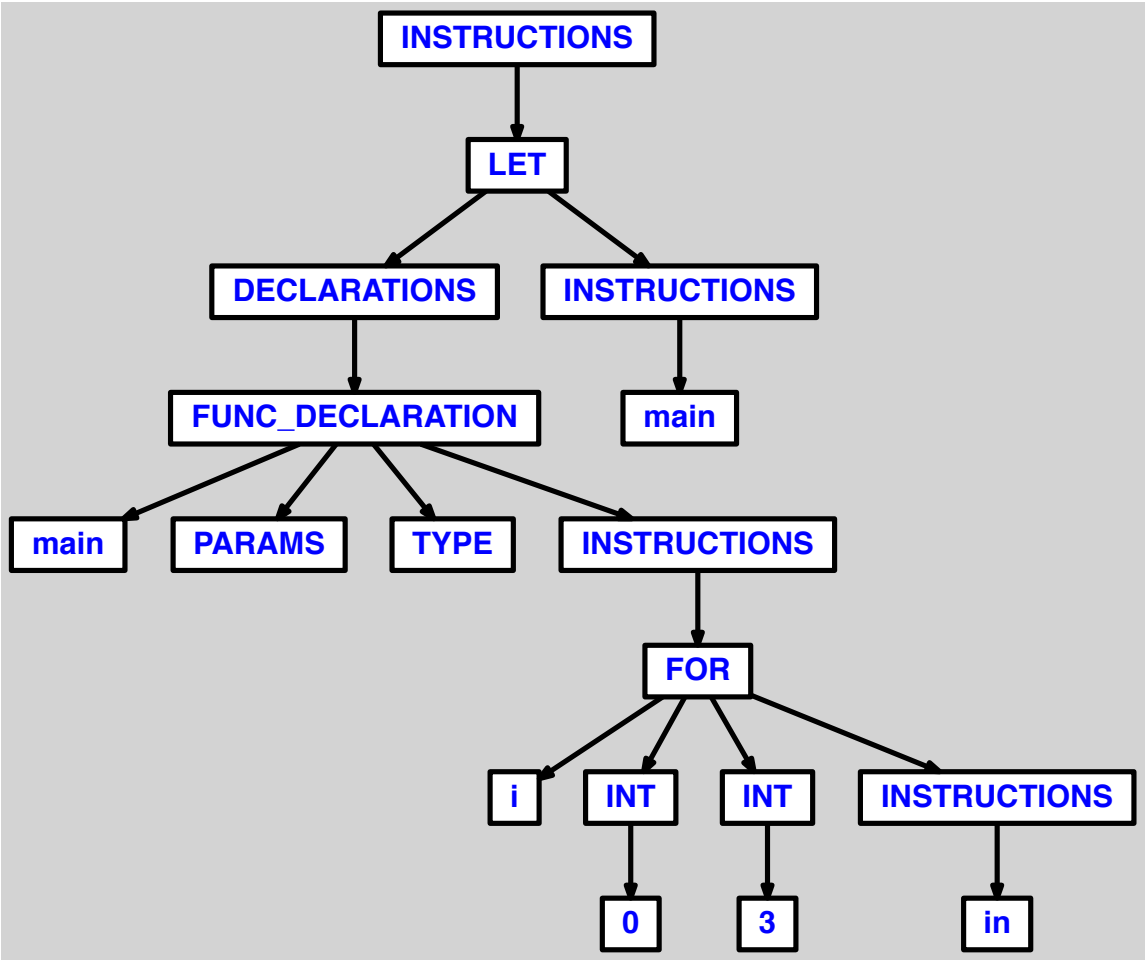
7.2.3 <for> sans instruction

```
let
  function main() =
    for i := 0 to 3 do
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
in

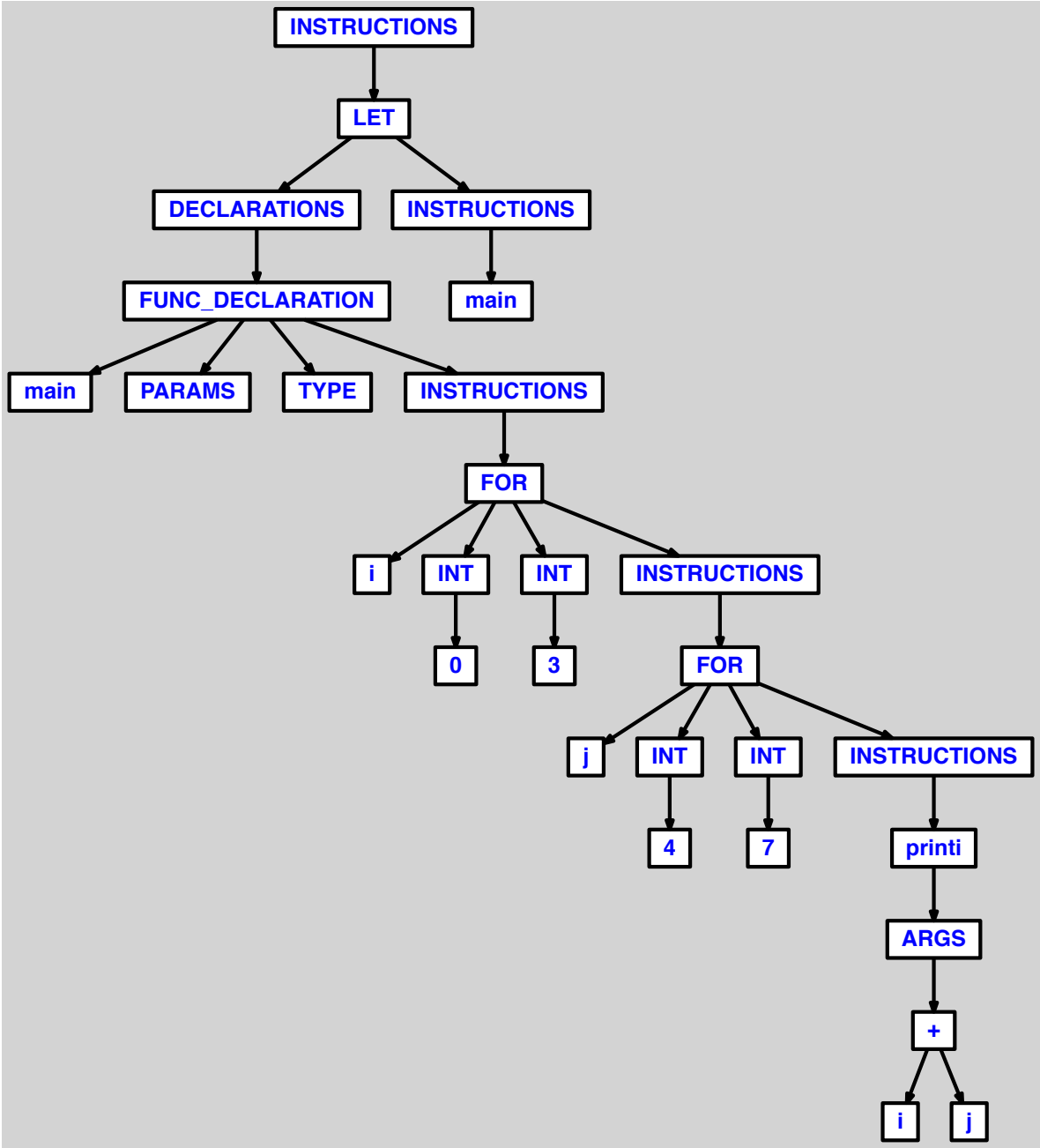
7.2.4 <for> avec ligne vide

```
let
  function main() =
    for i := 0 to 3 do

in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
in

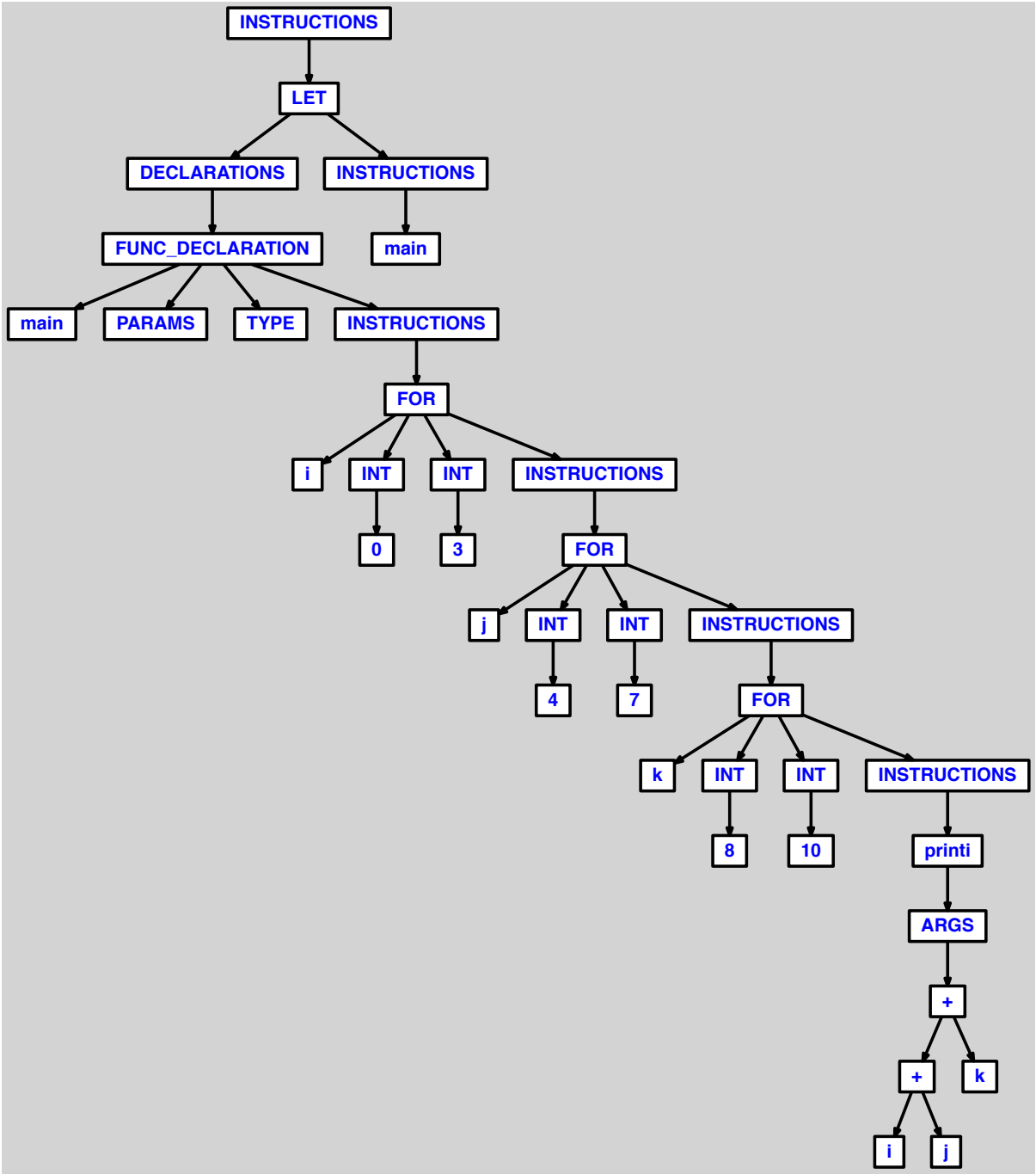
7.2.5 double-imbrication de <for>

```
let
  function main() =
    for i := 0 to 3 do
      for j := 4 to 7 do
        printi(i+j)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
FOR
j
INT
INT
INSTRUCTIONS
4
7
printi
ARGS
+
i
j

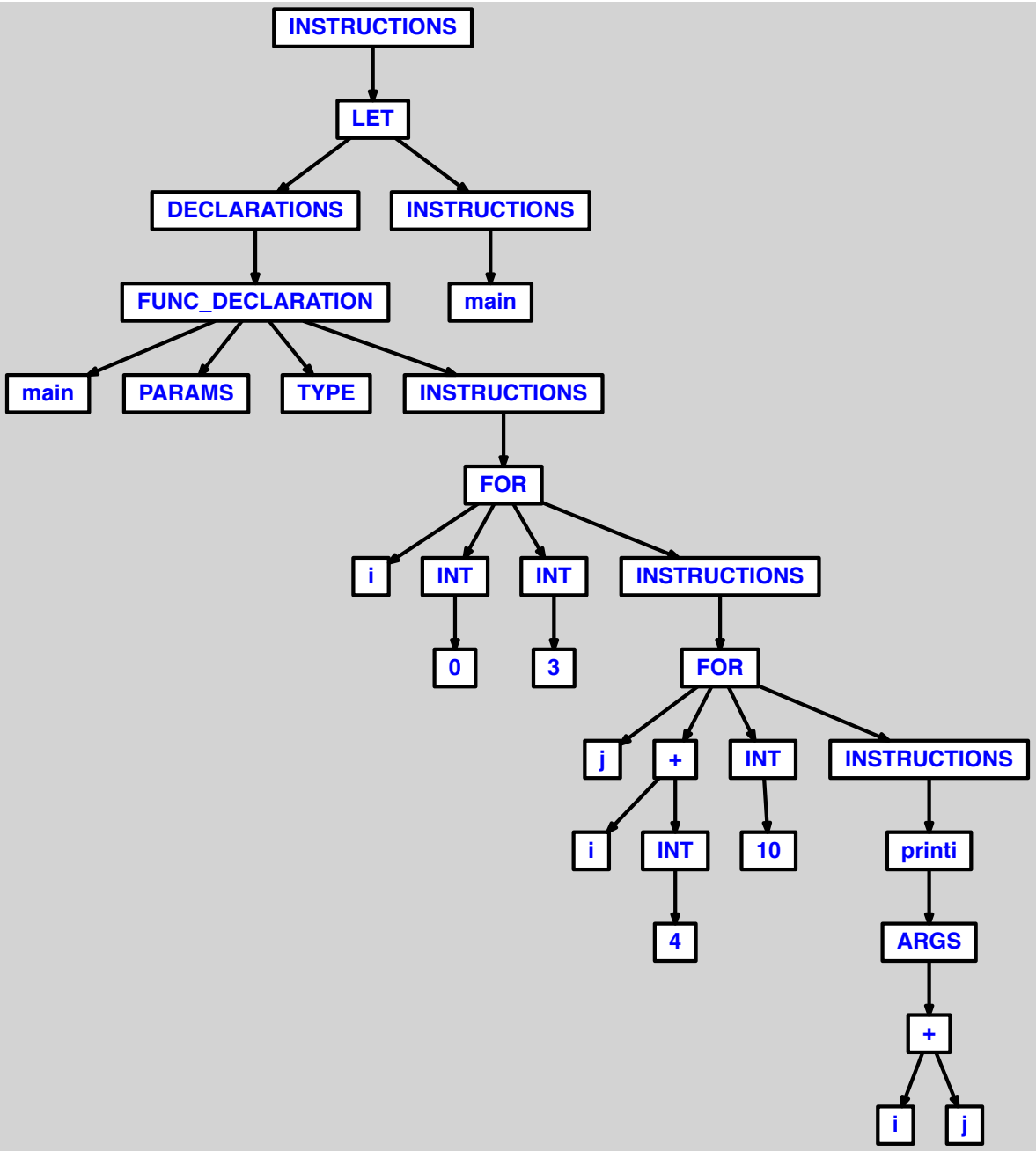
7.2.6 triple-imbrication de <for>

```
let
  function main() =
    for i := 0 to 3 do
      for j := 4 to 7 do
        for k := 8 to 10 do
          printi(i+j+k)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
FOR
j
INT
INT
INSTRUCTIONS
4
7
FOR
k
INT
INT
INSTRUCTIONS
8
10
printi
ARGS
+
+
k
i
j

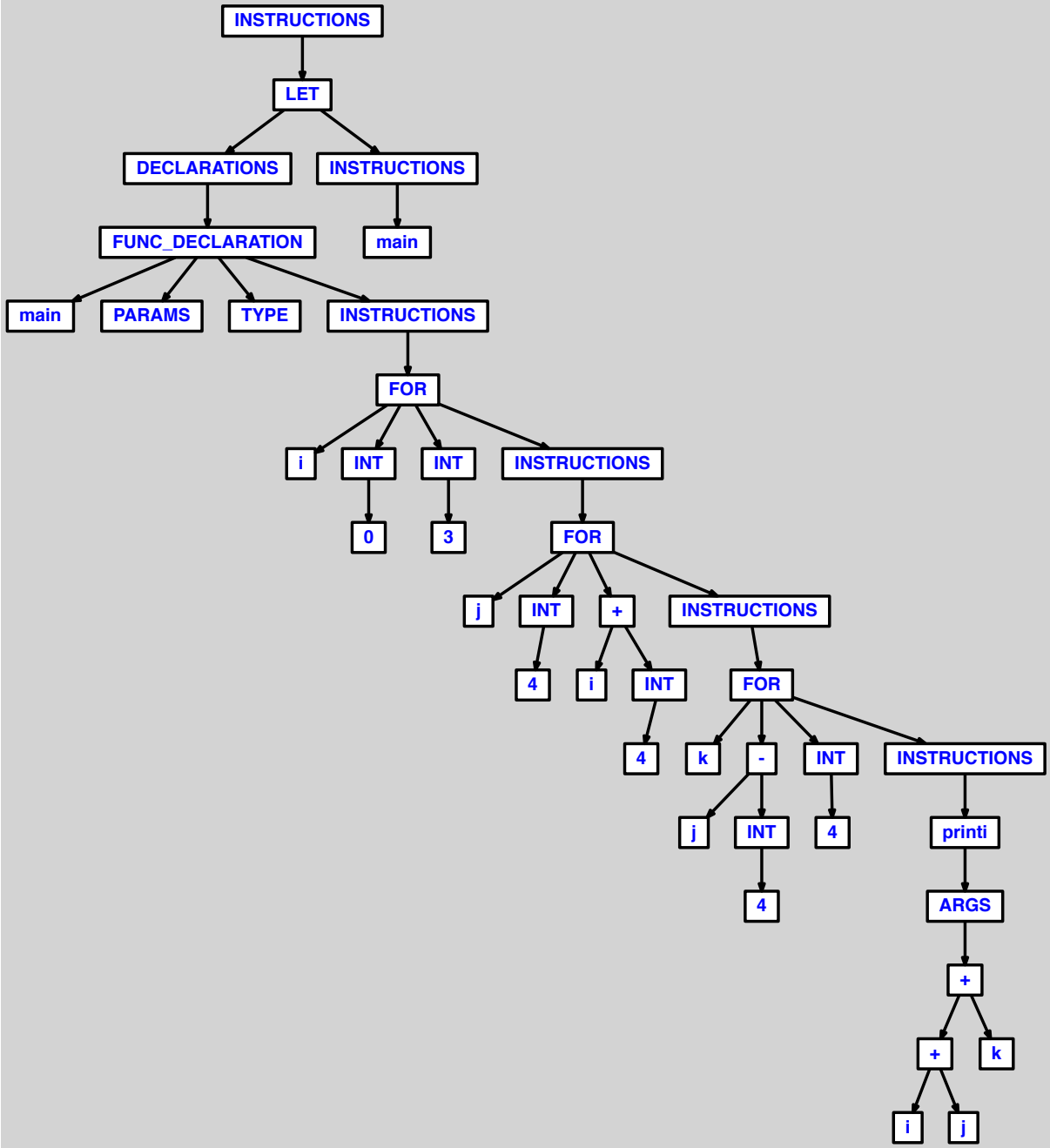
7.2.7 <for> avec reutilisation de compteur

```
let
  function main() =
    for i := 0 to 3 do
      for j := i+4 to 10 do
        printi(i+j)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
FOR
j
+
INT
INSTRUCTIONS
i
INT
10
printi
4
ARGS
+
i
j

7.2.8 <for> avec reutilisation de compteurs

```
let
  function main() =
    for i := 0 to 3 do
      for j := 4 to i+4 do
        for k := j-4 to 4 do
          printi(i+j+k)
in main() end
```

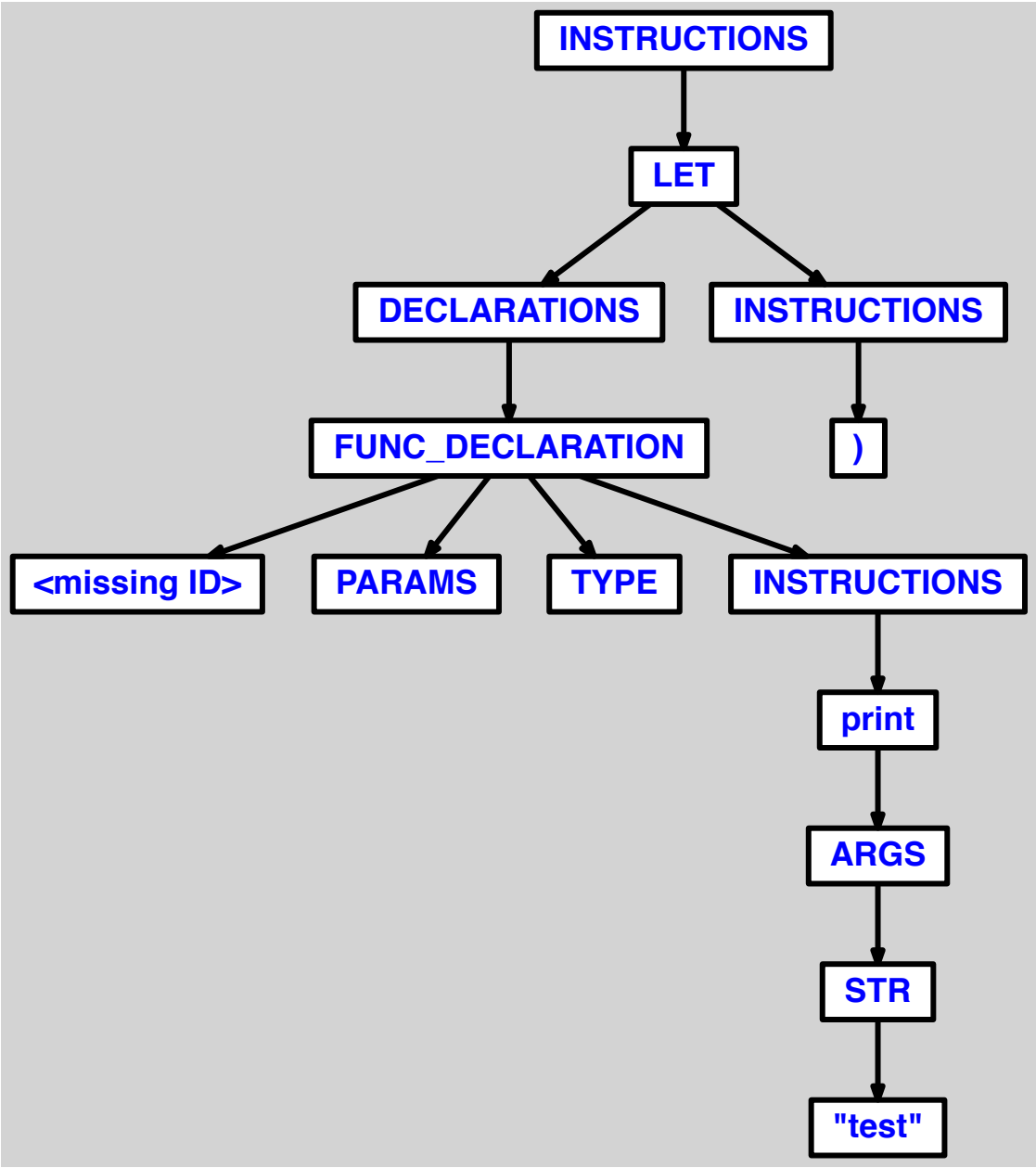

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
FOR
i
INT
INT
INSTRUCTIONS
0
3
FOR
j
INT
+
INSTRUCTIONS
4
i
INT
FOR
4
k
-
INT
INSTRUCTIONS
j
INT
4
printi
4
ARGS
+
+
k
i
j

8 function

8.1 KO

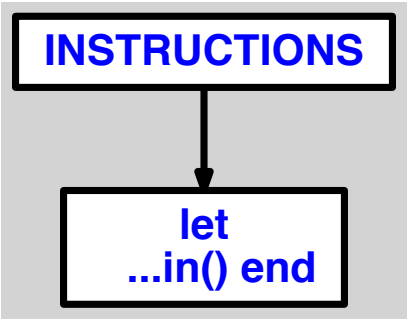
8.1.1 fonction identifiee par caractere special

```
let
  function \() = print("test")
in \() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
)
<missing ID>
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

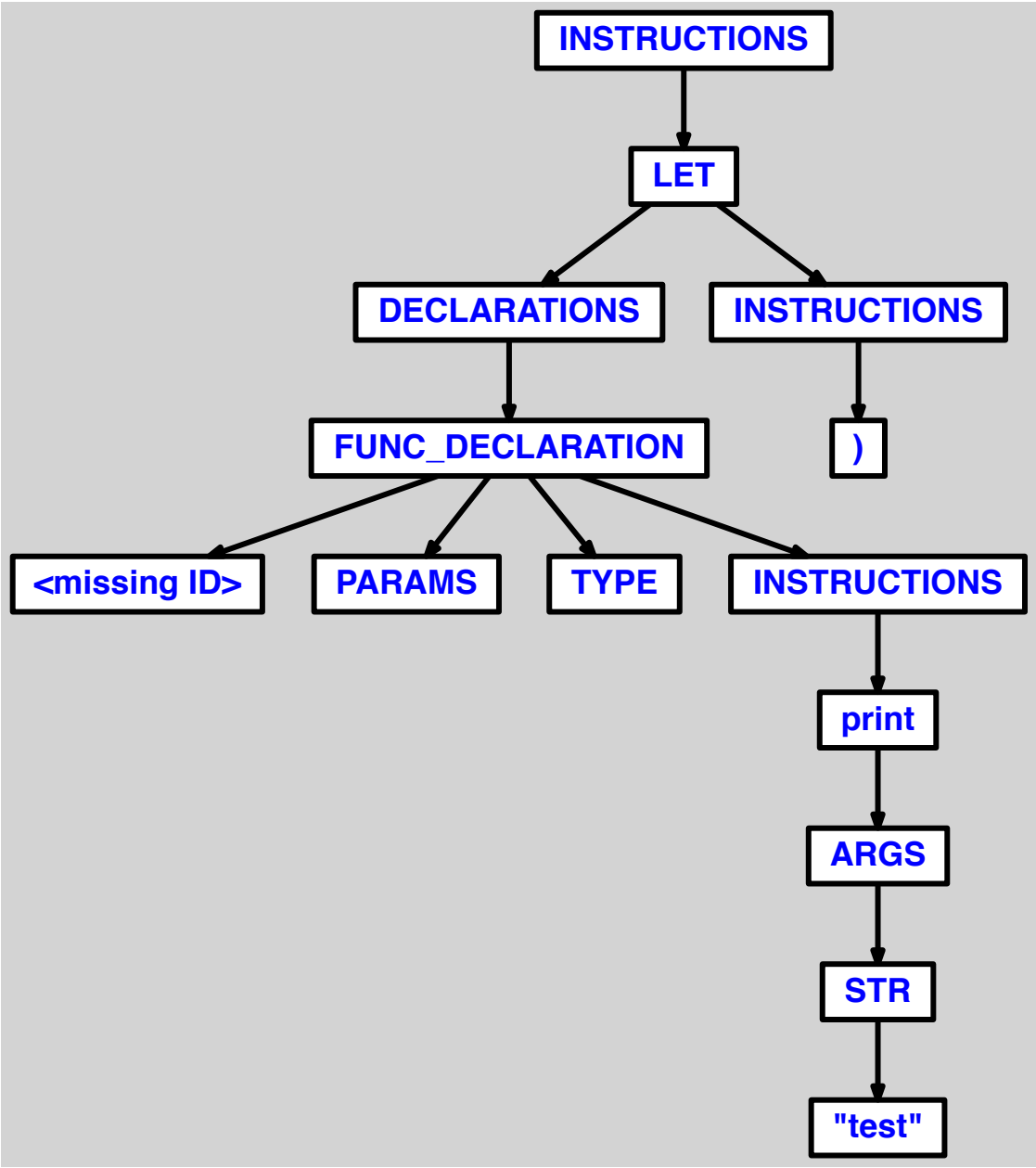
8.1.2 oubli de <function>

```
let
  main() = print("test")
in main() end
```


INSTRUCTIONS
let
...in() end

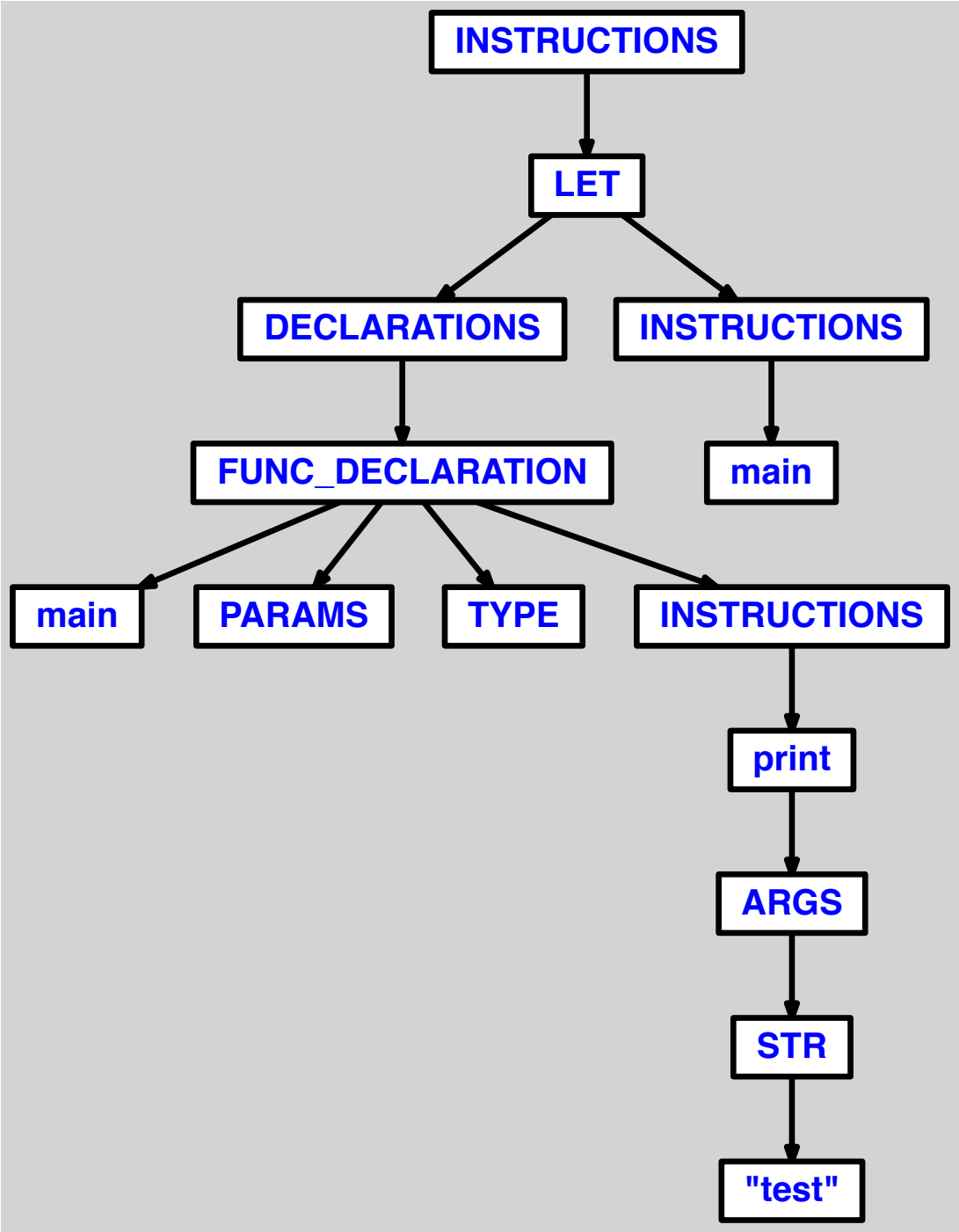
8.1.3 fonction sans identifiant

```
let
  function () = print("test")
in () end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
)
<missing ID>
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

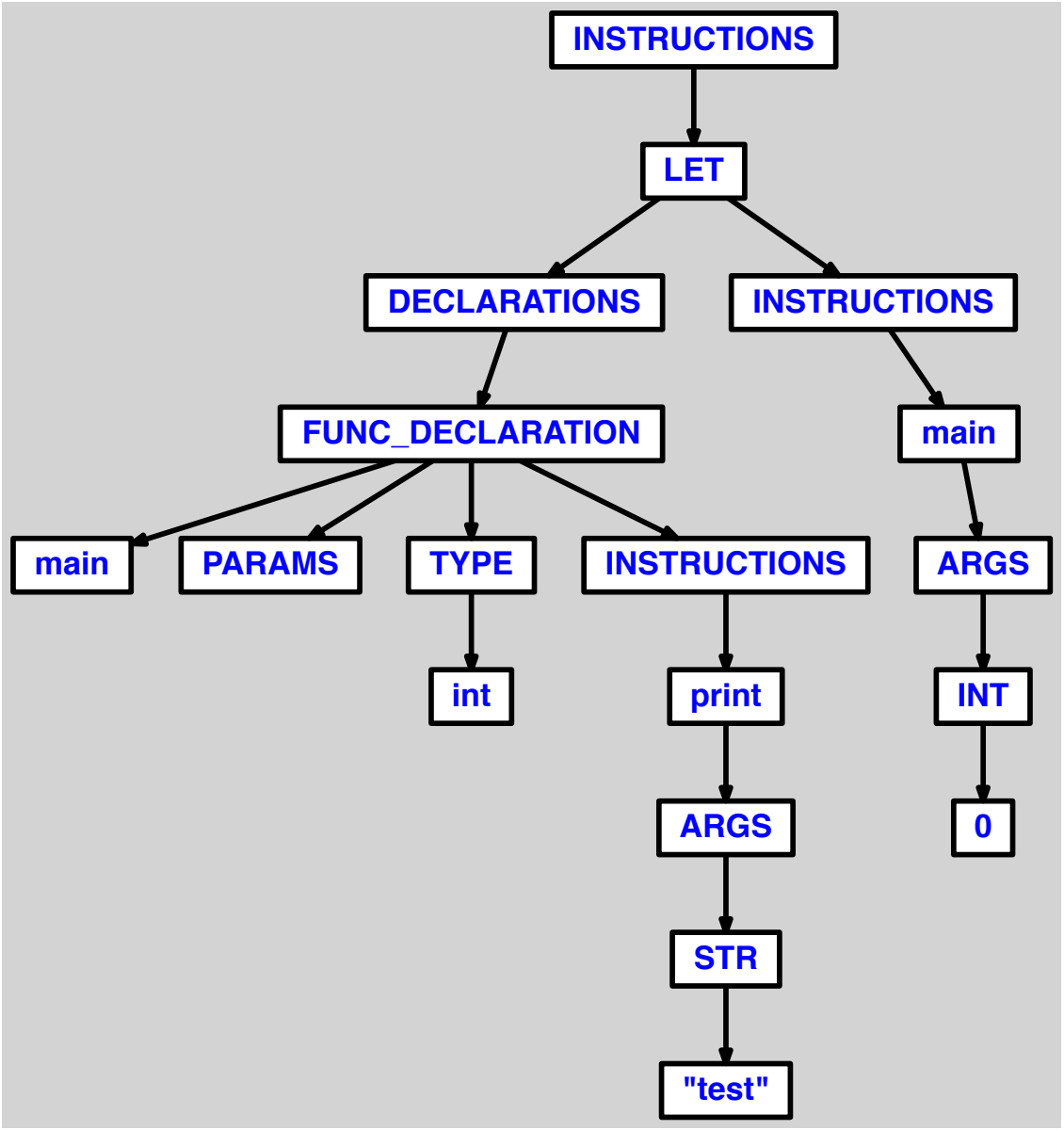
8.1.4 oubli de <(>

```
let
  function main) = print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

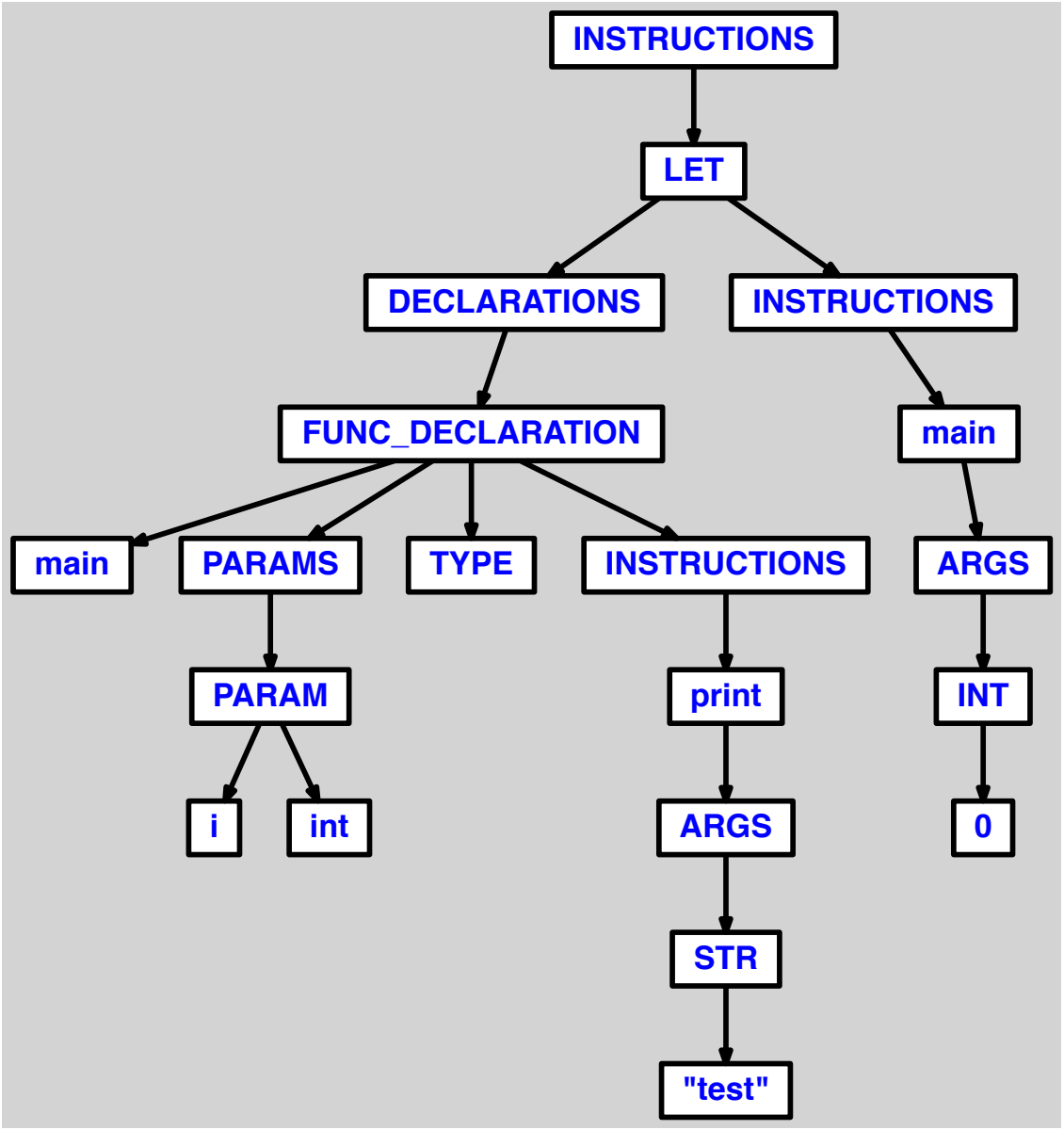
8.1.5 oubli d'identifiant de parametre

```
let
  function main(: int) = print("test")
in main(0) end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
ARGS
int
print
INT
ARGS
0
STR
"test"

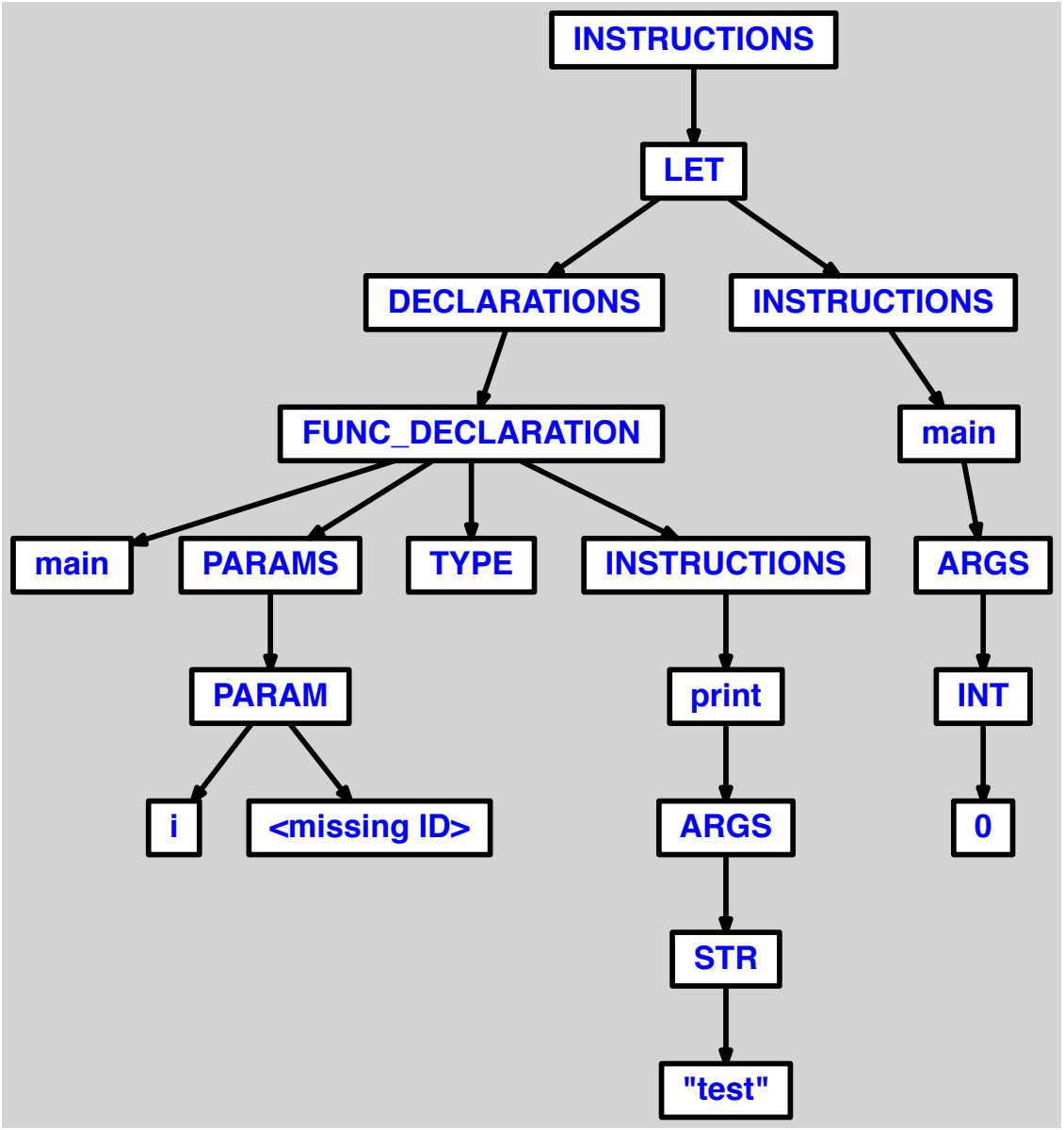
8.1.6 oubli de < :> pour parametre

```
let
  function main(i int) = print("test")
in main(0) end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
ARGS
PARAM
print
INT
i
int
ARGS
0
STR
"test"

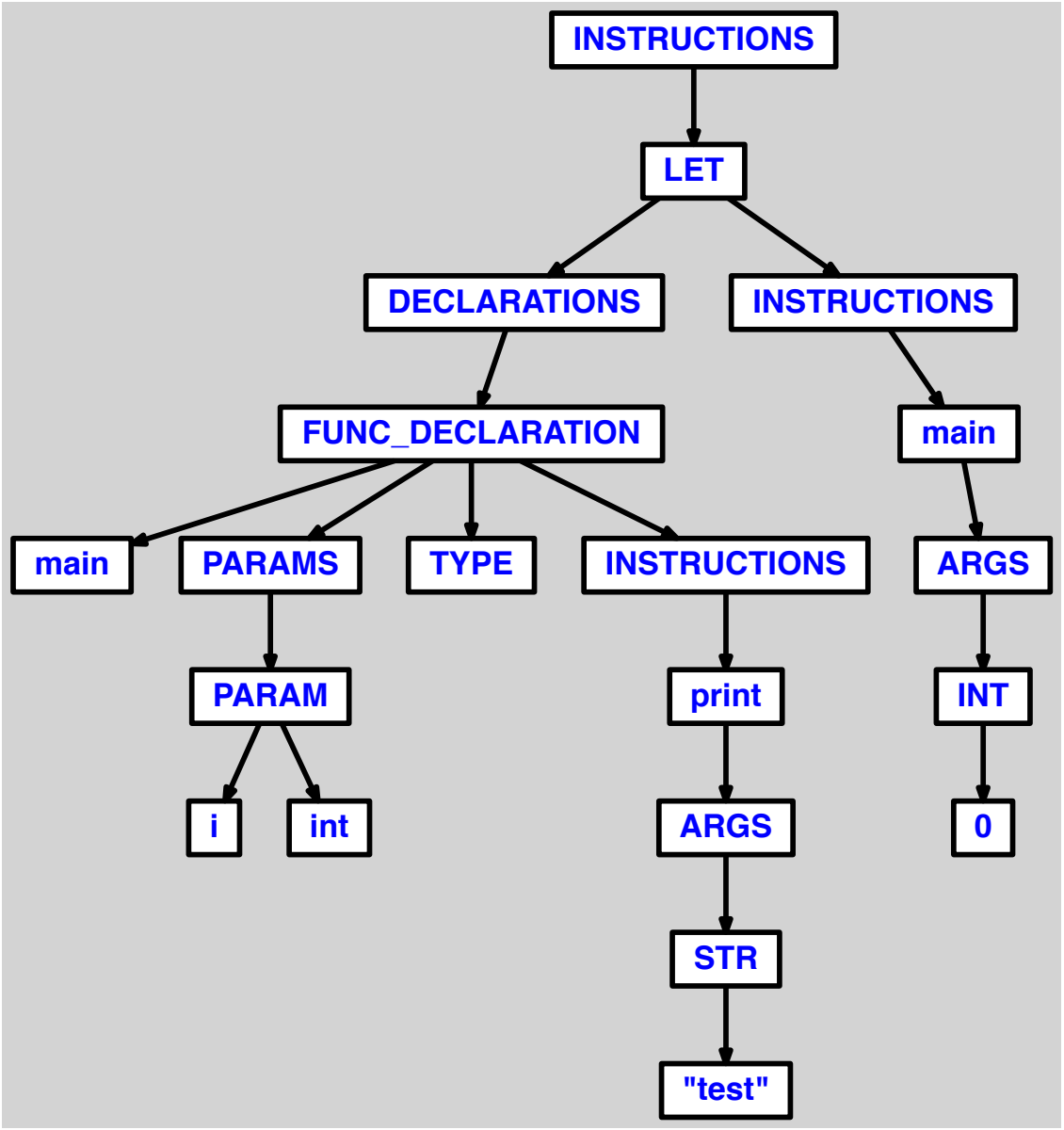
8.1.7 oubli de type de parametre

```
let
  function main(i: ) = print("test")
in main(0) end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
ARGS
PARAM
print
INT
i
<missing ID>
ARGS
0
STR
"test"

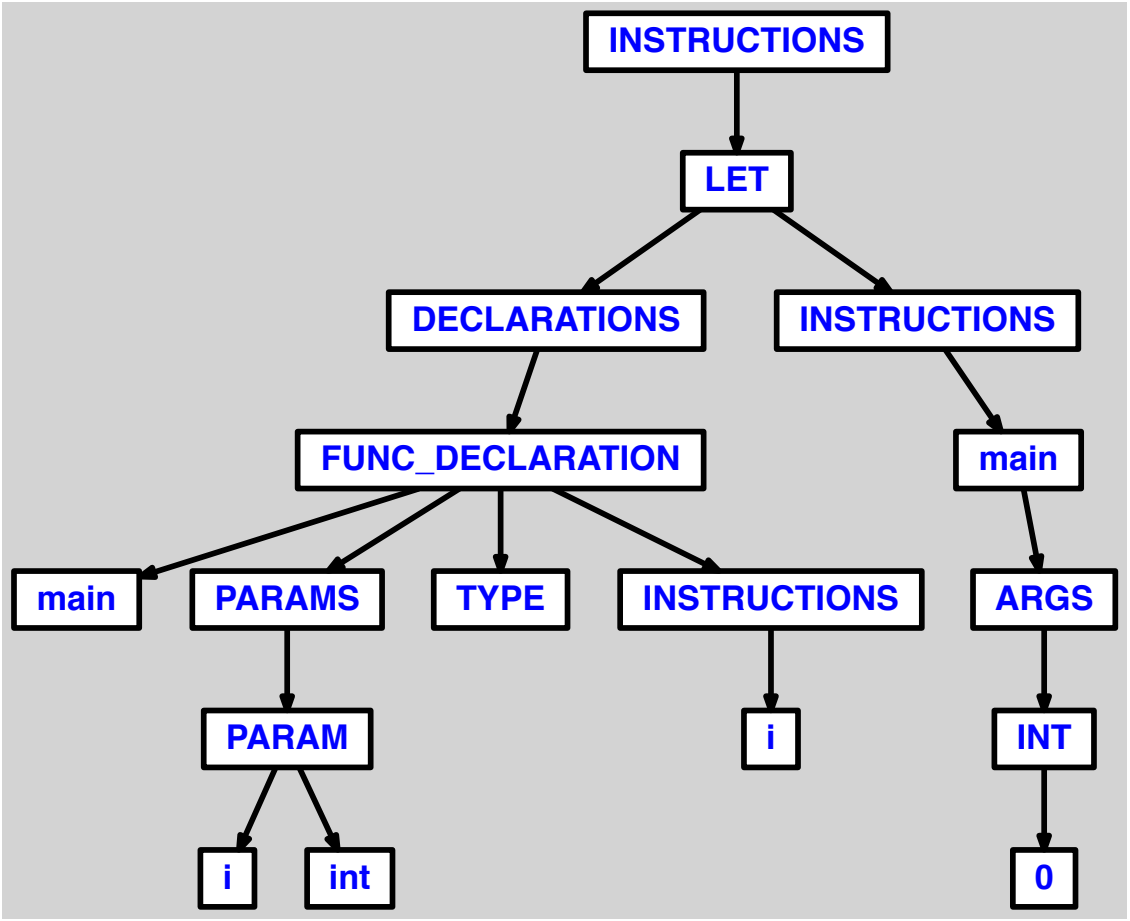
8.1.8 oubli de <)>

```
let
  function main(i: int = print("test")
in main(0) end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
ARGS
PARAM
print
INT
i
int
ARGS
0
STR
"test"

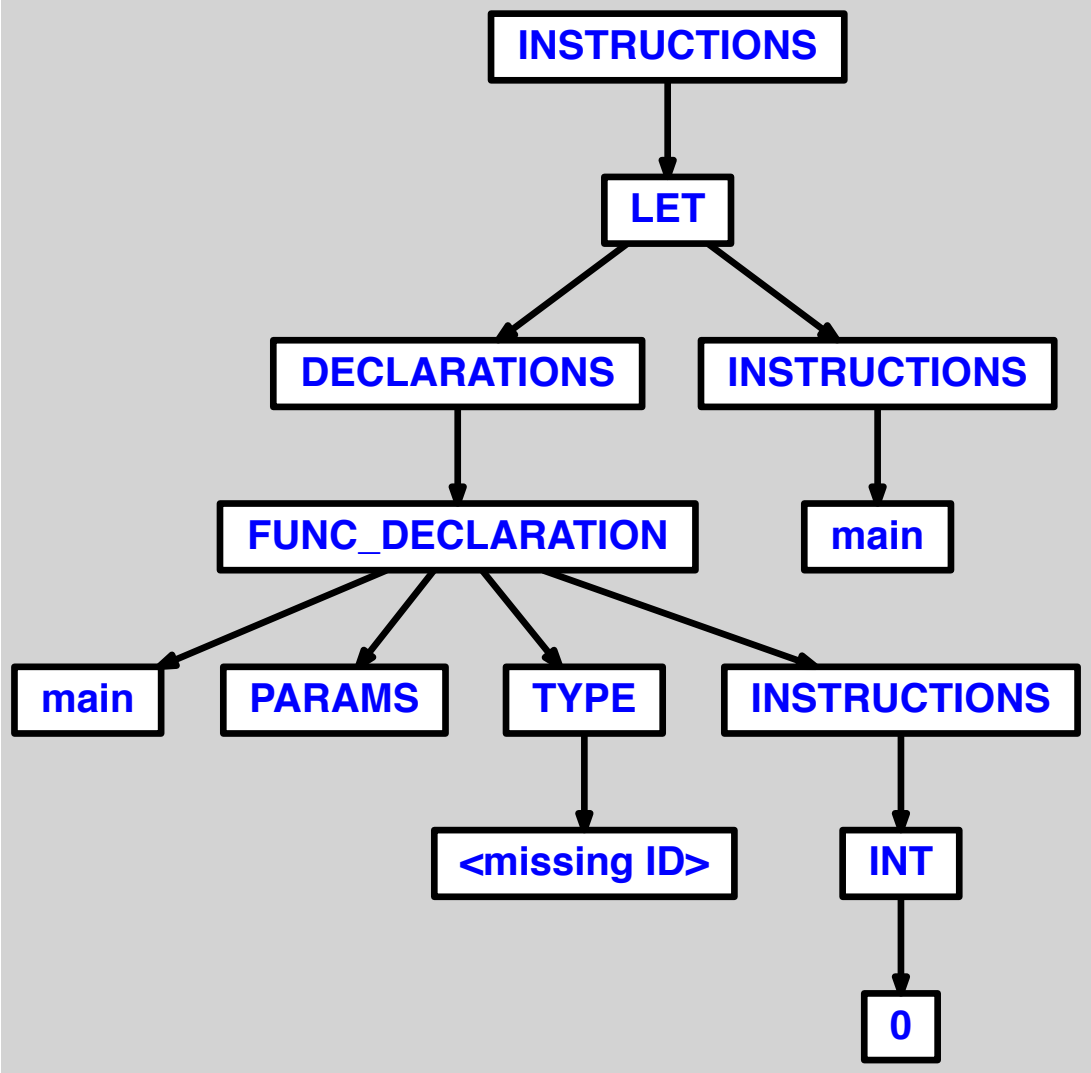
8.1.9 oubli de < :> pour type de fonction

```
let
  function main(i: int) int = i
in main(0) end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
ARGS
PARAM
i
INT
i
int
0

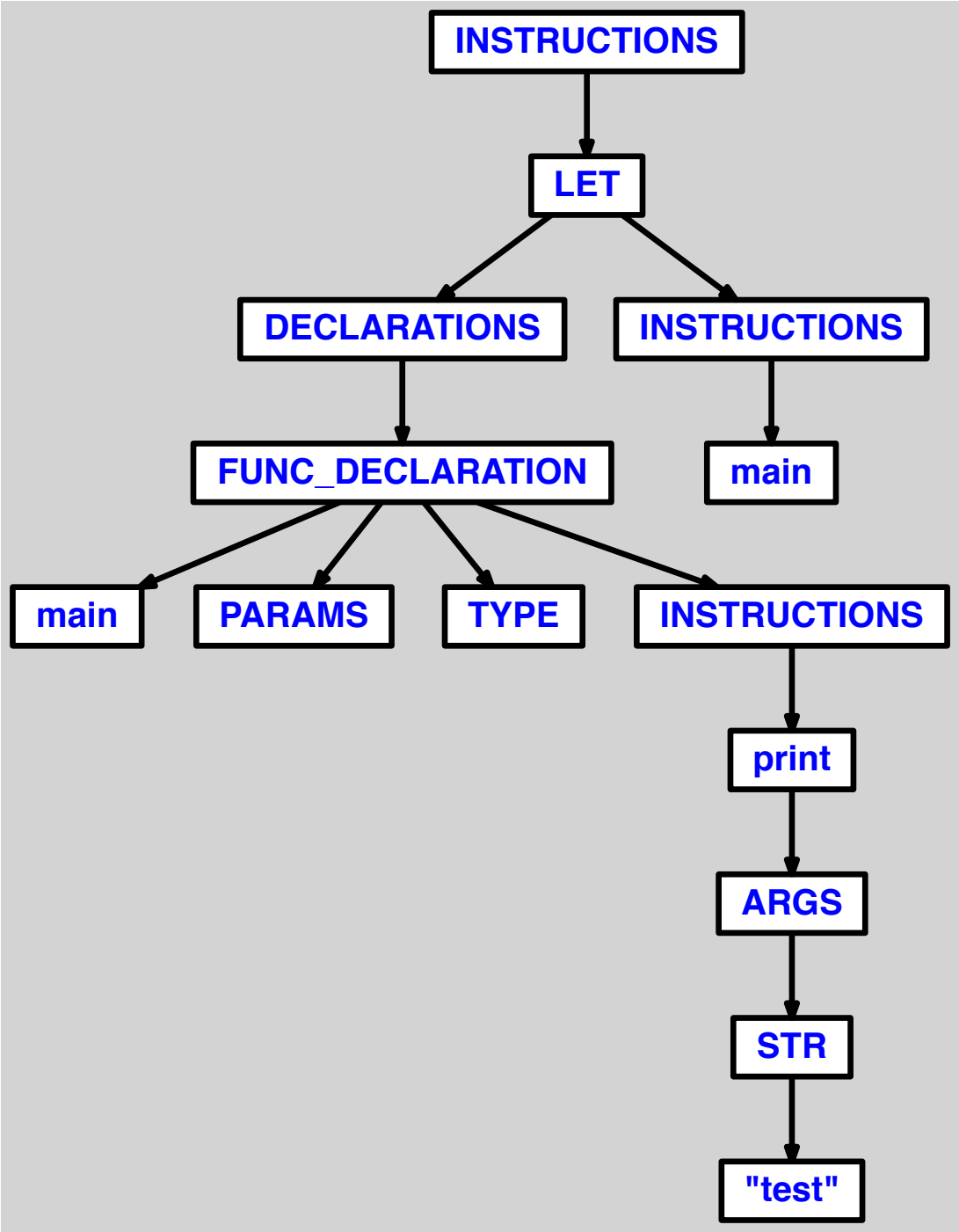
8.1.10 < :> pour type de fonction present mais pas de type

```
let
  function main(): = 0
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
<missing ID>
INT
0

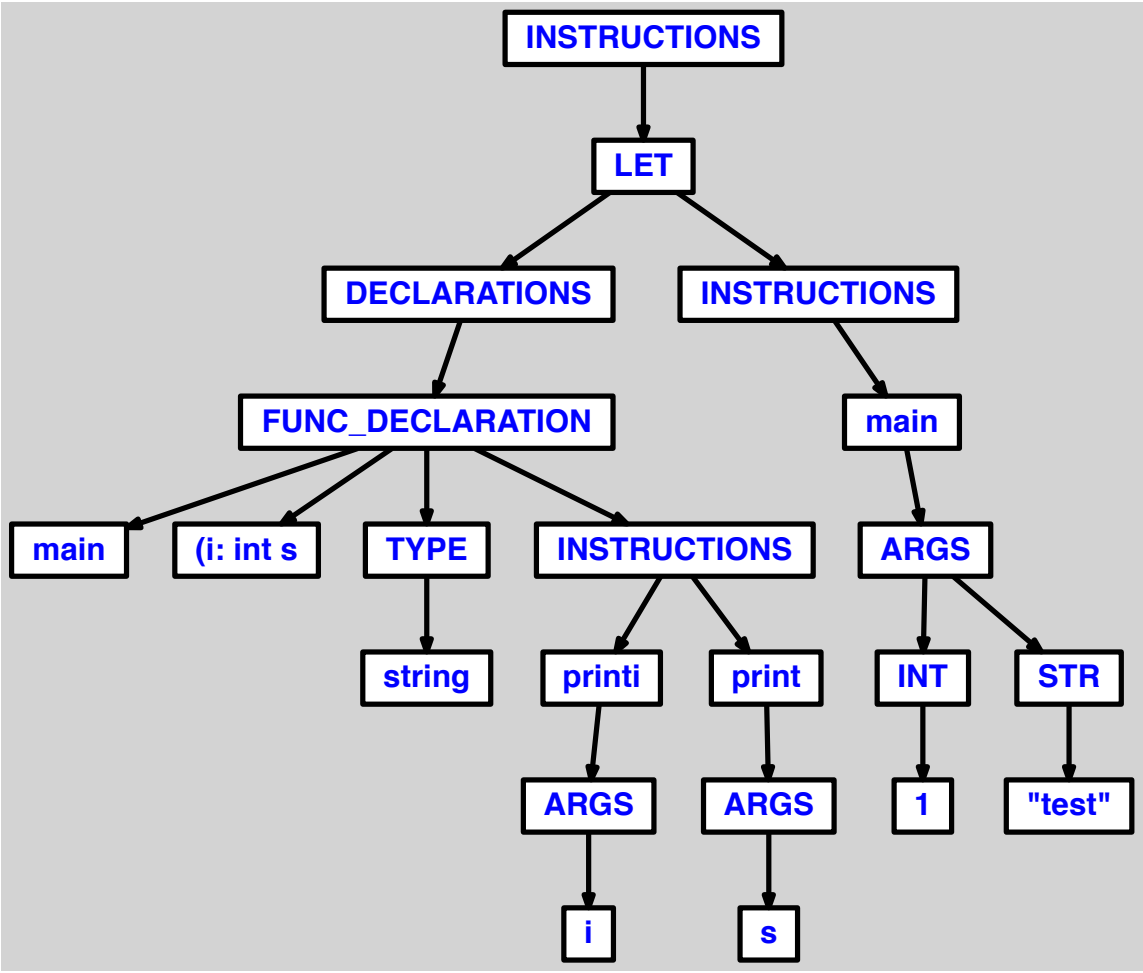
8.1.11 oubli de <=>

```
let
  function main() print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

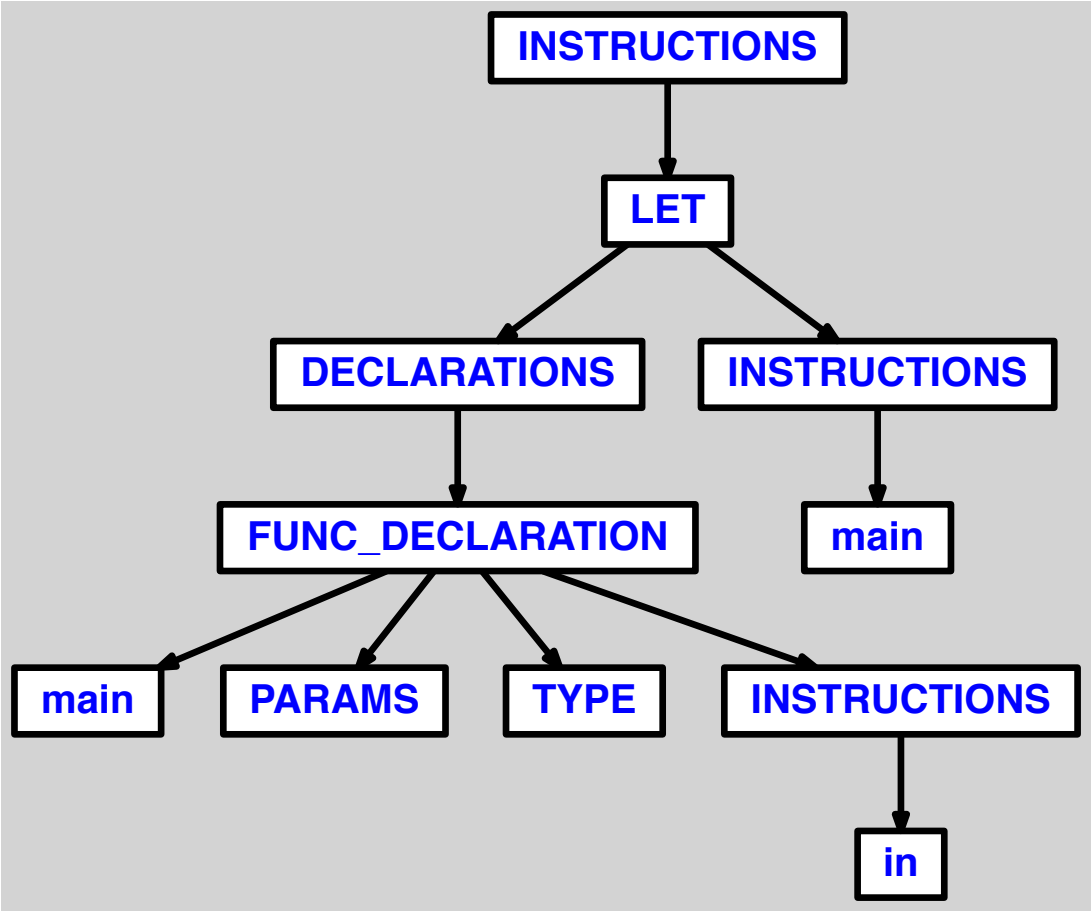
8.1.12 parametres mal separes

```
let
  function main(i: int s: string) =
    (printi(i); print(s))
in main(1, "test") end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
(i: int s
TYPE
INSTRUCTIONS
ARGS
string
printi
print
INT
STR
ARGS
ARGS
1
"test"
i
s

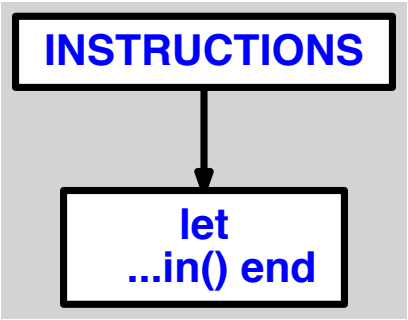
8.1.13 fonction sans instruction

```
let
  function main() =
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
in

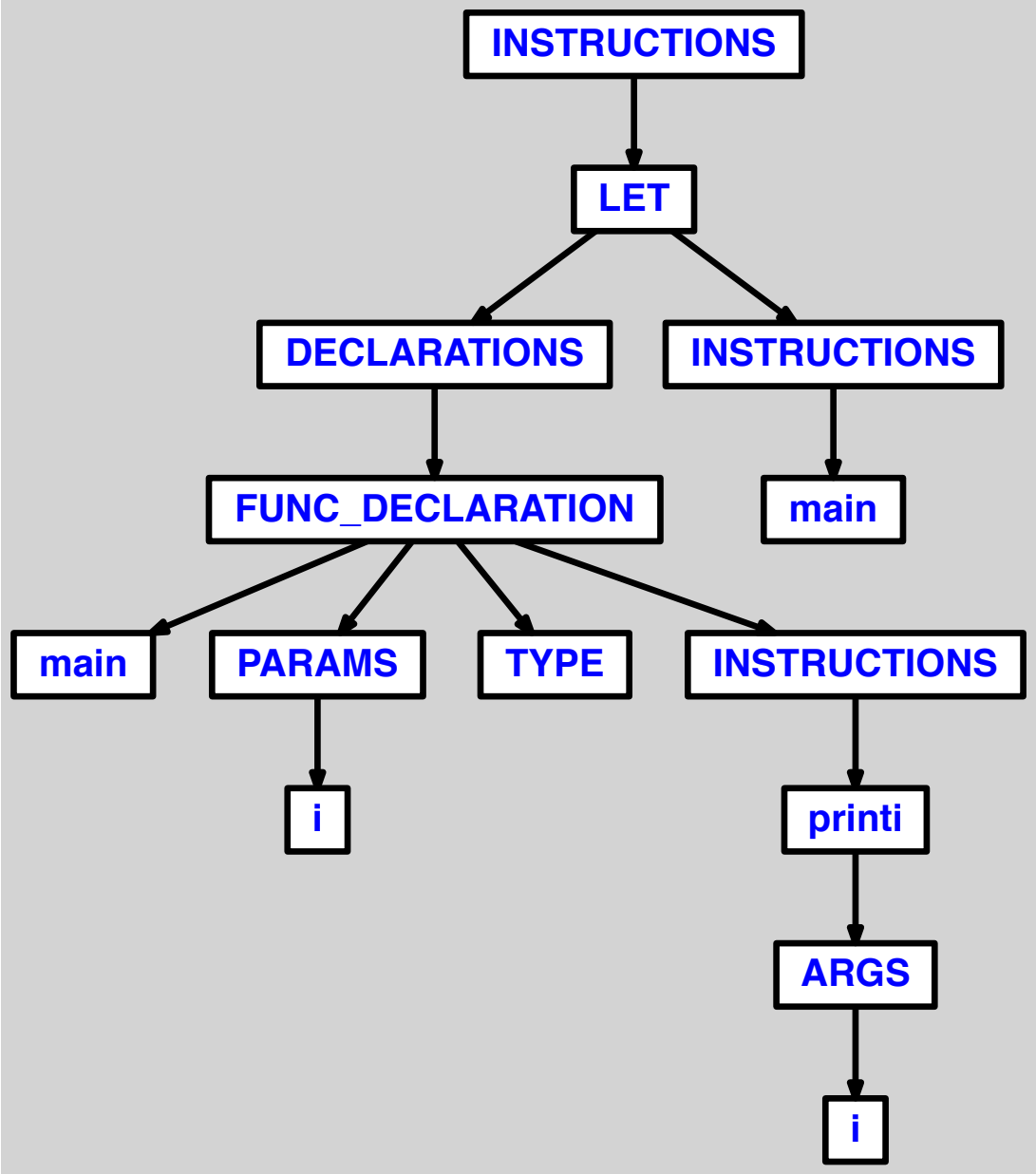
8.1.14 <function> mal ecrit

```
let
  functionn main() = print("test")
in main() end
```


INSTRUCTIONS
let
...in() end

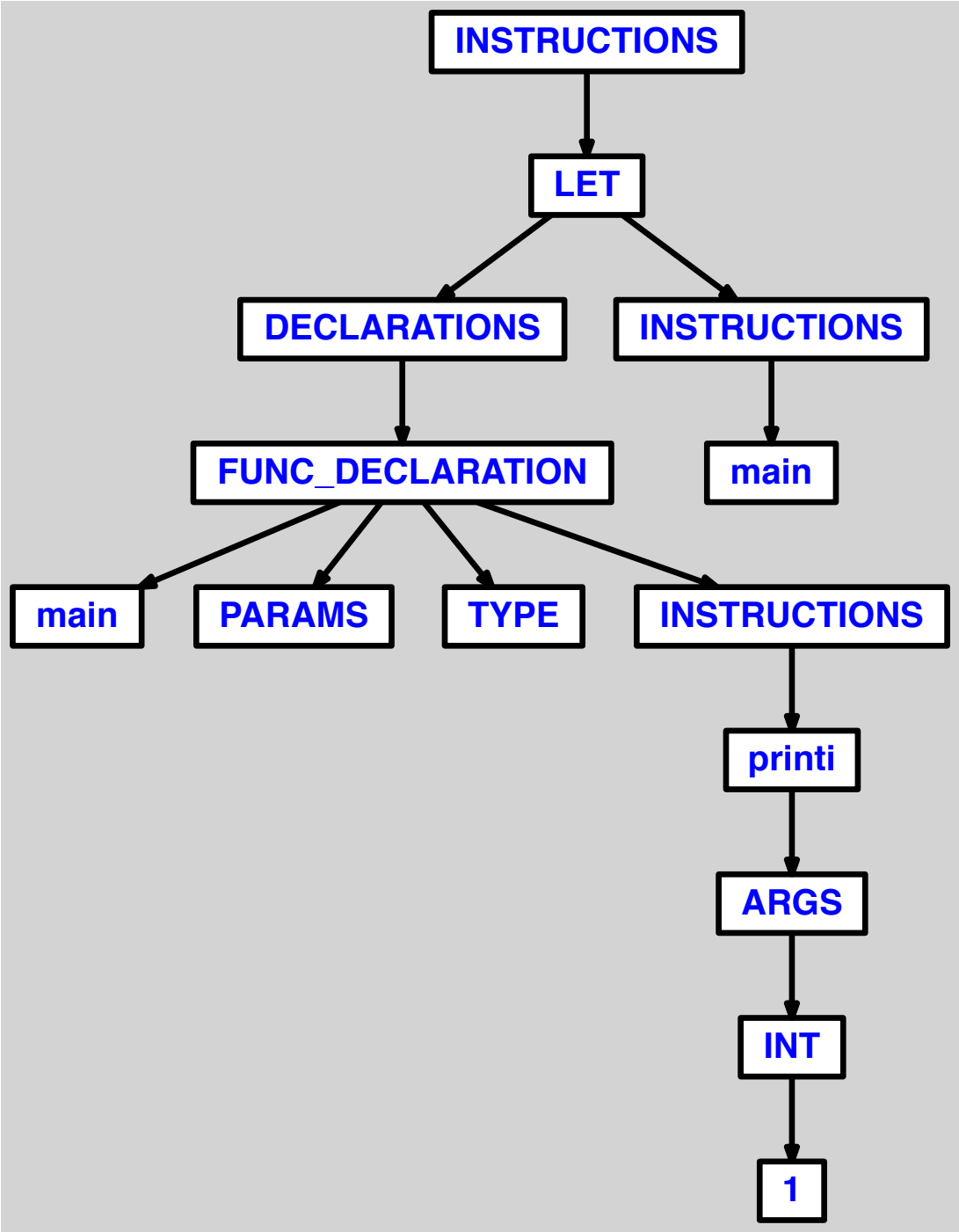
8.1.15 fonction avec identifiant seulement en parametre

```
let
  function main(i) = printi(i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
i
printi
ARGS
i

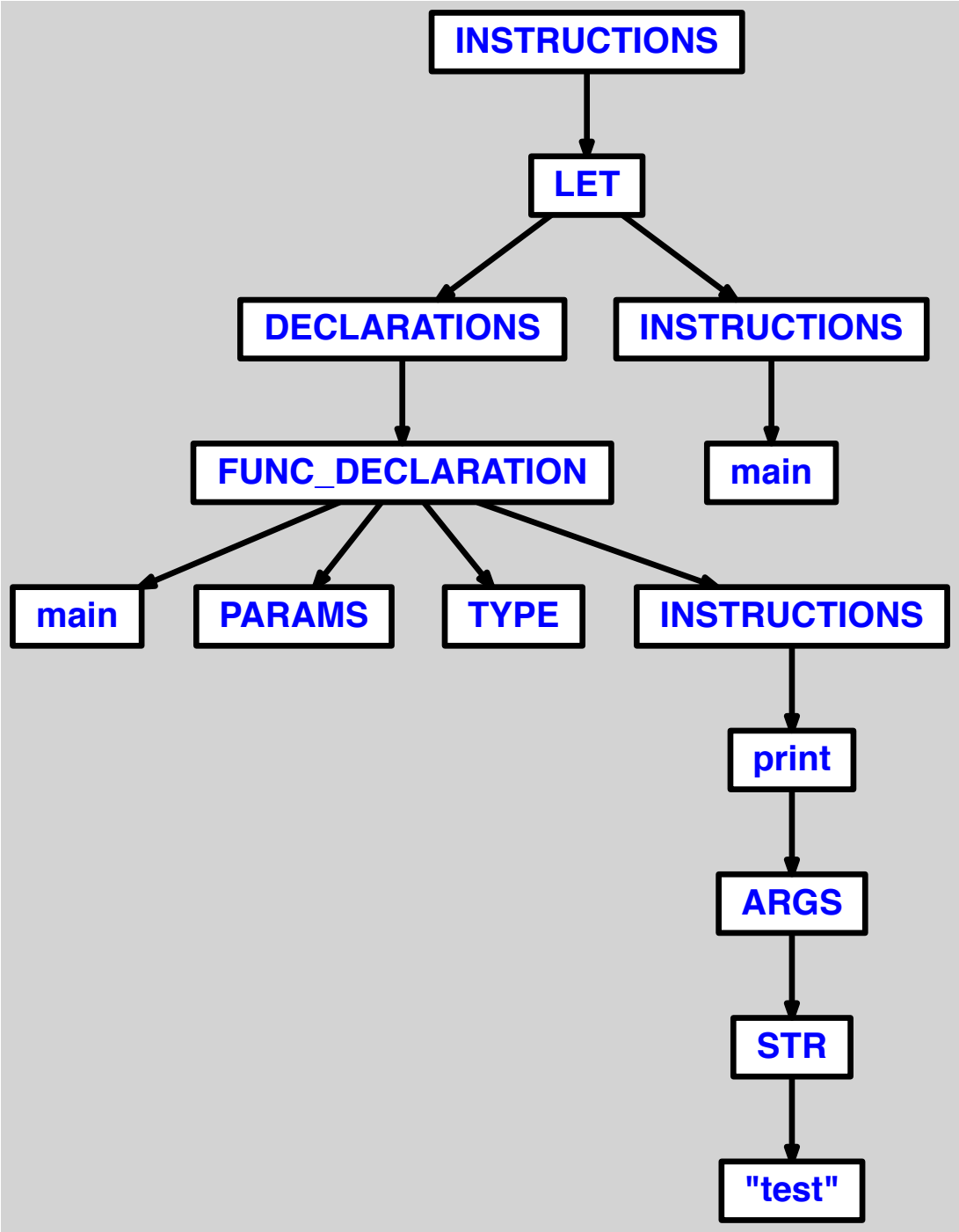
8.1.16 fonction avec entier directement en parametre

```
let
  function main(1) = printi(1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
INT
1

8.1.17 fonction avec chaine directement en parametre

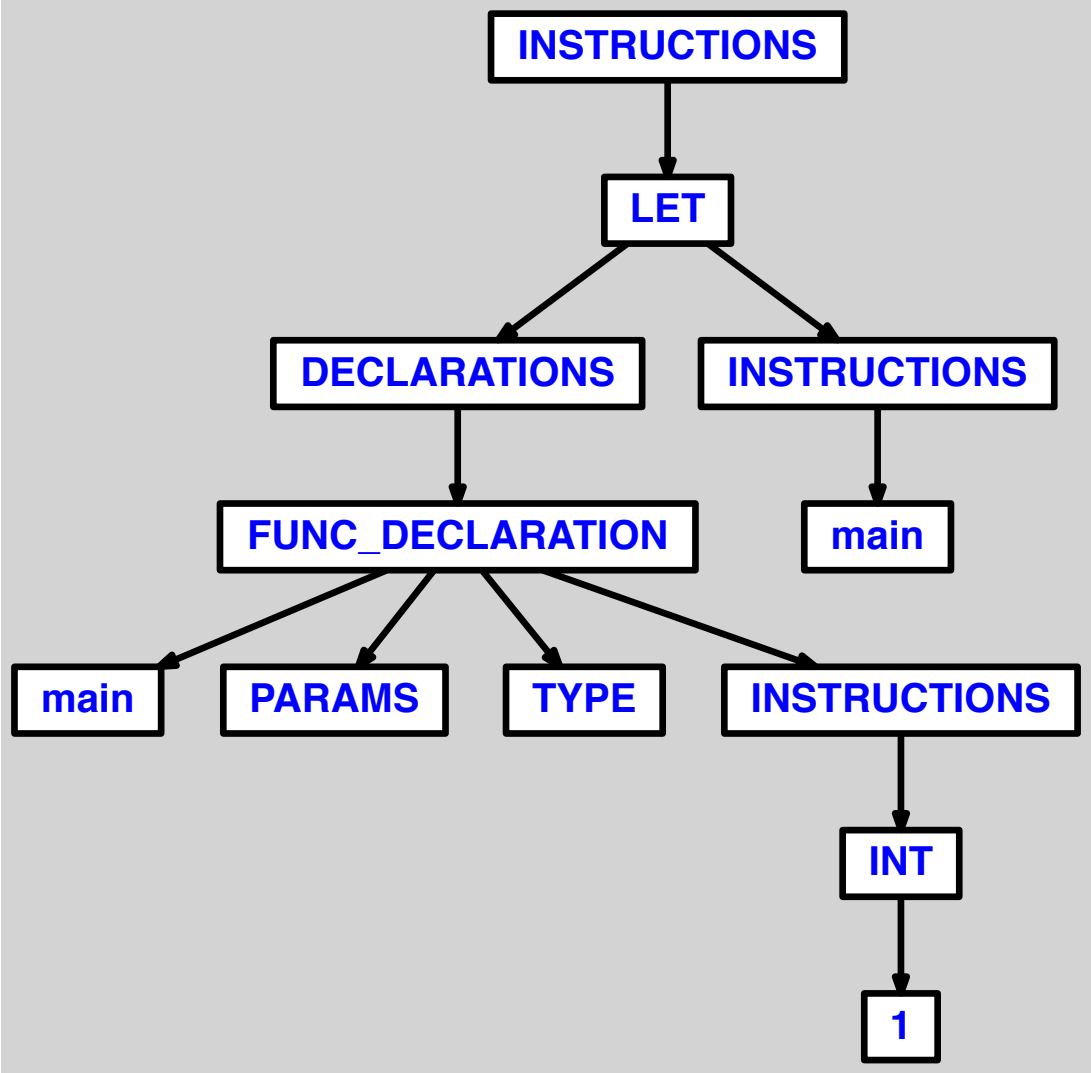
```
let
  function main("test") = print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

8.2 OK

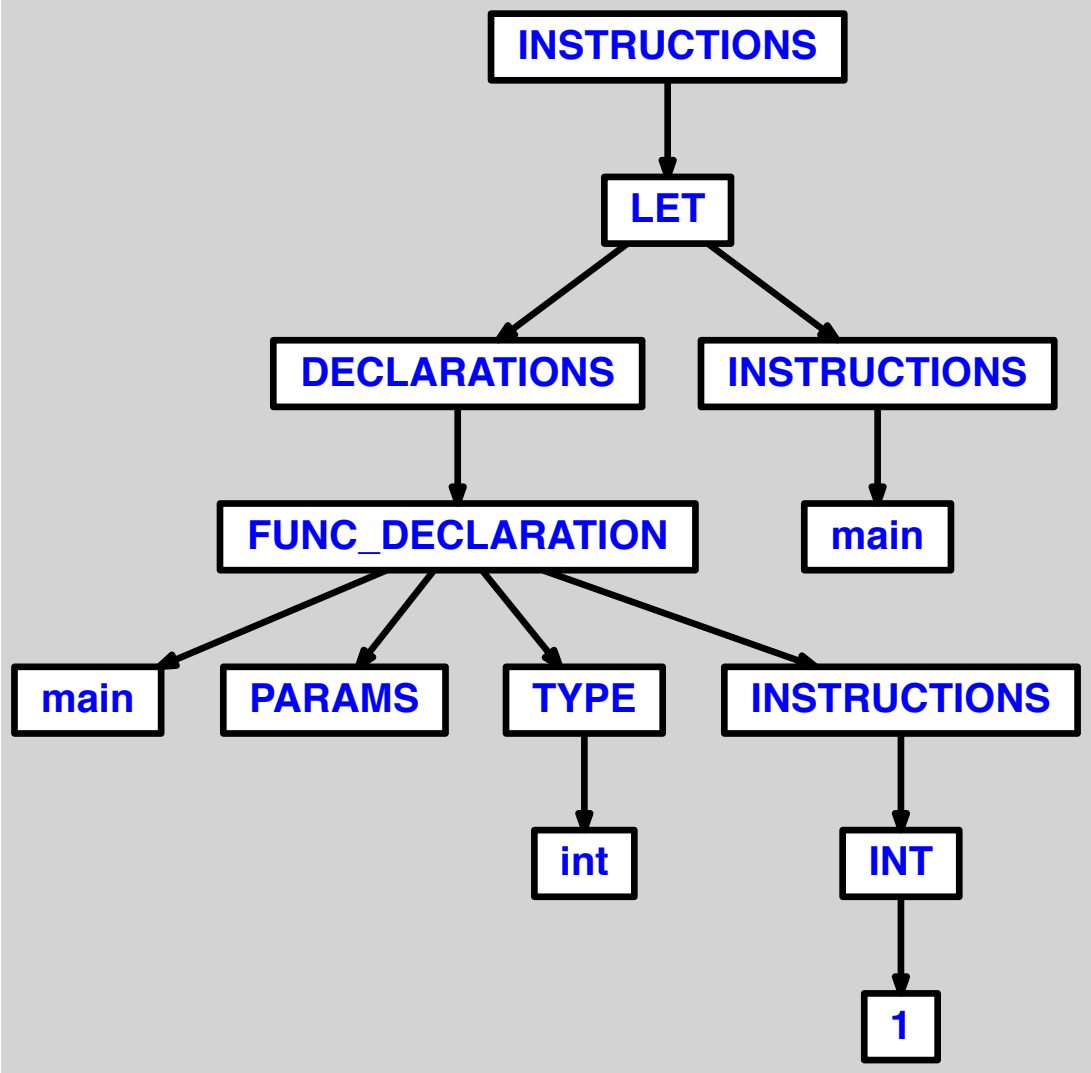
8.2.1 fonction definissant un entier

```
let
  function main() = 1
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
INT
1

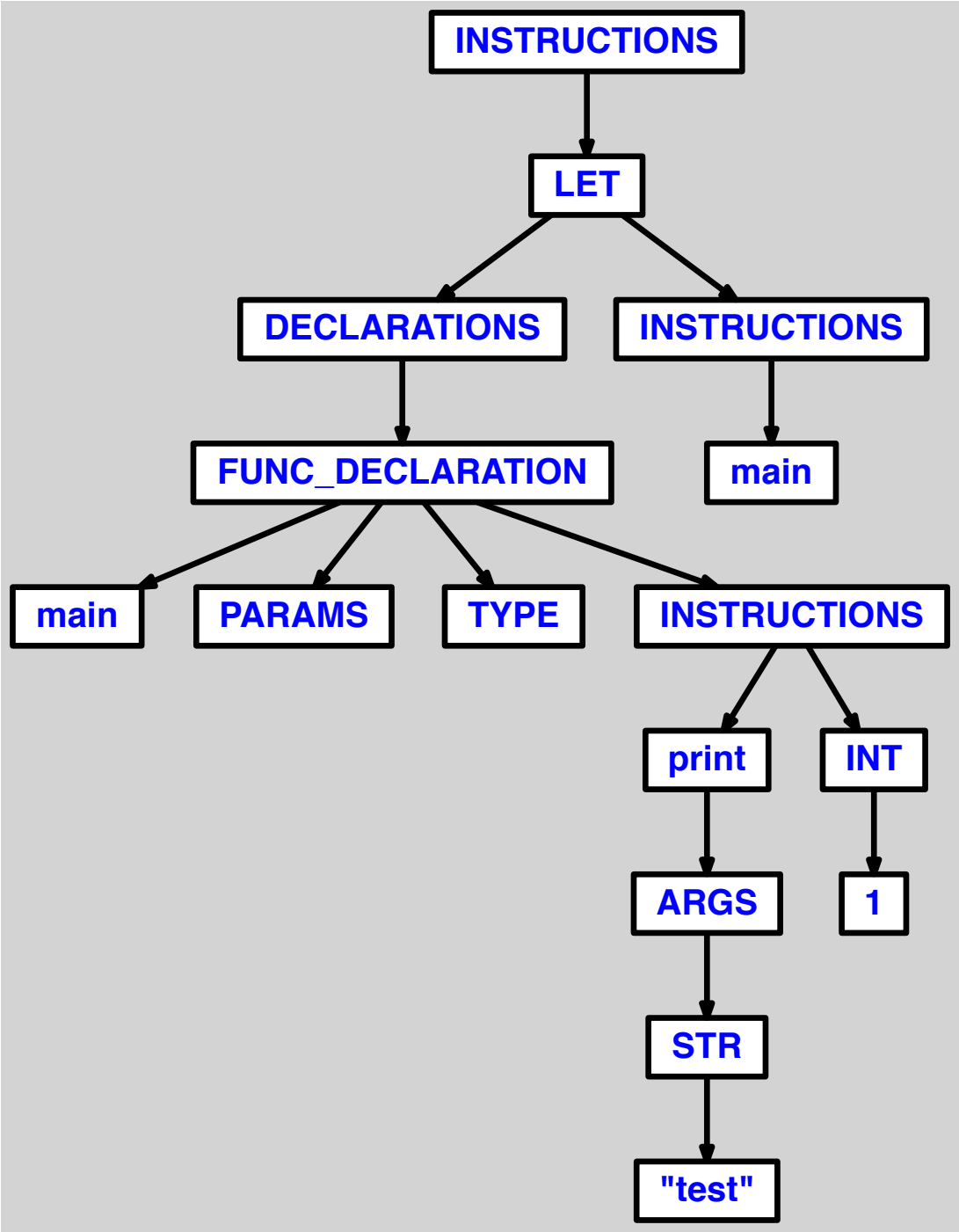
8.2.2 fonction simple, avec declaration du type de retour <int> et instruction de retour

```
let
  function main() : int = 1
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
int
INT
1

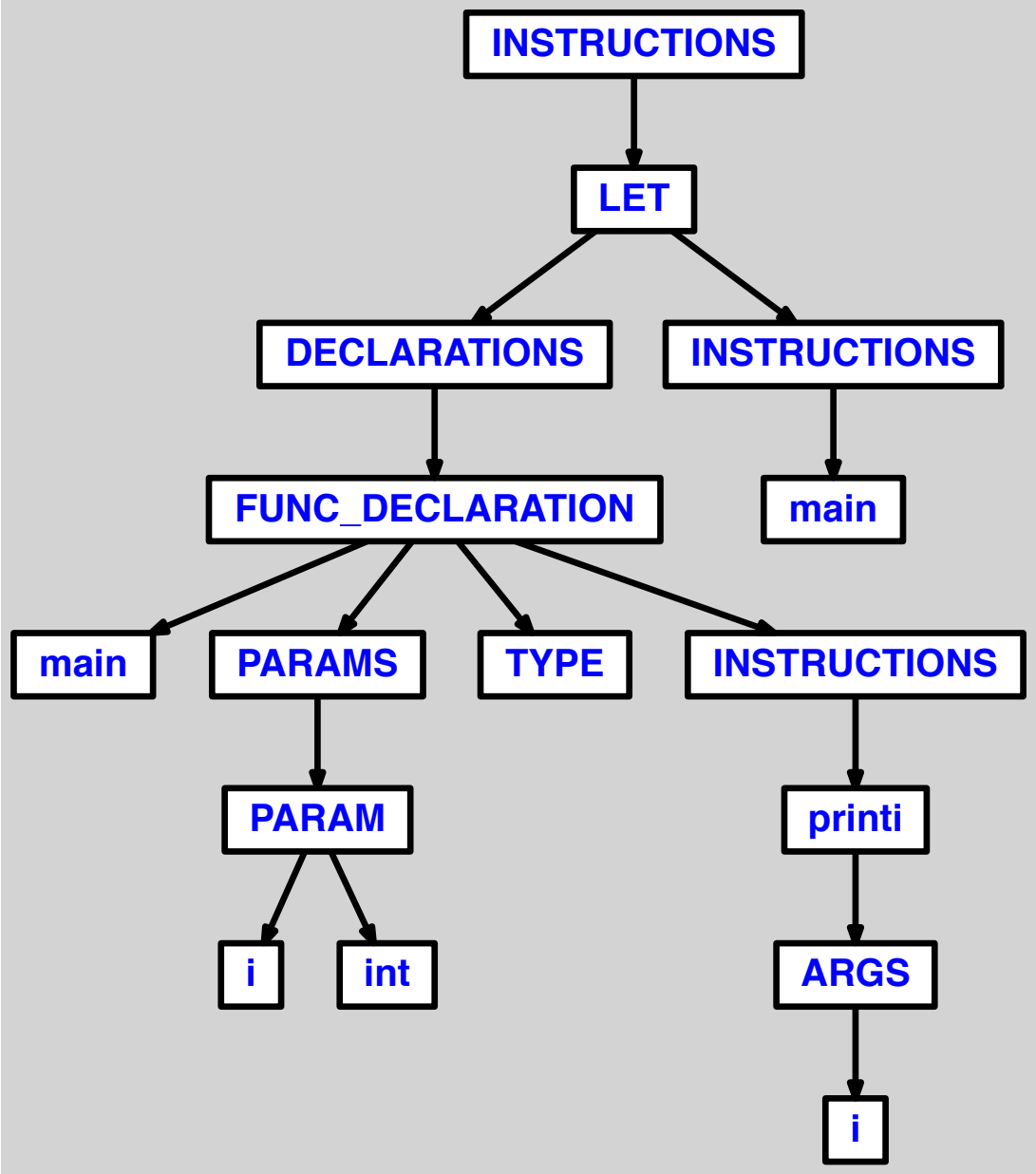
8.2.3 fonction simple, avec instruction simple et instruction retournant un entier

```
let
  function main() =
    (print("test"); 1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
INT
ARGS
1
STR
"test"

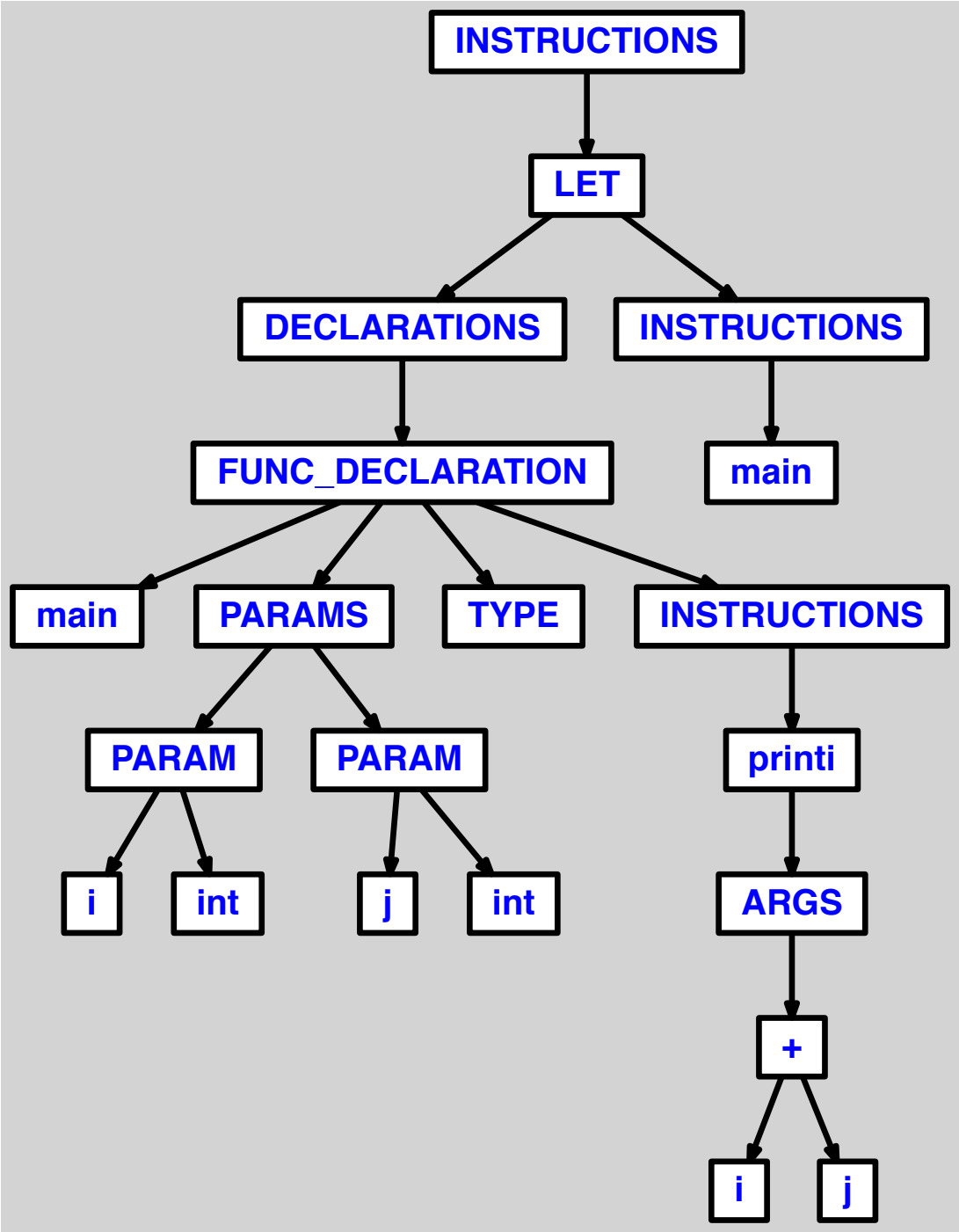
8.2.4 fonction avec 1 parametre entier

```
let
  function main(i: int) = printi(i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
PARAM
printi
i
int
ARGS
i

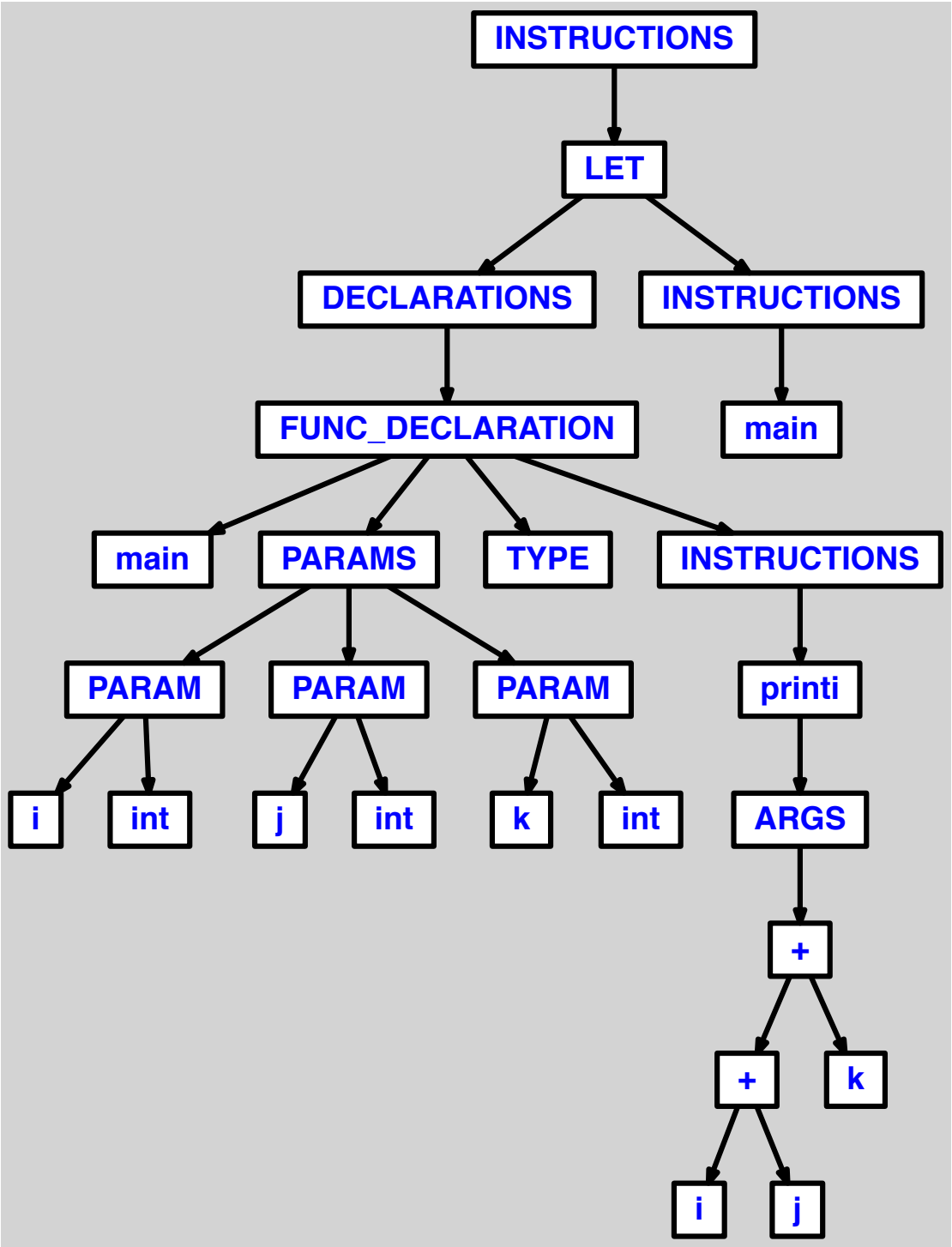
8.2.5 fonction avec 2 parametres entiers

```
let
  function main(i: int, j: int) = printi(i+j)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
PARAM
PARAM
printi
i
int
j
int
ARGS
+
i
j

8.2.6 fonction avec 3 parametres entiers

```
let
  function main(i: int, j: int, k: int) = printi(i+j+k)
in main() end
```


INSTRUCTIONS
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FUNC_DECLARATION
main
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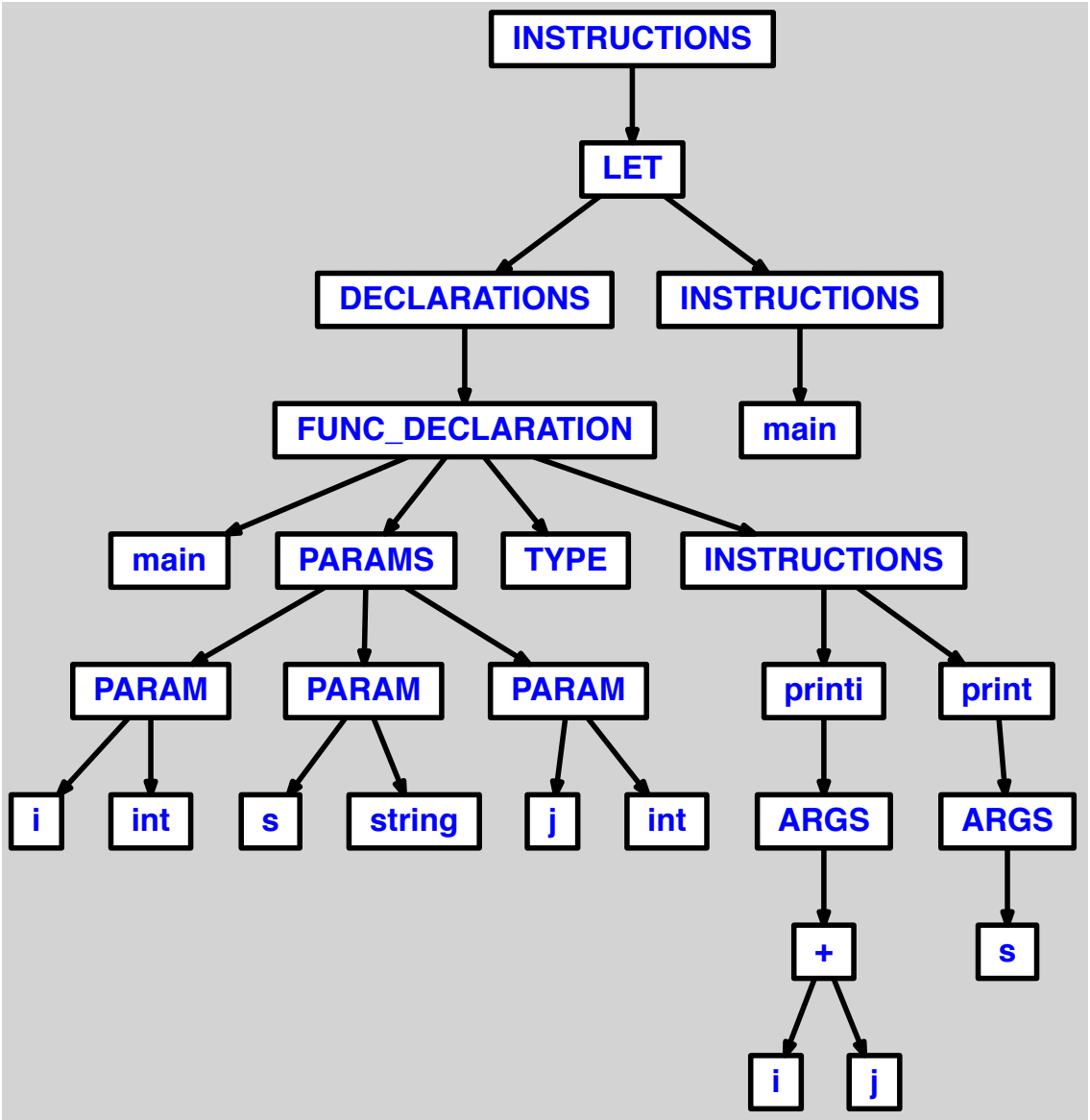
PARAMS
TYPE
INSTRUCTIONS
PARAM
PARAM
PARAM
printi
i
int
j
int
k
int
ARGS
+
+
k
i
j

8.2.7 fonction avec 2 parametres entiers et 1 parametre de type <string>

```
let
  function main(i: int, s: string, j: int) =
    (printi(i+j); print(s))
in main() end
```


INSTRUCTIONS
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PARAMS
TYPE
INSTRUCTIONS
PARAM
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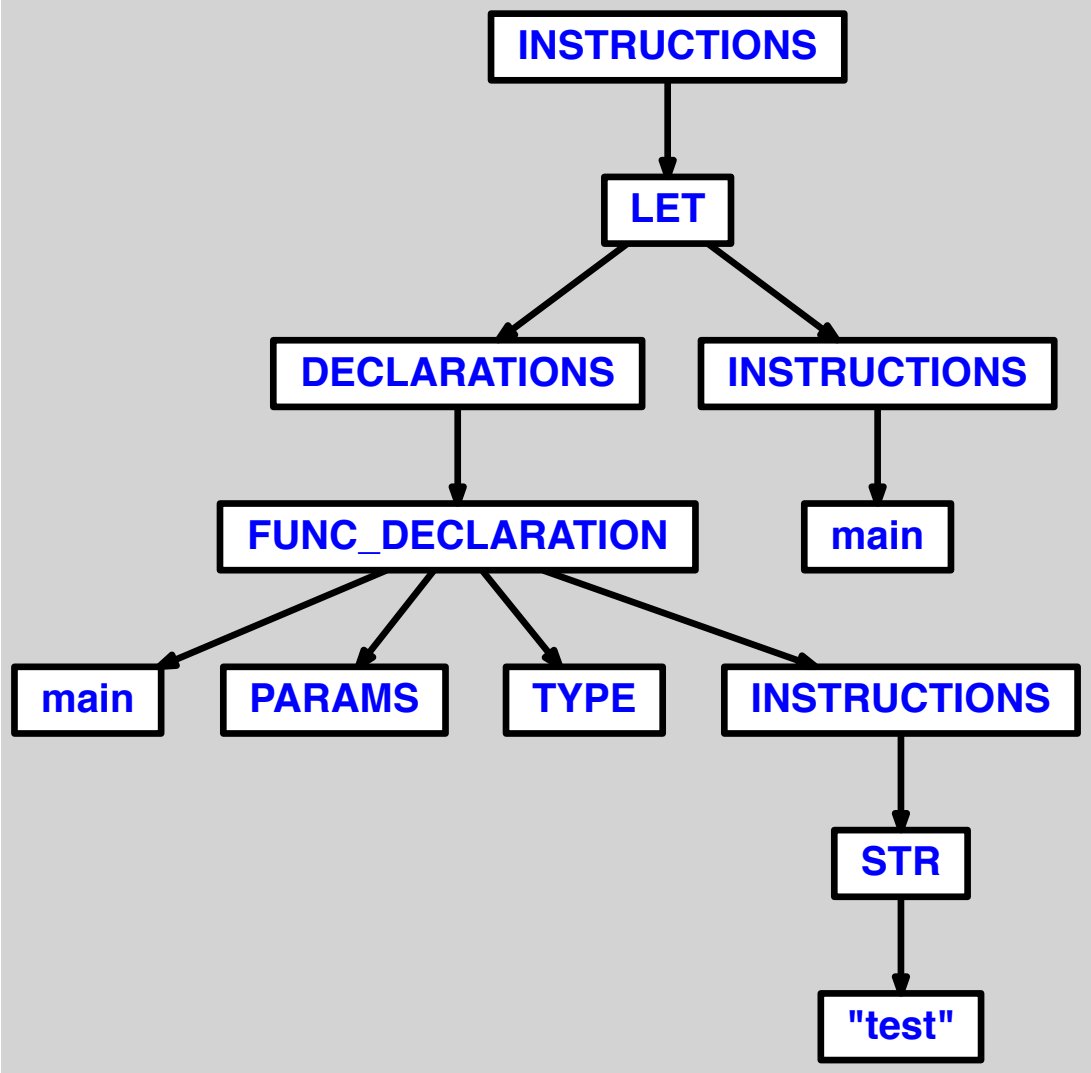
printi
print
i
int
s
string
j
int
ARGS
ARGS
+
s
i
j

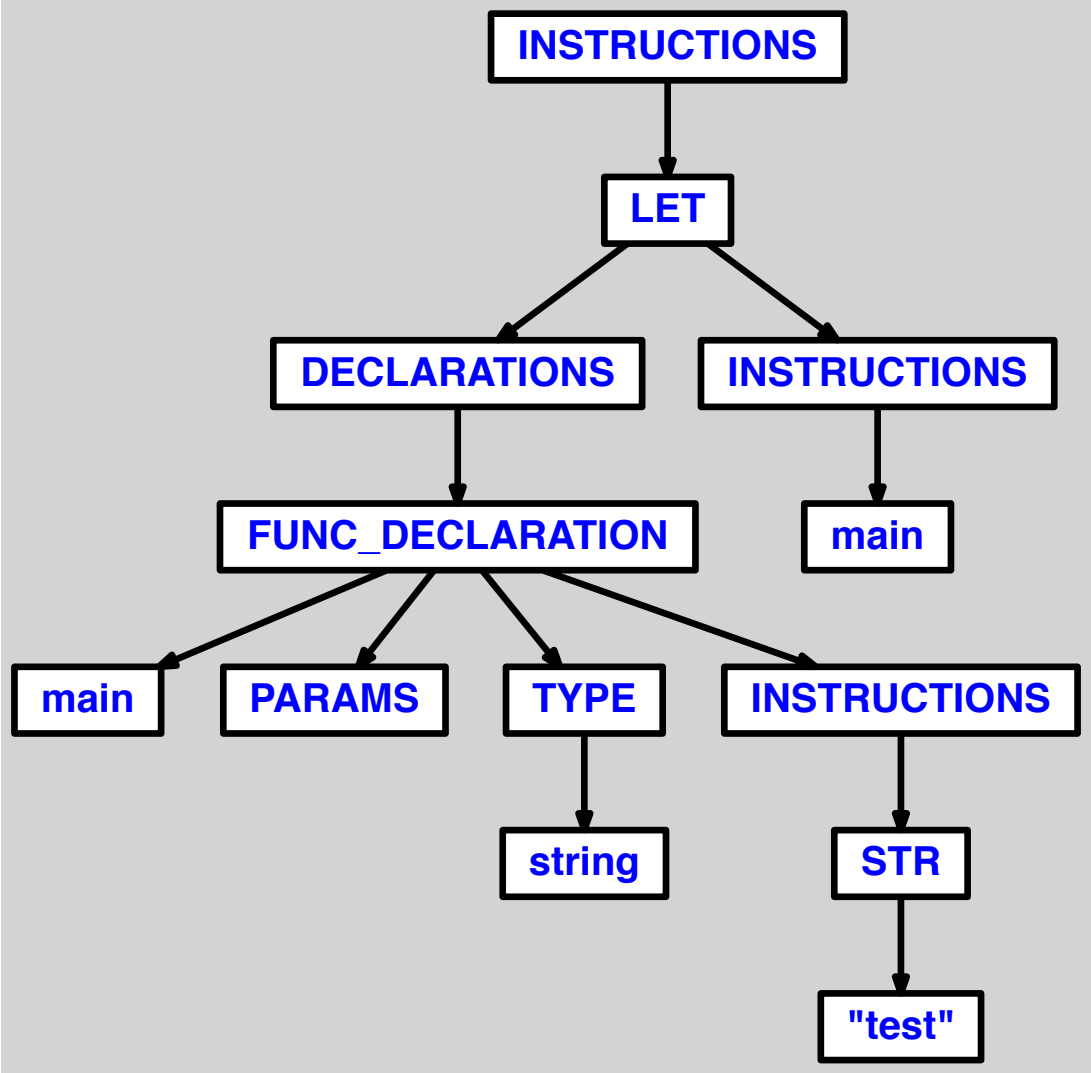
8.2.8 fonction definissant une chaine

```
let
  function main() = "test"
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
STR
"test"

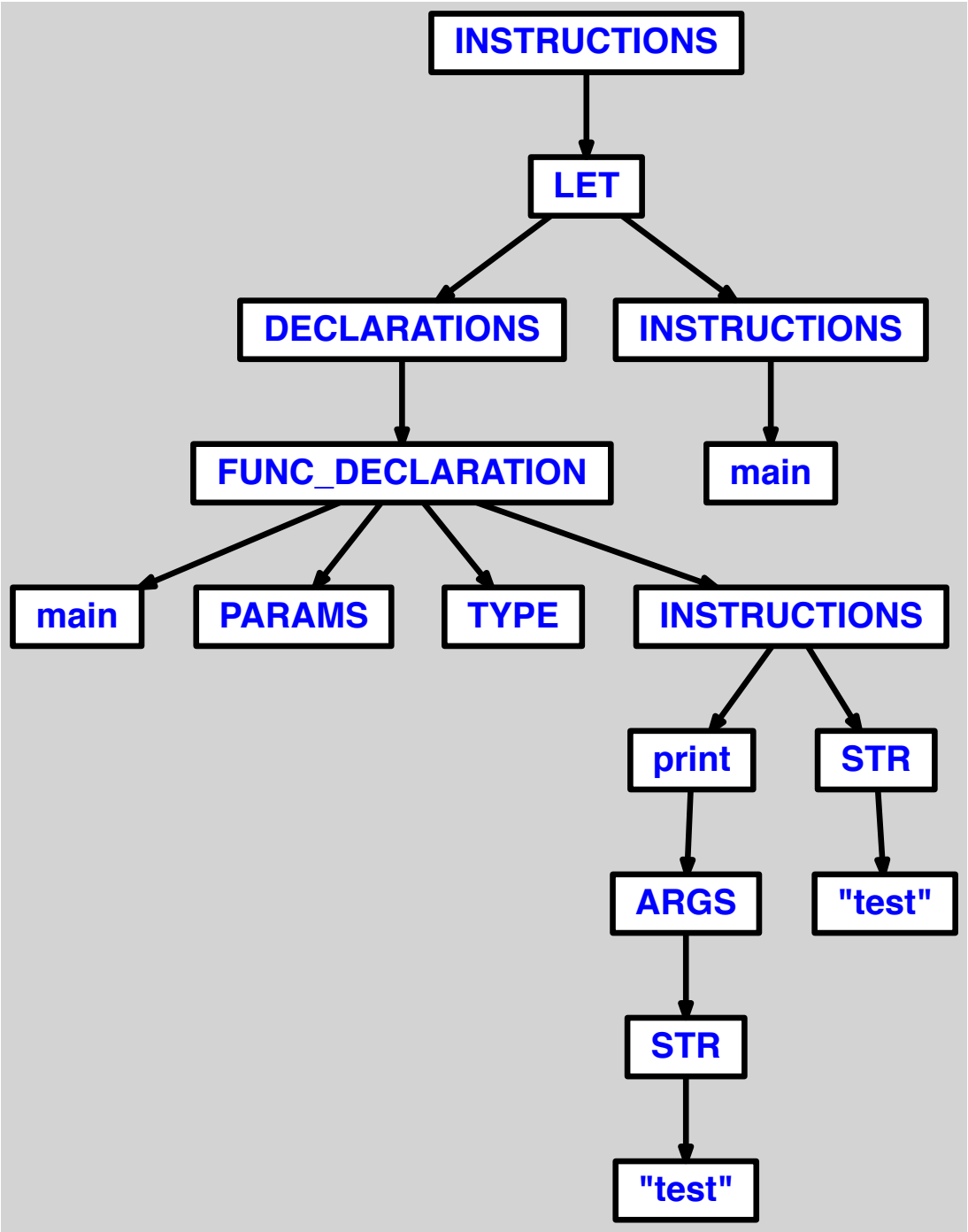
8.2.9 fonction simple, avec declaration du type de retour <string> et instruction de retour

```
let
  function main() : string = "test"
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
string
STR
"test"

8.2.10 fonction simple, avec instruction simple et instruction retournant une chaine

```
let
  function main() =
    (print("test"); "test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
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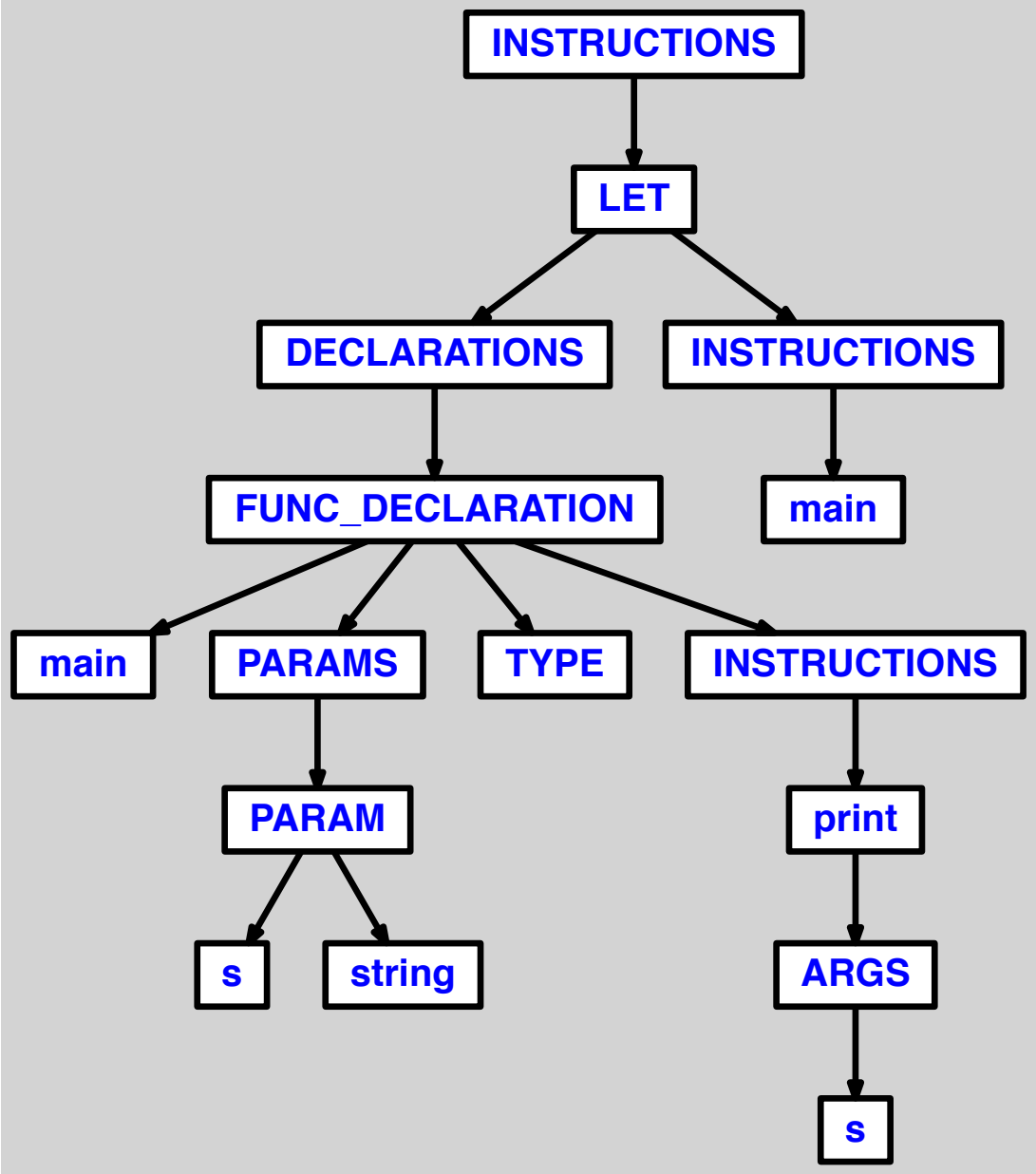
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
STR
ARGS
"test"
STR
"test"

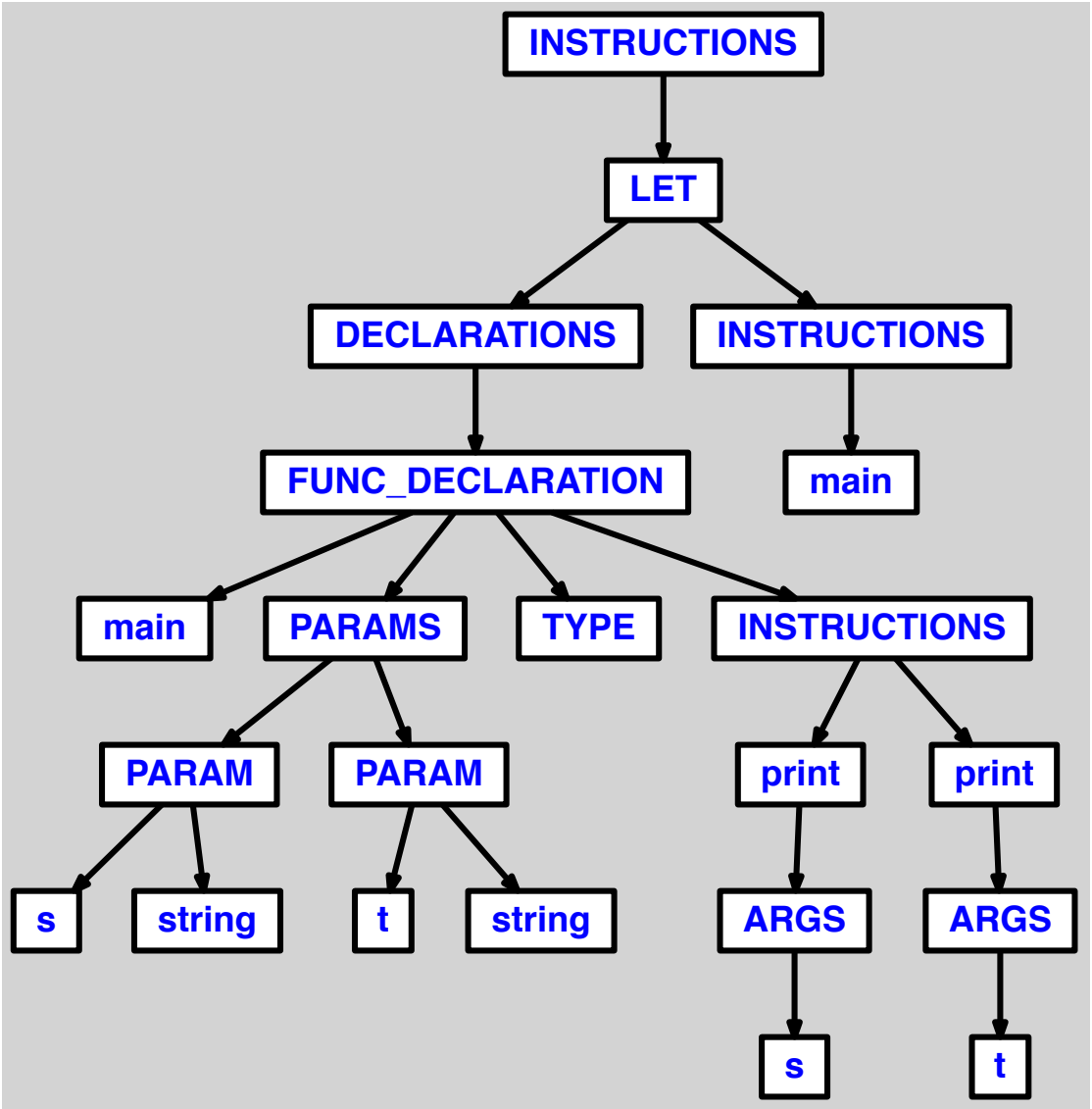
8.2.11 fonction avec 1 parametre de type <string>

```
let
  function main(s: string) = print(s)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
PARAM
print
s
string
ARGS
s

8.2.12 fonction avec 2 parametres de type <string>

```
let
  function main(s: string, t: string) =
    (print(s); print(t))
in main() end
```


INSTRUCTIONS
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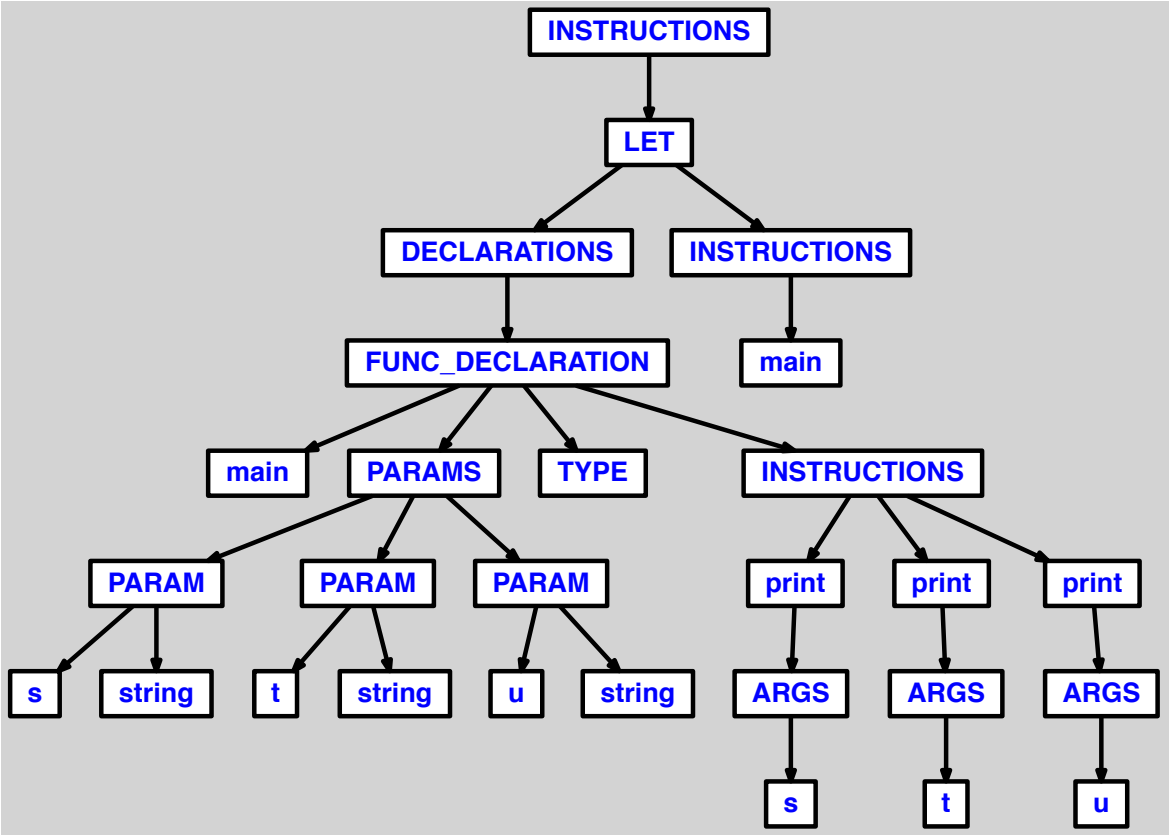
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
PARAM
PARAM
print
print
s
string
t
string
ARGS
ARGS
s
t

8.2.13 fonction avec 3 parametres de type <string>

```
let
  function main(s: string, t: string, u: string) =
    (print(s); print(t); print(u))
in main() end
```


INSTRUCTIONS
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TYPE
INSTRUCTIONS
PARAM
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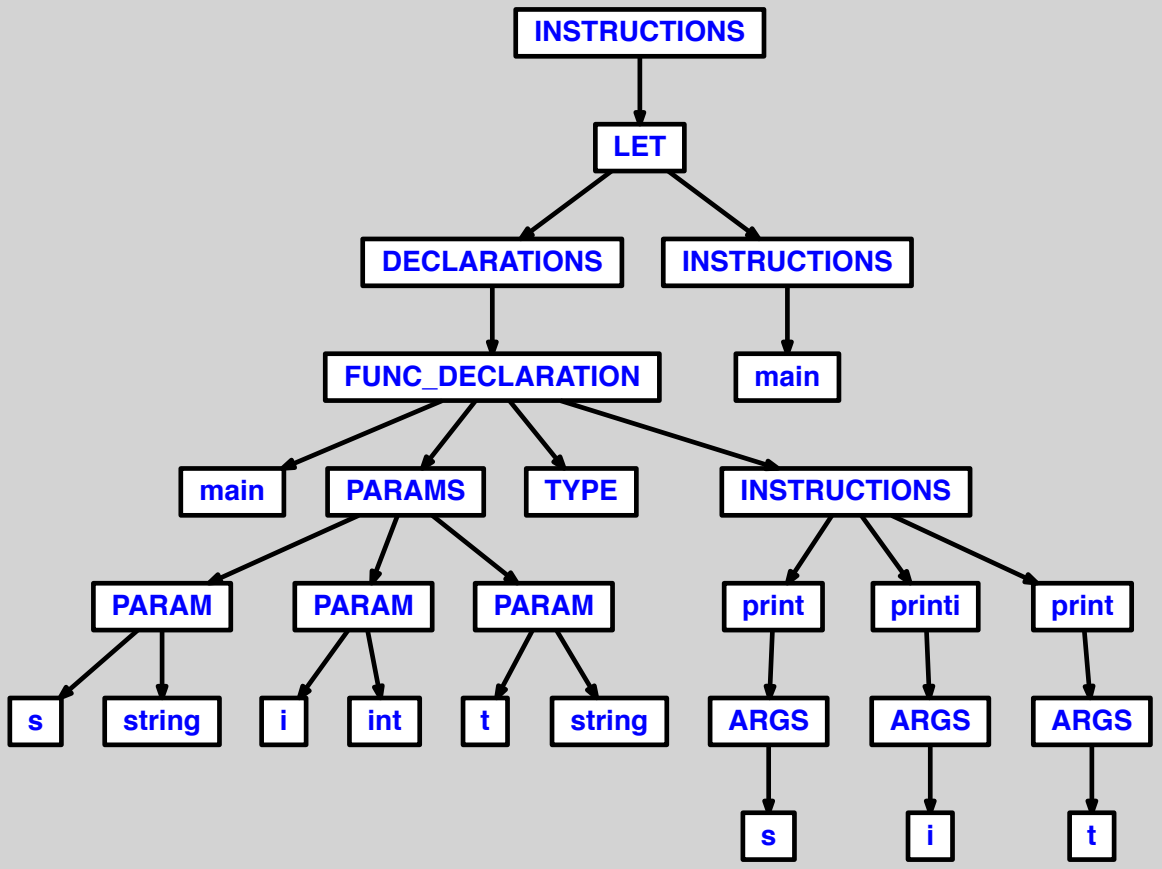
PARAM
print
print
print
s
string
t
string
u
string
ARGS
ARGS
ARGS
s
t
u

8.2.14 fonction avec 2 parametres de type <string> et 1 parametre entier

```
let
  function main(s: string, i: int, t: string) =
    (print(s); printi(i); print(t))
in main() end
```


INSTRUCTIONS
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INSTRUCTIONS
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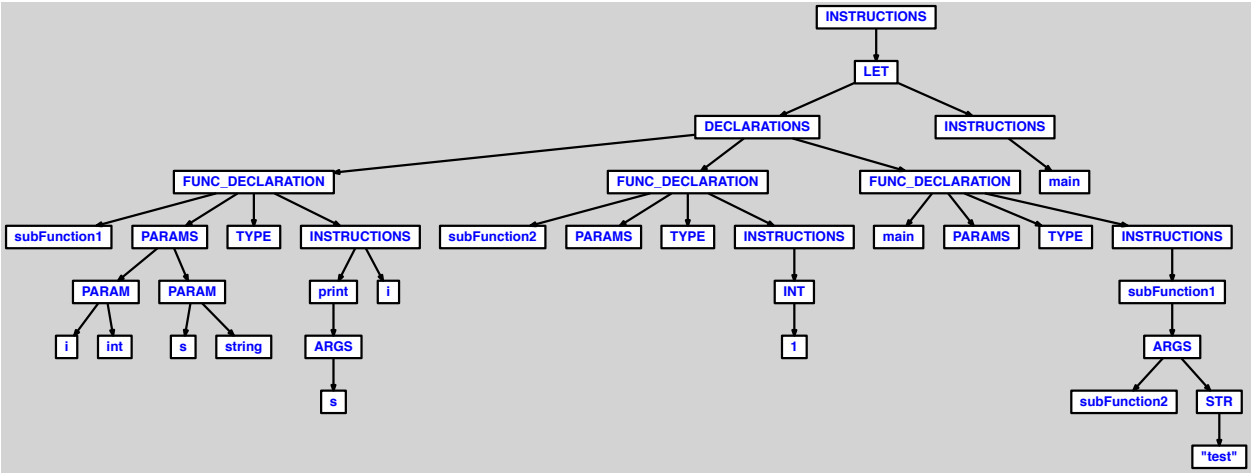
print
printi
print
s
string
i
int
t
string
ARGS
ARGS
ARGS
s
i
t

8.2.15 double-imbrication de fonction

```
let
  function subFunction1(i: int, s: string) =
    (print(s); i)

  function subFunction2() = 1

  function main() = subFunction1(subFunction2(), "test")
in main() end
```


INSTRUCTIONS
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main
subFunction1
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PARAMS
TYPE
INSTRUCTIONS
main
PARAMS
TYPE
INSTRUCTIONS
PARAM
PARAM
print
i
INT
subFunction1
i
int
s
string
ARGS
1
ARGS
s
subFunction2
STR
"test"

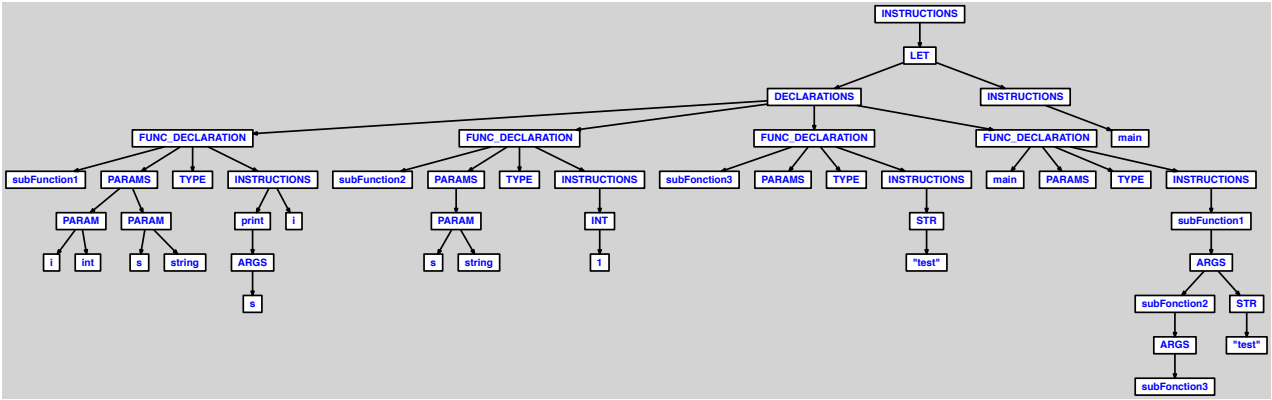
8.2.16 triple-imbrication de fonction

```
let
  function subFunction1(i: int, s: string) =
    (print(s); i)

  function subFunction2(s: string) = 1

  function subFonction3() = "test"

  function main() = subFunction1(subFonction2(subFonction3()), "test")
in main() end
```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INSTRUCTIONS
subFunction2
PARAMS
TYPE
INSTRUCTIONS
subFonction3
PARAMS
TYPE
INSTRUCTIONS
main
PARAMS
TYPE
INSTRUCTIONS
PARAM
PARAM
print
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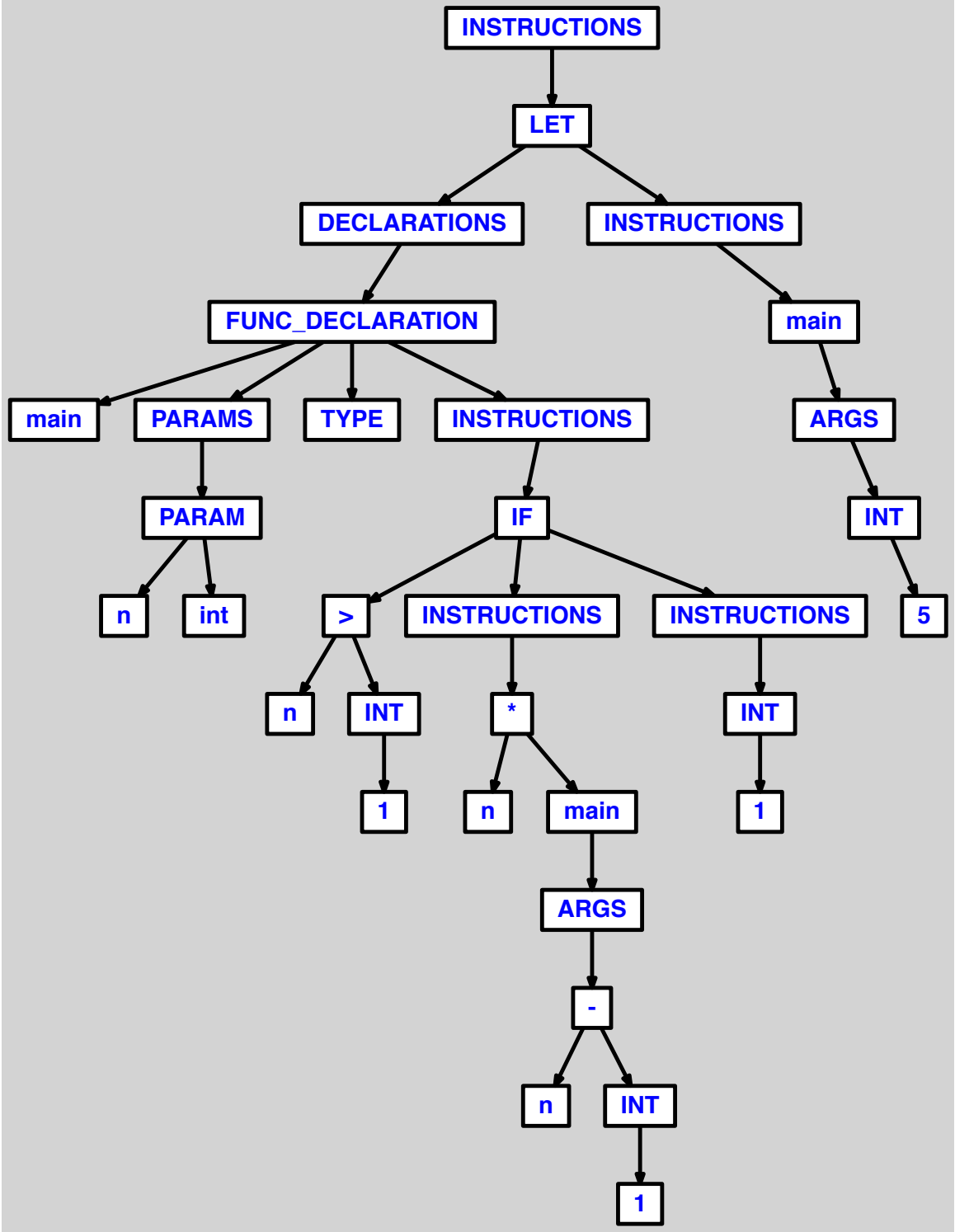
STR
subFunction1
i
int
s
string
ARGS
s
string
1
"test"
ARGS
s
subFonction2
STR
ARGS
"test"
subFonction3

8.2.17 recursion finie

```
let
  function main(n: int) =
    if n > 1 then
      n * main(n-1)
    else 1
in main(5) end
```


INSTRUCTIONS
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main
PARAMS
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INSTRUCTIONS
ARGS
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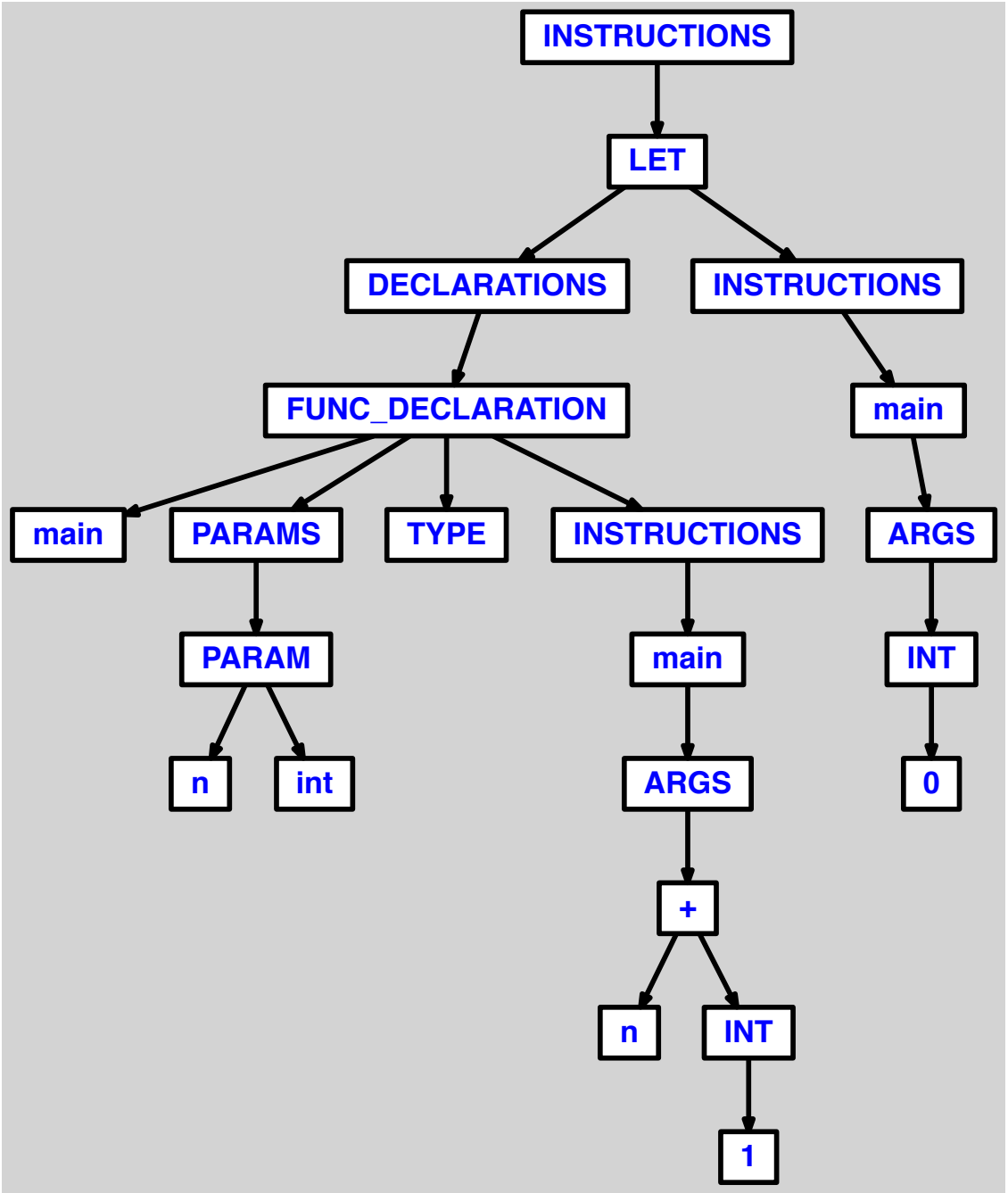
n
int
>
INSTRUCTIONS
INSTRUCTIONS
5
n
INT
*
INT
1
n
main
1
ARGS
-
n
INT
1

8.2.18 recursion infinie

```
let
  function main(n: int) = main(n+1)
in main(0) end
```


INSTRUCTIONS
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main
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PARAMS
TYPE
INSTRUCTIONS
ARGS
PARAM
main
INT
n
int
ARGS
0
+
n
INT
1

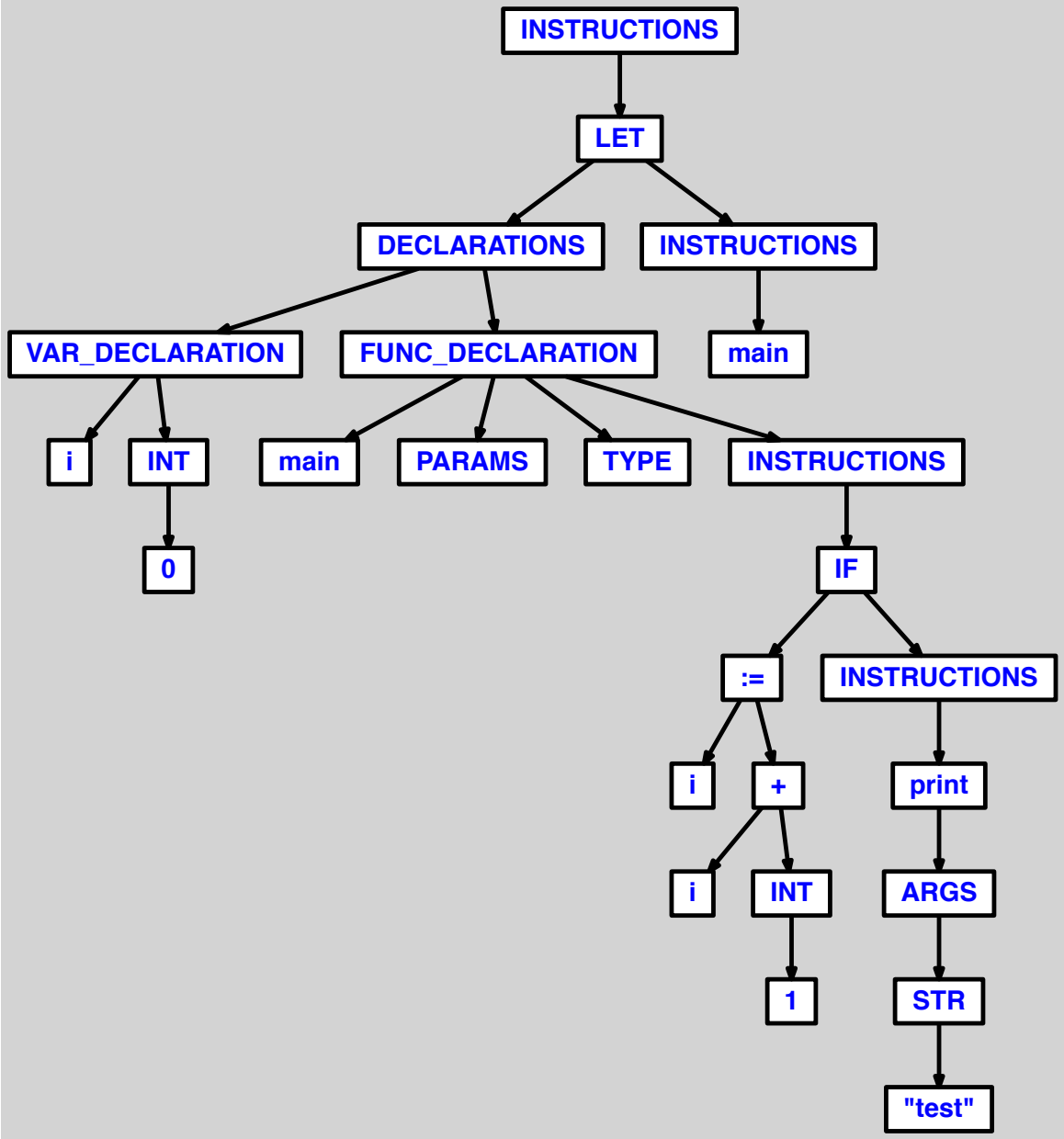
9 if

9.1 KO

9.1.1 incrementation dans la condition <if then>

```
let
  var i := 0

  function main() =
    if i := i+1 then
      print("test")
in main() end
```


INSTRUCTIONS
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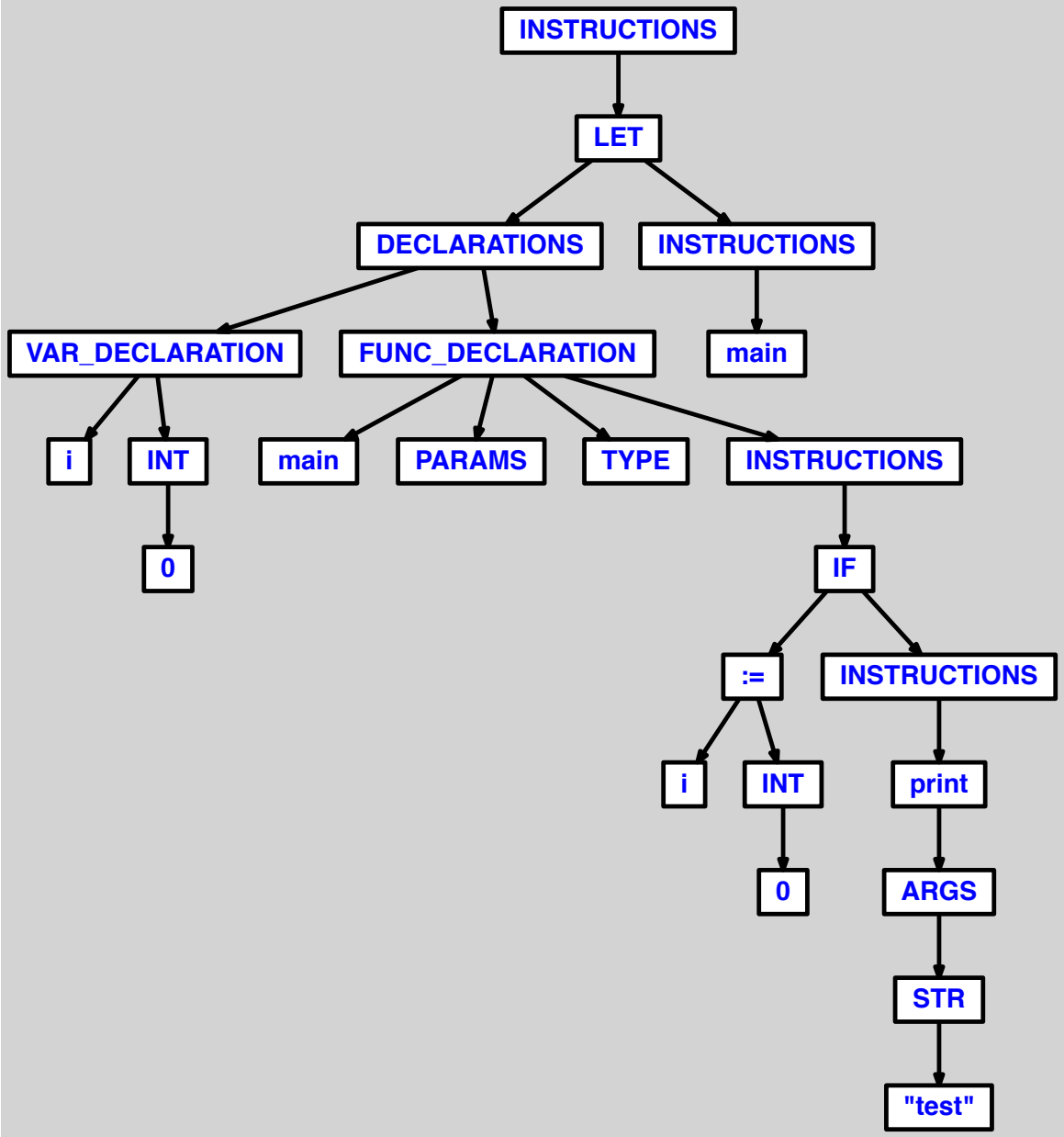
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
:=
INSTRUCTIONS
i
+
print
i
INT
ARGS
1
STR
"test"

9.1.2 affectation d'entier dans la condition <if then>

```
let
  var i := 0

  function main() =
    if i := 0 then
      print("test")
in main() end
```


INSTRUCTIONS
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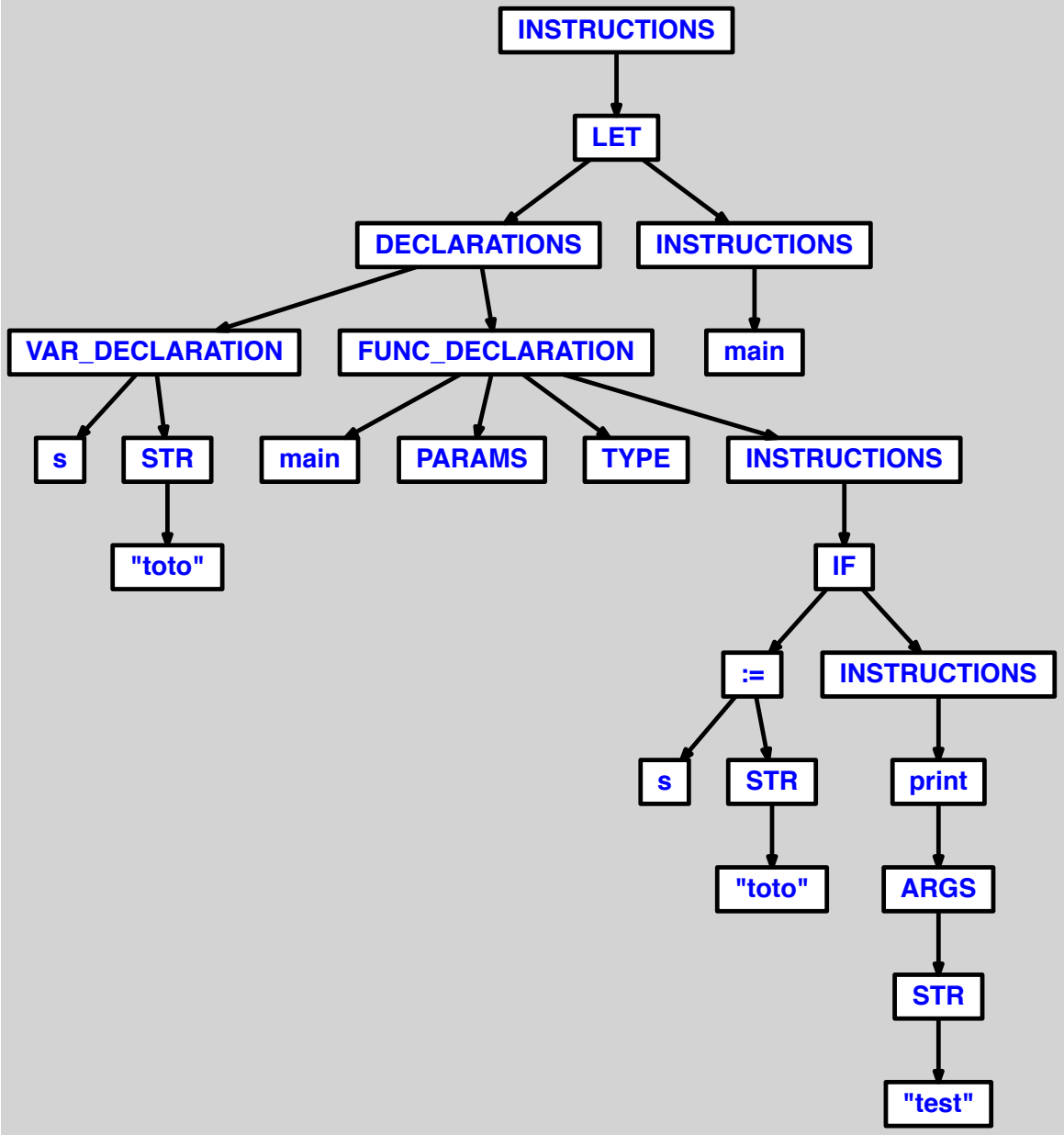
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
:=
INSTRUCTIONS
i
INT
print
0
ARGS
STR
"test"

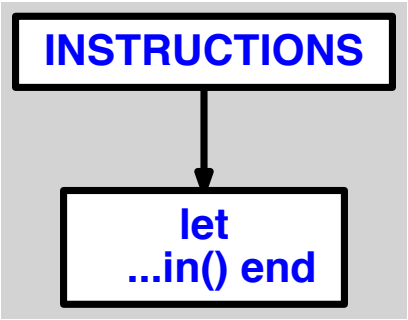
9.1.3 affectation de chaine dans la condition <if then>

```
let
  var s := "toto"

  function main() =
    if s := "toto" then
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
s
STR
main
PARAMS
TYPE
INSTRUCTIONS
"toto"
IF
:=
INSTRUCTIONS
s
STR
print
"toto"
ARGS
STR
"test"

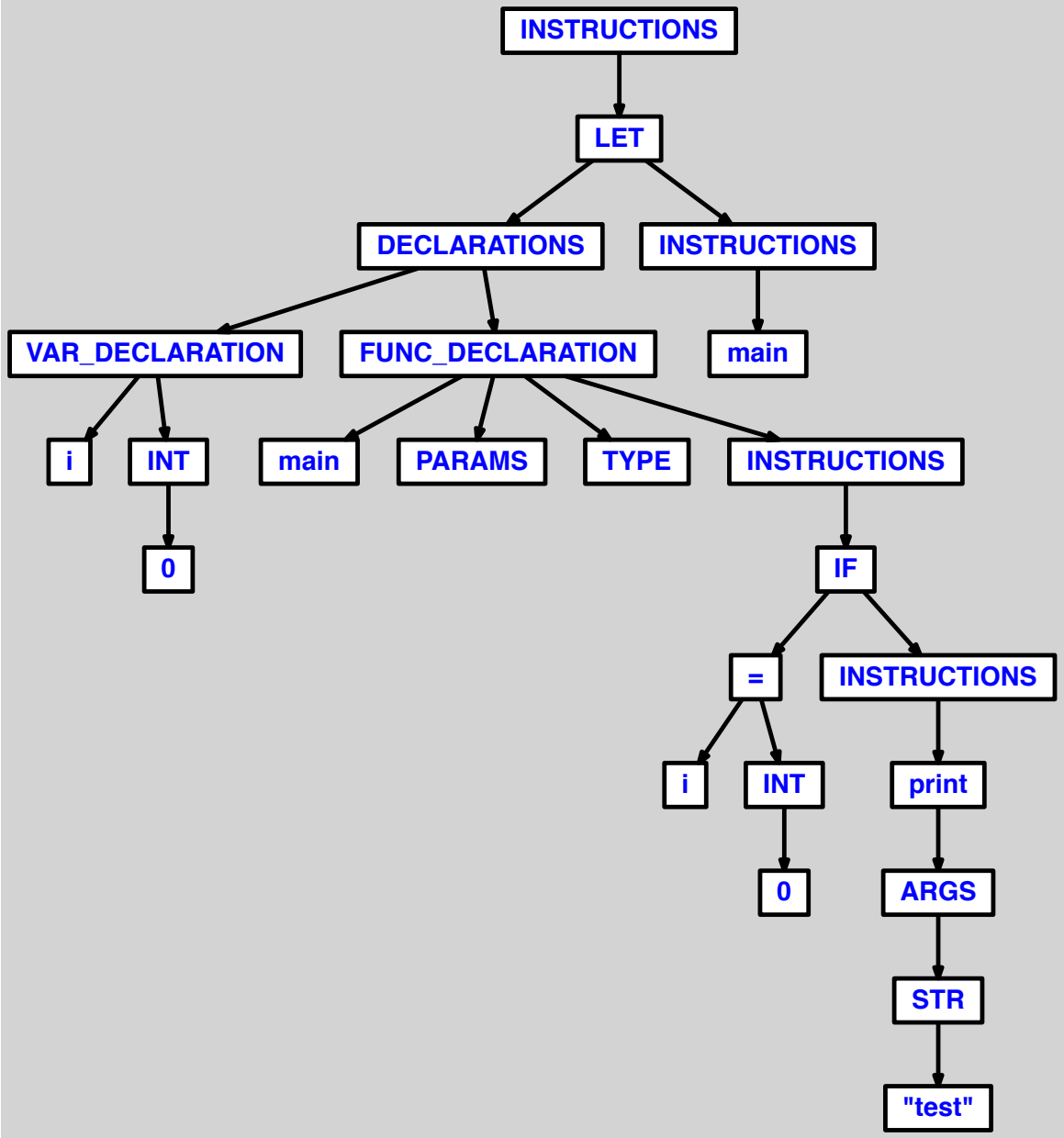
9.1.4 <if then> avec oubli du <if>

```
let
  var i := 0

  function main() =
    i = 0 then
      print("test")
in main() end
```


INSTRUCTIONS
let
...in() end

9.1.5 <if then> avec oubli du <then>

```
let
  var i := 0

  function main() =
    if i = 0
      print("test")
in main() end
```


INSTRUCTIONS
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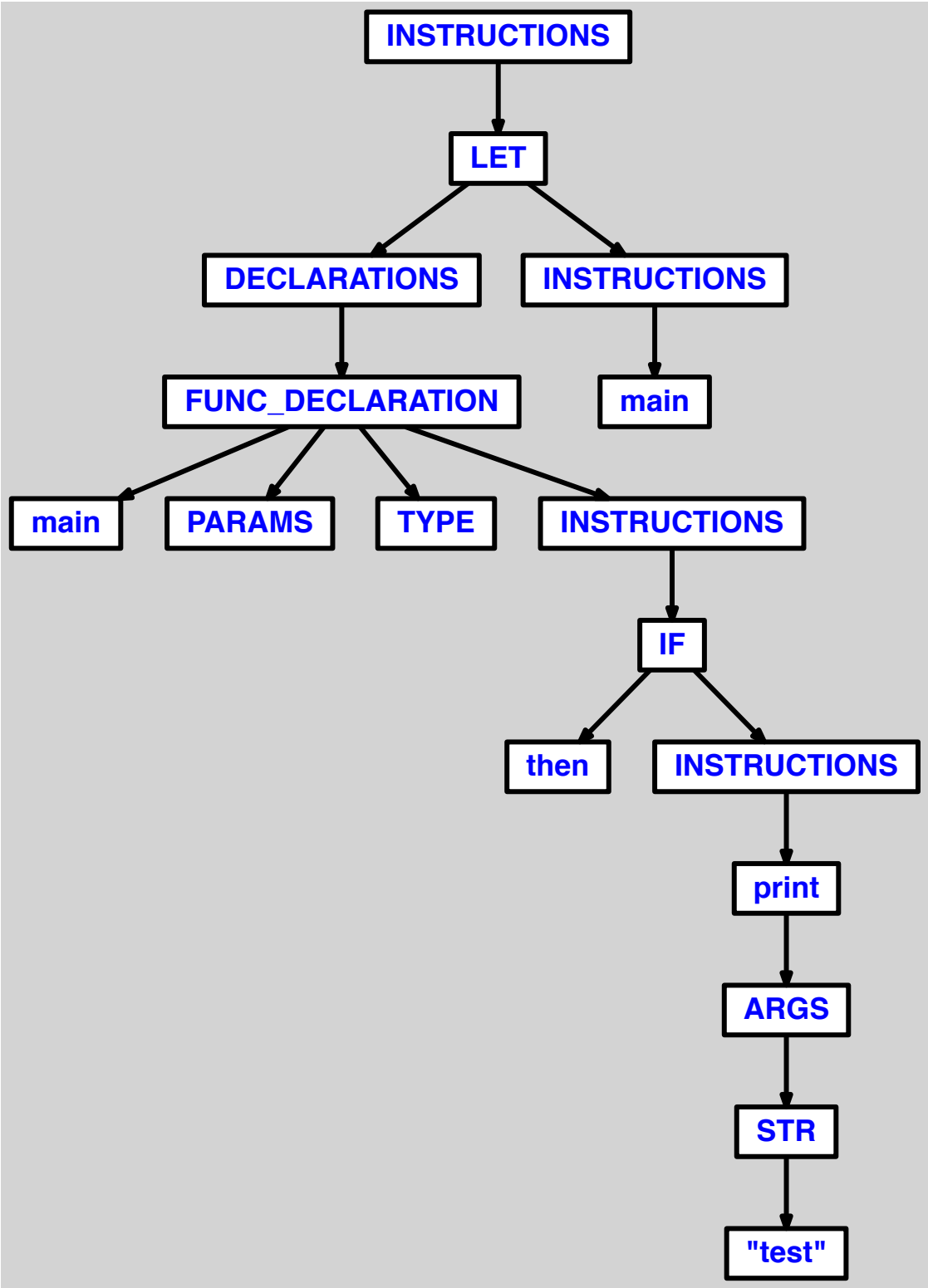
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
=
INSTRUCTIONS
i
INT
print
0
ARGS
STR
"test"

9.1.6 <if then> avec oubli de la condition

```
let
  function main() =
    if then
      print("test")
in main() end
```


INSTRUCTIONS
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DECLARATIONS
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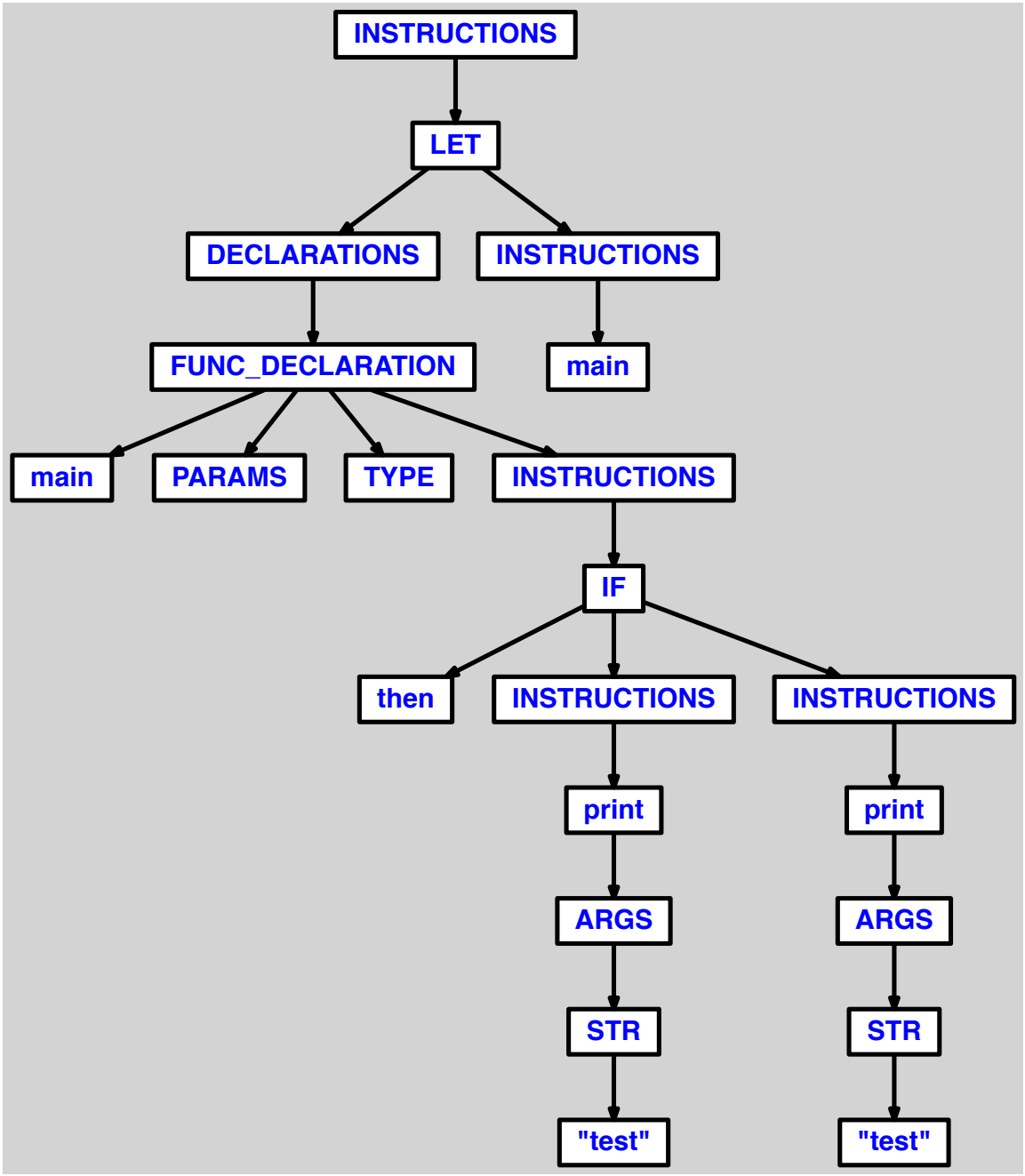
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
then
INSTRUCTIONS
print
ARGS
STR
"test"

9.1.7 <if then else> avec oubli de la condition

```
let
  function main() =
    if then
      print("test")
    else
      print("test")
in main() end
```


INSTRUCTIONS
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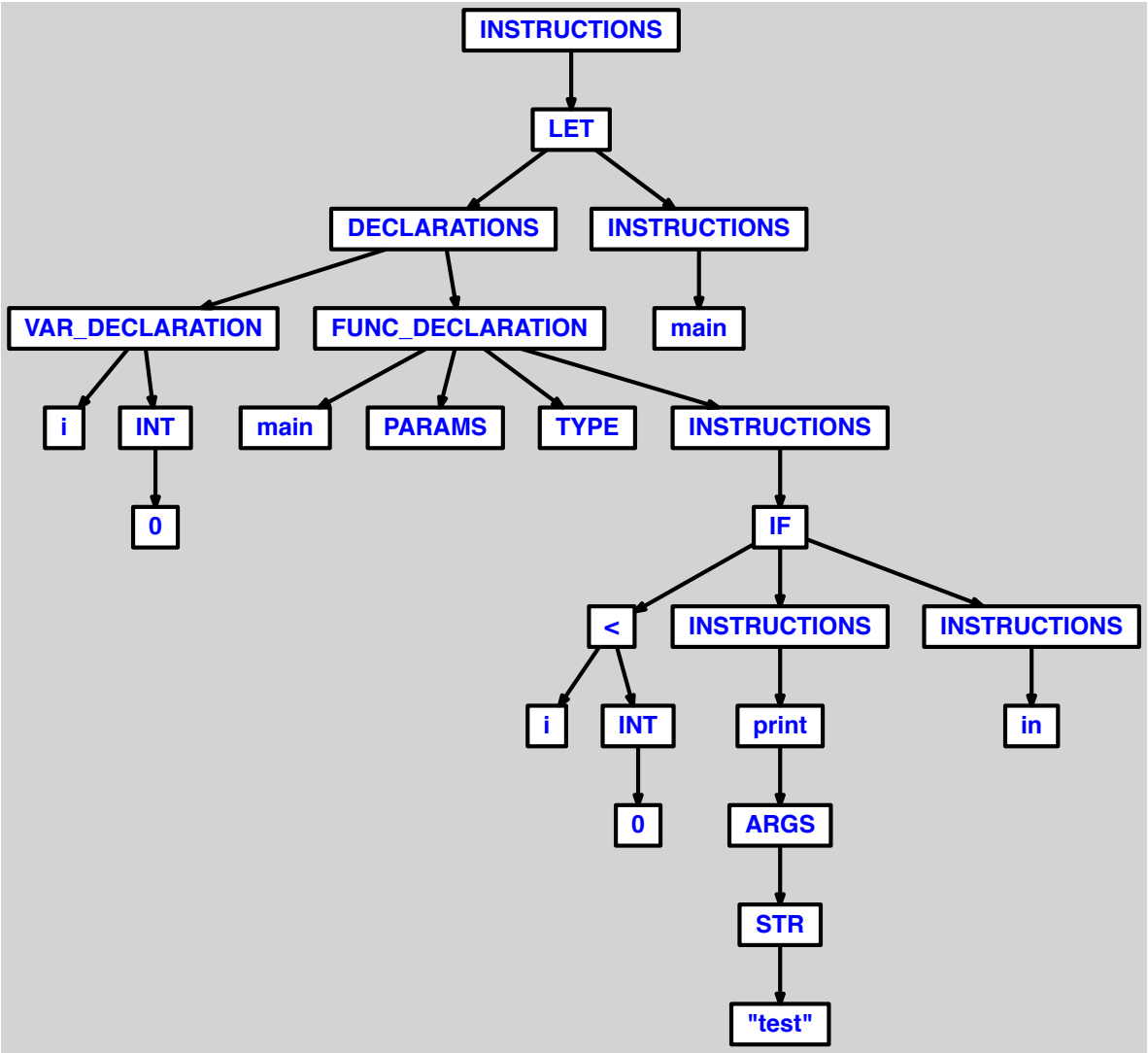
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
then
INSTRUCTIONS
INSTRUCTIONS
print
print
ARGS
ARGS
STR
STR
"test"
"test"

9.1.8 <if then else> sans instruction dans <else>

```
let
  var i := 0

  function main() =
    if i < 0 then
      print("test")
    else
in main() end
```


INSTRUCTIONS
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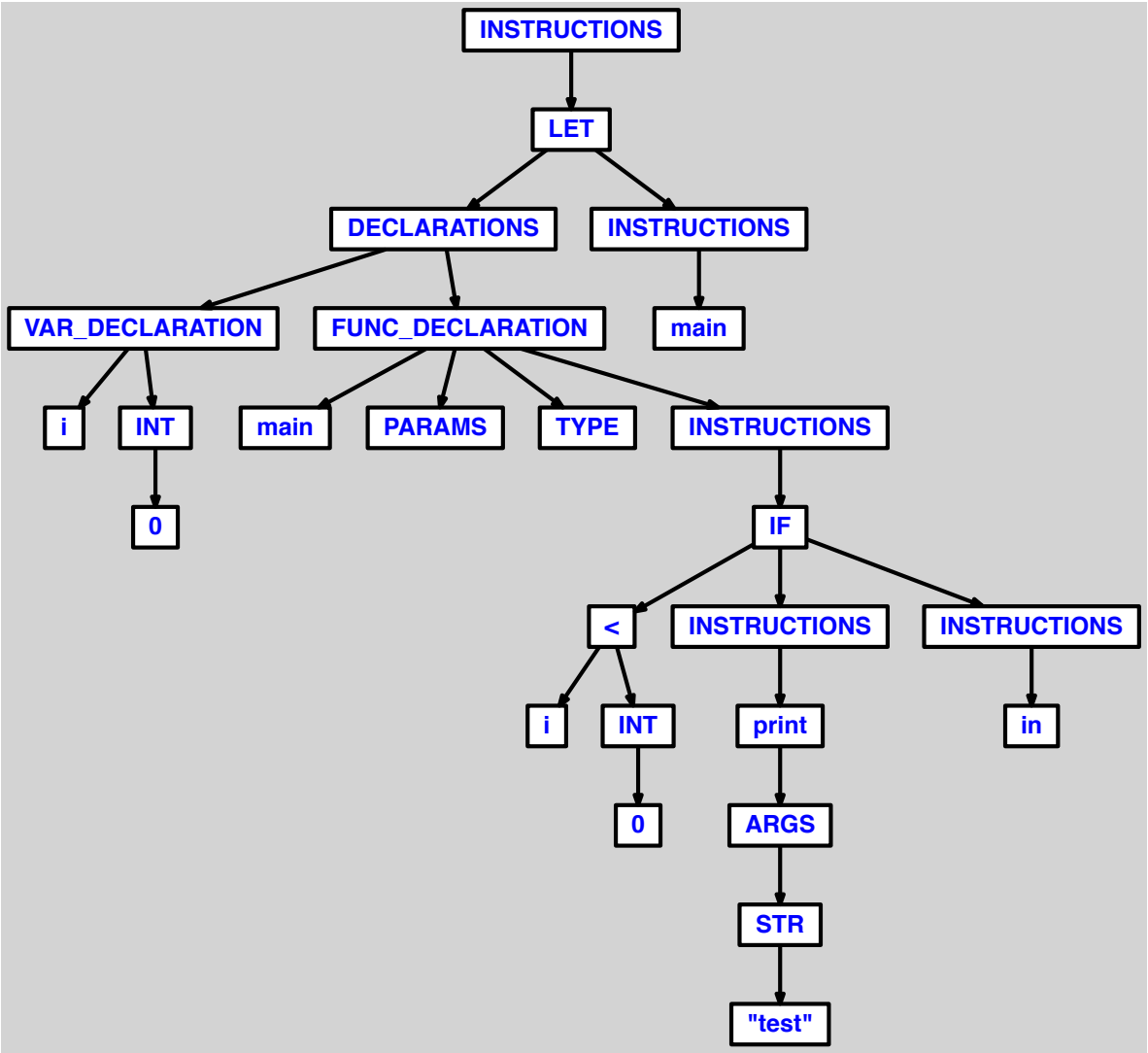
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
<
INSTRUCTIONS
INSTRUCTIONS
i
INT
print
in
0
ARGS
STR
"test"

9.1.9 <if then else> avec ligne vide dans <else>

```
let
  var i := 0

  function main() =
    if i < 0 then
      print("test")
    else

in main() end
```


INSTRUCTIONS
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FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
<
INSTRUCTIONS
INSTRUCTIONS
i
INT
print
in
0
ARGS
STR
"test"

9.1.10 <if then> avec condition entiere

```
let
  function main()() =
    if 1 then
      print("test")
in main() end
```

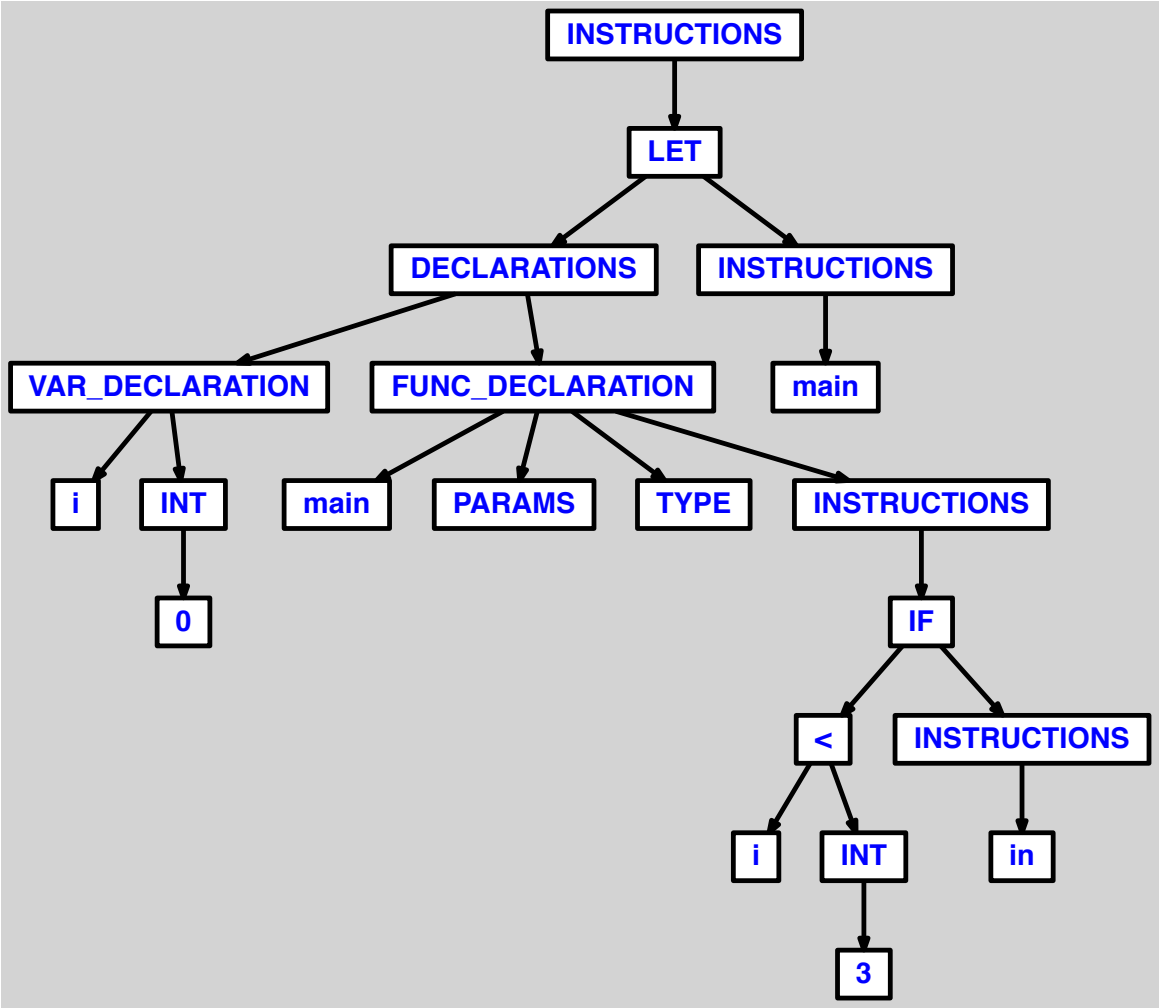
Pas d'AST, problème de syntaxe.

9.2 OK

9.2.1 <if then> sans instruction

```
let
  var i := 0

  function main() =
    if i < 3 then
in main() end
```


INSTRUCTIONS
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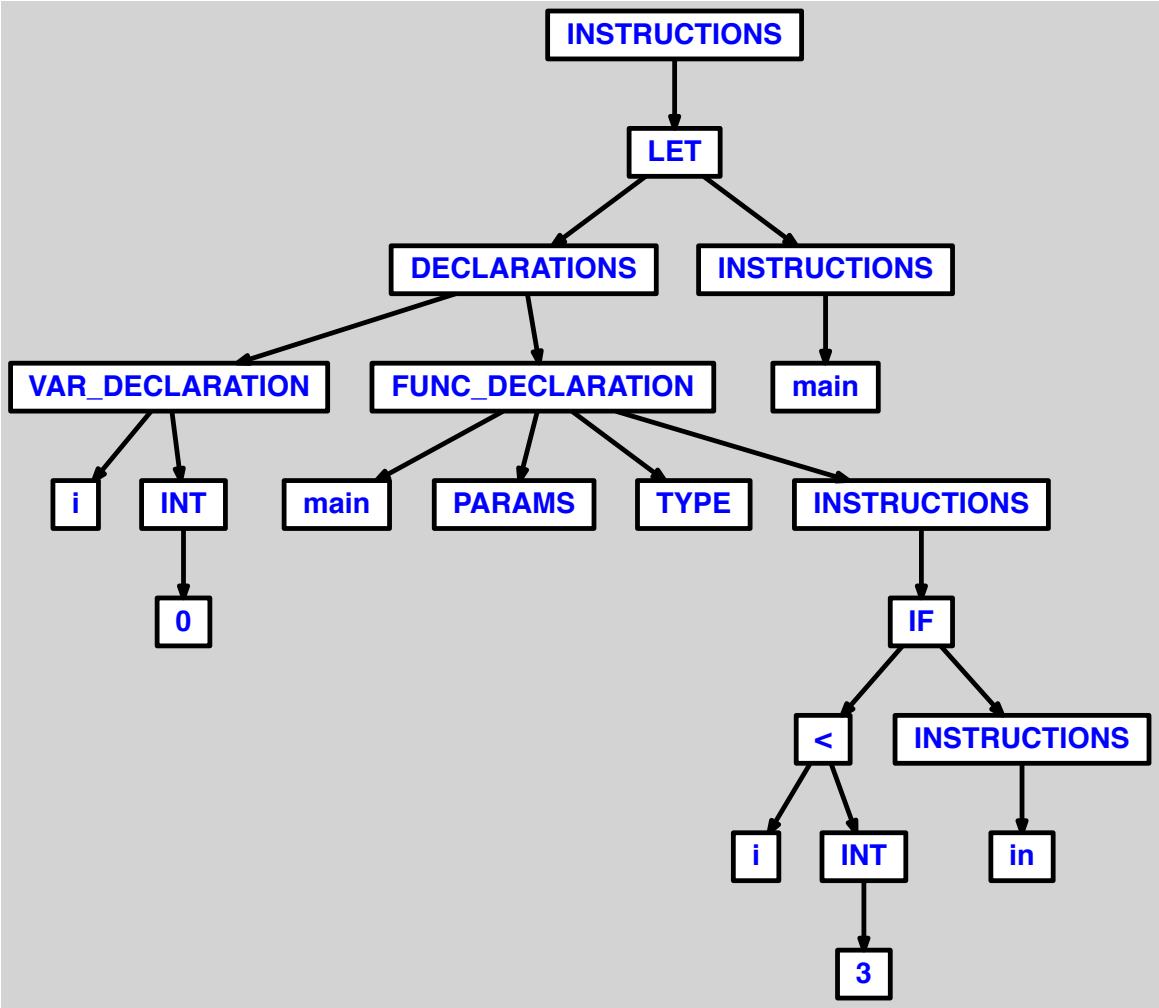
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
<
INSTRUCTIONS
i
INT
in
3

9.2.2 <if then> avec ligne vide

```
let
  var i := 0

  function main() =
    if i < 3 then

in main() end
```


INSTRUCTIONS
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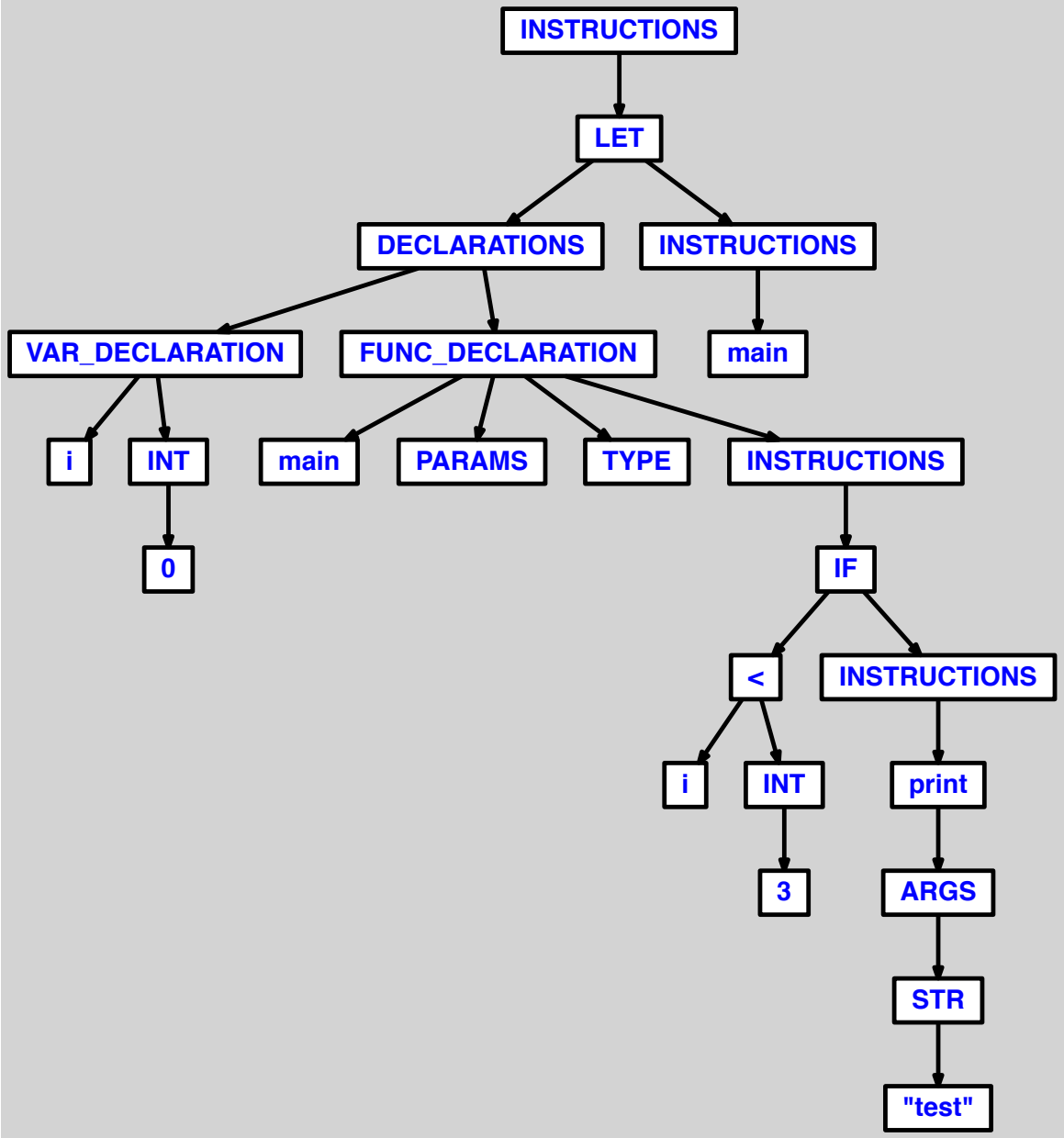
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
<
INSTRUCTIONS
i
INT
in
3

9.2.3 <if then> avec simple condition

```
let
  var i := 0

  function main() =
    if i < 3 then
      print("test")
in main() end
```


INSTRUCTIONS
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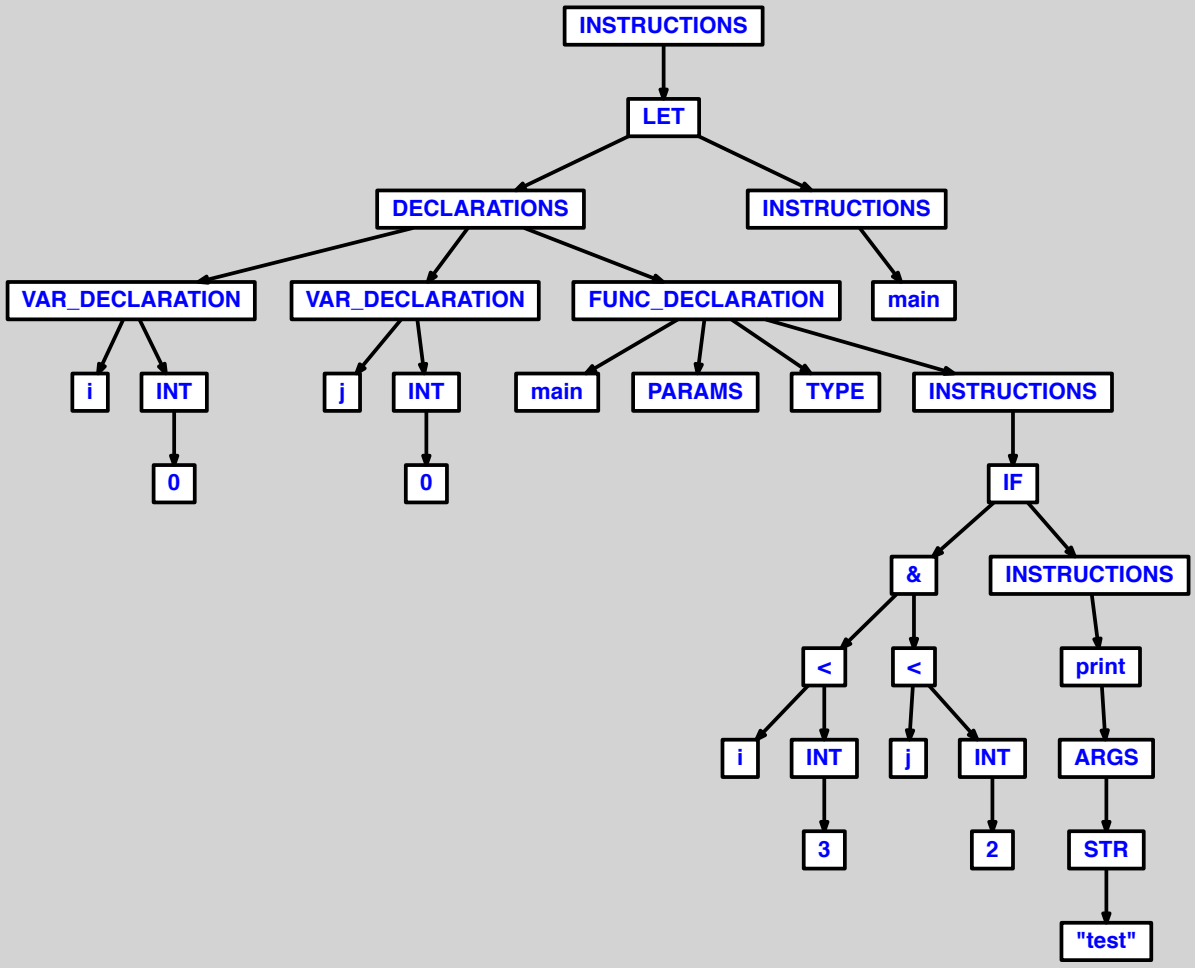
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
IF
<
INSTRUCTIONS
i
INT
print
3
ARGS
STR
"test"

9.2.4 <if then> avec double-condition

```
let
  var i := 0
  var j := 0

  function main() =
    if i < 3 & j < 2 then
      print("test")
in main() end
```


INSTRUCTIONS
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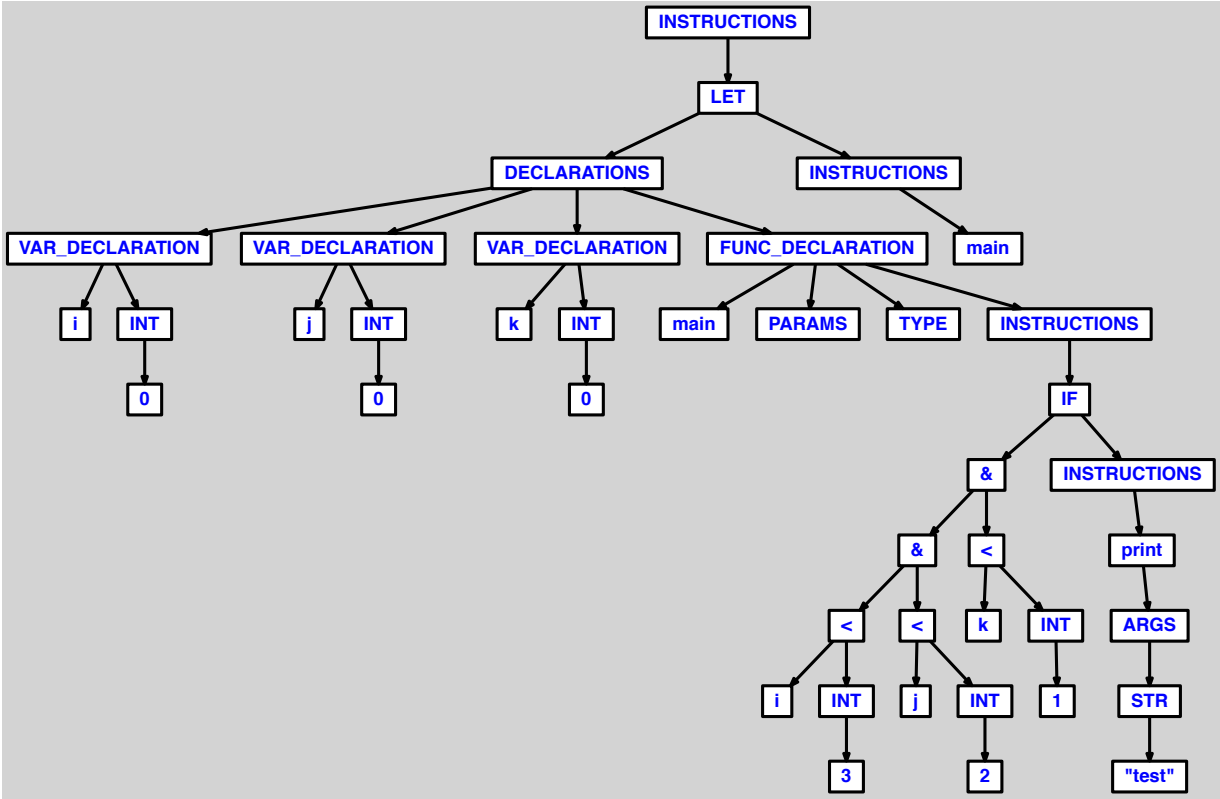
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
0
IF
&
INSTRUCTIONS
<
<
print
i
INT
j
INT
ARGS
3
2
STR
"test"

9.2.5 <if then> avec triple-condition

```
let
  var i := 0
  var j := 0
  var k := 0

  function main() =
    if i < 3 & j < 2 & k < 1 then
      print("test")
in main() end
```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VAR_DECLARATION
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FUNC_DECLARATION
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k
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
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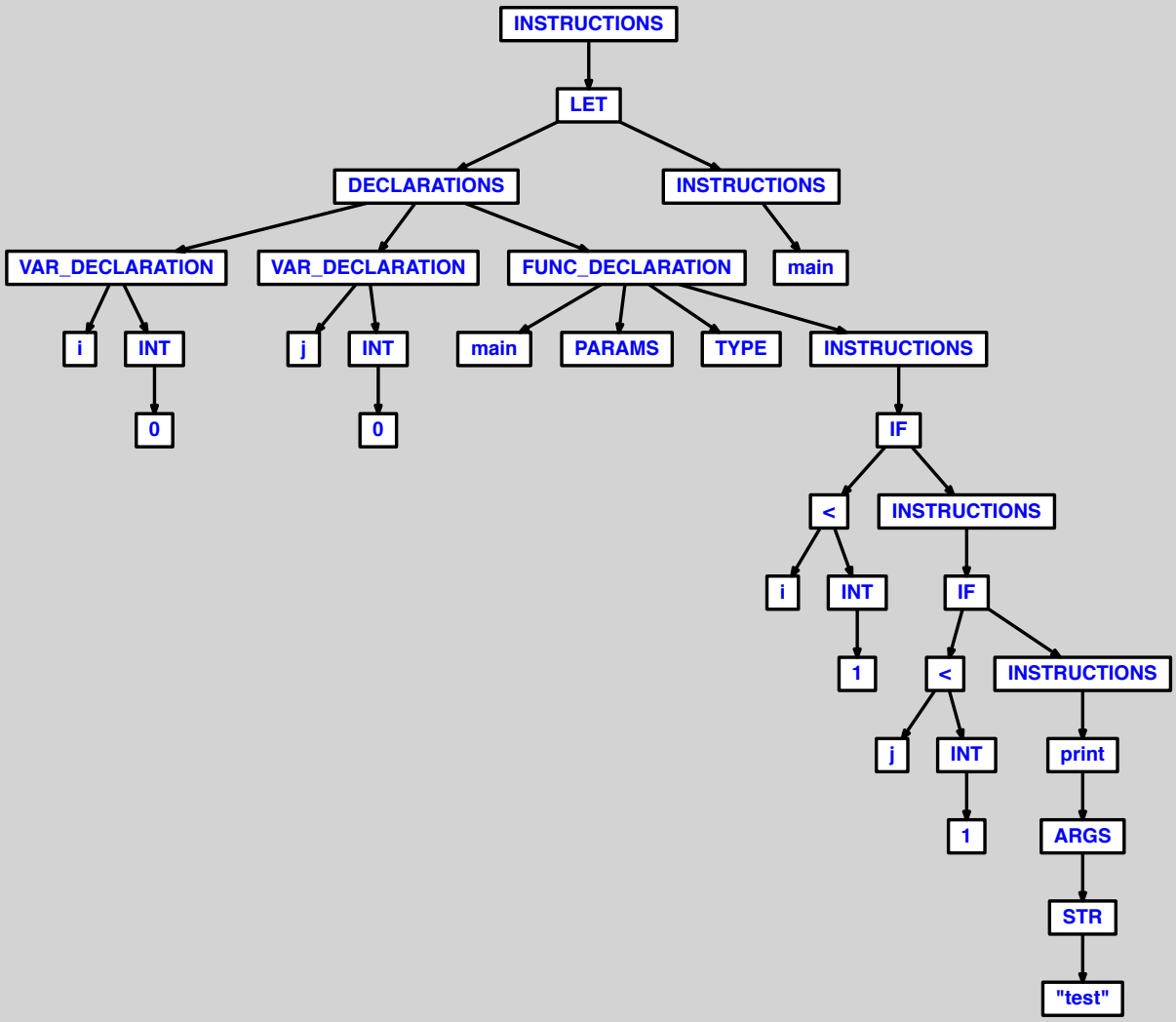
0
IF
&
INSTRUCTIONS
&
<
print
<
<
k
INT
ARGS
i
INT
j
INT
1
STR
3
2
"test"

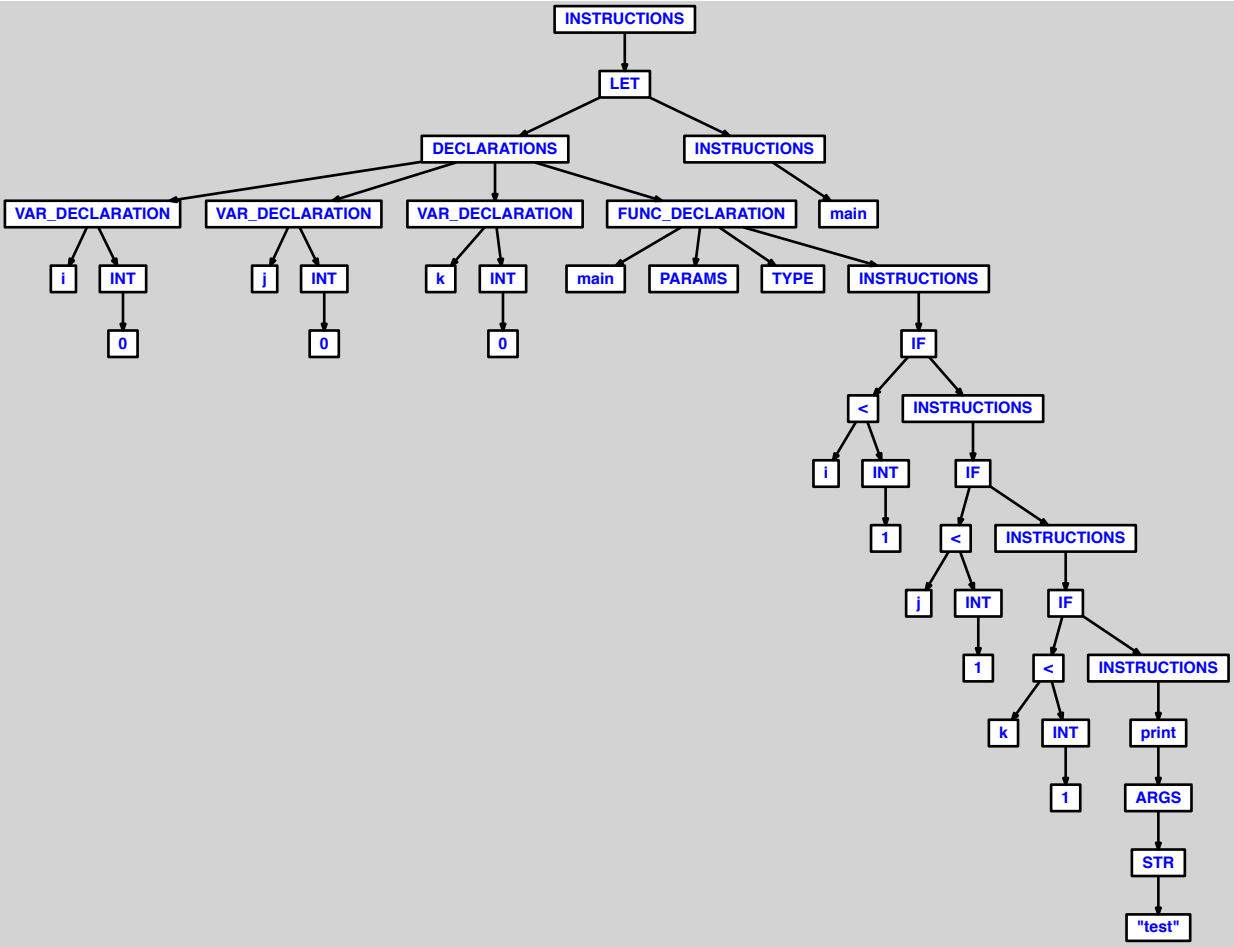
9.2.6 double-imbrication de <if then>

```
let
  var i := 0
  var j := 0

  function main() =
    if i < 1 then
      if j < 1 then
        print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
0
IF
<
INSTRUCTIONS
i
INT
IF
1
<
INSTRUCTIONS
j
INT
print
1
ARGS
STR
"test"

9.2.7 triple-imbrication de <if then>

```
let
  var i := 0
  var j := 0
  var k := 0

  function main() =
    if i < 1 then
      if j < 1 then
        if k < 1 then
          print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
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VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
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k
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
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IF
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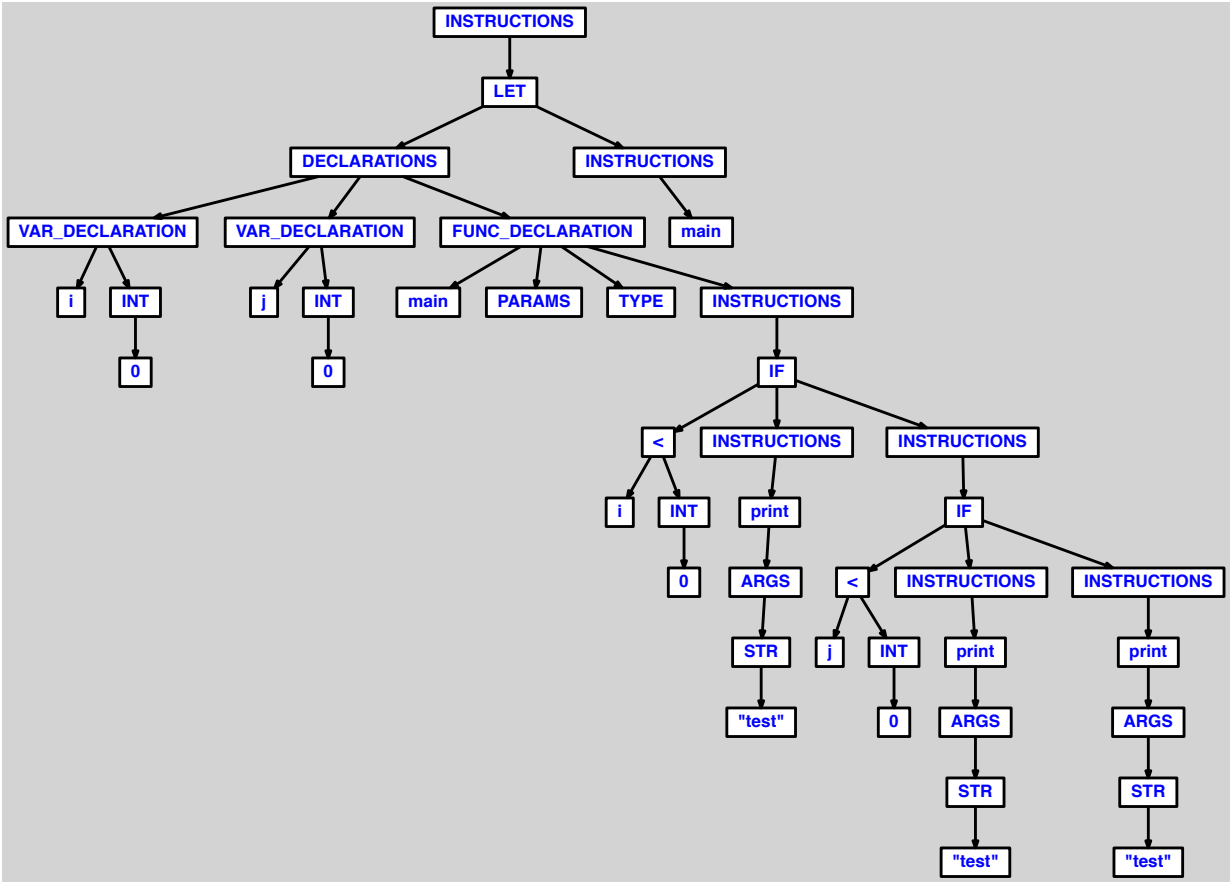
INSTRUCTIONS
i
INT
IF
1
<
INSTRUCTIONS
j
INT
IF
1
<
INSTRUCTIONS
k
INT
print
1
ARGS
STR
"test"

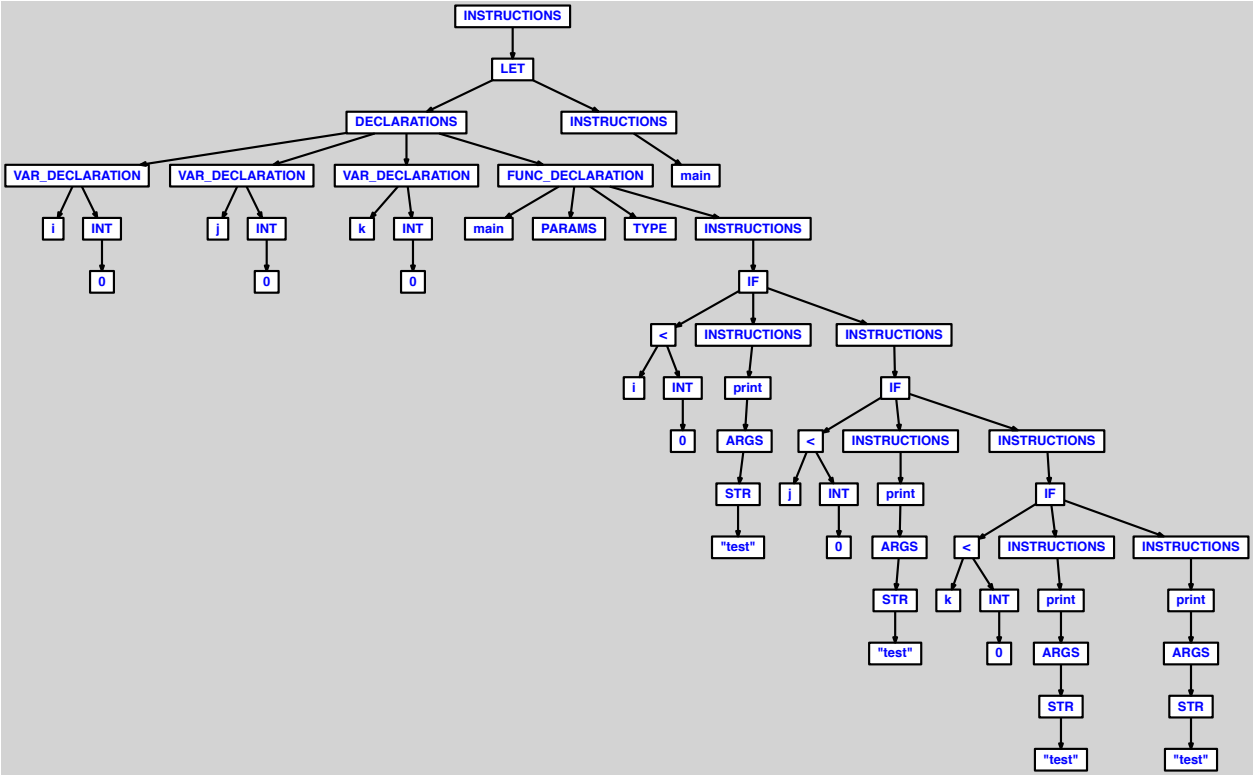
9.2.8 double-imbrication de <if then else>

```
let
  var i := 0
  var j := 0

  function main() =
    if i < 0 then
      print("test")
    else
      if j < 0 then
        print("test")
      else
        print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
0
IF
<
INSTRUCTIONS
INSTRUCTIONS
i
INT
print
IF
0
ARGS
<
INSTRUCTIONS
INSTRUCTIONS
STR
j
INT
print
print
"test"
0
ARGS
ARGS
STR
STR
"test"
"test"

9.2.9 triple-imbrication de <if then else>

```
let
  var i := 0
  var j := 0
  var k := 0

  function main() =
    if i < 0 then
      print("test")
    else
      if j < 0 then
        print("test")
      else
        if k < 0 then
          print("test")
        else
          print("test")
in main() end
```

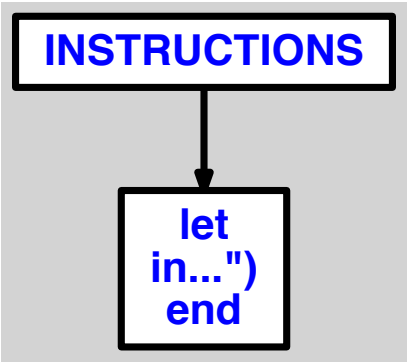

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
0
0
IF
<
INSTRUCTIONS
INSTRUCTIONS
i
INT
print
IF
0
ARGS
<
INSTRUCTIONS
INSTRUCTIONS
STR
j
INT
print
IF
"test"
0
ARGS
<
INSTRUCTIONS
INSTRUCTIONS
STR
k
INT
print
print
"test"
0
ARGS
ARGS
STR
STR
"test"
"test"

10 let

10.1 KO

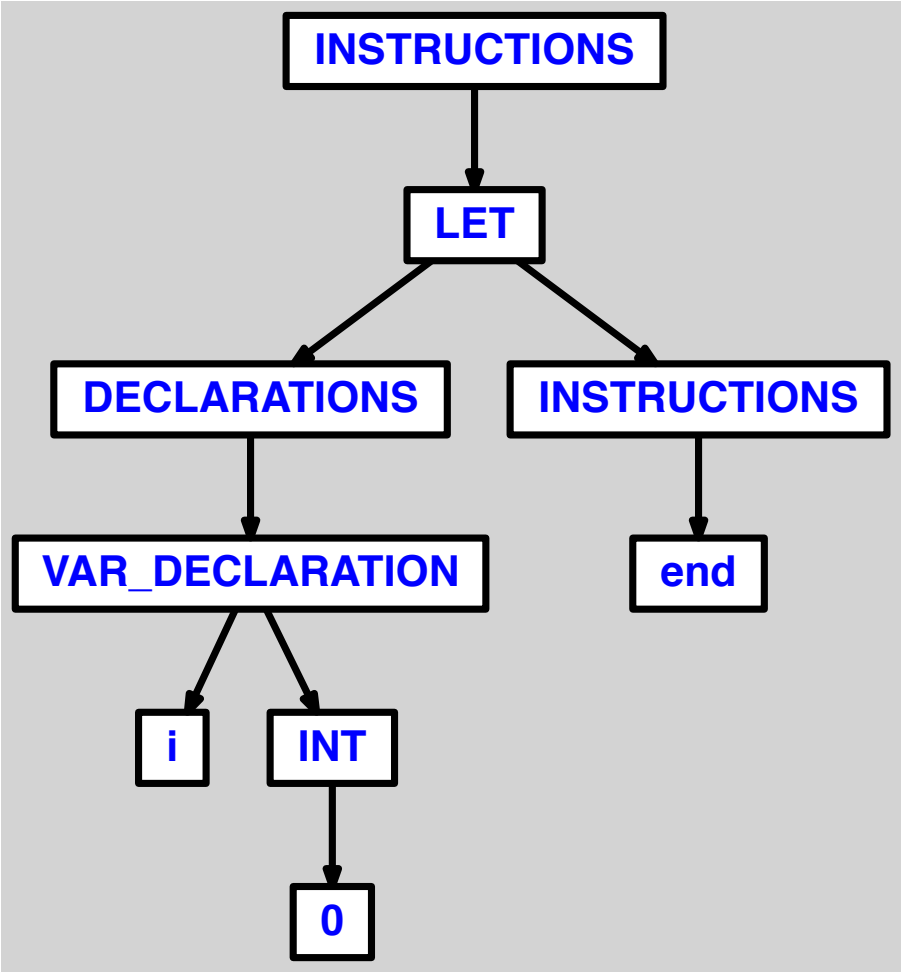
10.1.1 <let> sans declaration

```
let
in
  print("test")
end
```


INSTRUCTIONS
let
in...")
end

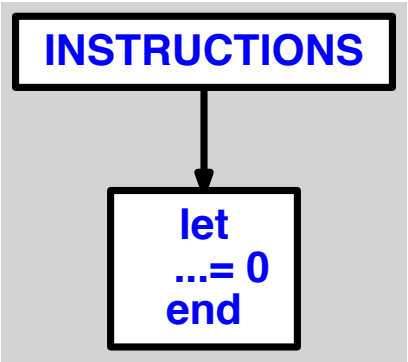
10.1.2 <let> sans instruction

```
let
  var i := 0
in
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
end
i
INT
0

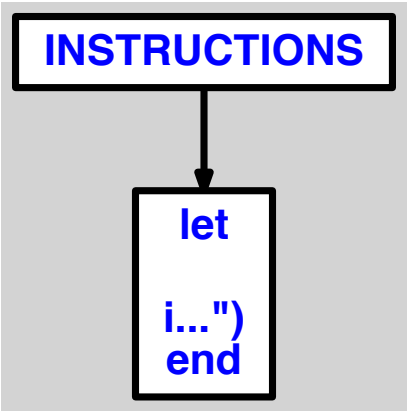
10.1.3 <let> avec inversion de declaration et instruction

```
let
  printi(i)
in
  var i := 0
end
```


INSTRUCTIONS
let
...= 0
end

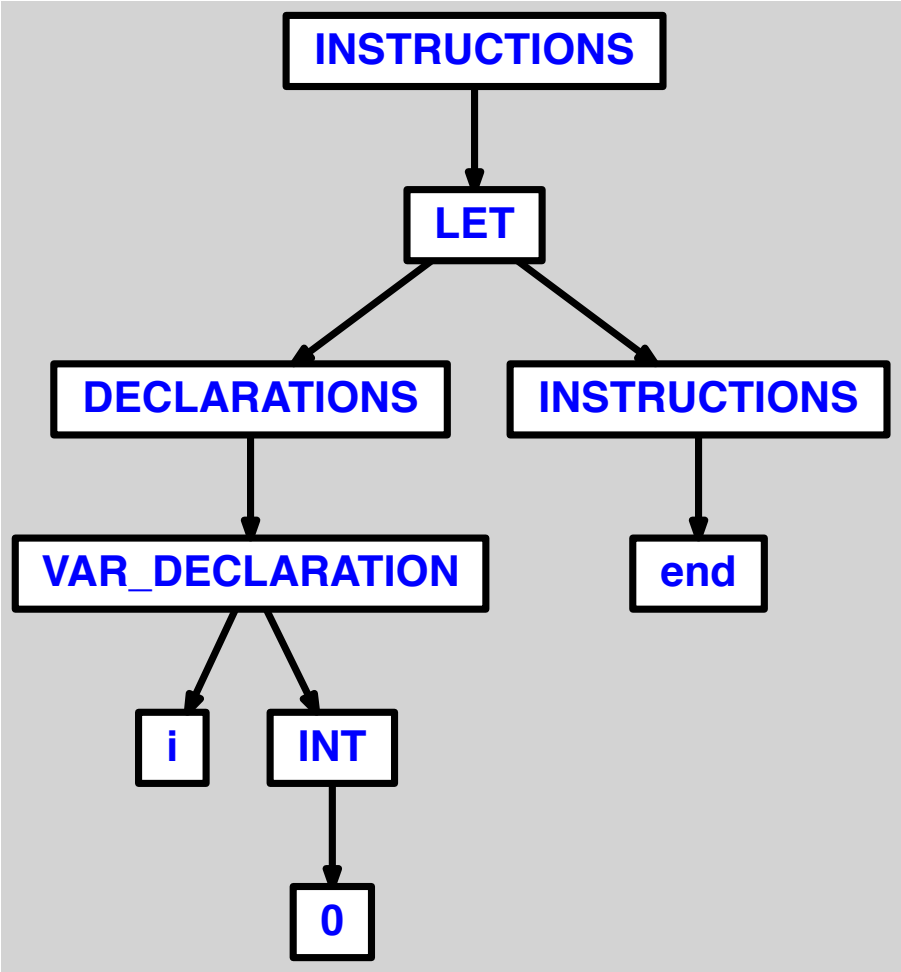
10.1.4 <let> avec declaration vide

```
let

in
  print("test")
end
```


INSTRUCTIONS
let
i...")
end

10.1.5 <let> avec instruction vide

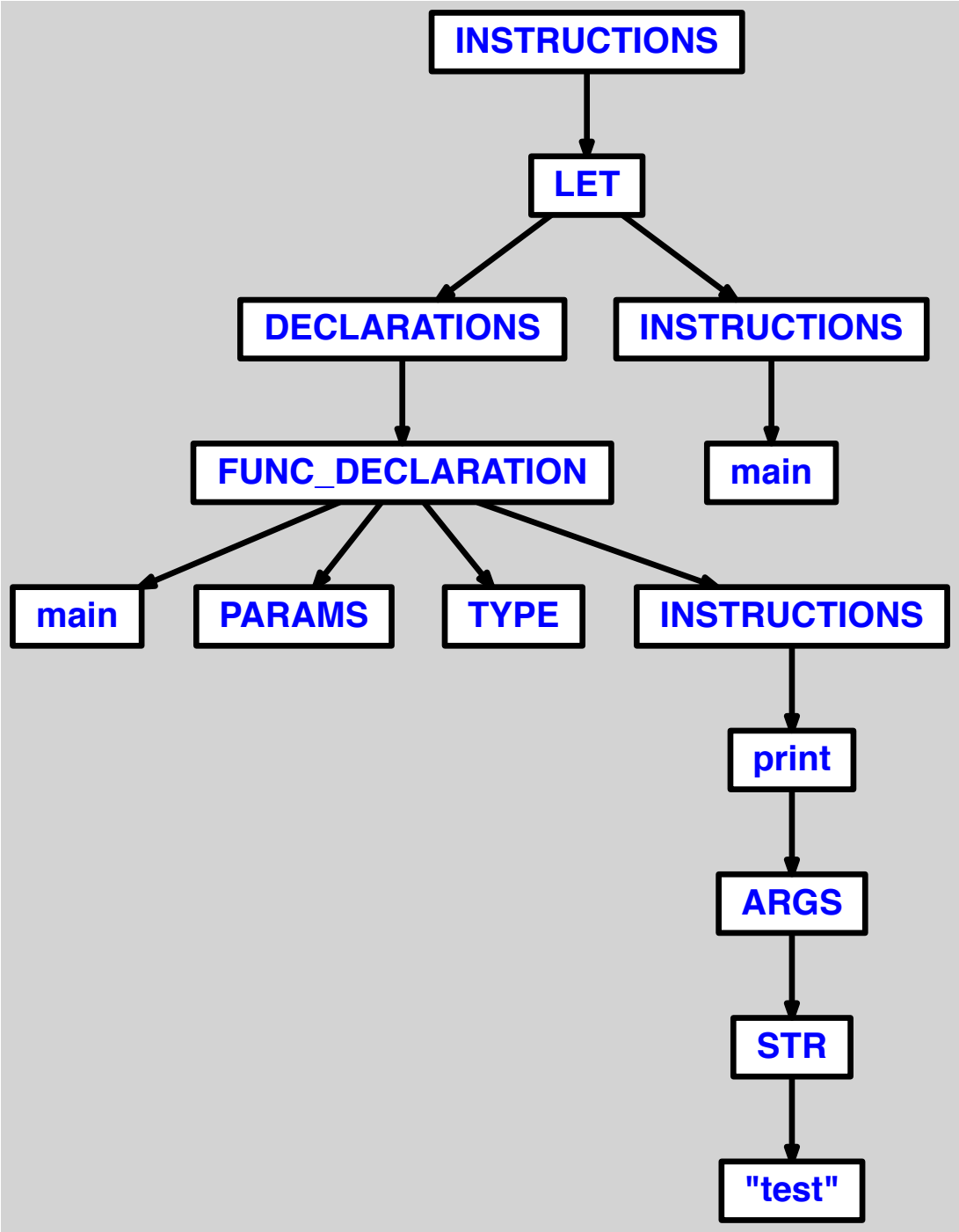
```
let
  var i := 0
in

end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
end
i
INT
0

10.2 OK

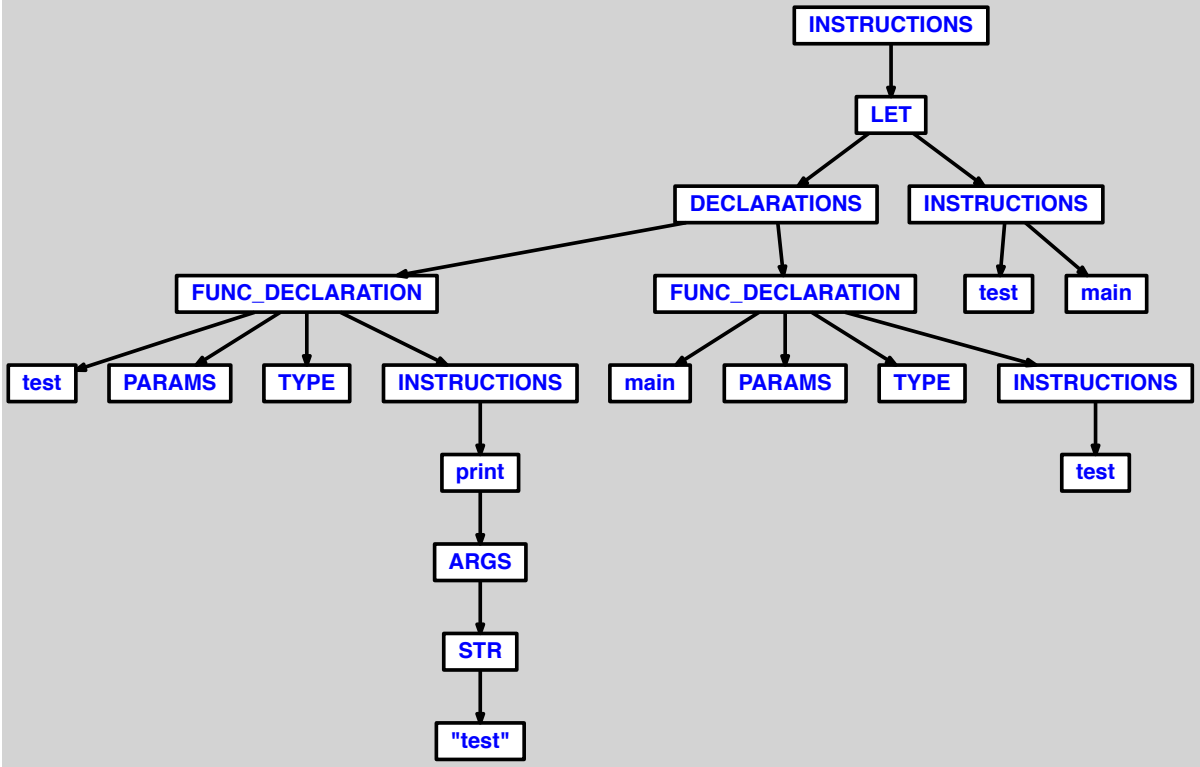
10.2.1 <let> avec 1 declaration de fonction et 1 appel de fonction

```
let
  function main() = print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
print
ARGS
STR
"test"

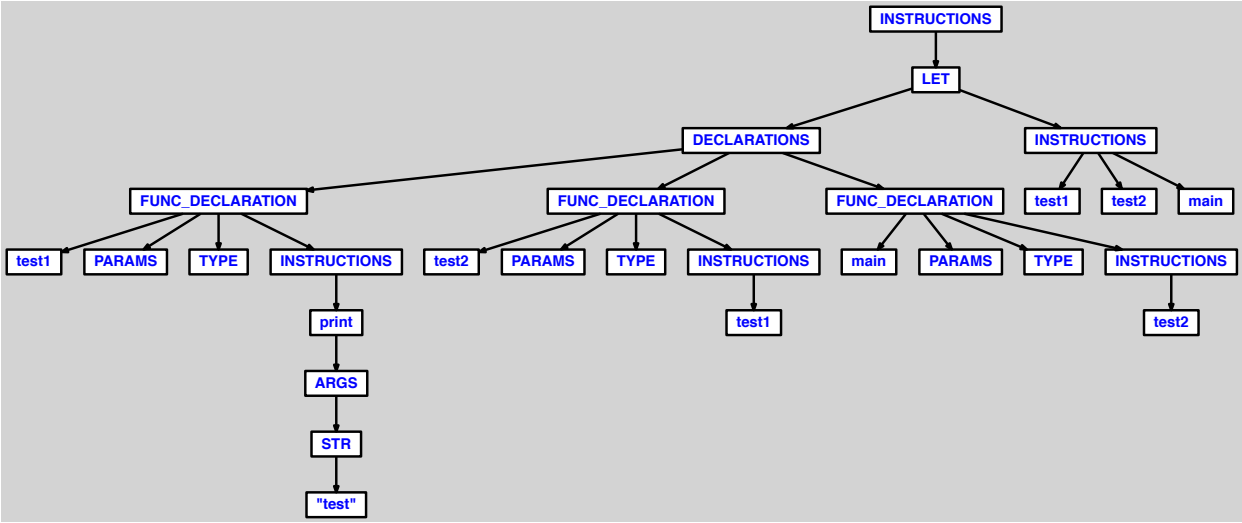
10.2.2 <let> avec 2 declarations de fonction et 2 appels de fonction

```
let
  function test() = print("test")

  function main() = test()
in
  (test(); main())
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
FUNC_DECLARATION
test
main
test
PARAMS
TYPE
INSTRUCTIONS
main
PARAMS
TYPE
INSTRUCTIONS
print
test
ARGS
STR
"test"

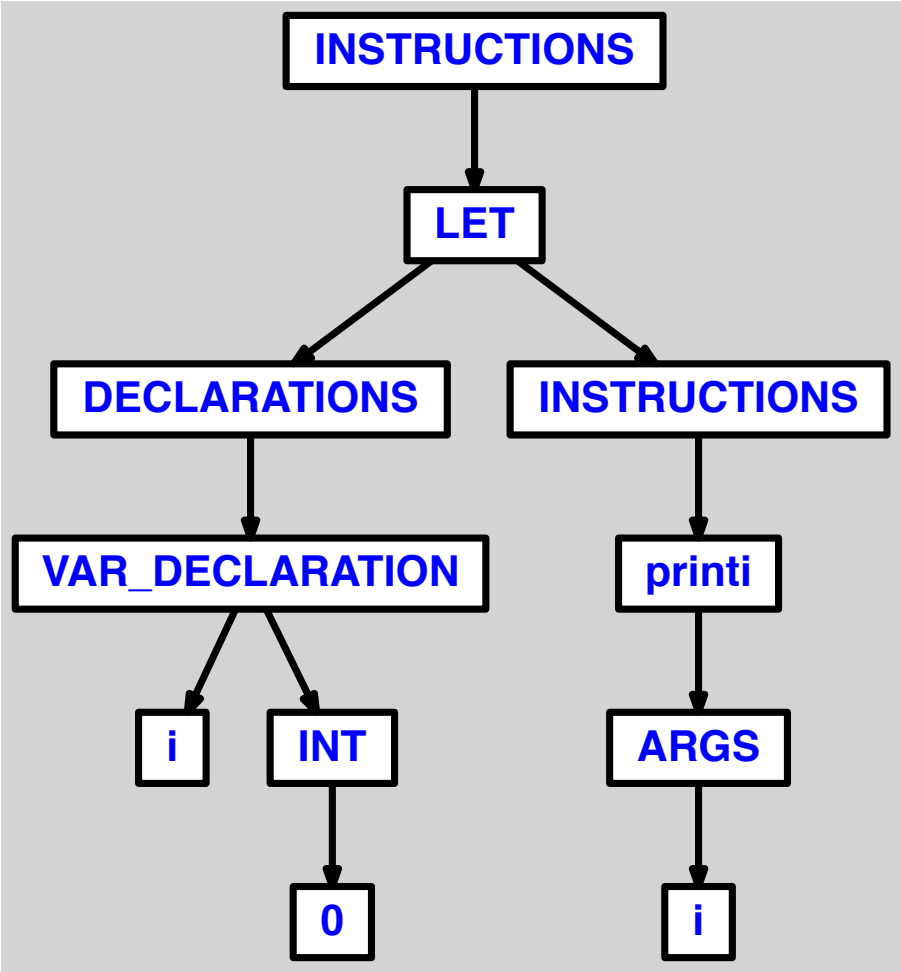
10.2.3 <let> avec 3 declarations de fonction et 3 appels de fonction

```
let
  function test1() = print("test")

  function test2() = test1()

  function main() = test2()
in
  (test1(); test2(); main())
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
FUNC_DECLARATION
FUNC_DECLARATION
test1
test2
main
test1
PARAMS
TYPE
INSTRUCTIONS
test2
PARAMS
TYPE
INSTRUCTIONS
main
PARAMS
TYPE
INSTRUCTIONS
print
test1
test2
ARGS
STR
"test"

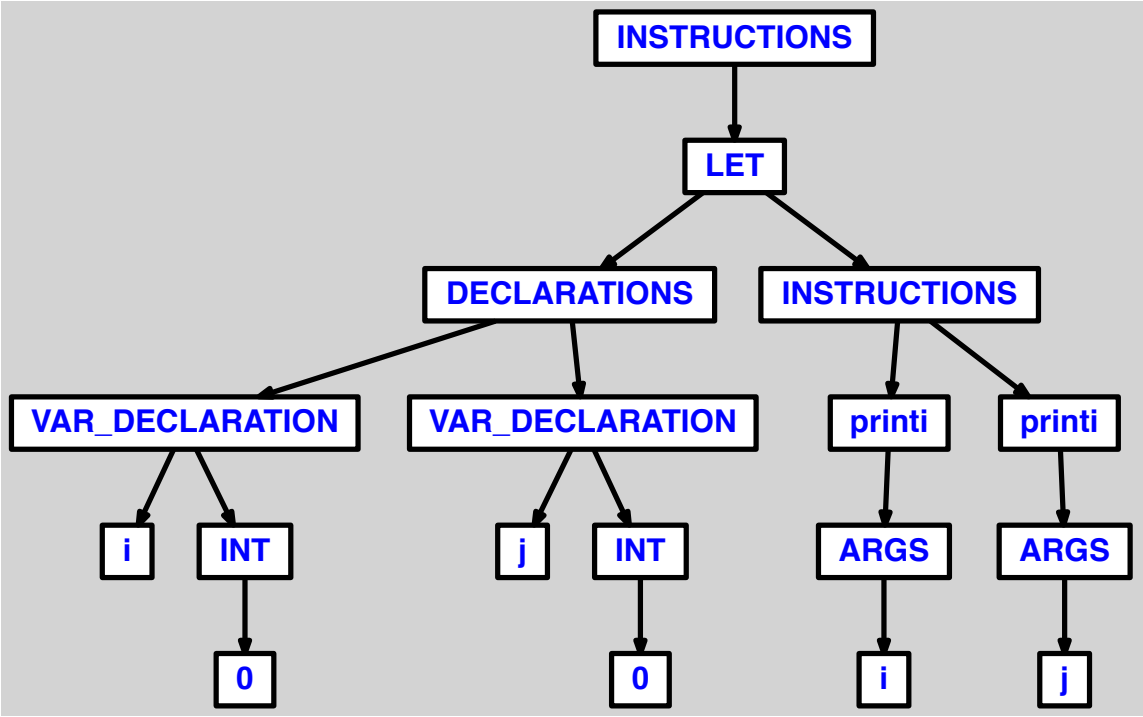
10.2.4 <let> avec 1 declaration de variable et 1 instruction

```
let
  var i := 0
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
printi
i
INT
ARGS
0
i

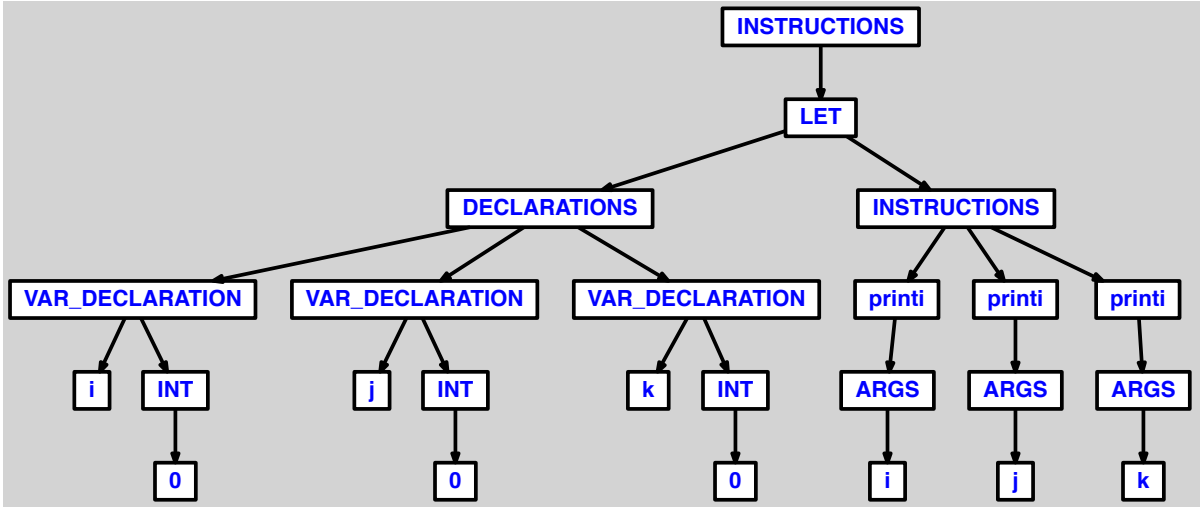
10.2.5 <let> avec 2 declarations de variable et 2 instructions

```
let
  var i := 0
  var j := 0
in
  (printi(i); printi(j))
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
printi
printi
i
INT
j
INT
ARGS
ARGS
0
0
i
j

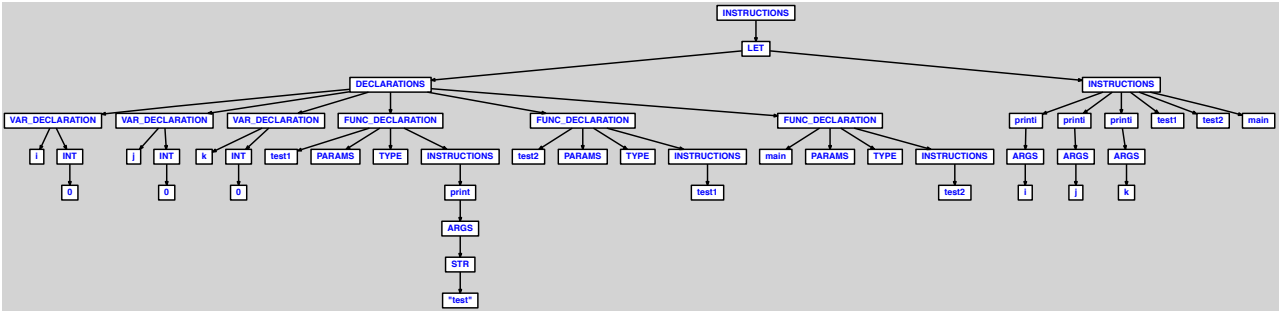
10.2.6 <let> avec 3 declarations de variable et 3 instructions

```
let
  var i := 0
  var j := 0
  var k := 0
in
  (printi(i); printi(j); printi(k))
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
printi
printi
printi
i
INT
j
INT
k
INT
ARGS
ARGS
ARGS
0
0
0
i
j
k

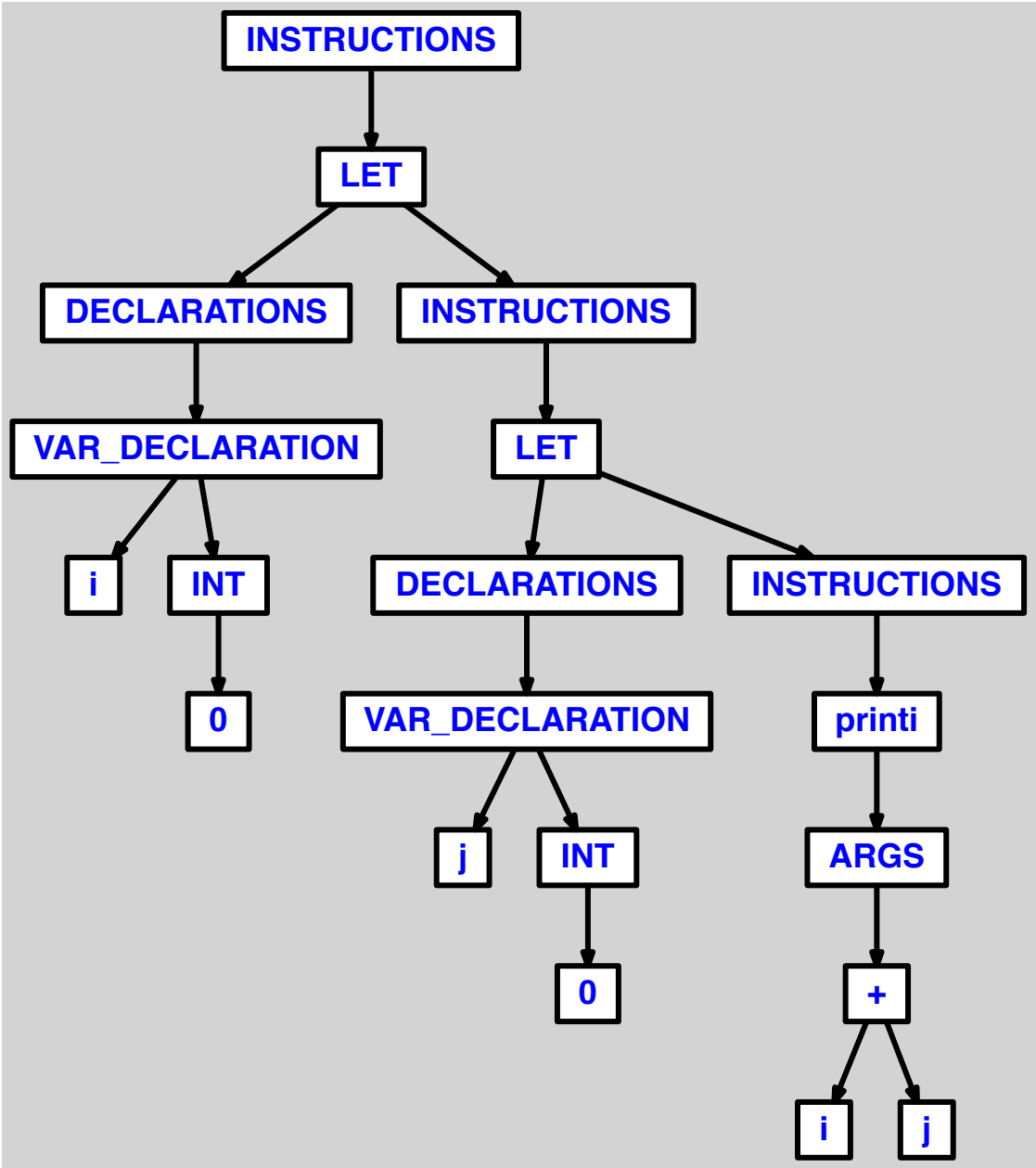
10.2.7 <let> avec 3 declarations de variable et fonction, et 3 instructions et appels de fonction

```
let
  var i := 0
  var j := 0
  var k := 0

  function test1() = print("test")

  function test2() = test1()

  function main() = test2()
in
  (printi(i);
  printi(j);
  printi(k);
  test1();
  test2();
  main())
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
FUNC_DECLARATION
FUNC_DECLARATION
printl
printl
printl
test1
test2
main
i
INT
j
INT
k
INT
test1
PARAMS
TYPE
INSTRUCTIONS
test2
PARAMS
TYPE
INSTRUCTIONS
main
PARAMS
TYPE
INSTRUCTIONS
ARGS
ARGS
ARGS
0
0
0
print
test1
test2
i
j
k
ARGS
STR
"test"

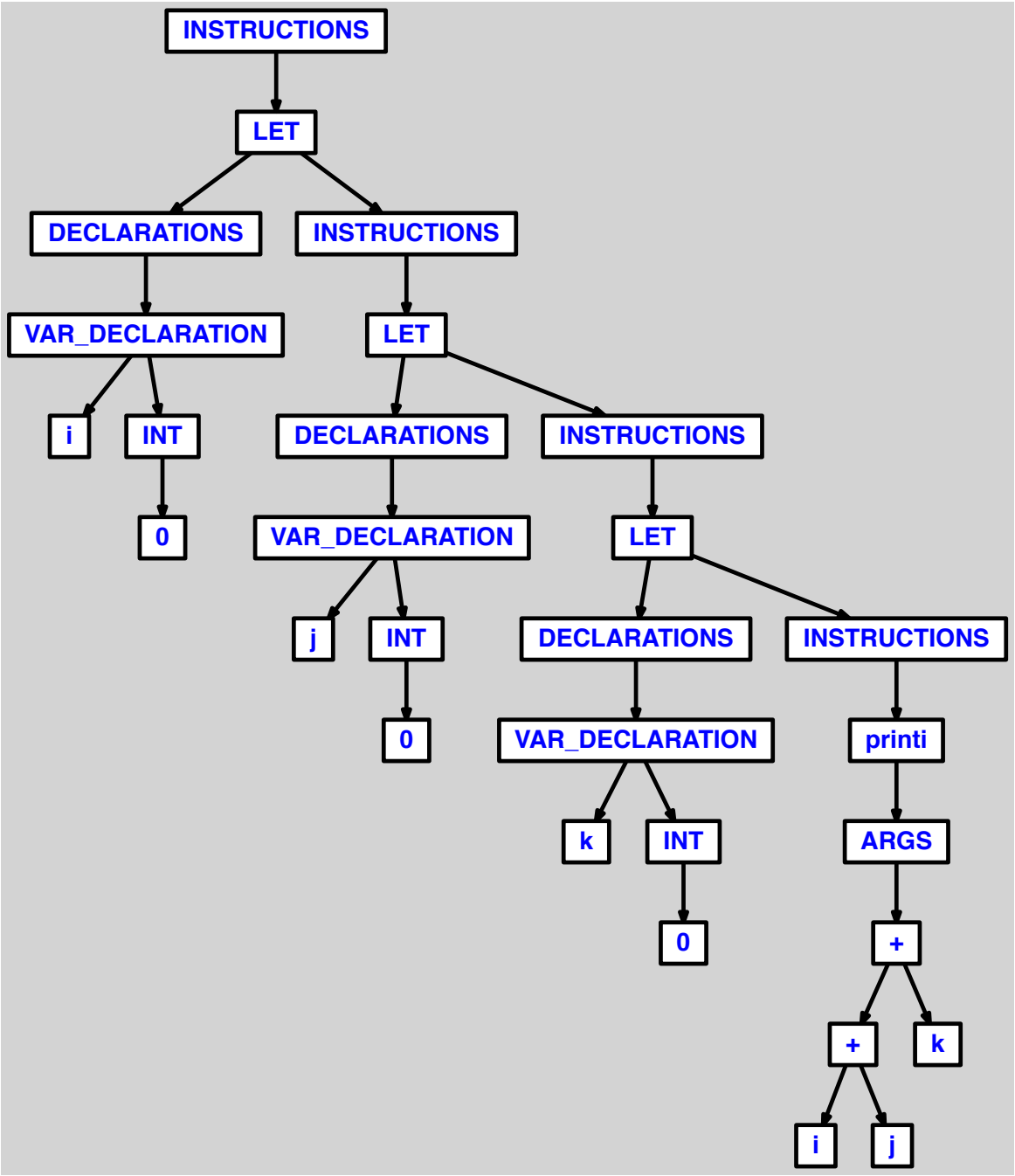
10.2.8 <let> avec double-imbrication

```
let
  var i := 0
in
  let
    var j := 0
  in
    printi(i+j)
  end
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
LET
i
INT
DECLARATIONS
INSTRUCTIONS
0
VAR_DECLARATION
printi
j
INT
ARGS
0
+
i
j

10.2.9 <let> avec triple-imbrication

```
let
  var i := 0
in
  let
    var j := 0
  in
    let
      var k := 0
    in
      printi(i+j+k)
    end
  end
end
```

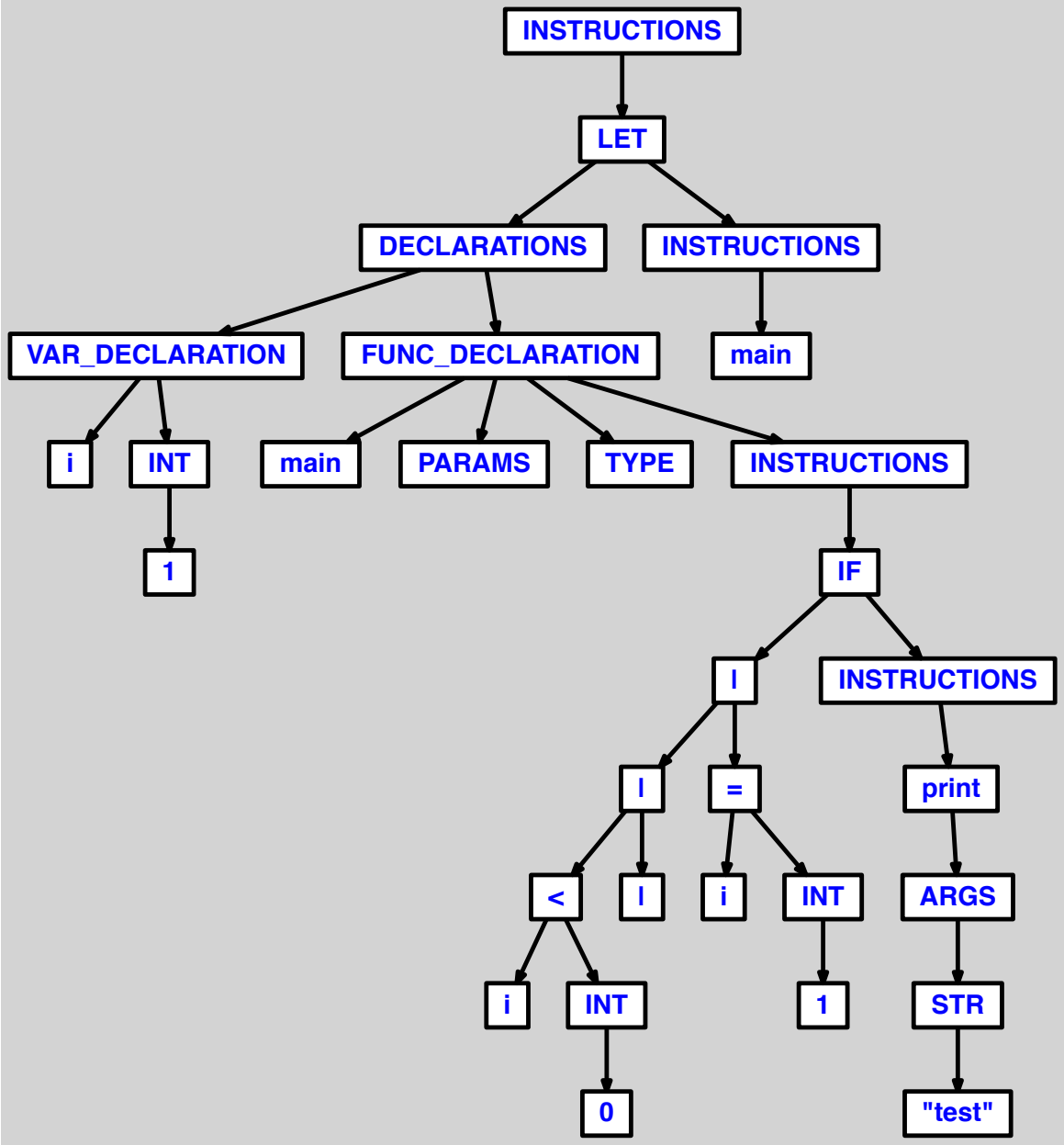

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
LET
i
INT
DECLARATIONS
INSTRUCTIONS
0
VAR_DECLARATION
LET
j
INT
DECLARATIONS
INSTRUCTIONS
0
VAR_DECLARATION
printi
k
INT
ARGS
0
+
+
k
i
j

11 or

11.1 KO

11.1.1 <|> mal ecrit

```
let
  var i := 1

  function main() =
    if i < 0 || i = 1 then print("test")
in main() end
```


INSTRUCTIONS
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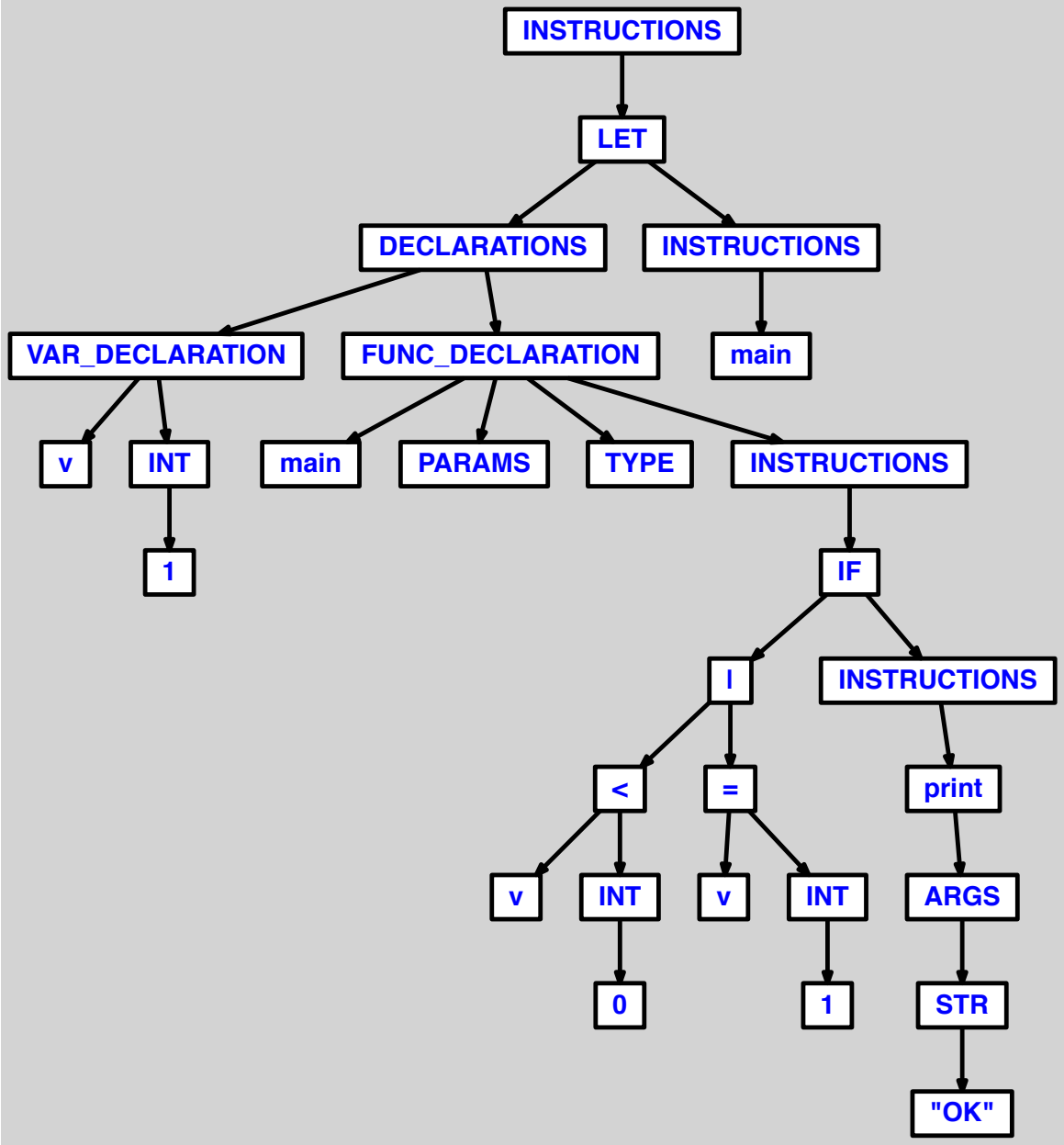
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
IF
I
INSTRUCTIONS
I
=
print
<
I
i
INT
ARGS
i
INT
1
STR
0
"test"

11.2 OK

11.2.1 condition avec 1 <|>

```
let
  var v := 1

  function main() =
    if v < 0 | v = 1 then print("OK")
in main() end
```


INSTRUCTIONS
LET
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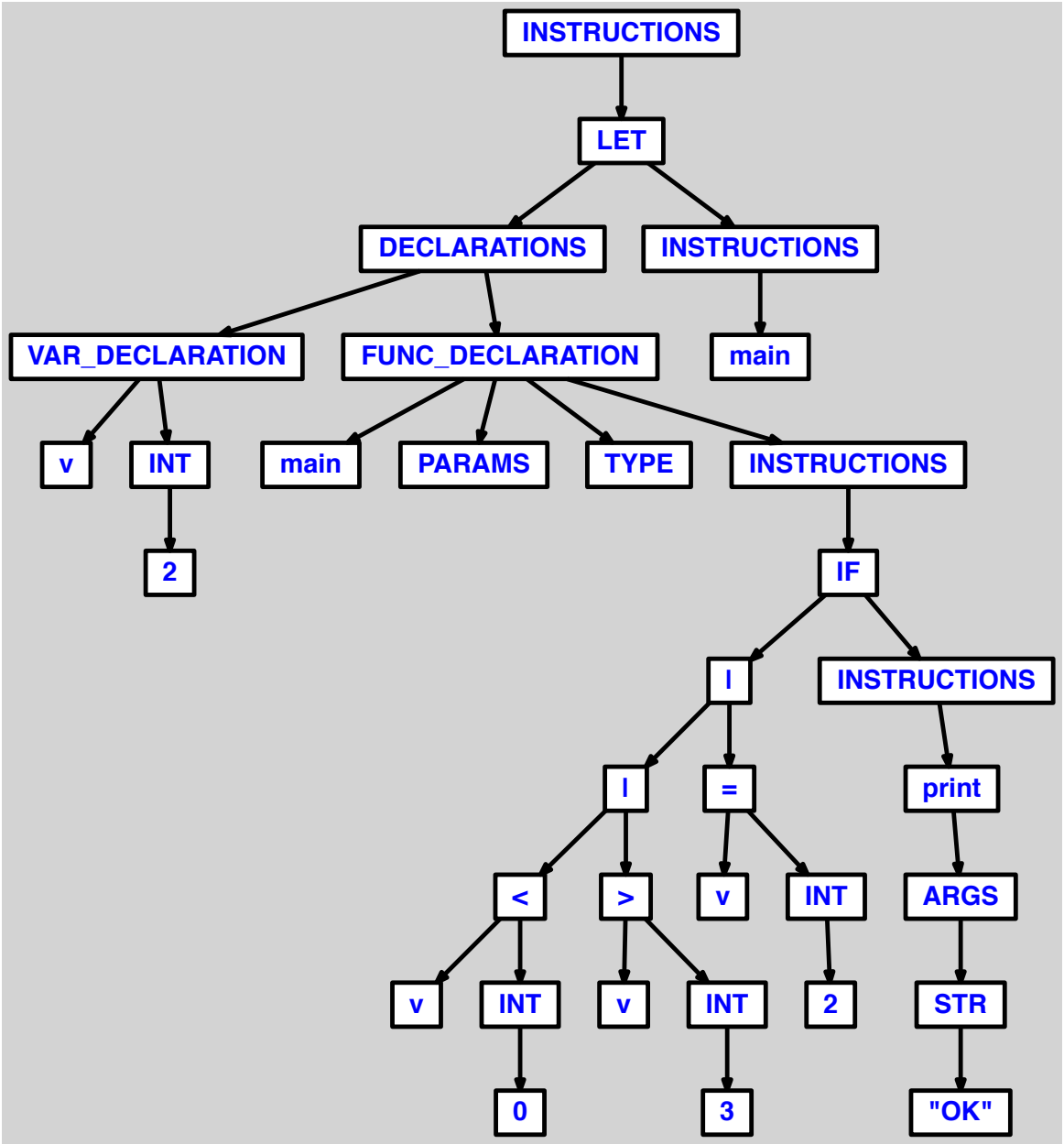
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
v
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
IF
|
INSTRUCTIONS
<
=
print
v
INT
v
INT
ARGS
0
1
STR
"OK"

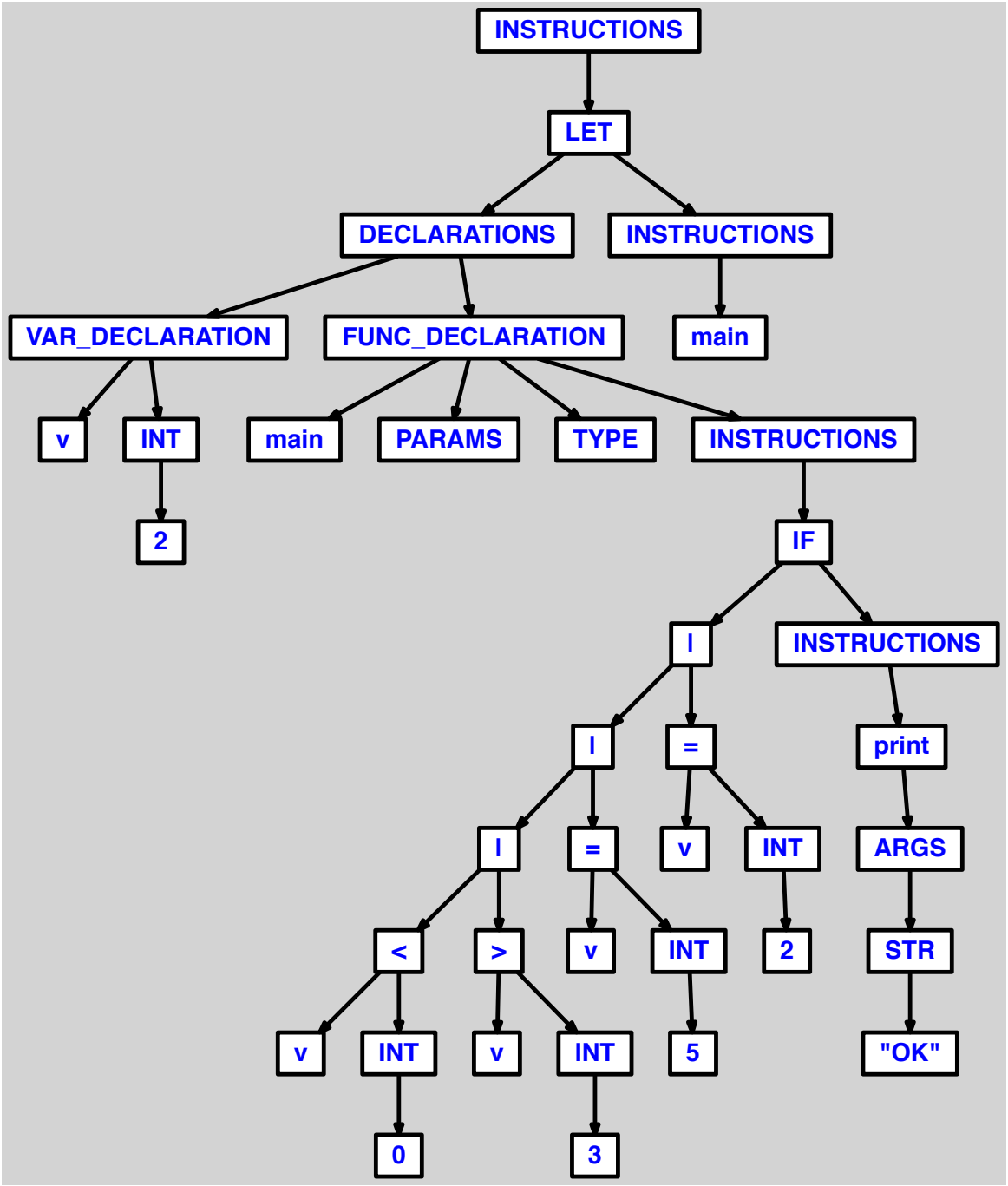
11.2.2 condition avec 2 <|>

```
let
  var v := 2

  function main() =
    if v < 0 | v > 3 | v = 2 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
v
INT
main
PARAMS
TYPE
INSTRUCTIONS
2
IF
|
INSTRUCTIONS
|
=
print
<
>
v
INT
ARGS
v
INT
v
INT
2
STR
0
3
"OK"

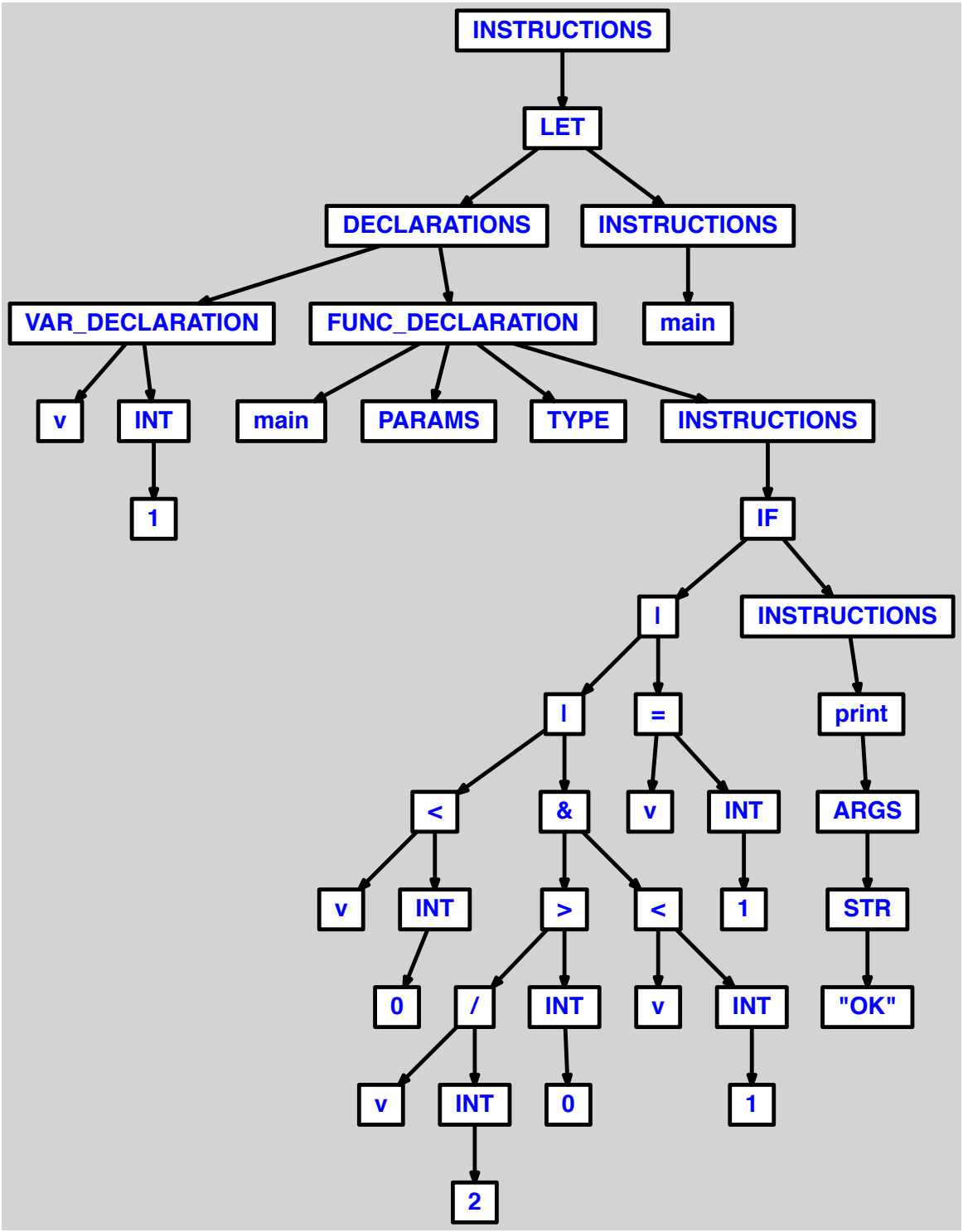
11.2.3 condition avec 3 <|>

```
let
  var v := 2

  function main() =
    if v < 0 | v > 3 | v = 5 | v = 2 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
v
INT
main
PARAMS
TYPE
INSTRUCTIONS
2
IF
I
INSTRUCTIONS
I
=
print
I
=
v
INT
ARGS
<
>
v
INT
2
STR
v
INT
v
INT
5
"OK"
0
3

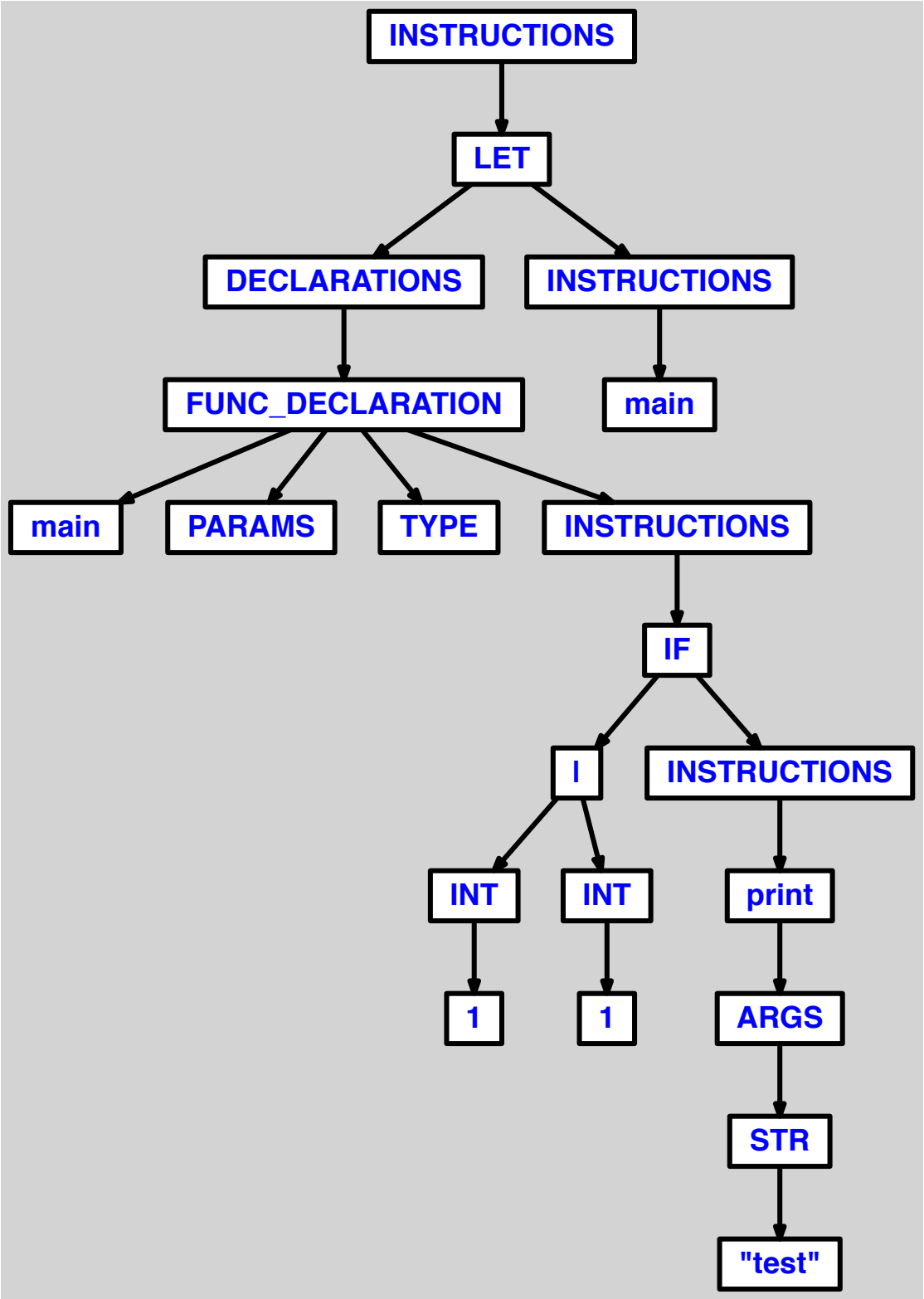
11.2.4 condition avec 2 <|> et 1 <&>

```
let
  var v := 1

  function main() =
    if v < 0 | v/2 > 0 & v < 1 | v = 1 then print("OK")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
v
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
IF
|
INSTRUCTIONS
|
=
print
<
&
v
INT
ARGS
v
INT
>
<
1
STR
0
/
INT
v
INT
"OK"
v
INT
0
1
2

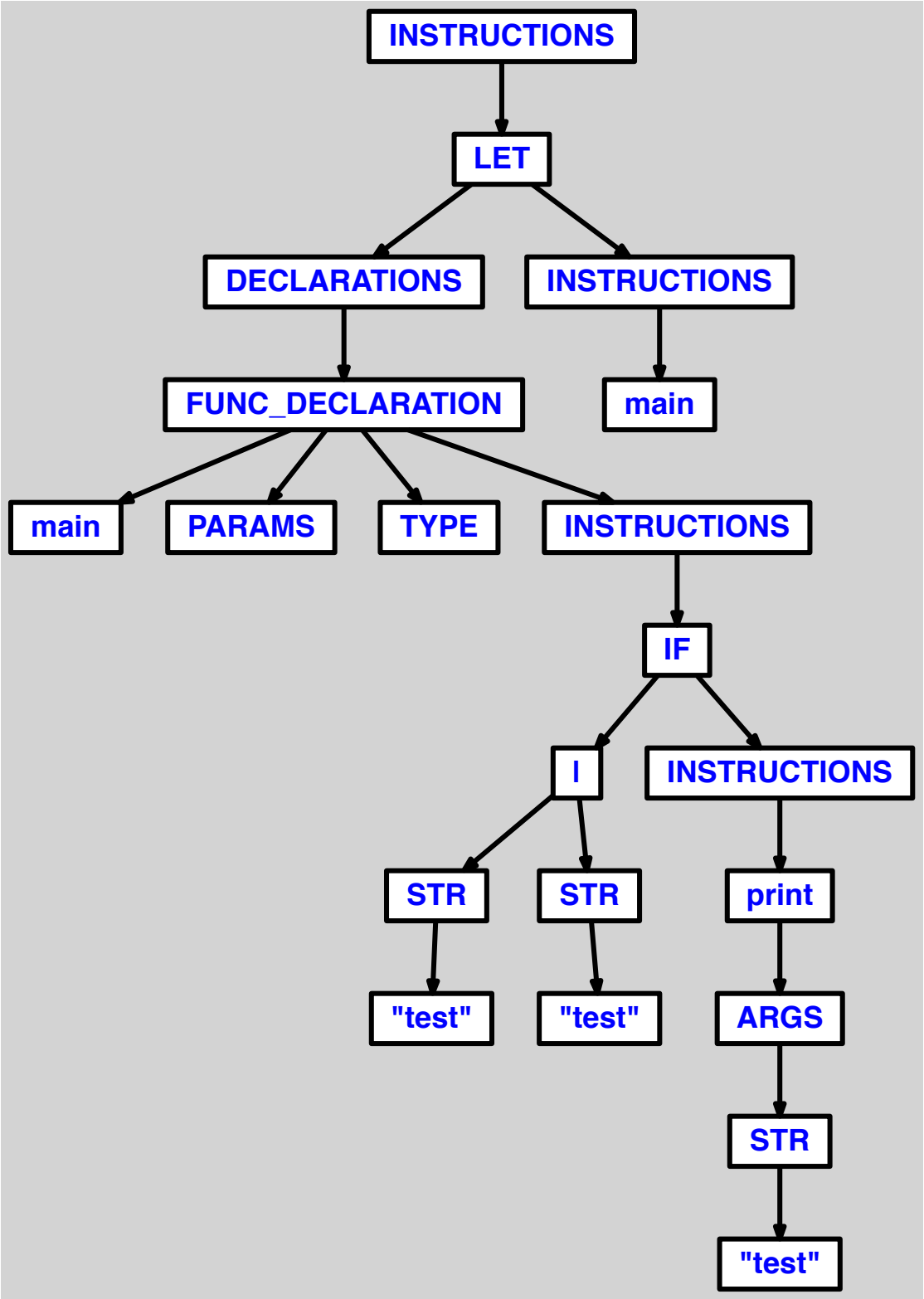
11.2.5 <|> avec des entiers

```
let
  function main() =
    if 1 | 1 then print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
I
INSTRUCTIONS
INT
INT
print
1
1
ARGS
STR
"test"

11.2.6 <|> avec des chaines

```
let
  function main() =
    if "test" | "test" then print("test")
in main() end
```

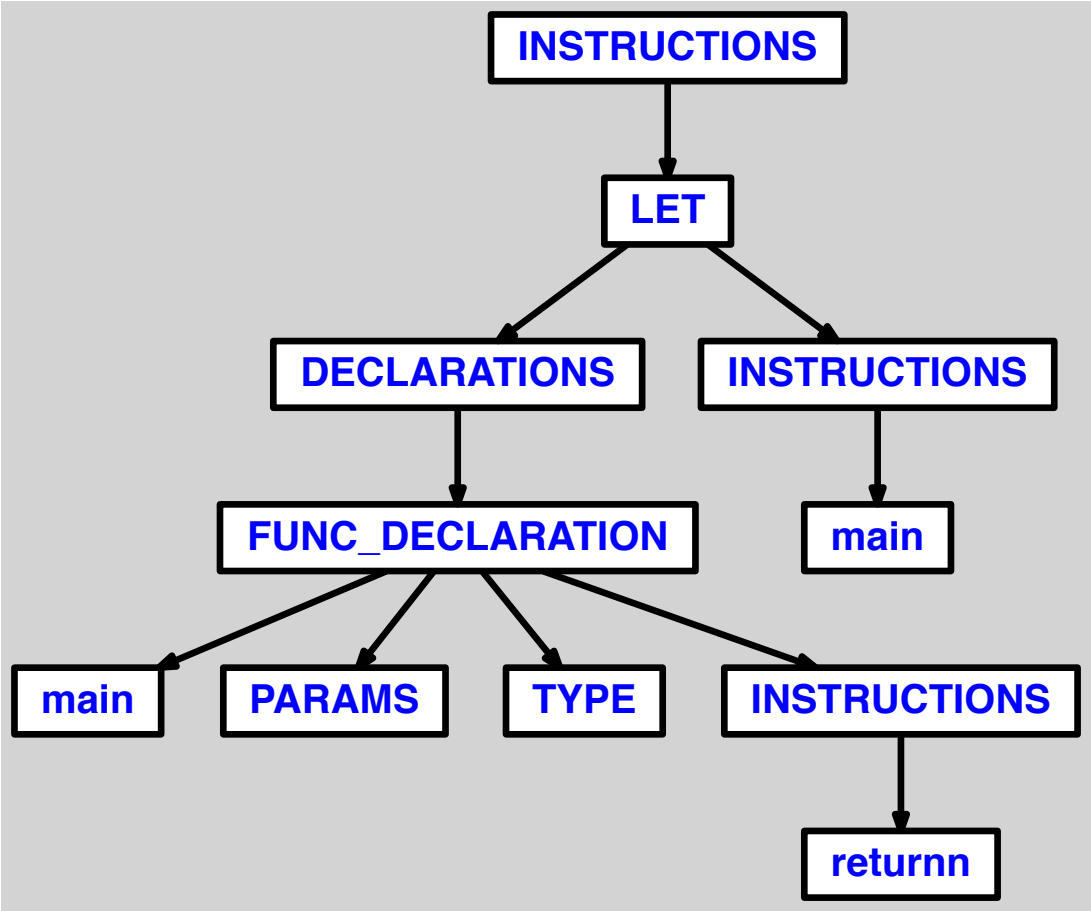

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
IF
I
INSTRUCTIONS
STR
STR
print
"test"
"test"
ARGS
STR
"test"

12 return

12.1 KO

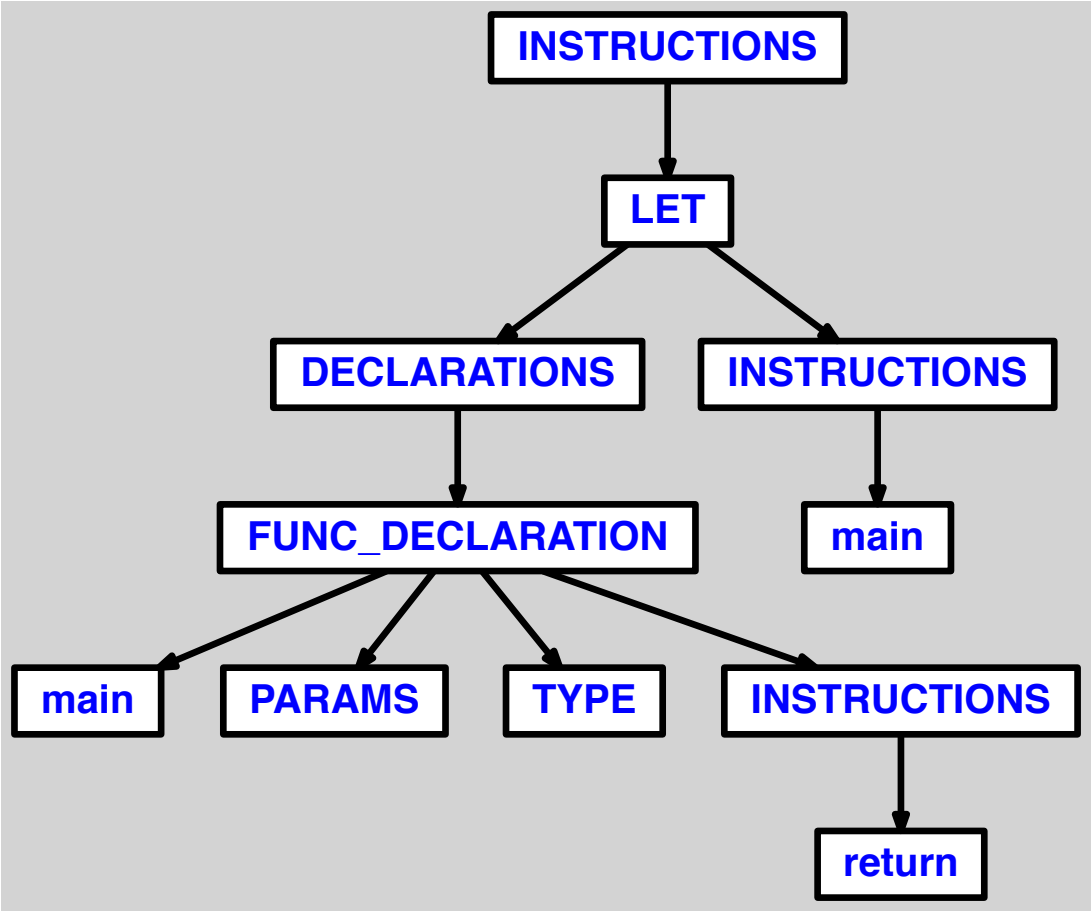
12.1.1 <return> mal ecrit

```
let
  function main() = returnn 1
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
returnn

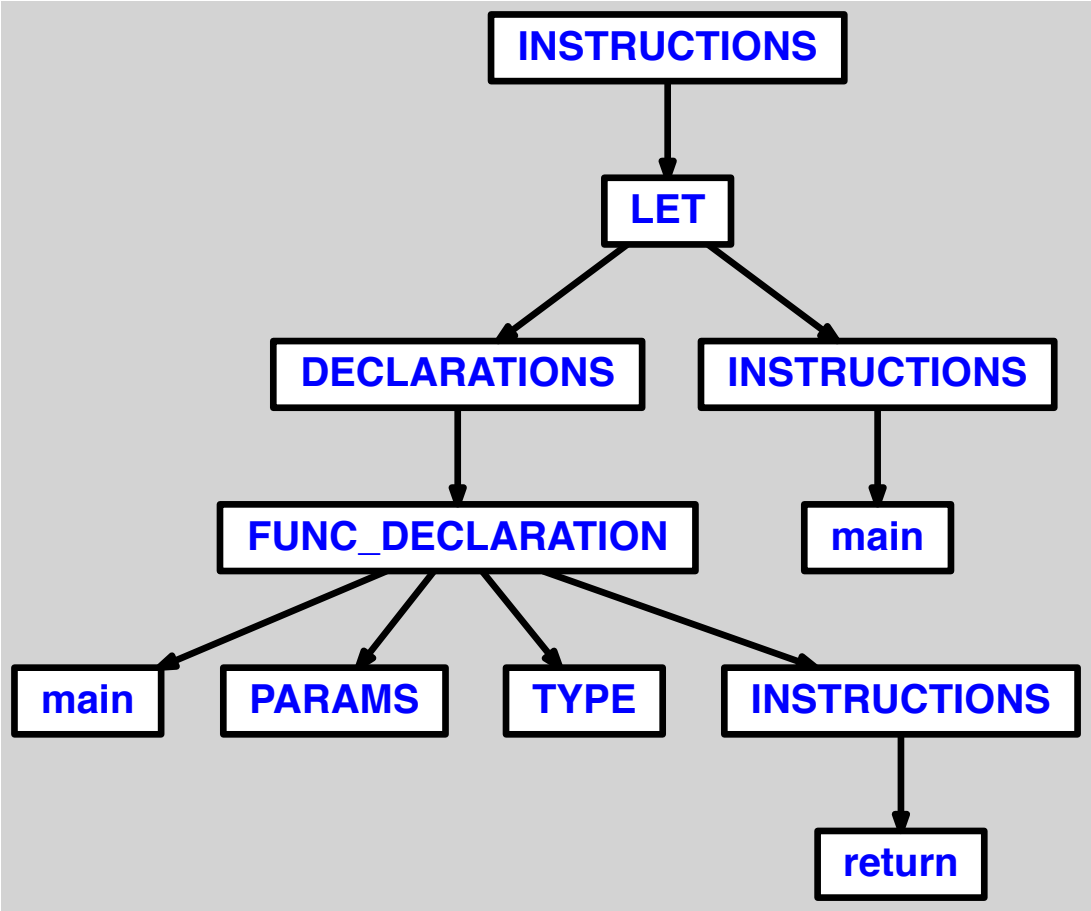
12.1.2 <return> sans valeur

```
let
  function main() = return
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
return

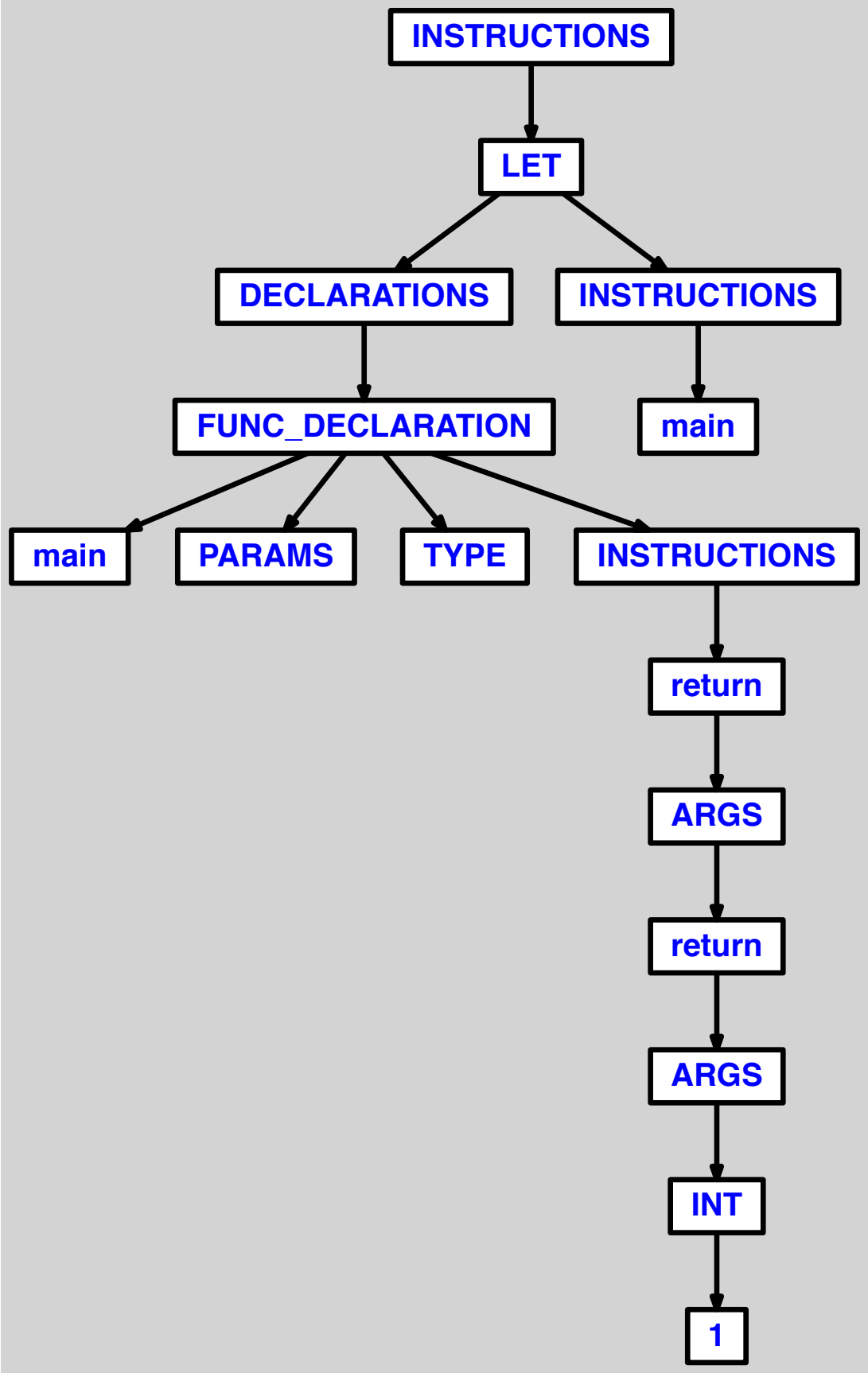
12.1.3 <return> avec oubli de parentheses

```
let
  function main() = return 1
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
return

12.1.4 2 <return>

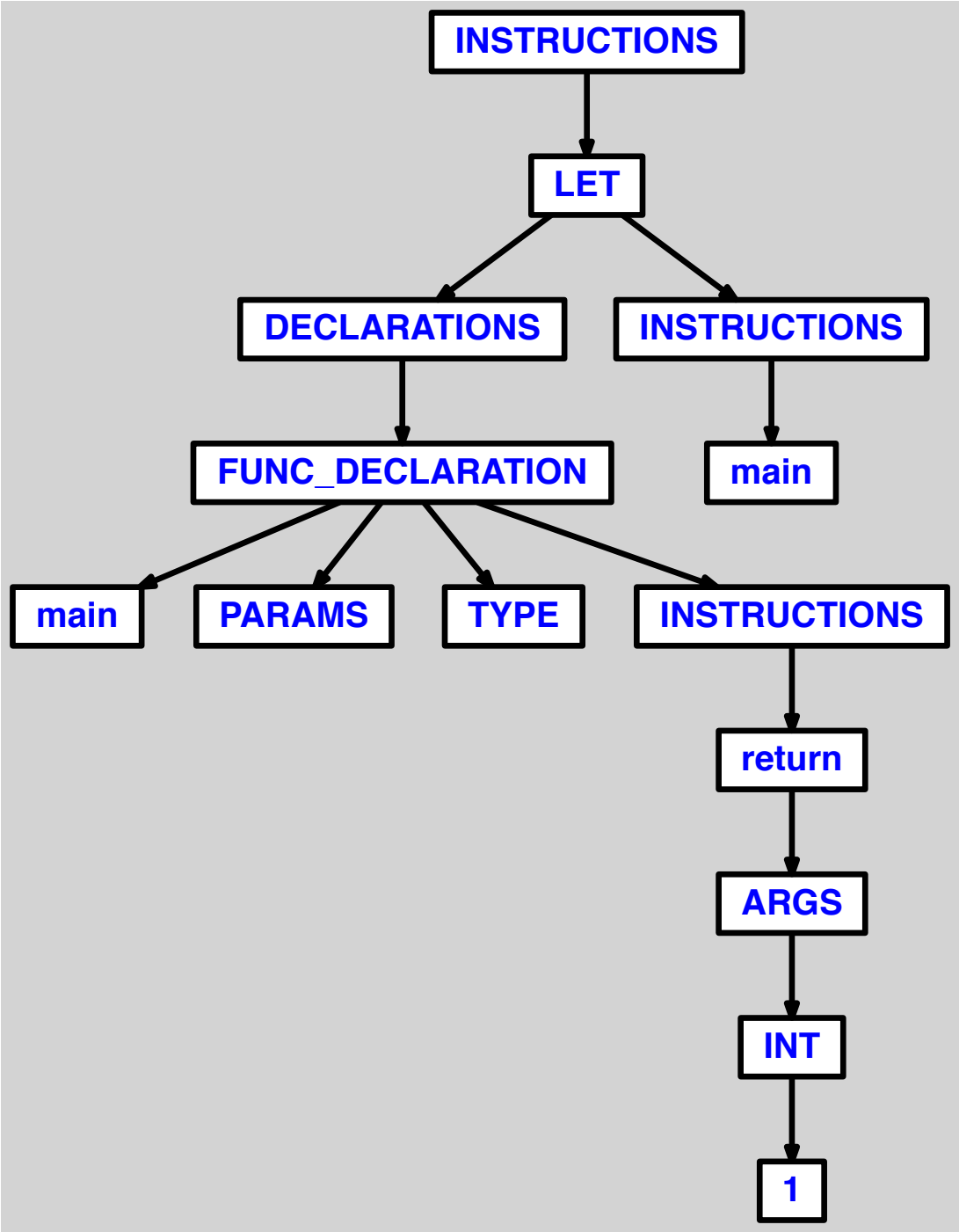
```
let
  function main() = return (return (1))
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
return
ARGS
return
ARGS
INT
1

12.2 OK

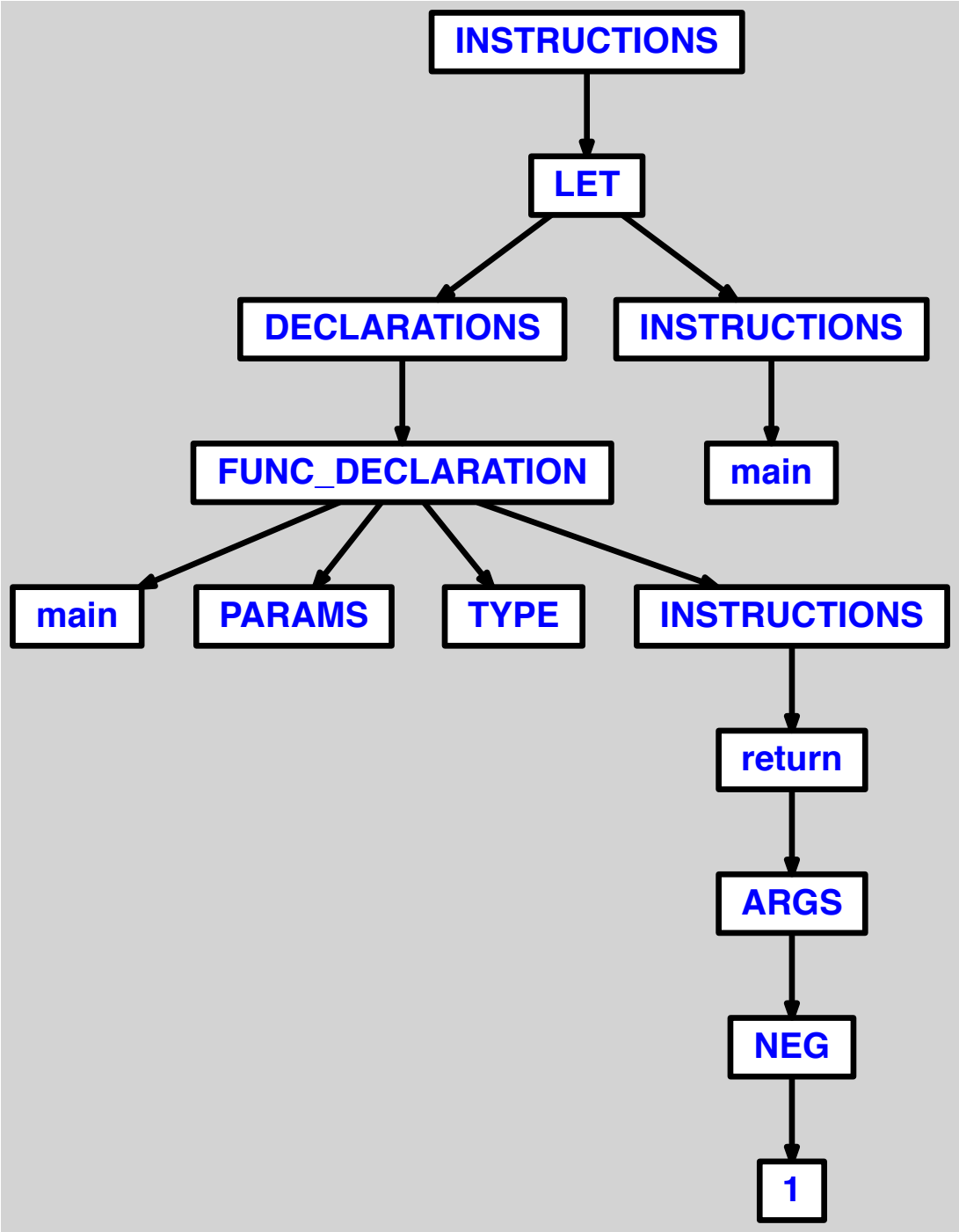
12.2.1 retour d'entier positif

```
let
  function main() = return (1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
return
ARGS
INT
1

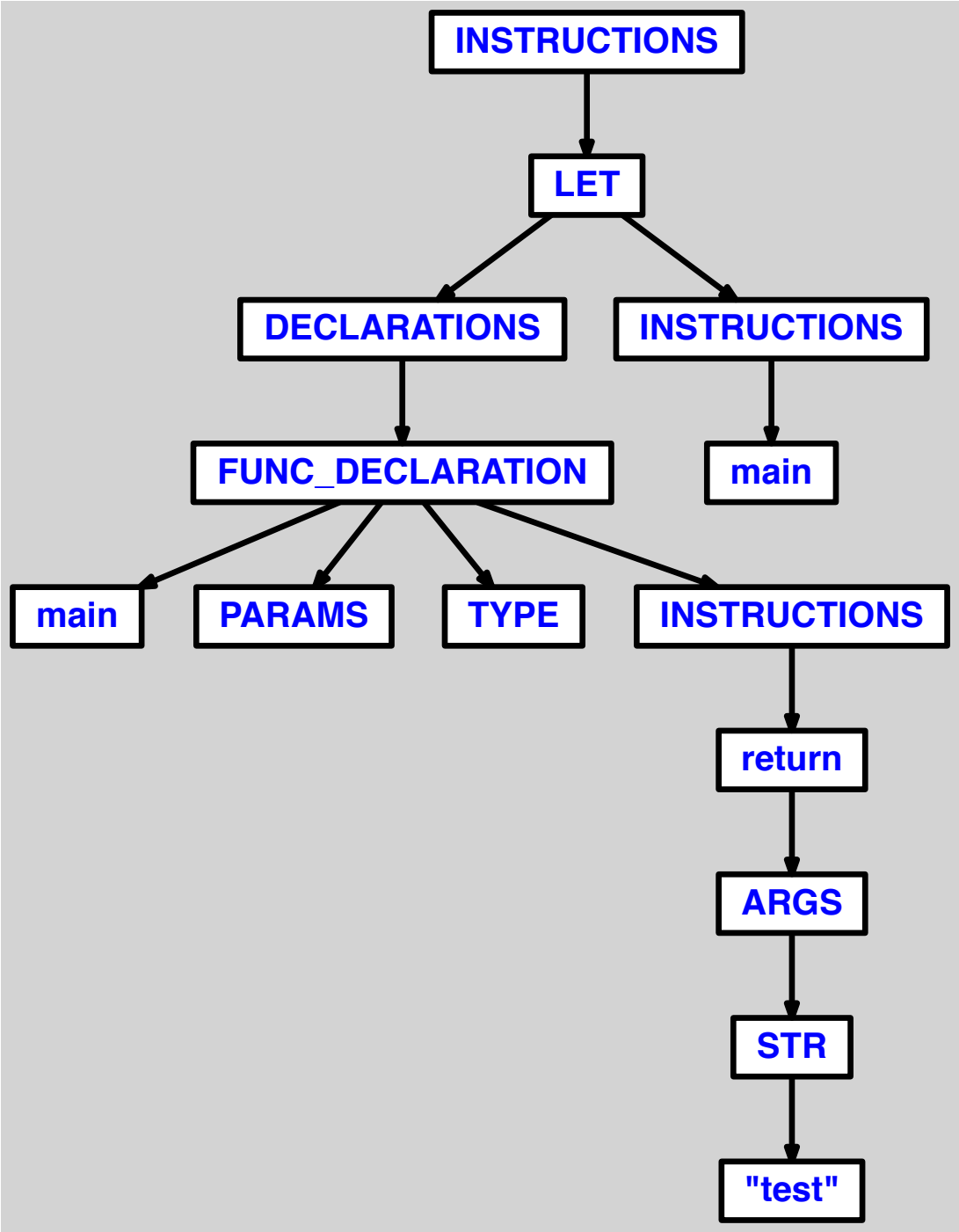
12.2.2 retour d'entier negatif

```
let
  function main() = return (-1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
return
ARGS
NEG
1

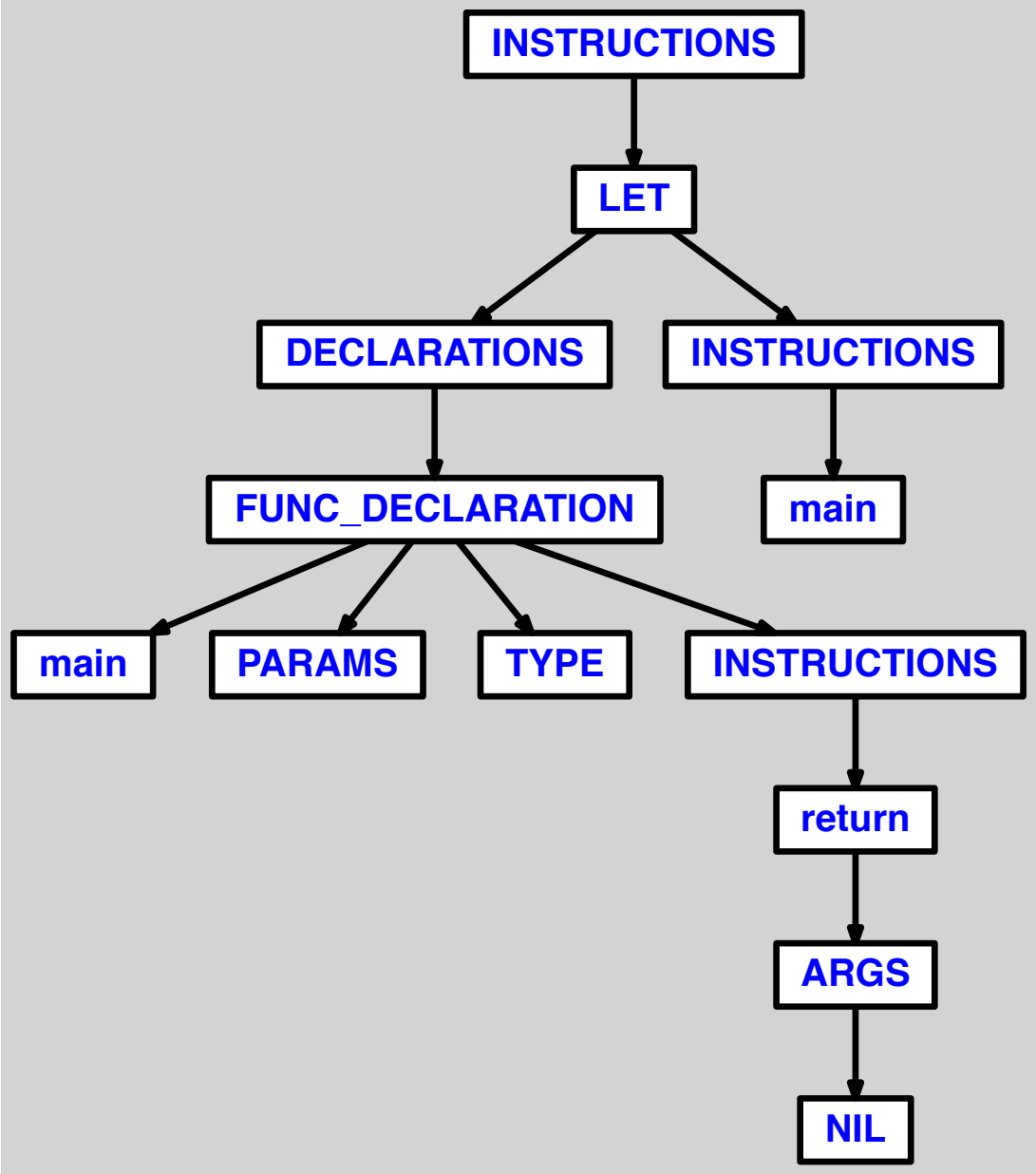
12.2.3 retour de chaine

```
let
  function main() = return ("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
return
ARGS
STR
"test"

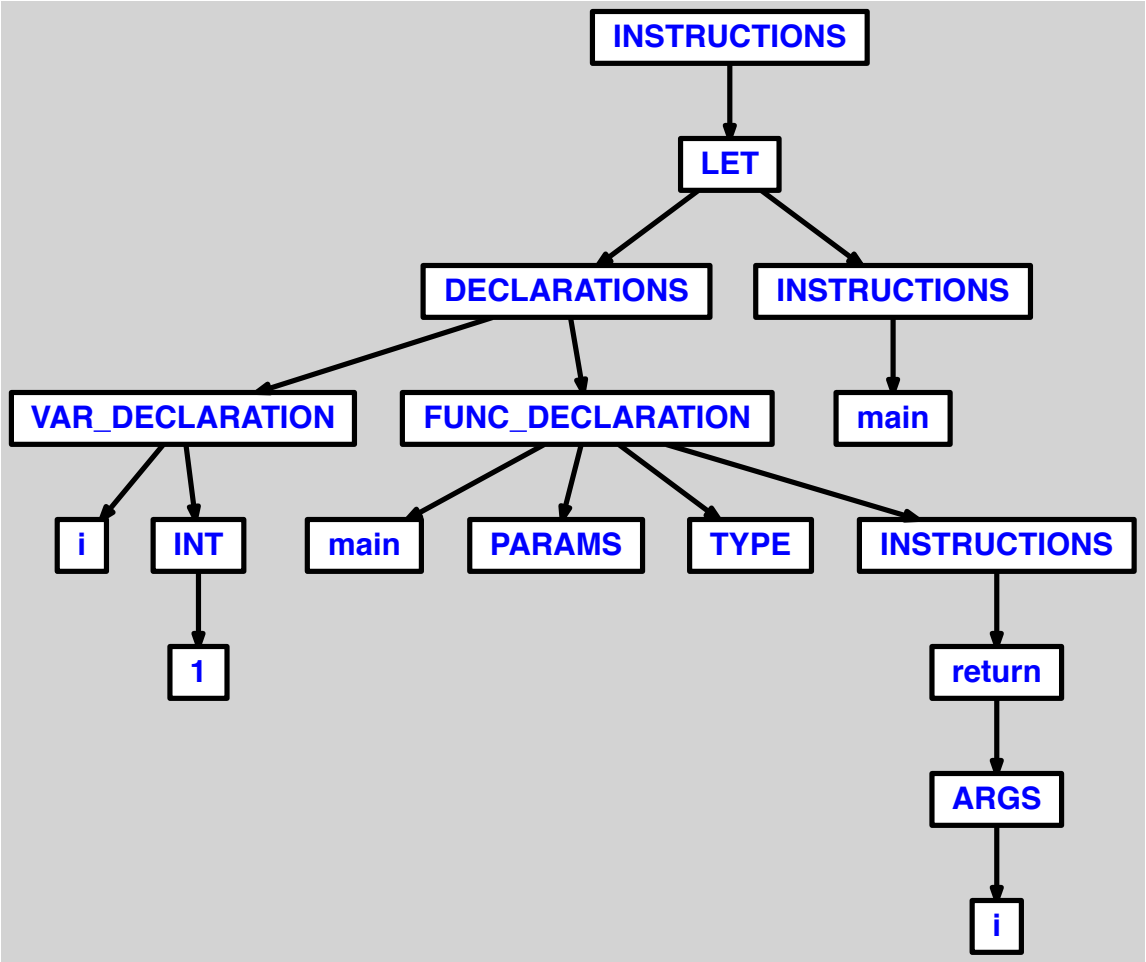
12.2.4 retour de <nil>

```
let
  function main() = return (nil)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
return
ARGS
NIL

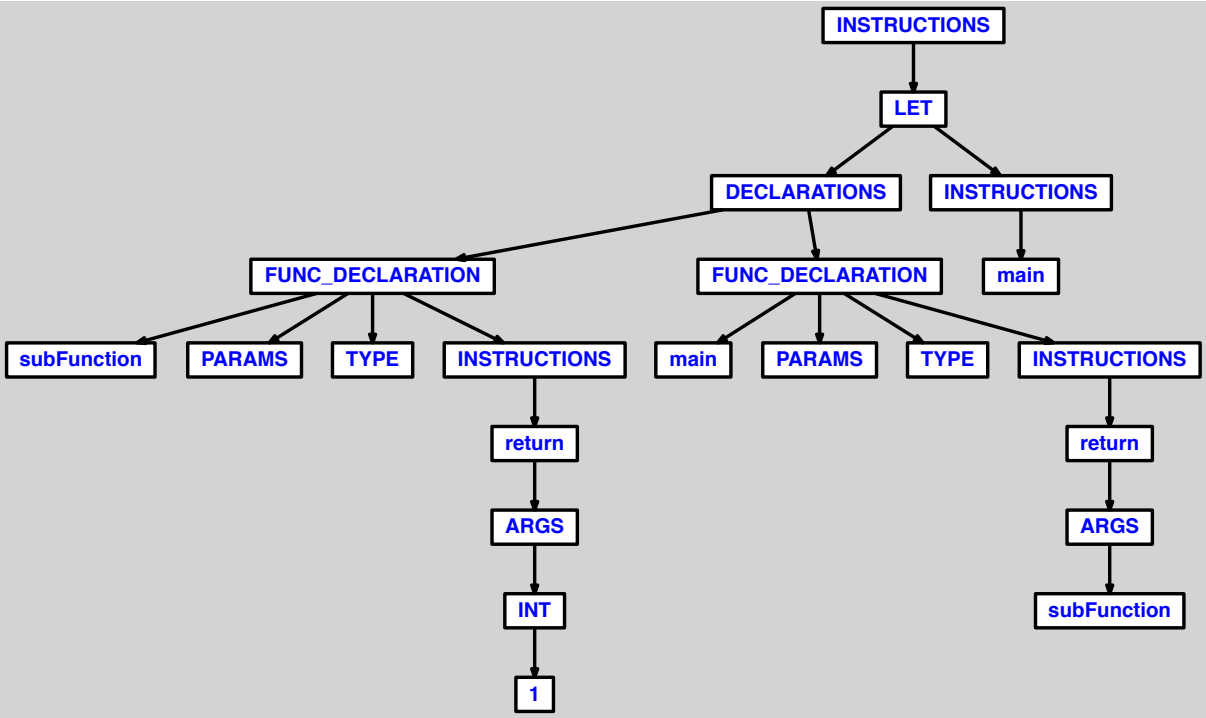
12.2.5 retour de variable

```
let
  var i := 1

  function main() = return (i)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
return
ARGS
i

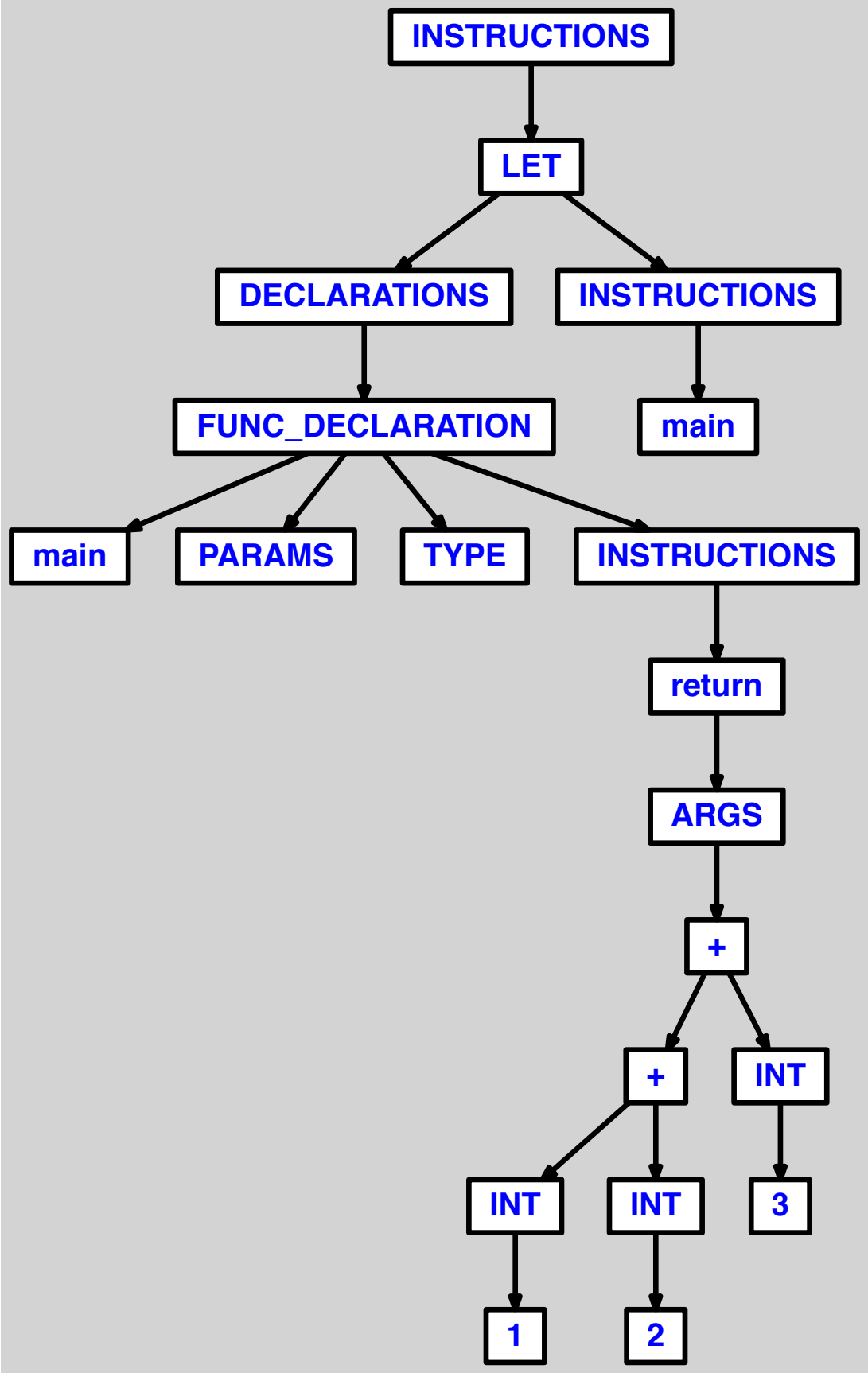
12.2.6 retour de fonction

```
let
  function subFunction() = return (1)

  function main() = return (subFunction())
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
FUNC_DECLARATION
main
subFunction
PARAMS
TYPE
INSTRUCTIONS
main
PARAMS
TYPE
INSTRUCTIONS
return
return
ARGS
ARGS
INT
subFunction
1

12.2.7 retour d'expression

```
let
  function main() = return (1+2+3)
in main() end
```

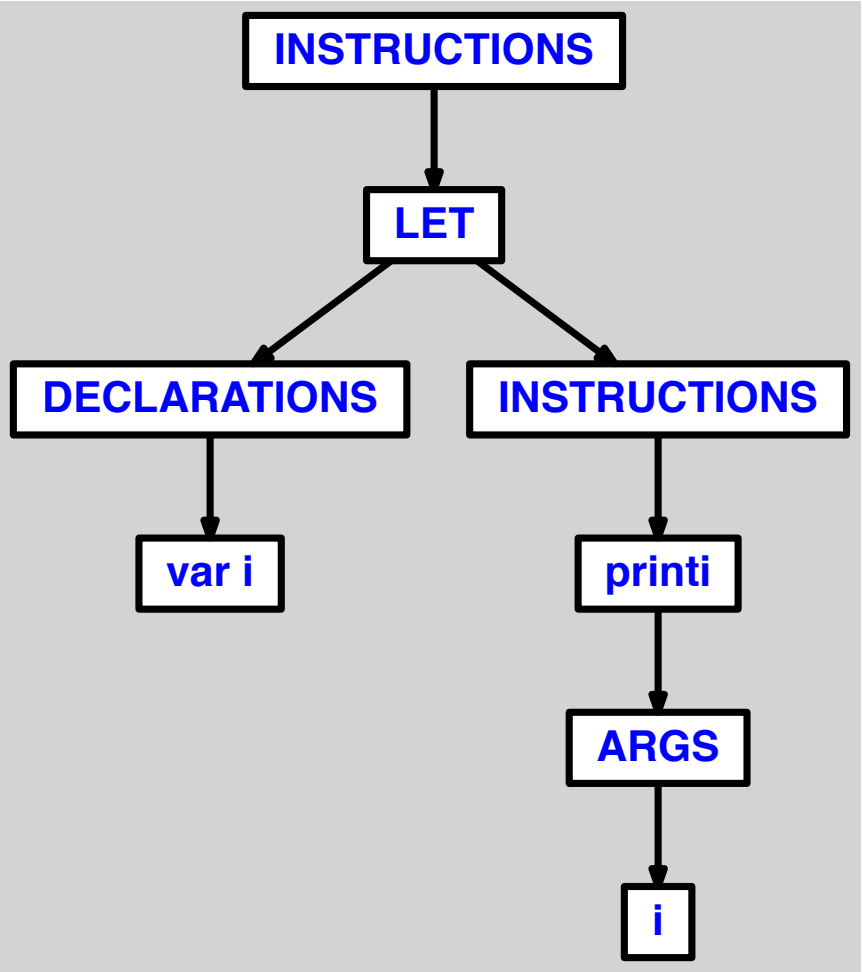

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
return
ARGS
+
+
INT
INT
INT
3
1
2

13 var

13.1 KO

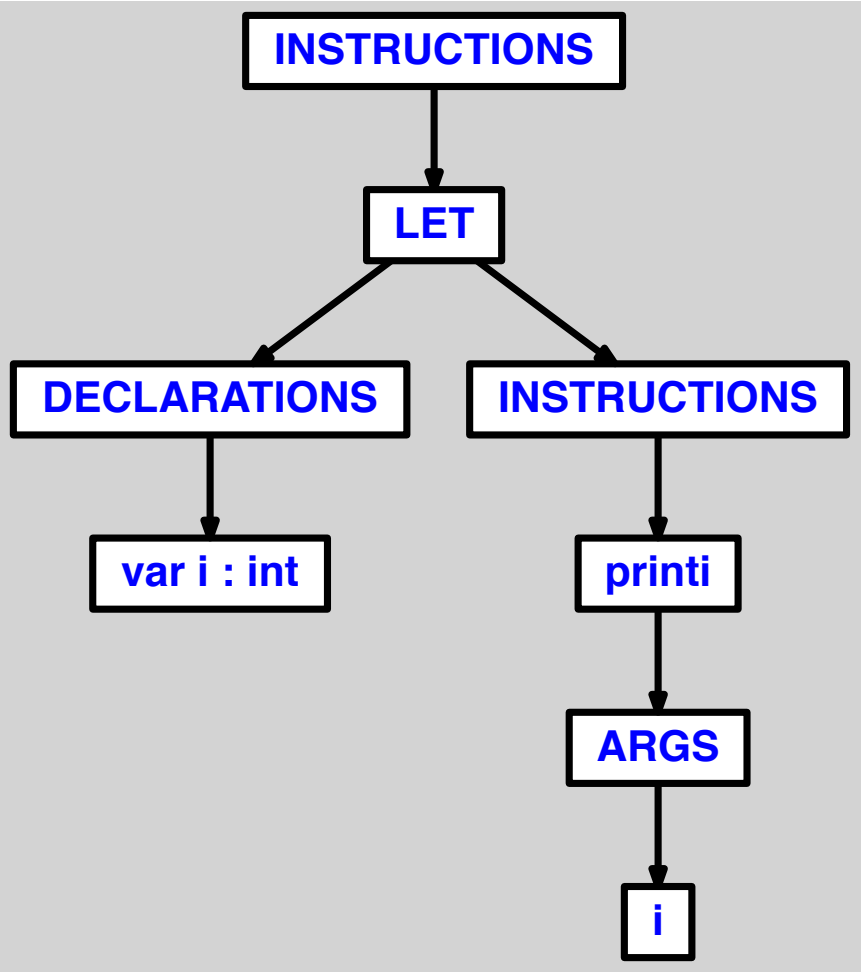
13.1.1 declaration sans affectation

```
let
  var i
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
var i
printi
ARGS
i

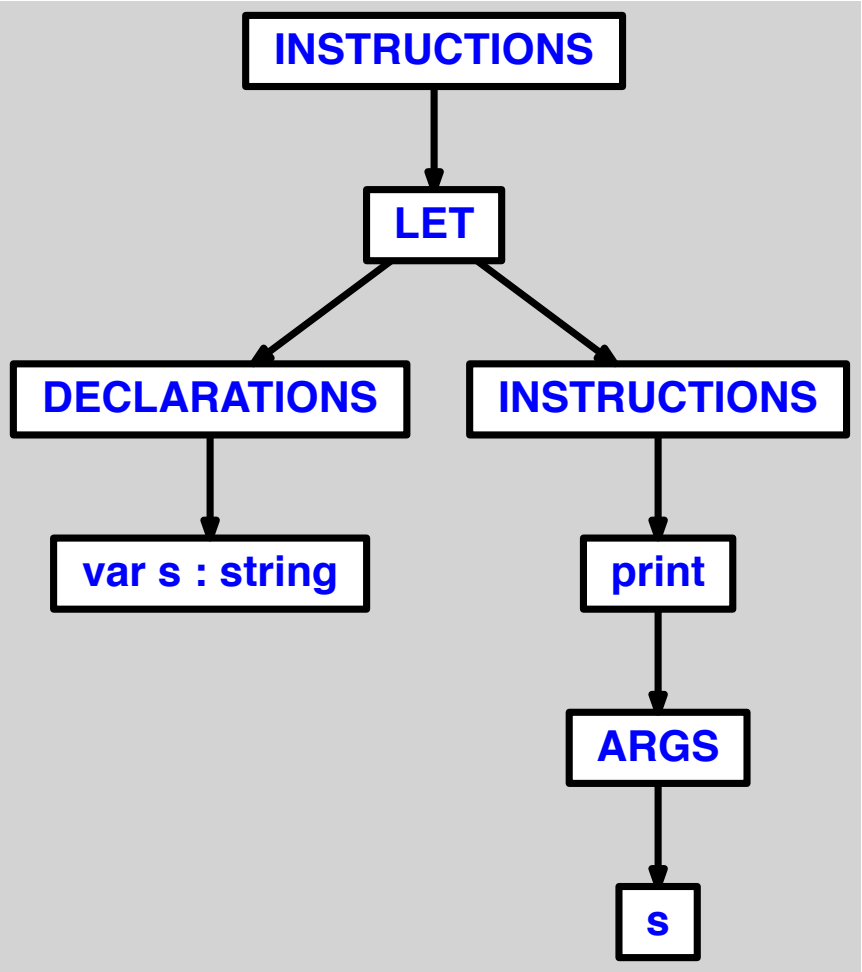
13.1.2 declaration d'entier avec type sans affectation

```
let
  var i : int
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
var i : int
printi
ARGS
i

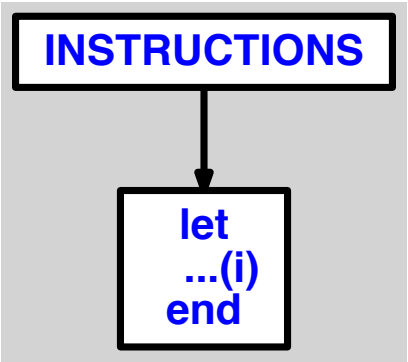
13.1.3 declaration de chaine avec type sans affectation

```
let
  var s : string
in
  print(s)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
var s : string
print
ARGS
s

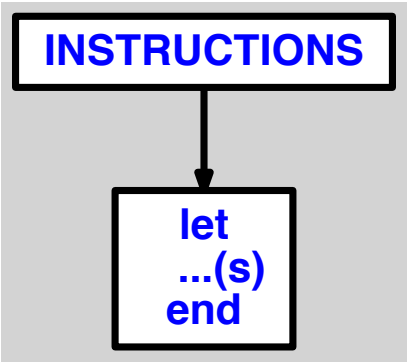
13.1.4 affectation d'entier sans declaration

```
let
  i := 1
in
  printi(i)
end
```


INSTRUCTIONS
let
...(i)
end

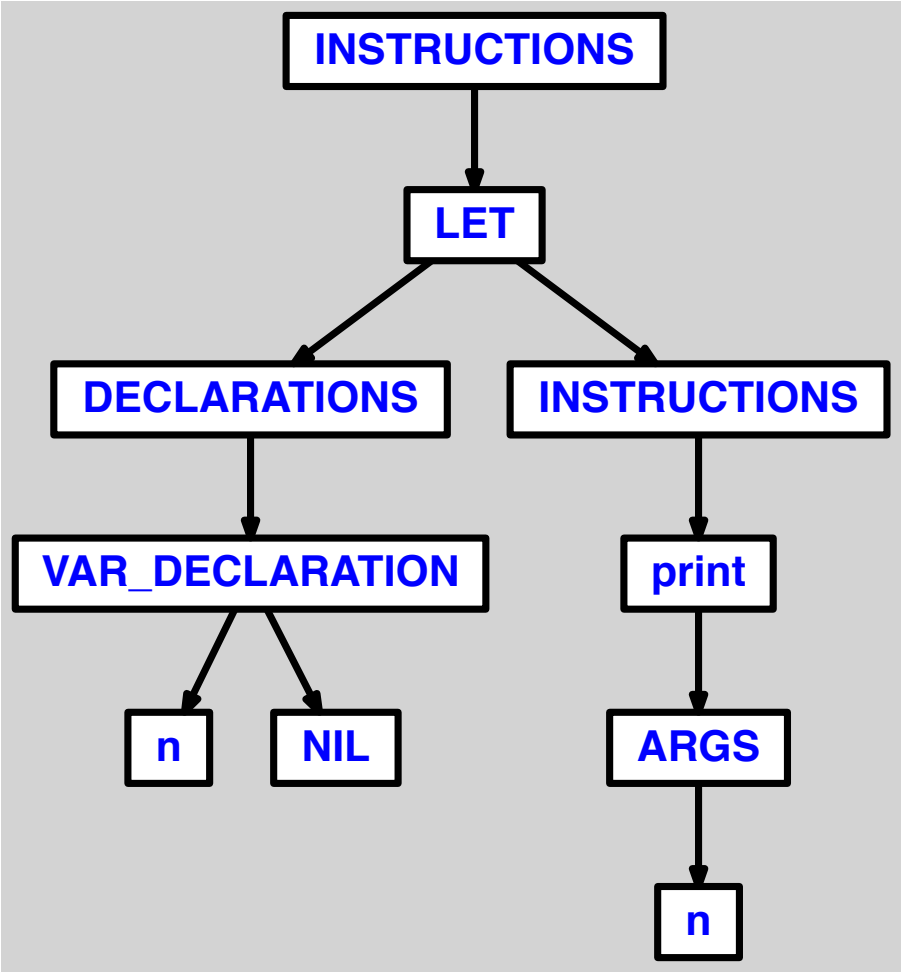
13.1.5 affectation de chaine sans declaration

```
let
  s := "test"
in
  print(s)
end
```


INSTRUCTIONS
let
...(s)
end

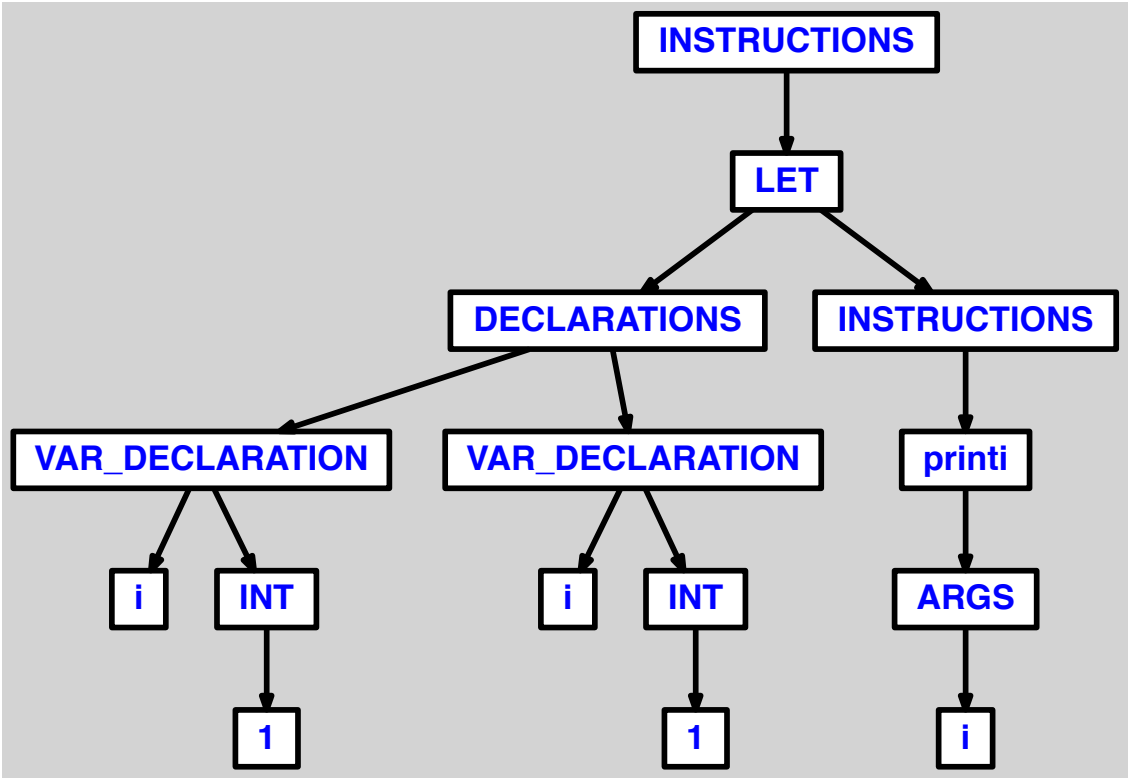
13.1.6 affectation de <nil>

```
let
  var n := nil
in
  print(n)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
print
n
NIL
ARGS
n

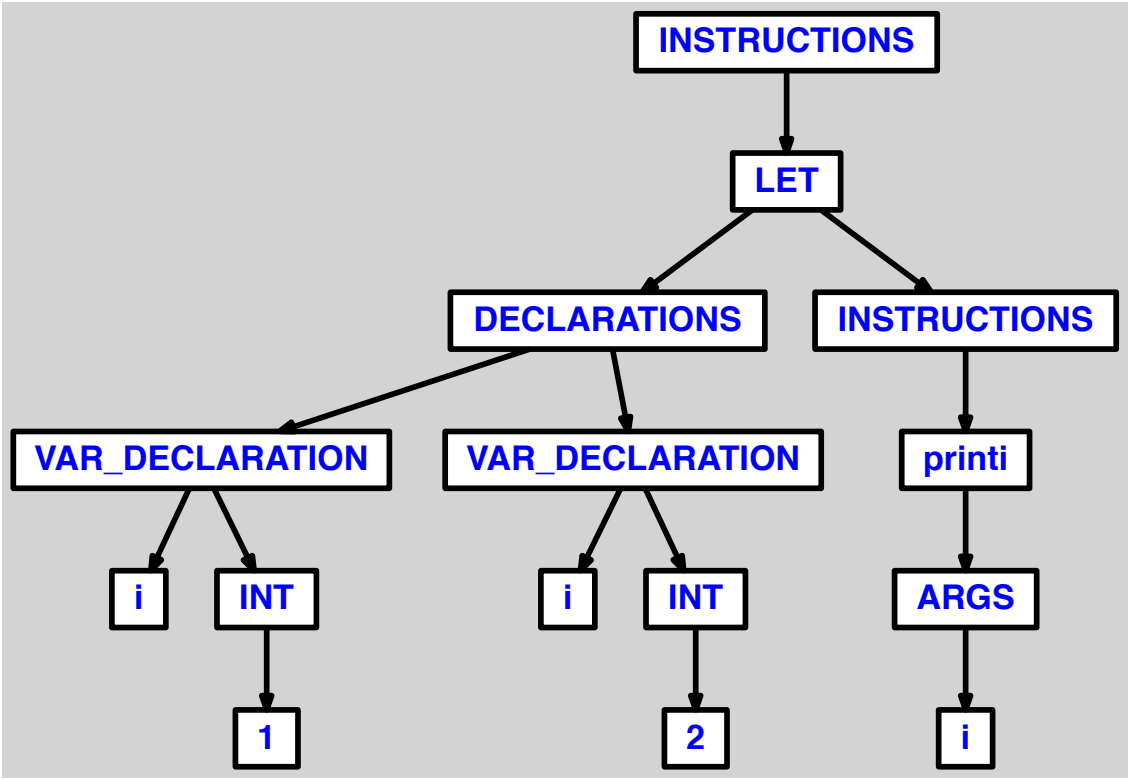
13.1.7 double-declaration avec valeurs egales

```
let
  var i := 1
  var i := 1
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
printi
i
INT
i
INT
ARGS
1
1
i

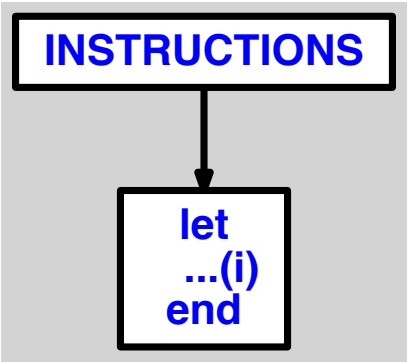
13.1.8 double-declaration avec valeurs differentes

```
let
  var i := 1
  var i := 2
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
printi
i
INT
i
INT
ARGS
1
2
i

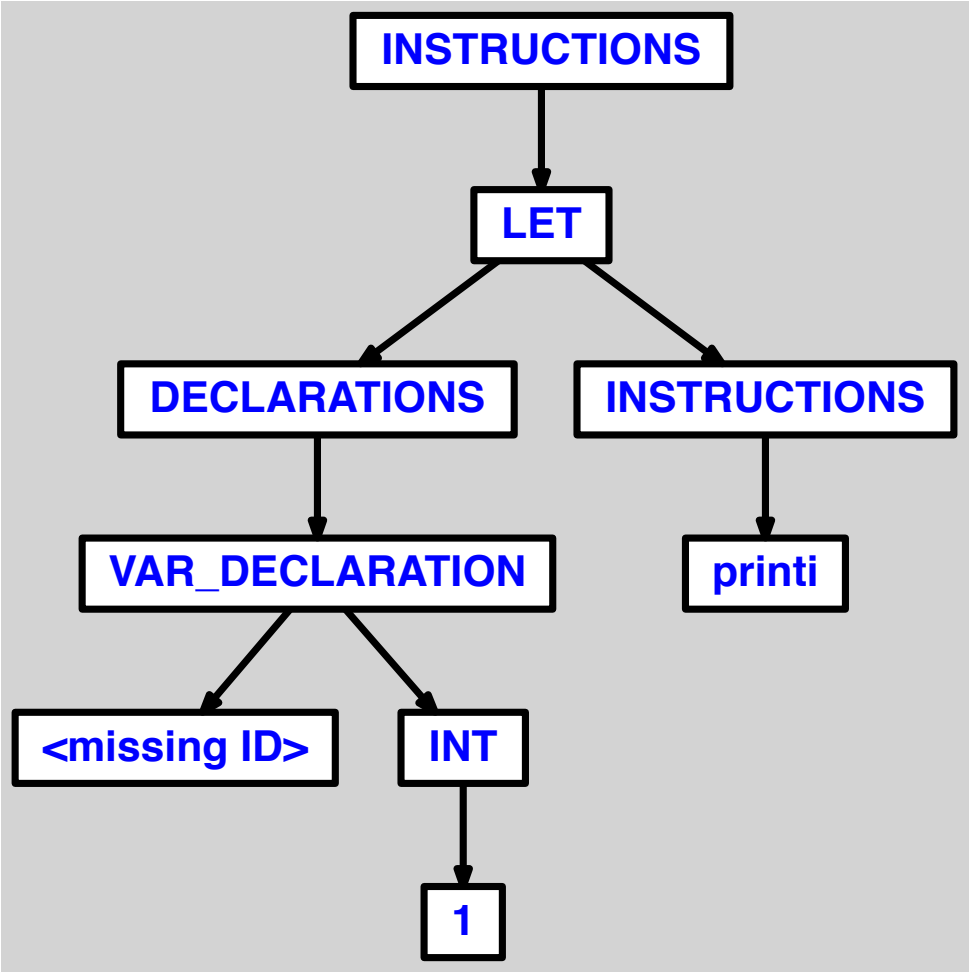
13.1.9 <var> mal ecrit

```
let
  varr i := 1
in
  printi(i)
end
```


INSTRUCTIONS
let
...(i)
end

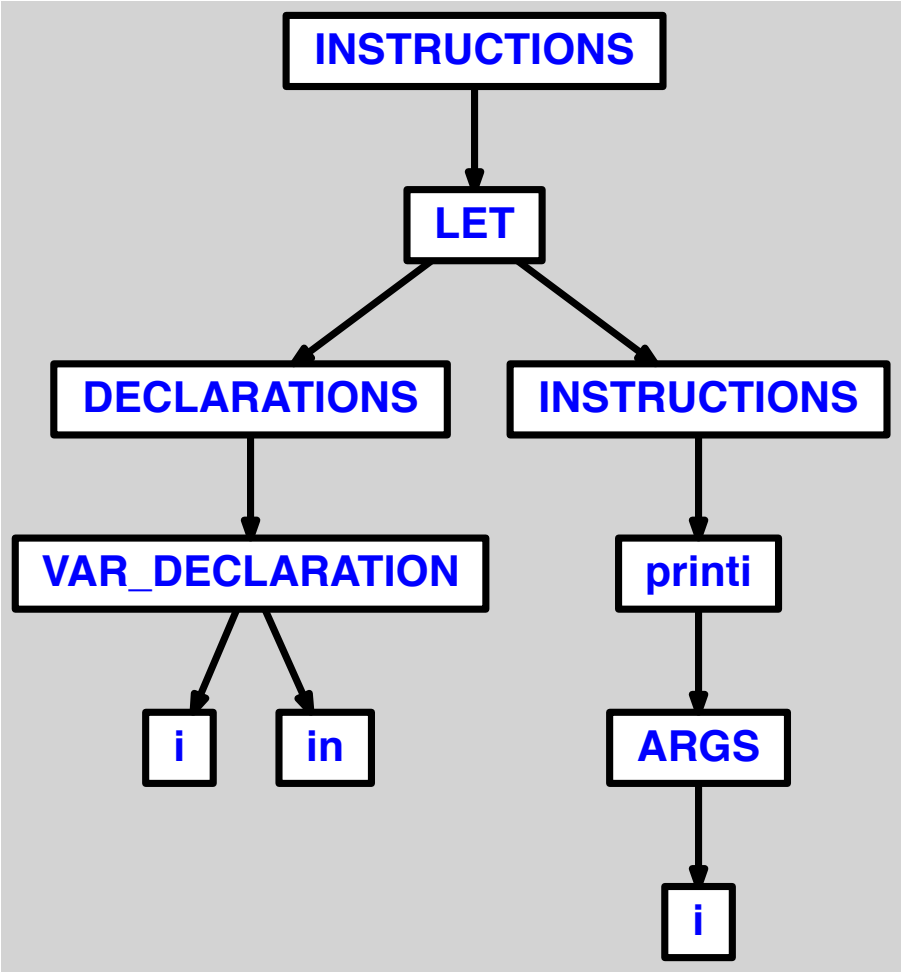
13.1.10 declaration de caractere special

```
let
  var \ := 1
in
  printi(\)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
printi
<missing ID>
INT
1

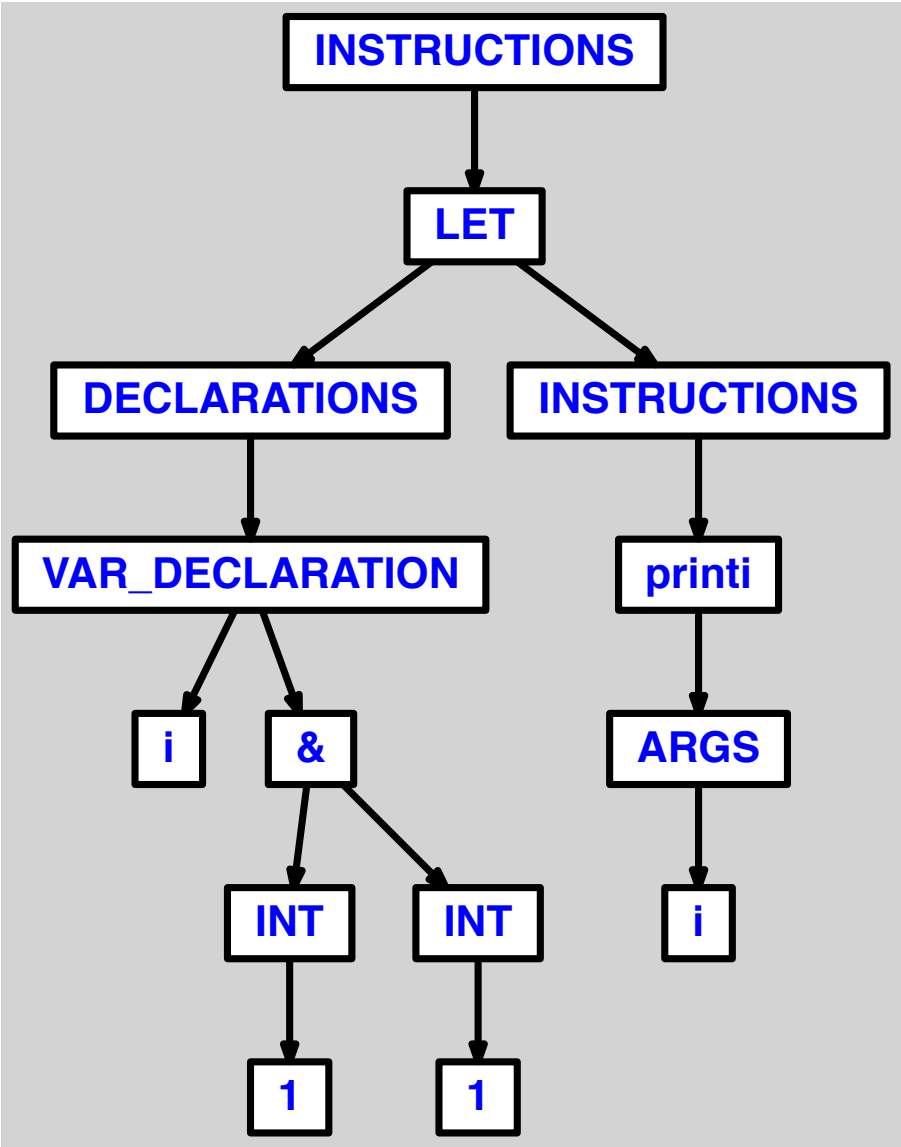
13.1.11 affectation de caractere special

```
let
  var i := \
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
printi
i
in
ARGS
i

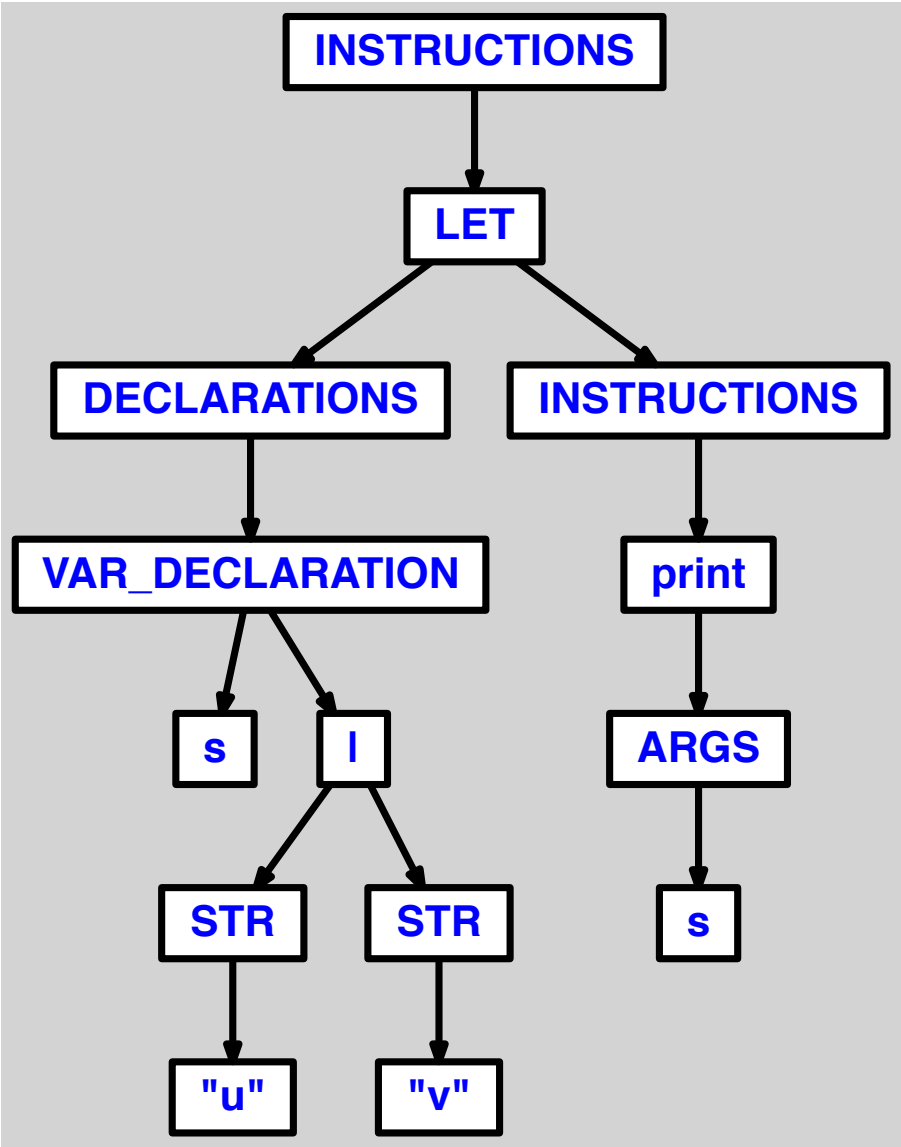
13.1.12 affectation d'operation logique sur entiers

```
let
  var i := 1 & 1
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
printi
i
&
ARGS
INT
INT
i
1
1

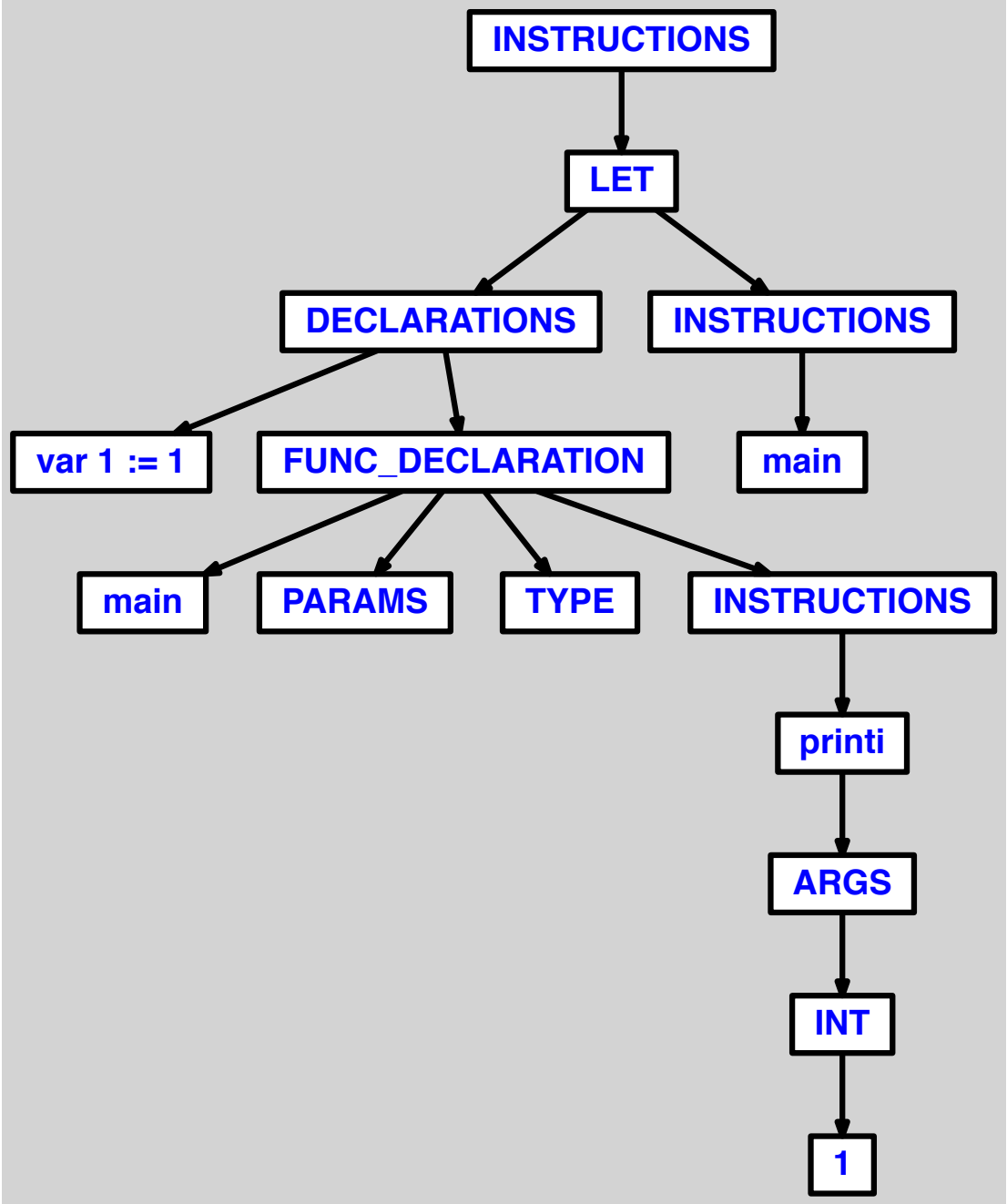
13.1.13 affectation d'operation logique sur chaines

```
let
  var s := "u" | "v"
in
  print(s)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
print
s
l
ARGS
STR
STR
s
"u"
"v"

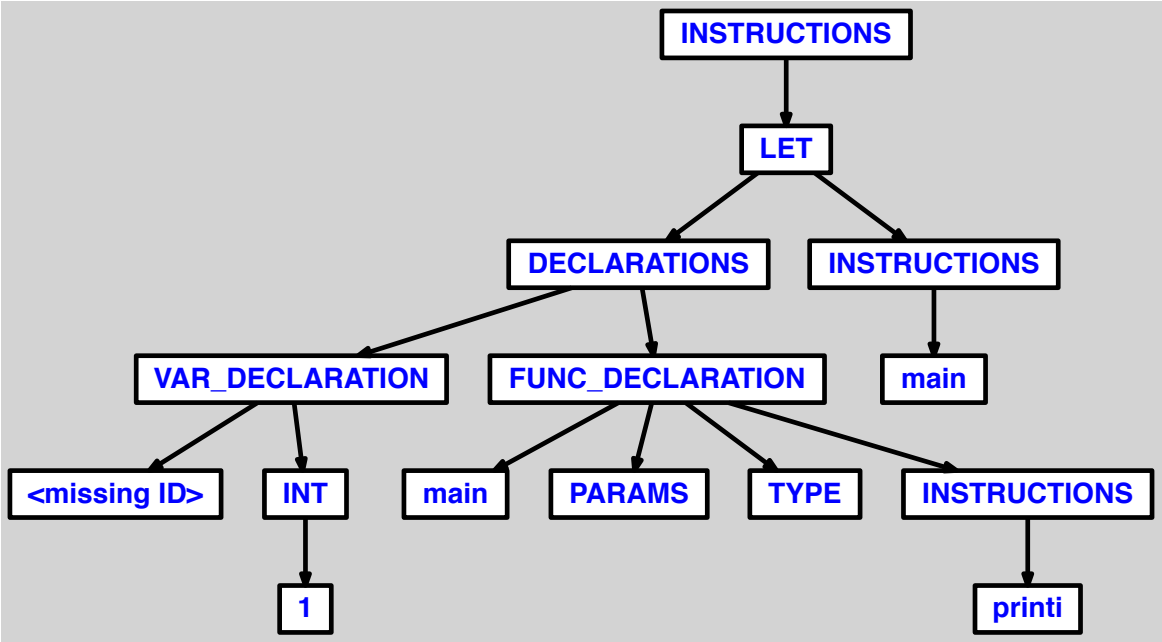
13.1.14 chiffre comme nom de variable

```
let
  var 1 := 1

  function main() = printi(1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
var 1 := 1
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
printi
ARGS
INT
1

13.1.15 <_> comme nom de variable

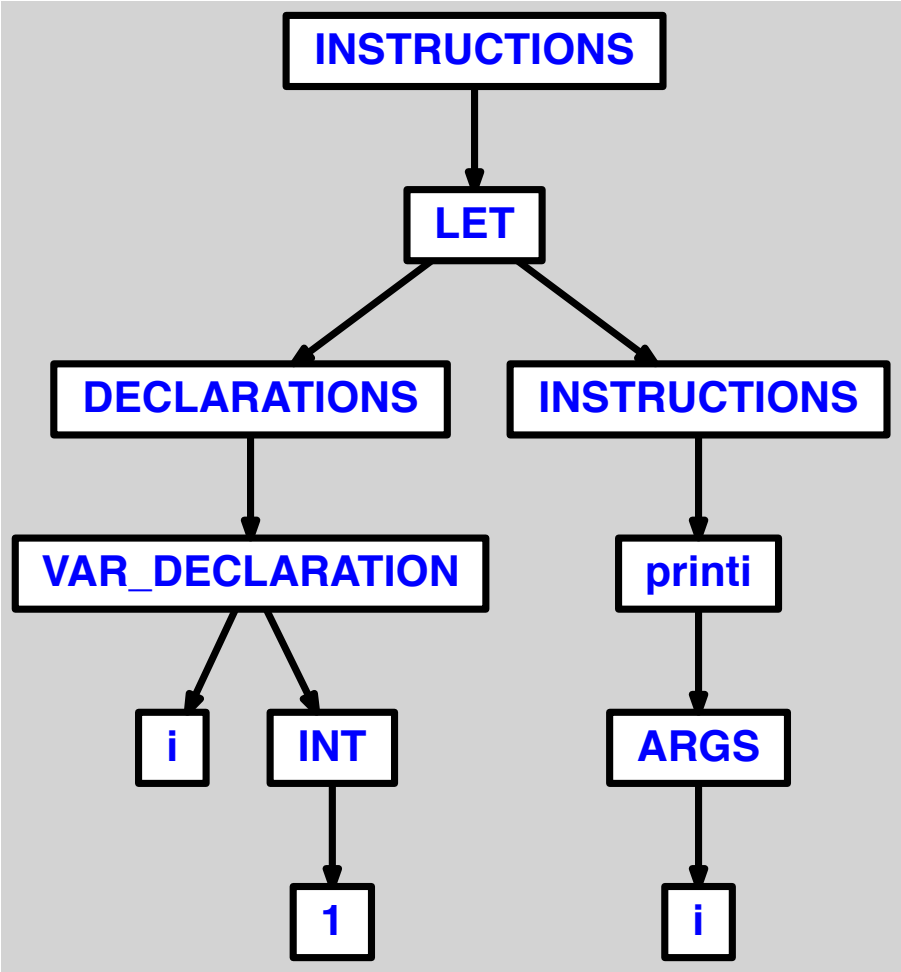
```
let
  var _ := 1

  function main() = printi(_)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
<missing ID>
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi

13.2 OK

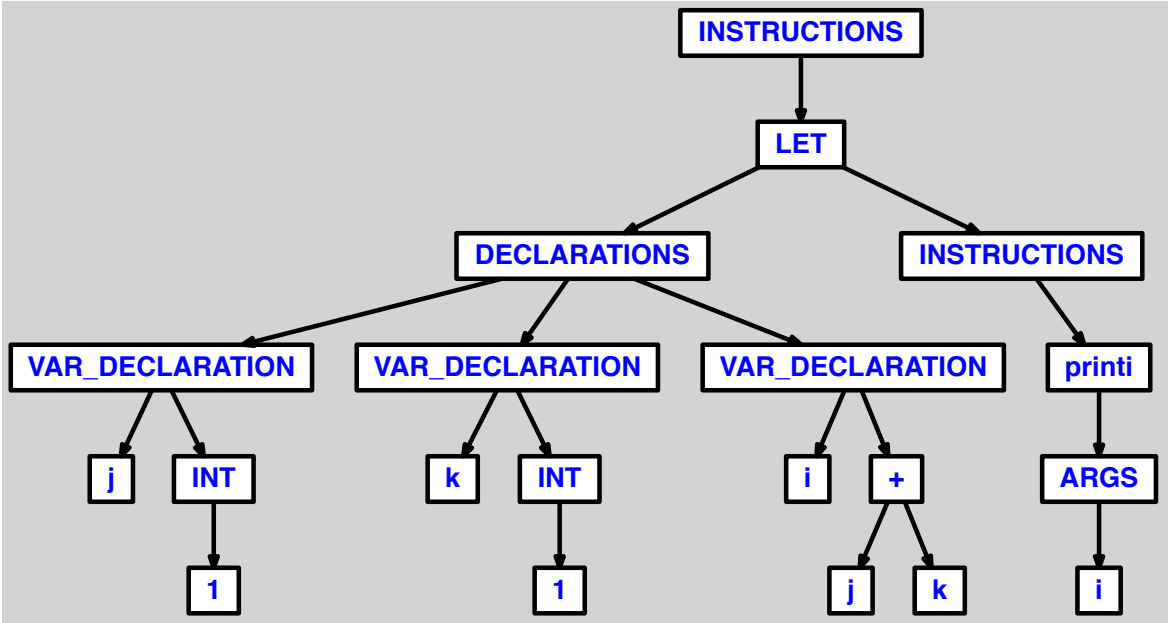
13.2.1 declaration d'entier simple

```
  var i := 1
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
printi
i
INT
ARGS
1
i

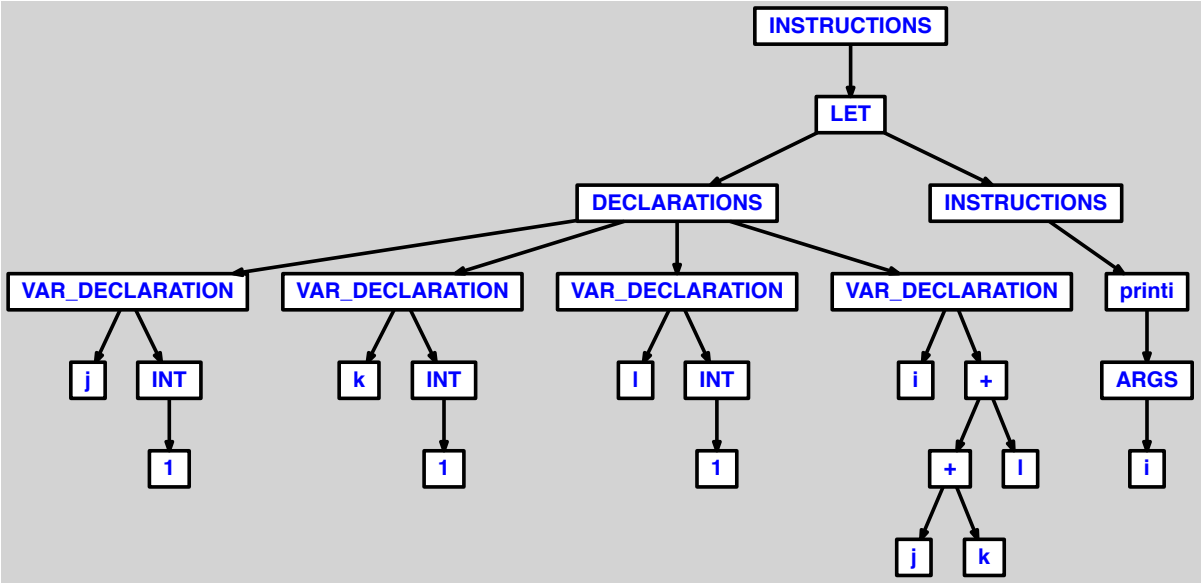
13.2.2 declarations d'entier avec reutilisation de 2 autres entiers

```
let
  var j := 1
  var k := 1
  var i := j+k
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
printi
j
INT
k
INT
i
+
ARGS
1
1
j
k
i

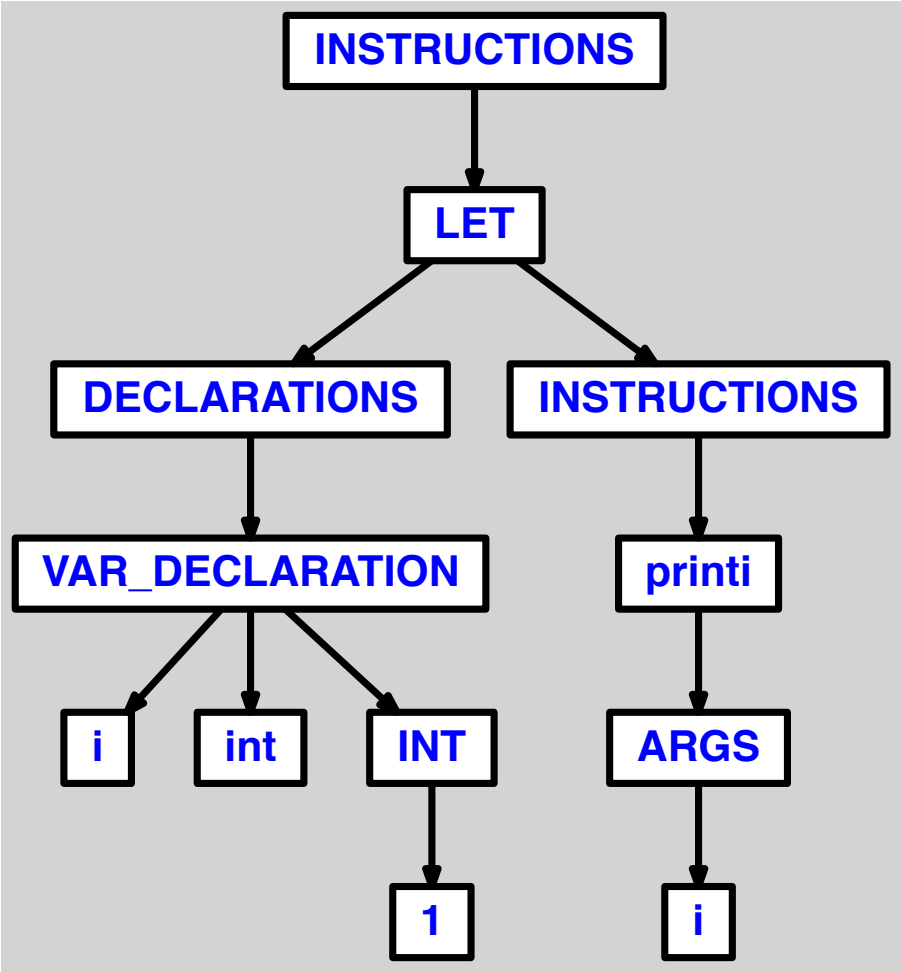
13.2.3 declarations d'entier avec reutilisation de 3 autres entiers

```
let
  var j := 1
  var k := 1
  var l := 1
  var i := j+k+l
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
printi
j
INT
k
INT
l
INT
i
+
ARGS
1
1
1
+
l
i
j
k

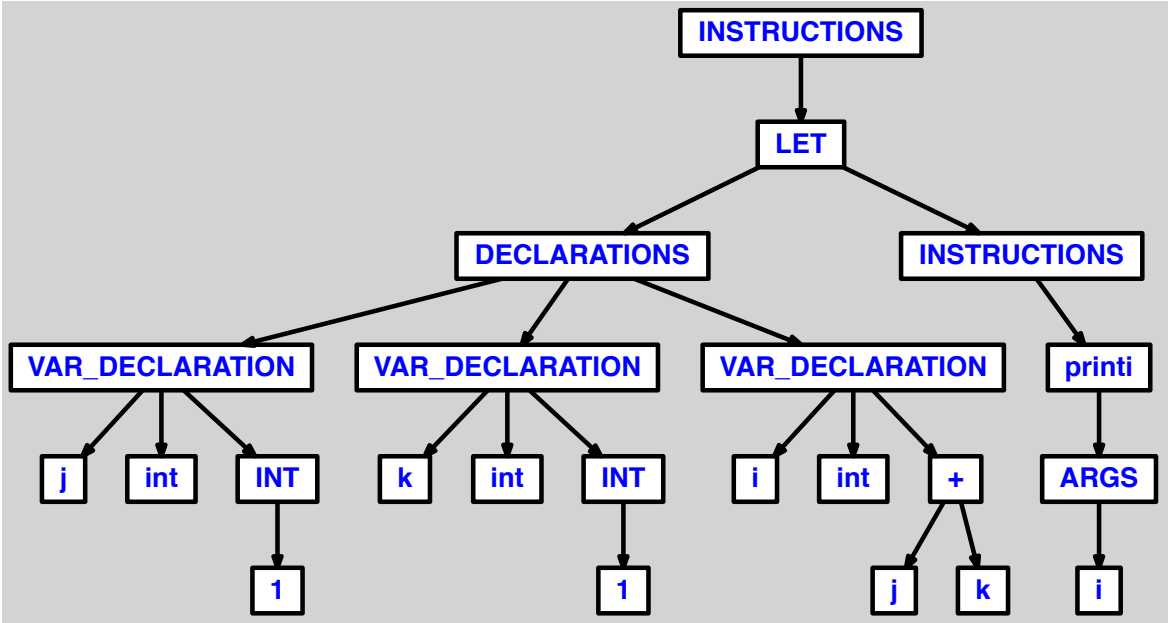
13.2.4 declaration simple d'entier avec type

```
let
  var i : int := 1
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
printi
i
int
INT
ARGS
1
i

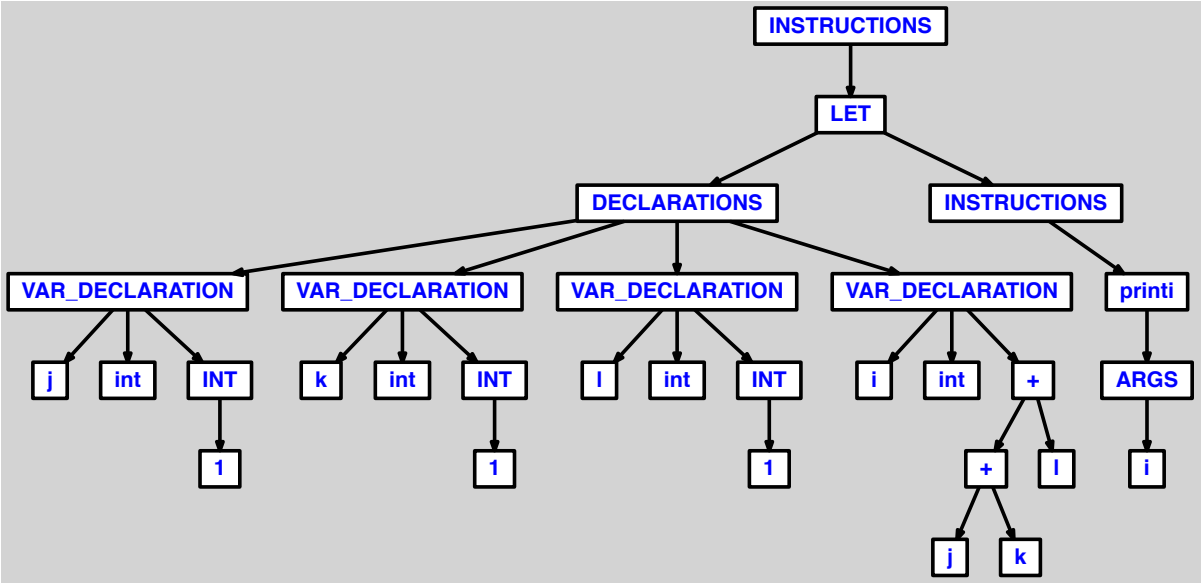
13.2.5 declarations d'entier avec types et reutilisation de 2 autres entiers

```
let
  var j : int := 1
  var k : int := 1
  var i : int := j+k
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
printi
j
int
INT
k
int
INT
i
int
+
ARGS
1
1
j
k
i

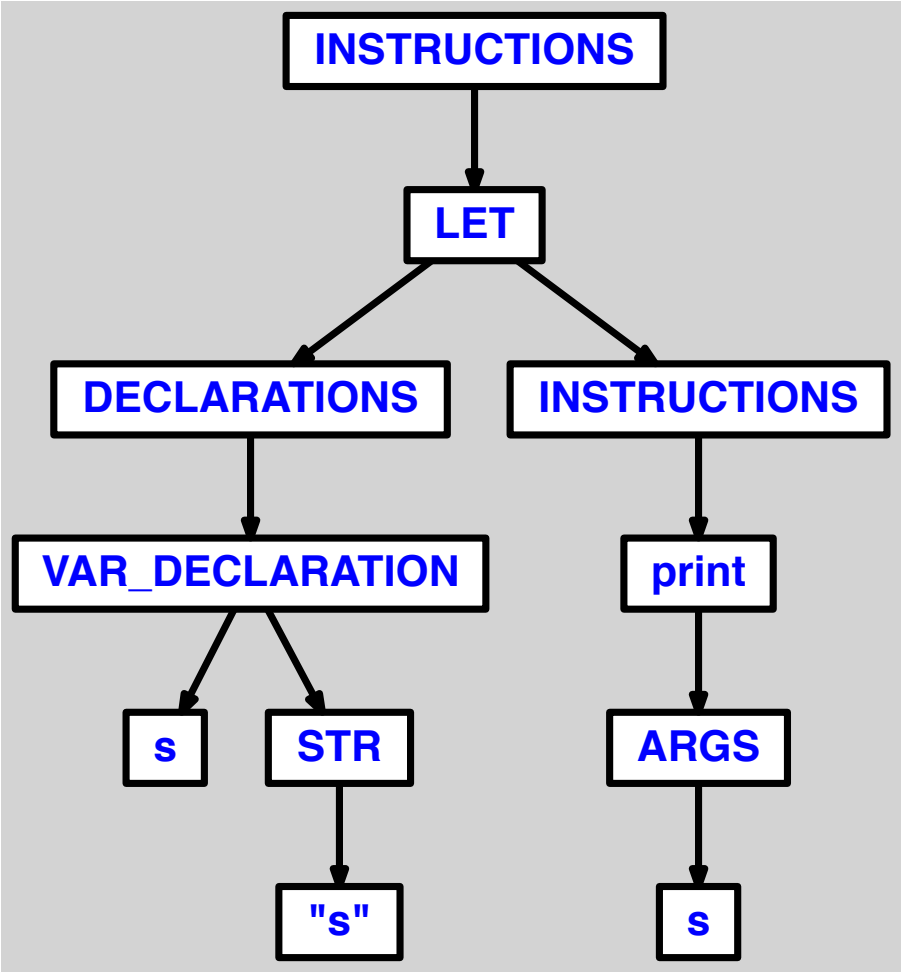
13.2.6 declarations d'entier avec types et reutilisation de 3 autres entiers

```
let
  var j : int := 1
  var k : int := 1
  var l : int := 1
  var i : int := j+k+l
in
  printi(i)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
printi
j
int
INT
k
int
INT
l
int
INT
i
int
+
ARGS
1
1
1
+
l
i
j
k

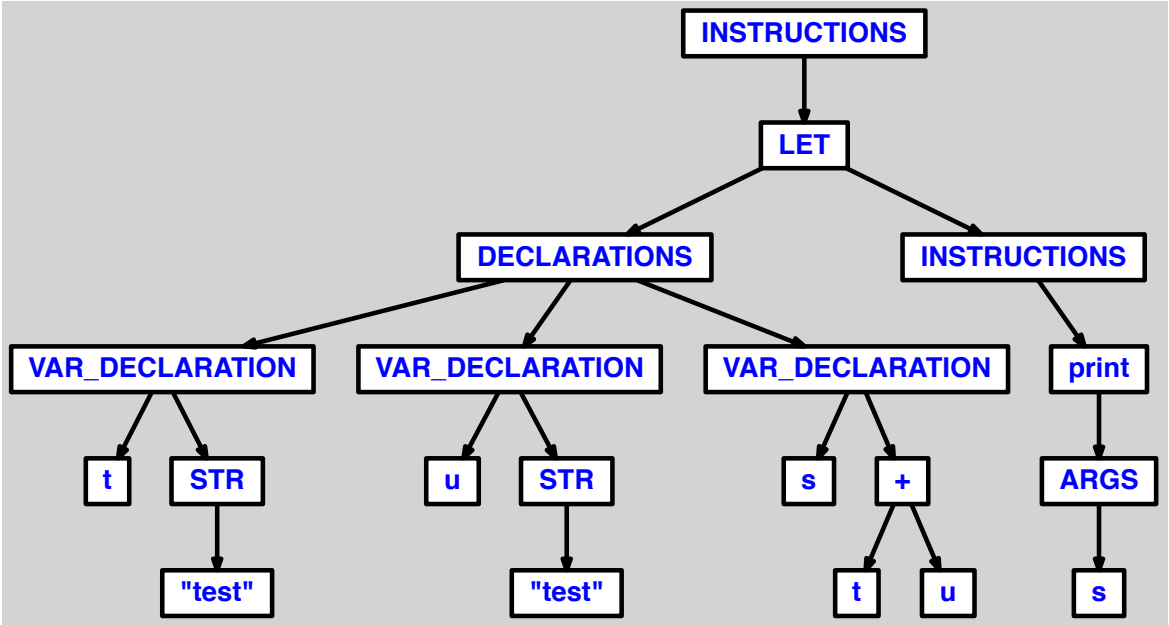
13.2.7 declaration de chaine simple

```
let
  var s := "s"
in
  print(s)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
print
s
STR
ARGS
"s"
s

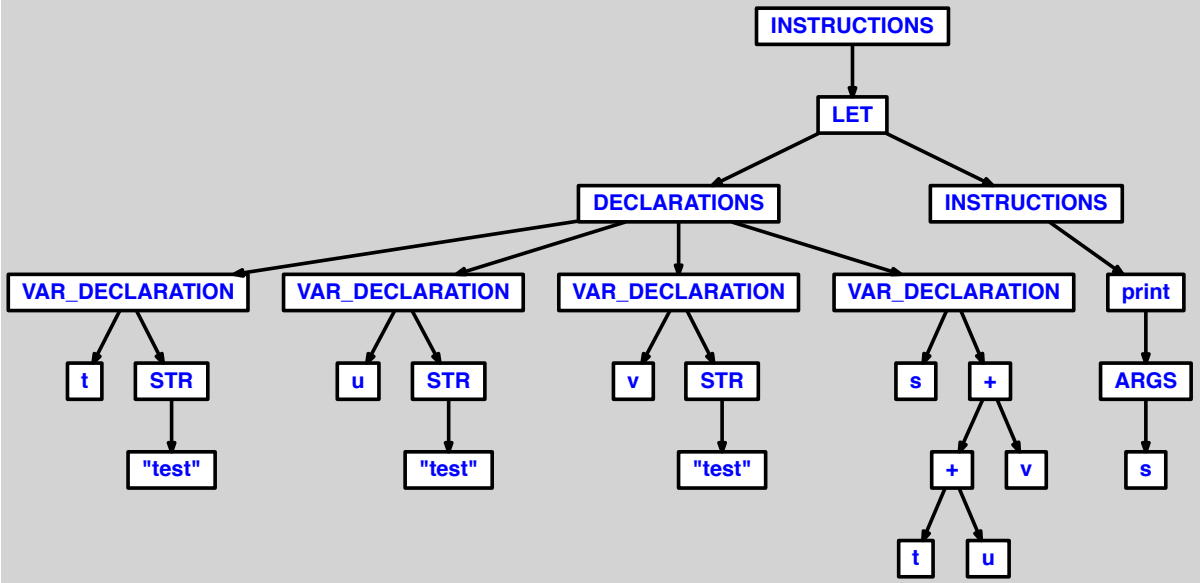
13.2.8 declarations de chaine avec reutilisation de 2 autres chaines

```
let
  var t := "test"
  var u := "test"
  var s := t+u
in
  print(s)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
print
t
STR
u
STR
s
+
ARGS
"test"
"test"
t
u
s

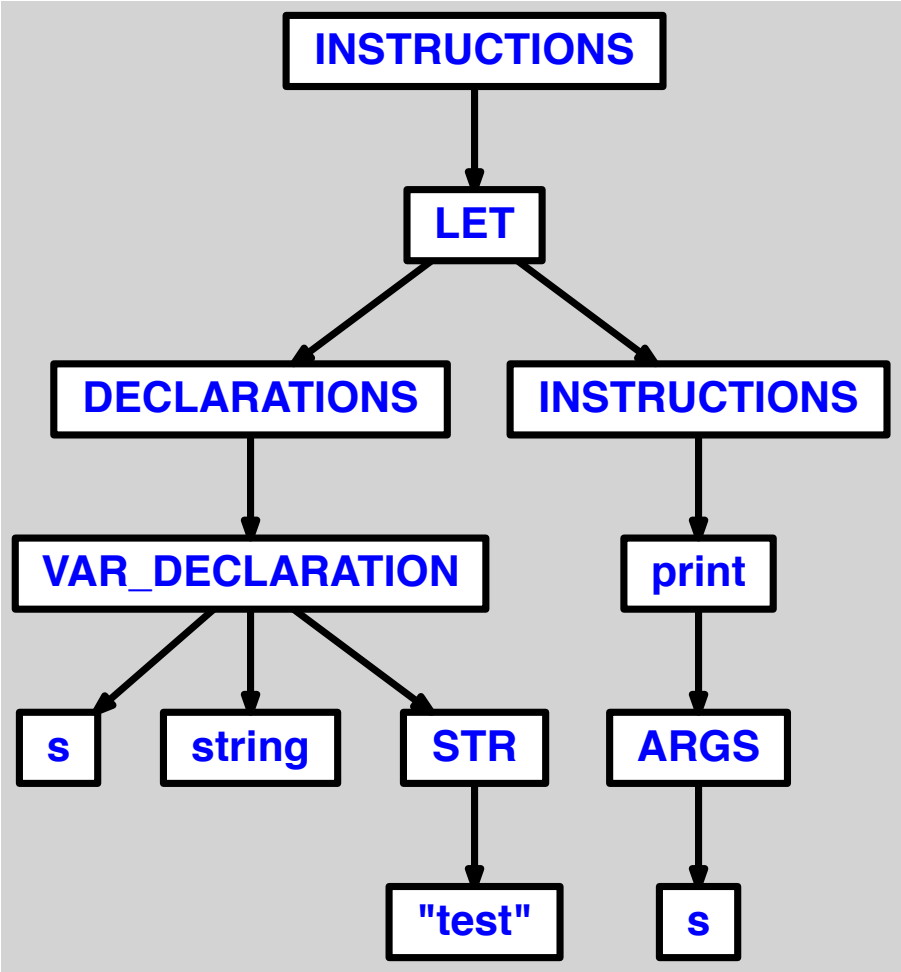
13.2.9 declarations de chaine avec reutilisation de 3 autres chaines

```
let
  var t := "test"
  var u := "test"
  var v := "test"
  var s := t+u+v
in
  print(s)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
print
t
STR
u
STR
v
STR
s
+
ARGS
"test"
"test"
"test"
+
v
s
t
u

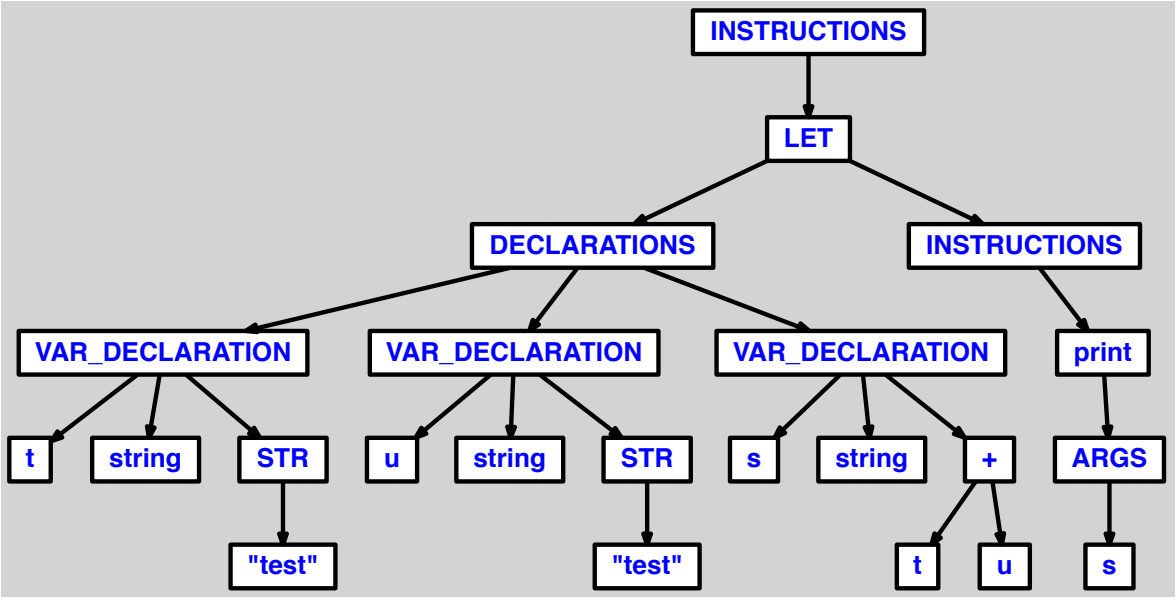
13.2.10 declaration de chaine avec type

```
let
  var s : string := "test"
in
  print(s)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
print
s
string
STR
ARGS
"test"
s

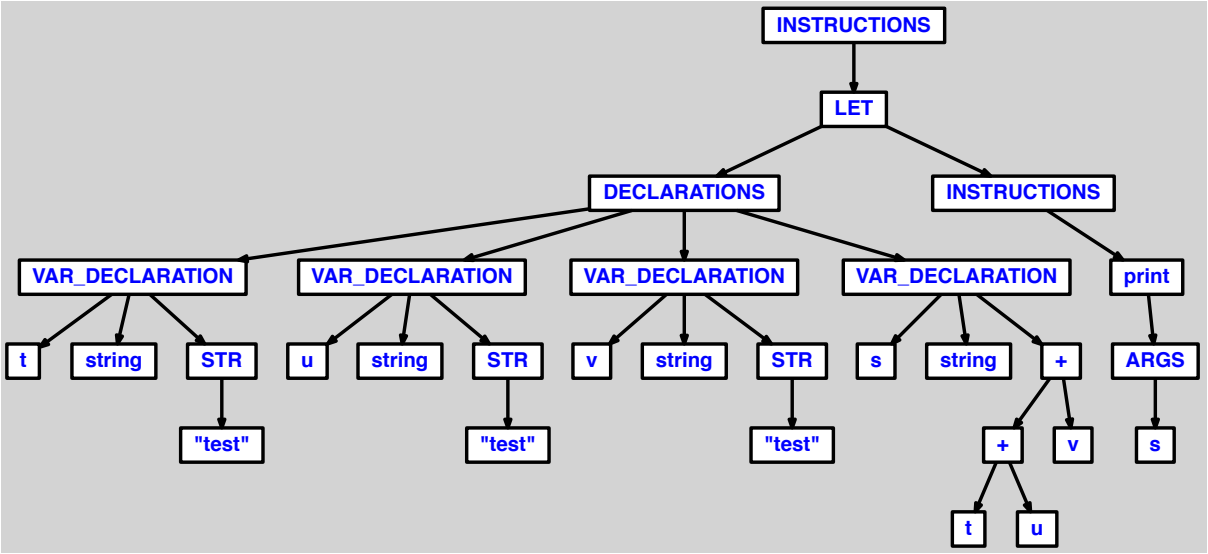
13.2.11 declarations de chaine avec types et reutilisation de 2 autres chaines

```
let
  var t : string := "test"
  var u : string := "test"
  var s : string := t+u
in
  print(s)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
print
t
string
STR
u
string
STR
s
string
+
ARGS
"test"
"test"
t
u
s

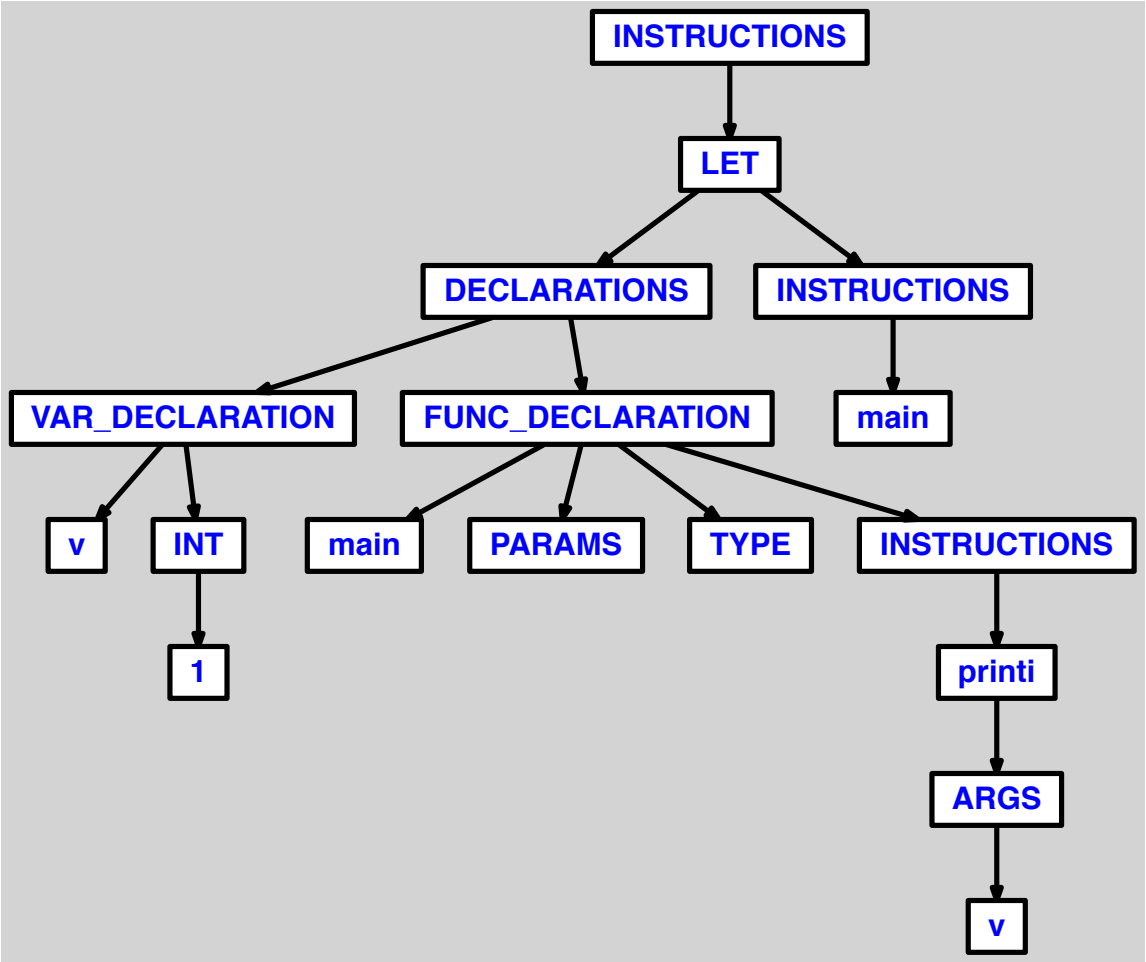
13.2.12 declarations de chaine avec types et reutilisation de 3 autres chaines

```
let
  var t : string := "test"
  var u : string := "test"
  var v : string := "test"
  var s : string := t+u+v
in
  print(s)
end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
print
t
string
STR
u
string
STR
v
string
STR
s
string
+
ARGS
"test"
"test"
"test"
+
v
s
t
u

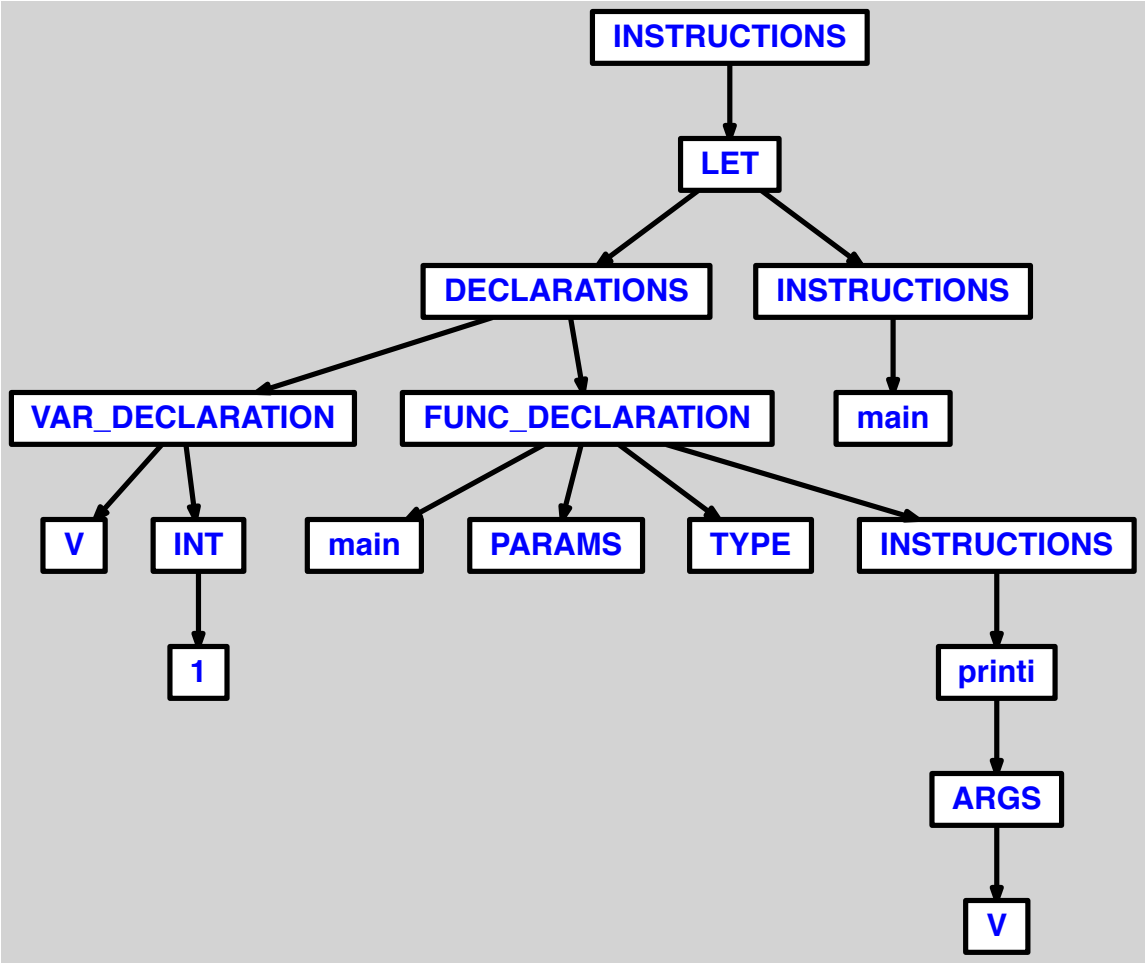
13.2.13 lettre minuscule comme nom de variable

```
let
  var v := 1

  function main() = printi(v)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
v
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
v

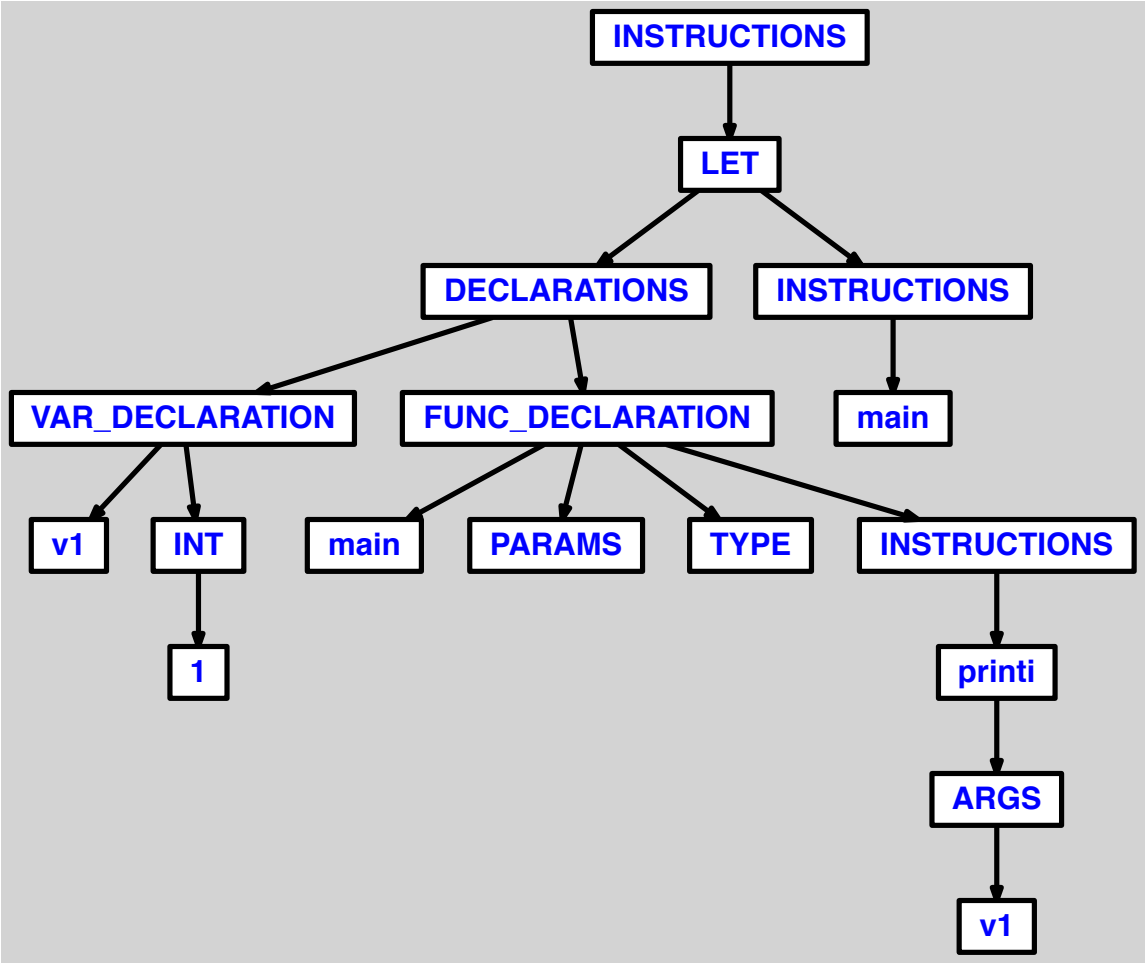
13.2.14 lettre majuscule comme nom de variable

```
let
  var V := 1

  function main() = printi(V)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
V
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
V

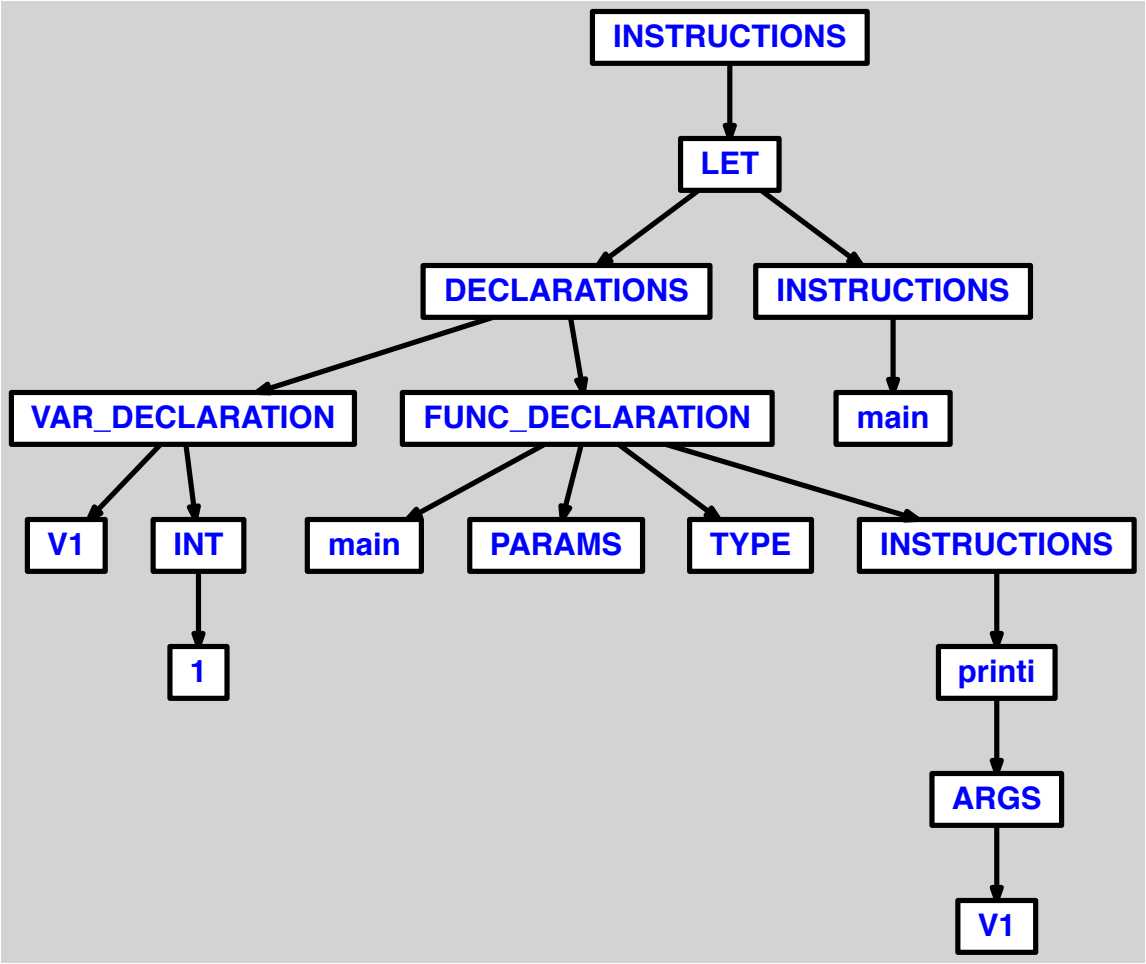
13.2.15 lettre minuscule et chiffre dans nom de variable

```
let
  var v1 := 1

  function main() = printi(v1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
v1
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
v1

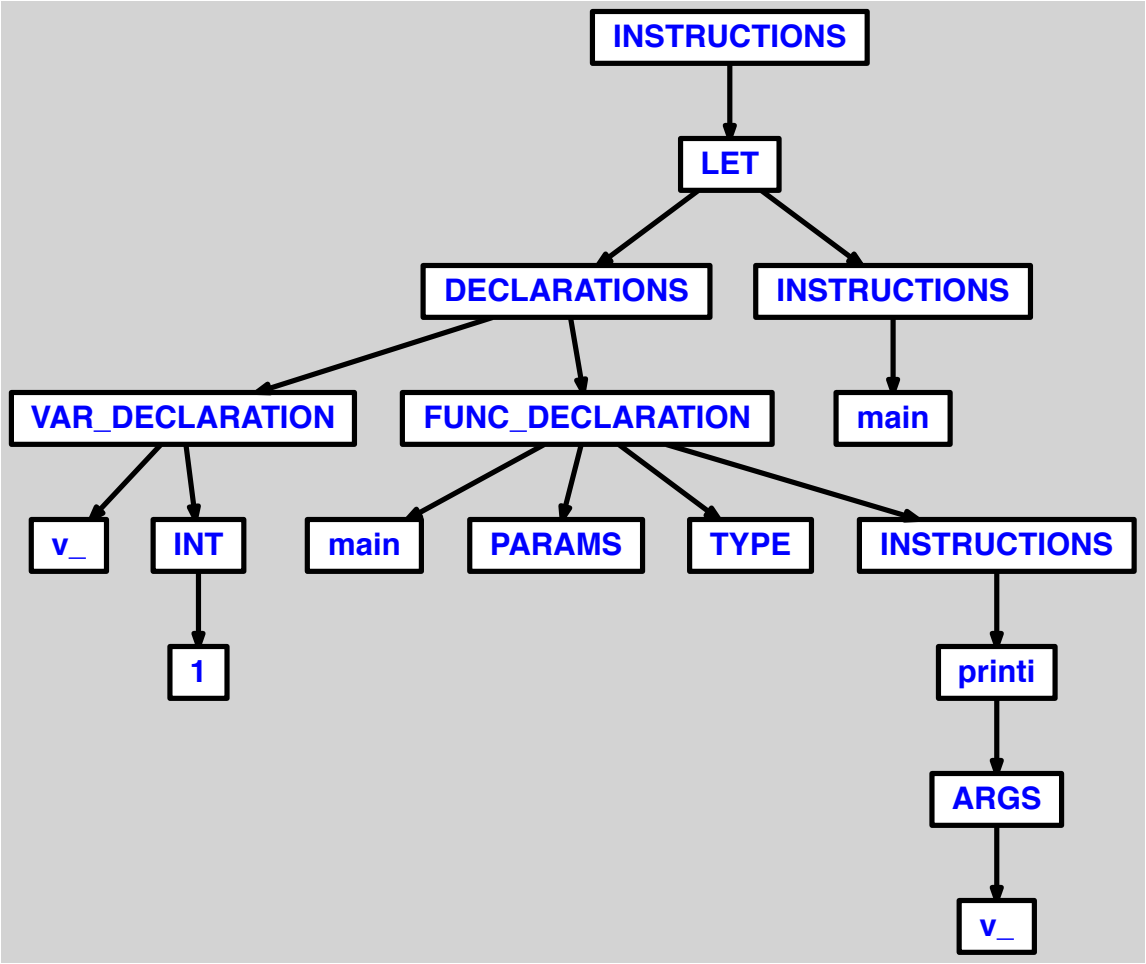
13.2.16 lettre majuscule et chiffre dans nom de variable

```
let
  var V1 := 1

  function main() = printi(V1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
V1
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
V1

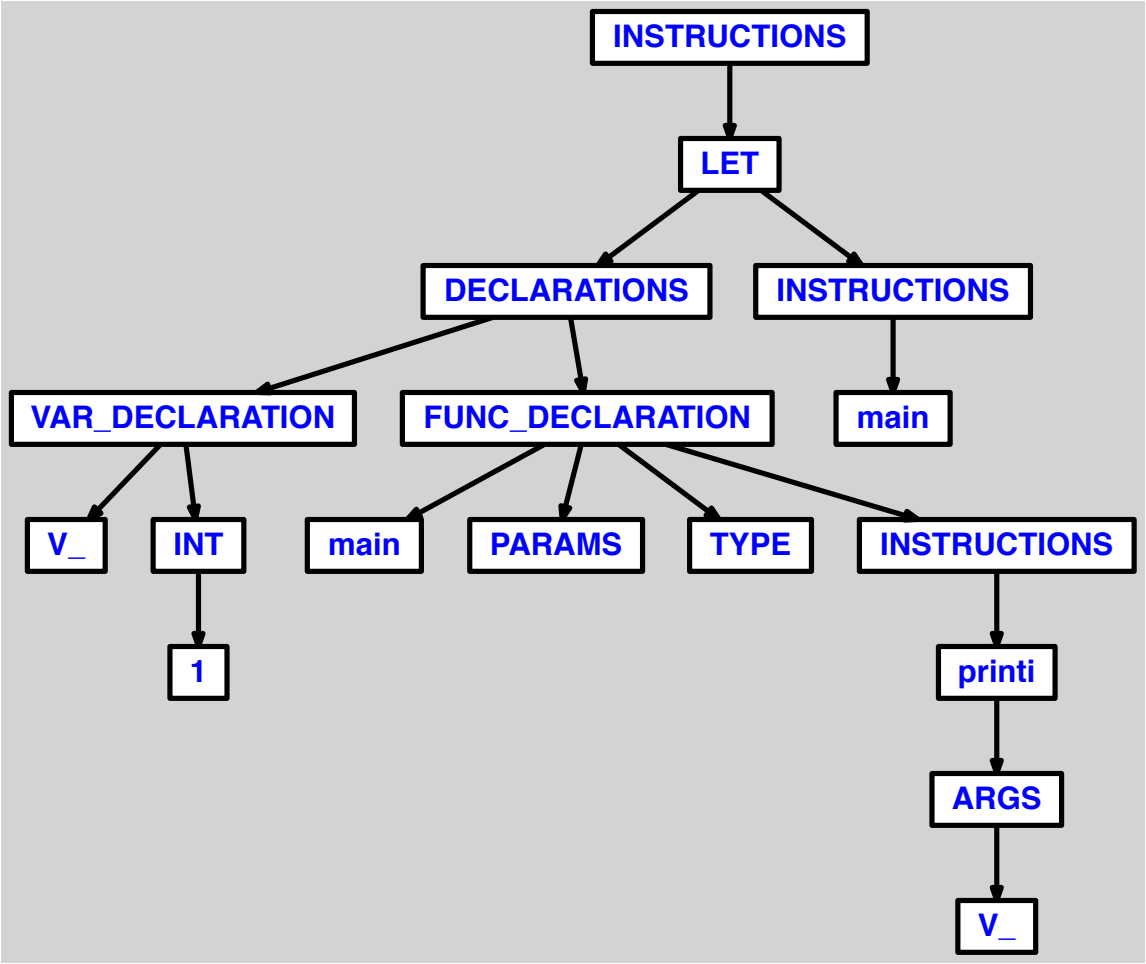
13.2.17 lettre minuscule et <_> dans nom de variable

```
let
  var v_ := 1

  function main() = printi(v_)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
v_
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
v_

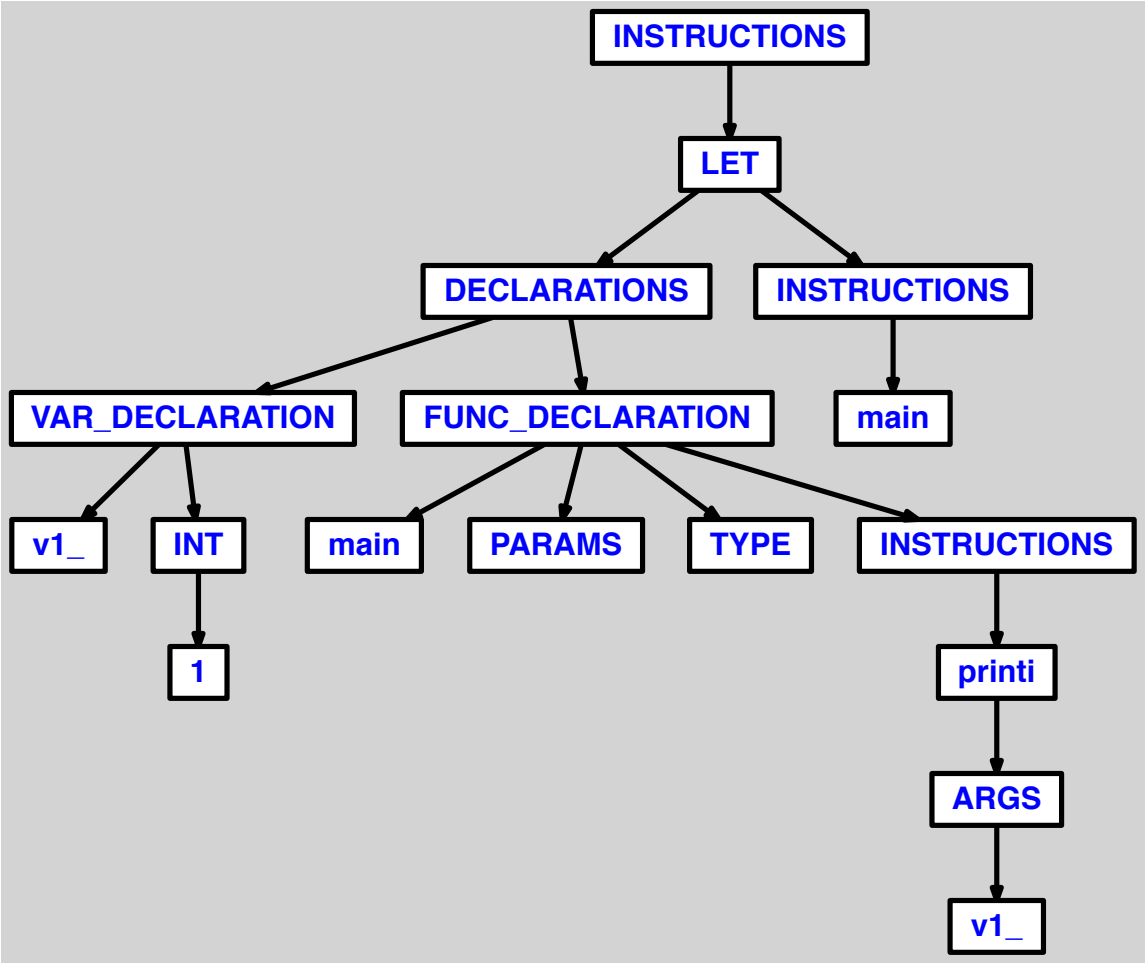
13.2.18 lettre majuscule et <_> dans nom de variable

```
let
  var V_ := 1

  function main() = printi(V_)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
V_
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
V_

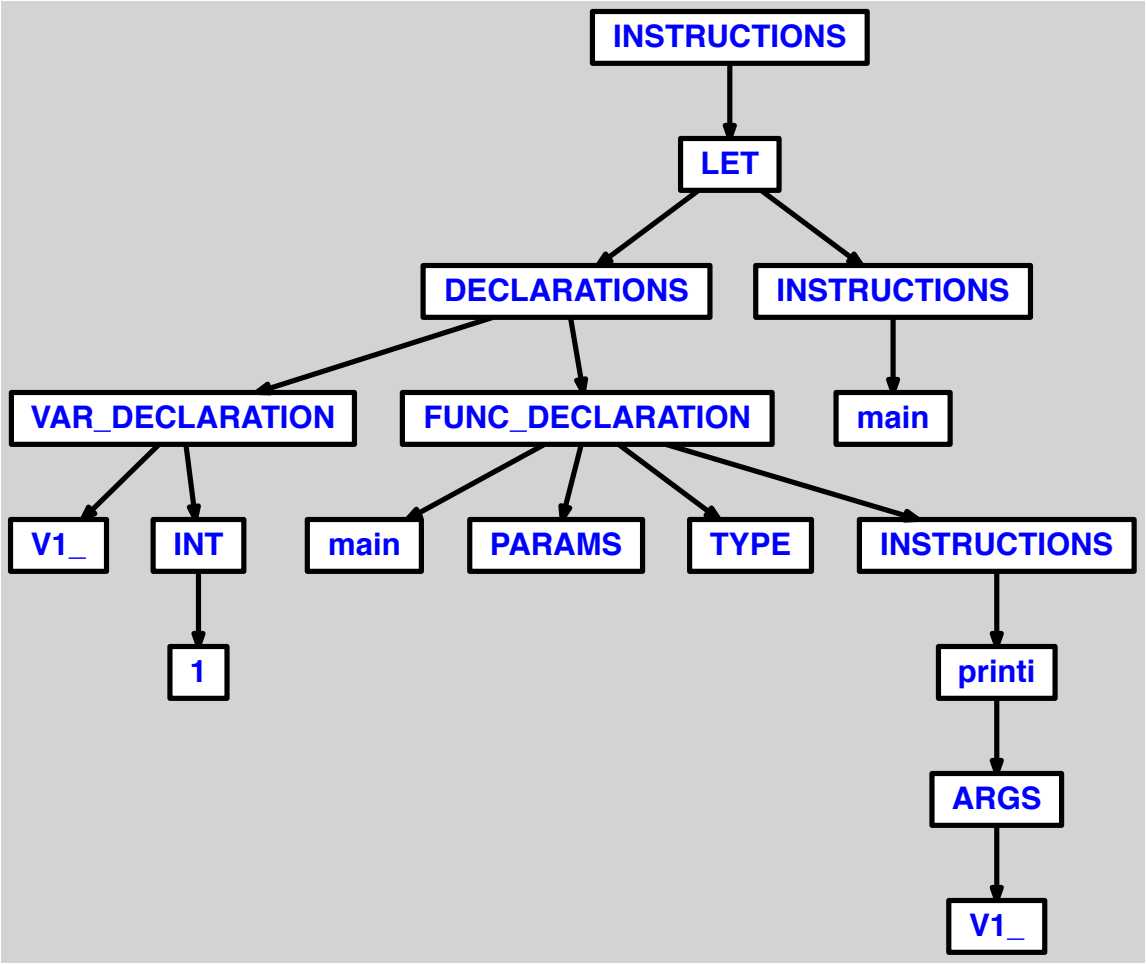
13.2.19 lettre minuscule, chiffre et <_> dans nom de variable

```
let
  var v1_ := 1

  function main() = printi(v1_)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
v1_
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
v1_

13.2.20 lettre majuscule, chiffre et <_> dans nom de variable

```
let
  var V1_ := 1

  function main() = printi(V1_)
in main() end
```

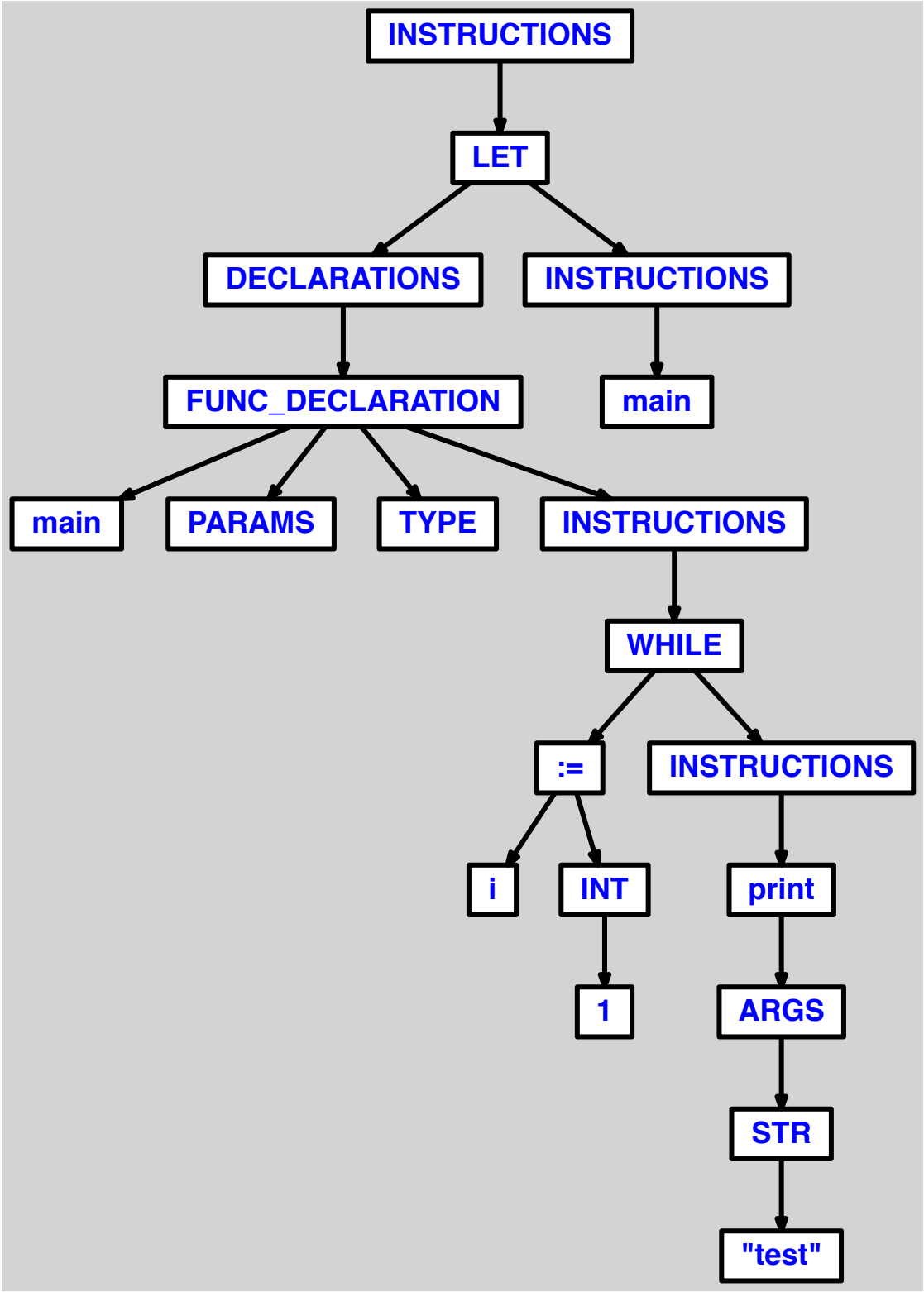

INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
V1_
INT
main
PARAMS
TYPE
INSTRUCTIONS
1
printi
ARGS
V1_

14 while

14.1 KO

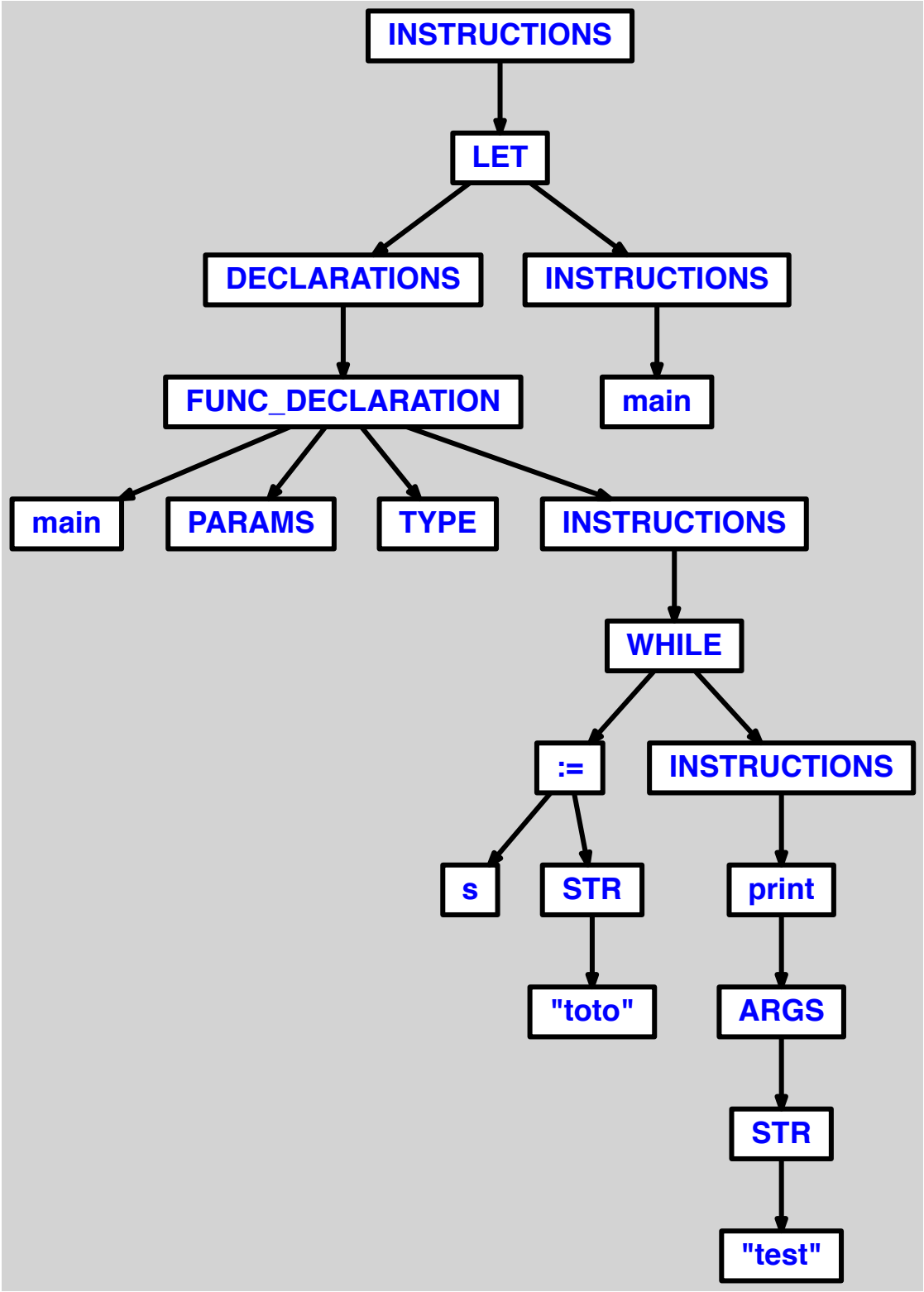
14.1.1 <while> avec affectation d'entier

```
let
  function main() =
    while i := 1 do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
WHILE
:=
INSTRUCTIONS
i
INT
print
1
ARGS
STR
"test"

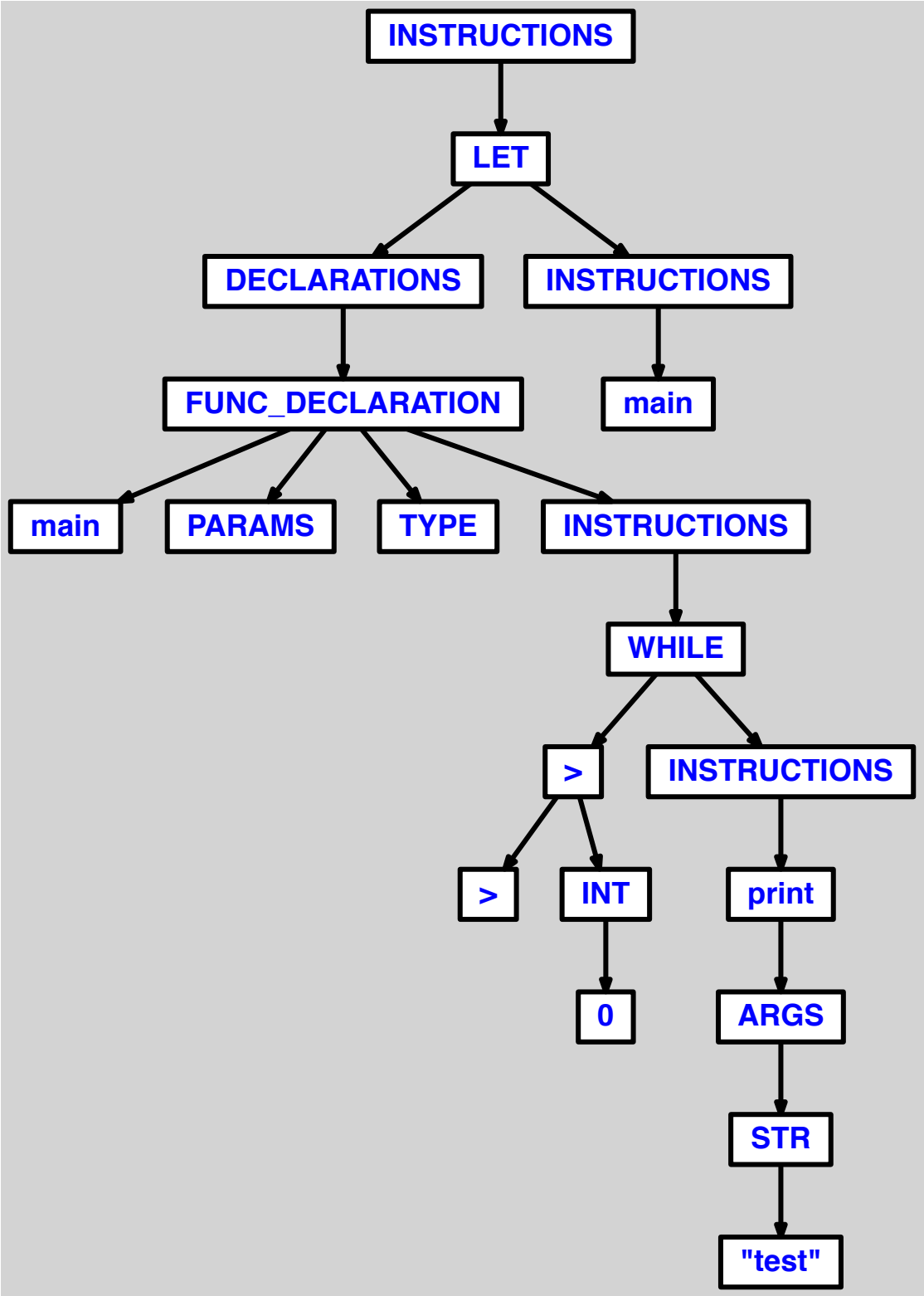
14.1.2 <while> avec affectation de chaine

```
let
  function main() =
    while s := "toto" do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
WHILE
:=
INSTRUCTIONS
s
STR
print
"toto"
ARGS
STR
"test"

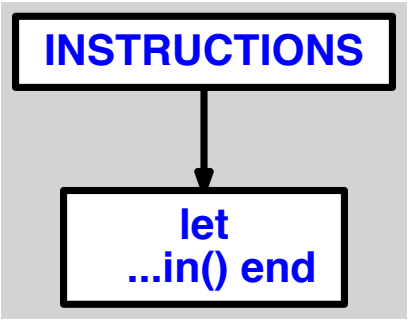
14.1.3 <while> avec oubli du compteur

```
let
  function main() =
    while > 0 do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
WHILE
>
INSTRUCTIONS
>
INT
print
0
ARGS
STR
"test"

14.1.4 <while> avec oubli du <while>

```
let
  var i := 0

  function main() =
    i >= 0 do
      print("test")
in main() end
```


INSTRUCTIONS
let
...in() end

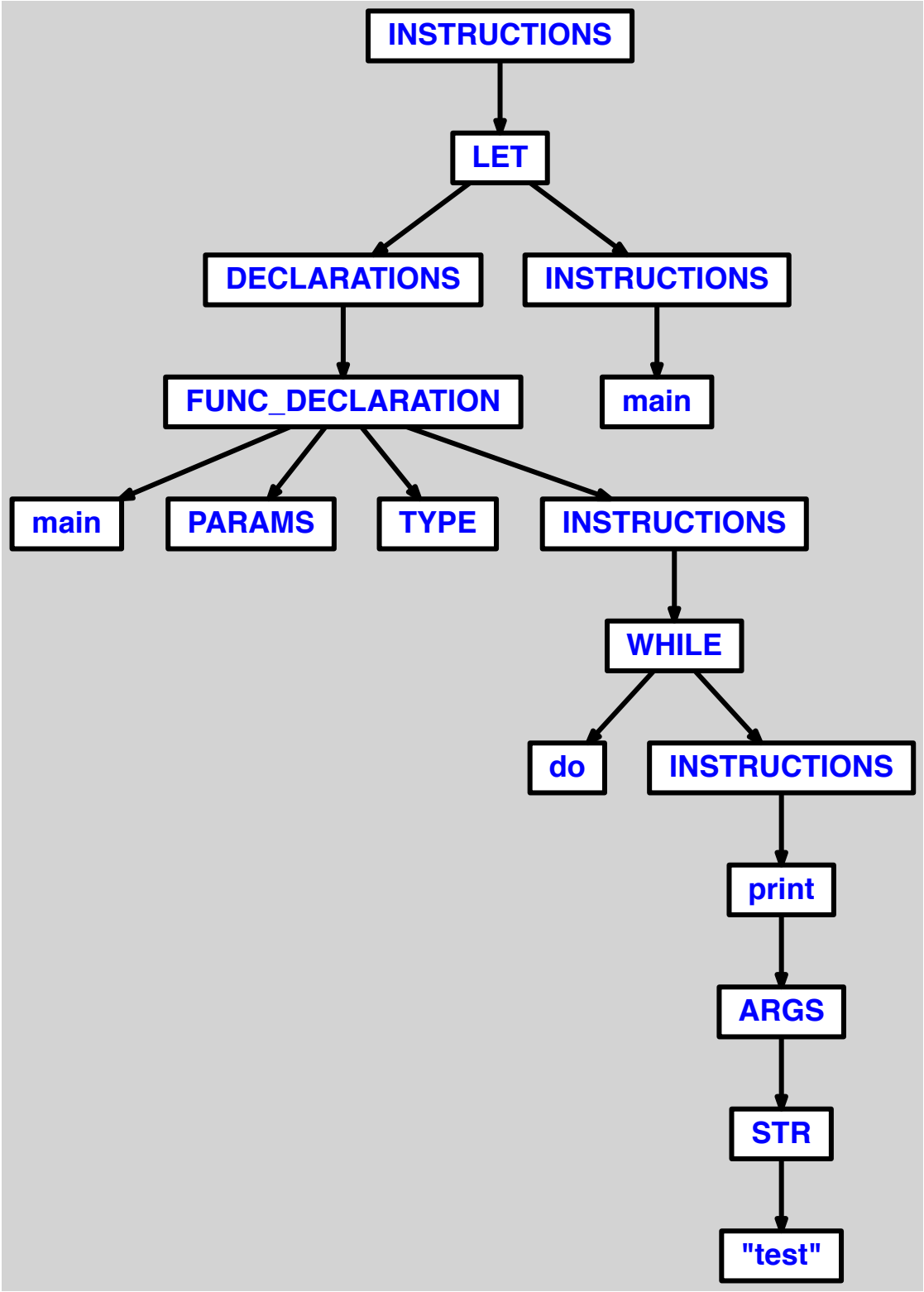
14.1.5 <while> avec oubli du <do>

```
let
  var i := 0

  function main() :
    while i >= 0
      print("test")
in main() end
```

Pas d'AST, problème de syntaxe.

14.1.6 <while> avec oubli de la condition

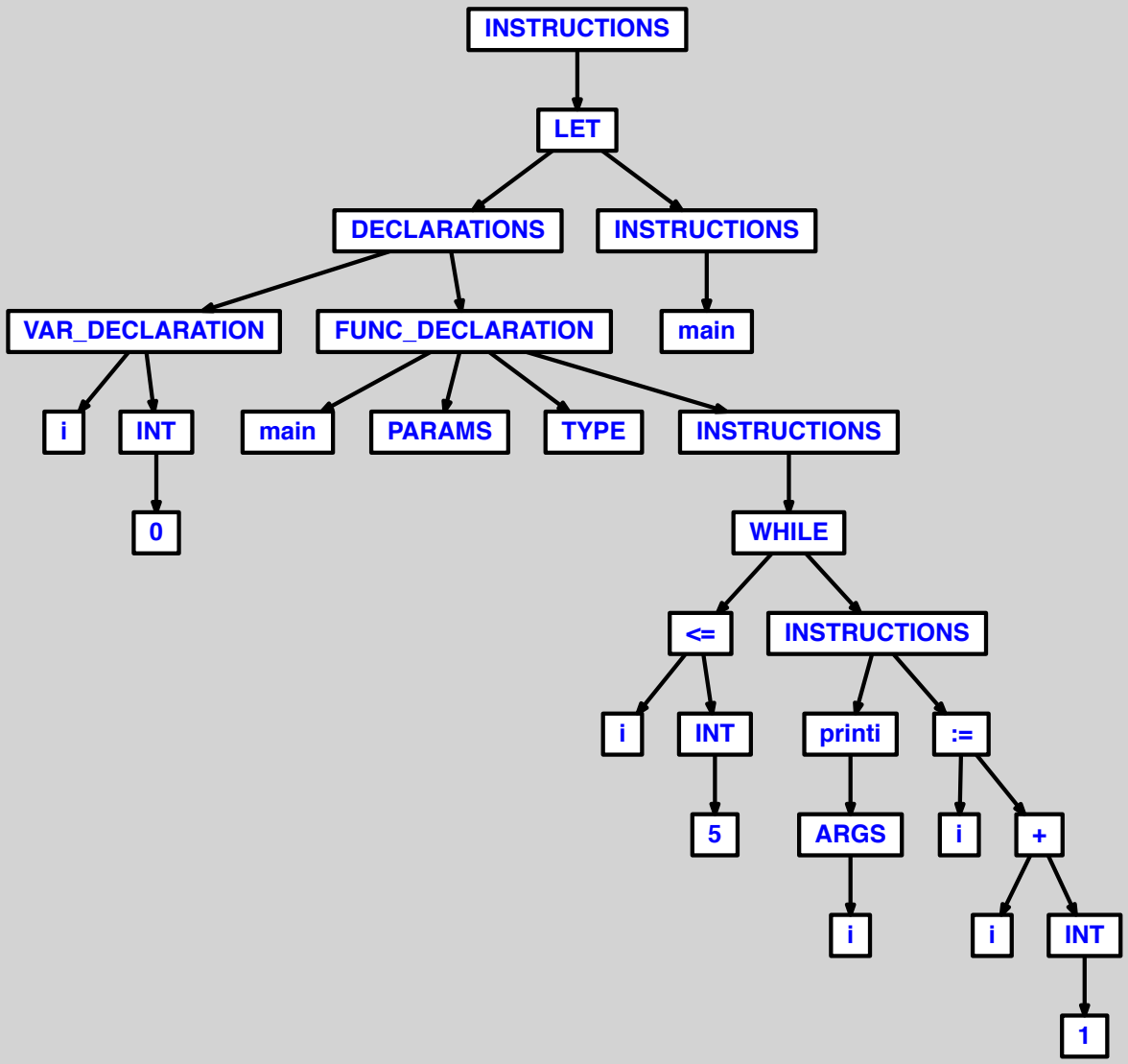
```
let
  function main() =
    while do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
WHILE
do
INSTRUCTIONS
print
ARGS
STR
"test"

14.2 OK

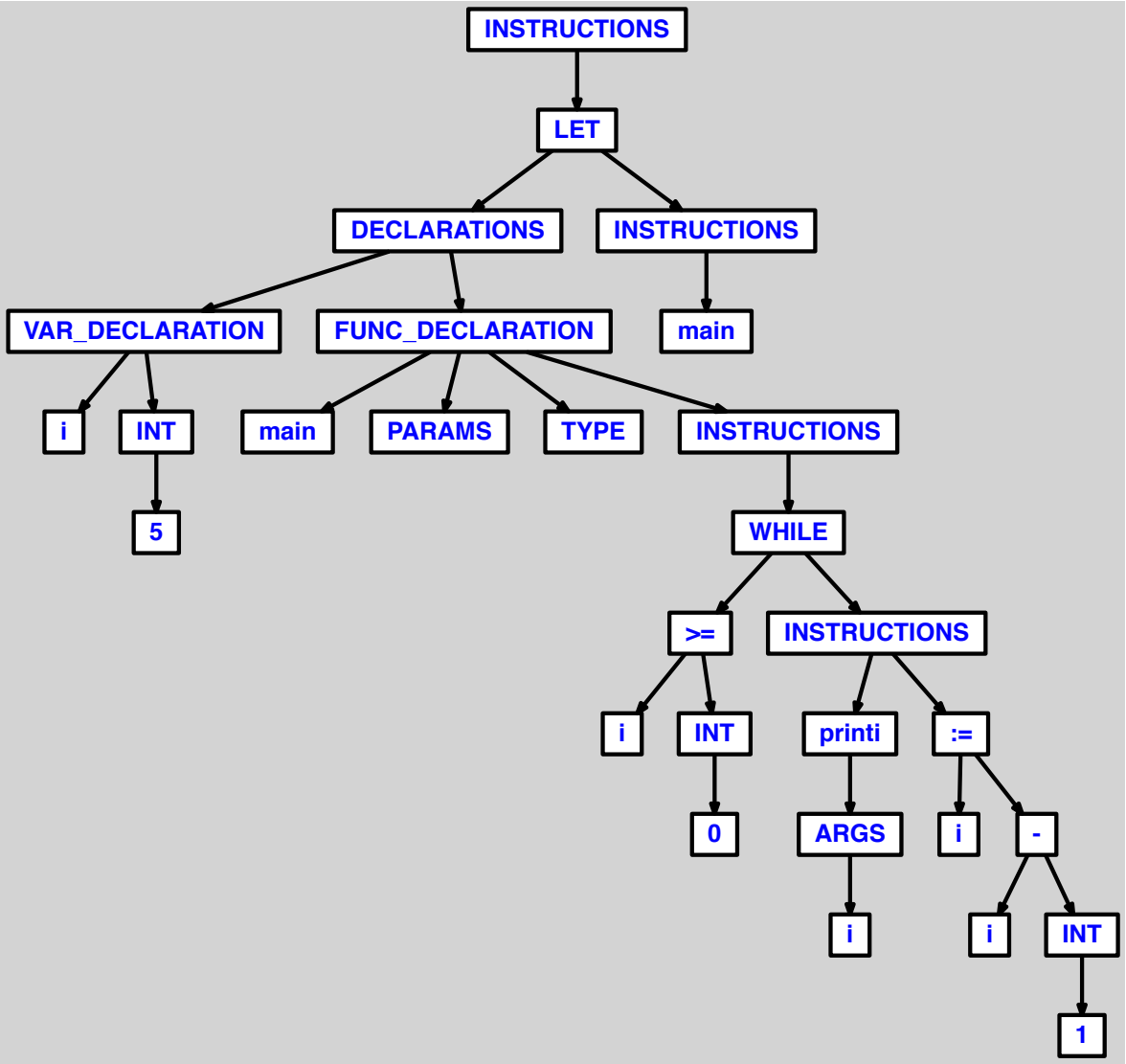
14.2.1 <while> avec iteration croissante

```
let
  var i := 0

  function main() =
    while i <= 5 do
      (printi(i);
      i := i+1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
WHILE
<=
INSTRUCTIONS
i
INT
printi
:=
5
ARGS
i
+
i
i
INT
1

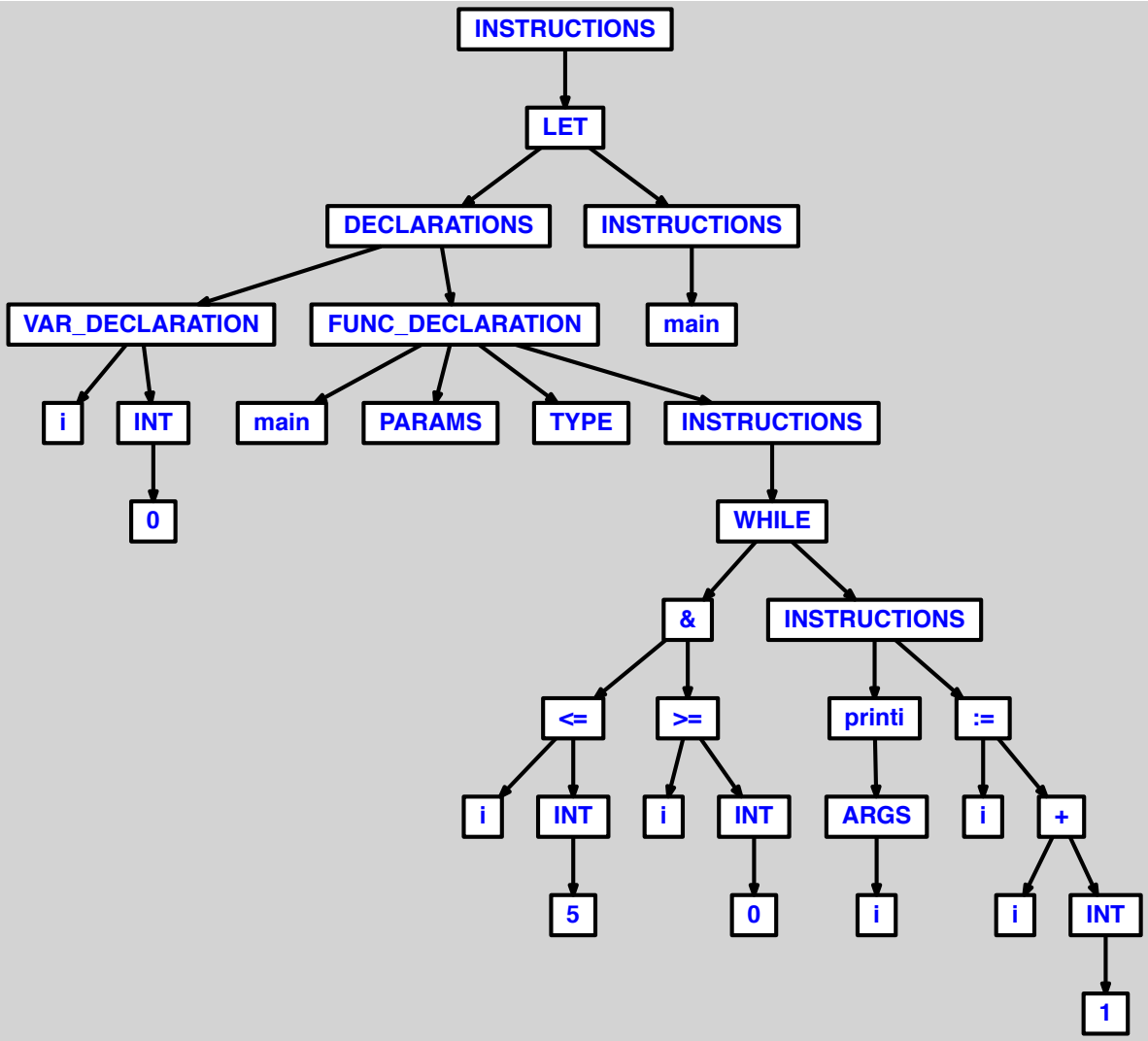
14.2.2 <while> avec iteration decroissante

```
let
  var i := 5

  function main() =
    while i >= 0 do
      (printi(i);
      i := i-1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
5
WHILE
>=
INSTRUCTIONS
i
INT
printi
:=
0
ARGS
i
-
i
i
INT
1

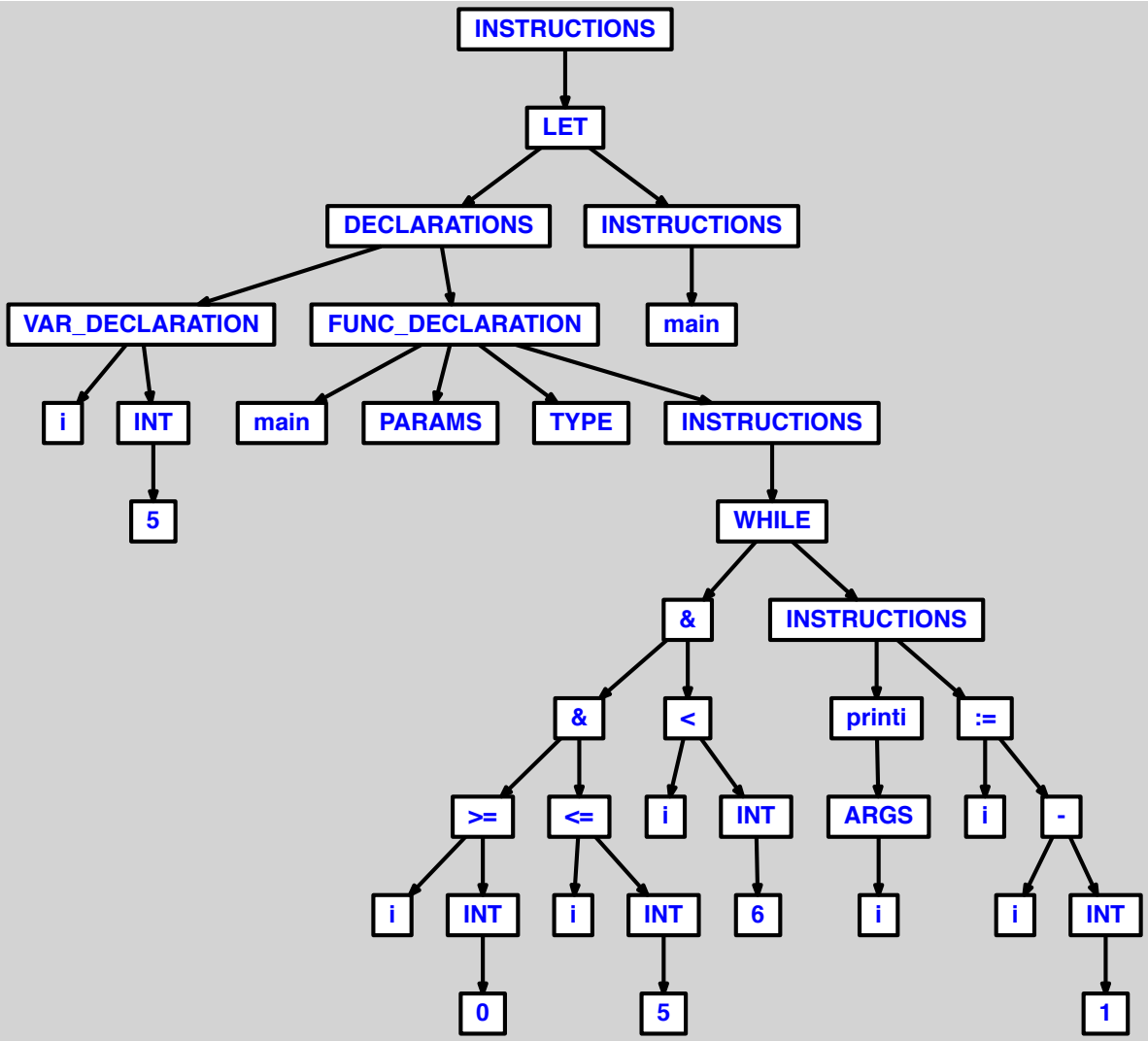
14.2.3 <while> avec double-condition

```
let
  var i := 0

  function main() =
    while i <= 5 & i >= 0 do
      (printi(i);
      i := i+1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
WHILE
&
INSTRUCTIONS
<=
>=
printi
:=
i
INT
i
INT
ARGS
i
+
5
0
i
i
INT
1

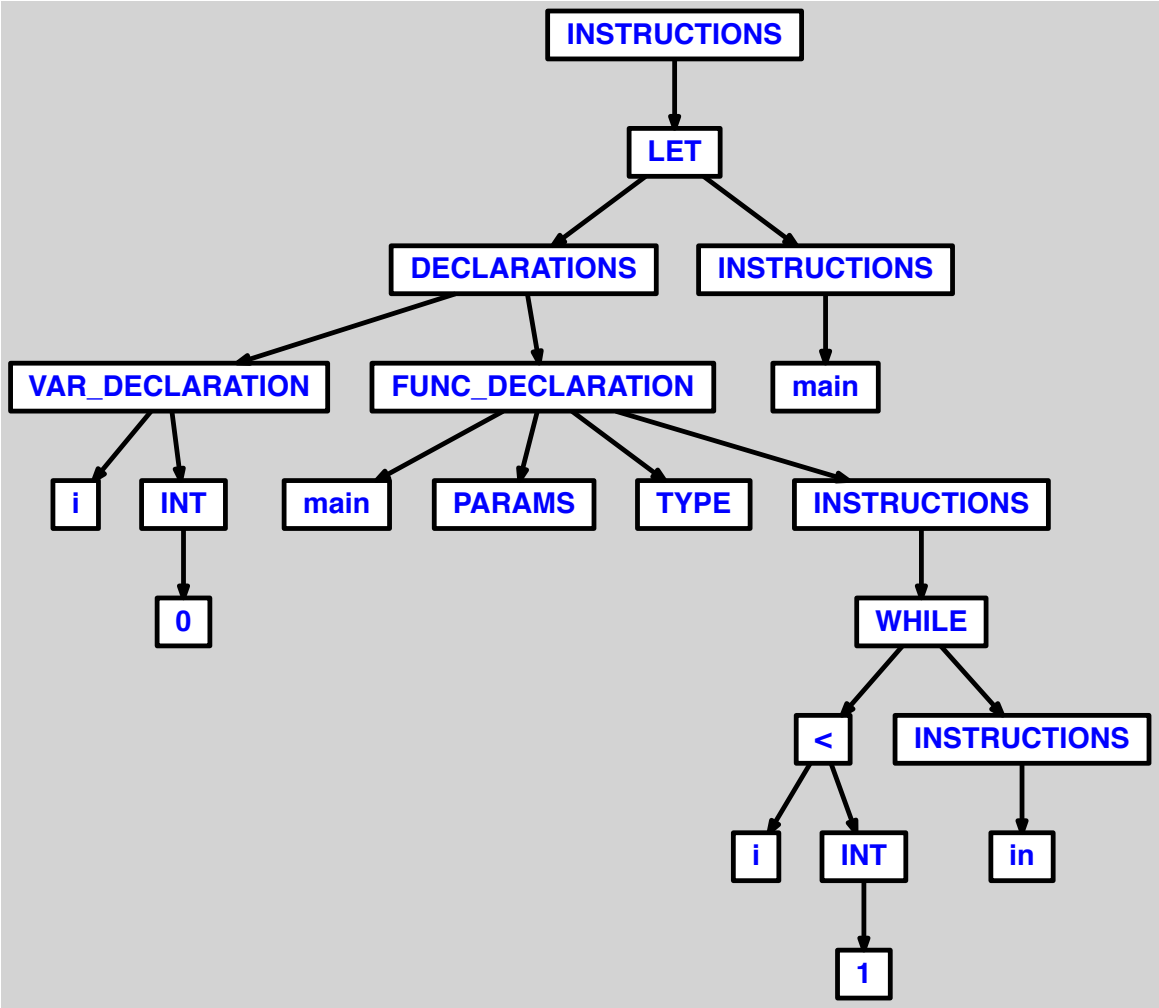
14.2.4 <while> avec triple-condition

```
let
  var i := 5

  function main() =
    while i >= 0 & i <= 5 & i < 6 do
      (printi(i);
      i := i-1)
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
5
WHILE
&
INSTRUCTIONS
&
<
printi
:=
>=
<=
i
INT
ARGS
i
-
i
INT
i
INT
6
i
i
INT
0
5
1

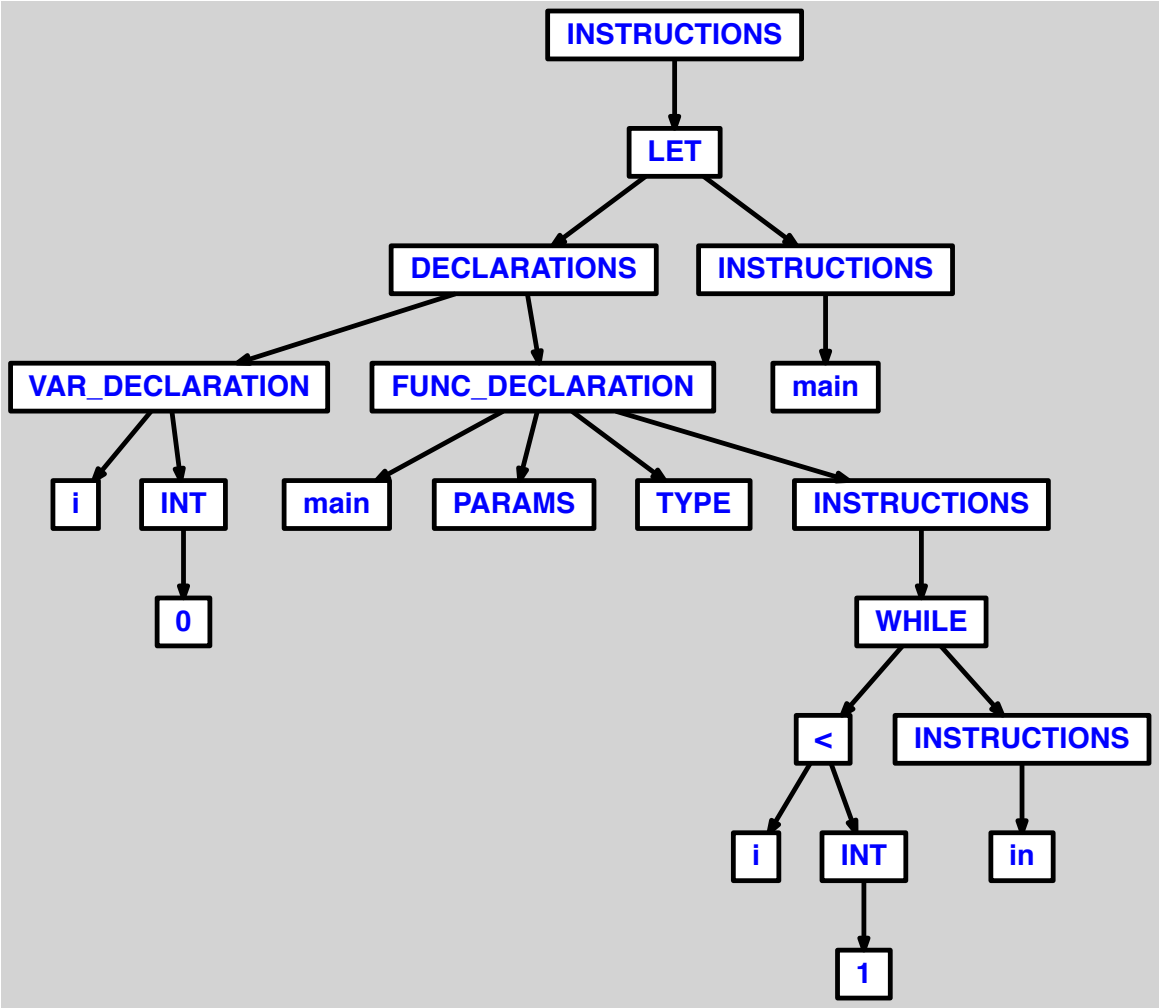
14.2.5 <while> sans instruction

```
let
  var i := 0

  function main() =
    while i < 1 do
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
WHILE
<
INSTRUCTIONS
i
INT
in
1

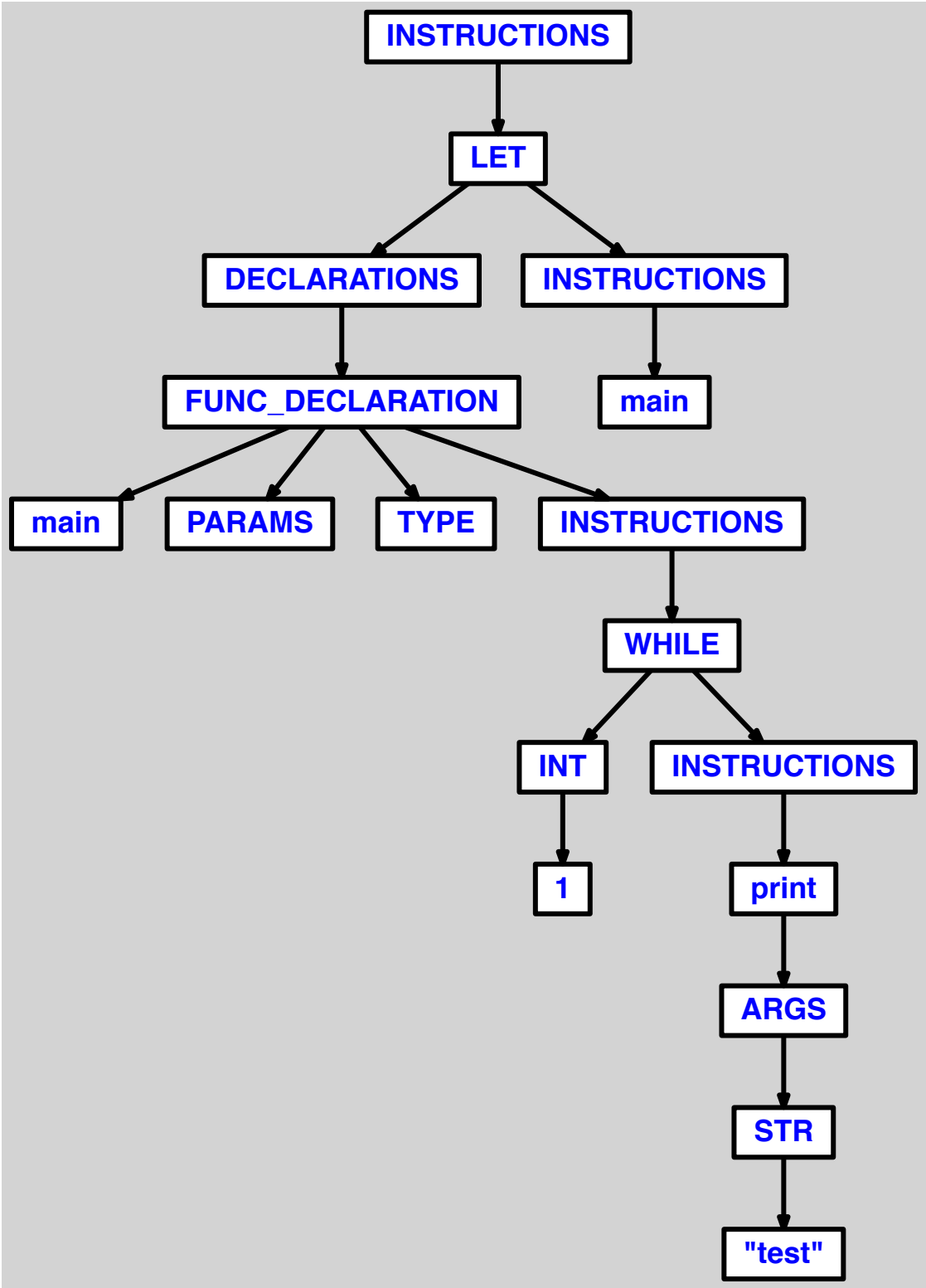
14.2.6 <while> avec ligne vide

```
let
  var i := 0

  function main() =
    while i < 1 do

in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
WHILE
<
INSTRUCTIONS
i
INT
in
1

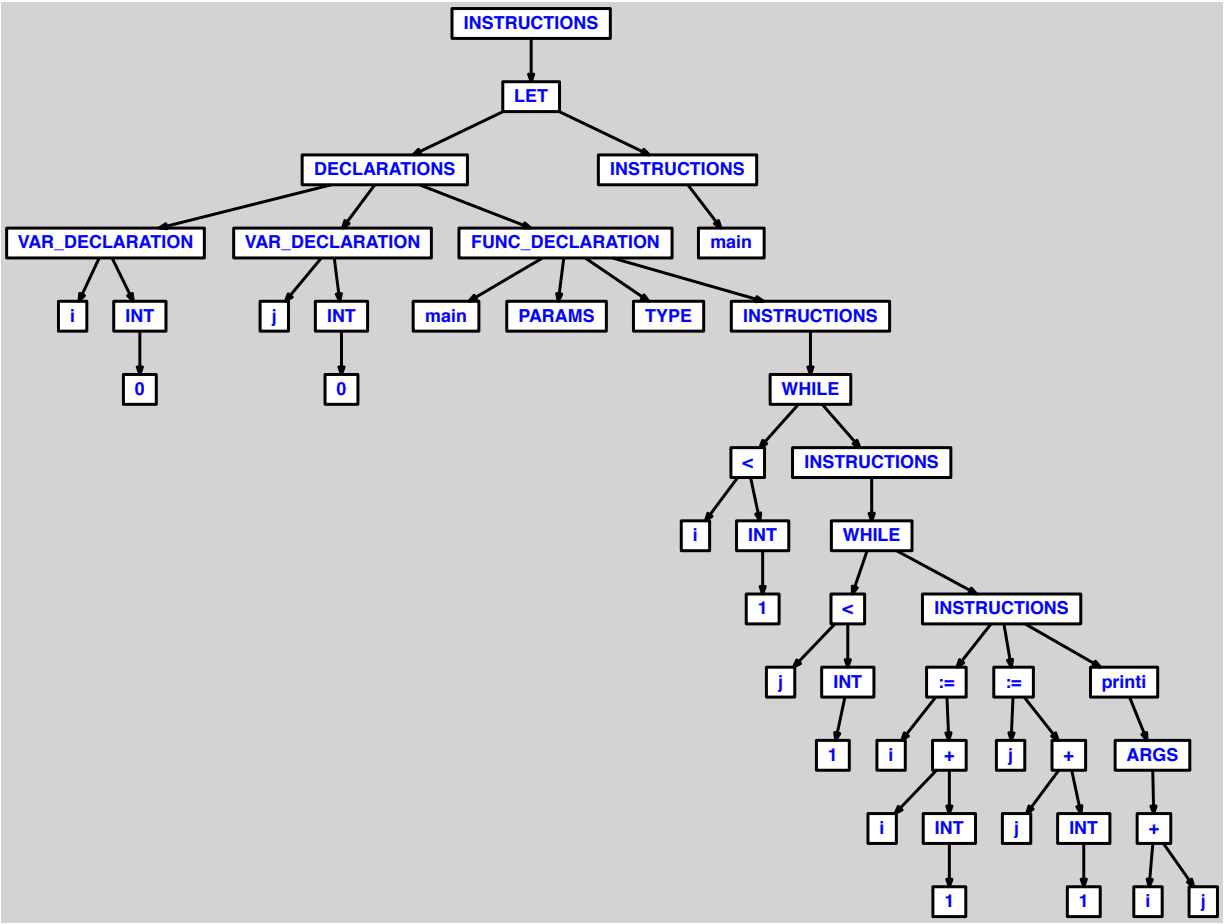
14.2.7 <while> avec condition entiere

```
let
  function main() =
    while 1 do
      print("test")
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
FUNC_DECLARATION
main
main
PARAMS
TYPE
INSTRUCTIONS
WHILE
INT
INSTRUCTIONS
1
print
ARGS
STR
"test"

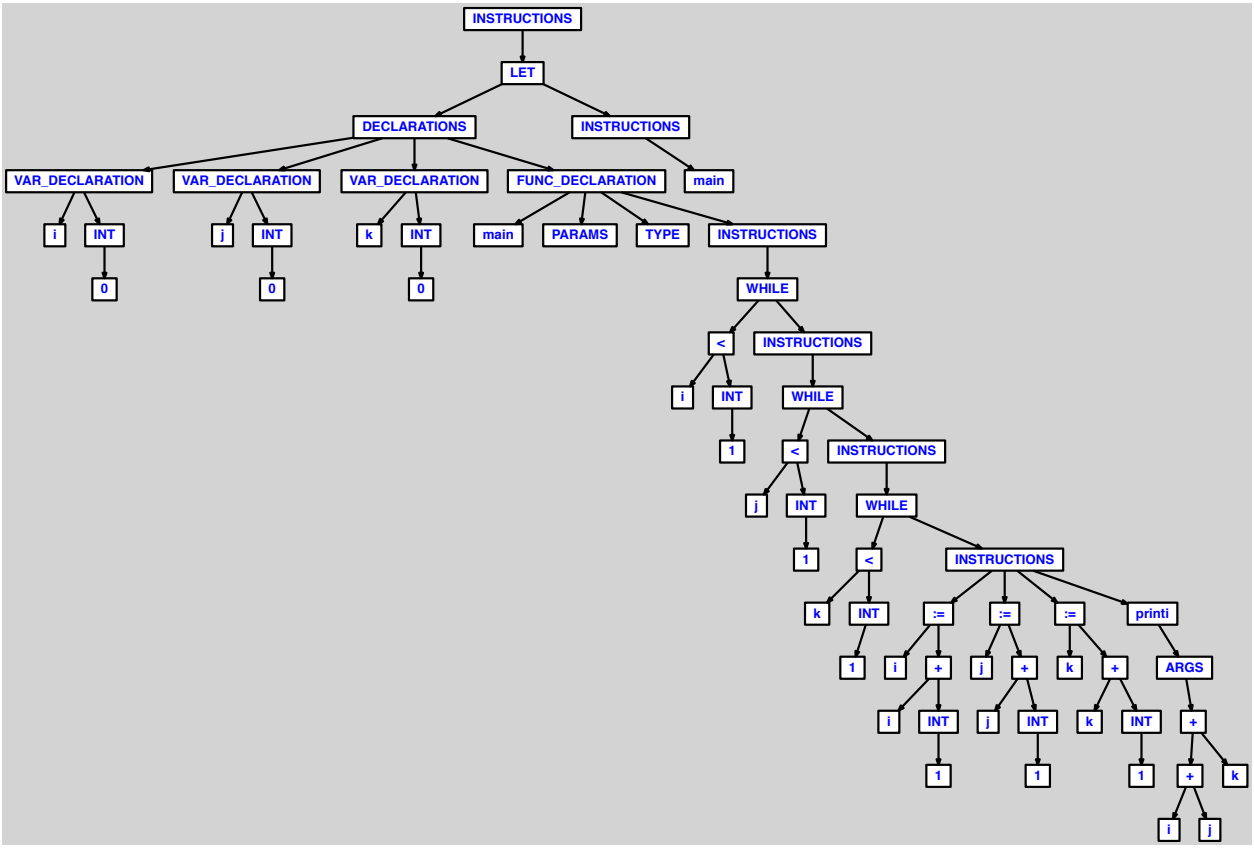
14.2.8 <while> avec double-imbrication

```
let
  var i := 0
  var j := 0

  function main() =
    while i < 1 do
      while j < 1 do
        (i := i+1;
        j := j+1;
        printi(i+j))
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
0
WHILE
<
INSTRUCTIONS
i
INT
WHILE
1
<
INSTRUCTIONS
j
INT
:=
:=
printi
1
i
+
j
+
ARGS
i
INT
j
INT
+
1
1
i
j

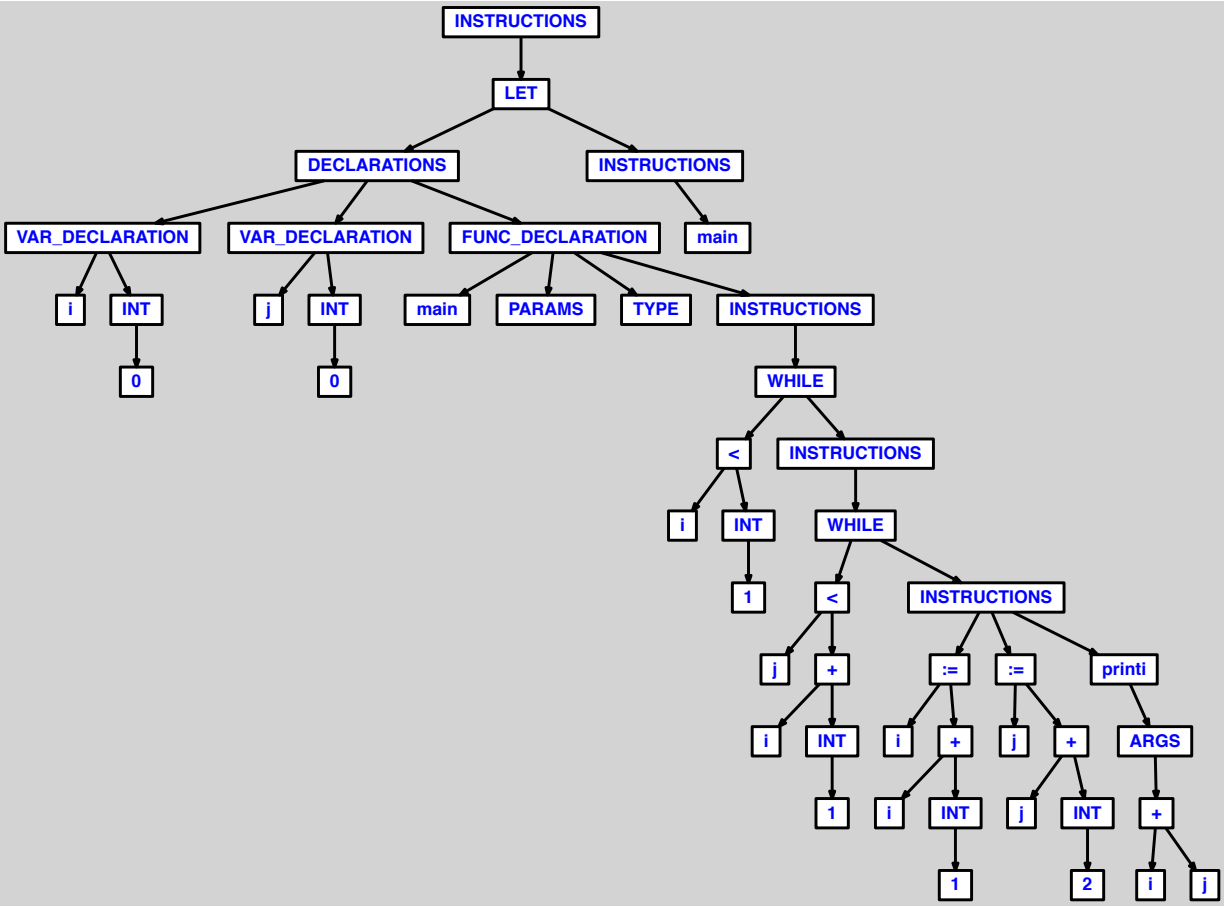
14.2.9 <while> avec triple-imbrication

```
let
  var i := 0
  var j := 0
  var k := 0

  function main() =
    while i < 1 do
      while j < 1 do
        while k < 1 do
          (i := i+1;
          j := j+1;
          k := k+1;
          printi(i+j+k))
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
k
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
0
0
WHILE
<
INSTRUCTIONS
i
INT
WHILE
1
<
INSTRUCTIONS
j
INT
WHILE
1
<
INSTRUCTIONS
k
INT
:=
:=
:=
printi
1
i
+
j
+
k
+
ARGS
i
INT
j
INT
k
INT
+
1
1
1
+
k
i
j

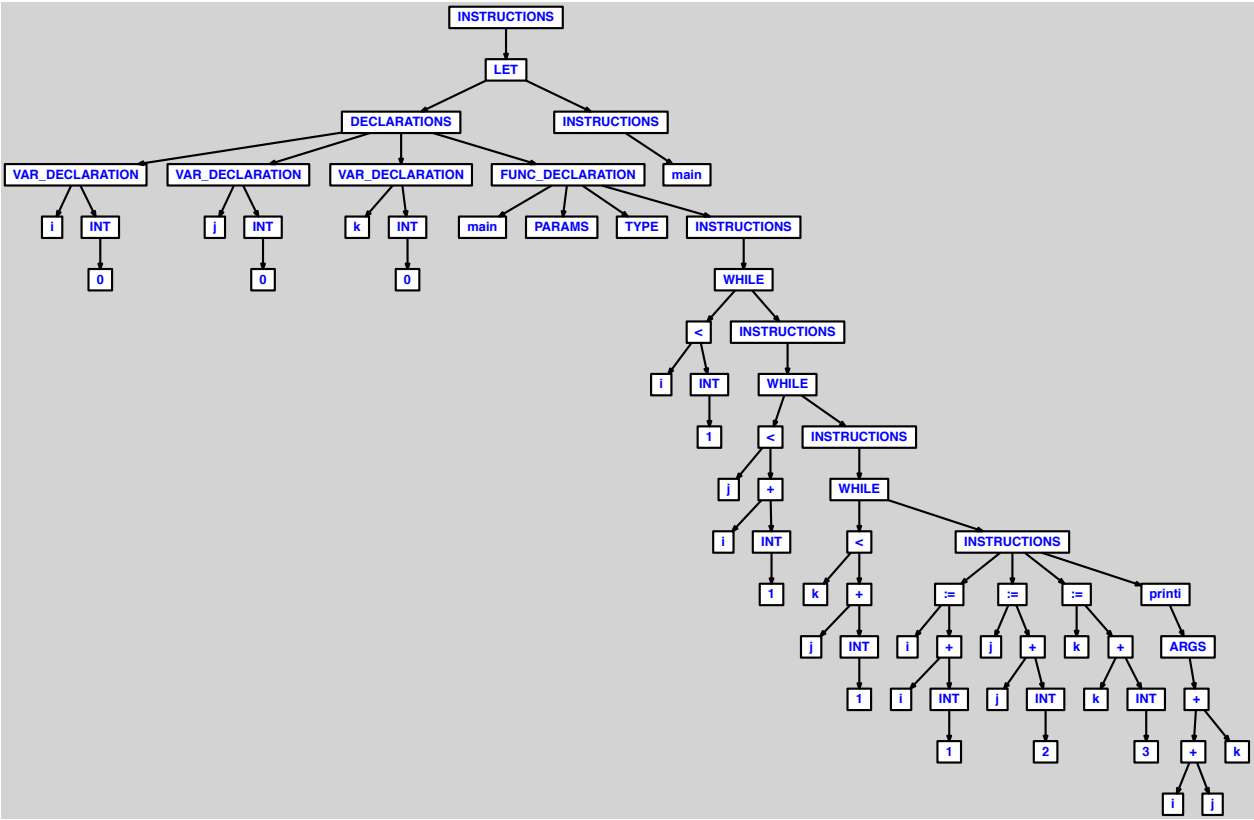
14.2.10 <while> avec reutilisation de compteur

```
let
  var i := 0
  var j := 0

  function main() =
    while i < 1 do
      while j < i+1 do
        (i := i+1;
        j := j+2;
        printi(i+j))
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
j
INT
main
PARAMS
TYPE
INSTRUCTIONS
0
0
WHILE
<
INSTRUCTIONS
i
INT
WHILE
1
<
INSTRUCTIONS
j
+
:=
:=
printi
i
INT
i
+
j
+
ARGS
1
i
INT
j
INT
+
1
2
i
j

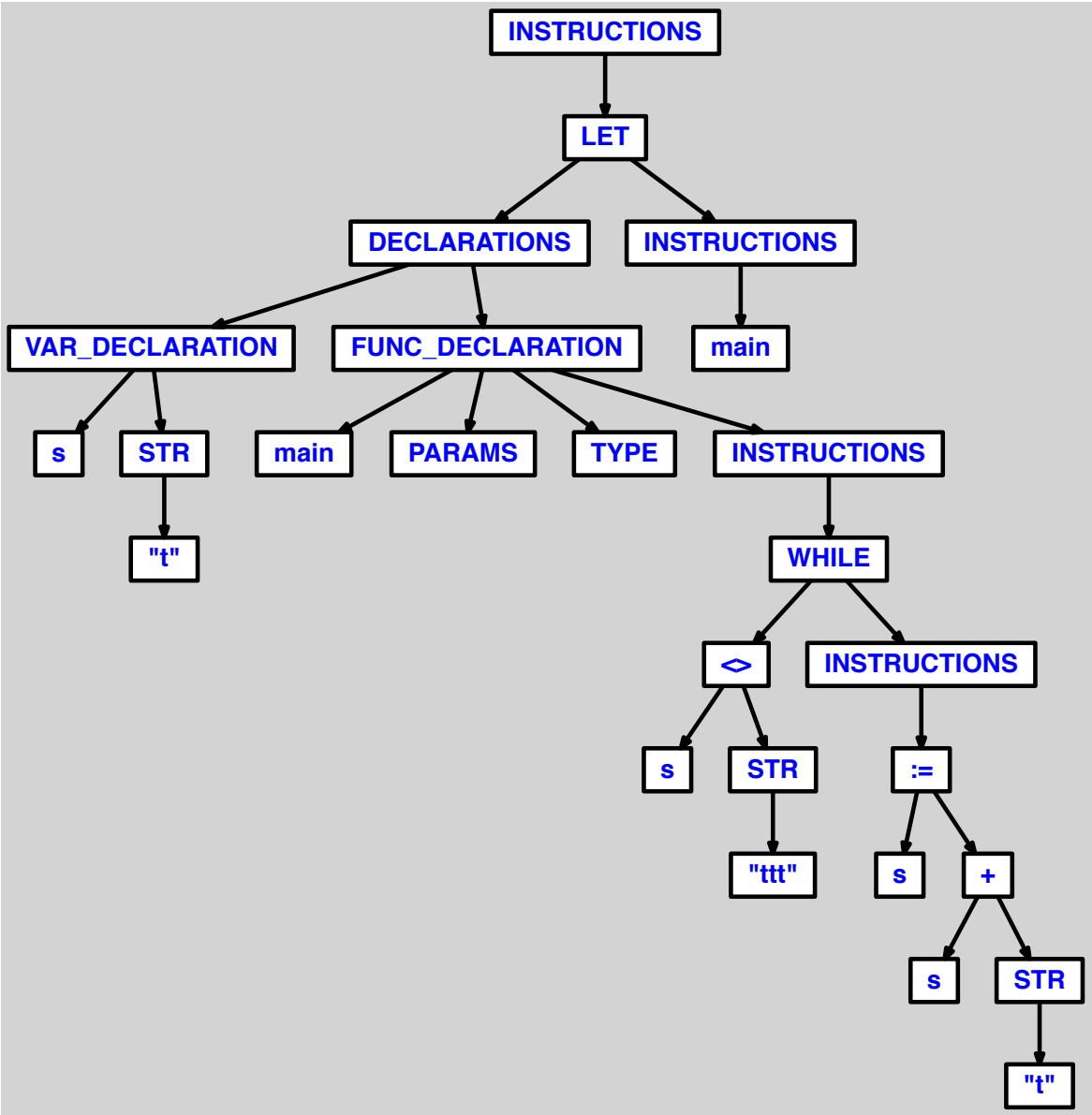
14.2.11 <while> avec reutilisation de compteurs

```
let
  var i := 0
  var j := 0
  var k := 0

  function main() =
    while i < 1 do
      while j < i+1 do
        while k < j+1 do
          (i := i+1;
          j := j+2;
          k := k+3;
          printi(i+j+k))
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
VAR_DECLARATION
VAR_DECLARATION
FUNC_DECLARATION
main
i
INT
0
j
INT
0
k
INT
0
main
PARAMS
TYPE
INSTRUCTIONS
WHILE
<
INSTRUCTIONS
i
INT
1
WHILE
<
INSTRUCTIONS
j
+
i
INT
1
WHILE
<
INSTRUCTIONS
k
+
j
INT
1
:=
:=
:=
printi
i
+
i
INT
1
j
+
j
INT
2
k
+
k
INT
3
ARGS
+
+
k
i
j

14.2.12 <while> avec iteration sur une chaine

```
let
  var s := "t"

  function main() =
    while s <> "ttt" do
      s := s+"t"
in main() end
```


INSTRUCTIONS
LET
DECLARATIONS
INSTRUCTIONS
VAR_DECLARATION
FUNC_DECLARATION
main
s
STR
main
PARAMS
TYPE
INSTRUCTIONS
"t"
WHILE
<>
INSTRUCTIONS
s
STR
:=
"ttt"
s
+
s
STR
"t"