מגישים:
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פרוייקט מבוא לקומפילציה- חלק 1

דוגמאות הרצה: Correct & InCorrect:

1. Main Example + Output:

home > eyalb > Desktop > project1 > project1MainExample.t

```
proc foo (x, y, z: int;f: real)
{
    if (x>y)
    {
        x = x + f;
    }
    else
    {
        y = x + y + z;
        x = f*2;
        z = f;
    }
}
func goo() return char
{
    return 'a';
}
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
(CODE
        (PROC
                (foo
                        (ARGS
                                (INT
                                        (x)
                                        (y)
                                        (z)
                                )
                                (REAL
                                        (f)
                                )
                        )
                )
                (BODY
                        (IF-ELSE
                                (>
                                        (x)
                                        (y)
                                )
                                (BLOCK
                                        (=
                                                (x)
                                                (+
                                                        (x)
                                                        (f)
                                                )
                                        )
                                )
                                (BLOCK
                                        (=
                                                (y)
                                                (+
                                                        (+
                                                                (x)
                                                                (y)
                                                        )
                                                        (z)
                                                )
                                        )
                                        (=
                                                (x)
                                                (*
                                                        (f)
                                                        (2)
                                                )
                                        )
                                        (=
                                                (z)
                                                (f)
                                        )
                                )
                        )
                )
        )
        (FUNC
                (goo
                        (ARGS
                                (NONE)
                        )
                        (RET
                                (CHAR)
                        )
                )
                (BODY
                )
                (RET
                        ('a')
                )
        )
)
eyalb@eyalb-VirtualBox:~/Desktop/project1$
```

2. RealNumbers - Correct:

```
proc realNumbers()
{
    var x,y,z: real;
    x = 3.14;
    x = -34.9988;
    x = 45.3E-23;
    x = -4E+2101;
    x =  +.2E4;
    x = 4.e-67;
}
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
(CODE
        (PROC
                (realNumbers
                        (ARGS
                                (NONE)
                        )
                )
                (BODY
                        (REAL
                                (x)
                                (y)
                                (z)
                        )
                        (=
                                (x)
                                (3.14)
                        )
                        (=
                                (x)
                                (-
                                        (34.9988)
                                )
                        )
                        (=
                                (x)
                                (45.3E-23)
                        )
                        (=
                                (x)
                                (-4E+2101)
                        )
                        (=
                                (x)
                                (+.2E4)
                        )
                        (=
                                (x)
                                (4.e-67)
                        )
                )
        )
)
```

3. **Comment:**

Correct Code + Output:

```
func comment() return char
{
    /% this is a comment %/
    return 'c';
}
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
(CODE
        (FUNC
                (comment
                        (ARGS
                                (NONE)
                        )
                        (RET
                                (CHAR)
                        )
                )
                (BODY
                )
                (RET
                        ('c')
                )
        )
)
```

incorrect Code + Output:

```
func comment() return char
{
    /* this is a comment */
    return 'c';
}
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
Error: syntax error at line 3
does not accept '/'
```

4. **Nested Functions/Producers:**

- **Correct Code + Output:**

home > eyalb > Desktop > project1 > project1MainExample.t

```
1   func comment() return char
2   {
3      func inner (x , y , z : int) return char
4       {
5           return 'a';
6       }
7       return 'c';
8   }
9   proc goo(f , z , x : int; f : real)
10  {
11      func inner (x , y , z : int) return char
12      {
13          return 'a';
14      }
15  }
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
(CODE
        (FUNC
                (comment
                        (ARGS
                                (NONE)
                        )
                        (RET
                                (CHAR)
                        )
                )
                (BODY
                        (FUNC
                                (inner
                                        (ARGS
                                                (INT
                                                        (x)
                                                        (y)
                                                        (z)
                                                )
                                        )
                                        (RET
                                                (CHAR)
                                        )
                                )
                                (BODY
                                )
                                (RET
                                        ('a')
                                )
                        )
                )
                (RET
                        ('c')
                )
        )
        (PROC
                (goo
                        (ARGS
                                (INT
                                        (f)
                                        (z)
                                        (x)
                                )
                                (REAL
                                        (f)
                                )
                        )
                )
                (BODY
                        (FUNC
                                (inner
                                        (ARGS
                                                (INT
                                                        (x)
                                                        (y)
                                                        (z)
                                                )
                                        )
                                        (RET
                                                (CHAR)
                                        )
                                )
                                (BODY
                                )
                                (RET
                                        ('a')
                                )
                        )
                )
        )
)
```

5. **Function Identifier:**
   - **Correct Code + Output:**

```
home > eyalb > Desktop > project1 > project1MainExample.t
1   func foo_123 () return char
2   {
3     return 'a';
4   }
5   proc goo8473 (f : int)
6   {
7
8   }
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
(CODE
        (FUNC
                (foo_123
                        (ARGS
                                (NONE)
                        )
                        (RET
                                (CHAR)
                        )
                )
                (BODY
                )
                (RET
                        ('a')
                )
        )
        (PROC
                (goo8473
                        (ARGS
                                (INT
                                        (f)
                                )
                        )
                )
                (BODY
                )
        )
)
```

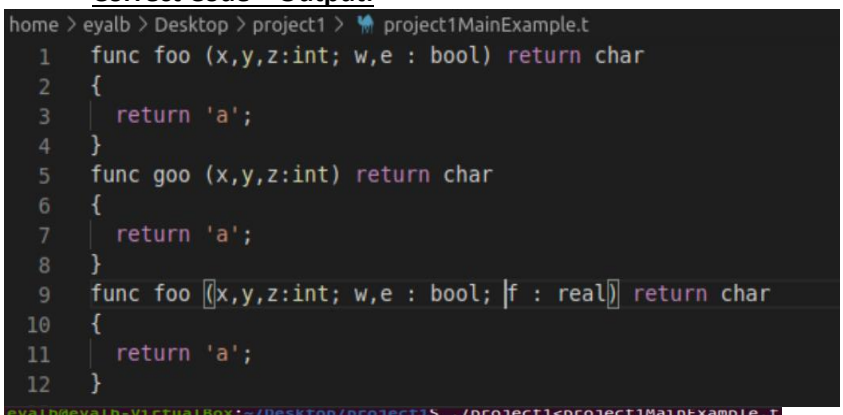
Incorrect Code + Output:

```
home > eyalb > Desktop > project1 > project1MainExample.t
1   func 2foo () return char
2   {
3     return 'a';
4   }
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
Error: syntax error at line 1
does not accept '2'
eyalb@eyalb-VirtualBox:~/Desktop/project1$
```

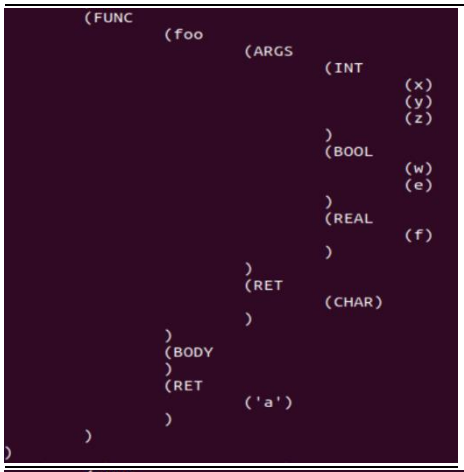
6. Parameter list:

- **Correct Code + Output:**

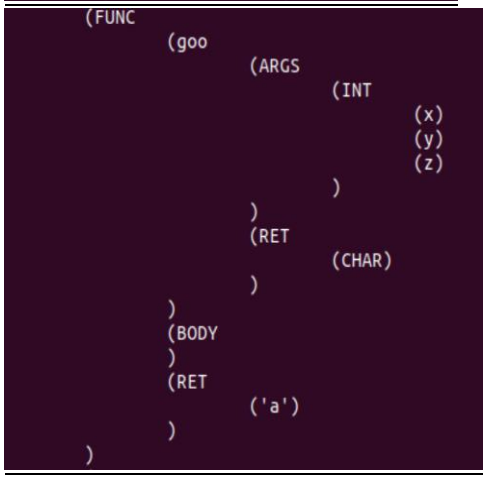


```
home > eyalb > Desktop > project1 > project1MainExample.t
1   func foo (x,y,z:int; w,e : bool) return char
2   {
3     return 'a';
4   }
5   func goo (x,y,z:int) return char
6   {
7     return 'a';
8   }
9   func foo (x,y,z:int; w,e : bool; f : real) return char
10  {
11    return 'a';
12  }
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
(CODE
        (FUNC
                (foo
                        (ARGS
                                (INT
                                        (x)
                                        (y)
                                        (z)
                                )
                                (BOOL
                                        (w)
                                        (e)
                                )
                        )
                        (RET
                                (CHAR)
                        )
                )
                (BODY
                )
                (RET
                        ('a')
                )
        )
```



```
        (FUNC
                (foo
                        (ARGS
                                (INT
                                        (x)
                                        (y)
                                        (z)
                                )
                                (BOOL
                                        (w)
                                        (e)
                                )
                                (REAL
                                        (f)
                                )
                        )
                        (RET
                                (CHAR)
                        )
                )
                (BODY
                )
                (RET
                        ('a')
                )
        )
)
```



```
        (FUNC
                (goo
                        (ARGS
                                (INT
                                        (x)
                                        (y)
                                        (z)
                                )
                        )
                        (RET
                                (CHAR)
                        )
                )
                (BODY
                )
                (RET
                        ('a')
                )
        )
```

Incorrect Code + Output:

```
home > eyalb > Desktop > project1 > project1MainExample.t
1    func foo (x y z:int) return char
2    {
3        return 'a';
4    }
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
Error: syntax error at line 1
does not accept 'y'
```

7. **Strings:**
   - **Correct Code + Output:**

```
home > eyalb > Desktop > project1 > project1.t
1   proc foo()
2   {
3       var x : char;
4       x = 's';
5       x[1+3] = y;
6       x[2+4] = 'a';
7       x = "test";
8
9   }
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1.t
(CODE
        (PROC
                (foo
                        (ARGS
                                (NONE)
                        )
                )
                (BODY
                        (CHAR
                                (x)
                        )
                        (=
                                (x)
                                ('s')
                        )
                        (=
                                (x
                                        ([]
                                                (+
                                                        (1)
                                                        (3)
                                                )
                                        )
                                )
                                (y)
                        )
                        (=
                                (x
                                        ([]
                                                (+
                                                        (2)
                                                        (4)
                                                )
                                        )
                                )
                                ('a')
                        )
                        (=
                                (x
                                        ("test")
                                )
                        )
                )
        )
)
eyalb@eyalb-VirtualBox:~/Desktop/project1$
```

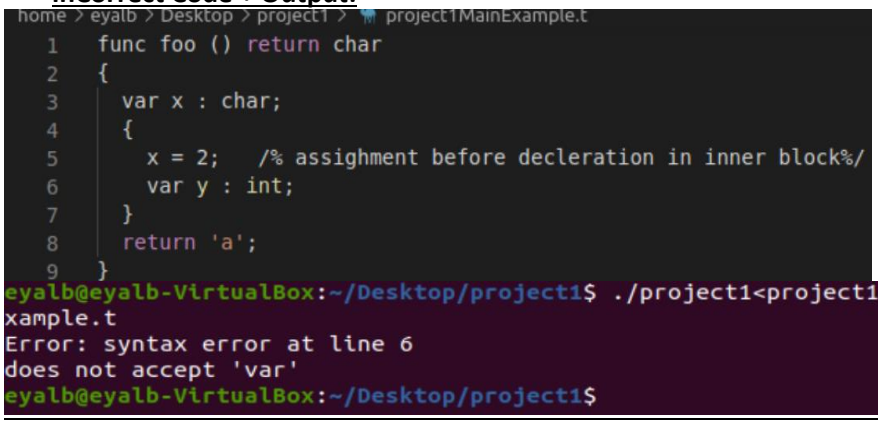
8. **Stmt & Code(decleration before stmt) :**
   - **Correct Code + Output:**

home > eyalb > Desktop > project1 > project1MainExample.t

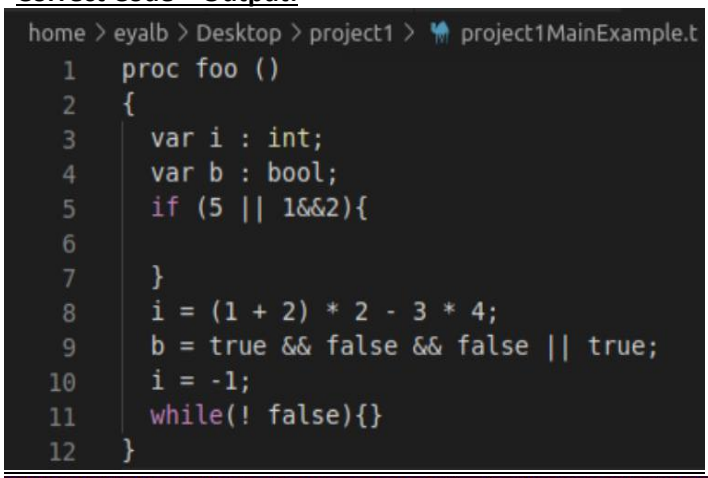
```
1   func foo () return char
2   {
3     var x : char;
4     {
5         var y : bool;
6         x = 2;
7         y = 3;
8         {
9           var z: real;
10          if(a <= v)
11          {
12              y = 3;
13          }
14          z=3;
15        }
16    }
17    return 'a';
18  }
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
(CODE
        (FUNC
                (foo
                        (ARGS
                        )
                                (NONE)
                        (RET
                                (CHAR)
                        )
                )
                (BODY
                        (CHAR
                                (x)
                        )
                        (BLOCK
                                (BOOL
                                        (y)
                                )
                        )
                        (=
                                (x)
                                (2)
                        )
                        (=
                                (y)
                                (3)
                        )
                        (BLOCK
                                (REAL
                                        (z)
                                )
                        )
                        (IF
                                (<=
                                        (a)
                                        (v)
                                )
                                (BLOCK)
                                (=
                                        (z)
                                        (3)
                                )
                        )
                )
                (RET
                        ('a')
                )
        )
)
eyalb@eyalb-VirtualBox:~/Desktop/project1$
```

- **inCorrect Code + Output:**

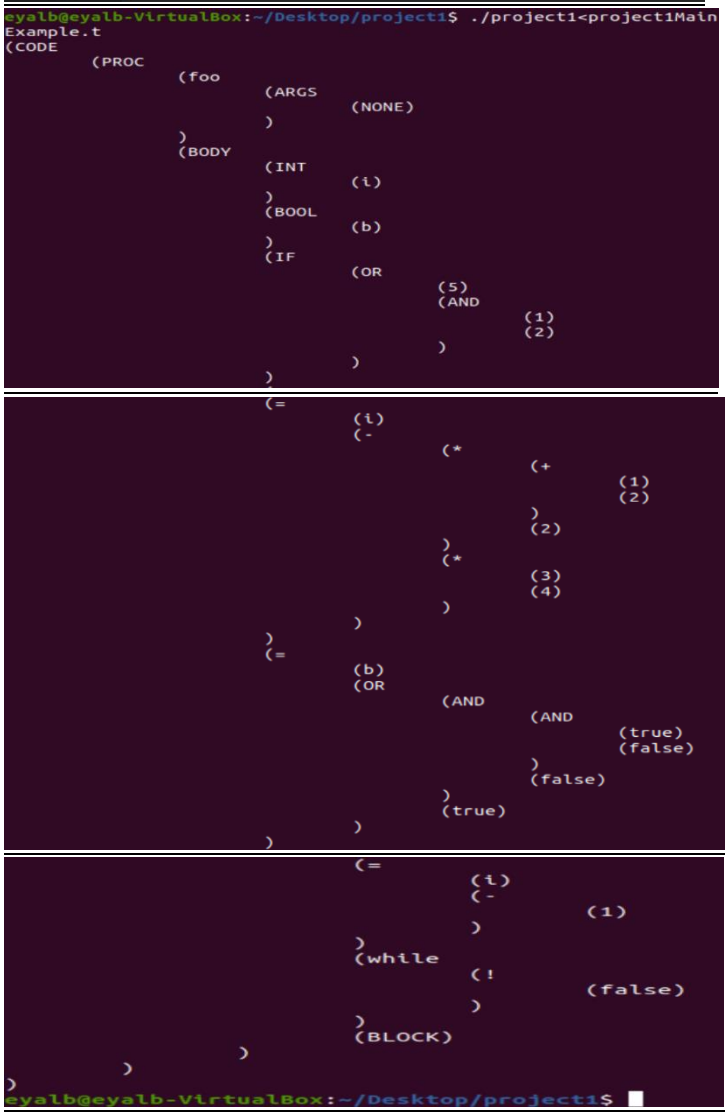


9. **Expression:**
   - **Correct Code + Output:**



```
proc foo ()
{
  var i : int;
  var b : bool;
  if (5 || 1&&2){

  }
  i = (1 + 2) * 2 - 3 * 4;
  b = true && false && false || true;
  i = -1;
  while(! false){}
}
```



```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
(CODE
        (PROC
                (foo
                        (ARGS
                                (NONE)
                        )
                )
                (BODY
                        (INT
                                (i)
                        )
                        (BOOL
                                (b)
                        )
                        (IF
                                (OR
                                        (5)
                                        (AND
                                                (1)
                                                (2)
                                        )
                                )
                        )
                        (=
                                (i)
                                (-
                                        (*
                                                (+
                                                        (1)
                                                        (2)
                                                )
                                                (2)
                                        )
                                        (*
                                                (3)
                                                (4)
                                        )
                                )
                        )
                        (=
                                (b)
                                (OR
                                        (AND
                                                (AND
                                                        (true)
                                                        (false)
                                                )
                                                (false)
                                        )
                                        (true)
                                )
                        )
                        (=
                                (i)
                                (-
                                        (1)
                                )
                        )
                        (while
                                (!
                                        (false)
                                )
                        )
                        (BLOCK)
                )
        )
)
eyalb@eyalb-VirtualBox:~/Desktop/project1$
```

10. **If, While:**
    - **Correct Code + Output:**

home > eyalb > Desktop > project1 > project1MainExample.t

```
1   proc foo ()
2   {
3     var x : int;
4     if (2 >= 5) { x = 2; }
5     while(true)
6     {
7         var i : int;
8         if(x == 1){
9             x = i;
10        }
11        while (!false){
12            x = X + 1;
13        }
14    }
15
16  }
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1Main
Example.t
(CODE
        (PROC
                (foo
                        (ARGS
                                (NONE)
                        )
                )
                (BODY
                        (INT
                                (x)
                        )
                        (IF
                                (>=
                                        (2)
                                        (5)
                                )
                        )
                        (while
                                (true)
                        )
                        (BLOCK
                                (INT
                                        (i)
                                )
                                (IF
                                        (==
                                                (x)
                                                (1)
                                        )
                                )
                                (while
                                        (!
                                                (false)
                                        )
                                )
                                (BLOCK
                                        (=
                                                (x)
                                                (+
                                                        (X)
                                                        (1)
                                                )
                                        )
                                )
                        )
                )
        )
)
eyalb@eyalb-VirtualBox:~/Desktop/project1$
```

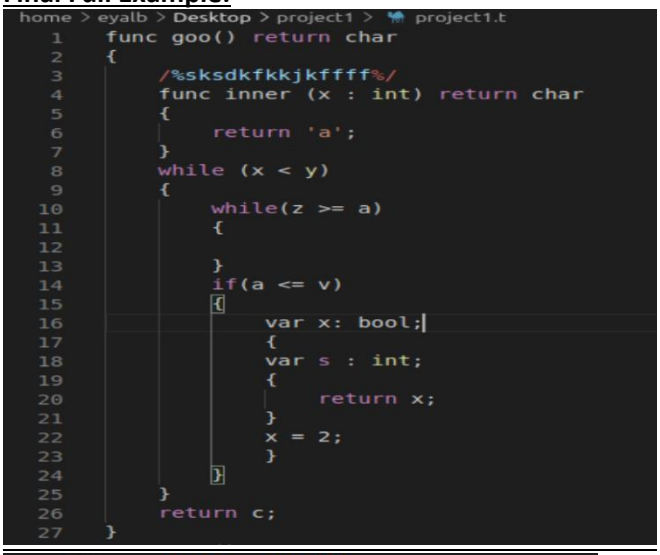
11. **Pointers:**
    - **Correct Code + Output:**

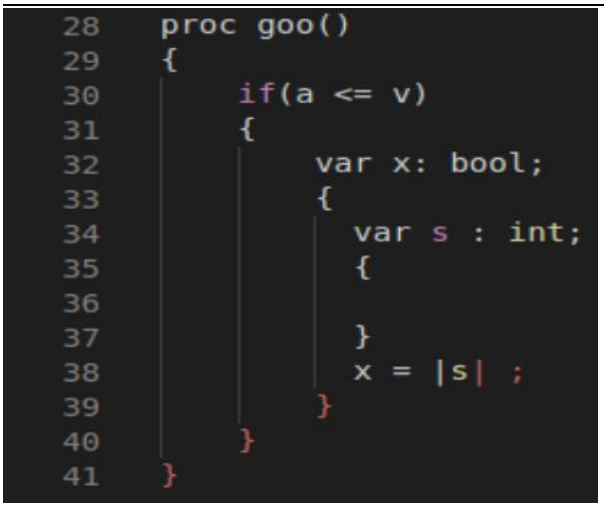
home > eyalb > Desktop > project1 > project1MainExample.t

```
1   proc foo ()
2   {
3    var x : int*;
4    var x1 : int;
5    var y : char*;
6    var y1,z : char;
7    x = &x1;
8    y = &y1;
9    z = ^y;
10   y = null;
11  }
```

```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1MainExample.t
(CODE
        (PROC
                (foo
                        (ARGS
                                (NONE)
                        )
                )
                (BODY
                        (INT_PTR
                                (x)
                        )
                        (INT
                                (x1)
                        )
                        (CHAR_PTR
                                (y)
                        )
                        (CHAR
                                (y1)
                                (z)
                        )
                        (=
                                (x)
                                (&
                                        (x1)
                                )
                        )
                        (=
                                (y)
                                (&
                                        (y1)
                                )
                        )
                        (=
                                (z)
                                (^
                                        (y)
                                )
                        )
                        (=
                                (y)
                                (null)
                        )
                )
        )
)
eyalb@eyalb-VirtualBox:~/Desktop/project1$
```

12. Final Full Example:





```
eyalb@eyalb-VirtualBox:~/Desktop/project1$ ./project1<project1.t
(CODE
        (FUNC
                (goo
                        (ARGS
                                (NONE)
                        )
                        (RET
                                (CHAR)
                        )
                )
                (BODY
                        (FUNC
                                (inner
                                        (ARGS
                                                (INT
                                                (x)
                                                )
                                        )
                                        (RET
                                                (CHAR)
                                        )
                                )
                                (BODY
                                )
                                (RET
                                        ('a')
                                )
                        )
                        (while
                                (<
                                        (x)
                                        (y)
                                )
                                (BLOCK)
                                (IF
                                        (<=
                                                (a)
                                                (v)
                                        )
                                        (BLOCK
                                                (BOOL
                                                (x)
                                                )
                                        )
                                        (BLOCK
                                                (INT
                                                (s)
                                                )
                                        )
                                        (BLOCK
                                        )
                                        (=
                                                (x)
                                                (2)
                                        )
                                )
                        )
                )
                (RET
                        (c)
                )
        )
        (PROC
                (goo
                        (ARGS
                                (NONE)
                        )
                )
                (BODY
                        (IF
                                (<=
                                        (a)
                                        (v)
                                )
                        )
                        (BLOCK
                                (BOOL
                                        (x)
                                )
                                (BLOCK
                                        (INT
                                                (s)
                                        )
                                        (BLOCK)
                                        (=
                                                (x)
                                                (STR_LEN
                                                (s)
                                                )
                                        )
                                )
                        )
                )
        )
)
```