

פרוייקט מבוא לקומפילציה- חלק 1דוגמאות הרצה: Correct & InCorrect:1. Lecturer Code Example + Output:• Code:

```

1 function void foo(int x,y;real f){
2     if (x < y) {
3         x = x + f;
4     }
5     else {
6         y = x + y + z;
7         x = f * 2;
8         x = f;
9     }
10 }
11 function char goo() {
12     return 'a';
13 }

```

```

asafrdt@asafrdt-VirtualBox:~/Documents/Project/projects ./test < project.t
(CODE
  (FUNCTION
    (foo)
    (ARGS
      (INT
        (x)
        (y)
        (z)
      )
      (REAL
        (f)
      )
    )
    (TYPE VOID)
    (BODY
      (IF-ELSE
        (>
          (x)
          (y)
        )
        (BLOCK
          (=
            (x)
            (+
              (x)
              (f)
            )
          )
        )
        (BLOCK
          (=
            (y)
            (+
              (x)
              (z)
            )
          )
          (=
            (f)
            (*
              (f)
              (2)
            )
          )
          (=
            (z)
            (f)
          )
        )
      )
    )
  )
  (FUNCTION
    (goo)
    (ARGS)
    (TYPE CHAR)
    (BODY)
    (RET
      ('a')
    )
  )
)

```

## 2. RealNumbers - Correct:

- Code + Output:

```
1 function void RealNumbers(){
2     var int x;
3     x= 3.14;
4     x= -34.9988;
5     x=45.3E-23;
6     x=-4E+2101;
7     X=+.2E4;
8     X=4.e-67;
9 }
```

```
asafrdt@asafrdt-VirtualBox:~/Documents/Projects$ ./test < project.t
(CODE
  (FUNCTION
    (RealNumbers)
    (ARGS)
    (TYPE VOID)
    (BODY
      (INT
        )
        (=
          (x)
          (3.14)
        )
        (=
          (x)
          (-
            (34.9988)
          )
        )
        (=
          (x)
          (45.3E-23)
        )
        (=
          (x)
          (-4E+2101)
        )
        (=
          (X)
          (+.2E4)
        )
        (=
          (X)
          (4.e-67)
        )
      )
    )
  )
)
```

### 3. Comment:

- Correct Code + Output:

```
1  function int foo(){
2      /* this is my comment */
3      return 0;
4  }
```

asafrdt@asafrdt-VirtualBox:~/Documents/Projects\$ ./test < project.t

```
(CODE
  (FUNCTION
    (foo)
    (ARGS)
    (TYPE INT)
    (BODY)
    (RET (0))
  )
)
```

- incorrect Code + Output:

```
1  function int foo(){
2      // this is my comment
3      return 0;
4  }
```

asafrdt@asafrdt-VirtualBox:~/Documents/Project\$ ./test < project.t

```
Error: syntax error at line 2
does not accept '/'
```

#### 4. Functions/Producers:

- Correct Code + Output:

```
1 function int foo(int i,j,k){
2     function bool fee (int l,m,n; real x,y) {
3         return true;
4     }
5     return 0;
6 }
7 function void goo(int i,j,k)
8 {
9     function bool fee (int l,m,n)
10    {
11        return true;
12    }
13    fee(x,y,z);
14 }
```

```
asafrdt@asafrdt-VirtualBox:~/Documents/Project$ ./test < project.t
(CODE
  (FUNCTION
    (foo)
    (ARGS
      (INT
        (i)
        (j)
        (k)
      )
    )
    (TYPE INT)
    (BODY
      (FUNCTION
        (fee)
        (ARGS
          (INT
            (l)
            (m)
            (n)
          )
          (REAL
            (x)
            (y)
          )
        )
        (TYPE BOOL)
        (BODY)
        (RET
          (true)
        )
      )
    )
    (RET
      (true)
    )
  )
  (RET
    (0)
  )
)
(FUNCTION
  (goo)
  (ARGS
    (INT
      (i)
      (j)
      (k)
    )
  )
  (TYPE VOID)
  (BODY
    (FUNCTION
      (fee)
      (ARGS
        (INT
          (l)
          (m)
          (n)
        )
      )
      (TYPE BOOL)
      (BODY)
      (RET
        (true)
      )
    )
    (fee
      (x)
      (y)
      (z)
    )
  )
)
)
```

## 5. Function Identifier:

- Correct Code + Output:

```
1 function int foo() { return 0;}
2 function int foo_2() {return 0;}
3 function void f234() {}
```

```
asafrdt@asafrdt-VirtualBox:~/Documents/Project$ ./test < project.t
(CODE
  (FUNCTION
    (foo)
    (ARGS)
    (TYPE INT)
    (BODY)
    (RET (0))
  )
  (FUNCTION
    (foo_2)
    (ARGS)
    (TYPE INT)
    (BODY)
    (RET (0))
  )
  (FUNCTION
    (f234)
    (ARGS)
    (TYPE VOID)
    (BODY)
  )
)
```

- Incorrect Code + Output:

```
1 function int 9foo() { return 0;}
2 function int _rip() {return 0;}
3
```

```
asafrdt@asafrdt-VirtualBox:~/Documents/Project$ ./test < project.t
Error: syntax error at line 1
does not accept '9'
```

## 6. Parameter list:

- Correct Code + Output:

```
1 function int foo (int i,j,k; bool l,m,n) { return 0;}
2 function void fee(int a,b) {}
3 function int fei (int a,b,c; bool d,e,f; int g,h) {return 0;}
4
```

```
(CODE
(FUNCTION
  (foo)
  (ARGS
    (INT
      (i)
      (j)
      (k)
    )
    (BOOL
      (l)
      (m)
      (n)
    )
  )
  (TYPE INT)
  (BODY)
  (RET (0))
)
(FUNCTION
  (fee)
  (ARGS
    (INT
      (a)
      (b)
    )
  )
  (TYPE VOID)
  (BODY)
)
(FUNCTION
  (fei)
  (ARGS
    (INT
      (a)
      (b)
      (c)
    )
    (BOOL
      (d)
      (e)
      (f)
    )
    (INT
      (g)
      (h)
    )
  )
  (TYPE INT)
  (BODY)
  (RET (0))
)
)
```

- Incorrect Code + Output:

```
1 function void foo(i,j,k) {}
2 function void foo (int i j k) {}
```

```
asafrdt@asafrdt-VirtualBox:~/Documents/Projects$ ./test < project.t
Error: syntax error at line 1
does not accept 'i'
```

## 7. Body:

- Correct Code + Output:

```
function int foo (int i,j,k)
{
    function int square(int t)
    {
        var int temp;
        temp = t * t;
        return 0;
    }
    var int total;
    total =1;
    return total;
}
```

```
asafrdt@asafrdt-VirtualBox:~/Documents/Projects$ ./test < project.t
(CODE
  (FUNCTION
    (foo)
    (ARGS
      (INT
        (i)
        (j)
        (k)
      )
    )
    (TYPE INT)
    (BODY
      (FUNCTION
        (square)
        (ARGS
          (INT
            (t)
          )
        )
        (TYPE INT)
        (BODY
          (INT
            (temp)
          )
          (=
            (temp)
            (*
              (t)
              (t)
            )
          )
        )
        (RET
          (0)
        )
      )
      (INT
        (total)
      )
      (=
        (total)
        (1)
      )
    )
    (RET
      (total)
    )
  )
)
```

## 8. Strings:

- Correct Code + Output:

```
1  function void foo() {  
2  var char c;  
3  var int i;  
4  c='e';  
5  a[19] = 'f';  
6  a[4+2] = 'g';  
7  b=a;  
8  b[3]=c;  
9  a="test";  
10 i=|b|;  
11 }
```

```
asafrrdt@asafrrdt-VirtualBox:~/Documents/Project$ ./test < project.t  
(CODE  
  (FUNCTION  
    (foo)  
    (ARGS)  
    (TYPE VOID)  
    (BODY  
      (CHAR  
        ) (c)  
      )  
      (INT  
        ) (i)  
      )  
      (= (c)  
        ('e'))  
      )  
      (= (a  
        ([1]  
        (19)  
        )  
      )  
      (= (a  
        ([1]  
        (+  
          (4)  
          (2)  
        )  
      )  
      )  
      (= (b)  
        (a)  
      )  
      (= (b  
        ([1]  
        (3)  
        )  
      )  
      (= (a  
        ("test")  
      )  
      (= (i  
        (STR_LEN  
        (b)  
      )  
    )  
  )  
)
```



## 9. Stmt & Code :

- Correct Code + Output:

```
1 function int foo()
2 {
3     var int x;
4     {
5         var int y;
6         x=1;
7         y=2;
8         {
9             x=2;
10        }
11        y=3;
12    }
13    return 0;
14 }
15 function int foo(){
16 {
17     {}
18 }
19 return 0;
20 }
```

```
asafrdt@asafrdt-VirtualBox:~/Documents/Project/project$ ./test < project.t
(CODE
  (FUNCTION
    (foo)
    (ARGS)
    (TYPE INT)
    (BODY
      (INT (x)
        (BLOCK
          (INT (y)
            (=
              (x)
              (1)
            )
            (=
              (y)
              (2)
            )
          )
          (BLOCK
            (=
              (x)
              (2)
            )
          )
          (=
            (y)
            (3)
          )
        )
      )
    )
  )
  (RET (0))
)
(FUNCTION
  (foo)
  (ARGS)
  (TYPE INT)
  (BODY
    (BLOCK
      (BLOCK)
    )
  )
  (RET (0))
)
)
```

- inCorrect Code + Output:

```
function int foo()
{
    var int x;
    {
        x=1;
        var int y;
    }
    return 0;
}
```

```
asafrdt@asafrdt-VirtualBox:~/Documents/Projects$ ./test < project.t
Error: syntax error at line 6
does not accept 'var'
```

## 10. Expression:

- Correct Code + Output:

```
1  function void foo()
2  {
3      var real x;
4      var bool y;
5      if (3||2&&3) {}
6      x=(3+2) / 3 - 5 * 2;
7      y=true && false || false;
8      x=5;
9      x=3.234;
10     y = true;
11     x=-5;
12     if (!false){}
13     if (a==b){}
14
15 }
```

```
asafrrdt@asafrrdt-VirtualBox:~/Documents/Project$ ./test < project.t
(CODE
  (FUNCTION
    (foo)
    (ARGS)
    (TYPE VOID)
    (BODY
      (REAL
        (x)
      )
      (BOOL
        (y)
      )
      (IF
        (OR
          (3)
          (AND
            (2)
            (3)
          )
        )
      )
      (=
        (x)
        (-
          (/
            (+
              (3)
              (2)
            )
            (3)
          )
          (*
            (5)
            (2)
          )
        )
      )
      (=
        (y)
        (OR
          (AND
            (true)
            (false)
          )
          (false)
        )
      )
      (=
        (x)
        (5)
      )
      (=
        (x)
        (3.234)
      )
      (=
        (y)
        (true)
      )
      (=
        (x)
        (-
          (5)
        )
      )
      (IF
        (!
          (false)
        )
      )
      (IF
        (==
          (a)
          (b)
        )
      )
    )
  )
)
```

## 11. If, Do, While, For:

- Correct Code + Output:

```
1  function void foo(){
2  if (3>2){x=5;}
3  if (true) { j=3;} else {k=4;}
4  while (true) {i=2; k=1+j;}
5  if (true) i=5;
6  if (true) { j=3; } else x=x-1;
7  while (false) x=x+1;
8  for (i=0; i<10; i=i + 2) { a = a + i;}
9  do {a = a + i; i= i + 1;} while (i<=10);
10 }
```

```
(CODE
(FUNCTION
  (foo)
  (ARGS)
  (TYPE VOID)
  (BODY
    (IF
      (>
        (3)
        (2)
      )
    )
    (IF-ELSE
      (true)
      (BLOCK
        (=
          (i)
          (3)
        )
      )
      (BLOCK
        (=
          (k)
          (4)
        )
      )
    )
    (while
      (true)
    )
    (IF
      (true)
    )
    (IF-ELSE
      (true)
      (BLOCK
        (=
          (j)
          (3)
        )
      )
    )
    (x)
    (-
      (x)
      (1)
    )
  )
  (while
    (false)
  )
  (for
    (INITS
      (=
        (i)
        (0)
      )
    )
    (EXPR
      (<
        (i)
        (10)
      )
    )
    (UPDATE
      (=
        (i)
        (+
          (i)
          (1)
        )
      )
    )
    (BLOCK
      (=
        (a)
        (+
          (a)
          (1)
        )
      )
    )
  )
)
```

## 12. Pointers:

- Correct Code + Output:

```
1  function void foo(){  
2  var int x;  
3  var int* y;  
4  var char* x;  
5  var char z;  
6  string y[10];  
7  x=5;  
8  y=&x;  
9  x=6;  
10 y= "foobar";  
11 x= &y[5];  
12 z=*(x-5);  
13 y="bartfoo";  
14 }
```

```
asafrdt@asafrdt-VirtualBox:~/Documents/Project$ ./test < project.t  
(CODE  
  (FUNCTION  
    (foo)  
    (ARGS)  
    (TYPE VOID)  
    (BODY  
      (INT (x)  
      )  
      (INT_PTR (y)  
      )  
      (CHAR_PTR (x)  
      )  
      (CHAR (z)  
      )  
      (STRING (y  
                ([])  
                (10)  
      )  
      (= (x)  
        (5)  
      )  
      (= (y)  
        (& (x)  
      )  
      (= (x)  
        (6)  
      )  
      (= (y  
        ("foobar")  
      )  
      (= (x)  
        (& (y  
            ([]) (5)  
          )  
      )  
      (= (z)  
        (* (- (x)  
              (5)  
            )  
      )  
      (= (y  
        ("bartfoo")  
      )  
    )  
  )  
)
```